Use these links to rapidly review the document
TABLE OF CONTENTS
MORPHIC HOLDING, INC. INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Table of Contents

As confidentially submitted to the Securities and Exchange Commission on April 12, 2019. This draft registration statement has not been publicly filed with the Securities and Exchange Commission and all information herein remains confidential.

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM S-1
REGISTRATION STATEMENT
Under
The Securities Act of 1933

MORPHIC HOLDING, INC.
(Exact name of registrant as specified in its charter)

Delaware	**2834**	**47-3878772**
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

35 Gatehouse Drive, A2
Waltham, Massachusetts 02451
(781) 996-0955
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Praveen P. Tipirneni, M.D.
Chief Executive Officer
Morphic Holding, Inc.
35 Gatehouse Drive, A2
Waltham, Massachusetts 02451
(781) 996-0955
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Effie Toshav, Esq. **Robert A. Freedman, Esq.** **Julia Forbess, Esq.** **Fenwick & West LLP** **555 California Street** **San Francisco, California 94104** **(415) 875-2300**	**William D. DeVaul, Esq.** **Morphic Holding, Inc.** **35 Gatehouse Drive, A2** **Waltham, Massachusetts 02451** **(781) 996-0955**	**Divakar Gupta, Esq.** **Richard Segal, Esq.** **Marc Recht, Esq.** **Cooley LLP** **500 Boylston Street, 14th Floor** **Boston, Massachusetts 02116** **(617) 937-2300**

Approximate date of commencement of proposed sale to the public:
As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box. o

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration number of the earlier effective registration statement for the same offering. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer" "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer o	Accelerated filer o	Non-accelerated filer ☒	Smaller reporting company ☒ Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. o

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	**Proposed Maximum Aggregate Offering Price(1)(2)**	**Amount of Registration Fee**
Common Stock, par value $0.0001 per share	$	$

(1) The proposed maximum aggregate offering price includes the offering price of additional shares that the underwriters have the option to purchase.

(2) Estimated solely for purposes of calculating the registration fee in accordance with Rule 457(o) under the Securities Act of 1933, as amended.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

Table of Contents

SUBJECT TO COMPLETION, DATED , 2019

PRELIMINARY PROSPECTUS

Shares

Morphic Holding, Inc.

Common Stock

We are offering shares of our common stock. This is our initial public offering and no public market currently exists for our common stock. We expect the initial public offering price to be between $ and $ per share. We intend to apply to have our common stock approved for listing on The Nasdaq Global Market under the symbol "MORF."

We are an "emerging growth company" as defined in Section 2(a) of the Securities Act of 1933, as amended, and will be subject to reduced public company reporting requirements. See "Prospectus Summary — Implications of Being an Emerging Growth Company and a Smaller Reporting Company."

Investing in our common stock involves a high degree of risk. Please read "Risk Factors" beginning on page 12 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	PER SHARE	TOTAL
Initial Public Offering Price	$	$
Underwriting Discounts and Commissions[(1)]	$	$
Proceeds to Morphic Holding, Inc., before expenses	$	$

(1) See "Underwriting" on page 163 for additional information regarding underwriting compensation.

Delivery of the shares of common stock is expected to be made on or about , 2019. We have granted the underwriters an option for a period of 30 days from the date of this prospectus to purchase an additional shares of our common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be $ million, and the total proceeds to us, before expenses, will be $ million.

Joint Book-Running Managers

Jefferies **Cowen** **BMO Capital Markets** **Wells Fargo Securities**

Prospectus dated , 2019

TABLE OF CONTENTS

We have not, and the underwriters have not, authorized anyone to provide any information or to make any representations other than those contained in this prospectus or in any free writing prospectuses we have prepared. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus or in any applicable free writing prospectus is current only as of its date, regardless of its time of delivery or any sale of shares of our common stock.

Through and including , 2019 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This delivery is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

For investors outside of the United States: We have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than the United States. Persons outside of the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside of the United States.

TRADEMARKS

"Morphic," "Morphic Therapeutic," the Morphic logo, and all product names are our common law trademarks. All other service marks, trademarks and trade names appearing in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and tradenames referred to in this prospectus appear without the ® and ™ symbols, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights, or the right of the applicable licensor to these trademarks and tradenames.

MARKET AND INDUSTRY DATA

This prospectus contains estimates and other statistical data made by independent parties and by us relating to our industry and the markets in which we operate, including our general expectations and market position, market opportunity, the incidence of certain medical conditions and other industry data. These data, to the extent they contain estimates or projections, involve a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates or projections. Industry publications and other reports we have obtained from independent parties generally state that the data contained in these publications or other reports have been obtained in good faith or from sources considered to be reliable, but they do not guarantee the accuracy or completeness of such data. The industry in which we operate is subject to risks and uncertainties due to a variety of factors, including those described in the section entitled "Risk Factors." These and other factors could cause results to differ materially from those expressed in these publications and reports.

PROSPECTUS SUMMARY

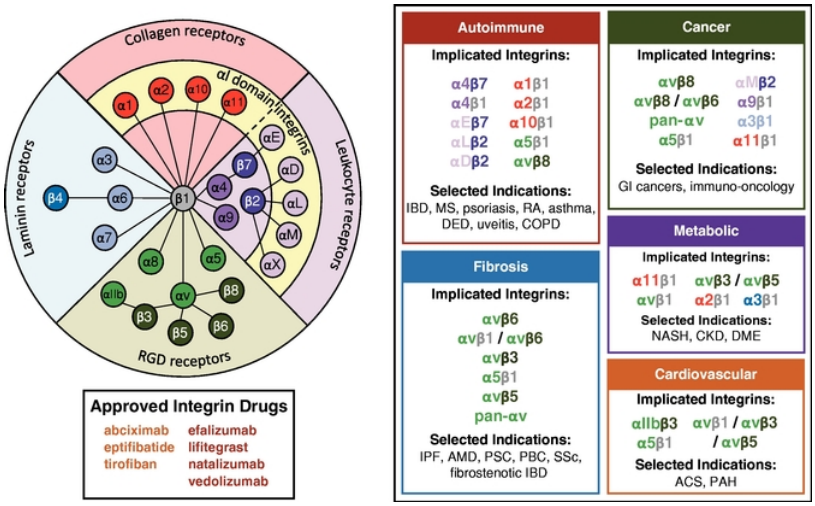
This summary highlights selected information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should carefully read this entire prospectus, including our financial statements and the related notes thereto and the information set forth under the sections entitled "Risk Factors," "Selected Consolidated Financial Data" and "Management's Discussion and Analysis of Financial Condition and Results of Operations," in each case included in this prospectus. Some of the statements in this prospectus constitute forward-looking statements that involve risks and uncertainties. See the section entitled "Special Note Regarding Forward-Looking Statements." Unless the context otherwise requires, we use the terms "Morphic," "company," "we," "us" and "our" in this prospectus to refer to Morphic Holding, Inc.

Overview

We are a biopharmaceutical company applying our proprietary insights into integrins to discover and develop a pipeline of potentially first-in-class oral small-molecule integrin therapeutics. Integrins are validated targets with multiple approved injectable blockbuster drugs for the treatment of serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer. Despite significant unsuccessful efforts, we believe tremendous untapped potential remains for us to develop oral integrin therapies. We created the Morphic integrin technology platform, or MInT Platform, by leveraging our unique understanding of integrin structure and biology to develop novel product candidates designed to achieve the potency, high selectivity and pharmaceutical properties required for oral administration. We are advancing our lead wholly-owned program for a_4b_7 specific integrin inhibitors affecting inflammation into clinical development for the treatment of inflammatory bowel disease, or IBD. We are also developing our most advanced product candidate, MORF-720, a selective oral a_vb_6 specific integrin inhibitor into clinical development for the treatment of idiopathic pulmonary fibrosis, or IPF, in collaboration with AbbVie Inc., or AbbVie. We intend to advance our a_4b_7 program and MORF-720 toward Investigational New Drug applications, or INDs, by the middle of 2020 and as early as the end of 2019, respectively. Beyond our current targets, we are using our MInT Platform to create a broad pipeline of programs across a variety of therapeutic areas, all of which aim to harness the potential of inhibition or activation.

Our Focus — Integrin Receptors

Integrins are the only receptors in the human body that use both intracellular and extracellular ligands to transmit signals both from inside of the cell to the outside of the cell and from the outside of the cell to the inside of the cell. This bi-directional signaling ability allows integrins to affect virtually every aspect of cell and organ homeostasis. Consequently, the dysregulation of integrin signaling is associated with many human diseases including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.



Integrins exist as paired combinations of 18 a and eight b subunits resulting in 24 known heterodimers. These pairings give integrins their unique abilities to recognize their ligands and modulate cellular function in specific ways. Integrins are subdivided into those on leukocytes, and those that recognize RGD peptide, collagen and laminin ligands. They regulate numerous aspects of cell biology and physiology including: leukocyte trafficking, activation of platelets and leukocytes, activation of growth factors such as TGF-b, cell adhesion to the basement membrane and extracellular matrix, and retention or adhesion strengthening of cells within tissues. This diverse set of functions makes them actionable targets across a broad range of human diseases based on preclinical modeling or clinical validation.

We initially focused on developing product candidates with validated targets for areas of high unmet medical needs including:

- a_4b_7 and a_4b_1, which are validated as targets for autoimmune diseases; their mechanism of action and the benefits and risks of their inhibition are well understood; and
- certain a_v integrins that have a preclinically well-characterized mechanism of action through the activation of TGF-b, a clinically important anti-inflammatory cytokine dysregulated in many human pathologies.

Our Platform and Approach

We believe that our discovery platform enables us to be the only company working across the entire 24-member integrin family. Our MInT Platform consists of three unique capabilities:

- Proprietary ability to determine integrin structures;
- Tunable product candidate design engine; and
- Biology and disease translation capability.

Our novel MInT Platform is rooted in our structural biology capability, based on deep insights into control of complex integrin conformational states. Dr. Timothy A. Springer of Harvard Medical School, our co-founder and a world-renowned immunologist and biophysicist who discovered integrins, characterized an initial set

of small molecules to lock specific integrin conformations and we have used and advanced this knowledge to optimize the pharmacology of our oral integrins. Today, pursuant to an exclusive license from the Children's Medical Center Corporation, our MInT Platform is powered by these initial insights, together with our proprietary knowledge of integrin conformations, affinity regulation and dynamics. We design our compounds to recognize integrin conformational states that are physiologic and dysregulated in disease. Binding of our compounds to integrins promotes the integrin to adopt a structure that is characteristic of healthy tissue and stops disease-specific integrin signaling. We believe past attempts to develop small molecules targeting integrins have in part failed due to a lack of sufficient understanding of these conformational changes and their impact on disease. We believe our MInT Platform has positioned us to apply our deep understanding of the biologic underpinnings of diseases linked to integrin dysfunction to develop a pipeline of novel integrin therapeutics.

Our Lead Product Candidates

The following table summarizes key information about our product candidates and programs:

	Name	Integrin Target	Modality	Indication(s)	Stage of Development	Product Rights
Leukocyte	**MRβ7 #1** **MRβ7 #2**	$\alpha_4\beta_7$	Oral Inhibitor	·Ulcerative Colitis ·Crohn's Disease ·Eosinophilic Esophagitis	·IND-enabling studies ·Intended IND application submission by the middle of 2020	Morphic
RGD	MORF-720	$\alpha v\beta_6$	Oral Inhibitor	Idiopathic Pulmonary Fibrosis	·IND-enabling studies ·Intended IND application submission as early as the end of 2019	AbbVie
		$\alpha v\beta_6$	Oral Inhibitor	Liver Diseases	Discovery	Morphic AbbVie
		αvβ1	Oral Inhibitor	Fibrosis	Discovery	Morphic
		TGF-β Activation	Oral Inhibitor	Gastrointestinal cancers	Discovery	Morphic
		TGF-β Activation	Oral Inhibitor	Fibrosis	Discovery	AbbVie
Other		Undisclosed targets, including αI Domain Integrins	Oral Modulator	Undisclosed	Discovery	Janssen

Our lead wholly-owned program focuses on the advancement of an oral therapy targeting the clinically validated a_4b_7 integrin receptor for the treatment of IBD, or more specifically, ulcerative colitis and Crohn's disease. We believe that there is a significant unmet need for an oral therapy with the safety and efficacy of a biologic such as vedolizumab. We have identified potent and selective oral small molecules targeting a_4b_7 and expect to submit an IND in the middle of 2020 for our a_4b_7 program.

- § We are progressing our most advanced product candidate, MORF-720, a selective oral first-in-class a_vb_6 specific integrin inhibitor, into clinical development for the treatment of IPF, a disease with high unmet medical need. As part of our collaboration with AbbVie, they have an option to license this program at IND for future development and commercialization, and if this option is exercised, we are entitled to a license fee of $20.0 million, as well as potential milestone payments and royalties. We expect an IND application to be submitted for our a_vb_6 product candidate for the treatment of IPF as early as the end of 2019.

Our Strategy

Our goal is to utilize our MInT Platform to discover and develop potentially first-in-class oral small-molecule integrin therapeutics. We believe our platform has the potential to transform the treatment paradigm for patients suffering from a broad range of serious chronic diseases. The key tenets of our business strategy to achieve this goal include:

- § establishing orally available integrin modulators as a new treatment for serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer;
- § leveraging our proprietary MInT Platform and knowledge base to grow our pipeline of novel integrin therapeutics;
- § continuing to drive innovation across our MInT Platform; and
- § independently commercializing our products, if approved, in indications and geographies where we believe we can realize maximum value.

We have assembled an experienced management team, board of directors and scientific advisory board with specialized expertise in integrin therapies. They collectively bring extensive experience in discovering, developing and commercializing therapeutics, having worked at companies such as Biogen Inc., Cubist Pharmaceuticals, Inc., Gilead Sciences, Inc., Merck & Co. and Pfizer Inc.

Since our inception, we have raised $248 million through equity financings and collaborations. Our investors include AbbVie Ventures, EcoR1 Capital Fund, Invus, Novo Holdings A/S, Omega Funds, Pfizer Ventures, Polaris Partners, Schrödinger, Inc., ShangPharma Investment Group Limited, S.R. One, Limited, Dr. Timothy A. Springer, and our collaborators are AbbVie, Janssen and Schrödinger.

Risks Affecting Our Business

Our business is subject to a number of risks, including risks that may prevent us from achieving our business objectives or may adversely affect our business, financial condition, results of operations, cash flows and prospects that you should consider before making a decision to invest in our common stock. These risks are discussed more fully in the section titled "Risk Factors" beginning on page 8 of this prospectus, and include the following:

- § We are a preclinical stage biopharmaceutical company with a limited operating history and no products in clinical development or approved for commercial sale. We have a history of significant losses and expect to continue to incur significant losses for the foreseeable future.
- § We have never generated revenue from product sales and may never be profitable.
- § Even if we complete this offering, we will need substantial additional funds to advance development of our product candidates, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit or terminate our product development programs, commercialization efforts or other operations.
- § Our product candidates are in early stages of development and may fail in development or suffer delays that materially and adversely affect their commercial viability. If we or our collaborators are unable to complete development of, or commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.
- § Our business is heavily dependent on the success of our a_4b_7 program and our most advanced product candidate, MORF-720. Existing and future preclinical studies and clinical trials of these product candidates may not be successful, and if we are unable to commercialize these product candidates or experience significant delays in doing so, our business will be materially harmed.

- Preclinical and clinical development involve a lengthy and expensive process, with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our current product candidates or any future product candidates.
- We have entered into collaborations with AbbVie and Janssen and may, in the future, seek to enter into collaborations with other third parties for the discovery, development and commercialization of our product candidates. If our collaborators cease development efforts under our collaboration agreements, or if any of those agreements are terminated, these collaborations may fail to lead to commercial products and we may never receive milestone payments or future royalties under these agreements.
- We expect to rely on third parties to conduct certain of our preclinical studies or clinical trials. If those third parties do not perform as contractually required, fail to satisfy legal or regulatory requirements, miss expected deadlines or terminate the relationship, our development program could be delayed with potentially material and adverse effects on our business, financial condition, results of operations and prospects.
- We face competition from entities that have developed or may develop product candidates for autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer, including companies developing novel treatments and technology platforms. If these companies develop technologies or product candidates more rapidly than we do or their technologies are more effective, our ability to develop and successfully commercialize product candidates may be adversely affected.
- Any inability to attract and retain qualified key management and technical personnel would impair our ability to implement our business plan.
- If we are not able to obtain, maintain, and enforce patent protection for our technologies or product candidates, development and commercialization of our product candidates may be adversely affected.

Implications of Being an Emerging Growth Company and a Smaller Reporting Company

As a company with less than $1.07 billion in revenue during our last fiscal year, we qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act. An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- being permitted to present only two years of audited financial statements and only two years of related Management's Discussion and Analysis of Financial Condition and Results of Operations in this prospectus;
- not being required to comply with the auditor attestation requirements on the effectiveness of our internal controls over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements (auditor discussion and analysis);
- reduced disclosure obligations regarding executive compensation arrangements; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We may use these provisions until the last day of our fiscal year in which the fifth anniversary of the completion of this offering occurs. However, if certain events occur prior to the end of such five-year period, including if we become a "large accelerated filer," our annual gross revenues exceed $1.07 billion or we issue more than $1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period.

We have elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus is a part and may elect to take advantage of other reduced reporting requirements in future filings. As a result, the information that we provide to our stockholders may be different than you might receive from other public reporting companies in which you hold equity interests.

The JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards, until those standards apply to private companies. We have elected to take advantage of the benefits of this extended transition period and, therefore, we will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. Our financial statements may therefore not be comparable to those of companies that comply with such new or revised accounting standards. Until the date that we are no longer an emerging growth company or affirmatively and irrevocably opt out of the exemption provided by Section 7(a)(2)(B) of the Securities Act of 1933, as amended, upon issuance of a new or revised accounting standard that applies to our financial statements and that has a different effective date for public and private companies, we will disclose the date on which we will adopt the recently issued accounting standard.

We are also a "smaller reporting company," meaning that the market value of our stock held by non-affiliates plus the proposed aggregate amount of gross proceeds to us as a result of this offering is less than $700.0 million and our annual revenue is less than $100.0 million during the most recently completed fiscal year. We may continue to be a smaller reporting company after this offering if either (i) the market value of our stock held by non-affiliates is less than $250.0 million or (ii) our annual revenue is less than $100.0 million during the most recently completed fiscal year and the market value of our stock held by non-affiliates is less than $700.0 million. If we are a smaller reporting company at the time we cease to be an emerging growth company, we may continue to rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. Specifically, as a smaller reporting company we may choose to present only the two most recent fiscal years of audited financial statements in our Annual Report on Form 10-K and, similar to emerging growth companies, smaller reporting companies have reduced disclosure obligations regarding executive compensation.

Corporate Information

We were formed under the laws of the State of Delaware in August 2014 under the name Integrin Rock, LLC. We subsequently changed our name to Morphic Rock Holding, LLC in October 2014 and then to Morphic Holding, LLC in June 2016, and we subsequently converted to a corporation under the name Morphic Holding, Inc. in December 2018. Our principal executive offices are located at 35 Gatehouse Drive, A2, Waltham, MA 02451, and our telephone number is (781) 996-0955. Our website address is www.morphictx.com. The information contained on, or that can be accessed through, our website is not part of, and is not incorporated by reference into, this prospectus. Investors should not rely on any such information in deciding whether to purchase our common stock.

THE OFFERING

Common stock offered	shares
Option to purchase additional shares	We have granted the underwriters an option, exercisable for 30 days after the date of this prospectus, to purchase up to an additional shares from us.
Common stock to be outstanding immediately after this offering	shares (or shares if the underwriters exercise their option to purchase additional shares in full).
Use of proceeds	We estimate that the net proceeds from this offering will be approximately $ million (or approximately $ million if the underwriters exercise their option to purchase additional shares in full), based upon the assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses. We intend to use the net proceeds from this offering to fund the further development of our oral small-molecule integrin therapeutics, the further development of our platform to broaden our pipeline of product candidates and for working capital and general corporate purposes. See the section entitled "Use of Proceeds."
Risk factors	You should read the section entitled "Risk Factors" in this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
Proposed Nasdaq Global Market symbol	"MORF"

The number of shares of our common stock to be outstanding after this offering is based on 137,593,380 shares of our common stock outstanding as of December 31, 2018, and gives effect to the automatic conversion of all 122,513,962 shares of our outstanding convertible preferred stock as of December 31, 2018 into an aggregate of 122,513,962 shares of common stock immediately prior to the completion of this offering, and excludes:

- 10,417,696 shares of common stock issuable upon the exercise of options outstanding as of December 31, 2018 under our 2018 Stock Incentive Plan, with an exercise price of $0.74 per share;
- 39,800 shares of common stock issuable upon the exercise of a warrant to purchase 39,800 shares of our Series Seed convertible preferred stock outstanding as of December 31, 2018, with an exercise price of $0.75286 per share, that will automatically convert to a warrant to purchase 39,800 shares of our common stock upon the completion of this offering; and
- shares of common stock reserved for future issuance under our stock-based compensation plans, consisting of (i) 2,667,369 shares of common stock reserved for future issuance under our 2018 Stock Incentive Plan as of December 31, 2018 (including the options to purchase shares of our common stock granted after December 31, 2018), (ii) shares of common stock reserved for future issuance under our 2019 Equity Incentive Plan, which will become effective on the date immediately prior to the date of the effectiveness of the registration statement of which this prospectus forms a part and (iii) shares of common stock reserved for future issuance under

our 2019 Employee Stock Purchase Plan, which will become effective on the date of the effectiveness of the registration statement of which this prospectus forms a part. Upon completion of this offering, any remaining shares available for issuance under our 2018 Stock Incentive Plan will be added to the shares reserved under our 2019 Equity Incentive Plan and we will cease granting awards under our 2018 Stock Incentive Plan. Our 2019 Equity Incentive Plan and 2019 Employee Stock Purchase Plan also provide for automatic annual increases in the number of shares reserved under the plans each year, as more fully described in "Executive Compensation — Equity Compensation Plans and Other Benefit Plans."

Except as otherwise indicated, all information in this prospectus assumes or gives effect to:

- the automatic conversion of all outstanding shares of our convertible preferred stock into an aggregate of 122,513,962 shares of common stock immediately prior to the completion of this offering;
- the automatic conversion of an outstanding warrant exercisable for 39,800 shares of our Series Seed convertible preferred stock as of December 31, 2018 into a warrant exercisable for 39,800 shares of common stock, which will occur automatically in connection with the completion of this offering;
- a -for- reverse stock split, which will become effective prior to the completion of this offering;
- the effectiveness of our restated certificate of incorporation and restated bylaws in connection with the completion of this offering;
- no exercise of outstanding options or warrants after December 31, 2018; and
- no exercise of the underwriters' option to purchase additional shares of our common stock.

SUMMARY CONSOLIDATED FINANCIAL DATA

The following tables set forth our summary consolidated statements of operations and consolidated balance sheet data. The summary consolidated statements of operations data presented below for the years ended December 31, 2017 and 2018 are derived from our audited consolidated financial statements included elsewhere in this prospectus. The following summary consolidated financial data should be read in conjunction with "Selected Consolidated Financial Data," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in any future period. The summary consolidated financial data in this section are not intended to replace the consolidated financial statements and are qualified in their entirety by the consolidated financial statements and related notes included elsewhere in this prospectus.

	Year Ended December 31,	
	2017	2018
	(in thousands, except share and per share data)	
Consolidated Statements of Operations		
Collaboration revenue — related party	$ —	$ 3,358
Operating expenses:		
Research and development	14,103	22,631
General and administrative	2,826	5,355
Total operating expenses	16,929	27,986
Loss from operations	(16,929)	(24,628)
Other income (expense):		
Interest income, net	14	871
Other expense, net	(5)	(74)
Total other income	9	797
Net loss	$ (16,920)	$ (23,831)
Net loss per unit, basic and diluted	$ (2.87)	
Net loss per share, basic and diluted		$ (3.82)
Weighted average common units outstanding, basic and diluted	5,896,584	
Weighted average common shares outstanding, basic and diluted		6,237,889
Pro-forma net loss per share, basic and diluted (unaudited)[1]		$ (0.31)
Pro-forma weighted average common shares outstanding, basic and diluted (unaudited)[1]		77,596,055

(1) Basic and diluted pro forma net loss per share give effect to the automatic conversion of all shares of convertible preferred stock into shares of common stock upon completion of this offering, assuming such conversion occurred on the later of January 1, 2018 or the original issuance dates of the convertible preferred units or convertible preferred stock.

	As of December 31, 2018		
	Actual	Pro Forma[1]	Pro Forma As Adjusted[2]
		(in thousands)	
Consolidated Balance Sheet Data:			
Cash and cash equivalents	$ 185,901	$ 185,901	$
Working capital[3]	152,220	152,220	
Total assets	189,305	189,305	
Convertible preferred stock	139,809	—	
Accumulated deficit	(54,185)	(54,185)	
Total stockholders' (deficit) equity	(52,552)	87,283	

(1) Pro forma amounts give effect to the automatic conversion of all of our outstanding shares of convertible preferred stock into an aggregate of 122,513,962 shares of common stock upon completion of this offering and the automatic conversion of the outstanding warrant to purchase 39,800 shares of convertible preferred stock into a warrant to purchase 39,800 shares of common stock, and the resulting reclassification of the warrant liability to additional paid-in capital.

(2) Pro forma as adjusted amounts reflect pro forma adjustments described in footnote (1) as well as the sale of shares of our common stock in this offering at the assumed initial public offering price of $ per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us. A $1.00 increase (decrease) in the assumed intial public offering price of $ per share, the midpoint of the price range set forth on the cover of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital, total assets and total stockholders' (deficit) equity by $ million, assuming that the number of shares offered by us, as set forth on the cover of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Similarly, each increase (decrease) of 1.0 million in the number of shares offered by us in this offering would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital, total assets and total stockholders' (deficit) equity by $ million, assuming the assumed initial offering price remains the same and after deducting estimated underwriting discounts commissions and estimated offering expenses payable by us.

(3) We define working capital as current assets less current liabilities. See our consolidated financial statements and related notes appearing at the end of this prospectus for further details regarding our current assets and current liabilities.

REORGANIZATION

Reorganization and Convertible Preferred Stock

On December 5, 2018, we completed a series of transactions, or the Reorganization, pursuant to which Morphic Holding, LLC was converted in a tax-free exchange into Morphic Holding, Inc. and three subsidiaries, namely Lazuli, Inc., Tourmaline, Inc. and Phyllite, Inc. were merged with and into Morphic Therapeutic, Inc. In connection with the Reorganization:

- Holders of Morphic Holding, LLC Series B convertible preferred units received one share of Morphic Holding, Inc. Series B convertible preferred stock for each outstanding Series B convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 61,538,454 shares of Morphic Holding, Inc. Series B convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC Series A convertible preferred units received one share of Morphic Holding, Inc. Series A convertible preferred stock for each outstanding Series A convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 49,047,619 shares of Morphic Holding, Inc. Series A convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC Series Seed convertible preferred units received one share of Morphic Holding, Inc. Series Seed convertible preferred stock for each outstanding Series Seed convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 11,927,889 shares of Morphic Holding, Inc. Series Seed convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC common units received one share of Morphic Holding, Inc. common stock for each outstanding common unit held immediately prior to the Reorganization, with an aggregate of 5,896,584 shares of common stock issued in the Reorganization;
- Holders of Morphic Holding, LLC vested and unvested incentive units, irrespective of any threshold amount or voting rights on any such outstanding incentive units, exchanged one incentive unit for one share of common stock or restricted common stock of Morphic Holding, Inc., respectively. Threshold amount on all vested and unvested incentive units was decreased to $0. The restricted common stock was issued with the same vesting terms as the unvested incentive units held immediately prior to the Reorganization. A total of 9,182,834 shares of common stock and restricted common stock were issued to the prior holders of incentive units; and
- The outstanding warrant to purchase 39,800 Series Seed convertible preferred units of Morphic Holding, LLC at an exercise price of $0.75286 per unit was converted to a warrant to purchase 39,800 shares of Series Seed convertible preferred stock of Morphic Holding, Inc. at the same exercise price per share.

Our Series B convertible preferred stock, Series A convertible preferred stock, Series Seed convertible preferred stock are designated as convertible preferred stock under our current amended and restated certificate of incorporation. All outstanding shares of convertible preferred stock are convertible into shares of common stock at the then-effective conversion ratios. The purpose of the Reorganization was to reorganize our corporate structure so that Morphic Holding, Inc. would continue as a corporation and so that our existing investors would own capital stock in a corporation rather than equity interests in a limited liability company. For the convenience of the reader, except as the context otherwise requires, all information included in this prospectus is presented giving effect to the Reorganization.

RISK FACTORS

Investing in our common stock involves a high degree of risk. Before making your decision to invest in shares of our common stock, you should carefully consider the risks described below, together with the other information contained in this prospectus, including our financial statements and the related notes appearing at the end of this prospectus. We cannot assure you that any of the events discussed below will not occur. These events could have a material and adverse impact on our business, financial condition, results of operations and prospects. If that were to happen, the trading price of our common stock could decline, and you could lose all or part of your investment.

Risks Related to Our Financial Position and Need for Capital

We are a preclinical stage biopharmaceutical company with a limited operating history and no products in clinical development or approved for commercial sale. We have a history of significant losses and expect to continue to incur significant losses for the foreseeable future.

We are a preclinical stage biopharmaceutical company with a limited operating history on which to base your investment decision. Biopharmaceutical product development is a highly speculative undertaking because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval or become commercially viable.

We have identified lead product candidates for our a_4b_7 and a_vb_6 programs, which are still in the preclinical testing stage. We have no products in clinical development or approved for commercial sale and have not generated any revenue from commercial product sales, and we will continue to incur significant research and development and other expenses related to our clinical development and ongoing operations. For the years ended December 31, 2017 and December 31, 2018, our net losses were approximately $16.9 million and $23.8 million, respectively. As of December 31, 2018, we had an accumulated deficit of approximately $54.2 million. Substantially all of our losses have resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations. We expect to incur significant losses for the foreseeable future, and we expect these losses to increase as we continue our research and development of our product candidates.

We anticipate that our expenses will increase substantially if, and as, we:

- conduct clinical trials for our lead wholly-owned a_4b_7 program and for our most advanced product candidate from our a_vb_6 program, MORF-720, and any future product candidates;
- discover and develop new product candidates, and conduct research and development activities, preclinical studies and clinical trials;
- manufacture, or have manufactured, pre-clinical, clinical and commercial supplies of our product candidates;
- seek regulatory approvals for our product candidates or any future product candidates;
- commercialize our current product candidates or any future product candidates, if approved;
- attempt to transition from a company with a research focus to a company capable of supporting commercial activities, including establishing sales, marketing and distribution infrastructure;
- hire additional clinical, scientific and management personnel;
- add operational, financial and management information systems and personnel;
- identify additional compounds or product candidates and acquire rights from third parties to those compounds or product candidates through licenses; and
- incur additional costs associated with operating as a public company following the completion of this offering.

Even if we succeed in commercializing one or more product candidates, we may continue to incur substantial research and development and other expenditures to develop and market additional product candidates. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders' equity and working capital.

We have never generated revenue from product sales and may never be profitable.

Our ability to become and remain profitable depends on our ability to generate revenue. We do not expect to generate significant revenue, if any, unless and until we, either alone or with a collaborator, are able to obtain regulatory approval for, and successfully commercialize, our lead product candidates, or any other product candidates we may develop. Successful commercialization will require achievement of many key milestones, including demonstrating safety and efficacy in clinical trials, obtaining regulatory, including marketing, approval for these product candidates, manufacturing, marketing and selling those products for which we, or any of our current or future collaborators, may obtain regulatory approval, satisfying any post-marketing requirements and obtaining reimbursement for our products from private insurance or government payors. Because of the uncertainties and risks associated with these activities, we are unable to accurately and precisely predict the timing and amount of revenues, the extent of any further losses or if or when we might achieve profitability. We and any current or future collaborators may never succeed in these activities and, even if we do, or any collaborators do, we may never generate revenues that are large enough for us to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Additionally, our expenses could increase if we are required by the U.S. Food and Drug Administration, or the FDA, or any comparable foreign regulatory authority to perform clinical trials in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our product candidates.

Our failure to become and remain profitable may depress the market price of our common stock and could impair our ability to raise capital, expand our business or continue our operations. If we continue to suffer losses as we have in the past, investors may not receive any return on their investment and may lose their entire investment.

Even if we complete this offering, we will need substantial additional funds to advance development of our product candidates, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit or terminate our product development programs, commercialization efforts or other operations.

The development of biopharmaceutical product candidates is capital-intensive. If our product candidates enter and advance through preclinical studies and clinical trials, we will need substantial additional funds to expand or create our development, regulatory, manufacturing, marketing and sales capabilities. We have used substantial funds to develop our technology and product candidates and will require significant funds to conduct further research and development and preclinical testing and clinical trials of our product candidates, to seek regulatory approvals for our product candidates and to manufacture and market products, if any, which are approved for commercial sale. In addition, upon the completion of this offering, we expect to incur additional costs associated with operating as a public company.

Since our inception, we have invested a significant portion of our efforts and financial resources in research and development activities for our product candidates from our lead programs, a_4b_7 and a_vb_6. Preclinical studies and clinical trials for our product candidates will require substantial funds to complete. As of December 31, 2018, we had $185.9 million in cash and cash equivalents. We expect to incur substantial expenditures in the foreseeable future as we seek to advance our current product candidates from our lead programs, a_4b_7 and a_vb_6, and any future product candidates through preclinical and clinical development,

the regulatory approval process and, if approved, commercial launch activities. Based on our current operating plan, we believe that our available cash and cash equivalents, together with the net proceeds from this offering, will be sufficient to fund our operating expenses and capital expenditure requirements through . However, our future capital requirements and the period for which we expect our existing resources to support our operations, fund expansion, develop new or enhanced products, or otherwise respond to competitive pressures, may vary significantly from what we expect and we may need to seek additional funds sooner than planned. Our monthly spending levels vary based on new and ongoing research and development and other corporate activities. Because the length of time and activities associated with successful research and development of our product candidates is highly uncertain, we are unable to estimate the actual funds we will require for development and any marketing and commercialization activities for approved products. Our future funding requirements, both near and long-term, will depend on many factors, including, but not limited to:

- the timing, cost and progress of preclinical and clinical development activities;
- the number and scope of preclinical and clinical programs we decide to pursue;
- the progress of the development efforts of parties with whom we have entered or may in the future enter into collaborations and/or research and development agreements;
- the timing and amount of milestone and other payments we may receive or make under our collaboration agreements;
- our ability to maintain our current licenses and research and development programs and to establish new collaboration arrangements;
- the costs involved in prosecuting and enforcing patent and other intellectual property claims;
- the costs of manufacturing our product candidates by third parties;
- the cost of regulatory submissions and timing of regulatory approvals;
- the cost of commercialization activities if our product candidates or any future product candidates are approved for sale, including marketing, sales and distribution costs;
- our efforts to enhance operational systems and hire additional personnel, including personnel to support development of our product candidates; and
- our need to implement additional internal systems and infrastructure, including financial and reporting systems to satisfy our obligations as a public company.

If we are unable to obtain funding on a timely basis or on acceptable terms, we may have to delay, reduce or terminate our research and development programs and preclinical studies or clinical trials, limit strategic opportunities or undergo reductions in our workforce or other corporate restructuring activities. We do not expect to realize revenue from sales of commercial products or royalties from licensed products in the foreseeable future, if at all, and, in no event, before our product candidates are clinically tested, approved for commercialization and successfully marketed. To date, we have primarily financed our operations through payments received under our collaboration agreements, the sale of equity securities and debt financing.

We will be required to seek additional funding in the future and currently intend to do so through additional collaborations and/or licensing agreements, public or private equity offerings or debt financings, credit or loan facilities, or a combination of one or more of these funding sources. If we raise additional funds by issuing equity securities, our stockholders will suffer dilution and the terms of any financing may adversely affect the rights of our stockholders. In addition, as a condition to providing additional funds to us, future investors may demand, and may be granted, rights superior to those of existing stockholders. Our future debt financings, if available, are likely to involve restrictive covenants limiting our flexibility in conducting future business activities, and, in the event of insolvency, debt holders would be repaid before holders of our equity securities received any distribution of our corporate assets. If we raise additional funds through licensing or collaboration arrangements with third parties, we may have to relinquish valuable rights to our

product candidates, or grant licenses on terms that are not favorable to us. We also could be required to seek collaborators for product candidate at an earlier stage than otherwise would be desirable or relinquish our rights to product candidates or technologies that we otherwise would seek to develop or commercialize ourselves. Failure to obtain capital when needed on acceptable terms may force us to delay, limit or terminate our product development and commercialization of our current or future product candidates, which could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Discovery, Development and Commercialization

Our product candidates are in early stages of development and may fail in development or suffer delays that materially and adversely affect their commercial viability. If we or our collaborators are unable to complete development of, or commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.

We have no products on the market and all of our product candidates are in early stages of development. We expect the Investigational New Drug applications, or INDs, with respect to our a_4b_7 program and MORF-720 to be submitted by the middle of 2020 and as early as the end of 2019, respectively. Additionally, we have a portfolio of targets and programs, including those listed in the "Business — Our Pipeline Programs" section of this prospectus, that are in earlier stages of discovery and preclinical development and may never advance to clinical-stage development. Our ability to achieve and sustain profitability depends on obtaining regulatory approvals for, and successfully commercializing our product candidates, either alone or with third parties, and we cannot guarantee you that we will ever obtain regulatory approval for any of our product candidates. We have limited experience in conducting and managing the clinical trials necessary to obtain regulatory approvals, including approval by the FDA. Before obtaining regulatory approval for the commercial distribution of our product candidates, we or an existing or future collaborator must conduct extensive preclinical tests and clinical trials to demonstrate the safety and efficacy in humans of our product candidates.

We may not have the financial resources to continue development of, or to modify existing or enter into new collaborations for, a product candidate if we experience any issues that delay or prevent regulatory approval of, or our ability to commercialize, product candidates, including:

- preclinical study results may show the product candidate to be less effective than desired or to have harmful or problematic side effects;
- negative or inconclusive results from our clinical trials or the clinical trials of others for product candidates similar to ours, leading to a decision or requirement to conduct additional preclinical testing or clinical trials or abandon a program;
- product-related side effects experienced by patients in our clinical trials or by individuals using drugs or therapeutic biologics similar to our product candidates;
- our third-party manufacturers' inability to successfully manufacture our products;
- inability of any third-party contract manufacturer to scale up manufacturing of our product candidates and those of our collaborators to supply the needs of clinical trials or commercial sales;
- delays in submitting INDs or comparable foreign applications or delays or failures in obtaining the necessary approvals from regulators to commence a clinical trial, or a suspension or termination of a clinical trial once commenced;
- conditions imposed by the FDA or comparable foreign authorities regarding the scope or design of our clinical trials;
- delays in enrolling patients in our clinical trials;
- high drop-out rates of our clinical trial patients;

- inadequate supply or quality of product candidate components or materials or other supplies necessary for the conduct of our clinical trials;
- inability to obtain alternative sources of supply for which we have a single source for product candidate components or materials;
- greater than anticipated costs of our clinical trials;
- manufacturing costs, formulation issues, pricing or reimbursement issues, or other factors that no longer make a product candidate economically feasible;
- harmful side effects or inability of our product candidates to meet efficacy endpoints during clinical trials;
- failure to demonstrate a benefit-risk profile acceptable to the FDA or other regulatory agencies;
- unfavorable FDA or other regulatory agency inspection and review of one or more clinical trial sites or manufacturing facilities used in the testing and manufacture of any of our product candidates;
- failure of our third-party contractors or investigators to comply with regulatory requirements or otherwise meet their contractual obligations in a timely manner, or at all;
- delays and changes in regulatory requirements, policy and guidelines, including the imposition of additional regulatory oversight around clinical testing generally or with respect to our technology in particular; or
- varying interpretations of our data by the FDA and similar foreign regulatory agencies.

We or our collaborators' inability to complete development of, or commercialize our product candidates, or significant delays in doing so due to one or more of these factors, could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Our business is heavily dependent on the success of our a_4b_7 program and of our most advanced product candidate, MORF-720. Existing and future preclinical studies and clinical trials of these product candidates may not be successful, and if we are unable to commercialize these product candidates or experience significant delays in doing so, our business will be materially harmed.

We have invested a significant portion of our efforts and financial resources in the development of our a_4b_7 program and MORF-720. However, our lead product candidates are still in the preclinical stage. Our ability to generate commercial product revenues, which we do not expect will occur for many years, if ever, will depend heavily on the successful development and eventual commercialization of our lead product candidates. We have not previously submitted a new drug application, or NDA, to the FDA, or similar regulatory approval filings to comparable foreign authorities, for any product candidate, and we cannot be certain that our product candidates will be successful in clinical trials or receive regulatory approval. Further, our product candidates may not receive regulatory approval even if they are successful in clinical trials. In addition, regulatory authorities may not complete their review processes in a timely manner, or additional delays may result if an FDA Advisory Committee or other regulatory authority recommends non-approval or restrictions on approval. In addition, we may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory authority policy during the period of product development, clinical trials and the review process. Regulatory authorities also may approve a product candidate for more limited indications than requested or with labeling that includes warnings, contraindications or precautions with respect to conditions of use. Regulatory authorities may also require Risk Evaluation and Mitigation Strategies, or REMS, or the performance of costly post-marketing clinical trials. If we do not receive regulatory approvals for our product candidates, we may not be able to continue our operations. Even if we successfully obtain regulatory approvals to market our product candidates, our revenues will be dependent, in part, upon the size of the markets in the territories for which we gain regulatory approval and have commercial rights. If the markets for patient subsets that we are targeting are not as significant as we estimate, we may not generate significant revenues from sales of such products, if approved.

We plan to seek regulatory approval to commercialize our product candidates both in the United States and in selected foreign countries. In order to obtain separate regulatory approvals in other countries, we must comply with numerous and varying regulatory requirements of such countries regarding safety and efficacy. Other countries also have their own regulations governing, among other things, clinical trials and commercial sales, as well as pricing and distribution of our product candidates, and we may be required to expend significant resources to obtain regulatory approval, which may not be successful, and to comply with ongoing regulations in these jurisdictions.

The success of our a_4b_7 program, MORF-720, and our other product candidates will depend on many factors, including the following:

- successful completion of necessary preclinical studies to enable the intiation of clinical trials;
- successful enrollment of patients in, and the completion of, our clinical trials;
- receiving required regulatory authorizations for the development and approvals for the commercialization of our product candidates;
- establishing and maintaining arrangements with third-party manufacturers;
- obtaining and maintaining patent and trade secret protection and non-patent exclusivity for our product candidates and their components;
- enforcing and defending our intellectual property rights and claims;
- achieving desirable therapeutic properties for our product candidates' intended indications;
- launching commercial sales of our product candidates, if and when approved, whether alone or in collaboration with third parties;
- acceptance of our product candidates, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies; and
- maintaining an acceptable safety profile of our product candidates through clinical trials and following regulatory approval.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our product candidates, which would materially harm our business.

If we do not achieve our projected development goals in the time frames we announce and expect, the commercialization of our products may be delayed and, as a result, our stock price may decline.

From time to time, we estimate the timing of the anticipated accomplishment of various scientific, clinical, regulatory and other product development goals, which we sometimes refer to as milestones. These milestones may include the commencement or completion of scientific studies and clinical trials and the submission of regulatory filings. From time to time, we may publicly announce the expected timing of some of these milestones. All of these milestones are and will be based on numerous assumptions. The actual timing of these milestones can vary dramatically compared to our estimates, in some cases for reasons beyond our control. If we do not meet these milestones as publicly announced, or at all, the commercialization of our products may be delayed or never achieved and, as a result, our stock price may decline.

Our approach to the discovery and development of our therapeutic treatments is based on novel technologies that are unproven and may not result in marketable products.

We are developing a pipeline of product candidates using our Morphic integrin technology platform, or MInT Platform. Historically, dozens of integrin-targeted oral small molecule candidates of other companies that entered late-stage clinical trials have failed to result in FDA or EMA approved medicines. We are aware of

certain companies currently exploring oral approaches to integrins. For example, Pliant Therapeutics, Inc. is currently in clinic for an a_vb_6 /a_vb_1 oral small-molecule integrin inhibitor. Development efforts and clinical results of these other companies may be unsuccessful, which could result in a negative perception of oral integrins and negatively impact the regulatory approval process of our product candidates, which would have a material and adverse effect on our business. We believe that product candidates identified with our MInT Platform may offer an optimized therapeutic approach by taking advantage of conformational targeting next-generation physics-based technologies augmented with machine learning and artificial intelligence, which allow us to design, iterate and optimize leads in our discovery process. However, the scientific research that forms the basis of our efforts to develop product candidates using our MInT Platform is ongoing and may not result in viable product candidates.

To date, we have not tested any of our product candidates in any clinical studies. We may ultimately discover that our MInT Platform and any product candidates resulting therefrom do not possess certain properties required for therapeutic effectiveness, including the ability to lock specific integrin conformations. Our product candidates may also be unable to remain stable in the human body for the period of time required for the drug to reach the target tissue or they may trigger immune responses that inhibit the ability of the product candidate to reach the target tissue or that cause adverse side effects in humans. We currently have only limited data regarding oral bioavailability of our product candidates. We may spend substantial funds attempting to introduce these properties and may never succeed in doing so. In addition, product candidates based on our MInT Platform may demonstrate different chemical and pharmacological properties in patients than they do in laboratory studies. Our MInT Platform and any product candidates resulting therefrom may not demonstrate the same chemical and pharmacological properties in humans and may interact with human biological systems in unforeseen, ineffective or harmful ways.

The regulatory approval process for novel product candidates such as ours can be more expensive and take longer than for other, better known or extensively studied product candidates. To our knowledge, no regulatory authority has granted approval for an oral small-molecule integrin inhibitor. We believe the FDA has limited experience with integrin-based therapeutics, which may increase the complexity, uncertainty and length of the regulatory approval process for our product candidates. We and our existing or future collaborators may never receive approval to market and commercialize any product candidate. Even if we or an existing or future collaborator obtains regulatory approval, the approval may be for targets, disease indications or patient populations that are not as broad as we intended or desired or may require labeling that includes significant use or distribution restrictions or safety warnings. We or an existing or future collaborator may be required to perform additional or unanticipated clinical trials to obtain approval or be subject to post-marketing testing requirements to maintain regulatory approval. If the products resulting from our MInT Platform and research programs prove to be ineffective, unsafe or commercially unviable, our MInT Platform and pipeline would have little, if any, value, which would have a material and adverse effect on our business, financial condition, results of operations and prospects.

Preclinical and clinical development involve a lengthy and expensive process, with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our current product candidates or any future product candidates.

All of our product candidates are in preclinical development and their risk of failure is high. It is impossible to predict when or if any of our product candidates will receive regulatory approval. To obtain the requisite regulatory approvals to commercialize any product candidates, we must demonstrate through extensive preclinical studies and lengthy, complex and expensive clinical trials that our product candidates are safe and effective in humans. Clinical testing can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical

trials. We may be unable to establish clinical endpoints that applicable regulatory authorities would consider clinically meaningful, and a clinical trial can fail at any stage of testing. Differences in trial design between early-stage clinical trials and later-stage clinical trials make it difficult to extrapolate the results of earlier clinical trials to later clinical trials. Moreover, clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in clinical trials have nonetheless failed to obtain marketing approval of their products. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or to unfavorable safety profiles, notwithstanding promising results in earlier trials. There is typically a high rate of failure of product candidates proceeding through clinical trials. Most product candidates that commence clinical trials are never approved as products and there can be no assurance that any of our future clinical trials will ultimately be successful or support clinical development of our current or any of our future product candidates.

Our two lead programs are a_4b_7 and a_vb_6. We intend to advance our a_4b_7 program and MORF-720, our development candidate for our a_vb_6 program, toward IND submissions by the middle of 2020 and as early as the end of 2019, respectively. Commencing our future clinical trials is subject to finalizing the trial design and submitting an IND or similar submission to the FDA or similar foreign regulatory authority. Even after we submit our IND or comparable submissions in other jurisdictions, the FDA or other regulatory authorities could disagree that we have satisfied their requirements to commence our clinical trials or disagree with our study design, which may require us to complete additional preclinical studies or amend our protocols or impose stricter conditions on the commencement of clinical trials.

We or our collaborators may experience delays in initiating or completing clinical trials. We or our collaborators also may experience numerous unforeseen events during, or as a result of, any future clinical trials that we could conduct that could delay or prevent our ability to receive marketing approval or commercialize our a_4b_7 program or MORF-720 or any future product candidates, including:

- regulators or institutional review boards, or IRBs, the FDA or ethics committees may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may experience delays in reaching, or fail to reach, agreement on acceptable terms with prospective trial sites and prospective contract research organizations, or CROs the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- clinical trials of any product candidates may fail to show safety or efficacy, produce negative or inconclusive results and we may decide, or regulators may require us, to conduct additional preclinical studies or clinical trials or we may decide to abandon product development programs;
- the number of subjects required for clinical trials of any product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or subjects may drop out of these clinical trials or fail to return for post-treatment follow-up at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all, or may deviate from the clinical trial protocol or drop out of the trial, which may require that we add new clinical trial sites or investigators;
- we may elect to, or regulators, IRBs, or ethics committees may require that we or our investigators, suspend or terminate clinical research or trials for various reasons, including noncompliance with regulatory requirements or a finding that the participants in our trials are being exposed to unacceptable health risks;
- the cost of clinical trials of any of our product candidates may be greater than we anticipate;
- the quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be inadequate to initiate or complete a given clinical trial;

- our inability to manufacture sufficient quantities of our product candidates for use in clinical trials;
- reports from clinical testing of other therapies may raise safety or efficacy concerns about our product candidates;
- our failure to establish an appropriate safety profile for a product candidate based on clinical or preclinical data for such product candidate as well as data emerging from other molecules in the same class as our product candidate; and
- the FDA, EMA or other regulatory authorities may require us to submit additional data such as long-term toxicology studies, or impose other requirements before permitting us to initiate a clinical trial.

Patient enrollment, a significant factor in the timing of clinical trials, is affected by many factors including the size and nature of the patient population, the number and location of clinical sites we enroll, the proximity of patients to clinical sites, the eligibility and exclusion criteria for the trial, the design of the clinical trial, the inability to obtain and maintain patient consents, the risk that enrolled participants will drop out before completion, competing clinical trials and clinicians' and patients' perceptions as to the potential advantages of the product candidate being studied in relation to other available therapies, including any new drugs or therapeutic biologics that may be approved for the indications being investigated by us. Furthermore, we expect to rely on our collaborators, CROs and clinical trial sites to ensure the proper and timely conduct of our future clinical trials, including the patient enrollment process, and we have limited influence over their performance. Additionally, we could encounter delays if treating physicians encounter unresolved ethical issues associated with enrolling patients in future clinical trials of our product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles.

We could also encounter delays if a clinical trial is suspended or terminated by us, the IRBs of the institutions in which such trials are being conducted, or the FDA, EMA or other regulatory authorities, or if a clinical trial is recommended for suspension or termination by the Data Safety Monitoring Board, or the DSMB, for such trial. A suspension or termination may be imposed due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA, EMA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product or treatment, failure to establish or achieve clinically meaningful trial endpoints, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. Clinical studies may also be delayed or terminated as a result of ambiguous or negative interim results. Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. Further, the FDA, EMA or other regulatory authorities may disagree with our clinical trial design and our interpretation of data from clinical trials, or may change the requirements for approval even after they have reviewed and commented on the design for our clinical trials.

Our product development costs will increase if we experience delays in clinical testing or marketing approvals. We do not know whether any of our clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates and may allow our competitors to bring products to market before we do, potentially impairing our ability to successfully commercialize our product candidates and harming our business and results of operations. Any delays in our clinical development programs may harm our business, financial condition and results of operations significantly.

Results of preclinical studies and early clinical trials may not be predictive of results of future clinical trials.

The outcome of preclinical studies and early clinical trials may not be predictive of the success of later clinical trials, and interim results of clinical trials. Many companies in the pharmaceutical and

biotechnology industries have suffered significant setbacks in late-stage clinical trials after achieving positive results in earlier development, and we could face similar setbacks. The design of a clinical trial can determine whether its results will support approval of a product and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. We have limited experience in designing clinical trials and may be unable to design and execute a clinical trial to support marketing approval. In addition, preclinical and clinical data are often susceptible to varying interpretations and analyses. Many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval for the product candidates. Even if we, or future collaborators, believe that the results of clinical trials for our product candidates warrant marketing approval, the FDA or comparable foreign regulatory authorities may disagree and may not grant marketing approval of our product candidates.

In some instances, there can be significant variability in safety or efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations, changes in and adherence to the dosing regimen and other clinical trial protocols and the rate of dropout among clinical trial patients. If we fail to receive positive results in clinical trials of our product candidates, the development timeline and regulatory approval and commercialization prospects for our most advanced product candidates, and, correspondingly, our business and financial prospects would be negatively impacted.

Interim and preliminary or topline data from our clinical trials that we announce or publish from time to time may change as more patient data become available and are subject to audit and verification procedures that could result in material changes in the final data.

From time to time, we may publish interim topline or preliminary data from our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Preliminary or topline data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary or topline data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between interim or preliminary or topline data and final data could significantly harm our reputation and business prospects.

Our future clinical trials or those of our current and future collaborators may reveal significant adverse events not seen in our preclinical studies and may result in a safety profile that could inhibit regulatory approval or market acceptance of any of our product candidates.

If significant adverse events or other side effects are observed in any of our clinical trials, we may have difficulty recruiting patients to our clinical trials, patients may drop out of our trials, or we may be required to abandon the trials or our development efforts of one or more product candidates altogether. For example, preclinical results have indicated that progressive multifocal leukoencephalopathy, or PML, is an adverse effect with the modulated target a_4b_7. We, the FDA, EMA or other applicable regulatory authorities, or an IRB may suspend clinical trials of a product candidate at any time for various reasons, including a belief that subjects or patients in such trials are being exposed to unacceptable health risks or adverse side effects. Some potential therapeutics developed in the biotechnology industry that initially showed therapeutic promise in early-stage trials have later been found to cause side effects that prevented their further development. Even if the side effects do not preclude the product candidate from obtaining or maintaining marketing approval, undesirable side effects may inhibit market acceptance of the approved product due to its tolerability versus other therapies. Any of these developments could materially harm our business, financial condition and prospects.

We may not be successful in our efforts to use our MInT Platform to expand our pipeline of product candidates and develop marketable products.

The success of our business depends in part upon our ability to discover, develop and commercialize products based on our MInT Platform. a_4b_7 and a_vb_6 are our lead preclinical programs and our research programs may fail to identify other potential product candidates for clinical development for a number of reasons. Our research methodology may be unsuccessful in identifying potential product candidates or our potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval. If any of these events occur, we may be forced to abandon our development efforts for a program or for multiple programs, which would materially harm our business and could potentially cause us to cease operations. Research programs to identify new product candidates require substantial technical, financial and human resources.

We may expend our limited resources to pursue a particular product candidate and fail to capitalize on product candidates that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we focus our research and development efforts on certain selected product candidates. For example, we are initially focused on our lead wholly-owned a_4b_7 program and for our most advanced product candidate, MORF-720. As a result, we may forgo or delay pursuit of opportunities with other product candidates that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable product candidates. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

We face competition from entities that have developed or may develop product candidates for autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer, including companies developing novel treatments and technology platforms. If these companies develop technologies or product candidates more rapidly than we do or their technologies are more effective, our ability to develop and successfully commercialize product candidates may be adversely affected.

The development and commercialization of drugs is highly competitive. Our product candidates, if approved, will face significant competition and our failure to effectively compete may prevent us from achieving significant market penetration. Most of our competitors have significantly greater resources than we do and we may not be able to successfully compete. We compete with a variety of multinational biopharmaceutical companies, specialized biotechnology companies and emerging biotechnology companies, as well as with technologies and product candidates being developed at universities and other research institutions. Our competitors have developed, are developing or will develop product candidates and processes competitive with our product candidates and processes. Competitive therapeutic treatments include those that have already been approved and accepted by the medical community and any new treatments, including those based on novel technology platforms that enter the market. We believe that a significant number of products are currently under development, and may become commercially available in the future, for the treatment of conditions for which we are trying, or may try, to develop product candidates. There is intense and rapidly evolving competition in the biotechnology, biopharmaceutical and integrin and immunoregulatory therapeutics fields. Competition from many sources exists or may arise in the future. Our competitors include larger and better funded biopharmaceutical, biotechnological and therapeutics companies, including companies focused on therapeutics for autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer, as well as numerous small companies. Moreover, we also compete with current and future therapeutics developed at universities and other research institutions. Some of these companies are well-capitalized and, in contrast to us, have significant clinical experience, and may include our existing or

future collaborators. In addition, these companies compete with us in recruiting scientific and managerial talent.

Our success will depend partially on our ability to develop and commercialize therapeutics that are safer and more effective than competing products. Our commercial opportunity and success will be reduced or eliminated if competing products are safer, more effective, or less expensive than the therapeutics we develop.

Our a_4b_7 program, initially under development for treatment of IBD, if approved would face competition from approved IBD treatments marketed by UCB, Johnson & Johnson, Biogen Inc., and Pfizer Inc., in addition to other major pharmaceutical companies. In addition, we are aware of IBD treatments in development by Roche Holding AG, AbbVie Inc., Gilead Sciences, RedHill Biopharma Ltd, Celgene Corporation, Eli Lilly and Company, and Boehringer Ingelheim GmbH. Further, Takeda Pharmaceutical Company Ltd. currently markets Entyvio, which is an a_4b_7 monoclonal antibody to treat ulcerative colitis and Crohn's disease. Protagonist Therapeutics, Inc. also has a Phase 1 clinical gut-restricted a_4b_7 program under development.

MORF-720, under development for the treatment of IPF, if approved, would face competition from approved IPF treatments marketed by Roche Holding AG and Boehringer Ingelheim GmbH. In addition, we are aware of IPF treatments in development by Galapagos NV. Further, we are aware of programs targeting a_vb_6 that are currently being investigated in preclinical studies or clinical trials by companies including Biogen Inc., Pliant Therapeutics, Inc., and Indalo Therapeutics, Inc.

Many of these competitors have significantly greater financial, technical, manufacturing, marketing, sales, and supply resources or experience than we have. If we successfully obtain approval for any product candidate, we will face competition based on many different factors, including the safety and effectiveness of our products, the ease with which our products can be administered and the extent to which patients accept relatively new routes of administration, the timing and scope of regulatory approvals for these products, the availability and cost of manufacturing, marketing and sales capabilities, price, reimbursement coverage and patent position. Competing products could present superior treatment alternatives, including by being more effective, safer, less expensive or marketed and sold more effectively than any products we may develop. Competitive products may make any products we develop obsolete or noncompetitive before we recover the expense of developing and commercializing our product candidates. Such competitors could also recruit our employees, which could negatively impact our level of expertise and our ability to execute our business plan.

Our current product candidates or any future product candidates may not achieve adequate market acceptance among physicians, patients, healthcare third-party payors and others in the medical community necessary for commercial success, if approved, and we may not generate any future revenue from the sale or licensing of product candidates.

Even if regulatory approval is obtained for a product candidate, we may not generate or sustain revenue from sales of the product due to factors such as whether the product can be sold at a competitive cost and whether it will otherwise be accepted in the market. Historically, several injectable integrin inhibitors have been approved by the FDA for treatment of inflammatory bowel disease, multiple sclerosis, psoriasis, acute coronary syndrome and dry eye disease. However, our product candidates are based on a novel approach to oral integrin therapies, and while integrins are a well-understood and clinically validated receptor family, there has been an absence of therapeutic success with orally bioavailable integrin inhibitors. Market participants with significant influence over acceptance of new treatments, such as physicians and third-party payors, may not adopt an orally bioavailable product based on our novel technologies, and we may not be able to convince the medical community and third-party payors to accept and use, or to provide

favorable reimbursement for, any product candidates developed by us or our existing or future collaborators. Market acceptance of our product candidates will depend on, among other factors:

- the timing of our receipt of any marketing and commercialization approvals;
- the terms of any approvals and the countries in which approvals are obtained;
- the safety and efficacy of our product candidates as demonstrated in clinical trials;
- the prevalence and severity of any adverse side effects associated with our product candidates;
- limitations or warnings contained in any labeling approved by the FDA or other regulatory authority;
- relative convenience and ease of administration of our product candidates;
- the willingness of patients to accept any new methods of administration;
- unfavorable publicity relating to our current product candidates or any future product candidates;
- the success of our physician education programs;
- the effectiveness of sales and marketing efforts;
- the availability of coverage and adequate reimbursement from government and third-party payors;
- the pricing of our products, particularly as compared to alternative treatments; and
- the availability of alternative effective treatments for the disease indications our product candidates are intended to treat and the relative risks, benefits and costs of those treatments.

Sales of medical products also depend on the willingness of physicians to prescribe the treatment, which is likely to be based on a determination by these physicians that the products are safe, therapeutically effective and cost effective. In addition, the inclusion or exclusion of products from treatment guidelines established by various physician groups and the viewpoints of influential physicians can affect the willingness of other physicians to prescribe the treatment. We cannot predict whether physicians, physicians' organizations, hospitals, other healthcare providers, government agencies or private insurers will determine that our product is safe, therapeutically effective and cost effective as compared with competing treatments. If any product candidate is approved but does not achieve an adequate level of acceptance by such parties, we may not generate or derive sufficient revenue from that product candidate and may not become or remain profitable.

Because our product candidates are based on new technology, we expect that they will require extensive research and development and have substantial manufacturing and processing costs. In addition, our estimates regarding potential market size for any indication may be materially different from what we discover to exist at the time we commence commercialization, if any, for a product, which could result in significant changes in our business plan and have a material adverse effect on our business, financial condition, results of operations and prospects. Moreover, if any product candidate we commercialize fails to achieve market acceptance, it could have a material and adverse effect on our business, financial condition, results of operations and prospects.

If in the future we are unable to establish U.S. or global sales and marketing capabilities or enter into agreements with third parties to sell and market our product candidates, we may not be successful in commercializing our product candidates if they are approved and we may not be able to generate any revenue.

We currently do not have a marketing or sales team for the marketing, sales and distribution of any of our product candidates that are able to obtain regulatory approval. To commercialize any product candidates after approval, we must build on a territory-by-territory basis marketing, sales, distribution, managerial and other non-technical capabilities or arrange with third parties to perform these services, and we may not be successful in doing so. If our product candidates receive regulatory approval, we may decide to establish an internal sales or marketing team with technical expertise and supporting distribution capabilities to commercialize our product candidates, which will be expensive and time consuming and will require

significant attention of our executive officers to manage. For example, some state and local jurisdictions have licensing and continuing education requirements for pharmaceutical sales representatives, which requires time and financial resources. Any failure or delay in the development of our internal sales, marketing and distribution capabilities would adversely impact the commercialization of any of our product candidates that we obtain approval to market.

With respect to the commercialization of all or certain of our product candidates, we may choose to collaborate, either globally or on a territory-by-territory basis, with third parties that have direct sales forces and established distribution systems, either to augment our own sales force and distribution systems or in lieu of our own sales force and distribution systems. If we are unable to enter into such arrangements when needed on acceptable terms, or at all, we may not be able to successfully commercialize any of our product candidates that receive regulatory approval or any such commercialization may experience delays or limitations. If we are not successful in commercializing our product candidates, either on our own or through collaborations with one or more third parties, our future product revenue will suffer and we may incur significant additional losses.

If any of our product candidates receives marketing approval and we or others later identify undesirable side effects caused by the product candidate, our ability to market and derive revenue from the product candidates could be compromised.

Undesirable side effects caused by our product candidates could cause regulatory authorities to interrupt, delay or halt clinical trials and could result in more restrictive labeling or the delay or denial of regulatory approval by the FDA or other regulatory authorities. Results of future clinical trials could reveal a high and unacceptable severity and prevalence of side effects. In such an event, our future clinical trials could be suspended or terminated and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. Such side effects could also affect patient recruitment or the ability of enrolled patients to initiate or complete the clinical trial or result in potential product liability claims. Any of these occurrences may materially and adversely affect our business, financial condition, results of operations and prospects.

Further, clinical trials by their nature utilize a sample of the potential patient population. With a limited number of patients and limited duration of exposure, rare and severe side effects of our product candidates may only be uncovered with a significantly larger number of patients exposed to the product candidate.

In the event that any of our product candidates receive regulatory approval and we or others identify undesirable side effects caused by such product, any of the following adverse events could occur:

- regulatory authorities may withdraw their approval of the product or seize the product;
- we may be required to recall the product or change the way the product is administered to patients;
- additional restrictions may be imposed on the marketing of the particular product or the manufacturing processes for the product or any component thereof;
- we may be subject to fines, injunctions or the imposition of civil or criminal penalties;
- regulatory authorities may require the addition of labeling statements, such as a boxed warning or a contraindication;
- we may be required to create a Medication Guide outlining the risks of such side effects for distribution to patients;
- we could be sued and held liable for harm caused to patients;
- the product may become less competitive; and
- our reputation may suffer.

Any of these occurrences could have a material and adverse effect on our business, financial condition, results of operations and prospects.

We anticipate that some of our product candidates may be studied in combination with third-party drugs, some of which may still be in development, and we have limited or no control over the supply, regulatory status, or regulatory approval of such drugs.

Some of our product candidates may be studied in combination with third-party drugs. For example, we may explore the use of our oral small-molecule integrin therapeutics targeting a_4b_7 as a combination therapy with other drugs for the treatment of inflammatory bowel disease. The development of product candidates for use in combination with another product or product candidate may present challenges that are not faced for single agent product candidates. The FDA or other regulatory authorities may require us to use more complex clinical trial designs in order to evaluate the contribution of each product and product candidate to any observed effects. It is possible that the results of these trials could show that any positive previous trial results are attributable to the combination therapy and not our product candidates. Moreover, following product approval, the FDA or other regulatory authorities may require that products used in conjunction with each other be cross labeled for combined use. To the extent that we do not have rights to the other product, this may require us to work with a third party to satisfy such a requirement. Moreover, developments related to the other product may impact our clinical trials for the combination as well as our commercial prospects should we receive marketing approval. Such developments may include changes to the other product's safety or efficacy profile, changes to the availability of the approved product, and changes to the standard of care.

If we pursue such combination therapies, we cannot be certain that a steady supply of such drugs will be commercially available. Any failure to enter into such commercial relationships, or the expense of purchasing therapies in the market, may delay our development timelines, increase our costs and jeopardize our ability to develop our product candidates as commercially viable combination therapies. The occurrence of any of these could adversely affect our business, results of operations and financial condition.

In the event that any future collaborator or supplier cannot continue to supply their products on commercially reasonable terms, we would need to identify alternatives for accessing such products. Additionally, should the supply of products of any collaborator or supplier be interrupted, delayed or otherwise be unavailable to us, our clinical trials may be delayed. In the event we are unable to source a supply of any alternative therapy, or are unable to do so on commercially reasonable terms, our business, results of operations and financial condition may be adversely affected.

Risks Related to Our Reliance on Third Parties

We have entered into collaborations with AbbVie and Janssen and may, in the future, seek to enter into collaborations with other third parties for the discovery, development and commercialization of our product candidates. If our collaborators cease development efforts under our collaboration agreements, or if any of those agreements are terminated, these collaborations may fail to lead to commercial products and we may never receive milestone payments or future royalties under these agreements.

Our collaborations with AbbVie and Janssen are important to our business. We have entered into collaborations with AbbVie and Janssen to discover or develop certain integrin-based therapeutics, and such collaborations currently represent a significant portion of our product pipeline. In particular, MORF-720 is developed in collaboration with AbbVie. In both collaborations, we will conduct research and development activities through the completion of IND-enabling studies, upon which AbbVie and Janssen can exercise their options to develop and commercialize a successful product candidate. We have derived substantially all of our revenue to date from these collaboration agreements, and we expect a significant portion of our future revenue and cash resources to be derived from these agreements or other similar agreements into which we may enter in the future. Revenue from research and development collaborations depends upon continuation of the collaborations, payments for research and development services and resulting options to acquire any licenses of successful product candidates, and the achievement of milestones, contingent payments and royalties, if any, derived from future products developed from our research. If we are unable to successfully advance the development of our product candidates or achieve milestones, revenue and cash

resources from milestone payments under our collaboration agreements will be substantially less than expected.

In addition, we may in the future seek third-party collaborators for research, development and commercialization of other therapeutic technologies or product candidates. Biopharmaceutical companies are our prior and likely future collaborators for any marketing, distribution, development, licensing or broader collaboration arrangements. If we fail to enter into future collaborations on commercially reasonable terms, or at all, or such collaborations are not successful, we may not be able to execute our strategy to develop certain targets, product candidates or disease areas that we believe could benefit from the resources of either larger biopharmaceutical companies or those specialized in a particular area of relevance.

With respect to our existing collaboration agreements, and what we expect will be the case with any future collaboration agreements, we have and expect to have limited control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of our product candidates. Moreover, our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements.

Collaborations involving our product candidates currently pose, and will continue to pose, the following risks to us:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not pursue development and commercialization of our product candidates or may elect not to continue or renew development or commercialization programs based on preclinical studies or clinical trial results, changes in the collaborators' strategic focus or available funding, or external factors such as an acquisition that diverts resources or creates competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- collaborators with marketing and distribution rights to one or more products may not commit sufficient resources to the marketing and distribution of such product or products;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to litigation or potential liability;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability;
- disputes may arise between the collaborators and us that result in the delay or termination of the research, development or commercialization of our product candidates or that result in costly litigation or arbitration that diverts management attention and resources; and
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates.

As a result of the foregoing, our current and any future collaboration agreements may not lead to development or commercialization of our product candidates in the most efficient manner or at all. If a collaborator of ours were to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program could be delayed, diminished or terminated. Any failure to successfully develop or commercialize our product candidates pursuant to our current or any

future collaboration agreements could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Moreover, to the extent that any of our existing or future collaborators were to terminate a collaboration agreement, we may be forced to independently develop these product candidates, including funding preclinical studies or clinical trials, assuming marketing and distribution costs and defending intellectual property rights, or, in certain instances, abandon product candidates altogether, any of which could result in a change to our business plan and have a material adverse effect on our business, financial condition, results of operations and prospects.

Our existing discovery collaboration with Schrödinger is important to our business. If we are unable to maintain this collaboration, or if this collaboration is not successful, our business could be adversely affected.

In June 2015, we entered into a Collaboration Agreement with Schrödinger, which was subsequently amended in March 2018, or the Schrödinger Agreement. Under the collaboration, Schrödinger will use its technology platform to perform virtual screens of members of the target class of human integrins, and we and Schrödinger will collaborate to facilitate prioritization of targets, perform target validation and analysis, identify leads and perform lead optimization. See "Business — Schrödinger Agreement." Schrödinger has granted us an exclusive license for all intellectual property for our product candidates.

Because we currently rely on Schrödinger for a substantial portion of our discovery capabilities, if Schrödinger delays or fails to perform its obligations under the Schrödinger Agreement, disagrees with our interpretation of the terms of the collaboration or our discovery plan or terminates the Schrödinger Agreement, our pipeline of product candidates would be adversely affected. Schrödinger may also fail to properly maintain or defend the intellectual property we have licensed from them, or even infringe upon, our intellectual property rights, leading to the potential invalidation of our intellectual property or subjecting us to litigation or arbitration, any of which would be time-consuming and expensive. Additionally, either party has the right to terminate the collaboration pursuant to the terms of the Schrödinger Agreement. If our collaboration with Schrödinger is terminated, especially during our discovery phase, the development of our product candidates would be materially delayed or harmed.

We may have conflicts with our collaborators that could delay or prevent the development or commercialization of our product candidates.

We may have conflicts with our collaborators, such as conflicts concerning the interpretation of preclinical or clinical data, the achievement of milestones, the interpretation of contractual obligations, payments for services, development obligations or the ownership of intellectual property developed during our collaboration. If any conflicts arise with any of our collaborators, such collaborator may act in a manner that is adverse to our best interests. Any such disagreement could result in one or more of the following, each of which could delay or prevent the development or commercialization of our product candidates, and in turn prevent us from generating revenues: unwillingness on the part of a collaborator to pay us milestone payments or royalties we believe are due to us under a collaboration, which could require us to raise additional capital; uncertainty regarding ownership of intellectual property rights arising from our collaborative activities, which could prevent us from entering into additional collaborations; unwillingness by the collaborator to cooperate in the development or manufacture of the product, including providing us with product data or materials; unwillingness on the part of a collaborator to keep us informed regarding the progress of its development and commercialization activities or to permit public disclosure of the results of those activities; initiating of litigation or alternative dispute resolution options by either party to resolve the dispute; or attempts by either party to terminate the agreement.

We may not successfully engage in strategic transactions, including any additional collaborations we seek, which could adversely affect our ability to develop and commercialize product candidates, impact our cash position, increase our expenses and present significant distractions to our management.

From time to time, we may consider strategic transactions, such as additional collaborations, acquisitions of companies, asset purchases and out- or in-licensing of product candidates or technologies that we believe will complement or augment our existing business. In particular, we will evaluate and, if strategically attractive, seek to enter into additional collaborations, including with major biotechnology or biopharmaceutical companies. The competition for collaborators is intense, and the negotiation process is time-consuming and complex. Any new collaboration may be on terms that are not optimal for us, and we may not be able to maintain any new collaboration if, for example, development or approval of a product candidate is delayed, sales of an approved product candidate do not meet expectations or the collaborator terminates the collaboration. In addition, a significant number of recent business combinations among large pharmaceutical companies has resulted in a reduced number of potential future strategic partners. Our collaborators may consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us for our product candidate. Our ability to reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the strategic partner's resources and expertise, the terms and conditions of the proposed collaboration and the proposed strategic partner's evaluation of a number of factors. These factors may include the design or results of clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the United States, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge and industry and market conditions generally. Moreover, if we acquire assets with promising markets or technologies, we may not be able to realize the benefit of acquiring such assets if we are not able to successfully integrate them with our existing technologies. We may encounter numerous difficulties in developing, testing, manufacturing and marketing any new products resulting from a strategic acquisition that delay or prevent us from realizing their expected benefits or enhancing our business.

We cannot assure you that following any such collaboration, or other strategic transaction, we will achieve the expected synergies to justify the transaction. For example, such transactions may require us to incur non-recurring or other charges, increase our near- and long-term expenditures and pose significant integration or implementation challenges or disrupt our management or business. These transactions would entail numerous operational and financial risks, including exposure to unknown liabilities, disruption of our business and diversion of our management's time and attention in order to manage a collaboration or develop acquired products, product candidates or technologies, incurrence of substantial debt or dilutive issuances of equity securities to pay transaction consideration or costs, higher than expected collaboration, acquisition or integration costs, write-downs of assets or goodwill or impairment charges, increased amortization expenses, difficulty and cost in facilitating the collaboration or combining the operations and personnel of any acquired business, impairment of relationships with key suppliers, manufacturers or customers of any acquired business due to changes in management and ownership and the inability to retain key employees of any acquired business.

Accordingly, although there can be no assurance that we will undertake or successfully complete any transactions of the nature described above, any transactions that we do complete may be subject to the foregoing or other risks and would have a material and adverse effect on our business, financial condition, results of operations and prospects. Conversely, any failure to enter any additional collaboration or other strategic transaction that would be beneficial to us could delay the development and potential commercialization of our product candidates and have a negative impact on the competitiveness of any product candidate that reaches market.

We expect to rely on third parties to conduct certain of our preclinical studies or clinical trials. If those third parties do not perform as contractually required, fail to satisfy legal or regulatory requirements, miss expected deadlines or terminate the relationship, our development program could be delayed with potentially material and adverse effects on our business, financial condition, results of operations and prospects.

We intend to rely in the future on third-party clinical investigators, CROs, clinical data management organizations and consultants to assist or provide the design, conduct, supervision and monitoring of preclinical studies and clinical trials of our product candidates. Because we intend to rely on these third parties and will not have the ability to conduct all preclinical studies or clinical trials independently, we will have less control over the timing, quality and other aspects of preclinical studies and clinical trials than we would have had we conducted them on our own. These investigators, CROs and consultants will not be our employees and we will have limited control over the amount of time and resources that they dedicate to our programs. These third parties may have contractual relationships with other entities, some of which may be our competitors, which may draw time and resources from our programs. The third parties with which we may contract might not be diligent, careful or timely in conducting our preclinical studies or clinical trials, resulting in the preclinical studies or clinical trials being delayed or unsuccessful.

If we cannot contract with acceptable third parties on commercially reasonable terms, or at all, or if these third parties do not carry out their contractual duties, satisfy legal and regulatory requirements for the conduct of preclinical studies or clinical trials or meet expected deadlines, our clinical development programs could be delayed and otherwise adversely affected. In all events, we will be responsible for ensuring that each of our preclinical studies and clinical trials are conducted in accordance with the general investigational plan and protocols for the trial as well as applicable legal and regulatory requirements. The FDA generally requires preclinical studies to be conducted in accordance with good laboratory practices and clinical trials to be conducted in accordance with good clinical practices, including for designing, conducting, recording and reporting the results of preclinical studies and clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. Our reliance on third parties that we do not control will not relieve us of these responsibilities and requirements. Any adverse development or delay in our preclinical studies or clinical trials as a result of our reliance on third parties could have a material and adverse effect on our business, financial condition, results of operations and prospects.

If any of our relationships with these third-party CROs or others terminate, we may not be able to enter into arrangements with alternative CROs or other third parties or to do so on commercially reasonable terms. Switching or adding additional CROs involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new CRO begins work. As a result, delays may occur, which can materially impact our ability to meet our desired clinical development timelines.

We rely on third-party manufacturers and suppliers to supply components of our product candidates. The loss of our third-party manufacturers or suppliers, or our or their failure to comply with applicable regulatory requirements or to supply sufficient quantities at acceptable quality levels or prices, or at all, would materially and adversely affect our business.

We do not own or operate facilities for drug manufacturing, storage, distribution or quality testing. We currently rely, and may continue to rely, on third-party contract manufacturers, including in the U.K. and China, to manufacture bulk drug substances, drug products, raw materials, samples, components, or other materials and reports. Reliance on third-party manufacturers may expose us to different risks than if we were to manufacture product candidates ourselves. Under our collaboration agreements with AbbVie and Janssen, our collaborators will assume responsibility for the manufacturing according to the terms of those agreements for licensed products. There can be no assurance that our preclinical and clinical development product supplies will not be limited, interrupted, terminated or of satisfactory quality or continue to be

available at acceptable prices. In particular, any replacement of our manufacturer could require significant effort and expertise because there may be a limited number of qualified replacements.

The manufacturing process for a product candidate is subject to FDA and foreign regulatory authority review. We, and our suppliers and manufacturers, must meet applicable manufacturing requirements and undergo rigorous facility and process validation tests required by regulatory authorities in order to comply with regulatory standards, such as current Good Manufacturing Practices, or cGMPs. Securing marketing approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the FDA and foreign regulatory authorities. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or comparable foreign regulatory authorities, we may not be able to rely on their manufacturing facilities for the manufacture of elements of our product candidates. Moreover, we do not control the manufacturing process at our contract manufacturers, and are completely dependent on them for compliance with current regulatory requirements. In the event that any of our manufacturers fails to comply with such requirements or to perform its obligations in relation to quality, timing or otherwise, or if our supply of components or other materials becomes limited or interrupted for other reasons, we may be forced to enter into an agreement with another third party, which we may not be able to do on reasonable terms, if at all. In some cases, the technical skills or technology required to manufacture our product candidates may be unique or proprietary to the original manufacturer and we may have difficulty transferring such to another third party. These factors would increase our reliance on such manufacturer or require us to obtain a license from such manufacturer in order to enable us, or to have another third party, manufacture our product candidates. If we are required to change manufacturers for any reason, we will be required to verify that the new manufacturer maintains facilities and procedures that comply with quality standards and with all applicable regulations and guidelines; and we may be required to repeat some of the development program. The delays associated with the verification of a new manufacturer could negatively affect our ability to develop product candidates in a timely manner or within budget.

We expect to continue to rely on third-party manufacturers if we receive regulatory approval for any product candidate. To the extent that we have existing, or enter into future, manufacturing arrangements with third parties, we will depend on these third parties to perform their obligations in a timely manner consistent with contractual and regulatory requirements, including those related to quality control and assurance. Any manufacturing facilities used to produce our products will be subject to periodic review and inspection by the FDA and foreign regulatory authorities, including for continued compliance with cGMP requirements, quality control, quality assurance and corresponding maintenance of records and documents. If we are unable to obtain or maintain third-party manufacturing for product candidates, or to do so on commercially reasonable terms, we may not be able to develop and commercialize our product candidates successfully. Our or a third party's failure to execute on our manufacturing requirements, comply with cGMPs or maintain a compliance status acceptable to the FDA or foreign regulatory authorities could adversely affect our business in a number of ways, including:

- an inability to initiate or continue clinical trials of product candidates under development;
- delay in submitting regulatory applications, or receiving regulatory approvals, for product candidates;
- loss of the cooperation of existing or future collaborators;
- subjecting third-party manufacturing facilities to additional inspections by regulatory authorities;
- requirements to cease distribution or to recall batches of our product candidates; and
- in the event of approval to market and commercialize a product candidate, an inability to meet commercial demands for our products.

Additionally, our contract manufacturers may experience manufacturing difficulties due to resource constraints or as a result of labor disputes or unstable political environments. If our contract manufacturers were to encounter any of these difficulties, our ability to provide our product candidates to patients in

preclinical and clinical trials, or to provide product for treatment of patients once approved, would be jeopardized.

The manufacturing of small molecules is complex and our third-party manufacturers may encounter difficulties in production. If we or any of our third-party manufacturers encounter such difficulties, our ability to provide supply of our product candidates for clinical trials, our ability to obtain marketing approval, or our ability to provide supply of our products for patients, if approved, could be delayed or stopped.

Our product candidates are biopharmaceuticals and the process of manufacturing biopharmaceuticals is complex, time-consuming, highly regulated and subject to multiple risks. Our contract manufacturers must comply with legal requirements, cGMPs and guidelines for the manufacturing of biopharmaceuticals used in clinical trials and, if approved, marketed products. Our contract manufacturers may have limited experience in the manufacturing of cGMP batches.

Manufacturing biopharmaceuticals is highly susceptible to product loss due to contamination, equipment failure, improper installation or operation of equipment, vendor or operator error, inconsistency in yields, variability in product characteristics and difficulties in scaling the production process. Even minor deviations from normal manufacturing processes could result in reduced production yields, product defects and other supply disruptions. If microbial, viral or other contaminations are discovered at our third-party manufacturers' facilities, such facilities may need to be closed for an extended period of time to investigate and remedy the contamination, which could delay clinical trials and adversely harm our business. Moreover, if the FDA determines that our third-party manufacturers' facilities are not in compliance with FDA laws and regulations, including those governing cGMPs, the FDA may deny NDA approval until the deficiencies are corrected or we replace the manufacturer in our NDA with a manufacturer that is in compliance.

In addition, there are risks associated with large scale manufacturing for clinical trials or commercial scale including, among others, cost overruns, potential problems with process scale-up, process reproducibility, stability issues, compliance with cGMPs, lot consistency and timely availability of raw materials. Even if our collaborators obtain regulatory approval for any of our product candidates, there is no assurance that manufacturers will be able to manufacture the approved product to specifications acceptable to the FDA or other regulatory authorities, to produce it in sufficient quantities to meet the requirements for the potential launch of the product or to meet potential future demand. If our manufacturers are unable to produce sufficient quantities for clinical trials or for commercialization, commercialization efforts would be impaired, which would have an adverse effect on our business, financial condition, results of operations and prospects.

Scaling up a biopharmaceutical manufacturing process is a difficult and uncertain task, and our third-party manufacturers may not have the necessary capabilities to complete the implementation, manufacturing and development process. If we are unable to adequately validate or scale-up the manufacturing process at our current manufacturers' facilities, we will need to transfer to another manufacturer and complete the manufacturing validation process, which can be lengthy. If we are able to adequately validate and scale-up the manufacturing process for our product candidates with a contract manufacturer, we will still need to negotiate with such contract manufacturer an agreement for commercial supply and it is not certain we will be able to come to agreement on terms acceptable to us.

We cannot assure you that any stability or other issues relating to the manufacture of any of our product candidates or products will not occur in the future. If our third-party manufacturers were to encounter any of these difficulties, our ability to provide any product candidates to patients in planned clinical trials and products to patients, once approved, would be jeopardized. Any delay or interruption in the supply of clinical trial supplies could delay the completion of planned clinical trials, increase the costs associated with maintaining clinical trial programs and, depending upon the period of delay, require us to commence new clinical trials at additional expense or terminate clinical trials completely. Any adverse developments

affecting clinical or commercial manufacturing of our product candidates or products may result in shipment delays, inventory shortages, lot failures, product withdrawals or recalls, or other interruptions in the supply of our product candidates or products. We may also have to take inventory write-offs and incur other charges and expenses for product candidates or products that fail to meet specifications, undertake costly remediation efforts or seek more costly manufacturing alternatives. Accordingly, failures or difficulties faced at any level of our supply chain could adversely affect our business and delay or impede the development and commercialization of any of our product candidates or products, if approved, and could have an adverse effect on our business, prospects, financial condition and results of operations.

As part of our process development efforts, we also may make changes to the manufacturing processes at various points during development, for various reasons, such as controlling costs, achieving scale, decreasing processing time, increasing manufacturing success rate or other reasons. Such changes carry the risk that they will not achieve their intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of our ongoing clinical trials or future clinical trials. In some circumstances, changes in the manufacturing process may require us to perform *ex vivo* comparability studies and to collect additional data from patients prior to undertaking more advanced clinical trials. For instance, changes in our process during the course of clinical development may require us to show the comparability of the product used in earlier clinical phases or at earlier portions of a trial to the product used in later clinical phases or later portions of the trial.

Risks Related to Our Business and Operations

We will need to grow our organization, and we may experience difficulties in managing our growth and expanding our operations, which could adversely affect our business.

As of December 31, 2018, we had approximately 37 full-time employees. As our development and commercialization plans and strategies develop, and as we transition into operating as a public company, we expect to expand our employee base for managerial, operational, financial and other resources. In addition, we have limited experience in product development. As our product candidates enter and advance through preclinical studies and clinical trials, we will need to expand our development and regulatory capabilities and contract with other organizations to provide manufacturing and other capabilities for us. In the future, we expect to have to manage additional relationships with collaborators or partners, suppliers and other organizations. Our ability to manage our operations and future growth will require us to continue to improve our operational, financial and management controls, reporting systems and procedures. We may not be able to implement improvements to our management information and control systems in an efficient or timely manner and may discover deficiencies in existing systems and controls. Our inability to successfully manage our growth and expand our operations could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Any inability to attract and retain qualified key management and technical personnel would impair our ability to implement our business plan.

Our success largely depends on the continued service of key management, advisors and other specialized personnel, including Praveen P. Tipirneni, M.D., our chief executive officer, Robert E. Farrell, Jr., CPA, our vice president of finance and operations and treasurer, Bruce N. Rogers, Ph.D., our chief scientific officer, Alexey A. Lugovskoy, Ph.D., our chief development officer, and Timothy A. Springer, Ph.D., our founder and advisor. We currently do not maintain key person insurance on these individuals. The loss of one or more members of our management team or other key employees or advisors could delay our research and development programs and have a material and adverse effect on our business, financial condition, results of operations and prospects. The relationships that our key managers have cultivated within our industry make us particularly dependent upon their continued employment with us. We are dependent on the continued service of our technical personnel, in particular, personnel involved with crystallization of integrins, because of the highly technical nature of our product candidates and technologies related to our

MInT Platform, and the specialized nature of the regulatory approval process. Because our management team and key employees are not obligated to provide us with continued service, they could terminate their employment with us at any time without penalty.

We conduct our operations at our facility in Waltham, Massachusetts. This region is headquarters to many other biopharmaceutical companies and many academic and research institutions. Competition for skilled personnel in our market is intense and may limit our ability to hire and retain highly qualified personnel on acceptable terms or at all. We also face competition for personnel from other companies, universities, public and private research institutions, government entities and other organizations. Our future success will depend in large part on our continued ability to attract and retain other highly qualified scientific, technical and management personnel, as well as personnel with expertise in clinical testing, manufacturing, governmental regulation and commercialization. If we are unable to continue to attract and retain high-quality personnel, the rate and success at which we can discover and develop product candidates will be limited which could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Our future growth may depend, in part, on our ability to operate in foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future growth may depend, in part, on our ability to develop and commercialize our product candidates in foreign markets for which we may rely on collaboration with third parties. We are not permitted to market or promote any of our product candidates before we receive regulatory approval from the applicable regulatory authority in that foreign market, and may never receive such regulatory approval for any of our product candidates. To obtain separate regulatory approval in many other countries, we must comply with numerous and varying regulatory requirements of such countries regarding safety and efficacy and governing, among other things, clinical trials and commercial sales, pricing and distribution of our product candidates, and we cannot predict success in these jurisdictions. If we fail to comply with the regulatory requirements in international markets and receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed and our business will be adversely affected. We may not obtain foreign regulatory approvals on a timely basis, if at all. Our failure to obtain approval of any of our product candidates by regulatory authorities in another country may significantly diminish the commercial prospects of that product candidate and our business, financial condition, results of operations and prospects could be materially and adversely affected. Moreover, even if we obtain approval of our product candidates and ultimately commercialize our product candidates in foreign markets, we would be subject to the risks and uncertainties, including the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements and reduced protection of intellectual property rights in some foreign countries.

Our business entails a significant risk of product liability and our ability to obtain sufficient insurance coverage could have a material and adverse effect on our business, financial condition, results of operations and prospects.

When we conduct clinical trials of our product candidates, we may be exposed to significant product liability risks inherent in the development, testing, manufacturing and marketing of therapeutic treatments. Product liability claims could delay or prevent completion of our development programs. If we succeed in marketing products, such claims could result in an FDA investigation of the safety and effectiveness of our products, our manufacturing processes and facilities or our marketing programs and potentially a recall of our products or more serious enforcement action, limitations on the approved indications for which they may be used or suspension or withdrawal of approvals. Regardless of the merits or eventual outcome, liability claims may also result in decreased demand for our products, termination of clinical trial sites or entire trial programs, withdrawal of clinical trial participants, injury to our reputation and significant negative media attention, significant costs to defend the related litigation, a diversion of management's time and our resources from our business operations, substantial monetary awards to trial participants or patients, loss of

revenue, the inability to commercialize and products that we may develop, and a decline in our stock price. We currently maintain general liability insurance with coverage up to $10.0 million. We may, however, need to obtain higher levels of product liability insurance for later stages of clinical development or marketing any of our product candidates. Any insurance we have or may obtain may not provide sufficient coverage against potential liabilities. Furthermore, clinical trial and product liability insurance is becoming increasingly expensive. As a result, we may be unable to obtain sufficient insurance at a reasonable cost to protect us against losses caused by product liability claims that could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Our employees, independent contractors, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee fraud or other illegal activity by our employees, independent contractors, consultants, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to comply with FDA regulations, provide true, complete and accurate information to the FDA and other similar foreign regulatory bodies, comply with manufacturing standards we may establish, comply with healthcare fraud and abuse laws and regulations, report financial information or data accurately or disclose unauthorized activities to us. If we obtain FDA approval of any of our product candidates and begin commercializing those products in the United States, our potential exposure under these laws will increase significantly, and our costs associated with compliance with these laws are likely to increase. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a material and adverse effect on our business, financial condition, results of operations and prospects, including the imposition of significant civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, the curtailment or restructuring of our operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in government contracting, healthcare reimbursement or other government programs, including Medicare and Medicaid, integrity oversight and reporting obligations, or reputational harm.

We depend on our information technology systems, and any failure of these systems, or those of our CROs or other contractors or consultants we may utilize, could harm our business. Security breaches, cyber-attacks, loss of data, and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business, results of operations, financial condition and prospects.

We collect and maintain information in digital form that is necessary to conduct our business, and we are increasingly dependent on information technology systems and infrastructure to operate our business. In the ordinary course of our business, we collect, store and transmit large amounts of confidential information, including intellectual property, proprietary business information and personal data. It is critical that we do so in a secure manner to maintain the confidentiality and integrity of such confidential information. We have established physical, electronic and organizational measures to safeguard and secure our systems to prevent a data compromise, and rely on commercially available systems, software, tools, and monitoring to

provide security for our information technology systems and the processing, transmission and storage of digital information. We have also outsourced elements of our information technology infrastructure, and as a result a number of third-party vendors may or could have access to our confidential information. Our internal information technology systems and infrastructure, and those of our current and any future collaborators, contractors and consultants and other third parties on which we rely, are vulnerable to damage from cyber incidents such as third parties getting access to employee accounts using stolen or inferred credentials, computer viruses, phishing attacks, spamming, malware, cyber-attacks or cyber-intrusions over the Internet, attachments to emails, persons inside our organization, or persons with access to systems inside our organization, and attempts to gain unauthorized access to computer systems and networks. Our internal information technology systems and infrastructure is also vulnerable to damage from natural disasters, terrorism, war, telecommunication and electrical failures.

The risk of a security breach or disruption or data loss, particularly through cyber-attacks or cyber intrusion, including by computer hackers, foreign governments and cyber terrorists, has generally increased as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased. In addition, the prevalent use of mobile devices that access confidential information increases the risk of data security breaches, which could lead to the loss of confidential information or other intellectual property. The costs to us to mitigate network security problems, bugs, viruses, worms, malicious software programs and security vulnerabilities could be significant, and while we have implemented security measures to protect our data security and information technology systems, our efforts to address these problems may not be successful, and these problems could result in unexpected interruptions, delays, cessation of service and other harm to our business and our competitive position. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our product development programs. For example, the loss of clinical trial data from completed or ongoing or planned clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. Moreover, if a computer security breach affects our systems or results in the unauthorized release of personally identifiable information, our reputation could be materially damaged. In addition, such a breach may require notification to governmental agencies, the media or individuals pursuant to various federal and state privacy and security laws, if applicable, including the Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and its implementing rules and regulations, as well as regulations promulgated by the Federal Trade Commission and state breach notification laws. In addition, such cyber-attacks, data breaches or destruction or loss of data could result in violation of applicable international privacy, data protection and other laws, resulting in exposure to material civil and/or criminal liability. Further, our general liability insurance and corporate risk program may not cover all potential claims to which we are exposed and may not be adequate to indemnify us for all liability that maybe imposed; and could materially adversely affect our business, results of operations, financial condition and prospects. For example, the loss of clinical trial data from completed or ongoing clinical trials for any of our product candidates could result in delays in our development and regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, we may suffer reputational harm or face litigation or adverse regulatory action as a result of cyber-attacks or other data security breaches and may incur significant additional expense to implement further data protection measures.

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be affected adversely.

Our research and development involves the use of hazardous chemicals and materials, including radioactive materials. We maintain quantities of various flammable and toxic chemicals in our facilities in Waltham, Massachusetts that are required for our research and development activities. We are subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous chemicals and materials. We believe our procedures for storing, handling and disposing these materials in our facilities comply with the relevant guidelines of Middlesex County, Massachusetts. Although

we believe that our safety procedures for handling and disposing of these materials comply with the standards mandated by applicable regulations, the risk of accidental contamination or injury from these materials cannot be eliminated. If an accident occurs, we could be held liable for resulting damages, which could be substantial. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of animals and biohazardous materials. Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials, this insurance may not provide adequate coverage against potential liabilities. We may incur substantial costs to comply with, and substantial fines or penalties if we violate, any of these laws or regulations.

Our current operations concentrated in one location, and we or the third parties upon whom we depend may be adversely affected by a heavy snow storm or other natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Our current operations are located in our facilities in Waltham, Massachusetts. Any unplanned event, such as flood, fire, explosion, earthquake, extreme weather condition, medical epidemic, power shortage, telecommunication failure or other natural or manmade accidents or incidents that result in us being unable to fully utilize our facilities, or the manufacturing facilities of our third-party contract manufacturers, may have a material and adverse effect on our ability to operate our business, particularly on a daily basis, and have significant negative consequences on our financial and operating conditions. For example, our operations are concentrated primarily on the east coast of the United States, and any adverse weather event or natural disaster, such as a hurricane or heavy snow storm, could have a material adverse effect on a substantial portion of our operations. Loss of access to these facilities may result in increased costs, delays in the development of our product candidates or interruption of our business operations. Extreme weather conditions or other natural disasters could further disrupt our operations, and have a material and adverse effect on our business, financial condition, results of operations and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as our research facilities or the manufacturing facilities of our third-party contract manufacturers, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible, for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business. As part of our risk management policy, we maintain insurance coverage at levels that we believe are appropriate for our business. However, in the event of an accident or incident at these facilities, we cannot assure you that the amounts of insurance will be sufficient to satisfy any damages and losses. If our facilities, or the manufacturing facilities of our third-party contract manufacturers, are unable to operate because of an accident or incident or for any other reason, even for a short period of time, any or all of our research and development programs may be harmed. Any business interruption could have a material and adverse effect on our business, financial condition, results of operations and prospects.

We are subject to complex tax rules relating to our business, and any audits, investigations or tax proceedings could have a material adverse effect on our business, results of operations and financial condition.

We are subject to income and non-income taxes in the United States. Income tax accounting often involves complex issues, and judgment is required in determining our provision for income taxes and other tax liabilities. We may operate in other non-United States jurisdictions in the future. We could become subject to income and non-income taxes in non-United States jurisdictions as well. In addition, many jurisdictions have detailed transfer pricing rules, which require that all transactions with non-resident related parties be priced using arm's length pricing principles within the meaning of such rules. The application of

withholding tax, goods and services tax, sales taxes and other non-income taxes is not always clear and we may be subject to tax audits relating to such withholding or non-income taxes. We believe that our tax positions are reasonable. We are currently not subject to any tax audits. However, the Internal Revenue Service or other taxing authorities may disagree with our positions. If the Internal Revenue Service or any other tax authorities were successful in challenging our positions, we may be liable for additional tax and penalties and interest related thereto or other taxes, as applicable, in excess of any reserves established therefor, which may have a significant impact on our results and operations and future cash flow.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

As of December 31, 2018, we had net operating loss carryforwards for federal and state income tax purposes of $34.7 million and $21.4 million, respectively, which begin to expire in 2036. As of December 31, 2018, we also had available tax credit carryforwards for federal and state income tax purposes of $0.6 million and $0.4 million, respectively, which begin to expire in 2031. To the extent that our taxable income exceeds any current year operating losses, we plan to use our carryforwards to offset income that would otherwise be taxable. However, utilization of carryforwards generated in tax years beginning after December 31, 2017 are limited to a maximum of 80% of the taxable income for such year determined without regard to such carryforwards. In addition, under Section 382 of the Code, changes in our ownership may limit the amount of our net operating loss carryforwards and tax credit carryforwards that could be utilized annually to offset our future taxable income, if any. This limitation would generally apply in the event of a cumulative change in ownership of our company of more than 50% within a three-year period. We have not performed an analysis to determine whether there has been an ownership change pursuant to Section 382. Any such limitation may significantly reduce our ability to utilize our net operating loss carryforwards and tax credit carryforwards before they expire. Private placements and other transactions that have occurred since our inception, as well as our initial public offering, may trigger such an ownership change pursuant to Section 382. Any such limitation, whether as the result of our initial public offering, prior private placements, sales of our common stock by our existing stockholders or additional sales of our common stock by us, could have a material adverse effect on our results of operations in future years. Under the Tax Cuts and Jobs Act of 2017, net operating losses generated after December 31, 2017 will not be subject to expiration.

Risks Related to Intellectual Property

If we are not able to obtain, maintain, and enforce patent protection for our technologies or product candidates, development and commercialization of our product candidates may be adversely affected.

Our success depends in part on our ability to obtain and maintain patents and other forms of intellectual property rights, including in-licenses of intellectual property rights of others, for our product candidates, as well as our ability to preserve our trade secrets, to prevent third parties from infringing upon our proprietary rights and to operate without infringing upon the proprietary rights of others. As of March 31, 2019, we solely owned four published pending patent applications and six unpublished pending patent applications; and, under an exclusive, worldwide license agreement with the Children's Medical Center Corporation, or the CMCC Agreement, we licensed one allowed U.S. patent application and one related pending U.S. divisional application with claims relating to modified integrin polypeptides and modified integrin polypeptide dimers. We may not be able to apply for patents on certain aspects of our product candidates in a timely fashion or at all. Further, we may not be able to prosecute all necessary or desirable patent applications, or maintain, enforce and license any patents that may issue from such patent applications, at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. We may not have the right to control the preparation, filing and prosecution of all patent applications that we license from third parties, or to maintain the rights to patents licensed to third parties. Therefore, these patents and applications may not be prosecuted and enforced in a manner consistent with the best interests of our business. Future patents we obtain may not be sufficiently broad to prevent others from using our technology or from developing

competing products and technology. There is no guarantee that any of our pending patent applications will result in issued or granted patents, that any of our future issued or granted patents will not later be found to be invalid or unenforceable or that any future issued or granted patents will include claims that are sufficiently broad to cover our product candidates or to provide meaningful protection from our competitors. Moreover, the patent position of biotechnology and biopharmaceutical companies can be highly uncertain because it involves complex legal and factual questions. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our current and future proprietary technology and product candidates are covered by valid and enforceable patents, or are effectively maintained as trade secrets. If third parties disclose or misappropriate our proprietary rights, it may materially and adversely affect our position in the market.

Our pending patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications. Assuming the other requirements for patentability are met, currently, the first to file a patent application is generally entitled to the patent. However, prior to March 16, 2013, in the United States, the first to invent was entitled to the patent. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we were the first to make the inventions claimed in our patents or pending patent applications, or that we were the first to file for patent protection of such inventions.

The U.S. Patent and Trademark Office, or USPTO, and various foreign governmental patent agencies require compliance with a large number of procedural, documentary, fee payment and other provisions during the patent process. There are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case. The standards applied by the USPTO and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology and biopharmaceutical patents. As such, we do not know the degree of future protection that we will have on our proprietary products and technology. The process of obtaining patents is time consuming, expensive and sometimes unpredictable.

Once granted, for a given period after allowance or grant patents may remain open to opposition, interference, re-examination, post-grant review, *inter partes* review, nullification, or derivation action in court or before patent offices or similar proceedings, during which time third parties can raise objections against such initial grant. Such proceedings may continue for a protracted period of time and an adverse determination in any such proceedings could reduce the scope of the allowed or granted claims thus attacked, or could result in our patents being invalidated in whole or in part, or being held unenforceable, which could allow third parties to commercialize our product candidates and compete directly with us without payment to us. In addition, there can be no assurance that:

- § others will not or may not be able to make, use or sell compounds that are the same as or similar to our product candidates but that are not covered by the claims of the patents that we own or license;
- § we or our licensors, or our existing or future collaborators are the first to make the inventions covered by each of our issued patents and pending patent applications that we own or license;
- § we or our licensors, or our existing or future collaborators are the first to file patent applications covering certain aspects of our inventions;
- § others will not independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights;
- § a third party may not challenge our patents and, if challenged, a court would hold that our patents are valid, enforceable and infringed;
- § any issued patents that we own or have licensed or that we may license in the future will provide us with any competitive advantages, or will not be challenged by third parties;
- § we may develop additional proprietary technologies that are patentable;

- the patents of others will not have a material or adverse effect on our business, financial condition, results of operations and prospects; and
- our competitors do not conduct research and development activities in countries where we do not have enforceable patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets.

If we or our licensors or collaborators fail to maintain the patents and patent applications covering our product candidates, our competitors might be able to enter the market, which could have a material and adverse effect on our business, financial condition, results of operations and prospects. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patent protection for certain aspects of our product candidates, we also consider trade secrets, including confidential and unpatented know-how, important to the maintenance of our competitive position. Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed. We seek to protect trade secrets and confidential and unpatented know-how, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to such knowledge, such as our employees, corporate collaborators, outside scientific collaborators, CROs, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants that obligate them to maintain confidentiality and assign their inventions to us. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts in the United States and certain foreign jurisdictions are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed which could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Other companies or organizations may challenge our or our licensors' patent rights or may assert patent rights that prevent us from developing and commercializing our products.

Oral integrin therapies in fibrosis and inflammatory bowel disease or other disease areas are a relatively new scientific field. We have applied for, and have obtained a license from a third party on an exclusive basis to U.S. patents related to our MInT Platform. Other pending patent applications in the United States and in key markets around the world that we own or license claim many different methods, compositions and processes relating to the discovery, development, and manufacture of small-molecule integrin inhibitor-based and other therapeutics.

As the field of small-molecule integrin inhibitor-based therapeutics continues to mature, patent applications are being processed by national patent offices around the world. There is uncertainty about which patents will issue and, if they do, as to when, to whom, and with what claims. In addition, third parties may attempt to invalidate our intellectual property rights. Even if our rights are not directly challenged, disputes could lead to the weakening of our intellectual property rights. Our defense against any attempt by third parties to circumvent or invalidate our intellectual property rights could be costly to us, could require significant time and attention of our management and could have a material and adverse effect on our business, financial condition, results of operations and prospects or our ability to successfully compete. If

we are found to infringe a third party's intellectual property rights, we could be forced, including by court order, to cease developing, manufacturing or commercializing the infringing product candidate or product.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting, defending and enforcing patents covering our technology in the United States and in other jurisdictions worldwide would be extremely costly, and our or our licensors' or collaborators' intellectual property rights may not exist in some countries outside the United States or may be less extensive in some countries than in the United States. In jurisdictions where we or our licensors or collaborators have not obtained patent protection, competitors may seek to use our or our licensors' or collaborators' technology to develop competing products and further, may export otherwise infringing products to territories where we have patent protection, but where it is more difficult to enforce a patent as compared to the United States. Competitor products may compete with our future products in jurisdictions where we do not have issued or granted patents or where our or our licensors' or collaborators' issued or granted patent claims or other intellectual property rights are not sufficient to prevent competitor activities in these jurisdictions. The legal systems of certain countries, particularly certain developing countries, make it difficult to enforce patents and such countries may not recognize other types of intellectual property protection, particularly relating to pharmaceuticals or biopharmaceuticals. This could make it difficult for us or our licensors or collaborators to prevent the infringement of our or their patents or marketing of competing products in violation of our or their proprietary rights generally in certain jurisdictions. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our and our licensors' or collaborators' efforts and attention from other aspects of our business, could put our and our licensors' or collaborators' patents at risk of being invalidated or interpreted narrowly and our and our licensors' or collaborators' patent applications at risk of not issuing and could provoke third parties to assert claims against us or our licensors or collaborators. We or our licensors or collaborators may not prevail in any lawsuits that we or our licensors or collaborators initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful.

When we elect to pursue patent protection on an invention, we generally first file a U.S. provisional patent application (a priority filing) at the USPTO. An international patent application under the Patent Cooperation Treaty, or PCT, is then usually filed within twelve months after the priority filing. Based on the PCT filing, national and regional patent applications may be filed in the United States, the European Patent Office and, depending on the individual case, also in any or all of, *inter alia*, Australia, Brazil, Canada, China, Hong Kong, India, Israel, Japan, Mexico, New Zealand, Russia, South Africa, South Korea and many other jurisdictions. We have thus far not filed for patent protection in all national and regional jurisdictions where such protection may be available. In addition, we may decide to abandon national and regional patent applications before grant. Finally, the grant proceeding of each national or regional patent office is an independent proceeding which may lead to situations in which applications might in some jurisdictions be refused by the relevant registration authorities, while granted by others. It is also quite common that, depending on the country, various scopes of patent protection may be granted on the same product candidate or technology.

The laws of some jurisdictions do not protect intellectual property rights to the same extent as the laws in the United States, and many companies have encountered significant difficulties in protecting and defending such rights in such jurisdictions. If we or our licensors or collaborators encounter difficulties in protecting, or are otherwise precluded from effectively protecting, the intellectual property rights important for our business in such jurisdictions, the value of these rights may be diminished and we may face additional competition from others in those jurisdictions. Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such a patent. If we or any of our licensors or collaborators are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position in the relevant jurisdiction may be

impaired and our business, financial condition, results of operations and prospects may be adversely affected.

If we fail to comply with our obligations under any license, collaboration or other agreements, we may be required to pay damages and could lose intellectual property rights that are necessary for developing and protecting our product candidates or we could lose certain rights to grant sublicenses.

We are dependent on patents, know-how and proprietary technology, both our own and licensed from others. Any termination of these licenses could result in the loss of significant rights and could harm our ability to develop our product candidates. Our current licenses impose, and any future licenses we enter into are likely to impose, various development, commercialization, funding, milestone, royalty, diligence, sublicensing, insurance, patent prosecution and enforcement and/or other obligations on us. If we breach any of these obligations, or use the intellectual property licensed to us in an unauthorized manner, we may be required to pay damages and the licensor may have the right to terminate the license, which could result in us being unable to develop, manufacture and sell any future products that are covered by the licensed technology or enable a competitor to gain access to the licensed technology. Moreover, our licensors may own or control intellectual property that has not been licensed to us and, as a result, we may be subject to claims, regardless of their merit, that we are infringing or otherwise violating a licensor's rights. In addition, while we cannot determine currently the amount of the royalty obligations we would be required to pay on sales of future products, if any, the amounts may be significant. The amount of our future royalty obligations will depend on the technology and intellectual property we use in products that we successfully develop and commercialize, if any. Therefore, even if we successfully develop and commercialize products, we may be unable to achieve or maintain profitability.

Moreover, disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our product candidates, technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations, and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates, which could have a material adverse effect on our business, financial conditions, results of operations, and prospects.

We, our licensors or collaborators, or any future strategic partners may need to resort to litigation to protect or enforce our patents, if and when granted, or other proprietary rights, all of which could be costly, time consuming, delay or prevent the development and commercialization of our product candidates, or put our patents, if and when granted, and other proprietary rights at risk.

Competitors may infringe our patents, if and when granted, or other intellectual property. If we were to initiate legal proceedings against a third party to enforce a patent covering one of our products or our

technology, the defendant could counterclaim that our patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, lack of adequate written description, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that an individual connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. The outcome following legal assertions of invalidity or unenforceability during patent litigation is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on one or more of our products or certain aspects of our platform technology. Such a loss of patent protection could have a material and adverse effect on our business, financial condition, results of operations and prospects. Interference or derivation proceedings provoked by third parties or brought by us or declared by the USPTO may be necessary to determine the inventorship or priority of inventions with respect to our patents or patent applications. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms or at all, or if a non-exclusive license is offered and our competitors gain access to the same technology. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to continue our clinical trials, continue our research programs, license necessary technology from third parties, or enter into development partnerships that would help us bring our product candidates to market. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions, or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock. Patents and other intellectual property rights will not protect our technology if competitors design around our protected technology without legally infringing our patents or other intellectual property rights.

Intellectual property rights of third parties could adversely affect our ability to commercialize our product candidates, and we, our licensors or collaborators, or any future strategic partners may become subject to third party claims or litigation alleging infringement of patents or other proprietary rights or seeking to invalidate patents or other proprietary rights. We might be required to litigate or obtain licenses from third parties in order to develop or market our product candidates. Such litigation or licenses could be costly or not available on commercially reasonable terms.

We, our licensors or collaborators, or any future strategic partners, may be subject to third-party claims for infringement or misappropriation of patent or other proprietary rights. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, derivations, oppositions and *inter partes* review proceedings before the USPTO, and corresponding foreign patent offices. There may be issued patents and pending patent applications that claim aspects of our targets, our MInT Platform, or our product candidates and modifications that we may need to apply to our product candidates. There may be issued patents that claim integrin inhibitors which may be relevant to the products we wish to develop. Thus, it is possible that one or more organizations will hold patent rights to which we will need a license. If those organizations refuse to grant us a license to such patent rights on reasonable terms, we may not be able to market products or perform research and development or other activities covered by these patents, which could have a material and adverse effect on our business, financial condition, results of operations and prospects. If we, our licensors or collaborators, or any future strategic partners are found to infringe a third-party patent or other intellectual property rights, we could be required to pay damages, potentially including treble damages and attorneys' fees if we or they are found to

have infringed willfully. In addition, we, our licensors or collaborators, or any future strategic partners may choose to seek, or be required to seek, a license from a third party, which may not be available on acceptable terms, if at all. Even if a license can be obtained on acceptable terms, the rights may be non-exclusive, which could give our competitors access to the same technology or intellectual property rights licensed to us. If we fail to obtain a required license, we or our existing or future collaborators may be unable to effectively market product candidates based on our technology, which could limit our ability to generate revenue or achieve profitability and possibly prevent us from generating revenue sufficient to sustain our operations. In addition, we may find it necessary to pursue claims or initiate lawsuits to protect or enforce our patent or other intellectual property rights. The cost to us in defending or initiating any litigation or other proceeding relating to patent or other proprietary rights, even if resolved in our favor, could be substantial, and litigation could divert our management's attention. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could delay our research and development efforts and limit our ability to continue our operations.

Because the integrin-based therapeutics landscape is still evolving, it is difficult to conclusively assess our freedom to operate without infringing on third-party rights. There are numerous companies that have pending patent applications and issued patents broadly covering integrins generally, covering integrins directed against the same targets as, or targets similar to, those we are pursuing, or covering compounds similar to our product candidates. Failure to receive a license could delay commercialization of our product candidates. Our competitive position may suffer if patents issued to third parties or other third-party intellectual property rights cover our products or product candidates or elements thereof, or our manufacture or uses relevant to our development plans. In such cases, we may not be in a position to develop or commercialize products or product candidates until such patents expire or unless we successfully pursue litigation to nullify or invalidate the third-party intellectual property right concerned, or enter into a license agreement with the intellectual property right holder, if available on commercially reasonable terms. There may be issued patents of which we are not aware, held by third parties that, if found to be valid and enforceable, could be alleged to be infringed by our MInT Platform and product candidates. There also may be pending patent applications of which we are not aware that may result in issued patents, which could be alleged to be infringed by our MInT Platform and product candidates. If such an infringement claim should be brought and be successful, we may be required to pay substantial damages, including potentially treble damages and attorneys' fees for willful infringement, and we may be forced to abandon our product candidates or seek a license from any patent holders. No assurances can be given that a license will be available on commercially reasonable terms, if at all.

It is also possible that we have failed to identify relevant third-party patents or applications. For example, U.S. applications filed before November 29, 2000, and certain U.S. applications filed after that date that will not be filed outside the United States remain confidential unless and until corresponding patents issue. Patent applications in the United States and elsewhere are published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Therefore, patent applications covering our products or MInT Platform could have been filed by others without our knowledge. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our MInT Platform, our products or the use of our products. Third-party intellectual property right holders may also actively bring infringement claims against us. We cannot guarantee that we will be able to successfully settle or otherwise resolve such infringement claims. If we are unable to successfully settle future claims on terms acceptable to us, we may be required to engage in or continue costly, unpredictable and time-consuming litigation and may be prevented from or experience substantial delays in marketing our products. Parties making claims against us may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation or administrative proceedings, there is a

risk that some of our confidential information could be compromised by disclosure. In addition, any uncertainties resulting from the initiation and continuation of any litigation could have material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operations, financial condition and prospects. If we fail in any such dispute, in addition to being forced to pay damages, we may be temporarily or permanently prohibited from commercializing any of our product candidates that are held to be infringing. We might, if possible, also be forced to redesign product candidates so that we no longer infringe the third-party intellectual property rights. Any of these events, even if we were ultimately to prevail, could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business and could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Intellectual property litigation could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Litigation and other legal proceedings relating to intellectual property claims, with or without merit, are unpredictable and generally expensive and time consuming and are likely to divert significant resources from our core business, including distracting our technical and management personnel from their normal responsibilities. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Moreover, such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities.

We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating or from successfully challenging our intellectual property rights. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

We may be subject to claims that we or our employees or consultants have wrongfully used or disclosed alleged trade secrets of our employees' or consultants' former employers or their clients. These claims may be costly to defend and if we do not successfully do so, we may be required to pay monetary damages and may lose valuable intellectual property rights or personnel.

Many of our employees, including our management, were previously employed at universities or biotechnology or biopharmaceutical companies, including our competitors or potential competitors. Some of these employees executed proprietary rights, non-disclosure and non-competition agreements in connection with such previous employment. Although no claims against us are currently pending, we may be subject to claims that these employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. A loss of key research personnel or their work product could hamper our ability to develop and ultimately commercialize, or prevent us from developing and commercializing, our product candidates, which could severely harm our business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Patent terms may be insufficient to protect our competitive position on our product candidates for an adequate amount of time.

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various patent term adjustments or extensions may be available, but the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired, we may be open to competition from competitive products, including generics or biosimilars. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to be paid to the USPTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. We have systems in place to remind us to pay these fees, and we employ an outside firm and/or rely on our outside counsel to pay these fees due to the USPTO and non-U.S. patent agencies. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and in many cases an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

Changes in U.S. patent and ex-U.S. patent laws could diminish the value of patents in general, thereby impairing our ability to protect our products.

Changes in either the patent laws or interpretation of the patent laws in the United States or in other jurisdictions could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. In the United States, numerous recent changes to the patent laws and proposed changes to the rules of the USPTO may have a significant impact on our ability to protect our technology and enforce our intellectual property rights. For example, the America Invents Act, enacted within the last several years, involves significant changes in patent legislation. The U.S. Supreme Court has ruled on several patent cases in recent years, some of which cases either narrow the scope of patent protection available in certain circumstances or weaken the rights of patent owners in certain situations. For example, the decision by the *U.S. Supreme Court in Association for Molecular Pathology v. Myriad Genetics, Inc.* precludes a claim to a nucleic acid having a stated nucleotide sequence that is identical to a sequence found in nature and unmodified. We currently are not aware of an immediate impact of this decision on our patent applications because we are developing product candidates that we believe are not found in nature. However, this decision continues to be interpreted by courts and by the USPTO. We cannot assure you that the interpretations of this decision or subsequent rulings will not adversely impact our patents or patent applications. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once granted. Depending on decisions by the U.S. Congress, the federal courts and the USPTO, and similar legislative and regulatory bodies in other countries in which may pursue patent protection, the laws and regulations governing patents could change in unpredictable ways, particularly with respect to pharmaceutical patent protection, that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our common law trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively which could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Government Regulation

We and/or our collaborators may be unable to obtain, or may be delayed in obtaining, U.S. or foreign regulatory approval and, as a result, unable to commercialize our product candidates.

Our product candidates are subject to extensive governmental regulations relating to, among other things, research, testing, development, manufacturing, approval, recordkeeping, reporting, labeling, storage, packaging, advertising and promotion, pricing, post-approval monitoring, marketing and distribution of drugs. Rigorous preclinical testing and clinical trials and an extensive regulatory approval process are required to be completed successfully in the United States and in many foreign jurisdictions before a new drug can be marketed. Satisfaction of these and other regulatory requirements is costly, time consuming, uncertain and subject to unanticipated delays. It is possible that none of the product candidates we may develop, either alone or with our collaborators, will obtain the regulatory approvals necessary for us or our existing or future collaborators to begin selling them.

We have no prior experience in conducting and managing the clinical trials necessary to obtain regulatory approvals, including approval by the FDA. The time required to obtain FDA and other approvals is unpredictable but typically takes many years following the commencement of clinical trials, depending upon the type, complexity and novelty of the product candidate. The standards that the FDA and its foreign counterparts use when regulating us require judgment and can change, which makes it difficult to predict with certainty their application. Any analysis we perform of data from preclinical and clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. We or our collaborators may also encounter unexpected delays or increased costs due to new government regulations, for example, from future legislation or administrative action, or from changes in FDA policy during the period of product development, clinical trials and FDA regulatory review. It is impossible to predict whether legislative changes will be enacted, or whether FDA or foreign regulations, guidance or interpretations will be changed, or the impact of such changes, if any.

Given that the product candidates we are developing, either alone or with our collaborators, represent a new therapeutic approach, the FDA and its foreign counterparts may not have established any definitive policies, practices or guidelines in relation to these product candidates. Moreover, the FDA may respond to any NDA that we may submit by defining requirements that we do not anticipate. Such responses could delay clinical development of our product candidates. In addition, because there may be approved treatments for some of the diseases for which we may seek approval, in order to receive regulatory approval, we may need to demonstrate through clinical trials that the product candidates we develop to treat these diseases, if any, are not only safe and effective, but safer or more effective than existing products. Furthermore, in recent years, there has been increased public and political pressure on the FDA with respect to the approval process for new drugs, and FDA standards, especially regarding product safety.

Any delay or failure in obtaining required approvals could have a material and adverse effect on our ability to generate revenues from the particular product candidate for which we are seeking approval. Furthermore, any regulatory approval to market a product may be subject to limitations on the approved uses for which we may market the product or on the labeling or other restrictions.

We are also subject to or may in the future become subject to numerous foreign regulatory requirements governing, among other things, the conduct of clinical trials, manufacturing and marketing authorization, pricing and third-party reimbursement. The foreign regulatory approval process varies among countries and may include all of the risks associated with the FDA approval process described above, as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. Moreover, the time required to obtain approval may differ from that required to obtain FDA approval. FDA approval does not ensure approval by regulatory authorities outside the United States and vice versa. Any delay or failure to obtain U.S. or foreign regulatory approval for a product candidate could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Even if we receive regulatory approval for any of our product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense. Additionally, our product candidates, if approved, could be subject to labeling and other restrictions and market withdrawal. We may also be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our products.

Any regulatory approvals that we or our existing or future collaborators obtain for our product candidates may also be subject to limitations on the approved indicated uses for which a product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing and surveillance to monitor the safety and efficacy of the product candidate.

In addition, if the FDA or a comparable foreign regulatory authority approves any of our product candidates, the manufacturing processes, labeling, packaging, distribution, post-approval monitoring and adverse event reporting, storage, import, export, advertising, promotion and recordkeeping for the product will be subject to extensive and ongoing regulatory requirements. The FDA has significant post-market authority, including the authority to require labeling changes based on new safety information and to require post-market studies or clinical trials to evaluate safety risks related to the use of a product or to require withdrawal of the product from the market. The FDA also has the authority to require a REMS plan after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug. The manufacturing facilities we use to make a future product, if any, will also be subject to periodic review and inspection by the FDA and other regulatory agencies, including for continued compliance with cGMP requirements. The discovery of any new or previously unknown problems with our third-party manufacturers, manufacturing processes or facilities may result in restrictions on the product, manufacturer or facility, including withdrawal of the product from the market. If we rely on third-party manufacturers, we will not have control over compliance with applicable rules and regulations by such manufacturers. Any product promotion and advertising will also be subject to regulatory requirements and continuing regulatory review. The FDA imposes stringent restrictions on manufacturers' communications regarding use of their products. If we promote our product candidates in a manner inconsistent with FDA-approved labeling or otherwise not in compliance with FDA regulations, we may be subject to enforcement action. If we or our existing or future collaborators, manufacturers or service providers fail to comply with applicable continuing regulatory requirements in the United States or foreign jurisdictions in which we seek to market our products, we or they may be subject to, among other things, fines, warning letters, holds on clinical trials, delay of approval or refusal by the FDA or similar foreign regulatory bodies to approve pending applications or supplements to approved applications, suspension or withdrawal of regulatory approval, product recalls and seizures, administrative detention of products, refusal to permit the import or export of products, operating restrictions, injunction, civil penalties and criminal prosecution.

Subsequent discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- § restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market or voluntary or mandatory product recalls;

- fines, warning or untitled letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or our strategic partners;
- suspension or revocation of product license approvals;
- product seizure or detention or refusal to permit the import or export of products; and
- injunctions or the imposition of civil or criminal penalties.

The FDA policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. For example, in December 2016, the 21st Century Cures Act, or Cures Act, was signed into law. The Cures Act, among other things, is intended to modernize the regulation of drugs and biologics and to spur innovation. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability, which would adversely affect our business.

We also cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. For example, certain policies of the current U.S. presidential administration may impact our business and industry. Namely, the current U.S. presidential administration has taken several executive actions, including the issuance of a number of executive orders, that could impose significant burdens on, or otherwise materially delay, the FDA's ability to engage in routine regulatory and oversight activities such as implementing statutes through rulemaking, issuance of guidance, and review and approval of marketing applications. Changes in FDA staffing could result in delays in the FDA's responsiveness or in its ability to review submissions or applications, issue regulations or guidance, or implement or enforce regulatory requirements in a timely fashion or at all. Similar consequences would also result in the event of another significant shutdown of the federal government such as the one that occurred from December 22, 2018 through January 25, 2019. It is difficult to predict how these requirements will be implemented, and the extent to which they will impact the FDA's ability to exercise its regulatory authority. If these executive actions impose constraints on the FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted.

We may face difficulties from healthcare legislative reform measures.

Existing regulatory policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability.

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Healthcare and Education Reconciliation Act, or together, the ACA, was enacted, which substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The ACA, among other things, (i) subjected therapeutic biologics to potential competition by lower-cost biosimilars by creating a licensure framework for follow on biologic products, (ii) proscribed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs and therapeutic biologics that are inhaled, infused, instilled, implanted or injected, (iii) increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, (iv) established annual non deductible fees and taxes on manufacturers of

certain branded prescription drugs and therapeutic biologics apportioned among these entities according to their market share in certain government healthcare programs, (v) established a new Medicare Part D coverage gap discount program, in which manufacturers must now agree to offer 70% point-of-sale discounts off negotiated prices of applicable brand drugs and therapeutic biologics to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs and therapeutic biologics to be covered under Medicare Part D, (vi) expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability, (vii) expanded the entities eligible for discounts under the Public Health program (viii) created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research and (ix) established a Center for Medicare Innovation at the Centers for Medicare & Medicaid Services, or CMS, to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

The current U.S. presidential administration and U.S. Congress have sought, and we expect they will continue to, seek to modify, repeal, or otherwise invalidate all, or certain provisions of, the ACA. Since January 2017, the current U.S. presidential administration has issued two executive orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. For example, on October 12, 2017, the current U.S. presidential administration issued an executive order that expands the use of association health plans and allows anyone to purchase short-term health plans that provide temporary, limited insurance. This executive order also calls for the halt of federal payments to health insurers for cost-sharing reductions previously available to lower-income Americans to afford coverage. There is still uncertainty with respect to the impact this executive order could have on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. The Tax Cuts and Jobs Act of 2017, or the Tax Reform Act, among other things, includes a provision that repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, the current U.S. presidential administration signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amended the ACA, effective January 1, 2019, to increase from 50 percent to 70 percent the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole". More recently, in July 2018, CMS published a final rule permitting further collections and payments to and from certain ACA qualified health plans and health insurance issuers under the ACA risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. On December 14, 2018, a Texas U.S. District Court Judge ruled that the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Reform Act. While the Texas U.S. District Court Judge, as well as the current U.S. presidential administration and CMS, have stated that the ruling will have no immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA. There is still uncertainty with respect to the impact the current U.S. presidential administration and Congress may have, if any, and any changes will likely take time to unfold, and could have an impact on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA.

However, we cannot predict the ultimate content, timing or effect of any healthcare reform legislation or the impact of potential legislation on us.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted to reduce healthcare expenditures. U.S. federal government agencies also currently face potentially significant spending reductions, which may further impact healthcare expenditures. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A joint select committee on deficit reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. Moreover, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. If federal spending is further reduced, anticipated budgetary shortfalls may also impact the ability of relevant agencies, such as the FDA or the National Institutes of Health to continue to function at current levels. Amounts allocated to federal grants and contracts may be reduced or eliminated. These reductions may also impact the ability of relevant agencies to timely review and approve research and development, manufacturing, and marketing activities, which may delay our ability to develop, market and sell any products we may develop.

Moreover, payment methodologies may be subject to changes in healthcare legislation and regulatory initiatives. For example, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. In addition, this legislation provided authority for limiting the number of drugs that will be covered in any therapeutic class. While the MMA only applies to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

Recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. At the federal level, the current U.S. presidential administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. Additionally, on May 11, 2018, the current U.S. presidential administration laid out the administration's "Blueprint" to reduce the cost of prescription medications while preserving innovation and cures. While the Department of Health and Human Services, or HHS, is soliciting feedback on some of these measures, other actions may be immediately implemented by HHS under existing authority. Further, on January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. Although a number of these, and other potential, proposals will require additional authorization to become effective, Congress and the current U.S. presidential administration have each

indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or companion diagnostics or additional pricing pressures.

Additionally, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017 was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA authorization under an FDA expanded access program; however, manufacturers are not obligated to provide investigational new drug products under the current federal right to try law.

We expect that the ACA, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved product. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our products.

Our operations and relationships with healthcare providers, healthcare organizations, customers and third-party payors will be subject to applicable anti-bribery, anti-kickback, fraud and abuse, transparency and other healthcare and privacy laws and regulations, which could expose us to, among other things, enforcement actions, criminal sanctions, civil penalties, contractual damages, reputational harm, administrative burdens and diminished profits and future earnings.

Our current and future arrangements with healthcare providers, healthcare organizations, third-party payors and customers expose us to broadly applicable anti-bribery, fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we research, market, sell and distribute our product candidates. In addition, we may be subject to patient data privacy and security regulation by the U.S. federal government and the states and the foreign governments in which we conduct our business. Restrictions under applicable federal and state anti-bribery and healthcare laws and regulations, include the following:

- the federal Anti-Kickback Statute, which prohibits, among other things, individuals and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal and state healthcare program such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the federal criminal and civil false claims and civil monetary penalties laws, including the federal False Claims Act, which can be enforced through civil whistleblower or qui tam actions against individuals or entities, prohibits, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent, knowingly making, using or causing to be made or used, a false record or statement material to a false or fraudulent claim, or from knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Moreover, the government may assert that a

claim including items and services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act;

- HIPAA, which imposes criminal and civil liability, prohibits, among other things, knowingly and willfully executing, or attempting to execute a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- HIPAA, as amended by HITECH, and their respective implementing regulations, including the Final Omnibus Rule published on January 25, 2013, which impose obligations on certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, as well as their business associates that perform certain services involving the storage, use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding the privacy, security, and transmission of individually identifiable health information, and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information; the federal legislation commonly referred to as Physician Payments Sunshine Act, enacted as part of the ACA, and its implementing regulations, which requires certain manufacturers of covered drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program, with certain exceptions, to report annually to CMS information related to certain payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by the physicians described above and their immediate family members, with the information made publicly available on a searchable website;

- state privacy laws and regulations, such as those of California and Massachusetts, that impose restrictive requirements regulating the use and disclosure of health information and other personally identifiable information (for example, in June 2018, California enacted the California Consumer Privacy Act, or CCPA. (which will go into effect on January 1, 2020) that gives California residents expanded rights to access and delete their personal information, opt out of certain personal information sharing and receive detailed information about how their personal information is used, and provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation; resulting in increased compliance costs and potential liability);

- the U.S. Foreign Corrupt Practices Act of 1977, as amended, which prohibits, among other things, U.S. companies and their employees and agents from authorizing, promising, offering, or providing, directly or indirectly, corrupt or improper payments or anything else of value to foreign government officials, employees of public international organizations and foreign government owned or affiliated entities, candidates for foreign political office, and foreign political parties or officials thereof;

- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, that may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; and

- certain state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures and drug pricing information, state and local laws that require the registration of pharmaceutical sales representatives, and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

If we or our collaborators, manufacturers or service providers fail to comply with applicable federal, state or foreign laws or regulations, we could be subject to enforcement actions, which could affect our ability to develop, market and sell our products successfully and could harm our reputation and lead to reduced acceptance of our products by the market. These enforcement actions include, among others:

- exclusion from participation in government-funded healthcare programs; and
- exclusion from eligibility for the award of government contracts for our products.

Efforts to ensure that our current and future business arrangements with third parties comply with applicable healthcare laws and regulations could involve substantial costs. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any such requirements, we may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, the curtailment or restructuring of our operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in government contracting, healthcare reimbursement or other government programs, including Medicare and Medicaid, integrity oversight and reporting obligations, or reputational harm, any of which could adversely affect our financial results. These risks cannot be entirely eliminated. Any action against us for an alleged or suspected violation could cause us to incur significant legal expenses and could divert our management's attention from the operation of our business, even if our defense is successful. In addition, achieving and sustaining compliance with applicable laws and regulations may be costly to us in terms of money, time and resources.

Even if we are able to commercialize any product candidate, such product candidate may become subject to unfavorable pricing regulations or third-party coverage and reimbursement policies, which would harm our business.

The regulations that govern regulatory approvals, pricing and reimbursement for new drugs vary widely from country to country. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing approval is granted. In some foreign markets, prescription biopharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain regulatory approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product, possibly for lengthy time periods and negatively impact the revenues we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain regulatory approval.

Our ability to commercialize any products successfully also will depend in part on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from third-party payors including government authorities, such as Medicare and Medicaid, private health insurers and other organizations. Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Coverage and adequate reimbursement from third-party payors is critical to new product acceptance. Even if we succeed in bringing one or more products to the market, these products may not be considered cost-effective, and the amount reimbursed for any products may be insufficient to allow us to sell our products on a competitive basis. Because our programs are in the early stages of development, we are unable at this time to determine their cost effectiveness or the likely level or method of coverage and reimbursement. Increasingly, the third-party payors who reimburse patients or healthcare providers, such as government and private insurance plans, are requiring that drug companies provide them with predetermined discounts from list prices, and are seeking to reduce the prices charged or the amounts reimbursed for biopharmaceutical products. If the price we are able to charge for any products we develop, or the coverage and reimbursement provided for such products, is inadequate in light of our development and other costs, our return on investment could be affected adversely.

There may be significant delays in obtaining reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or similar foreign regulatory authorities. Moreover, eligibility for reimbursement does not imply that any drug or therapeutic biologic will be reimbursed in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution.

Interim reimbursement levels for new drugs, if applicable, may also be insufficient to cover our costs and may not be made permanent. Reimbursement rates may be based on payments allowed for lower cost drugs that are already reimbursed, may be incorporated into existing payments for other services and may reflect budgetary constraints or imperfections in Medicare data. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Further, no uniform policy for coverage and reimbursement exists in the United States, and coverage and reimbursement can differ significantly from payor to payor. As a result, obtaining coverage and reimbursement approval of a product from a third-party payor is a time consuming and costly process that could require us to provide to each payor supporting scientific, clinical and cost effectiveness data for the use of our products on a payor-by-payor basis, with no assurance that coverage and adequate reimbursement will be obtained. There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement rates, but also have their own methods and approval process apart from Medicare determinations. Our inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for new drugs that we develop and for which we obtain regulatory approval could have a material and adverse effect on our business, financial condition, results of operations and prospects.

If we decide to pursue a Fast Track Designation by the FDA, it may not lead to a faster development or regulatory review or approval process.

We may seek Fast Track Designation for one or more of our product candidates. If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the product sponsor may apply for FDA Fast Track Designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular product candidate is eligible for this designation, we cannot assure you that the FDA would decide to grant it. Even if we do receive Fast Track Designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may withdraw Fast Track Designation if it believes that the designation is no longer supported by data from our clinical development program.

If we decide to seek Orphan Drug Designation for some of our product candidates, we may be unsuccessful or may be unable to maintain the benefits associated with Orphan Drug Designation, including the potential for supplemental market exclusivity.

As part of our business strategy, we may seek Orphan Drug Designation for one or more of our product candidates, and we may be unsuccessful. Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a drug as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. In the United States, Orphan Drug Designation entitles a party to financial incentives such as opportunities for grant funding toward clinical trial costs, tax advantages and user fee waivers. In addition, if a product that has Orphan Drug Designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications to market the same product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or where the manufacturer is unable to assure sufficient product quantity.

Even if we obtain Orphan Drug Designation for our product candidates in specific indications, we may not be the first to obtain marketing approval of these product candidates for the orphan-designated indication due to the uncertainties associated with developing pharmaceutical products. In addition, exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan-designated indication or may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different active moiety can be approved for the same condition. Even after an orphan product is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. Orphan Drug Designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process. In addition, while we may seek Orphan Drug Designation for our product candidates, we may never receive such designations.

The recent tax reform legislation, which was signed into law on December 22, 2017 reduced the amount of the qualified clinical research costs for a designated orphan product that a sponsor may claim as a credit from 50% to 25%. Thus, further limiting the advantage and may impact our future business strategy of seeking the Orphan Drug Designation.

We are subject to U.S. and certain foreign export and import controls, sanctions, embargoes, anti-corruption laws, and anti-money laundering laws and regulations. Compliance with these legal standards could impair our ability to compete in domestic and international markets. We can face criminal liability and other serious consequences for violations, which can harm our business.

We are subject to export control and import laws and regulations, including the U.S. Export Administration Regulations, U.S. Customs regulations, various economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls, the U.S. Foreign Corrupt Practices Act of 1977, as amended, or FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, and other state and national anti-bribery and anti-money laundering laws in the countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees, agents, contractors, and other collaborators from authorizing, promising, offering, or providing, directly or indirectly, improper payments or anything else of value to recipients in the public or private sector. We may engage third parties to sell our products sell our products outside the United States, to conduct clinical trials, and/or to obtain necessary permits, licenses, patent registrations, and other regulatory approvals. We have direct or indirect interactions with officials and employees of government agencies or government-affiliated hospitals, universities, and other organizations. We can be held liable for the corrupt or other illegal activities of our employees, agents, contractors, and other collaborators, even if we do not explicitly authorize or have actual knowledge of such activities. Any violations of the laws and regulations described above may result in substantial civil and criminal fines and penalties, imprisonment, the loss of export or import privileges, debarment, tax reassessments, breach of contract and fraud litigation, reputational harm, and other consequences.

Governments outside the United States tend to impose strict price controls, which may adversely affect our revenue, if any.

In some countries, particularly member states of the European Union, or EU, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of marketing approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various EU member states and parallel distribution, or arbitrage

between low-priced and high-priced member states, can further reduce prices. To obtain coverage and reimbursement or pricing approvals in some countries, we or current or future collaborators may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our therapeutic candidates to other available therapies in order to obtain or maintain reimbursement or pricing approval. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. If reimbursement of any product candidate approved for marketing is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business, financial condition, results of operations or prospects could be materially and adversely affected. In addition, the recent United Kingdom referendum on its membership in the EU resulted in a majority of United Kingdom voters voting to exit the European Union, often referred to as Brexit. Brexit could lead to legal uncertainty and potentially divergent national laws and regulations, including those related to the pricing of prescription pharmaceuticals, as the United Kingdom determines which EU laws to replicate or replace. If the United Kingdom were to significantly alter its regulations affecting the pricing of prescription pharmaceuticals, we could face significant new costs. As a result, Brexit could impair our ability to transact business in the EU and the United Kingdom.

European data collection is governed by restrictive regulations governing the use, processing, and cross-border transfer of personal information.

The collection and use of personal health data in the EU is governed by the provisions of the Data Protection Directive, and as of May 2018, the General Data Protection Regulation, or GDPR. These directives impose several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, notification of data processing obligations to the competent national data protection authorities and the security and confidentiality of the personal data. The Data Protection Directive and GDPR also impose strict rules on the transfer of personal data out of the European Union to the United States. Failure to comply with the requirements of the Data Protection Directive, the GDPR, and the related national data protection laws of the EU Member States may result in fines (for example, of up to €20,000,000 or up to 4% of the total worldwide annual turnover of the preceding financial year (whichever is higher)) and other administrative penalties. The GDPR regulations may impose additional responsibility and liability in relation to personal data that we process and we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. This may be onerous and adversely affect our business, financial condition, results of operations and prospects. As a result of the implementation of the GDPR, we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. There is significant uncertainty related to the manner in which data protection authorities will seek to enforce compliance with GDPR is not yet clear. For example, it is not clear if the authorities will conduct random audits of companies doing business in the EU, or if the authorities will wait for complaints to be filed by individuals who claim their rights have been violated. Enforcement uncertainty and the costs associated with ensuring GDPR compliance be onerous and adversely affect our business, financial condition, results of operations and prospects. Further, Brexit, has created uncertainty with regard to data protection regulation in the United Kingdom. In particular, it is unclear whether the United Kingdom will enact data protection legislation equivalent to the GDPR and how data transfers to and from the United Kingdom will be regulated.

Risks Related to Our Common Stock and This Offering

An active and liquid trading market for our common stock may not develop and you may not be able to resell your shares of common stock at or above the public offering price.

Prior to this offering, no market for shares of our common stock existed and an active trading market for our shares may never develop or be sustained following this offering. The initial public offering price for our common stock will be determined through negotiations with the underwriters and the negotiated price may not be indicative of the market price of our common stock after this offering. The market value of our common stock may decrease from the initial public offering price. As a result of these and other factors,

you may be unable to resell your shares of our common stock at or above the initial public offering price. The lack of an active market may impair your ability to sell your shares at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair market value of your shares. Furthermore, an inactive market may also impair our ability to raise capital by selling shares of our common stock and may impair our ability to enter into strategic collaborations or acquire companies or products by using our shares of common stock as consideration.

Our quarterly operating results may fluctuate significantly or may fall below the expectations of investors or securities analysts, each of which may cause our stock price to fluctuate or decline.

We expect our operating results to be subject to quarterly fluctuations. Our net loss and other operating results will be affected by numerous factors, including:

- variations in the level of expense related to the ongoing development of our MInT Platform, product candidates or future development programs;
- results of preclinical and future clinical trials, or the addition or termination of future clinical trials or funding support by us, or existing or future collaborators or licensing partners;
- our execution of any additional collaboration, licensing or similar arrangements, and the timing of payments we may make or receive under existing or future arrangements or the termination or modification of any such existing or future arrangements;
- any intellectual property infringement lawsuit or opposition, interference or cancellation proceeding in which we may become involved;
- additions and departures of key personnel;
- strategic decisions by us or our competitors, such as acquisitions, divestitures, spin-offs, joint ventures, strategic investments or changes in business strategy;
- if any of our product candidates receives regulatory approval, the terms of such approval and market acceptance and demand for such product candidates;
- regulatory developments affecting our product candidates or those of our competitors; and
- changes in general market and economic conditions.

If our quarterly operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially. Furthermore, any quarterly fluctuations in our operating results may, in turn, cause the price of our common stock to fluctuate substantially. We believe that quarterly comparisons of our financial results are not necessarily meaningful and should not be relied upon as an indication of our future performance.

The market price of our stock may be volatile, and you could lose all or part of your investment.

The trading price of our common stock following this offering is likely to be highly volatile and subject to wide fluctuations in response to various factors, some of which we cannot control. As a result of this volatility, investors may not be able to sell their common stock at or above the initial public offering price. The market price for our common stock may be influenced by many factors, including the other risks described in this section of the prospectus entitled "Risk Factors" and the following:

- results of preclinical studies and future clinical trials of our product candidates, or those of our competitors or our existing or future collaborators;
- regulatory or legal developments in the United States and other countries, especially changes in laws or regulations applicable to our product candidates;
- the success of competitive products or technologies;
- introductions and announcements of new products by us, our future commercialization partners, or our competitors, and the timing of these introductions or announcements;

- actions taken by regulatory agencies with respect to our products, clinical studies, manufacturing process or sales and marketing terms;
- actual or anticipated variations in our financial results or those of companies that are perceived to be similar to us;
- the success of our efforts to acquire or in-license additional technologies, products or product candidates;
- developments concerning any future collaborations, including but not limited to those with development and commercialization partners;
- market conditions in the pharmaceutical and biotechnology sectors;
- announcements by us or our competitors of significant acquisitions, strategic collaborations, joint ventures or capital commitments;
- developments or disputes concerning patents or other proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our product candidates and products;
- our ability or inability to raise additional capital and the terms on which we raise it;
- the recruitment or departure of key personnel;
- changes in the structure of healthcare payment systems;
- actual or anticipated changes in earnings estimates or changes in stock market analyst recommendations regarding our common stock, other comparable companies or our industry generally;
- our failure or the failure of our competitors to meet analysts' projections or guidance that we or our competitors may give to the market;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- announcement and expectation of additional financing efforts;
- speculation in the press or investment community;
- share price and fluctuations of trading volume of our common stock;
- sales of our common stock by us, insiders or our stockholders;
- the concentrated ownership of our common stock;
- changes in accounting principles;
- terrorist acts, acts of war or periods of widespread civil unrest;
- natural disasters and other calamities; and
- general economic, industry and market conditions.

In addition, the stock market in general, and the markets for pharmaceutical, biopharmaceutical and biotechnology stocks in particular, have experienced extreme price and volume fluctuations that have been often unrelated or disproportionate to the operating performance of the issuer. These broad market and industry factors may seriously harm the market price of our common stock, regardless of our actual operating performance. The realization of any of the above risks or any of a broad range of other risks, including those described in this "Risk Factors" section, could have a dramatic and adverse impact on the market price of our common stock.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for biopharmaceutical companies, which have experienced significant stock price volatility in recent years.

You will experience immediate and substantial dilution as a result of this offering and may experience additional dilution in the future.

If you purchase common stock in this offering, assuming an initial public offering price of $ per share, the midpoint of the estimated price range set forth on the cover of this prospectus, you will incur

immediate and substantial dilution of $ per share, representing the difference between the assumed initial public offering price of $ per share and our pro forma net tangible book value per share as of December 31, 2018 after giving effect to this offering and the conversion of all outstanding shares of our convertible preferred stock upon the completion of this offering.

Moreover, we issued options in the past to acquire common stock at prices significantly below the assumed initial public offering price. As of December 31, 2018, there were 10,417,696 shares of common stock subject to outstanding stock options. To the extent that the outstanding options are ultimately exercised, you will incur further dilution.

A sale of a substantial number of shares of our common stock may cause the price of our common stock to decline.

Based on shares outstanding as of December 31, 2018, upon completion of this offering, we will have outstanding a total of shares of common stock. Of these shares, only shares of common stock sold in this offering, or shares if the underwriters exercise their option to purchase additional shares in full, will be freely tradable, without restriction, in the public market immediately after this offering. Each of our officers, directors and certain of our stockholders have entered or will enter into lock-up agreements with the underwriters that restrict their ability to sell or transfer their shares. The lock-up agreements pertaining to this offering will expire 180 days from the date of this prospectus. However, our underwriters may, in their sole discretion, permit our officers, directors and other current stockholders who are subject to the contractual lock-up to sell shares prior to the expiration of the lock-up agreements. After the lock-up agreements expire, based on shares outstanding as of December 31, 2018, up to an additional shares of common stock will be eligible for sale in the public market, approximately of which are held by our officers, directors and their affiliated entities, and will be subject to volume limitations under Rule 144 under the Securities Act of 1933, as amended, or the Securities Act. In addition, shares of our common stock that are subject to outstanding options as of December 31, 2018 and shares of our common stock that are subject to options granted after December 31, 2018 will become eligible for sale in the public market to the extent permitted by the provisions of various vesting agreements, the lock-up agreements and Rules 144 and 701 under the Securities Act.

After this offering, the holders of an aggregate of shares of our outstanding common stock as of December 31, 2018 will have rights, subject to some conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or our stockholders. We also intend to register shares of common stock that we may issue under our equity incentive plans. Once we register these shares, they will be able to be sold freely in the public market upon issuance, subject to the 180-day lock-up period under the lock-up agreements described above and in the section entitled "Underwriting."

We cannot predict what effect, if any, sales of our shares in the public market or the availability of shares for sale will have on the market price of our common stock. However, future sales of substantial amounts of our common stock in the public market, including shares issued upon exercise of our outstanding warrant or options, or the perception that such sales may occur, could adversely affect the market price of our common stock.

We also expect that significant additional capital may be needed in the future to continue our planned operations. To raise capital, we may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. To the extent that additional capital is raised through the sale and issuance of shares or other securities convertible into shares, our stockholders will be diluted. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock.

We will have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds from this offering, and you will be relying on the judgment of our management regarding the application of these proceeds. You will not have the opportunity, as part of your investment decision, to assess whether we are using the proceeds appropriately. Our management might not apply our net proceeds in ways that ultimately increase the value of your investment. If we do not invest or apply the net proceeds from this offering in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause our stock price to decline. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value.

If securities or industry analysts do not publish research or reports about our business, or if they issue an adverse or misleading opinion regarding our stock, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. We do not currently have and may never obtain research coverage by securities and industry analysts. If no or few securities or industry analysts commence coverage of us, the trading price for our common stock could be impacted negatively. In the event we obtain securities or industry analyst coverage, if any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if our preclinical studies and clinical trials and operating results fail to meet the expectations of analysts, our stock price would likely decline. If one or more of such analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause a decline in our stock price or trading volume.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

Based on the beneficial ownership of our common stock as of March 31, 2019, prior to this offering, our executive officers, directors, holders of 5% or more of our capital stock and their respective affiliates beneficially owned approximately 52% of our voting stock and, upon the completion of this offering, that same group will hold approximately % of our outstanding voting stock (assuming no exercise of the underwriters' option to purchase additional shares, no exercise of our outstanding warrant or options and no purchases of shares in this offering by any of this group), in each case assuming the conversion of all outstanding shares of our convertible preferred stock into shares of our common stock. As a result, these stockholders, if acting together, will continue to have significant influence over the outcome of corporate actions requiring stockholder approval, including the election of directors, amendment of our organizational documents, any merger, consolidation or sale of all or substantially all of our assets and any other significant corporate transaction. The interests of these stockholders may not be the same as or may even conflict with your interests. For example, these stockholders could delay or prevent a change of control of our company, even if such a change of control would benefit our other stockholders, which could deprive our stockholders of an opportunity to receive a premium for their common stock as part of a sale of our company or our assets and might affect the prevailing market price of our common stock. The significant concentration of stock ownership may adversely affect the trading price of our common stock due to investors' perception that conflicts of interest may exist or arise.

We are an "emerging growth company" and a "smaller reporting company" and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies or smaller reporting companies will make our common stock less attractive to investors.

We are an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not

emerging growth companies, including (i) not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended, or the Sarbanes-Oxley Act, (ii) reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements and (iii) exemptions from the requirements of holding nonbinding advisory stockholder votes on executive compensation and stockholder approval of any golden parachute payments not approved previously. In addition, as an emerging growth company, we are only required to provide two years of audited financial statements and two years of selected financial data in this prospectus.

We could be an emerging growth company for up to five years following the completion of this offering, although circumstances could cause us to lose that status earlier, including if we are deemed to be a "large accelerated filer," which occurs when the market value of our common stock that is held by non-affiliates equals or exceeds $700.0 million as of the prior June 30, or if we have total annual gross revenue of $1.07 billion or more during any fiscal year before that time, in which cases we would no longer be an emerging growth company as of the following December 31, or if we issue more than $1.0 billion in non-convertible debt during any three-year period before that time, in which case we would no longer be an emerging growth company immediately. Even after we no longer qualify as an emerging growth company, we may still qualify as a "smaller reporting company," which would allow us to take advantage of many of the same exemptions from disclosure requirements, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and reduced disclosure obligations regarding executive compensation in this prospectus and in our periodic reports and proxy statements. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our share price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have elected to take advantage of the benefits of this extended transition period. Our financial statements may therefore not be comparable to those of companies that comply with such new or revised accounting standards. Until the date that we are no longer an "emerging growth company" or affirmatively and irrevocably opt out of the exemption provided by Section 7(a)(2)(B) of the Securities Act, upon issuance of a new or revised accounting standard that applies to our financial statements and that has a different effective date for public and private companies, we will disclose the date on which adoption is required for non-emerging growth companies and the date on which we will adopt the recently issued accounting standard.

We are also a "smaller reporting company," meaning that the market value of our stock held by non-affiliates plus the proposed aggregate amount of gross proceeds to us as a result of this offering is less than $700.0 million and our annual revenue is less than $100.0 million during the most recently completed fiscal year. We may continue to be a smaller reporting company after this offering if either (i) the market value of our stock held by non-affiliates is less than $250.0 million or (ii) our annual revenue is less than $100.0 million during the most recently completed fiscal year and the market value of our stock held by non-affiliates is less than $700.0 million. If we are a smaller reporting company at the time we cease to be an emerging growth company, we may continue to rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. Specifically, as a smaller reporting company we may choose to present only the two most recent fiscal years of audited financial statements in our Annual Report on Form 10-K and, similar to emerging growth companies, smaller reporting companies have reduced disclosure obligations regarding executive compensation.

Anti-takeover provisions in our charter documents and under Delaware law could prevent or delay an acquisition of us, which may be beneficial to our stockholders, and may prevent attempts by our stockholders to replace or remove our current management.

Our restated certificate of incorporation and our restated bylaws that will be in effect upon completion of this offering contain provisions that could delay or prevent a change in control of our company. These provisions could also make it difficult for stockholders to elect directors who are not nominated by current members of our board of directors or take other corporate actions, including effecting changes in our management. These provisions:

- establish a classified board of directors so that not all members of our board are elected at one time;
- permit only the board of directors to establish the number of directors and fill vacancies on the board;
- provide that directors may only be removed "for cause" and only with the approval of two-thirds of our stockholders;
- require super-majority voting to amend some provisions in our restated certificate of incorporation and restated bylaws;
- authorize the issuance of "blank check" preferred stock that our board could use to implement a stockholder rights plan;
- eliminate the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- prohibit cumulative voting; and
- establish advance notice requirements for nominations for election to our board or for proposing matters that can be acted upon by stockholders at annual stockholder meetings.

In addition, our restated certificate of incorporation will provide that the Court of Chancery of the State of Delaware will be the exclusive forum for: proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, or the DGCL, our restated certificate of incorporation, or our restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, or other employees, which may discourage lawsuits with respect to such claims. Alternatively, if a court were to find the choice of forum provision contained in our restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business, operating results and financial condition.

In addition, Section 203 of the DGCL may discourage, delay or prevent a change in control of our company. Section 203 imposes certain restrictions on mergers, business combinations and other transactions between us and holders of 15% or more of our common stock.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, and particularly after we are no longer an emerging growth company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of the Nasdaq Global Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, we expect these rules and regulations to substantially increase our legal and financial compliance costs and to make some activities more time

consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain sufficient coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers. The increased costs may require us to reduce costs in other areas of our business or increase the prices of our services. Moreover, these rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

We are not currently required to comply with the SEC's rules that implement Section 404 of the Sarbanes-Oxley Act, and are therefore not required to make a formal assessment of the effectiveness of our internal control over financial reporting for that purpose. Pursuant to Section 404, we will be required to furnish a report by our management on our internal control over financial reporting. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. This process will be time-consuming, costly and complicated. Despite our efforts, there is a risk that we will not be able to conclude, within the prescribed timeframe or at all, that our internal control over financial reporting is effective as required by Section 404. If we identify one or more material weaknesses, it could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements. In addition, if we are not able to continue to meet these requirements, we may not be able to remain listed on the Nasdaq Global Market.

Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the sections entitled "Prospectus Summary," "Risk Factors," "Use of Proceeds," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and "Business" contains forward-looking statements. The words "believe," "may," "will," "potentially," "estimate," "continue," "anticipate," "intend," "could," "would," "project," "plan," "expect" and similar expressions that convey uncertainty of future events or outcomes are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this prospectus include, among other things, statements about:

- our plans to develop and commercialize oral small-molecule integrin therapeutics, including our lead wholly-owned program for a_4b_7-specific integrin inhibitors affecting inflammation, for the treatment of inflammatory bowel disease, and our most advanced product candidate, MORF-720, for the treatment of idiopathic pulmonary fibrosis, which we are developing in collaboration with AbbVie;
- our ability to obtain funding for our operations, including funding necessary to complete further discovery, development and commercialization of our product candidates;
- the timing of and our ability to obtain and maintain regulatory approvals for MORF-720 and our lead wholly-owned program for a_4b_7-specific integrin inhibitors, as well as our other product candidates;
- future agreements with third parties in connection with the commercialization of our product candidates;
- the success, cost and timing of our product candidate development activities and planned clinical trials;
- the rate and degree of market acceptance and clinical utility of our product candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- the success of competing therapies that are or may become available;
- our ability to attract and retain key management and technical personnel;
- our expectations regarding our ability to obtain, maintain and enforce intellectual property protection for our product candidates;
- our use of the net proceeds from this offering; and
- our estimates regarding expenses, future revenue, capital requirements and needs for additional financing.

These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in "Risk Factors" and elsewhere in this prospectus. Moreover, we operate in a competitive and rapidly changing environment, and new risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed in this prospectus may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. We undertake no obligation to update publicly any forward-looking statements for any reason after the date of this prospectus to conform these statements to actual results or to changes in our expectations, except as required by law.

You should read this prospectus and the documents that we reference in this prospectus and have filed with the Securities and Exchange Commission as exhibits to the registration statement of which this prospectus is a part with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

USE OF PROCEEDS

We estimate that we will receive net proceeds of approximately $ from the sale of shares of common stock in this offering, or approximately $ if the underwriters exercise their option to purchase additional shares in full, based on an assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses.

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, would increase (decrease) the net proceeds to us from this offering by $ million, assuming the number of shares offered, as set forth on the cover of this prospectus, remains the same, and after deducting the estimated underwriting discounts and commissions. Similarly, each increase (decrease) of 1,000,000 shares in the number of shares of common stock offered would increase (decrease) the net proceeds that we receive from this offering by $ million, assuming that the assumed initial public offering price remains the same and after deducting the estimated underwriting discounts and commissions.

We currently intend to use the net proceeds we receive from this offering together with our existing cash and cash equivalents, as follows:

- approximately $ million to $ million to fund further development of our $\alpha_4\beta_7$ program through ;
- approximately $ million to $ million to fund further development of MORF-720, our $\alpha_v\beta_6$ product candidate, through ;
- approximately $ million to $ million to fund further development of our MInT Platform, to broaden our pipeline of product candidates; and
- any remaining amounts to fund working capital and general corporate purposes.

Based on our planned use of the net proceeds, we estimate such funds, together with our existing cash and cash equivalents, will be sufficient for us to fund our operating expenses and capital expenditure requirements through at least .

The expected use of the net proceeds from the offering represents our intentions based upon our current plans and business conditions. The amounts we actually expend in these areas, and the timing thereof, may vary significantly from our current intentions and will depend on a number of factors, including the success of research and product development efforts, cash generated from future operations and actual expenses to operate our business. We may use a portion of the net proceeds for the acquisition of, or investment in, businesses that complement our business, although we have no present commitments or agreements.

The amounts and timing of our preclinical and clinical expenditures and the extent of preclinical and clinical development may vary significantly depending on numerous factors, including the status, results and timing of our current preclinical studies and the preclinical studies and clinical trials which we may commence in the future, the product approval process with the FDA and other regulatory agencies, our current collaborations and any new collaborations we may enter into with third parties and any unforeseen cash needs. As a result, we cannot predict with any certainty all of the particular uses for the net proceeds or the amounts that we will actually spend on the uses set forth above. Accordingly, our management will have broad discretion in the application of the net proceeds, and investors will be relying on the judgment of our management regarding the application of the net proceeds of this offering.

The expected net proceeds of this offering will not be sufficient for us to fund any of our product candidates through regulatory approval, and we will need to raise substantial additional capital to complete the development and commercialization of our product candidates.

Pending the uses described above, we intend to invest the net proceeds from this offering in short term, investment-grade interest-bearing securities such as money market accounts, certificates of deposit, commercial paper and guaranteed obligations of the U.S. government.

DIVIDEND POLICY

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any cash dividends on our common stock in the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and capitalization as of December 31, 2018 on:

- an actual basis;
- a pro forma basis, giving effect to (i) the automatic conversion of 122,513,962 outstanding shares of our convertible preferred stock as of December 31, 2018 immediately prior to the completion of this offering, and (ii) the automatic conversion of an outstanding warrant exercisable for 39,800 shares of our Series Seed convertible preferred stock into a warrant exercisable for 39,800 shares of common stock in connection with this offering and the related reclassification of the convertible preferred stock warrant liability to stockholders' (deficit) equity; and
- a pro forma as adjusted basis, giving effect to (i) the pro forma adjustments described above and (ii) the sale of shares of common stock in this offering, based upon an assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses.

The pro forma as adjusted information set forth in the table below is illustrative only and will be adjusted based on the actual initial public offering price and other terms of this offering as determined at pricing.

You should read this table together with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our audited consolidated financial statements and related notes, each included elsewhere in this prospectus.

	As of December 31, 2018		
	Actual	Pro Forma	Pro Forma As Adjusted
	(in thousands, except share and per share data)		
Cash and cash equivalents	$ 185,901	$ 185,901	$
Convertible preferred stock, $0.0001 par value; 122,553,762 shares authorized, 122,513,962 shares issued and outstanding and aggregate liquidation preference of $140,480, actual; no shares issued or outstanding, pro forma or pro forma as adjusted	$ 139,809	$ —	$
Stockholders' (deficit) equity:			
Preferred stock, $0.0001 par value: no shares authorized, issued or outstanding, actual; shares authorized, no shares issued or outstanding pro forma and pro forma as adjusted	—	—	
Common stock, $0.0001 par value; 151,000,000 shares authorized, 10,687,985 shares issued and outstanding, actual; shares authorized, pro forma and pro forma as adjusted; 133,201,947 shares issued and outstanding, pro forma; shares issued and outstanding, pro forma as adjusted	1	14	
Additional paid-in capital	1,632	141,454	
Accumulated deficit	(54,185)	(54,185)	
Total stockholders' (deficit) equity	(52,552)	87,283	
Total capitalization	$ 87,257	$ 87,283	$

The number of shares of our common stock to be outstanding after this offering is based on 137,593,380 shares of our common stock outstanding as of December 31, 2018, and gives effect to the automatic conversion of all 122,513,962 shares of our outstanding convertible preferred stock as of December 31, 2018 into an aggregate of 122,513,962 shares of common stock immediately prior to the completion of this offering, and excludes:

- 10,417,696 shares of common stock issuable upon the exercise of options outstanding as of December 31, 2018 under our 2018 Stock Incentive Plan, with an exercise price of $0.74 per share;
- 39,800 shares of common stock issuable upon the exercise of a warrant to purchase 39,800 shares of our Series Seed convertible preferred stock outstanding as of December 31, 2018, with an exercise price of $0.75286 per share, that will automatically convert to a warrant to purchase 39,800 shares of our common stock upon the completion of this offering; and
- shares of common stock reserved for future issuance under our stock-based compensation plans, consisting of (i) 2,667,369 shares of common stock reserved for future issuance under our 2018 Stock Incentive Plan as of December 31, 2018 (including the options to purchase shares of our common stock granted after December 31, 2018), (ii) shares of common stock reserved for future issuance under our 2019 Equity Incentive Plan, which will become effective on the date immediately prior to the date of the effectiveness of the registration statement of which this prospectus forms a part and (iii) shares of common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, which will become effective on the date of the effectiveness of the registration statement of which this prospectus forms a part. Upon completion of this offering, any remaining shares available for issuance under our 2018 Stock Incentive Plan will be added to the shares reserved under our 2019 Equity Incentive Plan and we will cease granting awards under our 2018 Stock Incentive Plan. Our 2019 Equity Incentive Plan and 2019 Employee Stock Purchase Plan also provide for automatic annual increases in the number of shares reserved under the plans each year, as more fully described in "Executive Compensation — Equity Compensation Plans and Other Benefit Plans."

DILUTION

If you invest in our common stock in this offering, your ownership interest will be immediately diluted to the extent of the difference between the amount per share paid by purchasers of shares of common stock in this offering and the pro forma as adjusted net tangible book value per share of common stock immediately after this offering.

Net tangible book value (deficit) per share is determined by dividing our total tangible assets (which excludes deferred offering costs) less our total liabilities and convertible preferred stock by the number of shares of common stock outstanding. Our historical net tangible book value (deficit) as of December 31, 2018 was $(52.6) million, or $(4.92) per share, based on 10,687,985 shares of common stock outstanding as of December 31, 2018. Our pro forma net tangible book value as of December 31, 2018 was approximately $87.3 million, or $0.66 per share of common stock. Our pro forma net tangible book value per share represents the amount of our total tangible assets (which excludes deferred offering costs) reduced by the amount of our total liabilities and divided by the total number of shares of our common stock outstanding as of December 31, 2018, after giving effect to (i) the automatic conversion of all outstanding shares of our convertible preferred stock as of December 31, 2018 into an aggregate of 122,513,962 shares of common stock effective immediately prior to the completion of this offering, and (ii) the automatic conversion of an outstanding warrant exercisable for 39,800 shares of our Series Seed convertible preferred stock into a warrant exercisable for 39,800 shares of common stock in connection with this offering.

Net tangible book value dilution per share to new investors in this offering represents the difference between the amount per share paid by purchasers of shares of common stock in this offering and the pro forma as adjusted net tangible book value per share of common stock immediately after completion of this offering. After giving effect to (i) the pro forma adjustments set forth above and (ii) our sale in this offering of shares of our common stock at an assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, and after deducting the estimated underwriting discounts and commissions and estimated offering expenses, our pro forma as adjusted net tangible book value as of December 31, 2018 would have been approximately $ million, or $ per share of our common stock. This represents an immediate increase in pro forma net tangible book value of $ per share to our existing stockholders and an immediate dilution of $ per share to investors in this offering, as illustrated in the following table:

Assumed initial public offering price, per share		$
Historical net tangible book value per share as of December 31, 2018	$ (4.92)	
Increase attributable to pro forma adjustments	5.58	
Pro forma net tangible book value per share as of December 31, 2018	0.66	
Increase in pro forma net tangible book value per share attributable to new investors in this offering		
Pro forma as adjusted net tangible book value per share after this offering		
Dilution per share to new investors in this offering		$

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, would increase (decrease) our pro forma as adjusted net tangible book value by $ million, or $ per share and the dilution in pro forma as adjusted net tangible book value per share to new investors in this offering

by $ per share, assuming the number of shares offered, as set forth on the cover of this prospectus, remains the same, and after deducting the estimated underwriting discounts and commissions. Similarly, each increase of 1,000,000 shares in the number of shares of common stock offered in this offering would increase our pro forma as adjusted net tangible book value by approximately $ million, or approximately $ per share, and would increase dilution per share to new investors in this offering by approximately $ per share and each decrease of 1,000,000 shares in the number of shares of common stock offered in this offering would decrease our pro forma as adjusted net tangible book value by approximately $ million, or approximately $ per share, and would decrease dilution per share to new investors in this offering by approximately $ per share, assuming the assumed initial public offering price per share remains the same and after deducting the estimated underwriting discounts and commissions. The pro forma as adjusted information is illustrative only, and we will adjust this information based on the actual initial public offering price and other terms of this offering determined at pricing.

If the underwriters exercise their option in full to purchase additional shares, the pro forma as adjusted net tangible book value per share after this offering would be $ per share, the increase in pro forma as adjusted net tangible book value per share to existing stockholders would be $ per share and the dilution to new investors in this offering would be $ per share.

The following table shows, as of December 31, 2018, on a pro forma as adjusted basis described above, the differences between the existing stockholders and the purchasers of shares in this offering with respect to the number of shares purchased from us, the total consideration paid, which includes net proceeds received from the issuance of common and convertible preferred stock, cash received from the exercise of stock options, and the value of any stock issued for services and the average price paid per share (in thousands, except per share amounts and percentages):

	Shares Purchased		Total Consideration		Average Price Per Share
	Number	Percent	Amount	Percent	
Existing stockholders		%	$	%	$
New investors					$
Total		100.0%	$	100.0%	

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover of this prospectus, would increase (decrease) total consideration paid by new investors by approximately $ million and, in the case of an increase, would increase the percentage of total consideration paid by new investors by percentage points and, in the case of a decrease, would decrease the percentage of total consideration paid by new investors by percentage points, assuming that the number of shares offered, as set forth on the cover of this prospectus, remains the same, and after deducting the estimated underwriting discounts and commissions. Similarly, each increase (decrease) of 1,000,000 shares in the number of shares of common stock offered in this offering would increase (decrease) total consideration paid by new investors by approximately $ million and, in the case of an increase, would increase the percentage of total consideration paid by new investors by percentage points and, in the case of a decrease, would decrease the percentage of total consideration paid by new investors by percentage points, assuming the assumed initial public offering price remains the same and after deducting the estimated underwriting discounts and commissions.

In addition, to the extent that any outstanding options or warrants are exercised, investors in this offering will experience further dilution.

Except as otherwise indicated, the above discussion and tables assume no exercise of the underwriters' option to purchase additional shares. If the underwriters exercise their option to purchase additional shares in full, our existing stockholders would own % and our new investors would own % of the total number of shares of our common stock outstanding upon the completion of this offering.

The number of shares of common stock outstanding as of December 31, 2018 excludes:

- 10,417,696 shares of common stock issuable upon the exercise of options outstanding as of December 31, 2018 under our 2018 Stock Incentive Plan, with an exercise price of $0.74 per share;
- 39,800 shares of common stock issuable upon the exercise of a warrant to purchase 39,800 shares of our Series Seed convertible preferred stock outstanding as of December 31, 2018, with an exercise price of $0.75286 per share, that will automatically convert to a warrant to purchase 39,800 shares of our common stock upon the completion of this offering; and
- shares of common stock reserved for future issuance under our stock-based compensation plans, consisting of (i) 2,667,369 shares of common stock reserved for future issuance under our 2018 Stock Incentive Plan as of December 31, 2018 (including the options to purchase shares of our common stock granted after December 31, 2018), (ii) shares of common stock reserved for future issuance under our 2019 Equity Incentive Plan, which will become effective on the date immediately prior to the date of the effectiveness of the registration statement of which this prospectus forms a part and (iii) shares of common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, which will become effective on the date of the effectiveness of the registration statement of which this prospectus forms a part. Upon completion of this offering, any remaining shares available for issuance under our 2018 Stock Incentive Plan will be added to the shares reserved under our 2019 Equity Incentive Plan and we will cease granting awards under our 2018 Stock Incentive Plan. Our 2019 Equity Incentive Plan and 2019 Employee Stock Purchase Plan also provide for automatic annual increases in the number of shares reserved under the plans each year, as more fully described in "Executive Compensation — Equity Compensation Plans and Other Benefit Plans."

SELECTED CONSOLIDATED FINANCIAL DATA

The following tables set forth our selected consolidated statements of operations and consolidated balance sheet data. The selected consolidated statements of operations data presented below for the years ended December 31, 2017 and 2018 and the selected consolidated balance sheet data as of December 31, 2017 and 2018 are derived from our audited consolidated financial statements included elsewhere in this prospectus, which financial statements have been audited by Ernst & Young LLP, our independent registered public accounting firm. The following selected consolidated financial data below should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes included elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in any future period. The selected consolidated financial data in this section are not intended to replace the consolidated financial statements and are qualified in their entirety by the consolidated financial statements and related notes included elsewhere in this prospectus.

	Year Ended December 31,	
	2017	2018
	(in thousands, except share and per share data)	
Consolidated Statements of Operations		
Collaboration revenue — related party	$ —	$ 3,358
Operating expenses:		
Research and development	14,103	22,631
General and administrative	2,826	5,355
Total operating expenses	16,929	27,986
Loss from operations	(16,929)	(24,628)
Other income (expense):		
Interest income, net	14	871
Other expense, net	(5)	(74)
Total other income	9	797
Net loss	$ (16,920)	$ (23,831)
Net loss per unit, basic and diluted	$ (2.87)	
Net loss per share, basic and diluted		$ (3.82)
Weighted average common units outstanding, basic and diluted	5,896,584	
Weighted average common shares outstanding, basic and diluted		6,237,889
Pro-forma net loss per share, basic and diluted (unaudited)[1]		$ (0.31)
Pro-forma weighted average common shares outstanding, basic and diluted (unaudited)[1]		77,596,055

(1) Basic and diluted pro forma net loss per share give effect to the automatic conversion of all shares of convertible preferred stock into shares of common stock upon completion of this offering, assuming such conversion occurred on the later of January 1, 2018 or the original issuance dates of the convertible preferred units or convertible preferred stock.

	December 31,	
	2017	2018
	(in thousands)	
Consolidated Balance Sheet Data:		
Cash and cash equivalents	$ 20,750	$ 185,901
Working capital[1]	18,712	152,220
Total assets	23,242	189,305
Convertible preferred units/stock	49,687	139,809
Accumulated deficit	(30,354)	(54,185)
Total stockholders' (deficit) equity	(29,693)	(52,552)

(1) We define working capital as current assets less current liabilities. See our consolidated financial statements and related notes appearing at the end of this prospectus for further details regarding our current assets and current liabilities.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of our financial condition and results of operations should be read together with our "Selected Consolidated Financial Data" and our consolidated financial statements and related notes appearing elsewhere in this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans, objectives, expectations, projections and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors identified below and those set forth in the "Risk Factors" section of this prospectus, our actual results and the timing of selected events could differ materially from the forward-looking statements contained in the following discussion and analysis. Please also see the section entitled "Special Note Regarding Forward-Looking Statements."

Overview

We are a biopharmaceutical company applying our proprietary insights into integrins to discover and develop a pipeline of potentially first-in-class oral small-molecule integrin therapeutics. Integrins are validated targets with multiple approved injectable blockbuster drugs for the treatment of serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer. Despite significant unsuccessful efforts, we believe tremendous untapped potential remains for us to develop oral integrin therapies. We created the Morphic integrin technology platform, or MInT Platform, by leveraging our unique understanding of integrin structure and biology to develop novel product candidates designed to achieve the potency, high selectivity and pharmaceutical properties required for oral administration. We are advancing our lead wholly-owned program for a_4b_7 specific integrin inhibitors affecting inflammation into clinical development for the treatment of inflammatory bowel disease, or IBD. We are also developing our most advanced product candidate, MORF-720, a selective oral a_vb_6 specific integrin inhibitor into clinical development for the treatment of idiopathic pulmonary fibrosis, or IPF, in collaboration with AbbVie Inc., or AbbVie. We intend to advance our a_4b_7 program and MORF-720 toward Investigational New Drug applications, or INDs, by the middle of 2020 and as early as the end of 2019, respectively. Beyond our current targets, we are using our MInT Platform to create a broad pipeline of programs across a variety of therapeutic areas, all of which aim to harness the potential of inhibition or activation.

We were formed as a limited liability company under the laws of the State of Delaware in August 2014 under the name Integrin Rock, LLC. We subsequently changed our name to Morphic Rock Holding, LLC in October 2014 and then to Morphic Holding, LLC in June 2016, and we subsequently converted to a corporation under the name Morphic Holding, Inc. in December 2018. In connection with the conversion to a Delaware corporation, or the Reorganization, each of the outstanding units of the members of the limited liability company were converted into shares of capital stock. On the date of the Reorganization, the following conversions of limited liability units took place: (i) each Series B convertible preferred unit converted into one share of Series B convertible preferred stock; (ii) each Series A convertible preferred unit converted into one share of Series A convertible preferred stock; (iii) each Series Seed convertible preferred unit converted into one share of Series Seed convertible preferred stock; and (iv) each common unit converted into one share of common stock. In addition, previously outstanding vested and unvested incentive units, irrespective of any threshold amount or voting rights, were exchanged for an equal number of shares of common stock or restricted common stock, respectively. The restricted common stock was issued with the same vesting terms as the unvested incentive units held immediately prior to the Reorganization. For additional information see "Reorganization".

Upon consummation of the Reorganization, the historical consolidated financial statements of Morphic Holding, LLC became the historical consolidated financial statements of Morphic Holding, Inc., the entity

whose shares are being offered in this offering. Except as otherwise indicated or as the context otherwise requires, all information included in this prospectus is presented after giving effect to the Reorganization.

Since inception, our operations have focused on organizing and staffing our company, business planning, raising capital, establishing our intellectual property portfolio, and performing research to discover and develop oral small-molecule integrin therapeutics. Revenue generation activities have been limited to research services in each case, pursuant to our collaboration and option agreement with AbbVie and, since February 2019, our research and development collaboration with Janssen Pharmaceuticals, Inc., or Janssen. We do not have any products approved for sale and have not generated any revenue from product sales. In addition to the foregoing sources of revenue, we have funded our operations primarily through the sale and issuance of our convertible preferred equity securities and borrowings under a loan and security agreement, or the credit facility, with Silicon Valley Bank, or SVB. From inception through December 31, 2018, we have raised an aggregate of approximately $141.0 million of gross proceeds through the issuance of equity and debt, of which $140.0 million was from the issuance of convertible preferred equity securities and $1.0 million was from borrowings under the credit facility. In October 2018, pursuant to our collaboration and option agreement with AbbVie, we received an upfront payment of $100.0 million for research and development activities, and provided to AbbVie exclusive license options on product candidates directed at multiple targets.

Since inception, we have incurred significant operating losses. Our net losses were $16.9 million and $23.8 million for the years ended December 31, 2017 and 2018, respectively. As of December 31, 2018, we had an accumulated deficit of $54.2 million. We expect to continue to incur significant and increasing expenses and operating losses for the foreseeable future, as we advance our current and future product candidates through preclinical and clinical development, seek regulatory approval for them, maintain and expand our intellectual property portfolio, hire additional research and development and business personnel and operate as a public company.

We will not generate revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for our product candidates. In addition, if we obtain regulatory approval for our product candidates and do not enter into a third-party commercialization partnership, we expect to incur significant expenses related to developing our commercialization capability to support product sales, marketing, manufacturing, and distribution activities.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until we can generate significant revenue from product sales, if ever, we expect to finance our operations through a combination of public or private equity offerings and debt financings or other sources, such as potential collaboration agreements. We may be unable to raise additional funds or enter into such other agreements or arrangements when needed on acceptable terms, or at all. Our failure to raise capital or enter into such agreements as, and when, needed, could have a material adverse effect on our business, results of operations, and financial condition.

As of December 31, 2018, we had cash and cash equivalents of $185.9 million. We believe that the net proceeds from this offering, together with our existing cash and cash equivalents, will enable us to fund our operating expenses and capital expenditure requirements into .

Financial Operations Overview

Collaboration Revenue — Related Party

We do not have any products approved for sale, and as a result, we have not generated any revenue from product sales and do not expect to generate any revenue from the sale of products in the foreseeable future.

To date, all of our revenue has been derived from our collaboration and option agreement with AbbVie and our research and development collaboration with Janssen. We expect that our revenue until we have a marketed product will be derived primarily from payments under our collaboration and option agreement with AbbVie, our research and development collaboration with Janssen, or other collaboration and license agreements that we may enter into in the future, if any.

In October 2018, we entered into a research and development collaboration with AbbVie, a related party holding in aggregate approximately 5% of Series A and Series B preferred stock, designed to advance a number of our oral integrin therapeutics for fibrosis-related indications. Under the terms of the agreement, AbbVie paid us an upfront payment of $100.0 million for research and development activities, and we provided to AbbVie exclusive license options on product candidates directed at multiple targets.

For each compound, we will conduct research and development activities through the completion of IND-enabling studies, at which point AbbVie may pay a license fee of $20.0 million, on a target-by-target basis, to exercise its exclusive license option and assume responsibility for global development and commercialization. We are also eligible for clinical and commercial milestone payments and tiered royalties from high single to low double digits on worldwide net sales for each licensed product. In addition, for certain compounds for which we have completed IND-enabling studies and which meet certain advancement criteria for a liver indication, we have the option to commit to share development costs in exchange for an increased fixed royalty rate. We may exercise this option following completion of the first phase IIb clinical trial for the relevant product. For a more complete description of our collaboration with AbbVie, see "Business — License Agreements."

In February 2019, we entered into a research and development collaboration with Janssen to discover and develop novel integrin therapeutics for patients with conditions not adequately addressed by current therapies. The Janssen collaboration focuses on three integrin targets, each target the subject of a research program, with the ability to substitute integrin targets not explored by us. Upon completing IND-enabling studies, on a research program-by-research program basis, Janssen may exercise an exclusive option to obtain an exclusive license with respect to the target that is the subject of the research program, including all licensed compounds that are the subject of the applicable research program, and then Janssen will be responsible for global clinical development and commercialization. In consideration of the rights granted, Janssen paid us an upfront fee of $10.0 million for each of the first two research programs, and will pay us an additional $5.0 million fee upon commencement of the third research program, and will fund research activities. Pursuant to the terms of the agreement, we are also eligible to receive additional milestone and royalty payments. For a more complete description of our collaboration with Janssen, see "Business — License Agreements."

Expenses

Research and Development

Research and development expenses consist primarily of costs incurred for our research and development activities, including our product candidate discovery efforts and preclinical studies under our research programs, which include:

- employee-related expenses, including salaries, benefits, and equity-based compensation expense for our research and development personnel;
- costs of funding research performed by third parties that conduct research and development and preclinical activities on our behalf;
- costs of manufacturing clinical supply related to any of our current or future product candidates;
- costs of conducting preclinical studies of any of our current or future product candidates;
- consulting and professional fees related to research and development activities, including equity-based compensation to non-employees;

- costs of purchasing laboratory supplies and non-capital equipment used in our preclinical studies;
- costs related to compliance with clinical regulatory requirements;
- facility costs and other allocated expenses, which include expenses for rent and maintenance of facilities, insurance, depreciation and other supplies; and
- fees for maintaining licenses and other amounts due under our third-party licensing agreements.

Research and development costs are expensed as incurred. Costs for certain activities are recognized based on an evaluation of the progress to completion of specific tasks using data such as information provided to us by our vendors and analyzing the progress of our preclinical studies or other services performed. Significant judgment and estimates are made in determining the accrued expense balances at the end of any reporting period. Non-refundable advance payments for research and development goods or services to be received in the future from third parties are deferred and capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed.

The successful development of our product candidates is highly uncertain. As such, at this time, we cannot reasonably estimate or know the nature, timing and estimated costs of the efforts that will be necessary to complete our future product candidates. We are also unable to predict when, if ever, material net cash inflows will commence from the sale of our product candidates, if approved. This is due to the numerous risks and uncertainties associated with developing product candidates, including the uncertainty of:

- the scope, rate of progress, and expenses of our ongoing research activities as well as any additional preclinical studies and clinical trials and other research and development activities;
- establishing an appropriate safety profile;
- successful enrollment in and completion of clinical trials;
- whether our product candidates show safety and efficacy in our clinical trials;
- receipt of marketing approvals from applicable regulatory authorities, if any;
- establishing commercial manufacturing capabilities or making arrangements with third-party manufacturers;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- commercializing the product candidates, if and when approved, whether alone or in collaboration with others; and
- continued acceptable safety profile of the products following any regulatory approval.

A change in the outcome of any of these variables with respect to the development of our current and future product candidates would significantly change the costs and timing associated with the development of those product candidates.

Research and development activities are central to our business model. Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect research and development costs to increase significantly for the foreseeable future as we continue the development of our product candidates. However, we do not believe that it is possible at this time to accurately project total program-specific expenses through commercialization. There are numerous factors associated with the successful commercialization of any of our product candidates, including future trial design and various regulatory requirements, many of which cannot be determined with accuracy at this time based on our stage of development. Additionally, future commercial and regulatory factors beyond our control will impact our clinical development programs and plans.

General and Administrative

General and administrative expenses consist primarily of employee-related expenses, including salaries, benefits, and equity-based compensation expenses for personnel in executive, finance, accounting, business development, legal, and human resources functions. Other significant general and administrative expenses include facility costs not otherwise included in research and development expenses, legal fees relating to patent and corporate matters, and fees for accounting and consulting services.

We anticipate that our general and administrative expenses will increase in the future as our business expands to support expected growth in research and development activities, including our future clinical programs. These increases will likely include increased costs related to the hiring of additional personnel and fees to outside consultants, among other expenses. We also anticipate increased expenses associated with being a public company, including costs for audit, legal, regulatory, and tax-related services related to compliance with the rules and regulations of the Securities and Exchange Commission, or SEC, and listing standards applicable to companies listed on a national securities exchange, director and officer insurance premiums, and investor relations costs. In addition, if we obtain regulatory approval for any of our product candidates and do not enter into a third-party commercialization collaboration, we expect to incur significant expenses related to building a sales and marketing team to support product sales, marketing and distribution activities.

Interest Income, Net

Interest income, net consists primarily of interest expense incurred on our credit facility, including amortization of debt discount and debt issuance costs, and interest income earned on our cash and cash equivalents.

Other Expense, Net

Other expense, net consists primarily of non-cash changes in the fair value of a warrant issued in connection with our credit facility and loss on extinguishment of our credit facility with SVB.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2018

The following table summarizes our results of operations for the years ended December 31, 2017 and 2018:

	Year Ended December 31,		Change	
	2017	2018	$	%
	(in thousands, except percentages)			
Collaboration revenue — related party	$ —	$ 3,358	$ 3,358	*
Operating expenses:				
Research and development	14,103	22,631	8,528	60%
General and administrative	2,826	5,355	2,529	89%
Total operating expenses	16,929	27,986	11,057	65%
Loss from operations	(16,929)	(24,628)	(7,699)	45%
Other income (expense):				
Interest income, net	14	871	857	*
Other expense, net	(5)	(74)	(69)	*
Total other income	9	797	788	*
Net loss	$ (16,920)	$ (23,831)	$ (6,911)	41%

* Percentage not meaningful

Collaboration Revenue

Collaboration revenue increased by $3.4 million for the year ended December 31, 2018 from $0 for the year ended December 31, 2017. The increase was due to a collaboration with AbbVie we executed in October 2018 to advance several oral integrin therapeutics for fibrosis-related indications.

Research and Development

Research and development expense increased by $8.5 million, or 60%, from $14.1 million for the year ended December 31, 2017 to $22.6 million for the year ended December 31, 2018. A significant portion of our research and development costs have been external costs, which we track on a program-by-program basis after a clinical product candidate has been identified. Our internal research and development costs are primarily personnel-related costs, depreciation, and other indirect costs. The following table summarizes our research and development expense for the years ended December 31, 2017 and 2018:

	Year Ended December 31,		Change	
	2017	2018	$	%
	(in thousands, except percentages)			
External costs by program:				
a_vb_6	$ 2,864	$ 6,763	$ 3,899	136%
a_4b_7	2,133	3,997	1,864	87%
Other early development candidates and unallocated costs	2,230	2,932	702	31%
Total external costs	7,227	13,692	6,465	89%
Internal costs:				
Employee compensation and benefits	5,766	7,754	1,988	34%
Facility and other	1,110	1,185	75	7%
Total internal costs	6,876	8,939	2,063	30%
Total research and development expense	$ 14,103	$ 22,631	$ 8,528	60%

The increase in research and development expense was primarily attributable to the following:

- The $6.5 million increase in external costs primarily related to increased research and preclinical development and manufacturing costs associated with our most advanced product candidate, MORF-720 targeting a_vb_6, and other external research costs associated with our other early development candidates.
- The $2.1 million increase in internal costs was primarily driven by an increase in employee compensation and benefits costs related to increased headcount in our research and development function.

General and Administrative

General and administrative expense increased by $2.5 million, or 89%, from $2.8 million for the year ended December 31, 2017 to $5.3 million for the year ended December 31, 2018.

The increase in general and administrative expense was primarily attributable to an increase of $0.8 million in employee compensation and benefits due to increased headcount and an increase of $1.5 million in professional services and consulting fees primarily due to increases in legal fees related to business development, regulatory and patent costs, accounting and audit fees, and public and investor relations fees due to ongoing business activities, and a $0.2 million increase in other expenses.

Interest Income, Net

Interest income increased by $0.9 million from $0 for the year ended December 31, 2017 to $0.9 million for the year ended December 31, 2018.

The increase in interest income, net was attributable to increased income earned on our investment portfolio, which increased significantly year-over-year due to the Series B financing and up-front payment pursuant to the AbbVie agreement.

Liquidity and Capital Resources

Sources of Liquidity

From inception through December 31, 2018, we have funded our operations with the gross proceeds of $140.0 million from sales of our convertible preferred equity securities and borrowings of $1.0 million under our credit facility with SVB, as well as $100.0 million we received as an up-front, non-refundable, payment from our collaboration with AbbVie. The following table provides information regarding our total cash and our cash equivalents, which consist of investments in money market funds, each of which are stated at their respective fair values as of December 31, 2017 and 2018:

	December 31,	
	2017	2018
	(in thousands)	
Cash	$ 289	$ 225
Money market funds	20,461	185,676
Total cash and cash equivalents	$ 20,750	$ 185,901

In March 2016, we entered into a credit facility with SVB for an equipment line of credit of up to $1.5 million to finance the purchase of eligible equipment. Principal and interest payments commenced on January 1, 2017 for a period of 36 months. The loan and security agreement also included a final payment fee equal to 5.0% of the aggregate advances and a pre-payment fee of 0.5% to 1.0%, depending on when the prepayment occurs. In December 2018, we paid the entire balance back to SVB, including a prepayment penalty of 0.5% and terminated the credit facility.

In connection with the credit facility, we also issued a warrant to SVB to purchase 39,800 Series Seed convertible preferred units at a purchase price of $0.75268 per unit, which became exercisable for 39,800 shares of Series Seed convertible preferred stock at a purchase price of $0.75268 per share in connection with the Reorganization. The SVB warrant is exercisable immediately and expires on March 30, 2026. Following the completion of this offering, the warrant will be exercisable for 39,800 shares of our common stock at an exercise price of $0.75268 per share.

Cash Flows

The following table provides information regarding our cash flows for the years ended December 31, 2017 and 2018:

	Year Ended December 31,	
	2017	2018
	(in thousands)	
Net cash provided by (used in) operating activities	$ (15,415)	$ 76,337
Net cash used in investing activities	(907)	(656)
Net cash provided by financing activities	20,261	89,470
Net increase in cash and cash equivalents and restricted cash	$ 3,939	$ 165,151

Net Cash Provided by (Used in) Operating Activities

The use of cash in all periods resulted primarily from our net losses adjusted for non-cash charges and changes in components of working capital. Net cash provided by operating activities was $76.4 million for the year ended December 31, 2018 compared to $15.4 million of cash used in operating activities for the year ended December 31, 2017. The increase in cash used in operating activities was due to an increase in net loss of $6.9 million for the year ended December 31, 2018 as compared to the year ended December 31, 2017 and an increase of $98.0 million of cash provided by operating assets and liabilities primarily due to an upfront payment from AbbVie.

Net Cash Used in Investing Activities

Net cash used in investing activities was $0.7 million for the year ended December 31, 2018 compared to net cash used in investing activities of $0.9 million for the year ended December 31, 2017. Net cash used in investing activities for the year ended December 31, 2018 and 2017 consisted primarily of purchases of equipment.

Net Cash Provided by Financing Activities

Net cash provided by financing activities was $89.4 million during the year ended December 31, 2018 compared to $20.3 million during the year ended December 31, 2017. The cash provided by financing activities for the year ended December 31, 2018 was primarily the result of $90.1 million of net proceeds received from private placements of our convertible preferred stock offset by repayment of debt of $0.7 million. The cash provided by financing activities for the year ended December 31, 2017 was primarily the result of $20.6 million of net proceeds received from private placements of our convertible preferred stock offset by repayment of debt of $0.3 million borrowings under the credit facility.

Funding Requirements

We expect our expenses to increase in connection with our ongoing activities, particularly as we continue research and development, initiate clinical trials, and seek marketing approval for our current and any of our future product candidates. In addition, if we obtain marketing approval for any of our current or our future product candidates, we expect to incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution, which costs we might offset through entry into collaboration agreements with third parties. Furthermore, upon the completion of this offering, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on acceptable terms, we would be forced to delay, reduce, or eliminate our research and development programs or future commercialization efforts.

We expect that the net proceeds from this offering, together with our existing cash and cash equivalents will enable us to fund our operating expenses and capital expenditure requirements into .

We have based this estimate on assumptions that may prove to be wrong, and we may use our available capital resources sooner than we currently expect. Our future capital requirements will depend on many factors, including:

- the costs of conducting preclinical studies and future clinical trials;
- the costs of future manufacturing;
- the scope, progress, results and costs of discovery, preclinical development, laboratory testing, and clinical trials for other potential product candidates we may develop, if any;
- the costs, timing, and outcome of regulatory review of our product candidates;
- our ability to establish and maintain collaborations on favorable terms, if at all;
- the achievement of milestones or occurrence of other developments that trigger payments under any collaboration agreements we might have at such time;

- the costs and timing of future commercialization activities, including product sales, marketing, manufacturing and distribution, for any of our product candidates for which we receive marketing approval;
- the amount of revenue, if any, received from commercial sales of our product candidates, should any of our product candidates receive marketing approval;
- the costs of preparing, filing and prosecuting patent applications, obtaining, maintaining and enforcing our intellectual property rights, and defending intellectual property-related claims;
- our headcount growth and associated costs as we expand our business operations and research and development activities; and
- the cost of operating as a public company.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances and licensing arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interests may be diluted, and the terms of these securities may include liquidation or other preferences that could adversely affect your rights as a common stockholder. Additional debt financing, if available, may involve agreements that include restrictive covenants that limit our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends, that could adversely impact our ability to conduct our business.

If we raise additional funds through collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates, or to grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Critical Accounting Policies and Significant Estimates

This management's discussion and analysis is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of these consolidated financial statements requires us to make judgments and estimates that affect the reported amounts of assets, liabilities, revenues and expenses, and the disclosure of contingent assets and liabilities in our consolidated financial statements. We base our estimates on historical experience, known trends and events, and various other factors that we believe to be reasonable under the circumstances. Actual results may differ from these estimates under different assumptions or conditions. On an ongoing basis, we evaluate our judgments and estimates in light of changes in circumstances, facts, and experience. The effects of material revisions in estimates, if any, will be reflected in the consolidated financial statements prospectively from the date of change in estimates.

While our significant accounting policies are described in more detail in the notes to our consolidated financial statements appearing elsewhere in this prospectus, we believe the following accounting policies used in the preparation of our consolidated financial statements require the most significant judgments and estimates.

Accrued Research and Development Expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate our accrued expenses as of each balance sheet date. This process involves reviewing open contracts and purchase orders, communicating with our personnel to identify services that have been performed on our behalf, and estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date based on facts and circumstances known

to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. The significant estimates in our accrued research and development expenses include the costs incurred for services performed by our vendors in connection with research and development activities for which we have not yet been invoiced. In certain instances, we prepay for services to be provided in the future. These amounts are expensed as the services are performed.

We base our expenses related to research and development activities on our estimates of the services received and efforts expended pursuant to quotes and contracts with vendors that conduct research and development on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the research and development expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepaid balance accordingly. Non-refundable advance payments for goods and services that will be used in future research and development activities are expensed when the activity has been performed or when the goods have been received rather than when the payment is made.

Although we do not expect our estimates to be materially different from amounts incurred, if our estimates of the status and timing of services performed differ from the actual status and timing of services performed, it could result in us reporting amounts that are too high or too low in any particular period. To date, there have been no material differences between our estimates of such expenses and the amounts incurred.

Equity-Based Compensation

Prior to the Reorganization, we granted incentive units, which we accounted for as equity-classified awards. As part of the Reorganization, the incentive units were exchanged for shares of our common stock and restricted common stock, which we account for as equity-classified awards. In 2018, we granted stock options, which we account for as equity-classified awards.

We measure employee equity-based compensation based on the grant date fair value of the equity-based awards and recognize equity-based compensation expense on a straight-line basis over the requisite service period of the awards, which is generally the vesting period of the respective award. As of January 1, 2018, we made an accounting policy election to recognize forfeitures as they occur upon full retrospective adoption of guidance per Accounting Standard Update ("ASU") No. 2016-09, *Compensation — Stock Compensation*, ("ASU 2016-09"). The adoption of ASU 2016-09 did not have a material impact on our consolidated financial statements. The term "forfeitures" is distinct from "cancellations" or "expirations" and represents only the unvested portion of the surrendered equity-based award. In addition, on January 1, 2018, we adopted, using modified retroactive approach, the guidance of Accounting Standard Update 2018-07, Compensation — Stock Compensation (Topic 718) — Improvements to Nonemployee Share-Based Payment Accounting and account for awards to non-employees using the grant date fair value without subsequent periodic remeasurement. The adoption of ASU 2018-07 did not have a material effect on our consolidated financial statements.

We recognize compensation expense for equity-based awards granted to non-employees over the related service period of the award. The fair value of the non-employee equity-based awards are established on the grant date and are not subject to re-measurement. Compensation expense to non-employees was not material for the years ended as of December 31, 2017 and 2018.

We classify equity-based compensation expense in our consolidated statements of operations in the same manner in which the award recipient's salary and related costs are classified or in which the award recipient's service payments are classified. In future periods, we expect equity-based compensation expense

to increase, due in part to our existing unrecognized stock-based compensation expense and as we grant additional stock-based awards to continue to attract and retain our employees.

Determination of the Fair Value of Equity-Based Awards

We determine the fair value of restricted common stock awards granted based on the fair value of our common stock. We estimate the fair value of incentive stock option awards and incentive units granted using the Black-Scholes option-pricing model, which uses as inputs the fair value of our common stock or unit and subjective assumptions we make, including the expected stock price volatility, the expected term of the award, the risk-free interest rate, and expected dividends. Due to the lack of a public market for the trading of our common stock and a lack of company-specific historical and implied volatility data, we base the estimate of expected volatility on the historical volatility of a representative group of publicly traded companies for which historical information is available. The historical volatility is generally calculated based on a period of time commensurate with the expected term assumption. We use the simplified method to calculate the expected term for options granted to employees and directors. We utilize this method as we do not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term. For options granted to non-employees, we utilize the expected term. The risk-free interest rate is based on a U.S. treasury instrument whose term is consistent with the expected term of the stock options. The expected dividend yield is assumed to be zero, as we have never paid dividends and do not have current plans to pay any dividends on our common stock.

As there has been no public market for our common units or incentive units to date, the estimated fair value of our common units and incentive units has been approved by our board of directors, with input from management, as of the date of each award grant, considering our most recently available independent third-party valuations of common units and incentive units and our board of directors assessment, with input from management, of additional objective and subjective factors that we believed were relevant and which may have changed from the date of the most recent valuation through the date of the grant. In addition, there has been no public market for our common stock to date. The estimated fair value of our common stock has been determined by our board of directors as of the date of each award grant considering our most recently available independent third-party valuations of common stock and our board of directors' assessment of additional objective and subjective factors that it believed were relevant and which may have changed from the date of the most recent valuation through the date of the grant. These independent third-party valuations were performed in accordance with the guidance outlined in the American Institute of Certified Public Accountants' Accounting and Valuation Guide, *Valuation of Privately-Held-Company Equity Securities Issued as Compensation.* We estimated the value of our equity using the market approach, including the guideline public company method and a precedent transaction method which "backsolves" to a preferred price. We allocated equity value to our common units, incentive units, and convertible preferred units or to our shares of common stock and shares of our convertible preferred stock, as the case may be, using either an option-pricing method, or OPM, or a hybrid method, which is a hybrid between the OPM and the probability-weighted expected return method. The OPM treats common securities and preferred securities as call options on the total equity value of a company, with exercise prices based on the value thresholds at which the allocation among the various holders of a company's securities changes. Under this method, the common units and incentive units and common stock have value only if the funds available for distribution to members exceed the value of the preferred security liquidation preference at the time of the liquidity event, such as a strategic sale or a merger. The hybrid method estimates the probability-weighted value across multiple scenarios but uses the OPM to estimate the allocation of value within at least one of the scenarios. In addition to the OPM, the hybrid method considers an initial public offering, or IPO, scenario in which the shares of convertible preferred stock are assumed to convert to common stock. The future value of the common units, incentive units and common stock in the IPO scenario is discounted back to the valuation date at an appropriate risk adjusted discount rate. In the hybrid method, the present value indicated for each scenario is probability weighted to arrive at an indication of value for the common units, incentive units and common stock.

As of August 31, 2017, our third-party valuation report estimated a valuation of our common units of $0.48 per unit, and our incentive units with a threshold price of $0.33 per unit. As of October 31, 2018, our third-party valuation report estimated a value of our common stock of $0.74 per share. As of January 31, 2019, our third-party valuation report estimated a value of our common stock of $1.33 per share.

In addition to considering the results of these third-party valuations, management considered various objective and subjective factors to determine the fair value of our common units, incentive units and common stock as of each grant date, which may be a date later than the most recent third-party valuation date, including:

- the prices of our preferred securities sold to or exchanged between outside investors in arm's length transactions, if any, and the rights, preferences and privileges of our preferred securities as compared to those of our common units, incentive units or common stock, including the liquidation preferences of our preferred securities;
- the progress of our research and development efforts, including the status of preclinical studies and planned clinical trials for our product candidates;
- the lack of liquidity of our equity as a private company;
- our stage of development and business strategy and the material risks related to our business and industry;
- the achievement of enterprise milestones, including entering into collaboration and license agreements;
- the valuation of publicly traded companies in the life sciences and biotechnology sectors, as well as recently completed mergers and acquisitions of peer companies;
- any external market conditions affecting the biotechnology industry, and trends within the biotechnology industry;
- the likelihood of achieving a liquidity event for the holders of our preferred shares, restricted common shares, and common stock, such as an IPO, or a sale of our company, given prevailing market conditions; and
- the analysis of IPOs and the market performance of similar companies in the biopharmaceutical industry.

The assumptions underlying these valuations represent management's best estimates, which involve inherent uncertainties and the application of management judgment. As a result, if factors or expected outcomes change and we use significantly different assumptions or estimates, our equity-based compensation expense could be materially different. Following the completion of this offering, the fair value of our common stock will be determined based on the quoted market price of our common stock.

The following table sets forth by grant date and type of award, the number of incentive units or stock options granted; the per unit strike price of incentive units or the per share exercise price of stock options granted between January 1, 2018 and the date of this prospectus.

Date of Issuance	Type of Award	Number of Units or Shares Subject to Awards/Grants	Per Unit Strike Price or Per Share Exercise Price	Fair Value per Common Unit or Common Share on Grant Date
6/21/2018	Incentive Unit	354,000	$ 0.33	$ 0.48
12/7/2018	Stock Option	999,309	$ 0.74	$ 0.74
12/14/2018	Stock Option	9,418,387	$ 0.74	$ 0.74
4/11/2019	Stock Option	1,522,000	$ 1.33	$ 1.33

Revenue Recognition

As of December 31, 2018, all of our revenue to date had been generated exclusively from our collaboration and option agreement with AbbVie. Effective January 1, 2018, we adopted the provisions of ASC Topic 606, *Revenue from Contracts with Customers* ("ASC 606") using the full retrospective transition method.

Under ASC 606, we recognize revenue when our customer obtains control of promised goods or services, in an amount that reflects the consideration which we expect to receive in exchange for those goods or services. To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, we perform the following five steps: (i) identification of the contract(s) with the customer, (ii) identification of the promised goods or services in the contract and determination of whether the promised goods or services are performance obligations, (iii) measurement of the transaction price, (iv) allocation of the transaction price to the performance obligations, and (v) recognition of revenue when (or as) we satisfy each performance obligation. We only apply the five-step model to contracts when it is probable that we will collect the consideration we are entitled to in exchange for the goods or services we transfer to our customer.

Identification of the Contracts with the Customers

We evaluate every contract to determine whether it in its entirety or in part represent a contract with a customer, or a collaboration agreement and, based on this determination, apply appropriate accounting guidance.

We account for a contract with a customer that is within the scope of ASC 606 when all of the following criteria are met: (i) the arrangement has been approved by the parties and the parties are committed to perform their respective obligations, (ii) each party's rights regarding the goods or services to be transferred can be identified, (iii) the payment terms for the goods or services to be transferred can be identified, (iv) the arrangement has commercial substance and (v) collection of substantially all of the consideration to which we will be entitled in exchange for the goods or services that will be transferred to the customer is probable.

Identification of the Performance Obligations

The promised goods or services in our collaboration and option arrangement consist of research and development services. The arrangement also has options for additional items (i.e., license rights). Options are considered to be marketing offers and are to be accounted for as separate contracts when the customer elects such options, unless we determine the option provides a material right which would not be provided without entering into the contract. Performance obligations are promised goods or services in a contract to transfer a distinct good or service to the customer. Promised goods or services are considered distinct when: (i) the customer can benefit from the good or service on its own or together with other readily available resources and (ii) the promised good or service is separately identifiable from other promises in the contract. In assessing whether promised goods or services are distinct, we consider factors such as the stage of development of the underlying intellectual property, the capabilities of our customer to develop the intellectual property on their own and whether the required expertise is readily available. We also concluded that the options for the license rights did not represent material rights, as the option exercise fees represent fair value of the rights AbbVie would acquire upon execution of the option(s) and do not provide for any discount to such fair value.

Determination of the Transaction Price

We estimate the transaction price based on the amount of consideration we expect to receive for transferring the promised goods or services in the contract. The consideration may include both fixed consideration and variable consideration. At the inception of each arrangement that includes variable consideration, we evaluate the amount of the potential payments and the likelihood that the payments will be received. We utilize either the most likely amount method or expected value method to estimate the transaction price

based on which method better predicts the amount of consideration expected to be received. If it is probable that a significant revenue reversal would not occur, the variable consideration is included in the transaction price.

Should AbbVie exercise any of the options, our arrangement includes development, regulatory milestone payments, and sales-based royalty payments. Those potential future payments have not been considered in the initial analysis, as they are contingent upon option(s) being exercised.

Allocation of Transaction Price

We allocate the transaction price based on the estimated standalone selling price. We must develop assumptions that require judgment to determine the standalone selling price for each performance obligation identified in the contract. We utilize key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction, and the estimated costs. Certain variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated to each performance obligation are consistent with the amounts we would expect to receive for satisfying each performance obligation.

Recognition of Revenue

We recognize revenue as we perform the research and development services based on the costs incurred to date, as such costs have direct relationship between our effort and the progress made towards satisfying its performance obligations to AbbVie.

Off-Balance Sheet Arrangements

We did not have, during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined under applicable SEC rules.

Contractual Obligations

The following table summarizes our significant contractual obligations by period presented according to the payment due date at December 31, 2018 (in thousands):

	Total	Less than 1 Year	1 to 3 Years	3 to 5 Years	More than 5 Years
Operating lease obligations[1]	$ 3,879	$ 1,087	$ 2,792	$ —	$ —
Total	$ 3,879	$ 1,087	$ 2,792	$ —	$ —

(1) Represents future minimum repayments under our non-cancellable operating leases as of December 31, 2018.

We entered into contracts with a number of third parties, including external CROs, that require us to make upfront payments, some of which may be non-refundable. Under various licensing and related agreements with third parties, we have agreed to make milestone payments and pay royalties to third parties. Pursuant to an exclusive license agreement with Children's Medical Center Corporation, or CMCC, a holder of our common stock, we paid CMCC an annual license maintenance fee of $15,000 in each of 2015 and 2018. In 2018 we amended the agreement and this obligation increased to $80,000 per year, and continues until the agreement is terminated. We will also be responsible for up to $1.3 million of development milestone payments through the first regulatory approval of a licensed product, tiered royalty payments of low single-digit percentages on net sales of licensed products in the event that we realize sales from products covered by the license agreement, and between 10% and 20% of non-royalty income attributable to a sublicense of

the CMCC rights. Amounts paid to CMCC are recorded as research and development expense in the statements of operations.

Pursuant to a collaboration agreement with Schrödinger, a holder of our preferred stock, we are responsible to pay Schrödinger up to an aggregate of $950,000 in development milestones on a target-by-target basis and royalty payments of low single-digit percentages on net sales of licensed products.

We enter into agreements in the normal course of business with vendors for preclinical studies, preclinical and clinical supply and manufacturing services, professional consultants for expert advice, and other vendors for other services for operating purposes. We have not included these payments in the table of contractual obligations above since the contracts do not contain any minimum purchase commitments and are cancelable at any time by us, generally upon 30 days prior written notice, and therefore we believe that our non-cancelable obligations under these agreements are not material.

Quantitative and Qualitative Disclosures About Market Risks

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our cash equivalents are in the form of a money market fund, which is primarily invested in short-term U.S. Treasury obligations. However, because of the short-term nature of the investments in our portfolio, an immediate one percentage point change in market interest rates would not have a material impact on the fair market value of our investment portfolio or on our financial position or results of operations.

We are not currently exposed to significant market risk related to changes in foreign currency exchange rates; however, we have contracted with and may continue to contract with foreign vendors that are located in Europe. Our operations may be subject to fluctuations in foreign currency exchange rates in the future.

Inflation generally affects us by increasing our cost of labor. We do not believe that inflation had a material effect on our business, financial condition or results of operations during the years ended December 31, 2017 or 2018.

Emerging Growth Company and Smaller Reporting Status

We are an "emerging growth company," or EGC, under the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. Section 107 of the JOBS Act provides that an EGC can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act, for complying with new or revised accounting standards. Thus, an EGC can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of delayed adoption of new or revised accounting standards and, therefore, we will be subject to the same requirements to adopt new or revised accounting standards as private entities.

As an EGC, we may take advantage of certain exemptions and reduced reporting requirements under the JOBS Act. Subject to certain conditions, as an EGC:

- we will present only two years of audited financial statements and only two years of related Management's Discussion and Analysis of Financial Condition and Results of Operations;
- we will avail ourselves of the exemption from providing an auditor's attestation report on our system of internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act;
- we will avail ourselves of the exemption from complying with any requirement that may be adopted by the Public Company Accounting Oversight Board, or PCAOB, regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements, known as the auditor discussion and analysis;
- we will provide reduced disclosure about our executive compensation arrangements; and

- we will not require nonbinding advisory votes on executive compensation or stockholder approval of any golden parachute payments.

We will remain an EGC until the earliest of (i) the last day of the fiscal year following the fifth anniversary of the completion of this offering, (ii) the last day of the fiscal year in which we have total annual gross revenues of $1.07 billion or more, (iii) the date on which we have issued more than $1.0 billion in non-convertible debt during the previous rolling three-year period, or (iv) the date on which we are deemed to be a large accelerated filer under the Securities Exchange Act of 1934, as amended, or the Exchange Act.

We are also a "smaller reporting company," meaning that the market value of our stock held by non-affiliates plus the proposed aggregate amount of gross proceeds to us as a result of this offering is less than $700.0 million and our annual revenue is less than $100.0 million during the most recently completed fiscal year. We may continue to be a smaller reporting company after this offering if either (i) the market value of our stock held by non-affiliates is less than $250.0 million or (ii) our annual revenue is less than $100.0 million during the most recently completed fiscal year and the market value of our stock held by non-affiliates is less than $700.0 million.

If we are a smaller reporting company at the time we cease to be an emerging growth company, we may continue to rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. Specifically, as a smaller reporting company we may choose to present only the two most recent fiscal years of audited financial statements in our Annual Report on Form 10-K and, similar to emerging growth companies, smaller reporting companies have reduced disclosure obligations regarding executive compensation.

Recent Accounting Pronouncements

We have reviewed all recently issued standards and have determined that, other than as disclosed in Note 2 to our consolidated financial statements appearing elsewhere in this prospectus, such standards will not have a material impact on our financial statements or do not otherwise apply to our operations.

Income Taxes

We have incurred NOLs from inception. At December 31, 2018, we had federal and state NOL carryforwards of approximately $34.7 million and $21.4 million, respectively, available to reduce future taxable income, which expire beginning in 2036. As of December 31, 2018, we also had federal and state research and development tax credit carryforwards of approximately $0.6 million and $0.4 million respectively, to offset future income taxes, which will begin to expire beginning in December 2031. Our NOL carryforwards are subject to review and possible adjustment by the appropriate taxing authorities. These NOL carryforwards that may be utilized in any future period may be subject to limitations based upon changes in the ownership of our stock in a prior or future period. We have not quantified the amount of such limitations, if any.

As required by ASC 740, our management has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are composed principally of NOL carryforwards and research and development credit carryforwards. Management has determined that it is more likely than not that we will not realize the benefits of our federal and state deferred tax assets, and, as a result, a valuation allowance of $8.9 million and $14.7 million has been established at December 31, 2017 and 2018, respectively. The change in the valuation allowance was $3.4 million and $5.8 million for the years ended December 31, 2017 and 2018.

BUSINESS

Overview

We are a biopharmaceutical company applying our proprietary insights into integrins to discover and develop a pipeline of potentially first-in-class oral small-molecule integrin therapeutics. Integrins are validated targets with multiple approved injectable blockbuster drugs for the treatment of serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer. Despite significant unsuccessful efforts, we believe tremendous untapped potential remains for us to develop oral integrin therapies. We created the Morphic integrin technology platform, or MInT Platform, by leveraging our unique understanding of integrin structure and biology to develop novel product candidates designed to achieve the potency, high selectivity and pharmaceutical properties required for oral administration. We are advancing our lead wholly-owned program for a_4b_7-specific integrin inhibitors affecting inflammation into clinical development for the treatment of inflammatory bowel disease, or IBD. We are also developing our most advanced product candidate, MORF-720, a selective oral a_vb_6-specific integrin inhibitor into clinical development for the treatment of idiopathic pulmonary fibrosis, or IPF, in collaboration with AbbVie Inc., or AbbVie. We intend to advance our a_4b_7 program and MORF-720 toward Investigational New Drug applications, or INDs, by the middle of 2020 and as early as the end of 2019, respectively. Beyond our current targets, we are using our MInT Platform to create a broad pipeline of programs across a variety of therapeutic areas, all of which aim to harness the potential of inhibition or activation.

Integrins are a family of transmembrane cell adhesion proteins that localize cells in specific tissues and then modulate cellular functions in response to these environments. They are the only receptors that can "integrate" extracellular and intracellular stimuli. Integrins contain two subunits: one protein in the integrin dimer comes from the a family and one from the b family. Combinations of various a and b subunits form 24 integrins that are subdivided across four receptor subgroups: those on leukocytes, and those that recognize RGD-peptide, collagen and laminin ligands. Their activity is modulated by the complexity of their conformational states. Tissues have distinct integrin expressions and these integrins play a role in autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer. We believe the diversity and specificity of integrin involvement in a broad range of diseases make this set of molecules ideal drug targets.

We believe that our discovery platform enables us to be the only company working across the entire 24-member integrin target family. Our MInT Platform consists of three unique capabilities:

- **Proprietary ability to determine integrin structures.** Using our protein constructs, cell lines and know-how, we have elucidated more than 150 proprietary structures for clinically important targets within the integrin family.

- **Tunable product candidate design engine.** We have built a library of optimized compounds using sophisticated medicinal chemistry capabilities and biological assays that allows us to tune highly potent and selective integrin inhibitors and activators into product candidates for preclinical and clinical development. Our ability to generate product candidates from our tunable product engine is accelerated by our exclusive computational design collaboration with Schrödinger.

- **Biology and disease translation capability.** Our sophisticated and comprehensive suite of biologic tools includes a gene and protein expression atlas, a single-cell resolution profiling of human tissues from diseases of interest and development of biomarkers, which allow us to assess target engagement and pharmacodynamic activity in the disease of interest.

The initial focus of our therapeutic product candidates is validated targets in areas of high unmet medical need. Our lead wholly-owned program focuses on the advancement of an oral therapy targeting the clinically validated a_4b_7 integrin receptor for the treatment of IBD, or more specifically, ulcerative colitis and Crohn's disease. Vedolizumab, an intravenously administered therapeutic antibody targeting a_4b_7, is approved by the U.S. Food and Drug Administration, or FDA, and other foreign regulatory authorities for late-stage treatment

of both diseases and generated worldwide sales of $1.9 billion in fiscal year 2018. We believe that there is a significant unmet need for an oral therapy with the safety and efficacy of a biologic such as vedolizumab. We have identified potent and selective oral small molecules targeting a_4b_7 and expect to submit an IND in the middle of 2020 for our a_4b_7 program.

We are progressing our most advanced product candidate, MORF-720, a selective oral first-in-class a_vb_6-specific integrin inhibitor, into clinical development for the treatment of IPF, a disease with high unmet medical need. In preclinical models of this disease, we observed that administration of our a_vb_6 inhibitor was associated with local inhibition of TGF-b, a clinically prominent anti-inflammatory cytokine, and anti-fibrotic effect in tissues. Furthermore, we did not observe systemic TGF-b inhibition, which is associated with immune dysfunction. As part of our collaboration with AbbVie, they have an option to license this program at IND for future development and commercialization, and if this option is exercised, we are entitled to a license fee of $20.0 million, as well as potential milestone payments and royalties. We expect an IND application to be submitted for our a_vb_6 product candidate for the treatment of IPF as early as end of 2019.

Based on the broad therapeutic potential of integrin inhibition and activation and the productivity of our MInT Platform, we have made the strategic decision to retain full commercial rights to certain compounds and indications in our development pipeline while selectively collaborating on the development of those that do not match our current resources or therapeutic focus. In October 2018, we entered into a research and development collaboration agreement with AbbVie designed to advance a number of our oral integrin programs for fibrosis-related indications, which included an upfront payment of $100.0 million to us to provide research and development activities, and we provided AbbVie with exclusive license options on product candidates directed at a number of targets. In February 2019, we entered into a collaboration agreement with Janssen Pharmaceuticals, Inc., or Janssen, to develop novel integrin therapeutics. We are eligible to receive up to $729 million in the aggregate from the collaboration in upfront, option and milestone payments, as well as royalties on net sales. We believe these collaborations further validate the transformational potential of our MInT Platform.

We were founded in 2014 by Dr. Timothy A. Springer of Harvard Medical School and Boston Children's Hospital, a world-renowned immunologist and biophysicist who discovered integrins. He established the importance of integrin conformations in modulating disease activity. Today, pursuant to an exclusive license from the Children's Medical Center Corporation, or the Springer Laboratory, our MInT platform is powered by these initial insights, together with our proprietary knowledge of integrin conformations, affinity regulation and dynamics. Together, this enables us to discover novel product candidates that bind and revert disease-specific integrin conformations to a non-disease physiologic state.

We have assembled an experienced management team, board of directors and scientific advisory board with specialized expertise in integrin therapies. They collectively bring extensive experience in discovering, developing and commercializing therapeutics, having worked at companies such as Biogen Inc., Cubist Pharmaceuticals, Inc., Gilead Sciences, Inc., Merck & Co. and Pfizer Inc.

Since our inception, we have raised $248 million through equity financings and collaborations. Our investors include AbbVie Ventures, EcoR1 Capital Fund, Invus, Novo Holdings A/S, Omega Funds, Pfizer Ventures, Polaris Partners, Schrödinger, Inc., ShangPharma Investment Group Limited, S.R. One, Limited, Dr. Timothy A. Springer, and our collaborators are AbbVie, Janssen and Schrödinger.

Our Strategy

Our goal is to utilize our MInT Platform to discover and develop potentially first-in-class oral small-molecule integrin therapeutics. We believe our platform has the potential to transform the treatment paradigm for patients suffering from a broad range of serious chronic diseases. The key tenets of our business strategy to achieve this goal include:

- ***Establishing orally available integrin modulators as a new treatment for serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.*** We are leveraging our MInT Platform to create a new class of oral integrin-targeted therapeutics to treat diseases where integrins are dysregulated and a potential benefit for oral therapies exists. We have prioritized our initial development efforts on diseases with validated clinical endpoints and biomarkers, which we believe will enable us to more rapidly achieve clinical proof of concept. We are advancing our lead wholly-owned program for a_4b_7-specific integrin inhibitors into clinical development for the treatment of IBD. We are also developing our most advanced product candidate, MORF-720, a selective first-in-class a_vb_6-specific integrin inhibitor of the growth of fibrotic tissue in the lung, into clinical development for the treatment of IPF. We intend to advance our a_4b_7 program and MORF-720 toward IND submissions by the middle of 2020 and as early as the end of 2019, respectively.

- ***Leveraging our proprietary MInT Platform and knowledge base to grow our pipeline of novel integrin therapeutics.*** Our comprehensive MInT Platform, coupled with our development capabilities, have enabled us to build a pipeline of novel product candidates targeting chronic diseases caused by integrin dysregulation. We intend to expand our pipeline by unlocking the therapeutic potential of the four integrin subgroups to treat diseases with high unmet medical need and to potentially expand our current product candidates into new indications.

- ***Continuing to drive innovation across our MInT Platform.*** We intend to extend our leading position in the field of integrin medicine by continuing to develop and incorporate platform innovations that can further broaden the potential therapeutic reach of our oral integrin programs. Our key focus areas include iteratively expanding the breadth of our structural knowledge in crystallography through technological investments, broadening our library of conformationally-specific integrin chemotypes and deepening our fundamental understanding of integrin disease biology. We believe that as we further expand our knowledgebase we will be able to iteratively grow our platform and deepen our understanding of additional integrin targets.

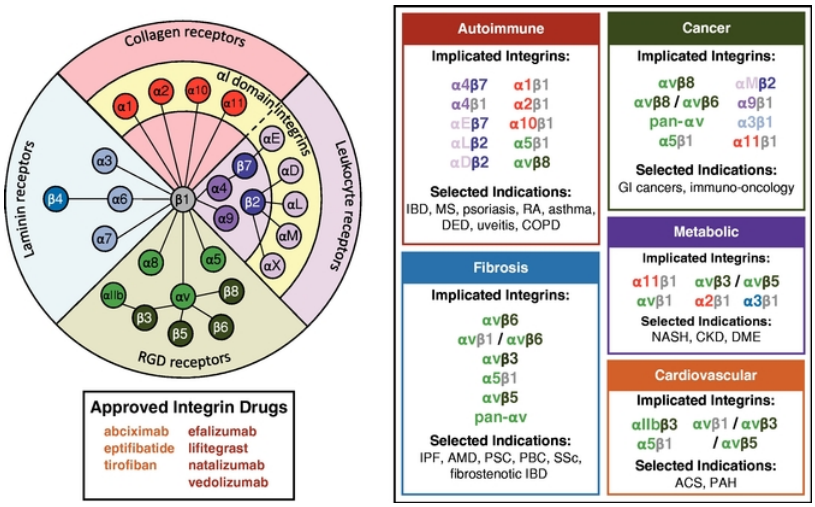
- ***Independently commercializing our products, if approved, in indications and geographies where we believe we can realize maximum value.*** We plan to independently advance those product candidates that we believe have well-defined clinical and regulatory approval pathways, and that we believe we can commercialize successfully, if approved. We may also seek to form strategic collaborations around certain targets, product candidates or disease areas that we believe could benefit from the resources of either larger biopharmaceutical companies or those specialized in a particular area. Our current collaborations with AbbVie and Janssen exemplify various aspects of this strategy.

Our Focus — Integrin Receptors

Integrins are the only receptors in the human body that use both intracellular and extracellular ligands to transmit signals both from inside of the cell to the outside of the cell and from the outside of the cell to the inside of the cell. Reciprocally, these states are regulated by tensile forces transmitted through integrins when they bind to extracellular ligands and the intracellular cytoskeleton. This bi-directional signaling ability allows integrins to affect virtually every aspect of cell and organ homeostasis. Consequently, the dysregulation of integrin signaling is associated with many human diseases including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.

Integrin receptors are evolutionarily conserved. Integrins exist as paired combinations of 18 a and eight b subunits resulting in 24 known heterodimers. These pairings give integrins their unique abilities to

recognize their ligands and modulate cellular function in specific ways. Integrins are subdivided into those on leukocytes, and those that recognize RGD-peptide, collagen and laminin ligands. They regulate numerous aspects of cell biology and physiology including: leukocyte trafficking, activation of platelets and leukocytes, activation of growth factors such as TGF-b, cell adhesion to the basement membrane and extracellular matrix, and retention or adhesion strengthening of cells within tissues. This diverse set of functions makes them actionable targets across a broad range of human diseases based on preclinical modeling or clinical validation. The figure below summarizes the 24-member integrin family and areas of clinical relevance:



Integrins as a Therapeutic Target Family

Integrins have long been recognized as drug targets. In the 1980s, the therapeutic interrogation of integrins focused on the RGD integrin, $a_{IIb}b_3$. When $a_{IIb}b_3$ on platelets is activated, it binds to fibrin, which bridges it to adjacent platelets and leads to clot formation. As the molecular details establishing the essential role of $a_{IIb}b_3$ in platelet aggregation emerged, it became clear that inhibition of its ligand binding function would be antithrombotic. In 1994, abciximab (marketed as Reopro) became the first approved integrin therapy for patients undergoing percutaneous transluminal coronary angioplasty, followed by the approval of tirofiban (marketed as Aggrastat) and eptifibatide (marketed as Integrilin).

The next stage of development of integrins as drug targets has focused on integrin receptors on leukocytes. These therapies modulate autoimmunity by inhibiting the ability of activated immune cells, including T-cells, to enter chronically inflamed tissues. Four approved integrin medicines belong to this category:

- Efalizumab (marketed as Raptiva), an injectable antibody inhibitor of a_Lb_2, approved by the FDA in 2003 for the treatment of chronic moderate to severe psoriasis;
- Natalizumab (marketed as Tysabri), an infusible antibody inhibitor of a_4b_1, approved by the FDA in 2004 for the treatment of relapsing forms of multiple sclerosis and in 2008 for the treatment of moderate to severe active Crohn's disease;
- Vedolizumab (marketed as Entyvio), an infusible antibody inhibitor of a_4b_7, approved by the FDA in 2014 for the treatment of moderate to severe active ulcerative colitis or Crohn's disease; and

- Lifitegrast (marketed as Xiidra), a topical small-molecule inhibitor of $a_L b_2$, approved by the FDA in 2016 for the treatment of keratoconjunctivitis sicca.

According to Evaluate Pharma, these autoimmune therapies were estimated to have achieved combined annual sales in their respective 2018 fiscal years of approximately $4.6 billion.

Development Challenges of Oral Integrin Modulators

The infusible, injectable or topical nature of these therapies has limited their utility. To address the limitations of these therapies, the pharmaceutical industry has invested significant resources in discovering and developing oral systemic integrin therapies. For $aIIb_b3$ alone, six different compounds (roxifiban, sibrafiban, orbofiban, xemilofiban, lefradafiban, lotrafiban) were advanced into registrational Phase 3 clinical trials. Disappointingly, the results of these trials showed these oral systemic inhibitors of $aIIb_b3$ increased vascular death in patients with acute coronary syndrome. The reason for these failures took another decade to establish. We now know that all failed oral inhibitors stabilized the active integrin conformation and promoted ligand signaling if they were not potent enough to maintain full active site binding. These drawbacks resulted in greater platelet aggregation and increased rate of adverse events.

Later, a conceptually similar paradoxical exacerbation of symptoms in multiple sclerosis patients was observed in Phase 2 clinical trials of firategrast, an oral non-selective inhibitor of a_4b_1 and a_4b_7, when it was administered in non-saturating doses. The development of this compound was subsequently halted.

Our Platform and Approach

We believe that our MInT Platform allows us to address and overcome the challenges faced by developers of first-generation oral integrin-targeted therapeutics.

We initially focused on developing product candidates with validated targets for areas of high unmet medical needs including:

- a_4b_7 and a_4b_1, which are validated as targets for autoimmune diseases; their mechanism of action and the benefits and risks of their inhibition are well understood; and
- certain a_v integrins that have a preclinically well-characterized mechanism of action through the activation of TGF-b, a clinically important anti-inflammatory cytokine dysregulated in many human pathologies.

Our understanding of the mechanism of integrin receptor activity, modulated by complex conformations and signaling, is unique and allows us to discover both inhibitors and activators across the integrin receptor target family. Our capability has been validated by our advancement of a_vb_6 and a_4b_7 programs, as well as our collaborations with AbbVie and Janssen. Our MInT Platform consists of three major components:

- Proprietary ability to determine integrin structures;
- Tunable product candidate design engine; and
- Biology and disease translation capability.

Leveraging our deep understanding of integrin conformation and molecular modes of action is a key element of our strategy to identify product candidates. These receptors undergo large conformational changes as shown in Figure 1 resulting in both inactive (bent-closed and extended-closed) and activated states of the receptor (extended-open). In the bent-closed form, the top portion of the integrin, formed by both a and b subunits, folds in half so that the top and lower half associate with each other (Figure 1 left) rendering the integrin inactive. For the integrin to be active, the extended-close state (Figure 1 middle) extends at the a and b mid-leg on the cell surface to render an extended open state (Figure 1 right). As shown with multiple integrins, the bent-closed and extended-closed conformations have low affinities for ligand, while depending on the integrin, the extended-open conformation is 700 to 5,000-fold higher in affinity for ligand. It is these changes in integrin conformation and affinity that function to transmit bidirectional signals, enabling

communication of the cell expressing the integrin on its surface and the extracellular matrix or ligands on other cells

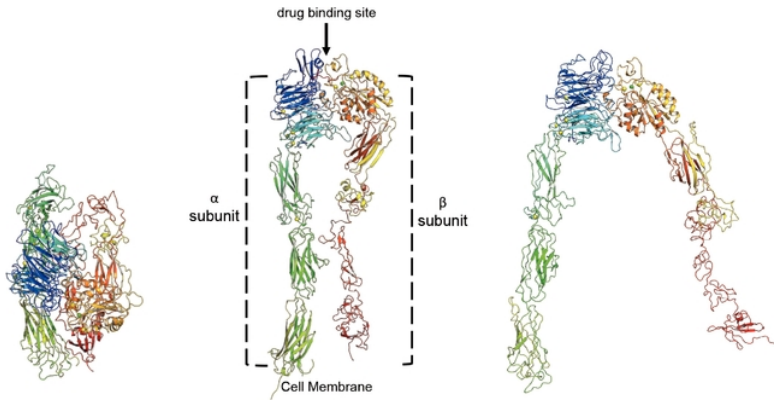


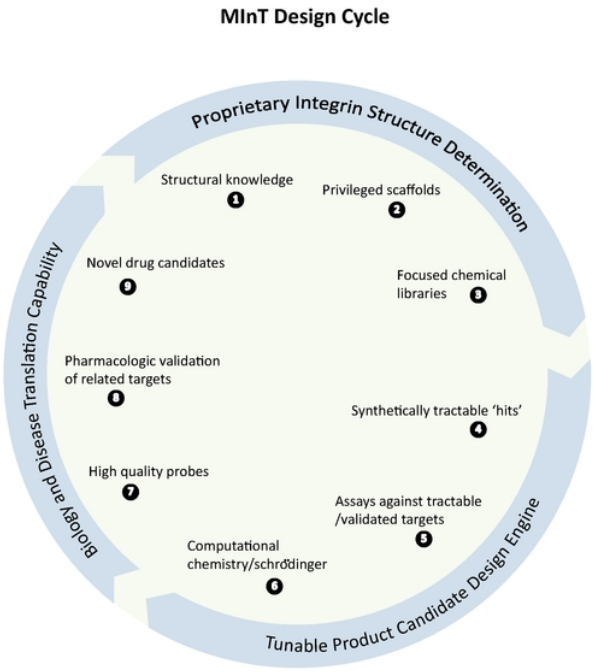
Figure 1:Integrin dynamic conformational states. Left — bent-closed inactive form of the integrin heterodimer pair, Middle — extended-closed inactive, and Right — extended-open active.

Our novel MInT Platform is rooted in our structural biology capability based on deep insights into control of complex integrin conformational states. Dr. Springer characterized an initial set of small molecules to lock specific integrin conformations and we have used and advanced this knowledge to optimize the pharmacology of our oral integrins. We design our compounds to recognize integrin conformational states that are physiologic dysregulated in disease. Binding of our compounds to integrins promotes the integrin to adopt a structure that is characteristic of healthy tissue and stops disease specific integrin signaling. We believe past attempts to develop small molecules targeting integrins have in part failed due to a lack of sufficient understanding of these conformational changes and their impact on disease. We believe our MInT Platform has positioned us to apply our deep understanding of the biologic underpinnings of diseases linked to integrin dysfunction to develop a pipeline of novel integrin therapeutics.

The Morphic Integrin Technology (MInT) Platform

Given that the integrin target family consists of structurally and functionally related proteins, each cycle of the MInT Platform yields chemistry assets and biological data in our programs of interest while in parallel furthering our understanding of the structure and function of new integrin complexes. We believe this results in a rapid strategic compounding of knowledge and assets with each turn of the MInT design cycle. Our a_4b_7 program produced its first development candidate over three years after program initiation. Our a_vb_6 program took only two years to achieve the same goal, which we believe was due in part to insights we had gained on chemical features that optimized oral bioavailability, clearance and metabolic stability. The chemotypes and initial medicinal chemistry hits we discover become tools and compounds that can further our knowledge base around each individual integrin, which also extends to related integrins. For example, discovery efforts in a_vb_6 led to starting points for a_vb_1, a_vb_8 and additional targets, directly enabling new programs and supporting collaboration efforts.

As shown in the graphic below, the iterative MInT design cycle consists of nine steps based on the three pillars of our MInT Platform: our proprietary ability to determine integrin structures, our tunable product candidate design engine, and our biology and disease translation capability.



Proprietary ability to determine integrin structures

We believe that an understanding of protein crystal structures enables more effective product candidate design. Integrins are difficult to characterize structurally because they are composed of many flexible domains and interdomain linkers (see Figure 1). Our unique position of integrin structural knowledge and access to proprietary protein reagents and know-how has allowed us to elucidate more than 150 proprietary structures for clinically important targets across nine of the 24 integrins. Our novel approach is based on combining our deep understanding of structural biology and how integrin protein conformation regulates function in disease. An example of this is in our a_4b_7 program where the crystal structure of the drug binding site enables the design of novel ligands that bind at the interface of the a and b subunits (Figure 2). This critical information at the molecular level directs our research to unlock the potential of this family of receptors and develop small molecules for targeting specific conformations of the integrin receptors.

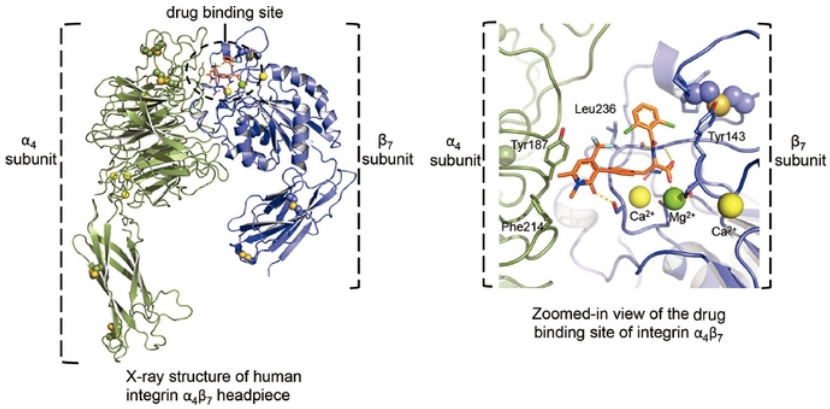


Figure 2: Left — X-ray crystal structural of the top portion of the heterodimer or headpiece of the human $\alpha_4\beta_7$ integrin receptor with the a-subunit on the left and b-subunit on the right. The drug binding site for this receptor is at the interface of the a and b subunits. Right — Zoomed in view of the drug binding site showing the key interactions responsible for regulation of protein conformation in this integrin. Data for structural rendering from: Yu, Y., Zhu, J., Mi, L.Z., Walz, T., Sun, H., Chen, J.-F., Springer, T.A. (2012). Structural specializations of $\alpha_4\beta_7$ an integrin that mediates rolling adhesion. J. Cell Biol. 196, 131-146.

Tunable product candidate design engine

Proprietary Chemistry: We have significant know-how in the development of molecules that stabilize specific integrin receptor conformations, which supports our novel approach to the identification of oral integrin inhibitors. Today, our small molecule chemical library contains over 6,000 uniquely designed integrin modulators (inhibitors and activators), which continues to grow, and our drug design technology leverages our proprietary understanding of integrin target dynamics. When coupled with our deep understanding of the molecular mode of action of specific integrins, we believe we can design appropriate chemotypes for each integrin function. Further optimization of library compounds, combined with excellence in medicinal chemistry, enables the identification of potent, selective oral small molecule product candidates.

Exclusive Schrödinger Computational Chemistry Collaboration: We have a collaboration with Schrödinger, a leader in chemical simulation and *in silico* drug discovery, that is exclusive as to integrins. We believe this collaboration enables us to undertake accelerated drug discovery through design, iteration and optimization of leads using a variety of next-generation physics-based computational technologies. Our collaboration with Schrödinger enables us to design molecules with atomic precision utilizing advanced structure-guided drug design technology.

Our In Vitro Integrin Assay Panels: To identify novel inhibitors that stabilize disease-relevant receptor conformations, we have established a suite of robust *in vitro* assays that cover a majority of integrin family members. These proprietary in-house screening assays enable biochemical and functional characterization of potency and selectivity within the integrin family, serving as powerful tools in different stages of the drug design process.

Biology and disease translation capability

The MInT Platform is built upon a deep understanding of integrin biology in human diseases. We have built a sophisticated and comprehensive suite of *in vitro*, *ex vivo*, and disease-specific *in vivo* assays designed to evaluate the pharmacological effects of integrin modulation and to gain additional insights into their

mechanism of action. The biological learnings from these assays have the potential to accelerate our work across multiple integrin discovery programs. We hope to strategically translate preclinical observations into our clinical development plans. These, along with our growing capabilities in pharmacokinetic and pharmacodynamic modeling, have enabled our discovery of integrin inhibitors that have the potential to impact human diseases of autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.

Our Pipeline Programs

We have conducted an analysis of opportunities for integrin inhibition in human disease on the basis of validating biology, safety, technology readiness and development feasibility. We have identified a number of actionable integrin targets across all four integrin families, and our initial focus is in high unmet medical need areas of autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.

The following table summarizes key information about our product candidates and programs:

	Name	Integrin Target	Modality	Indication(s)	Stage of Development	Product Rights
Leukocyte	**MRβ7 #1** **MRβ7 #2**	$\alpha_4\beta_7$	Oral Inhibitor	·Ulcerative Colitis ·Crohn's Disease ·Eosinophilic Esophagitis	·IND-enabling studies ·Intended IND application submission by the middle of 2020	Morphic
RGD	MORF-720	$\alpha v\beta_6$	Oral Inhibitor	Idiopathic Pulmonary Fibrosis	·IND-enabling studies ·Intended IND application submission as early as the end of 2019	AbbVie
		$\alpha v\beta_6$	Oral Inhibitor	Liver Diseases	Discovery	Morphic AbbVie
		αvβ1	Oral Inhibitor	Fibrosis	Discovery	Morphic
		TGF-β Activation	Oral Inhibitor	Gastrointestinal cancers	Discovery	Morphic
		TGF-β Activation	Oral Inhibitor	Fibrosis	Discovery	AbbVie
Other		Undisclosed targets, including αI Domain Integrins	Oral Modulator	Undisclosed	Discovery	Janssen

Our Lead Product Candidates and Additional Programs

Our a_4b_7-specific Integrin Inhibitor for Autoimmune Inflammation

We are advancing our a_4b_7 integrin program as a treatment for ulcerative colitis and Crohn's disease. Current medical management strategies focus on treating disease relapses and prolonging remission with immunomodulators and monoclonal antibody therapies. We believe our oral integrins have the potential, if approved, to offer a targeted and more convenient method of treatment for patients suffering from chronic gastrointestinal and gastroesophageal inflammatory diseases.

Inflammatory Bowel Diseases

IBD is a group of chronic autoimmune and inflammatory conditions of the gastrointestinal tract that can have periods of relapse or remittance. Ulcerative colitis and Crohn's disease are the principal sub-types of IBD. In ulcerative colitis, the lining of the colon, or large intestine, becomes inflamed, resulting in the formation of ulcers, which may subsequently lead to bleeding and diarrhea. In Crohn's disease,

inflammation may be presented segmentally, affecting some areas of the gastrointestinal tract while leaving other areas unharmed. According to a report by the Crohn's and Colitis Foundation, as of November 2014, there were approximately 907,000 people living with ulcerative colitis and 780,000 with Crohn's disease in the United States. The disease incidence is approximately 38,000 new cases per year of ulcerative colitis and 33,000 of Crohn's disease in the United States. According to Evaluate Pharma, as of December 31, 2018, the IBD market is estimated to be approximately $17.5 billion.

The mainstays of therapy over many years have been oral and topical salicylates and glucocorticoids, and various immunosuppressive agents. Anti-integrin antibody therapy for IBD was first introduced with the approval of the a_4 integrin inhibitor natalizumab for Crohn's disease, an indication approved following its initial approval for multiple sclerosis. Natalizumab therapy is associated with, and carries a black box warning for, progressive multifocal leucoencephalopathy, or PML, related to its a_4b_1 inhibitory activity, which has limited its use in Crohn's disease. PML is a rare and often fatal viral disease characterized by progressive damage of the white matter of the brain at multiple locations. Vedolizumab, a monoclonal antibody inhibitor of the integrin a_4b_7, is approved for the induction and maintenance of remission in late-line ulcerative colitis, and does not carry a black box warning. Vedolizumab is also approved as a late-line option for Crohn's disease.

Overview of Pathway and Target Biology

Integrin a_4b_7 binds to mucosal addressing cell adhesion molecule, or MAdCAM, which is expressed at a high level almost exclusively on the endothelial cells of the gut. Blockade of this interaction prevents immune cell entry into inflamed tissue in the gut and has been shown to be effective in treating IBD, as evidenced by the approval of vedolizumab.

Our Solution

We have generated oral small-molecule integrin therapeutics targeting a_4b_7 intended to treat patients with ulcerative colitis and Crohn's disease. Our strategy is driven by our ability to discover oral therapies and our knowledge of how to minimize off-target risk of inhibiting a_4b_1, which is implicated in PML. We believe this program represents an example of a validated target with opportunities to differentiate from established therapies, utilizing our MInT Platform. We believe that safe and effective oral therapies have the potential to transform the lives of IBD patients in two distinct ways: (i) as an earlier line of therapy, and (ii) in combination with other agents in the IBD landscape.

In preclinical studies, our a_4b_7 inhibitor molecules have exhibited high potency and selectivity for a_4b_7, good oral absorption and pharmacokinetic properties suitable for twice daily dosing. We have completed preclinical studies of multiple a_4b_7 inhibitors in which we established pharmacological proof of concept, including observed effects on T cell trafficking similar to a comparator a_4b_7 antibody, DATK-32 (a rodent surrogate of vedolizumab). We have initiated IND-enabling studies and expect an IND application to be filed in the middle of 2020.

Preclinical Data, Pharmacology and Biomarker Data

Using our proprietary MInT Platform, we have designed a_4b_7 small-molecule inhibitors that are potent and have high selectivity for a_4b_7 relative to other integrins, including a_4b_1, as assessed by a suite of *in vitro* assays. Table 1 below shows measurements of the potency of two product candidates, MRb_7 #1 and MRb_7 #2, as assessed in our cell adhesion assays, as compared to reference products vedolizumab and natalizumab and AJM-300, a product candidate being developed by a third party. We determined all of these potencies in our laboratories. The cell adhesion assay evaluated the ability of a_4b_7 to bind to its ligand MAdCAM, and a_4b_1 to its ligand VCAM *in vitro*. These assays have been shown to be useful in discovering drug candidates for IBD.

IC50 values are commonly accepted measurements of drug potency. However, we believe that *in vitro* IC90 values in the cell adhesion assays with human serum are most predictive for *in vivo* efficacy for a_4b_7 drug product. Both MRb_7#1 and MRb_7#2 have been observed to be highly potent a_4b_7 inhibitors with over 1,000-fold selectivity in our cell adhesion assay versus a_4b_1. We are progressing both a_4b_7 candidates

through IND-enabling studies and, based on their properties, we intend to advance one or both candidates into clinical development.

The *in vivo* activity of our a_4b_7 inhibitors was also evaluated in an acute pharmacodynamic model, where the impact of blocking the a_4b_7 integrin on the trafficking of T cells to the gut was assessed in mice (Figure 3). A number of our compounds, including our product candidates, have been evaluated in this assay to assess dose response. At the highest dose tested, we observed our compounds to be as potent as DATK32, a mouse surrogate of the a_4b_7 antibody vedolizumab.

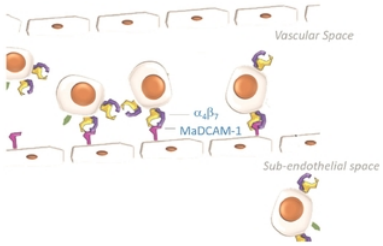


Figure 3: The panel shows the mechanism of the a_4b_7-expressing lymphocytes in IBD. The a_4b_7-expressing lymphocytes traffic to the gut and adhere to MAdCAM, followed by extravasation and migration to the inflammation site.

Translational biomarkers such as receptor occupancy, or RO, have been validated as a pharmacodynamics marker in preclinical studies and early clinical trials of vedolizumab. When a product candidate binds to a_4b_7, it occupies the integrin ligand binding site and interferes with the ability of MAdCAM to bind and contribute to immune cell accumulation into the inflamed gut tissue. An assay that measures binding of the product candidate to a_4b_7 in lymphocytes in circulating blood is termed a blood-based a_4b_7 RO assay. We are planning to assess the relationships of pharmacokinetics, pharmacodynamics and RO of our two a_4b_7 product candidates in a nonhuman primate study.

Clinical Development Overview

We expect that the early clinical development program will aim to demonstrate therapeutic engagement of a_4b_7 by our product candidate. We intend to monitor inhibition of a_4b_7 using an RO assay in blood as a marker of clinical activity.

We expect that a Phase 1a clinical program will be conducted in healthy volunteers, with single and multiple ascending dose trials designed to assess drug safety and pharmacokinetics. Additionally, our Phase 1a program will focus on finding doses of the product candidate that can achieve sustained RO.

We expect that our Phase 1b program will be conducted in patients with IBD to assess safety and pharmacokinetics, as well as RO as a pharmacodynamic marker of a_4b_7 inhibition. We expect that patients will be treated with multiple ascending doses of the product candidate for a two-week period until a dose is reached at which sustained RO levels consistent with those of vedolizumab are observed. Once this dose is achieved, we expect that patients will be continued on treatment for a minimum of eight additional weeks. Assessments of disease activity will be conducted at baseline and at the completion of the treatment regimen. They may include flexible sigmoidoscopy with biopsy to assess colonic mucosa, fecal calprotectin, serum biomarkers and standardized scores of disease activity.

Our a_vb_6-specific Integrin Inhibitor Program for Fibrosis

Fibrosis is an intrinsic response to chronic injury that can progress toward excessive tissue scarring and organ failure, such as liver cirrhosis and renal failure. The lack of antifibrotic treatments that can halt or ameliorate the progression of disease represents an unmet medical need for patients with diseases, such as

IPF, primary sclerosing cholangitis, or PSC, and NASH. The primary clinical indications for the a_vb_6 program are IPF and late-stage liver fibrosis. AbbVie has an option to acquire worldwide development and commercialization rights for our a_vb_6 programs in IPF and liver indications prior the commencement of clinical development.

Idiopathic Pulmonary Fibrosis

IPF is a life-threatening disease characterized by progressive fibrosis of the lungs leading to their deterioration and destruction. The cause of IPF is unknown. IPF primarily occurs in persons over 55 years old, with generally poor prognoses. Median survival time for IPF patients has been estimated to be two to five years from time of diagnosis. Most patients die from progressive loss of lung function. According to studies, conservative estimates of incidence ranges from three to nine cases per 100,000 per year for Europe and North America.

The current medical treatment strategy for IPF aims to slow disease progression and improve quality of life, as no medical therapies have been found to cure IPF. U.S and European regulatory agencies have approved pirfenidone (marketed as Esbriet) and nintedanib (marketed as Ofev) for the treatment of mild to moderate IPF. Both pirfenidone and nintedanib have been shown to slow the rate of functional decline in IPF and are viewed as the standard of care worldwide. While the regulatory approval of these drugs represents a significant advancement for IPF patients, neither drug improves lung function, and the disease continues to progress in most patients. Moreover, the adverse effects associated with these therapies includes diarrhea and liver function test abnormalities with nintedanib and nausea and rash with pirfenidone. The last line of treatment is lung transplantation, but many patients die while awaiting a transplant, as donors are limited.

Primary Sclerosing Cholangitis

PSC is a rare, serious, chronic cholestatic liver disease characterized by a progressive, autoimmune-based destruction of bile ducts with eventual onset of cirrhosis. PSC is often complicated by the development of malignancies, the most common being cholangiocarcinoma, as well as complications involving the biliary tree, including cholangitis, and ductal strictures and gallstones, which may require frequent endoscopic or surgical interventions. The true prevalence of ulcerative colitis in the patients with PSC is estimated to be 90 percent. PSC is usually a progressive disorder that ultimately leads to complications of cholestasis and hepatic failure. Median survival without liver transplantation after diagnosis is 10 to 12 years, depending upon stage of the disease at the time of diagnosis. According to studies, the estimated incidence of PSC is one case per 100,000 people in the U.S.

The current medical treatment strategy for PSC is limited. The FDA has not approved any therapies for the treatment of PSC. Liver transplant is currently the only treatment shown to improve clinical outcomes. However, the post-transplant recurrence rate of PSC has been shown to be as high as 20%. First-line treatment is typically off-label ursodeoxycholic acid, UDCA, although UDCA has not been shown to improve transplant-free survival and, at high doses, has been associated with increased risk for serious complications.

Nonalcoholic Steatohepatitis (NASH)

NASH is a common and progressive chronic liver disease that is an advanced progression of nonalcoholic fatty liver disease, or NAFLD. NASH has four main components: metabolic, steatosis, inflammation and fibrosis. NASH is increasingly understood to be a consequence of metabolic syndrome and is frequently associated with obesity, insulin resistance and type 2 diabetes. NASH is characterized by non-alcoholic-induced excessive fat accumulation, or steatosis, in the liver. In NASH patients, steatosis induces chronic inflammation and the death of liver cells, observed histologically as ballooning of necrotic cells. Inflammation and ballooning may lead to progressive fibrosis and ultimately cirrhosis in the liver, as the body responds to the liver's injured state. An estimated 20% of patients with NASH progress to cirrhosis within a decade of diagnosis and, compared to the general population, have a ten-fold greater risk of liver-related mortality. NASH is now widely believed to overtake hepatitis C as the leading cause of liver transplant. It is also considered the leading cause of primary liver cancer. The overall prevalence of NASH is reported to be three to five percent in the U.S. according to biopsy-based studies. However, given the prevalence of the underlying risk factors for the disease, including type 2 diabetes and obesity, as well as the need for a biopsy to diagnose NASH, the disease may be underdiagnosed.

The current medical treatment strategy for NASH is limited, as the disease is normally only diagnosed in advanced stages, as there are no FDA-approved therapies for the disease. Various therapeutics, including insulin sensitizers and vitamin E, are used off-label. Lifestyle changes, including modification of diet and exercise to reduce body weight, as well as treatment of concomitant diabetes and dyslipidemia, are commonly accepted as the standard of care, but patient adherence is often poor.

Overview of Pathway and Target Biology

Fibrosis is a major contributing factor in all of these diseases, with TGF-b being a recognized driver. Tissue release of active TGF-b is mediated by a_v integrins, including a_vb_6. We believe that targeting a_vb_6 will result in local inhibition of TGF-b to achieve anti-fibrotic effect in tissues, while limiting collateral unwanted effects associated with pan-TGF-b inhibition. An a_vb_6 inhibitor may prevent the release of activated TGF-b thereby abrogating a main driver of fibrosis in IPF. Pharmacological inhibition of a_vb_6 has been observed to be associated with anti-fibrotic activity in four lung fibrosis models, including a bleomycin-induced lung fibrosis model.

Our Integrin Approach to Fibrosis

We have developed oral small-molecule integrin therapeutics designed to have high potency and selectivity for a_vb_6, oral absorption and favorable pharmacokinetic properties. In the case of a_vb_6, we believe it is critical to stabilize a fully inactive state in order to achieve the desired activity, and all of our a_vb_6 programs thus seek to stabilize an inactive bent-closed state of the receptor. This approach is supported by studies that suggest that a significant population of the receptors exists in this inactive closed form in native tissue.

We investigated the impact of differences in conformational state in a preclinical model of liver fibrosis. In this model, we observed that an inhibitor of the bent closed state of a_vb_6 not only inhibited TGF-b-mediated downstream genes related to fibrosis, such as the collagen gene Col1a1, but that it also normalizes other fibrosis-related pathways such as connective tissue growth factor, or CTGF, and matrix metalloproteinase-3, or MMP3. On the other hand, we observed that an inhibitor of the extended open activated conformation of the integrin did not have these additional benefits on CTGF or MMP3 (Figure 4). CTGF has important roles in many biological processes, including fibrosis and several forms of cancers, while MMP3 is known to be involved in tissue remodeling and has been implicated in increased susceptibility to diseases where hyperpermeability in endothelium or epithelium would result in the exacerbation of diseases.

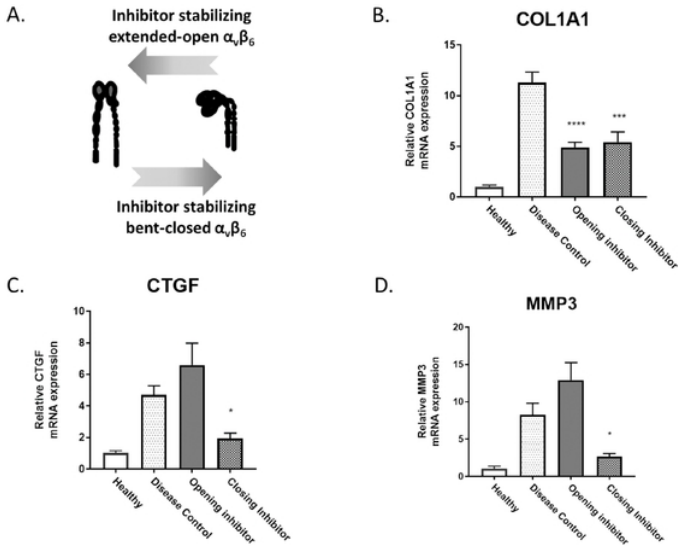


*Figure 4: Differential effects of a_vb_6 inhibitors that stabilize the extended-open and bent-closed conformation in an acute liver fibrosis model on collagen 1, CTGF and MMP3. The opening inhibitor is expected to shift the a_vb_6 integrin further towards the extended open conformation while the closing inhibitor shifts the a_vb_6 integrin to the closed conformation (Panel A). While we observed that both compounds inhibited TGF-b downstream fibrosis genes such as collagen 1 (Panel B), only the bent closed inhibitor was observed to decrease the expression of CTGF (Panel C) and MMP3 (Panel D), both of which are involved in various diseases. *p<0.05, **p<0.01, and ***p<0.001, vs. Disease control by One Way Anova followed by paired comparison.*

We have also observed antifibrotic activity of our small-molecule inhibitors in a variety of rodent fibrosis models. We examined the effects of one of our a_vb_6 compounds in an intratracheal-bleomycin-induced IPF mouse model, in which mice develop serious lung fibrosis. As shown in the left panel of Figure 5 below, we observed that our compound was associated with significantly improved lung fibrosis, as measured by Ashcroft scores, as compared to pirfenidone. We also examined the effects of one of our a_vb_6 compounds in a scleroderma model induced by bleomycin. As shown in the right panel of Figure 5, we observed that our compound was associated with near normal lung collagen content, which was more favorable than the lung collagen content that we observed with an ALK5i, a TGF-bR1 inhibitor in development by a third party.

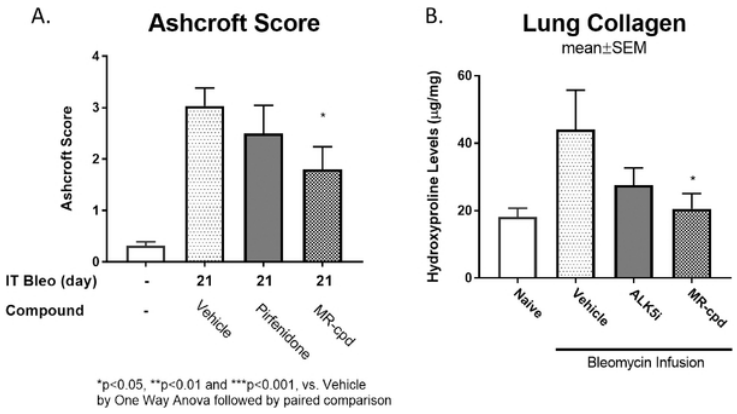


Figure 5: Effects of Morphic a_vb_6 inhibitors in lung fibrosis models. Panel A: Therapeutic dosing of a Morphic a_vb_6 inhibitor was observed to improve lung fibrosis in intratracheal-dosed bleomycin-induced lung fibrosis model in mice in comparison to pirfenidone. Formalin-fixed mouse lung lobes were sectioned and stained. Lung sections were scored according to the modified Ashcroft scale. Scores for five representative 200x microscopic fields per sample were averaged to obtain a mean score for each animal. Two-tailed tests were used, and significance was set at p£0.05 for all tests. Panel B: The effects of prophylactically dosed a_vb_6 compound and an ALK5i inhibitor in a fibrosis model induced by bleomycin through mini-pump infusion for 28 days. Mouse lung fibrosis was measured through collagen content (hydroxyproline concentration).

The therapeutic potential of our a_vb_6 inhibitors has also been evaluated in a diet-induced PSC-like biliary fibrosis model that cause mice to develop advanced biliary fibrosis. We observed that all of our a_vb_6 compounds evaluated in this model were associated with improvements in liver function and fibrosis. As shown in Figure 6 (left), we observed that our a_vb_6 inhibitor was associated with nearly normal the total plasma bilirubin levels. As shown in Figure 6 (right), we also observed that our a_vb_6 inhibitor was associated with abrogated liver fibrosis as shown by Sirius Red staining (right panel). The activity of our small molecule was observed to be substantially better than a mouse version of BG00011, an anti-a_vb_6 antibody in development by a third party.

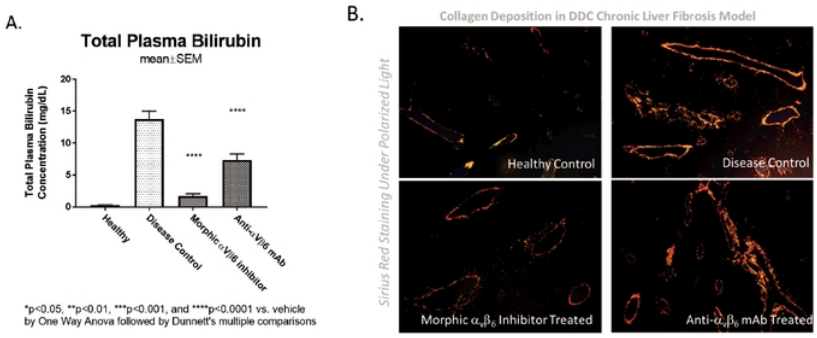


Figure 6: Our a_vb_6 inhibitor activity in a chronic DDC-induced PSC-like biliary fibrosis model in comparison to an anti-a_vb_6 antibody. Panel A. Panel B. Collagen deposition in the mouse liver as detected by Sirius Red staining.

The differential effects between our a_vb_6 small-molecule compounds and anti-a_vb_6 antibody were also observed in a surgically created unilateral ureteral obstruction, or UUO, mouse model, in which the mice developed renal fibrosis. We observed that the blockade of the a_vb_6 integrin with our compound was associated with reduced kidney fibrosis, as shown in Figure 7, and that our a_vb_6 inhibitor exhibited greater activity than the anti-a_vb_6 antibody.

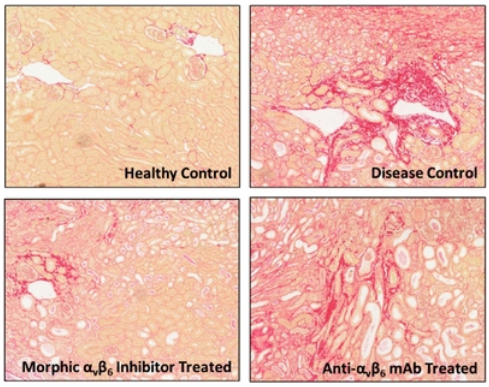


Figure 7: Our a_vb_6 small-molecule inhibitor and anti-a_vb_6 mAb 3G9 were both observed to reduce kidney fibrosis in UUO model after 14-day treatment. Collagen was stained by Sirius Red. Images were taken under bright-field microscopy.

A critical biochemical change associated with TGF-b pathway activation is an increase in the ratio of cellular phosphorylated SMAD, or pSMAD, to cell protein. Inhibition of pSMAD in a target tissue was used to establish the levels of TGF-b pathway inhibition that correspond to active doses in animals (Figure 8).

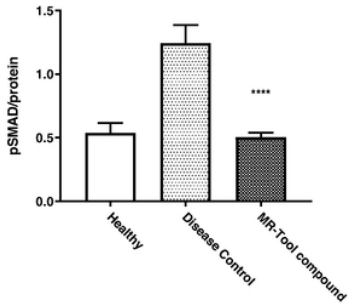


*Figure 8: We observed that our compound was associated inhibition of TGF-b signaling as illustrated by a decrease in the ratio of hepatic phosphorylated SMAD to protein in chronic DDC mice. ****p<0.0001 indicates statistical significance compared to DDC vehicle group by One Way Anova followed by paired comparison.*

MORF-720 — Our most advanced integrin candidate product

Designed using our MInT Platform, MORF-720 is a highly potent inhibitor of a_vb_6, and has high selectivity for a_vb_6 as compared to other integrins. MORF-720 seeks to stabilize the inactive bent closed conformation of the a_vb_6 integrin and has exhibited antifibrotic activity in multiple preclinical fibrosis models. MORF-720 also exhibited good cell permeability *in vitro* and high oral exposure in multiple preclinical models.

MORF-720 has been observed to be very potent in a variety of *in vitro* and *ex vivo* assays. Because a_vb_6-mediated TGF-b activation is a key driver of fibrogenesis, we believe the TGF-b activation assay is the most biologically relevant measure of a compound's *in vivo* efficacy. In this assay, we observed that MORF-720 was highly potent with an IC_{50} of less than 10 nM. Another assay that we believe is highly relevant is precision-cut liver slice *ex vivo* system using fibrotic livers, in which the expression of fibrogenesis-related genes, such as COL1A1, are measured following treatment with a compound. Precision-cut liver slice represents an *ex vivo* tissue culture technique that replicates the multicellular characteristics of whole liver *in vivo* as they contain all physiologically relevant cells, as well as intact intercellular and cell-matrix interactions. The IC_{50} value of MORF-720 in this *ex vivo* system was observed to have an IC_{50} of less than 10 nM. In addition, MORF-720 has been observed to be highly selective a_vb_6 as compared to other integrin family members, including all of the RGD-binding integrins.

The anti-fibrotic activity of MORF-720 was evaluated in a chronic 3,5-diethoxycarboncyl-1, 4-dihydrocollidine, or DDC, diet-induced PSC-like liver fibrosis model. We have observed that oral dosing of MORF-720 was associated with a statistically significant dose-dependent inhibition of fibrogenesis as measured by expression of the collagen gene COL1A1, reduction of collagen content as measured by hydroxyproline and improvement of liver function as measured by total plasma bilirubin levels, which was more favorable that the liver collagen content that we observed with an ALK5i, a TGF-bR1 inhibitor in development by a third party. Based on preclinical data, we believe MORF-720 will, in humans, be suitable to support favorable dosing strategies.

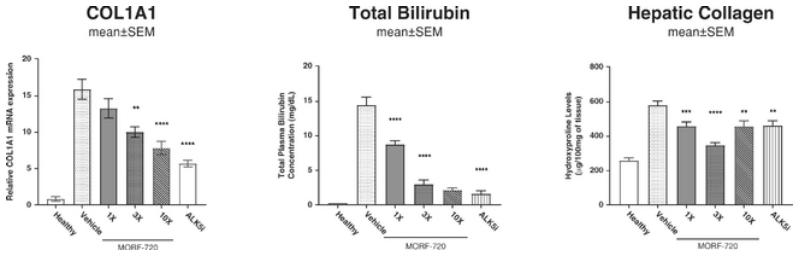


*Figure 9: We observed that MORF-720 was associated with dose-dependent reductions in liver fibrotic gene Col1A1 expression (Panel A), total plasma bilirubin (Panel B) and liver collagen content (Panel C) in chronic DDC mice. *p<0.05, **p<0.01, ***p<0.001, and ****p<0.0001 indicate statistical significance compared to DDC vehicle group by One Way Anova followed by paired comparison.*

Clinical Development Overview

a_vb_6 inhibitor for treatment of Idiopathic Pulmonary Fibrosis (IPF)

As part of our collaboration with AbbVie, they have an option to license this program at IND for future development and commercialization, and if they exercise this option, they will control clinical development of MORF-720. If they do not exercise the option, our aim for the early clinical development program will be to demonstrate pharmacodynamic activity of MORF-720 and may include imaging of its binding to a_vb_6 and measurement of downstream markers of its inhibitory activity on TGF-b signaling.

The presence of a_vb_6 integrin in the lung may be assessed by positron emission tomography, or PET, scanning imaging using a specific probe that binds to the a_vb_6 integrin. Since MORF-720 is designed to inhibit binding of this probe competitively, we believe the change in the PET signal after MORF-720 administration in human trials will be indicative of its RO of a_vb_6.

We also plan to use the pSMAD/tSMAD ratio as a pharmacodynamic marker of MORF-720's activity on TGF-b signaling.

We expect the Phase 1a clinical program to include single and multiple dose ascending trials in healthy volunteers to assess MORF-720's safety and pharmacokinetics.

We expect the Phase 1b clinical program will be conducted in patients with IFP and will assess MORF-720's safety and pharmacokinetics, and may include PET RO imaging and pSMAD/tSMAD analysis. We expect that multiple ascending doses of MORF-720 will be administered to IPF patients for two-week intervals until a sustained inhibition of a_vb_6 is achieved. Patients may be continued on treatment with this dose of MORF-720 for additional 12-24 weeks.

Assessments of disease activity in Phase 1b clinical program may include, but are not limited to, quantitative high-resolution computed tomography with computer aided algorithm analysis and assessments of forced vital capacity and diffusion capacity.

a_vb_6 inhibitor for treatment of Primary Sclerosing Cholangitis (PSC)

We expect the early clinical development program will aim to demonstrate safety, pharmacokinetics and the therapeutic engagement of the a_vb_6 integrin by MORF-720. The Phase 1 clinical plan is to perform multiple ascending dose trials in the patients with PSC. The approach of directly starting clinical trials in the target patient populations may be acceptable given that a_vb_6 inhibitors are expected to have already been tested in Phase 1 trials in healthy volunteers and IPF patients. Pharmacodynamic assessments may include, but

are not limited to, serum biomarkers of cholestasis, serum biomarkers of fibrosis, magnetic resonance elastography, and magnetic resonance cholangiography.

$a_v b_6$ inhibitor for treatment of Non-Alcoholic Steatohepatitis (NASH)

The Phase 1 clinical plan is to perform multiple ascending dose trials in two cohorts of NASH patients, one with advanced fibrosis, but not cirrhosis, and a second with compensated NASH cirrhosis. Once the optimum dose is achieved, patients may be continued on treatment to extend disease assessments, that may include, but are not limited to serum biomarkers, magnetic resonance elastography, multi-parametric magnetic resonance imaging and ultrasound transient elastography.

Additional Programs

Integrin modulator program for immuno-oncology

The involvement of the TGF-b pathways and extracellular matrix in cancer has been publicly reported by the scientific community. We seek to block the TGF-b pathway through antagonizing TGF-b-activating integrins in the tumor microenvironment which we believe would both inhibit tumor growth directly and inhibit down-regulation by TGF-b of immune responses and thereby also enable productive anti-tumor immune responses. This program aims to deliver an oral small-molecule integrin modulator as an immuno-oncology therapy. The target is expressed in solid tumor and tumor stroma cells, including both immune and non-immune cells. The integrin modulator is expected to have several mechanisms of action, which include the blockade of regulatory T cell formation through dendritic cells, the modulation of immune suppressive tumor environment through inhibition of local TGF-b activation and the increase of immune cell infiltration through tumor microenvironment remodeling. For this program, chemical matter has advanced thanks to synergistic structure activity relationship, or SAR, screening with other integrin modulator programs. The crystal structure of the target integrin has been elucidated for the first time in the field using our MInT Platform. Several of our compounds have been co-crystalized to fuel our understanding of the features driving compound selectivity and potency. Target validation and translational biology efforts are underway using small-molecule inhibitors.

New anti-fibrosis programs

We are pursuing additional integrin modulator programs for fibrosis-related indications such as NASH, cirrhosis, and pulmonary arterial fibrosis. Due to the role of integrins in TGF-b activation, mechano-transduction, cell migration and cell proliferation, integrins may trigger different pathways to initiate or exacerbate fibrosis under various pathologic conditions. Our strategy has enabled the identification of small molecules of multiple integrin targets that allow in-depth interrogations of these mechanisms. The $a_v b_1$ integrin is an emerging target for fibrosis based on literature and our internal data. The $a_v b_1$ heterodimer can be detected in hepatic stellate cells and fibroblasts, especially when they are activated. In human tissues, increase in $a_v b_1$ dimerization is observed in IPF, chronic kidney disease, or CKD, and NASH tissues. While our team continuous to investigate the mechanisms of action of $a_v b_1$ in fibrosis, we have generated crystal structures and advanced chemical matter for this target. These programs are at different discovery stages, with at least one of them expected to transition to lead optimization by the fourth quarter of 2019. AbbVie has an option to acquire worldwide development and commercialization rights for this program prior the commencement of clinical development.

Integrin modulators targeting additional receptors

Our research collaboration with Janssen has strategically expanded the targets that our MInT Platform addresses, including ai integrins and modulators that are both antagonists and agonists. Several ai integrins play critical roles in immune cell tissue retention, regulation of collagen stiffness or cell attachment in extracellular matrix. Aberrant expression and function of these integrins have been implicated in a variety of diseases.

License Agreements

AbbVie Agreement

In October 2018, we entered into a research and development collaboration with AbbVie designed to advance a number of our oral integrin therapeutics for fibrosis-related indications.

Under the terms of the agreement, AbbVie paid us an upfront payment of $100.0 million for research and development activities, and we provided AbbVie with exclusive license options on product candidates directed at a number of targets. For each compound, we will conduct research and development activities through the completion of IND-enabling studies, at which point AbbVie may pay a license fee of $20.0 million, on a compound-by-compound basis, to exercise its exclusive license option and assume responsibility for global development and commercialization. We are also eligible for clinical and commercial milestone payments and tiered royalties from high single to low double digits on worldwide net sales for each licensed product. In addition, for certain compounds for which we have completed IND-enabling studies and which meet certain advancement criteria for a liver fibrosis indication, we have the option to commit to share development costs in exchange for an increased fixed royalty rate. We may exercise this option following completion of the first Phase 2b clinical trial for the relevant product.

With respect to certain additional integrin targets, we have also granted AbbVie a fully paid up, irrevocable and one-time (with limited exceptions) right of first negotiation to obtain an exclusive license to develop and commercialize licensed compounds directed to such targets, and corresponding licensed products, in consideration for additional payments to be negotiated by the parties.

We and AbbVie have each agreed to certain exclusivity obligations under the agreement. In particular, we have agreed not to develop, either alone or with any third party, any product directed to a target for which we have granted AbbVie an exclusive option until the expiration of the agreement or, if AbbVie does not exercise an option, the end of the option period for such target.

AbbVie may terminate the agreement in its entirety, on a country-by-country basis, or on a target-by-target basis (for each target for which AbbVie has exercised an option), at any time and without cause, upon 180 days' prior written notice to us. Additionally, AbbVie may terminate the agreement on a target-by-target basis (for each target for which AbbVie has exercised an option) immediately upon for any safety reason. Either party may terminate the agreement for an uncured material breach by the other party or in the case of the other party's insolvency.

Prior to this collaboration, AbbVie Ventures was an investor in our Series A and Series B financings.

Janssen Agreement

In February 2019, we entered into a collaboration and option agreement with Janssen, or Janssen Agreement, to discover and develop novel integrin therapeutics for patients with conditions not adequately addressed by current therapies. The Janssen collaboration focuses on three integrin targets, each target the subject of a research program, with the ability to substitute integrin targets not explored by us.

Under the terms of the Janssen Agreement, on a research program-by-research program basis, the companies will collaborate through preclinical development to identify and advance candidates. Upon completing IND-enabling studies, on a research program-by-research program basis, Janssen may exercise an exclusive option to obtain an exclusive license with respect to the target that is the subject of the research program, including all licensed compounds that are the subject of the applicable research program, and then Janssen will be responsible for global clinical development and commercialization. In consideration of the rights granted, Janssen paid us an upfront fee of $10.0 million for each of the first two research programs, and will pay us an additional $5.0 million fee upon commencement of the third research program, and will fund research activities. In addition, on a research program-by-research program basis, we may be eligible to receive up to an additional $10.0 million in payments for late lead candidate optimization activities and Janssen's exercise of its exclusive option for such research program. We are

eligible to receive up to $729.0 million in the aggregate from the collaboration in upfront, option and milestone payments, as well as royalties on net sales. We will also receive, on a product-by-product and country-by-country basis, mid-single digit royalties (subject to royalty adjustments with aggregate floors) on worldwide net sales for any products resulting from the collaboration until the later of (i) the expiration of the last valid claim within the royalty bearing patents covering such product in such country and (ii) ten years after the first commercial sale of such product in such country.

In the event that Janssen does not exercise an option for a research program, and we have completed a POC clinical trial for a product that was the subject of such research program, then Janssen will have an exclusive right of first negotiation to negotiate the terms of a definitive agreement pursuant to which Janssen would be granted exclusive rights to develop and commercialize such product. In addition, if we have not completed a POC clinical trial for a product that was the subject of such research program and we make or receive a bona fide offer from a third party to license or transfer the rights to develop and commercialize such product, then under certain circumstances Janssen will have an exclusive first right to negotiate the terms of a definitive agreement pursuant to which Janssen would be granted exclusive rights to develop and commercialize such product.

Under the Janssen Agreement, we have agreed to certain exclusivity obligations, including not to exploit, either alone or with a third party, any molecules that are intended to bind to any of the targets that are the subject of a research program, and also not to conduct clinical trials for, manufacture or commercialize compounds synthesized by us during our research activities in patients with chronic kidney disease or acute kidney injury for three years after Janssen's exercise of a first option. The Janssen Agreement will expire, on a research program-by-research program basis, upon (i) the expiration of the option period for such research program, if Janssen does not exercise its option for such research program, or (ii) the expiration all royalty terms for all products that are the subject of the research program, if Janssen does exercise its option for such research program. In addition, Janssen may terminate the agreement in its entirety or on a research program-by-research program basis or country-by-country basis at any time and for any reason, upon 60 days' advance written notice to us. Either party may terminate the agreement on program-by-research program basis for an uncured material breach by the other party or in the case of the other party's insolvency.

Schrödinger Agreement

In June 2015, we entered into a collaboration agreement (as amended) with Schrödinger, or Schrödinger Agreement, to explore drug targets selected by us. Under the collaboration, Schrödinger will use its technology platform to perform virtual screens, and we and Schrödinger will collaborate to facilitate prioritization of targets, perform target validation and analysis, identify leads and perform lead optimization. Under the terms of the agreement, Schrödinger will exclusively work with us on integrin targets during the term of the agreement. In consideration for its performance of activities under the collaboration, Schrödinger received approximately 3.4 million shares of Series Seed preferred stock. In addition, with respect to compounds identified as part of the collaboration, Schrödinger may be eligible to receive certain payments from us related to development milestones, not to exceed in the aggregate, on a target-by-target basis, $950,000, as well as royalties in the low single digits on sales of products containing such compounds. Schrödinger may terminate the Schrödinger Agreement under certain circumstances, including if a certain number of developmental milestones have not been achieved by us within a certain timeframe.

Children's Medical Center Corporation Agreement

In October 2015, we entered into an exclusive license agreement (as amended) with CMCC, or CMCC Agreement, relating to technology on inhibiting integrins developed by Dr. Springer during the course of his employment at Boston Children's Hospital, an affiliate of CMCC. Under this agreement, we have an exclusive license under certain patent rights, and a non-exclusive license under certain know-how, owned by CMCC to develop and commercialize products worldwide for any therapeutic or diagnostic use in humans and veterinary applications. We also have the option to add new patent rights and know-how generated by the laboratory of Dr. Springer within a specified time period after the effective date of the CMCC Agreement

to that agreement for additional payments consistent with fair market value. In consideration of the license grants, upon execution of the CMCC Agreement we issued CMCC a number of shares of common stock representing 6% of the issued and outstanding units on a fully diluted basis. We also paid CMCC an upfront license issue fee of $50,000, and reimbursed CMCC for certain patent prosecution costs. We have also agreed to pay CMCC a license maintenance fee for the first three years after the effective date of the CMCC Agreement, certain development milestones, a percentage of sublicensing income we may receive, and running royalties in the low single digits on net sales of licensed products.

Under the CMCC Agreement, we have agreed to use commercially reasonably efforts to bring one or more licensed products to market, and to implement activities in a development plan within the timeframes set forth therein. In addition, if we fail to meet one or more specific developmental milestones, and do not take appropriate corrective action, then CMCC shall have the right to terminate the agreement.

Intellectual Property

Our success depends, in part, on our ability to protect (i) our intellectual property related to our product candidates and related methods, and (ii) our MInT Platform for generating integrin structures and modulators of those structures. Our success also depends on having the freedom to operate to enable commercialization of our product candidates, if approved, and preventing others from infringing our patent rights. We protect our MInT Platform using trade secrets, proprietary know-how, and, on rare occasion, patents. We protect our small molecule products using patents, and our policy is to seek product patent protection in key jurisdictions, including the United States, major European countries, and other jurisdictions we deem appropriate or as required by our collaboration agreements.

We file patent applications with respect to claims to compositions comprising our small-molecule compounds that modulate integrin activity, the compounds themselves, the use of such compounds to treat disease, as well as related manufacturing methods.

IP Rights

We have exclusively licensed one allowed U.S. patent application and one related pending U.S. divisional application from CMCC with claims relating to modified integrin polypeptides and modified integrin polypeptide dimers. Any U.S. patents issuing from the licensed U.S. patent applications are expected to expire August 6, 2035, absent any adjustments or extensions. In addition, we rely extensively on trade secret protection for our MInT Platform, which extends beyond the initial integrin technology licensed from CMCC.

As of March 31, 2019, we solely owned four published pending patent applications and six unpublished pending patent applications with respect to compositions-of-matter and methods of use for treating therapeutic indications related to the a_4b_7 and a_vb_6 integrins. Of the unpublished cases, five are pending U.S. provisional patent applications and one is a pending foreign application, and of the published cases, two are pending PCT patent applications, one is a pending U.S. non-provisional patent application, and one is a pending foreign patent application. Any U.S. or foreign patents issuing from the foregoing owned U.S. applications are expected to expire between February 2038 and August 2039, absent any adjustments or extensions.

Intellectual Property Protection

We cannot predict whether the patent applications we pursue will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide any proprietary protection from competitors. Even if our pending patent applications are granted as issued patents, those patents, as well as any patents we license from third parties, may be challenged, circumvented or invalidated by third parties. While there are currently no contested proceedings or third-party claims relating to any of the patent applications described above, we cannot provide any assurances that we will not have such proceedings or third-party claims at a later date or once any patent is granted.

The term of a patent depends upon the legal term of patents in the particular country in which it is obtained. In most countries in which we file, the patent term is 20 years from the earliest date of filing a non-provisional patent application. In the United States, the term of a patent that covers an FDA-approved drug may be eligible for patent term extension, which permits in some cases restoration of patent term as compensation for patent term lost during the FDA regulatory review process. In certain circumstances, the Hatch-Waxman Act permits a patent term extension of up to five years beyond the unextended expiration date of the U.S. patent. The length of the patent term extension is related to the length of time the approved drug is under regulatory review. Patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, and only one patent applicable to an approved drug may be extended. Provisions are available in Europe and other foreign jurisdictions to extend the term of a patent that covers an approved drug, or provide an additional period of protection for the approved pharmaceutical product following expiry of the patent. In the future, if our products receive FDA approval, we expect to apply for patent term extensions on patents covering those products. We plan to seek patent term extensions to any of our issued patents in any jurisdiction where these are available; however, there is no guarantee that the applicable authorities, including the U.S. Patent and Trademark Office in the United States and the national patent offices in Europe, will agree with our assessment of whether such extensions should be granted, and, if granted, the length of such extensions.

In addition to our reliance on patent protection for our inventions, product candidates, and research programs, we also rely on trade secret protection for our confidential and proprietary information. For example, certain elements of our MInT Platform may be based on unpatented trade secrets that are not publicly disclosed. Although we take steps to protect our proprietary information and trade secrets, including through contractual means with our employees and consultants, third parties may independently develop substantially equivalent proprietary information and techniques, or otherwise gain access to our trade secrets or disclose our technology. Thus, we may not be able to meaningfully protect our trade secrets. It is our policy to require our employees, consultants, outside scientific collaborators, sponsored researchers, and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information concerning our business or financial affairs developed or made known to the individual or entity during the course of the party's relationship with us is to be kept confidential, and not disclosed to third parties except in specific circumstances. In the case of employees, the agreements provide that all inventions conceived by the individual, and which are related to our current or planned business or research and development or made during normal working hours, on our premises or using our equipment or proprietary information, are our exclusive property. In addition, we take other appropriate precautions, such as physical and technological security measures, to guard against misappropriation of our proprietary technology by third parties. We have also adopted policies and conduct training that provides guidance on our expectations and practices to protect our trade secrets.

Manufacturing

Currently, all of our clinical manufacturing facilities for clinical drug manufacturing, storage, distribution or quality testing is outsourced to third-party manufacturers. As our development programs progress and we build new process efficiencies, we expect to continually evaluate this strategy with the objective of satisfying demand for registration trials and, if approved, the manufacture, sale and distribution of commercial products. Under our collaboration agreements with AbbVie and Janssen, our partners will assume responsibility for the manufacturing according to the terms of those agreements for licensed products.

Competition

The biotechnology and pharmaceutical industries are characterized by rapid evolution of technologies, fierce competition and strong defense of intellectual property. While we believe that our MInT Platform and our

knowledge, experience and scientific resources provide us with competitive advantages, we face competition from major pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions, among others.

Any product candidates that we successfully develop and commercialize will compete with currently approved therapies and new therapies that may become available in the future. Key product features that would affect our ability to effectively compete with other therapeutics include the efficacy, safety and convenience of our products.

Despite significant biopharmaceutical industry investment, no oral integrin therapies have been approved. We are advancing our lead wholly-owned program for a_4b_7-specific integrin inhibitors affecting inflammation into clinical development initially for the treatment of IBD. There are currently approved IBD treatments marketed by UCB, Johnson & Johnson, Biogen Inc. and Pfizer Inc., in addition to other major pharmaceutical companies, against which our product candidate may compete, if approved. In addition, we are aware of IBD treatments in development by Roche Holding AG, AbbVie Inc., Gilead Sciences, RedHill Biopharma Ltd, Celgene Corporation, Eli Lilly and Company and Boehringer Ingelheim GmbH. Further, Takeda Pharmaceutical Company Ltd. currently markets Entyvio, which is an a_4b_7 monoclonal antibody to treat ulcerative colitis and Crohn's disease. Protagonist Therapeutics, Inc. also has a Phase 1 clinical gut-restricted a_4b_7 program under development.

We are also developing our most advanced product candidate, MORF-720, a selective oral a_vb_6-specific integrin inhibitor into clinical development for the treatment of IPF, in collaboration with AbbVie. There are currently approved IPF treatments marketed by Roche Holding AG and Boehringer Ingelheim GmbH against which our product candidate may compete, if approved. In addition, we are aware of IPF treatments in development by Galapagos NV. Further, we are aware of programs targeting a_vb_6 that are currently being investigated in preclinical studies or clinical trials by companies including Biogen Inc., Pliant Therapeutics, Inc. and Indalo Therapeutics, Inc.

Many of our competitors have significantly greater financial resources and expertise than we do in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Additionally, our competitors may also include companies that are or will be developing therapies for the same therapeutic areas that we are targeting, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer.

Government Regulation

Government authorities in the United States, at the federal, state and local level, and in other countries and jurisdictions extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, and import and export of pharmaceutical products. The processes for obtaining regulatory approvals in the United States and in foreign countries and jurisdictions, along with subsequent compliance with applicable statutes and regulations and other regulatory authorities, require the expenditure of substantial time and financial resources.

FDA Approval Process

In the United States, pharmaceutical products are subject to extensive regulation by FDA. The Federal Food, Drug, and Cosmetic Act, or FD&C Act, and other federal and state statutes and regulations govern, among other things, the research, development, testing, manufacture, storage, recordkeeping, approval, labeling, promotion and marketing, distribution, post-approval monitoring and reporting, sampling and import and export of pharmaceutical products. Failure to comply with applicable U.S. requirements may

subject a company to a variety of administrative or judicial sanctions, such as FDA refusal to approve pending NDAs, warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties and criminal prosecution.

Pharmaceutical product development for a new product or certain changes to an approved product in the U.S. typically involves preclinical laboratory and animal tests, the submission to FDA of an investigational new drug application, or IND, which must become effective before clinical testing may commence, and adequate and well-controlled clinical trials to establish the safety and effectiveness of the drug for each indication for which FDA approval is sought. Satisfaction of FDA pre-market approval requirements typically takes many years and the actual time required may vary substantially based upon the type, complexity and novelty of the product or disease.

Preclinical tests include laboratory evaluation of product chemistry, formulation and toxicity, as well as animal trials to assess the characteristics and potential safety and efficacy of the product. The conduct of the preclinical tests must comply with federal regulations and requirements, including good laboratory practices. The results of preclinical testing are submitted to FDA as part of an IND along with other information, including information about product chemistry, manufacturing and controls, and a proposed clinical trial protocol. Long-term preclinical tests, such as animal tests of reproductive toxicity and carcinogenicity, may continue after the IND is submitted. A 30-day waiting period after the submission of each IND is required prior to the commencement of clinical testing in humans. If FDA has neither commented on nor questioned the IND within this 30-day period, the clinical trial proposed in the IND may begin. Clinical trials involve the administration of the investigational new drug to healthy volunteers or patients under the supervision of a qualified investigator. Clinical trials must be conducted: (i) in compliance with federal regulations; (ii) in compliance with good clinical practice, or GCP, an international standard meant to protect the rights and health of patients and to define the roles of clinical trial sponsors, administrators and monitors; as well as (iii) under protocols detailing the objectives of the trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. Each protocol involving testing on U.S. patients and subsequent protocol amendments must be submitted to FDA as part of the IND.

FDA may order the temporary, or permanent, discontinuation of a clinical trial at any time, or impose other sanctions, if it believes that the clinical trial either is not being conducted in accordance with FDA requirements or presents an unacceptable risk to the clinical trial patients. The study protocol and informed consent information for patients in clinical trials must also be submitted to an institutional review board, or IRB, and ethics committee for approval. An IRB may also require the clinical trial at the site to be halted, either temporarily or permanently, for failure to comply with the IRB's requirements, or may impose other conditions.

Clinical trials to support NDAs for marketing approval are typically conducted in three sequential phases, but the phases may overlap. In Phase 1, the initial introduction of the drug into healthy human subjects or patients, the drug is tested to assess metabolism, pharmacokinetics, pharmacological actions, side effects associated with increasing doses, and, if possible, early evidence of effectiveness. Phase 2 usually involves trials in a limited patient population to determine the effectiveness of the drug for a particular indication, dosage tolerance and optimum dosage, and to identify common adverse effects and safety risks. If a drug demonstrates evidence of effectiveness and an acceptable safety profile in Phase 2 evaluations, Phase 3 trials are undertaken to obtain the additional information about clinical efficacy and safety in a larger number of patients, typically at geographically dispersed clinical trial sites, to permit FDA to evaluate the overall benefit-risk relationship of the drug and to provide adequate information for the labeling of the drug. In most cases FDA requires two adequate and well-controlled Phase 3 clinical trials to demonstrate the efficacy of the drug. A single Phase 3 trial with other confirmatory evidence may be sufficient in rare instances, such as where the study is a large multicenter trial demonstrating internal consistency and a statistically very persuasive finding of a clinically meaningful effect on mortality, irreversible morbidity or

prevention of a disease with a potentially serious outcome and confirmation of the result in a second trial would be practically or ethically impossible.

The manufacturer of an investigational drug in a Phase 2 or 3 clinical trial for a serious or life-threatening disease is required to make available, such as by posting on its website, its policy on evaluating and responding to requests for expanded access.

After completion of the required clinical testing, an NDA is prepared and submitted to FDA. FDA approval of the NDA is required before marketing of the product may begin in the U.S. The NDA must include the results of all preclinical, clinical and other testing and a compilation of data relating to the product's pharmacology, chemistry, manufacture and controls. The cost of preparing and submitting an NDA is substantial. The submission of most NDAs is additionally subject to a substantial application user fee, currently exceeding $2,580,000 for Fiscal Year 2019, and the manufacturer and/or sponsor under an approved drugs license application are also subject to annual program fees, currently exceeding $300,000 for each prescription product. These fees are typically increased annually. Sponsors of applications for drugs granted Orphan Drug Designation are exempt from these user fees.

FDA has 60 days from its receipt of an NDA to determine whether the application will be accepted for filing based on the agency's threshold determination that it is sufficiently complete to permit substantive review. Once the submission is accepted for filing, FDA begins an in-depth review. FDA has agreed to certain performance goals in the review of new drug applications to encourage timeliness. Most applications for standard review drug products are reviewed within ten to twelve months; most applications for priority review drugs are reviewed in six to eight months. Priority review can be applied to drugs that FDA determines offer major advances in treatment or provide a treatment where no adequate therapy exists. The review process for both standard and priority review may be extended by FDA for three additional months to consider certain late-submitted information, or information intended to clarify information already provided in the submission.

FDA may also refer applications for novel drug products, or drug products that present difficult questions of safety or efficacy, to an outside advisory committee — typically a panel that includes clinicians and other experts — for review, evaluation and a recommendation as to whether the application should be approved. FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations.

Before approving an NDA, FDA will typically inspect one or more clinical sites to assure compliance with GCP. Additionally, FDA will inspect the facility or the facilities at which the drug is manufactured. FDA will not approve the product unless compliance with current good manufacturing practices, or cGMPs, is satisfactory and the NDA contains data that provide substantial evidence that the drug is safe and effective in the indication studied.

After FDA evaluates the NDA and the manufacturing facilities, it issues either an approval letter or a complete response letter. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing, or information, in order for FDA to reconsider the application. If, or when, those deficiencies have been addressed to FDA's satisfaction in a resubmission of the NDA, FDA will issue an approval letter. FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. As a condition of NDA approval, FDA may require a risk evaluation and mitigation strategy, or REMS, to help ensure that the benefits of the drug outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals, and elements to assure safe use, or ETASU. ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring and the use of patient registries. The requirement for a REMS can

materially affect the potential market and profitability of the drug. Moreover, product approval may require substantial post-approval testing and surveillance to monitor the drug's safety or efficacy. Once granted, product approvals may be withdrawn if compliance with regulatory standards is not maintained or problems are identified following initial marketing.

Changes to some of the conditions established in an approved application, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new NDA or NDA supplement before the change can be implemented. An NDA supplement for a new indication typically requires clinical data similar to that in the original application, and FDA uses the same procedures and actions in reviewing NDA supplements as it does in reviewing NDAs.

Fast Track Designation and Accelerated Approval

FDA is required to facilitate the development, and expedite the review, of drugs that are intended for the treatment of a serious or life-threatening disease or condition for which there is no effective treatment and which demonstrate the potential to address unmet medical needs for the condition. Under the Fast Track program, the sponsor of a new drug candidate may request that FDA designate the drug candidate for a specific indication as a Fast Track drug concurrent with, or after, the filing of the IND for the drug candidate. FDA must determine if the drug candidate qualifies for Fast Track Designation within 60 days of receipt of the sponsor's request. Under the Fast Track program and FDA's accelerated approval regulations, FDA may approve a drug for a serious or life-threatening illness that provides meaningful therapeutic benefit to patients over existing treatments based upon a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity or prevalence of the condition and the availability or lack of alternative treatments.

In clinical trials, a surrogate endpoint is a measurement of laboratory or clinical signs of a disease or condition that substitutes for a direct measurement of how a patient feels, functions or survives. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. A drug candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, will allow FDA to withdraw the drug from the market on an expedited basis. All promotional materials for drug candidates approved under accelerated regulations are subject to priority review by FDA.

If a submission is granted Fast Track Designation, the sponsor may engage in more frequent interactions with FDA, and FDA may review sections of the NDA before the application is complete. This rolling review is available if the applicant provides, and FDA approves, a schedule for the submission of the remaining information and the applicant pays applicable user fees. However, FDA's time period goal for reviewing an application does not begin until the last section of the NDA is submitted. Additionally, Fast Track Designation may be withdrawn by FDA if FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Breakthrough Therapy Designation

FDA is also required to expedite the development and review of the application for approval of drugs that are intended to treat a serious or life-threatening disease or condition where preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints. Under the Breakthrough Therapy program, the sponsor of a new drug candidate may request that FDA designate the drug candidate for a specific indication as a breakthrough therapy concurrent with, or after, the filing of the IND for the drug candidate. FDA must determine if the drug candidate qualifies for Breakthrough Therapy designation within 60 days of receipt of the sponsor's request.

Orphan Drugs

Under the Orphan Drug Act, FDA may grant Orphan Drug Designation to drugs intended to treat a rare disease or condition — generally a disease or condition that affects fewer than 200,000 individuals in the U.S. Orphan Drug designation must be requested before submitting an NDA. After FDA grants Orphan Drug Designation, the generic identity of the drug and its potential orphan use are disclosed publicly by FDA. Orphan Drug Designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process. The first NDA applicant to receive FDA approval for a particular active ingredient to treat a particular disease with FDA Orphan Drug Designation is entitled to a seven-year exclusive marketing period in the U.S. for that product, for that indication. During the seven-year exclusivity period, FDA may not approve any other applications to market the same drug for the same disease, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity. Orphan drug exclusivity does not prevent FDA from approving a different drug for the same disease or condition, or the same drug for a different disease or condition. Among the other benefits of Orphan Drug Designation are tax credits for certain research and an exemption from the NDA application user fee.

Disclosure of Clinical Trial Information

Sponsors of clinical trials of FDA regulated products, including drugs, are required to register and disclose certain clinical trial information. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to discuss the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed in certain circumstances for up to two years after the date of completion of the trial. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs.

Pediatric Information

Under the Pediatric Research Equity Act, or PREA, NDAs or supplements to NDAs must contain data to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the drug is safe and effective. FDA may grant full or partial waivers, or deferrals, for submission of data. With certain exceptions, PREA does not apply to any drug for an indication for which orphan designation has been granted.

The Best Pharmaceuticals for Children Act, or BPCA, provides NDA holders a six-month extension of any exclusivity — patent or nonpatent — for a drug if certain conditions are met. Conditions for exclusivity include FDA's determination that information relating to the use of a new drug in the pediatric population may produce health benefits in that population, FDA making a written request for pediatric studies, and the applicant agreeing to perform, and reporting on, the requested studies within the statutory timeframe. Applications under the BPCA are treated as priority applications, with all of the benefits that designation confers.

Post-Approval Requirements

Once an NDA is approved, a product will be subject to certain post-approval requirements. For instance, FDA closely regulates the post-approval marketing and promotion of drugs, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet. Drugs may be marketed only for the approved indications and in accordance with the provisions of the approved labeling.

Adverse event reporting and submission of periodic reports are required following FDA approval of an NDA. FDA also may require post-marketing testing, known as Phase 4 testing, risk evaluation and mitigation strategies, or REMS, and surveillance to monitor the effects of an approved product, or FDA may place conditions on an approval that could restrict the distribution or use of the product. In addition, quality control, drug manufacture, packaging and labeling procedures must continue to conform to cGMPs after

approval. Drug manufacturers and certain of their subcontractors are required to register their establishments with FDA and certain state agencies. Registration with FDA subjects entities to periodic unannounced inspections by FDA, during which the Agency inspects manufacturing facilities to assess compliance with cGMPs. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality-control to maintain compliance with cGMPs. Regulatory authorities may withdraw product approvals or request product recalls if a company fails to comply with regulatory standards, if it encounters problems following initial marketing, or if previously unrecognized problems are subsequently discovered.

The Hatch-Waxman Act

Orange Book Listing

In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent whose claims cover the applicant's product. Upon approval of a drug, each of the patents listed in the application for the drug is then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Drugs listed in the Orange Book can, in turn, be cited by potential generic competitors in support of approval of an abbreviated new drug application, or ANDA. An ANDA provides for marketing of a drug product that has the same active ingredients in the same strengths and dosage form as the listed drug and has been shown through bioequivalence testing to be therapeutically equivalent to the listed drug. Other than the requirement for bioequivalence testing, ANDA applicants are not required to conduct, or submit results of, pre-clinical or clinical tests to prove the safety or effectiveness of their drug product. Drugs approved in this way are commonly referred to as "generic equivalents" to the listed drug and can often be substituted by pharmacists under prescriptions written for the original listed drug.

The ANDA applicant is required to certify to the FDA concerning any patents listed for the approved product in the FDA's Orange Book. Specifically, the applicant must certify that (i) the required patent information has not been filed; (ii) the listed patent has expired; (iii) the listed patent has not expired but will expire on a particular date and approval is sought after patent expiration; or (iv) the listed patent is invalid or will not be infringed by the new product. The ANDA applicant may also elect to submit a section viii statement certifying that its proposed ANDA label does not contain (or carve out) any language regarding the patented method-of-use rather than certify to a listed method-of-use patent. If the applicant does not challenge the listed patents, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired. A certification that the new product will not infringe the already approved product's listed patents, or that such patents are invalid, is called a Paragraph IV certification. If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days of the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit, or a decision in the infringement case that is favorable to the ANDA applicant.

The ANDA application also will not be approved until any applicable non-patent exclusivity listed in the Orange Book for the referenced product has expired.

Exclusivity

Upon NDA approval of a new chemical entity, or NCE, which is a drug that contains no active moiety that has been approved by FDA in any other NDA, that drug receives five years of marketing exclusivity during which FDA cannot receive any ANDA seeking approval of a generic version of that drug. Certain changes to a drug, such as the addition of a new indication to the package insert, are associated with a three-year period of exclusivity during which FDA cannot approve an ANDA for a generic drug that includes the change. An ANDA may be submitted one year before NCE exclusivity expires if a Paragraph IV certification

is filed. If there is no listed patent in the Orange Book, there may not be a Paragraph IV certification, and, thus, no ANDA may be filed before the expiration of the exclusivity period.

Patent Term Extension

After NDA approval, owners of relevant drug patents may apply for up to a five-year patent extension. The allowable patent term extension is calculated as half of the drug's testing phase (the time between IND application and NDA submission) and all of the review phase (the time between NDA submission and approval up to a maximum of five years). The time can be shortened if FDA determines that the applicant did not pursue approval with due diligence. The total patent term after the extension may not exceed 14 years, and only one patent can be extended. For patents that might expire during the application phase, the patent owner may request an interim patent extension. An interim patent extension increases the patent term by one year and may be renewed up to four times. For each interim patent extension granted, the post-approval patent extension is reduced by one year. The director of the United States Patent and Trademark Office must determine that approval of the drug covered by the patent for which a patent extension is being sought is likely. Interim patent extensions are not available for a drug for which an NDA has not been submitted.

Other Healthcare Laws

In addition to FDA restrictions on marketing of pharmaceutical products, several other types of state and federal laws have been applied to restrict certain general business and marketing practices in the pharmaceutical industry in recent years. These laws include anti-kickback statutes, false claims statutes and other healthcare laws and regulations.

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce, or in return for, purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid, or other federally financed healthcare programs. The Patient Protection and Affordable Care Act as amended by the Health Care and Education Reconciliation Act, collectively, the ACA, amended the intent element of the federal statute so that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to commit a violation. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers, among others, on the other. Although there are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exceptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exception or safe harbor.

Federal civil and criminal false claims laws, including the federal civil False Claims Act, prohibit any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. This includes claims made to programs where the federal government reimburses, such as Medicare and Medicaid, as well as programs where the federal government is a direct purchaser, such as when it purchases off the Federal Supply Schedule. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Additionally, the ACA amended the federal Anti-Kickback Statute such that a violation of that statute can serve as a basis for liability under the federal civil False Claims Act. Most states also have statutes or regulations similar to the federal Anti-Kickback Statute and civil False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

Other federal statutes pertaining to healthcare fraud and abuse include the civil monetary penalties statute, which prohibits, among other things, the offer or payment of remuneration to a Medicaid or Medicare beneficiary that the offerer or payor knows or should know is likely to influence the beneficiary to order a receive a reimbursable item or service from a particular supplier, and the additional federal criminal statutes created by the Health Insurance Portability and Accountability Act of 1996, or HIPAA, which prohibits, among other things, knowingly and willfully executing or attempting to execute a scheme to defraud any healthcare benefit program or obtain by means of false or fraudulent pretenses, representations or promises any money or property owned by or under the control of any healthcare benefit program in connection with the delivery of or payment for healthcare benefits, items or services.

In addition, HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, including the Final Omnibus Rule published on January 25, 2013, impose obligations on certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, as well as their business associates that perform certain services involving the storage, use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding the privacy, security, and transmission of individually identifiable health information, and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information. HITECH increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, many state laws govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, and often are not pre-empted by HIPAA.

Further, pursuant to the ACA, the Centers for Medicare & Medicaid Services, or CMS, has issued a final rule that requires manufacturers of prescription drugs to collect and report information on certain payments or transfers of value to physicians and teaching hospitals, as well as investment interests held by physicians and their immediate family members. The first reports were due in 2014 and must be submitted on an annual basis. The reported data is made available in searchable form on a public website on an annual basis. Failure to submit required information may result in civil monetary penalties. Effective January 1, 2022, reporting on transfers of value to physician assistants, nurse practitioners or clinical nurse specialists, certified registered nurse anesthetists, and certified nurse-midwives will also be required.

In addition, several states now require prescription drug companies to report certain expenses relating to the marketing and promotion of drug products and to report gifts and payments to individual healthcare practitioners in these states. Other states prohibit various marketing-related activities, such as the provision of certain kinds of gifts or meals. Still other states require the posting of information relating to clinical studies and their outcomes. Some states require the reporting of certain drug pricing information, including information pertaining to and justifying price increases, or prohibit prescription drug price gouging. In addition, states such as California, Connecticut, Nevada, and Massachusetts require pharmaceutical companies to implement compliance programs and/or marketing codes. Several additional states are considering similar proposals. Certain states and local jurisdictions also require the registration of pharmaceutical sales and medical representatives. Compliance with these laws is difficult and time consuming, and companies that do not comply with these state laws face civil penalties.

Efforts to ensure that business arrangements with third parties comply with applicable healthcare laws and regulations involve substantial costs. If a drug company's operations are found to be in violation of any such requirements, it may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, the curtailment or restructuring of its operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in government contracting, healthcare reimbursement or other federal or state government healthcare programs, including Medicare and

Medicaid, integrity oversight and reporting obligations, imprisonment, and reputational harm. Although effective compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, these risks cannot be entirely eliminated. Any action for an alleged or suspected violation can cause a drug company to incur significant legal expenses and divert management's attention from the operation of the business, even if such action is successfully defended.

U.S. Healthcare Reform

In the United States there have been, and continue to be, proposals by the federal government, state governments, regulators and third-party payors to control or manage the increased costs of health care and, more generally, to reform the U.S. healthcare system. The pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives For example, in March 2010, the ACA was enacted, which intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms, substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The ACA, among other things, (i) subjected therapeutic biologics to potential competition by lower-cost biosimilars by creating a licensure framework for follow-on biologic products, (ii) proscribed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs and therapeutic biologics that are inhaled, infused, instilled, implanted or injected, (iii) increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, (iv) established annual nondeductible fees and taxes on manufacturers of certain branded prescription drugs and therapeutic biologics, apportioned among these entities according to their market share in certain government healthcare programs (v) established a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (now 70%) point of-sale discounts off negotiated prices of applicable brand drugs and therapeutic biologics to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs and therapeutic biologics to be covered under Medicare Part D, (vi) expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability, (vii) expanded the entities eligible for discounts under the Public Health program (viii) created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research, and (ix) established a Center for Medicare Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

The current U.S. presidential administration and Congress have, and we expect they will continue to, seek to modify, repeal, or otherwise invalidate all, or certain provisions of, the ACA. Since January 2017, the current U.S. presidential administration has issued two executive orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. For example, on October 12, 2017, the current U.S. presidential administration issued an executive order that expands the use of association health plans and allows anyone to purchase short-term health plans that provide temporary, limited insurance. This executive order also calls for the halt of federal payments to health insurers for cost-sharing reductions previously available to lower-income Americans to afford coverage. There is still uncertainty with respect to the impact this executive order could have on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. The Tax Cuts and Jobs Act of 2017, or the Tax Reform Act, among other things, included a provision that

repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate". Additionally, on January 22, 2018, the current U.S. presidential administration signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amended the ACA, effective January 1, 2019, to increase from 50% to 70% the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole". More recently, in July 2018, CMS published a final rule permitting further collections and payments to and from certain ACA qualified health plans and health insurance issuers under the ACA risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. On December 14, 2018, a Texas U.S. District Court Judge ruled that the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Reform Act. While the Texas U.S. District Court Judge, as well as the current U.S. presidential administration and CMS, have stated that the ruling will have no immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA. There is still uncertainty with respect to the impact the current U.S. presidential administration and the Congress may have, if any, and any changes will likely take time to unfold, and could have an impact on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA. However, we cannot predict the ultimate content, timing or effect of any healthcare reform legislation or the impact of potential legislation on us.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted to reduce healthcare expenditures. United States federal government agencies also currently face potentially significant spending reductions, which may further impact healthcare expenditures. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A joint select committee on deficit reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. Moreover, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. If federal spending is further reduced, anticipated budgetary shortfalls may also impact the ability of relevant agencies, such as the FDA or the National Institutes of Health to continue to function at current levels. Amounts allocated to federal grants and contracts may be reduced or eliminated. These reductions may also impact the ability of relevant agencies to timely review and approve research and development, manufacturing, and marketing activities, which may delay our ability to develop, market and sell any products we may develop.

Moreover, payment methodologies may be subject to changes in healthcare legislation and regulatory initiatives. For example, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. In addition, this legislation provided authority for limiting the number of drugs that will be covered in any therapeutic class. While the MMA only applies to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and

payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

Recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. At the federal level, the current U.S. presidential administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. Additionally, on May 11, 2018, the current U.S. presidential administration laid out the administration's "Blueprint" to reduce the cost of prescription medications while preserving innovation and cures. While the Department of Health and Human Services, or HHS, is soliciting feedback on some of these measures, other actions may be immediately implemented by HHS under existing authority. Further, on January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. Although a number of these, and other potential, proposals will require additional authorization to become effective, Congress and the current U.S. presidential administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Additionally, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017 was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA authorization under an FDA expanded access program; however, manufacturers are not obligated to provide investigational new drug products under the current federal right to try law.

Employees

As of December 31, 2018, we had 37 full-time employees. Of these employees, 21 have an M.D. or a Ph.D. From time to time, we also retain independent contractors to support our organization. None of our employees are represented by a labor union or covered by collective bargaining agreements, and we believe our relationship with our employees is good.

Properties and Facilities

Our principal executive office is located in Waltham, Massachusetts, where we lease a total of approximately 29,785 square feet of office and laboratory space in three buildings that we use for our administrative, research and development and other activities. The lease under our Waltham buildings expires in May 2022, unless we exercise our option to extend the lease term through May 2025.

Legal Proceedings

From time to time, we may be involved in legal proceedings arising in the ordinary course of our business. We are not presently a party to any legal proceedings that, in the opinion of management, would have a material adverse effect on our business. Regardless of outcome, litigation can have an adverse impact on us due to defense and settlement costs, diversion of management resources, negative publicity and reputational harm, and other factors.

MANAGEMENT

Executive Officers and Directors

The following table provides information regarding our executive officers and directors as of March 31, 2019:

Name	Age	Position
Executive Officers:		
Praveen P. Tipirneni, M.D.	50	President, Chief Executive Officer and Director
Robert E. Farrell, Jr., CPA	53	Vice President of Finance and Operations, Treasurer
William D. DeVaul, Esq.	48	General Counsel and Secretary
Bruce N. Rogers, Ph.D.	50	Chief Scientific Officer
Alexey A. Lugovskoy, Ph.D.	45	Chief Development Officer
Non-Employee Directors:		
Gustav Christensen	71	Chairman of the Board, Director
Barbara J. Dalton, Ph.D.	65	Director
Ramy Farid, Ph.D.	54	Director
Vikas Goyal	39	Director
Nilesh Kumar, Ph.D.	43	Director
Amir Nashat	46	Director
Timothy A. Springer, Ph.D.	71	Director
Otello Stampacchia, Ph.D.	49	Director

(1) Member of the Compensation Committee.

(2) Member of the Audit Committee.

(3) Member of the Nominating and Governance Committee.

Executive Officers

Praveen P. Tipirneni, M.D. has served as our President and Chief Executive Officer and a member of our board of directors since July 2015. Previously, he served as the Senior Vice President of Corporate Development and Global Strategy at Cubist Pharmaceuticals, Inc., a biotechnology company focused on antibiotics, from November 2002 to February 2015. Prior to Cubist Pharmaceuticals, Dr. Tipirneni also held management positions at Sun Microsystems, Inc., Covad Communications Group and Deltagen, Inc. Dr. Tipirneni received a B.A. in Mechanical Engineering from Massachusetts Institute of Technology, an M.D. from McGill University and an M.B.A. from the Wharton School of Business of the University of Pennsylvania. We believe that Dr. Tipirneni is qualified to serve on our board of directors because of his experience with biotechnology companies, including working with and serving in various executive positions in life sciences companies.

Robert E. Farrell, Jr., CPA has served as our Vice President of Finance and Operations and Treasurer since June 2015. From March 2015 to June 2015, Mr. Farrell worked as an independent consultant. From April 2009 to March 2015, Mr. Farrell served as Vice President of Finance and Administration and Treasurer of Genocea Biosciences Inc. Previously, Mr. Farrell served in various senior level financial positions at Oscient Pharmaceuticals Corp., Magen Biosciences, Inc. and NeoGenesis Pharmaceuticals, Inc. Mr. Farrell received a B.S. in Accounting from Bentley University.

William D. DeVaul, Esq. has served as our General Counsel and Secretary since February 2019. From May 2015 to February 2019, he served as Vice President, Head of Intellectual Property at Evelo Biosciences, Inc., a biotechnology company. Prior to Evelo, Mr. DeVaul served Cubist Pharmaceuticals in

various positions from December 2003 to February 2015, including most recently as Deputy Chief Intellectual Property Counsel. Mr. DeVaul earned a J.D. from Boston University School of Law and a B.A. in Biochemistry from Columbia University.

Bruce N. Rogers, Ph.D. has served as our Chief Scientific Officer since January 2016. From June 2014 to January 2016, Dr. Rogers served as the Head of Neuro-Opportunities at Pfizer Inc. Prior to that position, Dr. Rogers held positions of increasing responsibility within the medicinal chemistry organization at Pfizer Global R&D since August 2003. Dr. Rogers started his career in the private sector at Pharmacia & Upjohn Company LLC as a scientist from September 1998 to August 2003. Dr. Rogers received a B.A. in Chemistry from the University of Minnesota, a Ph.D. in Organic Chemistry from the University of California at Irvine and was a National Institutes of Health postdoctoral fellow at the University of California.

Alexey A. Lugovskoy, Ph.D. has served as our Chief Development Officer since January 2016. Previously, Dr. Lugovskoy served as a Vice President of Therapeutics of Merrimack Pharmaceuticals, Inc., a biopharmaceutical company, where he worked from June 2010 to January 2016. Prior to joining Merrimack, Dr. Lugovskoy served as Associate Director of Drug Discovery at Biogen Inc., a biotechnology company, where he worked from September 2001 to June 2010. Dr. Lugovskoy has been an Assistant Editor of the journal *mAbs* since December 2013. Dr. Lugovskoy received an Advanced Certificate for Executives in Management, Innovation and Technology from MIT Sloan School of Management, a Ph.D. in Biophysics from Harvard University and a M.Sc. in Molecular Biophysics and a B.Sc. in Mathematics and Physics from the Moscow Institute of Physics and Technology.

Non-Employee Directors

Gustav Christensen has served as a member of our board of directors since January 2016. Mr. Christensen was most recently the President and Chief Executive Officer and director at Dyax Corp., a biopharmaceutical company, where he worked from April 2007 to February 2016. Prior to joining Dyax, Mr. Christensen was a Managing Director at Apeiron Partners, LLC, a boutique life sciences firm, where he worked from 2005 until 2007. Mr. Christensen received his M.Sc. in Economics from the University of Aarhus (Denmark) and his M.B.A. from Harvard Business School. We believe that Mr. Christensen is qualified to serve on our board of directors due to his extensive management and business experience in the life sciences industry and in the commercialization of pharmaceutical products.

Barbara J. Dalton, Ph.D. has served as a member of our board of directors since June 2016. Since September 2007, Dr. Dalton has served as Vice President, WWBD and Senior Managing Partner of Pfizer Ventures, the venture capital arm of Pfizer Inc. Previously, Dr. Dalton served as Partner at EuclidSR Partners LP and President at SR One. Dr. Dalton earned a B.S. in General Science from Penn State and a Ph.D. in Microbiology and Immunology from Drexel University College of Medicine. We believe that Dr. Dalton is qualified to serve on our board of directors because of her strong biopharmaceutical director and investment experience.

Ramy Farid, Ph.D. has served as a member of our board of directors since June 2016. Since January 2017, Dr. Farid has served as the President and Chief Executive Officer at Schrödinger, LLC, a chemical simulation software company. Previously, from January 2002 to December 2016 Dr. Farid served in various roles at Schrödinger. Dr. Farid currently serves on the board of directors of Nimbus Therapeutics. Prior to Schrödinger, Dr. Farid was an Assistant Professor in the Chemistry Department at Rutgers University. Dr. Farid was also an NIH Postdoctoral Fellow in the Department of Biochemistry and Biophysics at the University of Pennsylvania. Dr. Farid received a B.S. in Chemistry from the University of Rochester and received his Ph.D. in Chemistry from the California Institute of Technology. We believe that Dr. Farid is qualified to serve on our board of directors because of his experience in the biopharmaceutical industry, including his expertise in drug discovery and development.

Vikas Goyal has served as a member of our board of directors since June 2016. Mr. Goyal is currently a Principal at S.R. One, Limited, the corporate venture capital arm of GlaxoSmithKline plc, in Cambridge, Massachusetts, where he manages investments in innovative drug discovery and development companies. He joined S.R. One, Limited in January 2011. Prior to joining S.R. One, Limited, Mr. Goyal was a

consultant in the pharmaceutical and medical products practice at McKinsey and Company, a co-founder of Extera Partners, where he advised public and private life sciences companies, and a business development manager at Infinity Pharmaceuticals, Inc. He received his B.A. in Neurobiology from Harvard University and his M.B.A. in Health Care Management from the Wharton School of the University of Pennsylvania. We believe that Mr. Goyal is qualified to serve on our board of directors because of his investing and operations experiences in the life sciences industry.

Nilesh Kumar, Ph.D. has served as a member of our board of directors since December 2018. Dr. Kumar has been a Partner at Novo Ventures (US), Inc., which provides consulting services to Novo Holdings A/S, a venture capital fund, since January 2017, and before that, a Senior Principle since April 2015. Prior to Novo Ventures, Dr. Kumar held various positions in the Merck KGaA family of companies since 2009, culminating in the position of Senior Investment Director, where he led venture investments and strategic licensing transactions in the field of oncology and autoimmune diseases. Dr. Kumar also serves on the boards of directors of several private companies. Dr. Kumar received a B.A. in Natural Sciences from Cambridge University, a Ph.D. in Chemistry from Harvard University and an M.B.A. from Harvard Business School. We believe that Dr. Kumar is qualified to serve on our board of directors because of his venture capital experience, his extensive experience in the pharmaceutical industry and his educational background.

Amir Nashat, Sc.D. previously served as a member of our board of directors from June 2015 through June 2016 and has served as a member of our board of directors since June 2017. Dr. Nashat is a managing partner at Polaris Partners, a venture capital firm, where he has worked since 2002. Dr. Nashat was also the founding Chief Executive Officer of Living Proof, Inc. and Sun Catalytix Corporation. Dr. Nashat currently represents Polaris as a director of aTyr Pharmaceuticals, Inc., Fate Therapeutics, Inc., Selecta Biosciences Inc., Scholar Rock Holding Corporation, and Syros Pharmaceuticals, Inc., as well as on the boards of directors of several private companies. Dr. Nashat also serves on the Partners Innovation Fund, the Investment Advisory Committee for The Engine at MIT, and helped launch the MIT Sandbox Innovation Fund as its active President. Dr. Nashat previously served on the Board of the New England Venture Capital Association. Dr. Nashat received an M.S. and B.S. in Materials Science and Mechanical Engineering from the University of California, Berkeley and a Sc.D. as a Hertz Fellow in Chemical Engineering at the Massachusetts Institute of Technology with a minor in Biology under Dr. Robert Langer. We believe that Dr. Nashat's biotechnology investment experience qualifies him to serve on our board of directors.

Timothy A. Springer, Ph.D. founded our company in August 2014 and has served as a scientific advisor to us and as a member of our board of directors since June 2015. Since 1989, Dr. Springer has served as the Latham Family Professor at Harvard Medical School. He has also served as Senior Investigator in the Program in Cellular and Molecular Medicine at Boston Children's Hospital since 2012, and as a Professor of Biological Chemistry and Molecular Pharmacology at Harvard Medical School and Professor of Medicine at Boston Children's Hospital since 2011. Dr. Springer was the Founder of LeukoSite, a biotechnology company acquired by Millennium Pharmaceuticals in 1999. Additionally, he is a founder and investor in Scholar Rock Holding Corporation and has served as a member of its board since October 2012. He has also served Selecta Biosciences Inc. as a scientific advisor since December 2008 and as a member of its board since June 2016. Dr. Springer is a member of the National Academy of Sciences and his honors include the Crafoord Prize, the American Association of Immunologists Meritorious Career Award, the Stratton Medal from the American Society of Hematology, and the Basic Research Prize from the American Heart Association. Dr. Springer received a B.A. in Biochemistry from the University of California, Berkeley, and a Ph.D. in Biochemistry and Molecular Biology from Harvard University. We believe that Dr. Springer is qualified to serve on our board of directors because of his extensive knowledge of the integrin field and his investment, business and board experience with biopharmaceutical companies.

Otello Stampacchia, Ph.D. has served as a member of our board of directors since December 2018. He has served as founder and Managing Director of Omega Funds since 2004. Previously, Dr. Stampacchia was in charge of life sciences direct investments at AlpInvest Partners B.V. from 2001 to 2003, and from 2000 to 2001, Dr. Stampacchia was the portfolio managing of the Lombard Odier Immunology Fund. Previously, Dr. Stampacchia was a member of the healthcare corporate finance and mergers and acquisitions team at

Goldman Sachs Group, Inc. from 1997 to 2000, Before joining Goldman Sachs, Dr. Stampacchia helped co-found the healthcare investment activities at Index Securities, now Index Ventures, Inc. Dr. Stampacchia is currently a member of the boards of directors of Replimune Group, Inc., Kronos Bio, Inc., Gossamer Bio, Inc. and ESSA Pharma, Inc. Previously, Dr. Stampacchia served on the boards of directors of several private companies. He has a Ph.D. degree in Molecular Biology from the University of Geneva and a European Ph.D. in Biotechnology (EDBT) from the European Association for Higher Education in Biotechnology. He has an M.S. in Genetics from Universa' degli Studi di Pavia. We believe that Dr. Stampacchia is qualified to serve on our board of directors because of his experience investing in life sciences companies and working with and serving on the boards of directors of various life sciences companies.

Election of Officers

Our executive officers are appointed by, and serve at the discretion of, our board of directors. There are no family relationships among any of our directors or executive officers.

Board Composition

Our board of directors currently consists of nine members. of our directors are independent within the meaning of the independent director guidelines of the Nasdaq Global Market, or Nasdaq. Pursuant to our current voting agreement and certificate of incorporation, Otello Stampacchia, Nilesh Kumar, Vikas Goyal, Barbara J. Dalton, Amir Nashat, Timothy A. Springer, Ramy Farid, Praveen P. Tipirneni, and Gustav Christensen have been designated to serve as members of our board. Otello Stampacchia and Nilesh Kumar were elected by the holders of our Series B convertible preferred stock. Vikas Goyal, Barbara J. Dalton, and Amir Nashat were elected by the holders of our Series A convertible preferred stock. Timothy A. Springer, Ramy Farid, Praveen P. Tipirneni, and Gustav Christensen were elected by the holders of our common stock and convertible preferred stock, voting together as a single class on an as-converted basis.

The voting agreement and the provisions of our current certificate of incorporation that govern the election and designation of our directors will terminate in connection with this offering, after which no contractual obligations will concern the election of our directors. Each of our current directors will continue to serve until the election and qualification of his or her successor, or until his or her earlier death, resignation or removal.

Classified Board of Directors

Upon the completion of this offering, our board of directors will be divided into three staggered classes of directors. At each annual meeting of stockholders, a class of directors will be subject to re-election for a three-year term. As a result, only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Our directors will be divided among the three classes as follows:

- the Class I directors will be , and and their terms will expire at the first annual meeting of stockholders held following the completion of the offering;
- the Class II directors will be , and and their terms will expire at the second annual meeting of stockholders held following the completion of the offering; and
- the Class III directors will be , and and their terms will expire at the third annual meeting of stockholders held following the completion of the offering.

Each director's term continues until the election and qualification of his or her successor, or his or her earlier death, resignation or removal. Our restated certificate of incorporation and restated bylaws that will be in effect upon the completion of this offering authorize only our board of directors to fill vacancies on our board of directors. Any increase or decrease in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors. This

classification of our board of directors may have the effect of delaying or preventing changes in control of our company. See the section entitled "Description of Capital Stock — Anti-Takeover Provisions — Restated Certificate of Incorporation and Restated Bylaw Provisions."

Director Independence

In connection with this offering, we intend to apply to have our common stock approved for listing on Nasdaq. Under the rules of Nasdaq, independent directors must comprise a majority of a listed company's board of directors within a specified period following the completion of this offering. In addition, the rules of Nasdaq require that, subject to specified exceptions, each member of a listed company's audit, compensation and nominating and governance committees be independent. Under the rules of Nasdaq, a director will only qualify as an "independent director" if, in the opinion of that company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director.

Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Securities Exchange Act of 1934, as amended, or the Exchange Act. In order to be considered independent for purposes of Rule 10A-3, a member of an audit committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors or any other board committee: (i) accept, directly or indirectly, any consulting, advisory or other compensatory fee from the listed company or any of its subsidiaries; or (ii) be an affiliated person of the listed company or any of its subsidiaries. We intend to satisfy the audit committee independence requirements of Rule 10A-3 as of the completion of this offering. Additionally, compensation committee members must not have a relationship with us that is material to the director's ability to be independent from management in connection with the duties of a compensation committee member.

Our board of directors has undertaken a review of the independence of each director and considered whether each director has a material relationship with us that could compromise his ability to exercise independent judgment in carrying out his responsibilities. As a result of this review, our board of directors determined that all of our directors, except for , are "independent directors" as defined under the applicable rules and regulations of the Securities and Exchange Commission, or SEC, and the listing requirements and rules of Nasdaq. In making these determinations, our board of directors reviewed and discussed information provided by the directors and us with regard to each director's business and personal activities and relationships as they may relate to us and our management, including the beneficial ownership of our capital stock by each non-employee director and the transactions involving them described in the section entitled "Certain Relationships and Related Party Transactions."

Committees of the Board of Directors

Our board of directors has an audit committee, a compensation committee and a nominating and governance committee, each of which will have the composition and responsibilities described below as of the completion of this offering. Each of the below committees has a written charter approved by our board of directors. Upon completion of this offering, copies of each charter will be posted on the investor relations section of our website. Members serve on these committees will serve until their resignation or until otherwise determined by our board of directors.

Audit Committee

Our audit committee is comprised of , with as the chairman of our audit committee. The composition of our audit committee meets the requirements for independence under the current Nasdaq and SEC rules and regulations. Each member of our audit committee is financially literate. In addition, our board of directors has determined that is an "audit committee financial expert" as defined in Item 407(d)(5)(ii) of Regulation S-K promulgated under the Securities Act of 1933, as amended. This designation does not impose on him any duties, obligations or liabilities that are greater than are

generally imposed on members of our audit committee and our board of directors. Our audit committee is directly responsible for, among other things:

- selecting and hiring our independent registered public accounting firm;
- the qualifications, independence and performance of our independent auditors;
- the preparation of the audit committee report to be included in our annual proxy statement;
- our compliance with legal and regulatory requirements;
- our accounting and financial reporting processes, including our financial statement audits and the integrity of our financial statements; and
- reviewing and approving related-person transactions.

Compensation Committee

Our compensation committee is comprised of , with as the chairman of our compensation committee. Each member of our compensation committee is a non-employee director, as defined by Rule 16b-3 promulgated under the Exchange Act and meets the requirements for independence under the current Nasdaq listing standards and SEC rules and regulations. Our compensation committee is responsible for, among other things:

- evaluating, recommending, approving and reviewing executive officer compensation arrangements, plans, policies and programs;
- evaluating and recommending non-employee director compensation arrangements for determination by our board of directors;
- administering our cash-based and equity-based compensation plans; and
- overseeing our compliance with regulatory requirements associated with the compensation of directors, officers and employees.

Nominating and Governance Committee

Our nominating and governance committee is comprised of , and , with as the chairman of our nominating and governance committee. Each member of our nominating and governance committee meets the requirements for independence under the current Nasdaq listing standards. Our nominating and governance committee is responsible for, among other things:

- identifying, considering and recommending candidates for membership on our board of directors;
- overseeing the process of evaluating the performance of our board of directors; and
- advising our board of directors on other corporate governance matters.

Compensation Committee Interlocks and Insider Participation

None of the current members of our compensation committee has at any time been one of our officers or employees. Dr. Tipirneni, our President and Chief Executive Officer and a member of our board of directors, was a member of our Compensation Committee until April 2019. None of our executive officers has served as a member of the board of directors, or as a member of the compensation or similar committee, of any entity that has one or more executive officers who served on our board of directors or compensation committee during the year ended December 31, 2018. Prior to establishing the compensation committee, our full board of directors made decisions relating to the compensation of our officers.

Scientific Advisory Board

We have established a scientific advisory board composed of leading academic and industry scientists. We seek advice and input from these scientists on an ad hoc basis, individually or as a group, to provide scientific and clinical feedback and advice related to our research and development platform and programs. The members of our advisory board consist of experts across a range of key disciplines relevant to our programs. Other than Timothy A. Springer, our advisors are not our employees or directors and have no decision-making authority over our activities. Our advisors may have commitments to, or consulting or advisory contracts with, other entities that may limit their availability to us. In addition, our advisors may

have arrangements with other companies to assist those companies in developing products or technologies that may compete with ours. All of our advisors are affiliated with other entities and devote only a small portion of their time to us. Our advisors are retained under consulting agreements and receive cash compensation based upon consulting services rendered. In addition, in the past we have granted stock options to purchase common stock to certain advisory members for their service.

Code of Business Conduct and Ethics

Prior to the completion of this offering, our board of directors will adopt a code of business conduct and ethics that applies to all of our employees, officers and directors, including our Chief Executive Officer and other executive and senior officers. The full text of our code of business conduct and ethics will be posted on the investor relations section of our website. The reference to our website address in this prospectus does not include or incorporate by reference the information on our website into this prospectus. We intend to disclose future amendments to certain provisions of our code of business conduct and ethics, or waivers of these provisions, on our website or in public filings to the extent required by the applicable rules.

Non-Employee Director Compensation

The following table presents the total compensation earned by each of our non-employee directors in the year ended December 31, 2018. Our President and Chief Executive Officer, Dr. Tipirneni, receives no compensation for his service as a director. Other than as described below, none of our non-employee directors received any fees or reimbursement of any expenses (other than customary expenses in connection with the attendance of meetings of our board of directors) or any equity or non-equity awards in the year ended December 31, 2018.

Name	Fees Earned or Paid in Cash ($)	All Other Compensation ($)	Total ($)
Gustav Christensen	40,000(1)	—	40,000
Barbara J. Dalton, Ph.D.	—		
Ramy Farid, Ph.D	—	—	—
Vikas Goyal	—	—	—
Nilesh Kumar, Ph.D.	—	—	—
Amir Nashat	—	—	—
Timothy A. Springer, Ph.D.	—	80,000(2)	80,000
Otello Stampacchia, Ph.D.	—	—	—

(1) In 2018, Mr. Christensen received approximately $40,000 in fees, paid quarterly, pursuant to a consulting agreement entered into with us in 2016.

(2) In 2018, Dr. Springer received $80,000 pursuant to a consulting agreement entered into with us in 2015. For additional information regarding Dr. Springer's consulting arrangement with us, see the section entitled "Certain Relationships and Related Party Transactions — Consulting Agreement with Timothy A. Springer."

Prior to this offering, we did not have a formal policy to provide any cash or equity compensation to our non-employee directors for their service on our board of directors or committees of our board of directors. In connection with this offering, our board of directors expects to approve annual non-employee director compensation, which will take effect following the completion of this offering.

EXECUTIVE COMPENSATION

The following tables and accompanying narrative disclosure set forth information about the compensation earned by our named executive officers during the year ended December 31, 2018. Our named executive officers, who are our principal executive officer and the two most highly-compensated executive officers (other than our principal executive officer) serving as executive officers as of December 31, 2018, were:

- Praveen P. Tipirneni, M.D., President and Chief Executive Officer;
- Bruce N. Rogers, Ph.D., Chief Scientific Officer; and
- Alexey A. Lugovskoy, Ph.D., Chief Development Officer.

Summary Compensation Table

The following table presents summary information regarding the total compensation for services rendered in all capacities that was awarded to and earned by our named executive officers during the year ended December 31, 2018.

Name and Principal Position	Salary($)	Bonus ($)[1]	Stock Awards ($)[2]	Option Awards ($)[3]	Non-equity Incentive Plan Compensation ($)[4]	All Other Compensation ($)[5]	Total($)
Praveen P. Tipirneni, M.D. *President and Chief Executive Officer*	402,097	110,000	329,708	1,266,568	208,700	8,250	2,317,073
Bruce N. Rogers, Ph.D. *Chief Scientific Officer*	320,671	60,000	111,533	603,526	124,700	8,250	1,220,430
Alexey A. Lugovskoy, Ph.D. *Chief Development Officer*	309,910	60,000	78,418	401,383	120,600	8,250	970,311

(1) The amounts reported in the Bonus column reflect special discretionary bonuses paid in January 2019 with respect to business development success in 2018.

(2) The amounts reported in the Stock Awards column for fiscal year 2018 reflect the incremental fair value associated with the December 5, 2018 exchange of incentive units in Morphic Holding, LLC previously awarded to our named executive officers into shares of our common stock and restricted stock in connection with the conversion of Morphic Holding, LLC to a corporation in the Reorganization (as discussed in greater detail above in "Reorganization"), with such value computed in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, or ASC 718. The assumptions used in calculating the incremental fair value of the stock awards reported in the Stock Awards column are set forth in Note 7 to the audited consolidated financial statements included in this prospectus.

(3) The amounts reported in the Option Awards column represent the grant date fair value of the stock options granted to the named executive officers during the year ended December 31, 2018 as computed in accordance with ASC 718. The assumptions used in calculating the grant date fair value of the stock options reported in the Option Awards column are set forth in Note 7 to the audited consolidated financial statements included in this prospectus. Note that the amounts reported in this column reflect the accounting cost for these stock options, and do not correspond to the actual economic value that may be received by the named executive officers from the options.

(4) For additional information regarding the non-equity incentive plan compensation, see "— Non-equity Incentive Plan Awards."

(5) The amounts reported in the All Other Compensation column reflect 401(k) contributions paid by us on behalf of each named executive officer.

Non-equity Incentive Plan Awards

Annual bonuses for our executive officers are based on the achievement of corporate and, for all of the executive officers other than our Chief Executive Officer, individual performance objectives. For the 2018 bonuses, the corporate performance objectives included the delivery of a development candidate, the completion of a target level of financing, and the establishment of development infrastructure capable of supporting advancement of the development candidates into the clinic. In January 2019, based on the achievement of these corporate performance objectives and satisfaction of individual performance goals, our board of directors determined to award bonuses equal to 130% of target.

Outstanding Equity Awards at 2018 Fiscal Year-End Table

The following table provides information regarding each unexercised stock option and share of restricted common stock held by our named executive officers as of December 31, 2018.

		Option Awards				Stock Awards[1]	
Name	Vesting Commencement Date of Option Award or Stock Award	Number of Securities Underlying Unexercised Options Exercisable	Number of Securities Underlying Unexercised Options Unexercisable	Option Exercise Price ($)	Option Expiration Date	Number of Shares of Restricted Stock That Have Not Vested (#)	Market Value of Shares of Restricted Stock That Have Not Vested ($)[3]
Praveen P. Tipirneni	12/14/2018[2]	—	2,703,000	0.74	12/14/2028		
	7/1/2015[4]					309,015	228,671
	12/13/2016[5]					542,500	401,450
	12/11/2017[5]					356,250	263,625
Bruce N. Rogers	12/14/2018[2]	—	1,287,000	0.74	12/14/2028		
	1/18/2016[4]					85,271	63,101
	12/13/2016[5]					207,500	153,550
	12/11/2017[5]					309,000	228,660
Alexey A. Lugovskoy	12/14/2018[2]	—	856,000	0.74	12/14/2028		
	1/5/2016[4]					40,467	29,946
	12/13/2016[5]					191,000	141,340
	12/11/2017[5]					173,250	128,205

(1) Stock award totals represent shares of our restricted common stock received by each named executive officer upon the exchange of his incentive units in Morphic Holding, LLC in connection with the conversion of Morphic Holding, LLC into a corporation, or the Reorganization. The shares of restricted common stock are subject to acceleration upon a qualifying termination of employment, which will be described in greater detail in the Employee Offer Letters section below.

(2) All of the outstanding options were granted under our 2018 Plan and vest in 48 equal monthly installments over the four-year period following the vesting commencement date. The options are also subject to acceleration of vesting upon a qualifying termination of employment, which will be described in greater detail in the Employee Offer Letters section below.

(3) There was no public market for our common stock as of December 31, 2018. The fair market value of our common stock as of December 31, 2018, as determined by an independent valuation, was $0.74 per share.

(4) The shares of restricted common stock vest as follows: 25% vests on the one-year anniversary of the vesting commencement date, with the remaining 75% vesting in equal monthly installments for the next 36 months thereafter.

(5) The shares of restricted common stock vest as follows: 1/48th of the shares vest in 48 equal monthly installments over the four-year period following the vesting commencement date.

Employee Offer Letters

We intend to enter into amended and restated offer letters with each of our named executive officers in connection with the offering. We expect that each of these offer letters will provide for at-will employment and will include each named executive officer's base salary, a discretionary annual incentive bonus opportunity, standard employee benefit plan participation and an initial equity award. We also expect these offer letters to provide for severance benefits upon certain qualifying terminations of employment, including in connection with a change in control of our company. Each of these arrangements will be approved by our then current Chief Executive Officer or our board of directors. In addition, each of our named executive officers has executed a form of our standard Employee Non-Disclosure, Non-Competition and Assignment of Intellectual Property Agreement.

2018 Stock Incentive Plan

We maintain the 2018 Plan. The purposes of the 2018 Plan are to attract and retain the best available personnel for positions of substantial responsibility, to provide additional incentive to employees, directors and consultants and to promote the success of our business. The material terms of the 2018 Plan are summarized below:

Share Reserve. Subject to adjustment as provided in the 2018 Plan, the maximum number of shares of common stock which may be issued under the 2018 Plan is 13,045,265 shares plus an additional number of shares equal to the number of shares of common stock subject to awards granted prior to the effectiveness of the 2018 Plan that are forfeited to or otherwise purchased by us, up to a maximum of 9,222,634 shares. 2,667,369 shares remained available for grant under the 2018 Plan as of December 31, 2018. As of December 31, 2018, no options to purchase shares had been exercised and options to purchase 10,417,696 shares remained outstanding, with an exercise price of $0.74 per share.

Administration. Our 2018 Plan is administered by our board of directors or a committee appointed by our board of directors. Subject to the terms of the 2018 Plan, our board of directors has the authority to, among other things, select the persons to whom awards will be granted, construe and interpret our 2018 Plan as well as to prescribe, amend and rescind rules and regulations relating to the 2018 Plan and awards granted thereunder.

Eligibility. Pursuant to the 2018 Plan, we may grant incentive stock options only to our employees (including officers and directors who are also employees). We may grant non-statutory stock options to our employees (including officers and directors who are also employees), non-employee directors and consultants.

Options. The 2018 Plan provides for the grant of both (i) incentive stock options, which are intended to qualify for tax treatment as set forth under Section 422 of the Internal Revenue Code, as amended, or the Code, and (ii) non-statutory stock options to purchase shares of our common stock, each at a stated exercise price. The exercise price of each stock option must be at least equal to the fair market value of our common stock on the date of grant. However, the exercise price of any stock option granted to an individual who owns more than ten percent of the total combined voting power of all classes of our capital stock must be at least equal to 110% of the fair market value of our common stock on the date of grant.

The maximum permitted term of options granted under our 2018 Plan is ten years from the date of grant, except that the maximum permitted term of incentive stock options granted to an individual who owns more than ten percent of the total combined voting power of all classes of our capital stock is five years from the date of grant.

Restricted Stock Awards. In addition, the 2018 Plan provides for the issuance of restricted stock awards pursuant to which the holder may purchase restricted shares of our common stock. Among other terms and conditions, we may retain an option to repurchase the restricted stock within 90 days of the holder's

termination of service. No restricted stock awards have been granted under the 2018 Plan and it is not expected that any such awards will be granted prior to the offering.

Limited Transferability. Unless otherwise determined by our board of directors, options and restricted stock awards generally may not be transferred or assigned in any manner other than by will or the laws of descent and distribution.

Change of Control. In the event of a change in control transaction (as defined in the 2018 Plan), the 2018 Plan provides that our board of directors or the board of any successor corporation has the discretion to take any of the following actions with respect to some or all outstanding equity awards: assumption or substitution of awards, immediate termination of the awards if not exercised within a specified time frame, repurchase restricted stock awards at cost, cash payment of the awards or partial or full accelerated vesting of such equity awards.

Adjustments. In the event of a merger, consolidation, sale of all or substantially all of our assets, reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar transaction, our board of directors may adjust the number and class of shares that may be delivered under 2018 Plan and/or the number, class and price of shares covered by each outstanding award, in order to prevent diminution or enlargement of benefits or potential benefits intended to be made available under the 2018 Plan or otherwise as required by applicable law.

Termination. We expect to terminate the 2018 Plan and cease issuing awards thereunder upon the effective date of our 2019 Equity Incentive Plan (described below), which is the date immediately prior to the date of the effectiveness of the registration statement of which this prospectus forms a part. Any outstanding options granted under the 2018 Plan will remain outstanding, subject to the terms of our 2018 Plan and applicable award agreements, until such awards are exercised or until they terminate or expire by their terms.

Restricted Stock Agreements

On December 5, 2018, in connection with the Reorganization, all of our then-outstanding vested and unvested incentive units were converted on a one-for-one basis into shares of common stock and restricted common stock, respectively. We entered into restricted stock agreements with each holder of incentive units and the restricted stock agreements provided for the same vesting terms as applied to the incentive units immediately prior to the Reorganization. As of December 31, 2018, 9,182,834 shares of common stock and restricted shares of common stock had been granted pursuant to the restricted stock agreements, of which 4,243,555 remain outstanding as restricted shares of common stock that are subject to vesting.

Vesting. The vesting schedule is set forth in each restricted stock agreement and certain restricted stock agreements provide for acceleration of vesting upon a qualifying termination of employment in connection with a change in control. Additionally, the Board of Directors has the discretion to accelerate any vesting dates or waiver any of the requirements for vesting. In the event the holder of a restricted stock award ceases to provide services as our active employee or consultant before the shares of restricted common stock vest, than we will have, for a period of 90 days from the date of termination of services, the right to purchase, or the Repurchase Option, any or all shares that are unvested shares as of such termination date, with the Repurchase Option deemed to be automatically exercised on the 90^{th} day of such termination date, absent our notification to the holder that such Repurchase Option will not be exercised as to some or all of the unvested shares. The repurchase price per share of restricted common stock is $0.0001 (subject to appropriate adjustments).

Transferability. Shares of restricted common stock may not be transferred in any manner other than for bona-fide estate planning purposes or by will or the laws of descent and distribution. Restrictions on transfer also apply to vested shares, as set forth in the restricted stock agreements.

Adjustments. The restricted stock agreements provide that the shares of restricted common stock shall also include any shares of our capital stock issued by stock dividend, stock split, recapitalization, merger, combination, reorganization or otherwise.

2019 Equity Incentive Plan

We intend to adopt our 2019 Equity Incentive Plan, or the 2019 Plan, that will become effective on the date immediately prior to the date of the effectiveness of the registration of which this prospectus forms a part and will serve as the successor to our 2018 Plan. Our 2019 Plan authorizes the award of stock options, restricted stock awards, or RSAs, stock appreciation rights, or SARs, restricted stock units, or RSUs, performance awards and stock bonus awards. We have initially reserved shares of our common stock, plus any reserved shares not issued or subject to outstanding grants under the 2018 Plan on the effective date of the 2019 Plan, for issuance pursuant to awards granted under our 2019 Plan. The number of shares reserved for issuance under our 2019 Plan will increase automatically on January 1 of each of 2020 through 2029 by the number of shares equal to the lesser of % of the aggregate number of outstanding shares of our common stock as of the immediately preceding December 31, or a number as may be determined by our board of directors.

In addition, the following shares will again be available for issuance pursuant to awards granted under our 2019 Plan:

- shares subject to options or SARs granted under our 2019 Plan that cease to be subject to the option or SAR for any reason other than exercise of the option or SAR;
- shares subject to awards granted under our 2019 Plan that are subsequently forfeited or repurchased by us at the original issue price;
- shares subject to awards granted under our 2019 Plan that otherwise terminate without such shares being issued;
- shares subject to awards granted under our 2019 Plan that are surrendered, cancelled or exchanged for cash or a different award (or combination thereof);
- shares issuable upon the exercise of options or subject to other awards granted under our 2018 Plan that cease to be subject to such options or other awards, by forfeiture or otherwise, after the termination of the 2018 Plan;
- shares subject to awards granted under our 2018 Plan that are forfeited or repurchased by us at the original price after the termination of the 2018 Plan; and
- shares subject to awards under our 2018 Plan or our 2019 Plan that are used to pay the exercise price of an option or withheld to satisfy the tax withholding obligations related to any award.

Administration. Our 2019 Plan is expected to be administered by our compensation committee, or by our board of directors acting in place of our compensation committee. Subject to the terms and conditions of the 2019 Plan, the compensation committee will have the authority, among other things, to select the persons to whom awards may be granted, construe and interpret our 2019 Plan as well as to determine the terms of such awards and prescribe, amend and rescind the rules and regulations relating to the plan or any award granted thereunder. The 2019 Plan provides that the board or compensation committee may delegate its authority, including the authority to grant awards, to one or more executive officers to the extent permitted by applicable law, provided that awards granted to non-employee directors may only be determined by our board of directors.

Eligibility. Our 2019 Plan provides for the grant of awards to our employees, directors, consultants, independent contractors and advisors. No non-employee director may receive awards under our 2019 Plan that exceed $ in a calendar year or $ in the calendar year of his or her initial services as a non-employee director with us.

Options. The 2019 Plan provides for the grant of both incentive stock options intended to qualify under Section 422 of the Code, and non-statutory stock options to purchase shares of our common stock at a

stated exercise price. Incentive stock options may only be granted to employees, including officers and directors who are also employees. The exercise price of stock options granted under the 2019 Plan must be at least equal to the fair market value of our common stock on the date of grant. Incentive stock options granted to an individual who holds, directly or by attribution, more than ten percent of the total combined voting power of all classes of our capital stock must have an exercise price of at least 110% of the fair market value of our common stock on the date of grant. Subject to stock splits, dividends, recapitalizations or similar events, no more than shares may be issued pursuant to the exercise of incentive stock options granted under the 2019 Plan.

Options may vest based on service or achievement of performance conditions. Our compensation committee may provide for options to be exercised only as they vest or to be immediately exercisable, with any shares issued on exercise being subject to our right of repurchase that lapses as the shares vest. The maximum term of options granted under our 2019 Plan is ten years from the date of grant, except that the maximum permitted term of incentive stock options granted to an individual who holds, directly or by attribution, more than ten percent of the total combined voting power of all classes of our capital stock is five years from the date of grant.

Restricted Stock Awards. An RSA is an offer by us to sell shares of our common stock subject to restrictions, which may lapse based on the satisfaction of service or achievement of performance conditions. The price, if any, of an RSA will be determined by the compensation committee. Holders of RSAs, unlike holders of options, will have the right to vote and any dividends or stock distributions paid pursuant to RSAs will be accrued and paid when the restrictions on such shares lapse. Unless otherwise determined by the compensation committee at the time of award, vesting will cease on the date the participant no longer provides services to us and unvested shares may be forfeited to or repurchased by us.

Stock Appreciation Rights. A SAR provides for a payment, in cash or shares of our common stock (up to a specified maximum of shares, if determined by our compensation committee), to the holder based upon the difference between the fair market value of our common stock on the date of exercise and a predetermined exercise price, multiplied by the number of shares. The exercise price of a SAR must be at least the fair market value of a share of our common stock on the date of grant. SARs may vest based on service or achievement of performance conditions, and may not have a term that is longer than ten years from the date of grant.

Restricted Stock Units. RSUs represent the right to receive shares of our common stock at a specified date in the future, and may be subject to vesting based on service or achievement of performance conditions. Payment of earned RSUs will be made as soon as practicable on a date determined at the time of grant, and may be settled in cash, shares of our common stock or a combination of both. No RSU may have a term that is longer than ten years from the date of grant.

Performance Awards. Performance awards granted to pursuant to the 2019 Plan may be in the form of a cash bonus, or an award of performance shares or performance units denominated in shares of our common stock that may be settled in cash, property or by issuance of those shares subject to the satisfaction or achievement of specified performance conditions.

Stock Bonus Awards. A stock bonus award provides for payment in the form of cash, shares of our common stock or a combination thereof, based on the fair market value of shares subject such award as determined by our compensation committee. The awards may be granted as consideration for services already rendered, or at the discretion of the compensation committee, may be subject to vesting restrictions based on continued service or performance conditions.

Dividend Equivalents Rights. Dividend equivalent rights may be granted at the discretion of our compensation committee, and represent the right to receive the value of dividends, if any, paid by us in respect of the number of shares of our common stock underlying an award. Dividend equivalent rights will

be subject to the same vesting or performance conditions as the underlying award and will be paid only at such time as the underlying award has become fully vested. Dividend equivalent rights may be settled in cash, shares or other property, or a combination of thereof as determined by the compensation committee.

Change of Control. Our 2019 Plan provides that, in the event of a change of control (as defined in the 2019 Plan), outstanding awards under our 2019 Plan shall be subject to the agreement evidencing the change of control, which need not treat all outstanding awards in an identical manner, and may include one or more of the following: (i) the continuation of the outstanding awards; (ii) the assumption of the outstanding awards by the surviving corporation or its parent; (iii) the substitution by the surviving corporation or its parent of new options or equity awards for the outstanding awards; (iv) the full or partial acceleration of exercisability or vesting or lapse of Company's right to repurchase or forfeiture rights and accelerated expiration of the award; or (v) the settlement of the full value of the outstanding awards (whether or not then vested or exercisable) in cash, cash equivalents, or securities of the successor entity with a fair market value equal to the required amount, as determined in accordance with the 2019 Plan and which payments may be deferred until the date or dates the award would have become exercisable or vested. However, in the event a successor or acquiring corporation refuses to assume, substitute or settle outstanding awards, all such awards will become fully vested and exercisable immediately prior to the consummation of the change in control. In addition, upon a change in control the vesting of all awards granted to our non-employee directors will accelerate and such awards will become exercisable (to the extent applicable) in full prior to the consummation of the change of control at such times and on such conditions as the committee determines.

Adjustment. In the event of a change in the number of outstanding shares of our common stock without consideration by reason of a stock dividend, extraordinary dividend or distribution, recapitalization, stock split, reverse stock split, subdivision, combination, consolidation reclassification, spin-off or similar change in our capital structure, appropriate proportional adjustments will be made to the number of shares reserved for issuance under our 2019 Plan; the exercise prices, number and class of shares subject to outstanding options or SARs; the number and class of shares subject to other outstanding awards; and any applicable maximum award limits with respect to incentive stock options.

Clawback; Transferability. All awards will be subject to clawback or recoupment pursuant to any compensation clawback or recoupment policy adopted by our board of directors or required by law during the term of service of the award holder, to the extent set forth in such policy or applicable agreement. Except in limited circumstances, awards granted under our 2019 Plan may generally not be transferred in any manner prior to vesting other than by will or by the laws of descent and distribution.

Amendment and Termination. Our board of directors may amend our 2019 Plan at any time, subject to stockholder approval as may be required. Our 2019 Plan will terminate ten years from the date our board of directors adopts the plan, unless it is terminated earlier by our board of directors. No termination or amendment of the 2019 Plan may adversely affect any then-outstanding award without the consent of the affected participant, except as is necessary to comply with applicable laws.

2019 Employee Stock Purchase Plan

We intend to adopt a 2019 Employee Stock Purchase Plan, or ESPP, that will become effective upon the effectiveness of the registration statement of which this prospectus forms a part in order to enable eligible employees to purchase shares of our common stock with accumulated payroll deductions. Our ESPP is intended to qualify under Section 423 of the Code.

Shares Available. We have initially reserved shares of our common stock for sale under our ESPP. The aggregate number of shares reserved for sale under our ESPP will increase automatically on January 1st of each of the first ten calendar years after the effective date by the number of shares equal to the lesser of % of the total outstanding shares of our common stock as of the immediately preceding December 31 (rounded to the nearest whole share) or a number of shares as may be determined by our

board of directors in any particular year. The aggregate number of shares issued over the term of our ESPP, subject to stock-splits, recapitalizations or similar events, may not exceed shares of our common stock.

Administration. Our compensation committee will administer our ESPP subject to the terms and conditions of the ESPP. Among other things, the compensation committee will have the authority to determine eligibility for participation in the ESPP, designate separate offerings under the plan, and construe, interpret and apply the terms of the plan.

Eligibility. Employees eligible to participate in any offering pursuant to the ESPP generally include any employee that is employed by us or certain of our designated subsidiaries at the beginning of the offering period. However, employees who are customarily employed for 20 hours or less per week or for five months or less in a calendar year may not be eligible to participate in the ESPP. In addition, any employee who owns (or is deemed to own as a result of attribution) 5% or more of the total combined voting power or value of all classes of our capital stock, or the capital stock of one of our qualifying subsidiaries, or who will own such amount as a result of participation in the ESPP, will not be eligible to participate in the ESPP. The compensation committee may impose additional restrictions on eligibility from time to time.

Offerings. Under our ESPP, eligible employees will be offered the option to purchase shares of our common stock at a discount over a series of offering periods. Each offering period may itself consist of one or more purchase periods. No offering period may be longer than 27 months.

Participation. Participating employees will be able to purchase the offered shares of our common stock by accumulating funds through payroll deductions. Participants may select a rate of payroll deduction between 1% and 15% of their compensation. However, a participant may not purchase more than shares during any one purchase period, and may not subscribe for more than $25,000 in fair market value of shares of our common stock (determined as of the date the offering period commences) in any calendar year in which the offering is in effect. Our compensation committee, in its discretion, may set a lower maximum amount of shares which may be purchased.

The purchase price for shares of our common stock purchased under the ESPP will be 85% of the lesser of the fair market value of our common stock on (i) the first trading day of the applicable offering period or (ii) the last trading day of each purchase period in the applicable offering period.

Once an employee becomes a participant in an offering period, the participant will be automatically enrolled in each subsequent offering period at the same contribution level. A participant may reduce his or her contribution in accordance with procedures set forth by the compensation committee and may withdraw from participation in the ESPP at any time prior the end of an offering period, or such other time as may be specified by the compensation committee. Upon withdrawal, the accumulated payroll deductions will be returned to the participant without interest.

Adjustments upon Recapitalization. If the number of outstanding shares of our common stock is changed by stock dividend, recapitalization, stock split, reverse stock split, subdivision, combination, reclassification or similar change in our capital structure without consideration, then our compensation committee will proportionately adjust the number and class of common stock that is available under the ESPP, the purchase price and number of shares any participant has elected to purchase as well as the maximum number of shares which may be purchased by participants.

Change of Control. If we experience a change of control transaction, any offering period that commenced prior to the closing of the proposed change of control transaction will be shortened and terminated on a new purchase date. The new purchase date will occur on or prior to the closing of the proposed change of control transaction, and our ESPP will then terminate on the closing of the proposed change of control.

Transferability. A participant may not assign, transfer, pledge or otherwise dispose of payroll deductions credited to his or her account, or any rights with regard to an election to purchase shares pursuant to the ESPP other than by will or the laws of descent or distribution.

Amendment; Termination. The compensation committee may amend, suspend or terminate the ESPP at any time without stockholder consent, except as required by law. Our ESPP will continue until the earlier to occur of (a) termination of the ESPP by the Board, (b) issuance of all of the shares reserved for issuance under the ESPP, or (c) the tenth anniversary of the effective date under the ESPP.

401(k) Plan

We sponsor a retirement savings plan that is intended to qualify for favorable tax treatment under Section 401(a) of the Code, and contains a cash or deferred feature that is intended to meet the requirements of Section 401(k) of the Code. Participants may make pre-tax and certain after-tax (Roth) salary deferral contributions to the plan from their eligible earnings up to the statutorily prescribed annual limit under the Code. Participants who are 50 years of age or older may contribute additional amounts based on the statutory limits for catch-up contributions. Participant contributions are held in trust as required by law. No minimum benefit is provided under the plan. An employee's interest in his or her salary deferral contributions is 100% vested when contributed. We have elected to match contributions equal to 50% of an employee's elective deferrals, with a cap of 6% of eligible earnings.

Other Benefits

Our named executive officers are eligible to participate in our employee benefit plans on the same basis as our other employees, including our health and welfare plans.

Limitations on Liability and Indemnification Matters

Our restated certificate of incorporation that will become effective in connection with the completion of this offering contains provisions that limit the liability of our directors for monetary damages to the fullest extent permitted by the Delaware General Corporation Law, or DGCL. Consequently, our directors will not be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duties as directors, except liability for:

- any breach of the director's duty of loyalty to us or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payments of dividends or unlawful stock repurchases or redemptions as provided in Section 174 of the DGCL; or
- any transaction from which the director derived an improper personal benefit.

Our restated certificate of incorporation and our restated bylaws that will become effective in connection with the completion of this offering require us to indemnify our directors and officers to the maximum extent not prohibited by the DGCL and allow us to indemnify other employees and agents as set forth in the DGCL.

We have entered, and intend to continue to enter, into separate indemnification agreements with our directors, officers and certain of our key employees, in addition to the indemnification provided for in our restated certificate of incorporation and restated bylaws. These agreements, among other things, require us to indemnify our directors, officers and key employees for certain expenses, including attorneys' fees, judgments, penalties, fines and settlement amounts actually incurred by these individuals in any action or proceeding arising out of their service to us or any of our subsidiaries or any other company or enterprise to which these individuals provide services at our request. Subject to certain limitations, our indemnification agreements also require us to advance expenses incurred by our directors, officers and key employees for the defense of any action for which indemnification is required or permitted.

We believe that these indemnification provisions and agreements are necessary to attract and retain qualified directors, officers and key employees. We also maintain directors' and officers' liability insurance.

The limitation of liability and indemnification provisions in our restated certificate of incorporation and restated bylaws may discourage stockholders from bringing a lawsuit against our directors and officers for breach of their fiduciary duty. They may also reduce the likelihood of derivative litigation against our directors and officers, even though an action, if successful, might benefit us and other stockholders. Further, a stockholder's investment may be adversely affected to the extent that we pay the costs of settlement and damage awards against directors and officers as required by these indemnification provisions.

At present, there is no pending litigation or proceeding involving any of our directors or executive officers as to which indemnification is required or permitted, and we are not aware of any threatened litigation or proceeding that may result in a claim for indemnification.

Insofar as indemnification for liabilities arising under the Securities Act of 1933, as amended, or Securities Act, may be permitted to directors, executive officers or persons controlling us, we have been informed that, in the opinion of the Securities and Exchange Commission, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

In addition to the compensation arrangements, including employment, termination of employment and change in control arrangements, with our directors and executive officers, including those discussed in the sections entitled "Management" and "Executive Compensation," the following is a description of each transaction since January 1, 2016 and each currently proposed transaction in which:

- we have been or are to be a participant;
- the amounts involved exceeded or will exceed the lesser of $120,000 and 1% of our total assets; and
- any of our directors, executive officers or holders of more than 5% of our capital stock, or an affiliate or immediate family member of the foregoing persons, had or will have a direct or indirect material interest.

Other than as described below, there have not been, nor are there any currently proposed, transactions or series of similar transactions to which we have been or will be a party other than compensation arrangements, which are described where required under the section entitled "Executive Compensation."

Series B Convertible Preferred Stock Financing

In September 2018, we sold an aggregate of 61,538,454 shares of our Series B convertible preferred stock at a purchase price of $1.30 per share for an aggregate purchase price of approximately $80.0 million. Each share of our Series B convertible preferred stock will convert automatically into one share of our common stock upon the completion of this offering.

The purchasers of our Series B convertible preferred stock are entitled to specified registration rights. For additional information, see "Description of Capital Stock — Registration Rights." The following table summarizes the Series B convertible preferred stock purchased by members of our board of directors or their affiliates and holders of more than 5% of our outstanding capital stock. The terms of these purchases were the same for all purchasers of our Series B convertible preferred stock. Please refer to the section titled "Principal Stockholders" for more details regarding the shares held by these entities.

Name of Stockholder	Shares of Series B Convertible Preferred Stock	Total Purchase Price ($)
Artal International SCA[1]	7,692,307	9,999,999
Entities related to EcoR1[2]	7,692,307	9,999,999
S.R. One, Limited[3]	4,842,668	6,295,468
Novo Holdings A/S[4]	11,538,461	14,999,999
Omega Fund V, L.P.[5]	11,538,461	14,999,999
Pfizer Inc.[6]	4,230,769	5,500,000
Entities related to Polaris[7]	2,150,360	2,795,468
Timothy A. Springer, Ph.D.[8]	7,846,153	10,199,999

(1) Artal International SCA holds more than 5% of our outstanding capital stock.

(2) Consists of 1,413,251 shares of Series B Preferred Stock held by EcoR1 Capital Fund, L.P. and 6,279,056 shares of Series B Preferred Stock held by EcoR1 Capital Fund Qualified, L.P. Together, they hold more than 5% of our outstanding capital stock.

(3) Vikas Goyal, a member of our board of directors, is a Principal at S.R. One, Limited.

(4) Nilesh Kumar, Ph.D., a member of our board of directors, is a partner at Novo Ventures (US), Inc., which is a wholly-owned subsidiary of Novo Holdings A/S.

(5) Otello Stampacchia, Ph.D., a member of our board of directors, is a Managing Director of Omega Funds.

(6) Barbara J. Dalton, Ph.D., a member of our board of directors, is the Vice President, WWBD and Senior Managing Partner of Pfizer Ventures, the venture capital arm of Pfizer Inc.

(7) Consists of 2,009,763 shares of Series B Preferred Stock held by Polaris Partners VII, L.P. and 140,597 shares of Series B Preferred Stock held by Polaris Entrepreneurs' Fund VII, L.P. Amir Nashat, a member of our board of directors, is a managing partner at Polaris Partners.

(8) Timothy A. Springer, Ph.D. is a member of our board of directors and holds more than 5% of our outstanding capital stock.

Series A Convertible Preferred Stock Financing

In three closings in June 2016, September 2017 and August 2018, we sold an aggregate of 49,047,619 shares of our Series A convertible preferred stock at a purchase price of $1.05 per share for an aggregate purchase price of approximately $51.5 million. Each share of our Series A convertible preferred stock will convert automatically into one share of our common stock upon the completion of this offering.

The purchasers of our Series A convertible preferred stock are entitled to specified registration rights. For additional information, see "Description of Capital Stock — Registration Rights." The following table summarizes the Series A convertible preferred stock purchased by members of our board of directors or their affiliates and holders of more than 5% of our outstanding capital stock. The terms of these purchases were the same for all purchasers of our Series A convertible preferred stock. Please refer to the section titled "Principal Stockholders" for more details regarding the shares held by these entities.

Name of Stockholder	Shares of Series A Convertible Preferred Stock	Total Purchase Price ($)
Gustav Christensen(1)	190,475	199,999
S.R. One, Limited(2)	8,571,428	8,999,999
Omega Fund V, L.P.(3)	5,000,000	5,250,000
Pfizer Ventures (US) LLC(4)	8,571,428	8,999,999
Entities related to Polaris(5)	7,713,328	8,098,994
Schrödinger, Inc.(6)	1,428,572	1,500,001
Timothy A. Springer, Ph.D.(7)	13,333,333	14,000,000

(1) Gustav Christensen is a member of our board of directors.

(2) Vikas Goyal, a member of our board of directors, is a Principal at S.R. One, Limited.

(3) Otello Stampacchia, Ph.D., a member of our board of directors, is a Managing Director of Omega Funds.

(4) Barbara J. Dalton, Ph.D., a member of our board of directors, is the Vice President, WWBD and Senior Managing Partner of Pfizer Ventures, the venture capital arm of Pfizer Inc.

(5) Consists of 7,209,008 shares of Series A Preferred Stock held by Polaris Partners VII, L.P. and 504,320 shares of Series A Preferred Stock held by Polaris Entrepreneurs' Fund VII, L.P. Amir Nashat, a member of our board of directors, is a managing partner at Polaris Partners.

(6) Ramy Farid, Ph.D., a member of our board of directors, serves as President and Chief Executive Officer of Schrödinger, Inc. and is a member of the Schrödinger, Inc. board of directors.

(7) Timothy A. Springer, Ph.D. is a member of our board of directors and holds more than 5% of our outstanding capital stock.

Series Seed Convertible Preferred Stock Financing

In January 2016, we sold an aggregate of 3,984,815 shares of our Series Seed convertible preferred stock at a purchase price of $0.75286 per share for an aggregate purchase price of approximately $3.0 million. Each share of our Series Seed convertible preferred stock will convert automatically into one share of our common stock upon the completion of this offering.

The purchasers of our Series Seed convertible preferred stock are entitled to specified registration rights. For additional information, see "Description of Capital Stock — Registration Rights." The following table summarizes the Series Seed convertible preferred stock purchased by members of our board of directors or their affiliates and holders of more than 5% of our outstanding capital stock. The terms of these purchases were the same for all purchasers of our Series Seed convertible preferred stock. Please refer to the section titled "Principal Stockholders" for more details regarding the shares held by these entities.

Name of Stockholder	Shares of Series Seed Convertible Preferred Stock	Total Purchase Price ($)
Gustav Christensen[1]	265,654	200,000
Entities related to Polaris[2]	960,376	723,027
Schrödinger, Inc.[3]	478,178	360,000
Timothy A. Springer, Ph.D.[4]	1,940,623	1,461,012
Praveen P. Tipirneni, M.D.[5]	132,827	100,000

(1) Gustav Christensen is a member of our board of directors.

(2) Consists of 897,584 shares of Series Seed Preferred Stock held by Polaris Partners VII, L.P. and 62,792 shares of Series Seed Preferred Stock held by Polaris Entrepreneurs' Fund VII, L.P. Amir Nashat, a member of our board of directors, is a managing partner at Polaris Partners.

(3) Ramy Farid, Ph.D., a member of our board of directors, serves as President and Chief Executive Officer of Schrödinger, Inc. and is a member of the Schrödinger, Inc. board of directors.

(4) Timothy A. Springer, Ph.D. is a member of our board of directors and holds more than 5% of our outstanding capital stock.

(5) Praveen P. Tipirneni, M.D. is our President and Chief Executive Officer and a member of our board of directors.

Transactions with Schrödinger, Inc. and Schrödinger, LLC

In June 2015, we entered into a collaboration agreement with Schrödinger, LLC, which we subsequently amended in March 2018 to explore drug targets selected by us. Under the collaboration Schrödinger will use its technology platform to perform virtual screens of members of the target class of human integrins, and we and Schrödinger will collaborate to facilitate prioritization of targets, perform target validation and analysis, identify leads and perform lead optimization. Schrödinger, LLC is a wholly-owned subsidiary of Schrödinger, Inc., of which Dr. Ramy Farid, one of our directors, serves as President and Chief Executive Officer and as a member of the Schrödinger, Inc. board of directors. Dr. Farid also holds approximately 1.67% of the outstanding shares of Schrödinger, Inc. Pursuant to the collaboration agreement, we have made two milestone payments to Schrödinger, LLC of $100,000 each in July 2017.

Additionally, Schrödinger, Inc. purchased shares of our Series Seed convertible preferred stock and shares of our Series A convertible preferred stock. For additional information, please see "— Series Seed Convertible Preferred Stock Financing" and "— Series A Convertible Preferred Stock Financing."

Transactions with Timothy A. Springer, Ph.D.

In June 2015, we entered into a consulting agreement, or the Springer Agreement, with Timothy A. Springer, Ph.D., a director on our Board and a beneficial owner of approximately 22% of our stock as of March 31, 2019, to provide advisory services related to our research and development programs, intellectual property development, strategic planning, our Scientific Advisory Board and other related services. Pursuant to the Springer Agreement, we pay an annual consulting fee of $80,000.

In April 2019, we granted to Dr. Springer a stock option to purchase 25,000 shares of our common stock, with an exercise price of $1.33 per share, in connection with his services as a member of our Scientific Advisory Board.

Investors' Rights Agreement

We have entered into an investors' rights agreement, dated December 5, 2018, with certain holders of our convertible preferred stock, including Artal International SCA, entities related to EcoR1, Gustav Christensen, Novo Holdings A/S , Omega Fund V., L.P., S.R. One, Limited, Pfizer Inc., entities related to Polaris, Praveen P. Tipirneni, M.D., Schrödinger, Inc. and Timothy A. Springer, Ph.D. These stockholders are entitled to rights with respect to the registration of their shares following this offering under the Securities Act of 1933, as amended. For a description of these registration rights, see the section entitled "Description of Capital Stock — Registration Rights."

Equity Grants to Executive Officers and Directors

We have granted stock options to our executive officers and certain directors, as more fully described in the sections entitled "Executive Compensation" and "Management — Non-Employee Director Compensation," respectively.

Director and Executive Officer Compensation

Please see the sections entitled "Management — Non-Employee Director Compensation" and "Executive Compensation" for information regarding the compensation of our directors and executive officers.

Employment Agreements

We intend to enter into amended and restated employment offer letters with our executive officers. For more information regarding these agreements, see the section entitled "Executive Compensation — Employee Offer Letters."

Indemnification Agreements

In connection with this offering, we intend to enter into new indemnification agreements with each of our directors and executive officers. The indemnification agreements, our restated certificate of incorporation and our restated bylaws will require us to indemnify our directors to the fullest extent not prohibited by Delaware law. Subject to certain limitations, our restated bylaws also require us to advance expenses incurred by our directors and officers. For more information regarding these agreements, see the section entitled "Executive Compensation — Limitations on Liability and Indemnification Matters" for information on our indemnification arrangements with our directors and executive officers.

Policies and Procedures for Related Party Transactions

In connection with this offering, we intend to adopt a written related person transactions policy that provides that our executive officers, directors, nominees for election as a director, beneficial owners of more than 5% of our common stock, and any members of the immediate family of and any entity affiliated with

any of the foregoing persons, are not permitted to enter into a material related person transaction with us without the review and approval of our audit committee, or a committee composed solely of independent directors in the event it is inappropriate for our audit committee to review such transaction due to a conflict of interest. We expect the policy to provide that any request for us to enter into a transaction with an executive officer, director, nominee for election as a director, beneficial owner of more than 5% of our common stock or with any of their immediate family members or affiliates in which the amount involved exceeds $120,000 will be presented to our audit committee (or the committee composed solely of independent directors, if applicable) for review, consideration and approval. In approving or rejecting any such proposal, we expect that our audit committee (or the committee composed solely of independent directors, if applicable) will consider the relevant facts and circumstances available and deemed relevant to the audit committee (or the committee composed solely of independent directors, if applicable), including, but not limited to, whether the transaction is on terms no less favorable than terms generally available to an unaffiliated third party under the same or similar circumstances and the extent of the related person's interest in the transaction.

PRINCIPAL STOCKHOLDERS

The following table and accompanying footnotes set forth certain information with respect to the beneficial ownership of our common stock at March 31, 2019, and as adjusted to reflect the shares of common stock to be issued and sold in this offering, for:

- each of our directors;
- each of our named executive officers;
- all of our current directors and executive officers as a group; and
- each person, or group of affiliated persons, who beneficially owned more than 5% of our outstanding shares of common stock.

We have determined beneficial ownership in accordance with the rules of the Securities and Exchange Commission, and the information is not necessarily indicative of beneficial ownership for any other purpose. Except as indicated by the footnotes below, we believe, based on information furnished to us, that the persons and entities named in the table below have sole voting and sole investment power with respect to all shares of common stock that they beneficially owned, subject to applicable community property laws.

Beneficial ownership prior to this offering is based on 137,593,380 shares of common stock outstanding as of March 31, 2019, assuming the automatic conversion of all outstanding shares of our convertible preferred stock into common stock in connection with this offering. Beneficial ownership after this offering is based on shares of common stock outstanding, assuming (i) the automatic conversion of all outstanding shares of our convertible preferred stock into common stock as described above and (ii) the issuance of shares of common stock in this offering.

In computing the number of shares of common stock beneficially owned by a person and the percentage ownership of that person, we deemed to be outstanding all shares of common stock subject to options held by that person or entity that are currently exercisable or that will become exercisable within 60 days of March 31, 2019. We did not deem these shares outstanding, however, for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated, the address of each beneficial owner listed in the table below is c/o Morphic Therapeutic, Inc., 35 Gatehouse Drive, A2, Waltham, Massachusetts 02451.

Name of Beneficial Owner	Beneficial Ownership Prior to this Offering		Beneficial Ownership After this Offering	
	Number	Percent	Number	Percent
Directors and Named Executive Officers:				
Praveen P. Tipirneni, M.D.(1)	4,226,165	3.1%		%
Bruce N. Rogers, Ph.D.(2)	1,275,908	*		
Alexey A. Lugovskoy, Ph.D.(3)	851,579	*		
Gustav Christensen(4)	586,129	*		
Barbara J. Dalton, Ph.D.(5)	—	—		
Ramy Farid, Ph.D(6)	4,868,800	3.5		
Vikas Goyal(7)	—	—		
Nilesh Kumar, Ph.D.(8)	—	—		
Amir Nashat(9)	12,816,474	9.3		
Timothy A. Springer, Ph.D.(10)	30,112,519	21.9		
Otello Stampacchia, Ph.D.(11)	16,538,461	12.0		
All executive officers and directors as a group (13 persons)(12)	71,914,087	52.1		
5% Stockholders:				
Artal International S.C.A.(13)	7,692,307	5.6		
EcoR 1 Capital Fund Entities(14)	7,692,307	5.6		
Novo Holdings A/S(8)	11,538,461	8.4		
Omega Fund V, L.P.(11)	16,538,461	12.0		
Pfizer Entities(5)	12,802,197	9.3		
Polaris Entities(10)	12,816,474	9.3		
Springer Entities(0)	30,112,519	21.9		
S.R. One, Limited(7)	13,414,096	9.8		

* Represents beneficial ownership of less than one percent.

(1) Represents (i) 3,944,603 shares of common stock, of which 977,831 shares are subject to a right of repurchase as of March 31, 2019, and (ii) 281,562 shares underlying options to purchase common stock that are exercisable within 60 days of March 31, 2019.

(2) Represents (i) 1,141,846 shares of common stock, of which 530,406 shares are subject to a right of repurchase as of March 31, 2019, and (ii) 134,062 shares underlying options to purchase common stock that are exercisable within 60 days of March 31, 2019.

(3) Represents (i) 762,413 shares of common stock, of which 357,066 shares are subject to a right of repurchase as of March 31, 2019, and (ii) 89,166 shares underlying options to purchase common stock that are exercisable within 60 days of March 31, 2019.

(4) Represents 586,129 shares of common stock, 27,084 of which are subject to our right of repurchase as of March 31, 2019.

(5) Represents (i) 4,230,769 shares of common stock held by Pfizer Inc., or Pfizer, and (ii) 8,571,428 shares held by Pfizer Ventures (US) Holdings, or Pfizer Ventures. Barbara J. Dalton, a member of our board of directors, is employed by Pfizer Ventures. Dr. Dalton has no voting or dispositive power over the shares held by Pfizer or Pfizer Ventures and disclaims beneficial ownership of all such shares. Each of these individuals disclaims beneficial ownership of the shares held by each of Pfizer and Pfizer Ventures except to the extent of their pecuniary interest therein. The address of Pfizer Inc. is 235 East 42nd Street, New York, New York 10017.

(6) Represents 4,868,800 shares of common stock held by Schrödinger, Inc., or Schrödinger. Ramy Farid, a member of our board of directors, is the President of Schrödinger and may be deemed to have sole voting and dispositive power over the

shares held by Schrödinger. Dr. Farid disclaims beneficial ownership of the shares held by Schrödinger. The address of Schrödinger is Frimley Road, Quatro House, Camberley GU16 7ER, United Kingdom.

(7) Represents 13,414,096 shares of common stock held by S.R. One, Limited, or S.R. One, a wholly-owned subsidiary of GlaxoSmithKline LLC, or GSK LLC. GSK LLC is an indirect wholly owned subsidiary of GlaxoSmithKline plc, or GSK plc. Vikas Goyal, a member of our board of directors, is a principal at S.R. One and an employee of GSK LLC. Mr. Goyal has no voting or dispositive power over the shares held by S.R. One and disclaims beneficial ownership of all such shares. The address of S.R. One Limited is 161 Washington Street, Suite 500, Conshohocken, Pennsylvania 19428.

(8) Represents 11,538,461 shares of common stock held by Novo Holdings A/S, or Novo. Nilesh Kumar, a member of our board of directors, is a partner of Novo Ventures (US) Inc., which is a wholly-owned subsidiary of Novo. Dr. Kumar has no voting or dispositive power over the shares held by Novo and disclaims beneficial ownership of all such shares. Viviane Monges, Jeppe Christiansen, Steen Riisgaard, Lars Rebien Sorensen, Jean-Luc Butel and Francis Cuss, the members of Novo's board of directors, may be deemed to share voting and dispositive power over the shares held by Novo. Each of such individuals disclaims beneficial ownership of all shares held by Novo. The address of Novo Holdings A/S is Tuborg Havnevej 19, 2900 Hellerup, Denmark.

(9) Represents (i) 11,978,495 shares of common stock held by Polaris Partners VII, L.P., or PP VII, and (ii) 837,979 shares of common stock held by Polaris Partners Entrepreneurs Fund VII, L.P., or PEF VII. Polaris Management Company VII, L.L.C., or PP GP VII, is the general partner of each of PP VII and PEF VII. PP GP VII may be deemed to have sole voting and investment power with respect to the shares owned by each of PP VII and PEF VII and disclaims beneficial ownership of these securities, except to the extent of its pecuniary interest therein. Amir Nashat, a member of our board of directors, Brian Chee, David Barrett, Bryce Youngren, Jonathan Flint and Terrance McGuire are the managing members of PP GP VII. Each of these managing members may be deemed to share voting and dispositive power over the shares held by each of PP VII and PEF VI. Each of these managing members disclaims beneficial ownership of such shares, except to the extent of their pecuniary interests therein. The address of Polaris Partners is One Marina Park Drive, 10th Floor, Boston, Massachusetts 02210.

(10) Represents (i) 26,620,109 shares of common stock held directly, (ii) 250,000 shares of common stock held by Dr. Springer's spouse, (iii) 1,250,000 shares of common stock held by Springer-Lu Family 2004 Irrevocable Trust dated March 29, 2004, Fiduciary Trust Company of New England LLC, Trustee, over which shares Dr. Springer has no voting or dispositive control, and (iv) 1,992,410 shares of common stock held by TAS Partners LLC, of which Dr. Springer is manager and has sole voting and dispositive control.

(11) Represents 16,538,461 shares of common stock held by Omega Fund V, L.P., or Omega L.P. Otello Stampacchia, a member of our board of directors, Richard Lim, Claudio Nessi and Anne-Mari Paster are the directors of Omega Fund V GP Manager, Ltd., or Omega Manager, which is the sole general partner of Omega Fund GP, L.P., or Omega GP, which is the sole general partner of Omega L.P. Messrs. Stampacchia, Lim and Nessi and Ms. Paster may be deemed to share voting and dispositive power over the shares held by Omega L.P. Each of such individuals, together with Omega GP and Omega Manager, disclaims beneficial ownership of the shares held by Omega L.P. except to the extent of their pecuniary interest therein. The address of Omega Fund V, L.P. is 185 Dartmouth Street, Suite 502, Boston, Massachusetts 02116.

(12) Represents (i) 71,342,318 shares of issued and outstanding common stock, of which 2,137,450 shares are subject to a right of repurchase as of March 31, 2019, and (ii) 571,769 shares underlying options to purchase common stock that are exercisable within 60 days of March 31, 2019.

(13) Represents 7,692,307 shares of common stock held by Artal International S.C.A., or Artal S.C.A. Artal International Management SA, or Artal Management, is the managing partner of Artal SCA. Stichting Administratiekantoor Westend, or Stichting, controls Westend SA, which controls Artal Group SA, which controls Artal Management. Pascal Minne, the sole Director of Stichting, may be deemed to have sole voting and dispositive power over the shares held by Artal S.C.A. Mr. Minne disclaims beneficial ownership of the shares held by Artal S.C.A. except to the extent of his pecuniary interest therein. The address of Artal International S.C.A. is 44, rue de la Vallee, L-2661, Luxembourg.

(14) Represents (i) 1,413,251 shares of common stock held by EcoR1 Capital Fund, L.P., or EcoR1 Capital, and (ii) 6,279,056 shares of common stock held by EcoR1 Capital Fund Qualified, L.P., or EcoR1 Qualified. EcoR1 Capital, LLC, or EcoR1 LLC, is the general partner of each of EcoR1 Capital and EcoR1 Qualified and may be deemed to indirectly beneficially own the shares held by each of EcoR1 Capital and EcoR1 Qualified. Oleg Nodelman is the managing member of EcoR1 and may be deemed to have sole voting and dispositive power over the shares held by EcoR1 Capital and EcoR1 Qualified. Mr. Nodelman disclaims beneficial ownership of the shares held by EcoR1 Capital and EcoR1 Qualified except to the extent of his pecuniary interest therein. The address of EcoR1 Capital and EcoR1 Qualified is 409 Illinois Street, San Francisco, California 94158.

DESCRIPTION OF CAPITAL STOCK

The following description summarizes the most important terms of our capital stock, as they will be in effect following this offering. Because it is only a summary, it does not contain all the information that may be important to you. We expect to adopt a restated certificate of incorporation and restated bylaws that will become effective upon the completion of this offering, and this description summarizes provisions that are expected to be included in these documents. For a complete description, you should refer to our restated certificate of incorporation and restated bylaws, which are included as exhibits to the registration statement of which this prospectus forms a part, and to the applicable provisions of Delaware law.

General

Upon the completion of this offering, our authorized capital stock will consist of shares of common stock, $0.0001 par value per share, and shares of undesignated preferred stock, $0.0001 par value per share.

Pursuant to the provisions of our current certificate of incorporation all of the outstanding convertible preferred stock will automatically convert into common stock in connection with the completion of this offering. Our Series Seed convertible preferred stock will convert at a ratio of 1:1, our Series A convertible preferred stock will convert at a ratio of 1:1 and our Series B convertible preferred stock will convert at a ratio of 1:1. Assuming the effectiveness of this conversion as of December 31, 2018, there were 137,593,380 shares of our common stock issued, held by approximately 75 stockholders of record, and no shares of our convertible preferred stock outstanding. Our board of directors is authorized, without stockholder approval, to issue additional shares of our capital stock.

Common Stock

Dividend Rights

Subject to preferences that may apply to any shares of preferred stock outstanding at the time, the holders of our common stock are entitled to receive dividends out of funds legally available if our board of directors, in its discretion, determines to issue dividends and then only at the times and in the amounts that our board of directors may determine. See the section entitled "Dividend Policy."

Voting Rights

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders. We have not provided for cumulative voting for the election of directors in our restated certificate of incorporation, which means that holders of a majority of the shares of our common stock will be able to elect all of our directors. Our restated certificate of incorporation will establish a classified board of directors, to be divided into three classes with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms.

No Preemptive or Similar Rights

Our common stock is not entitled to preemptive rights, and is not subject to conversion, redemption or sinking fund provisions.

Right to Receive Liquidation Distributions

Upon our liquidation, dissolution or winding-up, the assets legally available for distribution to our stockholders would be distributable ratably among the holders of our common stock and any participating preferred stock outstanding at that time, subject to prior satisfaction of all outstanding debt and liabilities and the preferential rights of and the payment of liquidation preferences, if any, on any outstanding shares of preferred stock.

Preferred Stock

Immediately prior to the completion of this offering, each outstanding share of preferred stock will be converted into one share of common stock.

Following the completion of this offering, our board of directors will be authorized, subject to limitations prescribed by Delaware law, to issue preferred stock in one or more series, to establish from time to time the number of shares to be included in each series and to fix the designation, powers, preferences and rights of the shares of each series and any of their qualifications, limitations or restrictions, in each case without further vote or action by our stockholders. Our board of directors will also be able to increase or decrease the number of shares of any series of preferred stock, but not below the number of shares of that series then outstanding, without any further vote or action by our stockholders. Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control of our company and might adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. We have no current plan to issue any shares of preferred stock.

Warrants

As of December 31, 2018, we had outstanding the following warrant to purchase shares of our capital stock:

Type of Capital Stock Underlying Warrant	Total Number of Shares Subject to Warrant	Exercise Price Per Share($)	Issuance Date
Series Seed[(1)]	39,800	0.75268	3/31/2016

(1) The exercise price of this warrant may be paid either in cash or by surrendering the right to receive shares having a value equal to the exercise price. This warrant will convert into a warrant to receive 39,800 shares of our common stock upon the completion of this offering and will expire on March 30, 2026.

Stock Options

As of December 31, 2018, we had outstanding options to purchase an aggregate 10,417,696 shares of our common stock, with an exercise price of $0.74.

Registration Rights

Pursuant to the terms of our amended and restated investors' rights agreement, immediately following this offering, the holders of shares of our common stock will be entitled to rights with respect to the registration of these shares under the Securities Act of 1933, as amended, or the Securities Act, as described below. We refer to these shares collectively as registrable securities.

Demand Registration Rights

Beginning 180 days after the completion of this offering, if the holders of not less than 40% of the then-outstanding registrable securities may request the registration under the Securities Act of any registrable securities, if the anticipated aggregate offering price, net of selling expenses, would exceed $10.0 million, we are obligated to provide notice of such request to all holders of registration rights and, as soon as practicable and in any event within 60 days, file a Form S-1 registration statement under the Securities Act covering all registrable securities that the initiating holders requested to be registered and any additional registrable securities requested to be included in such registration by any other holders. We

are only required to file two registration statements that are declared effective upon exercise of these demand registration rights. We may postpone taking action with respect to such filing not more than twice during any 12-month period for a period of not more than 120 days, if after receiving a request for registration, we furnish to the holders requesting such registration a certificate signed by our Chief Executive Officer stating that, in the good faith judgment of our board of directors, it would be materially detrimental to us and our stockholders.

Form S-3 Registration Rights

The holders of at least 10% of the then-outstanding registrable securities can request that we register all or part of their shares on Form S-3 if we are eligible to file a registration statement on Form S-3 and if the aggregate price to the public of the shares offered, net of selling expenses, is at least $3.0 million. The stockholders may only require us to effect two registration statements on Form S-3 in a 12-month period. We may postpone taking action with respect to such filing twice during any 12-month period for a period of not more than 120 days if our board of directors determines in its good faith judgment that the filing would be materially detrimental to us and our stockholders.

Piggyback Registration Rights

If we register any of our securities for public sale, holders of then-outstanding registrable securities or their permitted transferees will have the right to include their registrable securities in the registration statement. However, this right does not apply to a registration relating to any of our employee benefit plans, a corporate reorganization or transaction under Rule 145 of the Securities Act, a registration that requires information that is not substantially the same, or a registration in which the only common stock being registered is common stock issuable upon conversion of debt securities that are also being registered. In an underwritten offering, if the total number of securities requested by stockholders to be included in the offering exceeds the number of securities to be sold (other than by the us) that the underwriters determine in their reasonable discretion is compatible with the success of the offering, then we will be required to include only that number of securities that the underwriters and us, in our sole discretion, determine will not jeopardize the success of the offering. If the underwriters determine that less than all the securities requested to be registered cab be included in the offering, the number of shares to be registered will be apportioned pro rata among the selling holders, according to the total number of registrable securities owned by each holder, or in a manner mutually agreed upon by all such selling holders. However, the number of shares to be registered by these holders cannot be reduced unless all other securities (other than the securities to be sold by us) are excluded entirely and may not be reduced below 30% of the total number of securities included in such offering, except for in connection with an initial public offering, in which case the underwriters may exclude these holders entirely.

Expenses of Registration Rights

We generally will pay all expenses, other than underwriting discounts, selling commissions and stock transfer taxes incurred in connection with each of the registrations described above, including the fees and disbursements, not to exceed $75,000, of one counsel for the selling holders.

Expiration of Registration Rights

The registration rights described above will expire, with respect to any particular holder of these rights, on the earliest to occur of (a) the closing of a deemed liquidation event, as defined in our restated certificate of incorporation, (b) at such time that all of the holder's registrable securities can be sold without limitation in any three-month period without registration in compliance with Rule 144 or a similar exemption under the Securities Act and (c) seven years following the completion of this offering.

Anti-Takeover Provisions

The provisions of Delaware General Corporation Law, or DGCL, our restated certificate of incorporation and our restated bylaws, as we expect they will be in effect upon the completion of this offering, could have the effect of delaying, deferring or discouraging another person from acquiring control of our company. These provisions, which are summarized below, may have the effect of discouraging takeover bids. They are also

designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us because negotiation of these proposals could result in an improvement of their terms.

Delaware Law

We are subject to the provisions of Section 203 of the DGCL regulating corporate takeovers. In general, Section 203 prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a period of three years following the date on which the person became an interested stockholder unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, but not the outstanding voting stock owned by the interested stockholder, (i) shares owned by persons who are directors and also officers and (ii) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- at or subsequent to the date of the transaction, the business combination is approved by the board of directors of the corporation and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66.67% of the outstanding voting stock that is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction or series of transactions together resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting stock. We expect the existence of this provision to have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. We also anticipate that Section 203 may also discourage attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

Restated Certificate of Incorporation and Restated Bylaw Provisions

Our restated certificate of incorporation and our restated bylaws, as we expect they will be in effect upon the completion of this offering, include a number of provisions that could deter hostile takeovers or delay or prevent changes in control of our company, including the following:

- *Board of Directors Vacancies.* Our restated certificate of incorporation and restated bylaws will authorize only our board of directors to fill vacant directorships, including newly created seats. In addition, the number of directors constituting our board of directors is permitted to be set only by a resolution adopted by a majority vote of our entire board of directors. These provisions would prevent a stockholder from increasing the size of our board of directors and then gaining control of our board of directors by filling the resulting vacancies with its own nominees. This makes it more difficult to change the composition of our board of directors but promotes continuity of management.
- *Classified Board.* Our restated certificate of incorporation and restated bylaws will provide that our board of directors is classified into three classes of directors, each with staggered three-year terms. A third party may be discouraged from making a tender offer or otherwise attempting to obtain control of us as it is more difficult and time consuming for stockholders to replace a majority of the directors on a classified board of directors. See the section entitled "Management — Board Composition."

- *Stockholder Action; Special Meetings of Stockholders.* Our restated certificate of incorporation will provide that our stockholders may not take action by written consent, but may only take action at annual or special meetings of our stockholders. As a result, a holder controlling a majority of our capital stock would not be able to amend our restated bylaws or remove directors without holding a meeting of our stockholders called in accordance with our restated bylaws. Further, our restated bylaws will provide that special meetings of our stockholders may be called only by a majority of our board of directors, the chairman of our board of directors, our Chief Executive Officer or our President, thus prohibiting a stockholder from calling a special meeting. These provisions might delay the ability of our stockholders to force consideration of a proposal or for stockholders controlling a majority of our capital stock to take any action, including the removal of directors.

- *Advance Notice Requirements for Stockholder Proposals and Director Nominations.* Our restated bylaws will provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. Our restated bylaws also will specify certain requirements regarding the form and content of a stockholder's notice. These provisions might preclude our stockholders from bringing matters before our annual meeting of stockholders or from making nominations for directors at our annual meeting of stockholders if the proper procedures are not followed. We expect that these provisions might also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

- *No Cumulative Voting.* The DGCL provides that stockholders are not entitled to the right to cumulate votes in the election of directors unless a corporation's certificate of incorporation provides otherwise. Our restated certificate of incorporation and restated bylaws will not provide for cumulative voting.

- *Directors Removed Only for Cause.* Our restated certificate of incorporation will provide that stockholders may remove directors only for cause and only by the affirmative vote of the holders of at least two-thirds of our outstanding common stock.

- *Amendment of Charter Provisions.* Any amendment of the above expected provisions in our restated certificate of incorporation would require approval by holders of at least two-thirds of our outstanding common stock.

- *Issuance of Undesignated Preferred Stock.* Our board of directors has the authority, without further action by the stockholders, to issue up to shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by our board of directors. The existence of authorized but unissued shares of preferred stock would enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by merger, tender offer, proxy contest or other means.

- *Choice of Forum.* Our restated certificate of incorporation will provide that, to the fullest extent permitted by law, the Court of Chancery of the State of Delaware will be the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the DGCL, our restated certificate of incorporation or our restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable.

Transfer Agent and Registrar

Upon the completion of this offering, the transfer agent and registrar for our common stock will be Computershare Trust Company, N.A. The transfer agent's address is 250 Royall Street, Canton, Massachusetts 02021, and its telephone number is (800) 962-4284.

The Nasdaq Global Market Listing

We intend to apply to have our common stock approved for listing on The Nasdaq Global Market under the symbol "MORF."

SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for our common stock, and we cannot predict the effect, if any, that market sales of shares of our common stock or the availability of shares of our common stock for sale will have on the market price of our common stock prevailing from time to time. Nevertheless, sales of substantial amounts of our common stock, including shares issued upon exercise of outstanding options and warrants, in the public market following this offering could adversely affect market prices prevailing from time to time and could impair our ability to raise capital through the sale of our equity securities.

Upon the completion of this offering, we will have a total of shares of our common stock outstanding, assuming (i) the automatic conversion of all outstanding shares of our convertible preferred stock into an aggregate of shares of our common stock and (ii) the issuance of shares of common stock in this offering. Of these outstanding shares, all of the shares of common stock sold in this offering will be freely tradable, except that any shares purchased in this offering by our affiliates, as that term is defined in Rule 144 under the Securities Act of 1933, as amended, or the Securities Act, can only be sold in compliance with the Rule 144 limitations described below or in compliance with the lock-up agreements.

The remaining outstanding shares of our common stock will be deemed "restricted securities" as defined in Rule 144. Restricted securities may be sold in the public market only if they are registered under the Securities Act or if they qualify for an exemption from registration under Rule 144 or Rule 701 promulgated under the Securities Act, which rules are summarized below. In addition, substantially all of our security holders have, or will have, entered into market standoff agreements with us or lock-up agreements with the underwriters under which they have agreed, subject to specific exceptions, not to sell any of our stock for at least 180 days following the date of this prospectus, as described below. As a result of these agreements and the provisions of our amended and restated investors' rights agreement described above under the section entitled "Description of Capital Stock — Registration Rights," subject to the provisions of Rule 144 or Rule 701, shares will be available for sale in the public market as follows:

- beginning on the date of this prospectus, all of the shares sold in this offering will be immediately available for sale in the public market; and
- beginning 181 days after the date of this prospectus, additional shares will become eligible for sale in the public market, of which shares will be held by affiliates and subject to the volume and other restrictions of Rule 144, as described below.

Lock-Up/Market Standoff Agreements

All of our directors and officers and substantially all of our security holders are, or will be, subject to lock-up agreements or market standoff provisions that prohibit them from offering for sale, selling, contracting to sell, granting any option for the sale of, transferring or otherwise disposing of any shares of our common stock, options or warrants to acquire shares of our common stock or any security or instrument related to our common stock, or entering into any swap, hedge or other arrangement that transfers any of the economic consequences of ownership of our common stock, for a period of 180 days following the date of this prospectus without the prior written consent of Jefferies LLC and Cowen and Company, LLC, subject to certain exceptions. Jefferies LLC and Cowen and Company, LLC may, in their sole discretion and at any time or from time to time before the termination of the 180-day period release all or any portion of the securities subject to lock-up agreements. See the section entitled "Underwriting."

Rule 144

In general, under Rule 144 as currently in effect, once we have been subject to public company reporting requirements for at least 90 days, a person who is not deemed to have been one of our affiliates for

purposes of the Securities Act at any time during the three months preceding a sale and who has beneficially owned the shares proposed to be sold for at least six months, including the holding period of any prior owner other than our affiliates, is entitled to sell those shares without complying with the manner of sale, volume limitation or notice provisions of Rule 144, subject to compliance with the public information requirements of Rule 144. If such a person has beneficially owned the shares proposed to be sold for at least one year, including the holding period of any prior owner other than our affiliates, then that person would be entitled to sell those shares without complying with any of the requirements of Rule 144.

In general, under Rule 144, as currently in effect, our affiliates or persons selling shares on behalf of our affiliates are entitled to sell upon expiration of the lock-up and market standoff agreements described above, within any three-month period, a number of shares that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately shares immediately after this offering; or
- the average reported weekly trading volume of our common stock during the four calendar weeks preceding the filing of a notice on Form 144 with respect to that sale.

Sales under Rule 144 by our affiliates or persons selling shares on behalf of our affiliates are also subject to certain manner of sale provisions and notice requirements and to the availability of current public information about us.

Rule 701

Rule 701 generally allows a stockholder who purchased shares of our common stock pursuant to a written compensatory plan or contract and who is not deemed to have been an affiliate of our company during the immediately preceding three months to sell these shares in reliance upon Rule 144, but without being required to comply with the public information, holding period, volume limitation or notice provisions of Rule 144. Rule 701 also permits affiliates of our company to sell their Rule 701 shares under Rule 144 without complying with the holding period requirements of Rule 144. All holders of Rule 701 shares, however, are required by that rule to wait until 90 days after the date of this prospectus before selling those shares pursuant to Rule 701 and are subject to the lock-up and market standoff agreements described above.

Form S-8 Registration Statement

In connection with this offering, we intend to file a registration statement on Form S-8 under the Securities Act covering all of the shares of our common stock subject to outstanding options and the shares of our common stock reserved for issuance under our stock plans. We expect to file this registration statement as soon as permitted under the Securities Act. However, the shares registered on Form S-8 may be subject to the volume limitations and the manner of sale, notice and public information requirements of Rule 144 and will not be eligible for resale until expiration of the lock-up and market standoff agreements to which they are subject.

Registration Rights

We have granted demand, piggyback and Form S-3 registration rights to certain of our stockholders to sell our common stock. Registration of the sale of these shares under the Securities Act would result in these shares becoming freely tradable without restriction under the Securities Act immediately upon the effectiveness of the registration, except for shares purchased by affiliates. For a further description of these rights, see the section entitled "Description of Capital Stock — Registration Rights."

MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS

The following summary describes the material U.S. federal income tax consequences of the acquisition, ownership and disposition of our common stock acquired in this offering by Non-U.S. Holders (as defined below). This discussion does not address all aspects of U.S. federal income taxes, does not discuss the potential application of the alternative minimum tax or Medicare Contribution tax on net investment income and does not deal with state or local taxes, U.S. federal gift and estate tax laws, except to the limited extent provided below, or any non-U.S. tax consequences that may be relevant to Non-U.S. Holders in light of their particular circumstances.

Special rules different from those described below may apply to certain Non-U.S. Holders that are subject to special treatment under the Internal Revenue Code of 1986, as amended, or the Code, such as:

- insurance companies, banks and other financial institutions;
- tax-exempt organizations (including private foundations) and tax-qualified retirement plans;
- foreign governments and international organizations;
- broker-dealers and traders in securities;
- U.S. expatriates and certain former citizens or long-term residents of the United States;
- persons required for U.S. federal income tax purposes to conform the timing of income accruals to their financial statements under Section 451(b) of the Code;
- persons that own, or are deemed to own, more than 5% of our capital stock;
- "controlled foreign corporations," "passive foreign investment companies" and corporations that accumulate earnings to avoid U.S. federal income tax;
- persons that hold our common stock as part of a "straddle," "hedge," "conversion transaction," "synthetic security" or integrated investment or other risk reduction strategy;
- persons who do not hold our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, for investment purposes); and
- partnerships and other pass-through entities, and investors in such pass-through entities (regardless of their places of organization or formation).

Such Non-U.S. Holders are urged to consult their own tax advisors to determine the U.S. federal, state, local and other tax consequences that may be relevant to them.

Furthermore, the discussion below is based upon the provisions of the Code, and U.S. Treasury Regulations, rulings and judicial decisions thereunder as of the date hereof, and such authorities may be repealed, revoked or modified, possibly retroactively, and are subject to differing interpretations which could result in U.S. federal income tax consequences different from those discussed below. We have not requested a ruling from the Internal Revenue Service, or the IRS, with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS will agree with such statements and conclusions or will not take a contrary position regarding the tax consequences described herein, or that any such contrary position would not be sustained by a court.

PERSONS CONSIDERING THE PURCHASE OF OUR COMMON STOCK PURSUANT TO THIS OFFERING SHOULD CONSULT THEIR OWN TAX ADVISORS CONCERNING THE U.S. FEDERAL INCOME TAX CONSEQUENCES OF ACQUIRING, OWNING AND DISPOSING OF OUR COMMON STOCK IN LIGHT OF THEIR PARTICULAR SITUATIONS AS WELL AS ANY CONSEQUENCES ARISING UNDER THE LAWS OF ANY OTHER TAXING JURISDICTION, INCLUDING ANY STATE, LOCAL OR NON-U.S. TAX CONSEQUENCES OR ANY U.S. FEDERAL NON-INCOME TAX CONSEQUENCES, AND THE POSSIBLE APPLICATION OF TAX TREATIES. IN ADDITION, SIGNIFICANT CHANGES IN U.S. FEDERAL TAX LAWS WERE RECENTLY ENACTED. PROSPECTIVE INVESTORS SHOULD ALSO CONSULT WITH THEIR TAX ADVISORS WITH

RESPECT TO SUCH CHANGES IN U.S. TAX LAW AS WELL AS POTENTIAL CONFORMING CHANGES IN STATE TAX LAWS.

For the purposes of this discussion, a "Non-U.S. Holder" is a beneficial owner of common stock that is not a U.S. Holder or a partnership for U.S. federal income tax purposes. A "U.S. Holder" means a beneficial owner of our common stock that is, for U.S. federal income tax purposes, (a) an individual citizen or resident of the United States, (b) a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes), created or organized in or under the laws of the United States, any state thereof or the District of Columbia, (c) an estate the income of which is subject to U.S. federal income taxation regardless of its source, or (d) a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons (within the meaning of Section 7701(a)(30) of the Code) have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury Regulations to be treated as a U.S. person.

If you are an individual non-U.S. citizen, you may, in some cases, be deemed to be a resident alien (as opposed to a nonresident alien) by virtue of being present in the United States for at least 31 days in the calendar year and for an aggregate of at least 183 days during a three-year period ending in the current calendar year. Generally, for this purpose, all the days present in the current year, one-third of the days present in the immediately preceding year, and one-sixth of the days present in the second preceding year, are counted.

Resident aliens are generally subject to U.S. federal income tax as if they were U.S. citizens. Individuals who are uncertain of their status as resident or nonresident aliens for U.S. federal income tax purposes are urged to consult their own tax advisors regarding the U.S. federal income tax consequences of the ownership or disposition of our common stock.

Distributions

We do not expect to make any distributions on our common stock in the foreseeable future. If we do make distributions on our common stock, however, such distributions made to a Non-U.S. Holder of our common stock will constitute dividends for U.S. tax purposes to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital that is applied against and reduces, but not below zero, a Non-U.S. Holder's adjusted tax basis in our common stock. Any remaining excess will be treated as gain realized on the sale or exchange of our common stock as described below under the section entitled "— Gain on Disposition of Our Common Stock."

Any distribution on our common stock that is treated as a dividend paid to a Non-U.S. Holder that is not effectively connected with the holder's conduct of a trade or business in the United States will generally be subject to withholding tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and the Non-U.S. Holder's country of residence. To obtain a reduced rate of withholding under a treaty, a Non-U.S. Holder generally will be required to provide the applicable withholding agent with a properly executed IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate form, certifying the Non-U.S. Holder's entitlement to benefits under that treaty. Such form must be provided prior to the payment of dividends and must be updated periodically. If a Non-U.S. Holder holds stock through a financial institution or other agent acting on the holder's behalf, the holder will be required to provide appropriate documentation to such agent. The holder's agent may then be required to provide certification to the applicable withholding agent, either directly or through other intermediaries. If you are eligible for a reduced rate of U.S. withholding tax under an income tax treaty, you should consult with your own tax advisor to determine if you are able to obtain a refund of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS.

We generally are not required to withhold tax on dividends paid to a Non-U.S. Holder that are effectively connected with the holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, are attributable to a permanent establishment that the holder maintains in the United States) if a properly executed IRS Form W-8ECI, stating that the dividends are so connected, is furnished to us (or, if stock is held through a financial institution or other agent, to the applicable withholding agent). In general, such effectively connected dividends will be subject to U.S. federal income tax on a net income basis at the regular graduated rates applicable to U.S. persons. A corporate Non-U.S. Holder receiving effectively connected dividends may also be subject to an additional "branch profits tax," which is imposed, under certain circumstances, at a rate of 30% (or such lower rate as may be specified by an applicable treaty) on the corporate Non-U.S. Holder's effectively connected earnings and profits, subject to certain adjustments.

See also the section below entitled "— Foreign Accounts" for additional withholding rules that may apply to dividends paid to certain foreign financial institutions or non-financial foreign entities.

Gain on Disposition of Our Common Stock

Subject to the discussions below under the sections entitled "— Backup Withholding and Information Reporting," a Non-U.S. Holder generally will not be subject to U.S. federal income or withholding tax with respect to gain realized on a sale or other disposition of our common stock unless (a) the gain is effectively connected with a trade or business of the holder in the United States (and, if required by an applicable income tax treaty, is attributable to a permanent establishment that the holder maintains in the United States), (b) the Non-U.S. Holder is a nonresident alien individual and is present in the United States for 183 or more days in the taxable year of the disposition and certain other conditions are met, or (c) we are or have been a "United States real property holding corporation" within the meaning of Code Section 897(c)(2) at any time within the shorter of the five-year period preceding such disposition or the holder's holding period in the common stock.

If you are a Non-U.S. Holder described in (a) above, you will be required to pay tax on the net gain derived from the sale at the regular graduated U.S. federal income tax rates applicable to U.S. persons. Corporate Non-U.S. Holders described in (a) above may also be subject to the additional branch profits tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty. If you are an individual Non-U.S. Holder described in (b) above, you will be required to pay a flat 30% tax on the gain derived from the sale, which gain may be offset by certain U.S. source capital losses (even though you are not considered a resident of the United States), provided you have timely filed U.S. federal income tax returns with respect to such losses. With respect to (c) above, in general, we would be a United States real property holding corporation if U.S. real property interests as defined in the Code and the U.S. Treasury Regulations comprised (by fair market value) at least half of our worldwide real property interests plus our other assets used or held for use in a trade or business. We believe that we are not, and do not anticipate becoming, a United States real property holding corporation. However, there can be no assurance that we will not become a United States real property holding corporation in the future. Even if we were to be treated as a U.S. real property holding corporation, gain realized by a Non-U.S. Holder on a disposition of our common stock would not be subject to U.S. federal income tax so long as (1) the Non-U.S. Holder owned, directly, indirectly or constructively, no more than five percent of our common stock at all times within the shorter of (i) the five-year period preceding the disposition or (ii) the holder's holding period and (2) our common stock is regularly traded on an established securities market. There can be no assurance that our common stock will qualify as regularly traded on an established securities market.

U.S. Federal Estate Tax

The estates of nonresident alien individuals generally are subject to U.S. federal estate tax on property with a U.S. situs. Because we are a U.S. corporation, our common stock will be U.S. situs property and, therefore, will be included in the taxable estate of a nonresident alien decedent, unless an applicable estate

tax treaty between the United States and the decedent's country of residence provides otherwise. The terms "resident" and "nonresident" are defined differently for U.S. federal estate tax purposes than for U.S. federal income tax purposes. Investors are urged to consult their own tax advisors regarding the U.S. federal estate tax consequences of the ownership or disposition of our common stock.

Backup Withholding and Information Reporting

Generally, we or certain financial middlemen must report information to the IRS with respect to any dividends we pay on our common stock including the amount of any such dividends, the name and address of the recipient, and the amount, if any, of tax withheld. A similar report is sent to the holder to whom any such dividends are paid. Pursuant to tax treaties or certain other agreements, the IRS may make its reports available to tax authorities in the recipient's country of residence.

Dividends paid by us (or our paying agents) to a Non-U.S. Holder may also be subject to U.S. backup withholding. U.S. backup withholding generally will not apply to a Non-U.S. Holder who provides a properly executed IRS Form W-8BEN or IRS Form W-8BEN-E, as applicable, or otherwise establishes an exemption, provided that the applicable withholding agent does not have actual knowledge or reason to know the holder is a U.S. person.

Under current U.S. federal income tax law, U.S. information reporting and backup withholding requirements generally will apply to the proceeds of a disposition of our common stock effected by or through a U.S. office of any broker, U.S. or non-U.S., unless the Non-U.S. Holder provides a properly executed IRS Form W-8BEN or IRS Form W-8BEN-E, as applicable, or otherwise meets documentary evidence requirements for establishing non-U.S. person status or otherwise establishes an exemption. Generally, U.S. information reporting and backup withholding requirements will not apply to a payment of disposition proceeds to a Non-U.S. Holder where the transaction is effected outside the United States through a non-U.S. office of a non-U.S. broker. Information reporting and backup withholding requirements may, however, apply to a payment of disposition proceeds if the broker has actual knowledge, or reason to know, that the holder is, in fact, a U.S. person. For information reporting purposes, certain brokers with substantial U.S. ownership or operations will generally be treated in a manner similar to U.S. brokers.

Backup withholding is not an additional tax. If backup withholding is applied to you, you should consult with your own tax advisor to determine whether you have overpaid your U.S. federal income tax, and whether you are able to obtain a tax refund or credit of the overpaid amount.

Foreign Accounts

In addition, U.S. federal withholding taxes may apply under the Foreign Account Tax Compliance Act, or FATCA, on certain types of payments, including dividends paid to non-U.S. financial institutions and certain other non-U.S. entities. Specifically, a 30% withholding tax may be imposed on dividends on our common stock paid to a "foreign financial institution" or a "non-financial foreign entity" (each as defined in the Code), unless (1) the foreign financial institution agrees to undertake certain diligence and reporting obligations, (2) the non-financial foreign entity either certifies it does not have any "substantial United States owners" (as defined in the Code) or furnishes identifying information regarding each substantial United States owner, or (3) the foreign financial institution or non-financial foreign entity otherwise qualifies for an exemption from these rules. The 30% federal withholding tax described in this paragraph cannot be reduced under an income tax treaty with the United States. If the payee is a foreign financial institution and is subject to the diligence and reporting requirements in (1) above, it must enter into an agreement with the U.S. Department of the Treasury requiring, among other things, that it undertake to identify accounts held by certain "specified United States persons" or "United States-owned foreign entities" (each as defined in the Code), annually report certain information about such accounts, and withhold 30% on certain payments to non-compliant foreign financial institutions and certain other account holders. Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United

States governing FATCA may be subject to different rules. Under the applicable Treasury Regulations and administrative guidance, withholding under FATCA generally also would apply to payments of gross proceeds from the sale or other disposition of common stock on or after January 1, 2019. Under recently proposed regulations, however, no withholding will apply with respect to payments of gross proceeds. The preamble to the proposed regulations specifies that taxpayers are permitted to rely on such proposed regulations pending finalization.

Prospective investors should consult their tax advisors regarding the potential application of withholding under FATCA to their investment in our common stock.

EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAW, AS WELL AS TAX CONSEQUENCES ARISING UNDER ANY STATE, LOCAL, NON-U.S. OR U.S. FEDERAL NON-INCOME TAX LAWS SUCH AS ESTATE AND GIFT TAX.

UNDERWRITING

Subject to the terms and conditions set forth in the underwriting agreement, dated , 2019, by and among us and Jefferies LLC, Cowen and Company, LLC, BMO Capital Markets Corp. and Wells Fargo Securities, LLC, as the representatives of the underwriters named below, we have agreed to sell to the underwriters, and each of the underwriters has agreed, severally and not jointly, to purchase from us, the respective number of shares of common stock shown opposite its name below:

Underwriter	Number of Shares
Jefferies LLC	
Cowen and Company, LLC	
BMO Capital Markets Corp.	
Wells Fargo Securities, LLC	
Total	

The underwriting agreement provides that the obligations of the several underwriters are subject to certain conditions precedent such as the receipt by the underwriters of officers' certificates and legal opinions and approval of certain legal matters by their counsel. The underwriting agreement provides that the underwriters will purchase all of the shares of common stock if any of them are purchased. If an underwriter defaults, the underwriting agreement provides that the purchase commitments of the nondefaulting underwriters may be increased or the underwriting agreement may be terminated. We have agreed to indemnify the underwriters and certain of their controlling persons against certain liabilities, including liabilities under the Securities Act, and to contribute to payments that the underwriters may be required to make in respect of those liabilities.

The underwriters have advised us that, following the completion of this offering, they currently intend to make a market in the common stock as permitted by applicable laws and regulations. However, the underwriters are not obligated to do so, and the underwriters may discontinue any market-making activities at any time without notice in their sole discretion. Accordingly, no assurance can be given as to the liquidity of the trading market for the common stock, that you will be able to sell any of the common stock held by you at a particular time or that the prices that you receive when you sell will be favorable.

The underwriters are offering the shares of common stock subject to their acceptance of the shares of common stock from us and subject to prior sale. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Commission and Expenses

The underwriters have advised us that they propose to offer the shares of common stock to the public at the initial public offering price set forth on the cover page of this prospectus and to certain dealers, which may include the underwriters, at that price less a concession not in excess of $ per share of common stock. After the offering, the initial public offering price and concession to dealers may be reduced by the representatives. No such reduction will change the amount of proceeds to be received by us as set forth on the cover page of this prospectus.

The following table shows the public offering price, the underwriting discounts and commissions that we are to pay the underwriters and the proceeds, before expenses, to us in connection with this offering. Such amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Per Share		Total	
	Without Option to Purchase Additional Shares	With Option to Purchase Additional Shares	Without Option to Purchase Additional Shares	With Option to Purchase Additional Shares
Public offering price	$	$	$	$
Underwriting discounts and commissions paid by us	$	$	$	$
Proceeds to us, before expenses	$	$	$	$

We estimate expenses payable by us in connection with this offering, other than the underwriting discounts and commissions referred to above, will be approximately $. We have also agreed to reimburse the underwriters for certain of their expenses in an amount up to $.

Determination of Offering Price

Prior to this offering, there has not been a public market for our common stock. Consequently, the initial public offering price for our common stock will be determined by negotiations between us and the representatives. Among the factors to be considered in these negotiations will be prevailing market conditions, our financial information, market valuations of other companies that we and the underwriters believe to be comparable to us, estimates of our business potential, the present state of our development and other factors deemed relevant.

We offer no assurances that the initial public offering price will correspond to the price at which the common stock will trade in the public market subsequent to the offering or that an active trading market for the common stock will develop and continue after the offering.

Listing

We intend to apply to have our common stock approved for listing on The Nasdaq Global Market under the trading symbol "MORF."

Option to Purchase Additional Shares

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus, to purchase, from time to time, in whole or in part, up to an aggregate of shares from us at the public offering price set forth on the cover page of this prospectus, less underwriting discounts and commissions. If the underwriters exercise this option, each underwriter will be obligated, subject to specified conditions, to purchase a number of additional shares proportionate to that underwriter's initial purchase commitment as indicated in the table above. This option may be exercised only if the underwriters sell more shares than the total number set forth on the cover page of this prospectus.

No Sales of Similar Securities

We, our officers, directors and holders of all or substantially all our outstanding capital stock and other securities have agreed, subject to specified exceptions, not to directly or indirectly:

- sell, offer, contract or grant any option to sell (including any short sale), pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-l(h) under the Securities Exchange Act of 1934, as amended, or
- otherwise dispose of any shares of common stock, options or warrants to acquire shares of common stock, or securities exchangeable or exercisable for or convertible into shares of common stock currently or hereafter owned either of record or beneficially, or

- publicly announce an intention to do any of the foregoing for a period of 180 days after the date of this prospectus.

This restriction terminates after the close of trading of the common stock on and including the 180th day after the date of this prospectus.

Jefferies LLC and Cowen and Company, LLC may, with respect to our officers, directors and our holders, and the representatives, with respect to us, in their sole discretion and at any time or from time to time before the termination of the 180-day period release all or any portion of the securities subject to lock-up agreements. There are no existing agreements between the underwriters and any of our shareholders who will execute a lock-up agreement, providing consent to the sale of shares prior to the expiration of the lock-up period.

Stabilization

The underwriters have advised us that they, pursuant to Regulation M under the Securities Exchange Act of 1934, as amended, and certain persons participating in the offering may engage in short sale transactions, stabilizing transactions, syndicate covering transactions or the imposition of penalty bids in connection with this offering. These activities may have the effect of stabilizing or maintaining the market price of the common stock at a level above that which might otherwise prevail in the open market. Establishing short sales positions may involve either "covered" short sales or "naked" short sales.

"Covered" short sales are sales made in an amount not greater than the underwriters' option to purchase additional shares of our common stock in this offering. The underwriters may close out any covered short position by either exercising their option to purchase additional shares of our common stock or purchasing shares of our common stock in the open market. In determining the source of shares to close out the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the option to purchase additional shares.

"Naked" short sales are sales in excess of the option to purchase additional shares of our common stock. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the shares of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering.

A stabilizing bid is a bid for the purchase of shares of common stock on behalf of the underwriters for the purpose of fixing or maintaining the price of the common stock. A syndicate covering transaction is the bid for or the purchase of shares of common stock on behalf of the underwriters to reduce a short position incurred by the underwriters in connection with the offering. Similar to other purchase transactions, the underwriter's purchases to cover the syndicate short sales may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. A penalty bid is an arrangement permitting the underwriters to reclaim the selling concession otherwise accruing to a syndicate member in connection with the offering if the common stock originally sold by such syndicate member are purchased in a syndicate covering transaction and therefore have not been effectively placed by such syndicate member.

Neither we nor any of the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of our common stock. The underwriters are not obligated to engage in these activities and, if commenced, any of the activities may be discontinued at any time.

The underwriters may also engage in passive market making transactions in our common stock on The Nasdaq Global Market in accordance with Rule 103 of Regulation M during a period before the

commencement of offers or sales of shares of our common stock in this offering and extending through the completion of distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

Electronic Distribution

A prospectus in electronic format may be made available by e-mail or on the web sites or through online services maintained by one or more of the underwriters or their affiliates. In those cases, prospective investors may view offering terms online and may be allowed to place orders online. The underwriters may agree with us to allocate a specific number of shares of common stock for sale to online brokerage account holders. Any such allocation for online distributions will be made by the underwriters on the same basis as other allocations. Other than the prospectus in electronic format, the information on the underwriters' web sites and any information contained in any other web site maintained by any of the underwriters is not part of this prospectus, has not been approved and/or endorsed by us or the underwriters and should not be relied upon by investors.

Other Activities and Relationships

The underwriters and certain of their affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. The underwriters and certain of their affiliates have, from time to time, performed, and may in the future perform, various commercial and investment banking and financial advisory services for us and our affiliates, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and certain of their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments issued by us and our affiliates. If the underwriters or their respective affiliates have a lending relationship with us, they routinely hedge their credit exposure to us consistent with their customary risk management policies. The underwriters and their respective affiliates may hedge such exposure by entering into transactions which consist of either the purchase of credit default swaps or the creation of short positions in our securities or the securities of our affiliates, including potentially the common stock offered hereby. Any such short positions could adversely affect future trading prices of the common stock offered hereby. The underwriters and certain of their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Disclaimers About Non-U.S. Jurisdictions

Australia

This prospectus is not a disclosure document for the purposes of Australia's Corporations Act 2001 (Cth) of Australia, or Corporations Act, has not been lodged with the Australian Securities & Investments Commission and is only directed to the categories of exempt persons set out below. Accordingly, if you receive this prospectus in Australia:

You confirm and warrant that you are either:

- a "sophisticated investor" under section 708(8)(a) or (b) of the Corporations Act;
- a "sophisticated investor" under section 708(8)(c) or (d) of the Corporations Act and that you have provided an accountant's certificate to the Company which complies with the requirements of

section 708(8)(c)(i) or (ii) of the Corporations Act and related regulations before the offer has been made;

- a person associated with the Company under Section 708(12) of the Corporations Act; or
- a "professional investor" within the meaning of section 708(11)(a) or (b) of the Corporations Act.

To the extent that you are unable to confirm or warrant that you are an exempt sophisticated investor, associated person or professional investor under the Corporations Act any offer made to you under this prospectus is void and incapable of acceptance.

You warrant and agree that you will not offer any of the securities issued to you pursuant to this prospectus for resale in Australia within 12 months of those securities being issued unless any such resale offer is exempt from the requirement to issue a disclosure document under section 708 of the Corporations Act.

Canada

(A) Resale Restrictions. The distribution of common stock in Canada is being made only in the provinces of Ontario, Quebec, Alberta and British Columbia on a private placement basis exempt from the requirement that we prepare and file a prospectus with the securities regulatory authorities in each province where trades of these securities are made. Any resale of the common stock in Canada must be made under applicable securities laws which may vary depending on the relevant jurisdiction, and which may require resales to be made under available statutory exemptions or under a discretionary exemption granted by the applicable Canadian securities regulatory authority. Purchasers are advised to seek legal advice prior to any resale of the securities.

(B) Representations of Canadian Purchasers. By purchasing common stock in Canada and accepting delivery of a purchase confirmation, a purchaser is representing to us and the dealer from whom the purchase confirmation is received that:

- the purchaser is entitled under applicable provincial securities laws to purchase the common stock without the benefit of a prospectus qualified under those securities laws as it is an "accredited investor" as defined under National Instrument 45-106 — *Prospectus Exemptions*,
- the purchaser is a "permitted client" as defined in National Instrument 31-103 — *Registration Requirements, Exemptions and Ongoing Registrant Obligations*,
- where required by law, the purchaser is purchasing as principal and not as agent, and
- the purchaser has reviewed the text above under Resale Restrictions.

(C) Conflicts of Interest. Canadian purchasers are hereby notified that the representatives are relying on the exemption set out in section 3A.3 or 3A.4, if applicable, of National Instrument 33-105 — *Underwriting Conflicts* from having to provide certain conflict of interest disclosure in this document.

(D) Statutory Rights of Action. Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if the offering memorandum (including any amendment thereto) such as this document contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser of these securities in Canada should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

(E) Enforcement of Legal Rights. All of our directors and officers as well as the experts named herein may be located outside of Canada and, as a result, it may not be possible for Canadian purchasers to effect service of process within Canada upon us or those persons. All or a substantial portion of our assets and the assets of those persons may be located outside of Canada and, as a result, it may not be possible to satisfy a judgment against us or those persons in Canada or to enforce a judgment obtained in Canadian courts against us or those persons outside of Canada.

(F) Taxation and Eligibility for Investment. Canadian purchasers of common stock should consult their own legal and tax advisors with respect to the tax consequences of an investment in the common stock in their particular circumstances and about the eligibility of the common stock for investment by the purchaser under relevant Canadian legislation.

European Economic Area

Any distributor subject to MiFID II that is offering, selling or recommending the common stock is responsible for undertaking its own target market assessment in respect of the common stock and determining its own distribution channels for the purposes of the MiFID product governance rules under Commission Delegated Directive (EU) 2017/593, or the Delegated Directive. Neither we nor the underwriters make any representations or warranties as to a distributor's compliance with the Delegated Directive.

In relation to each member state of the European Economic Area which has implemented the Prospectus Directive, or a Relevant Member State, an offer to the public of any shares of common stock which are the subject of the offering contemplated by this prospectus may not be made in that Relevant Member State except that an offer to the public in that Relevant Member State of any shares of common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

- to any legal entity which is a "qualified investor" as defined in the Prospectus Directive;
- to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the underwriters or the underwriters nominated by us for any such offer; or
- in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares of common stock shall require us or any of the underwriters to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer shares of common stock to the public" in relation to the shares of common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the shares of common stock to be offered so as to enable an investor to decide to purchase or subscribe to the shares of common stock, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State and the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

Hong Kong

No securities have been offered or sold, and no securities may be offered or sold, in Hong Kong, by means of any document, other than to persons whose ordinary business is to buy or sell shares or debentures, whether as principal or agent; or to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong, or SFO, and any rules made under that Ordinance; or in other circumstances which do not result in the document being a "prospectus" as defined in the Companies Ordinance (Cap. 32) of Hong Kong, or CO, or which do not constitute an offer or invitation to the public for the purpose of the CO or the SFO. No document, invitation or advertisement relating to the securities has been issued or may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted under the securities laws of Hong Kong) other than with respect to securities which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the SFO and any rules made under that Ordinance.

This prospectus has not been registered with the Registrar of Companies in Hong Kong. Accordingly, this prospectus may not be issued, circulated or distributed in Hong Kong, and the securities may not be offered for subscription to members of the public in Hong Kong. Each person acquiring the securities will be required, and is deemed by the acquisition of the securities, to confirm that he is aware of the restriction on offers of the securities described in this prospectus and the relevant offering documents and that he is not acquiring, and has not been offered any securities in circumstances that contravene any such restrictions.

Israel

This document does not constitute a prospectus under the Israeli Securities Law, 5728-1968, or the Securities Law, and has not been filed with or approved by the Israel Securities Authority. In Israel, this prospectus is being distributed only to, and is directed only at, and any offer of the common stock is directed only at, (i) a limited number of persons in accordance with the Israeli Securities Law and (ii) investors listed in the first addendum, or the Addendum, to the Israeli Securities Law, consisting primarily of joint investment in trust funds, provident funds, insurance companies, banks, portfolio managers, investment advisors, members of the Tel Aviv Stock Exchange, underwriters, venture capital funds, entities with equity in excess of NIS 50 million and "qualified individuals," each as defined in the Addendum (as it may be amended from time to time), collectively referred to as qualified investors (in each case, purchasing for their own account or, where permitted under the Addendum, for the accounts of their clients who are investors listed in the Addendum). Qualified investors are required to submit written confirmation that they fall within the scope of the Addendum, are aware of the meaning of same and agree to it.

Japan

The offering has not been and will not be registered under the Financial Instruments and Exchange Law of Japan (Law No. 25 of 1948 of Japan, as amended), or FIEL, and the underwriters will not offer or sell any securities, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the FIEL and any other applicable laws, regulations and ministerial guidelines of Japan.

Singapore

This prospectus has not been and will not be lodged or registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the common stock may not be circulated or distributed, nor may the common stock be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or SFA, (ii) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275, of the SFA, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the securities are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

- a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or
- a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities (as defined in Section 239(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the securities pursuant to an offer made under Section 275 of the SFA except:

- to an institutional investor or to a relevant person defined in Section 275(2) of the SFA, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the SFA;
- where no consideration is or will be given for the transfer;
- where the transfer is by operation of law;
- as specified in Section 276(7) of the SFA; or
- as specified in Regulation 32 of the Securities and Futures (Offers of Investments) (Shares and Debentures) Regulations 2005 of Singapore.

Solely for the purposes of its obligations pursuant to Section 309B of the SFA, we have determined, and hereby notify all relevant persons (as defined in the CMP Regulations 2018), that the shares are "prescribed capital markets products" (as defined in the CMP Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

Switzerland

The securities may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or SIX, or on any other stock exchange or regulated trading facility in Switzerland. This prospectus has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this prospectus nor any other offering or marketing material relating to the securities or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this prospectus nor any other offering or marketing material relating to the offering, the Company or the securities have been or will be filed with or approved by any Swiss regulatory authority. In particular, this prospectus will not be filed with, and the offer of securities will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA, and the offer of securities has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or CISA. The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of securities.

United Kingdom

This prospectus is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors within the meaning of Article 2(1)(e) of the Prospectus Directive that are also (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended, or Order, and/or (ii) high net worth entities falling within Article 49(2)(a) to (d) of the Order and other persons to whom it may lawfully be communicated, or a Relevant Person.

This prospectus and its contents are confidential and should not be distributed, published or reproduced (in whole or in part) or disclosed by recipients to any other persons in the United Kingdom. Any person in the United Kingdom that is not a Relevant Person should not act or rely on this document or any of its content.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus will be passed upon for us by Fenwick & West LLP, San Francisco, California. Certain legal matters relating to the offering will be passed upon for the underwriters by Cooley LLP, Boston, Massachusetts.

EXPERTS

Ernst & Young LLP, independent registered public accounting firm, has audited our consolidated financial statements as of December 31, 2017 and December 31, 2018 and for each of the two years in the period ended December 31, 2018, as set forth in their report. We have included our financial statements in the prospectus and elsewhere in the registration statement in reliance on Ernst & Young LLP's report, given on their authority as experts in accounting and auditing.

ADDITIONAL INFORMATION

We have filed with the Securities and Exchange Commission, or SEC, a registration statement on Form S-1 (File Number 333-) under the Securities Act of 1933, as amended, with respect to the shares of common stock offered hereby. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits filed therewith. For further information about us and the common stock offered hereby, reference is made to the registration statement and the exhibits filed therewith. Statements contained in this prospectus concerning the contents of any contract or any other document are not necessarily complete, please see the copy of the contract or document that has been filed for the complete contents of that contract or document. Each statement in this prospectus relating to a contract or document filed as an exhibit is qualified in all respects by the filed exhibit. The exhibits to the registration statement should be reviewed for the complete contents of these contracts and documents.

We currently do not file periodic reports with the SEC. Upon the completion of this offering, we will be required to file periodic reports, proxy statements and other information with the SEC pursuant to the Securities Exchange Act of 1934, as amended. The SEC maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC. The address of the website is www.sec.gov.

We also maintain a website at www.morphictx.com. Upon completion of this offering, you may access these materials at our website free of charge as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. Information contained in, or that can be accessed through, our website is not a part of, and is not incorporated into, this prospectus.

MORPHIC HOLDING, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and the Board of Directors of Morphic Holding, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Morphic Holding, Inc. (the Company) as of December 31, 2017 and 2018, the related consolidated statements of operations and comprehensive loss, convertible preferred stock and stockholders' (deficit) equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2017 and 2018, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2017.
Boston, Massachusetts
April 12, 2019

MORPHIC HOLDING, INC.
CONSOLIDATED BALANCE SHEETS
(In thousands, except unit, share and per share data)

	December 31,		Pro forma December 31,
	2017	2018	2018
			(unaudited)
Assets			
Current assets:			
Cash and cash equivalents	$ 20,750	$ 185,901	$ 185,901
Prepaid expenses and other current assets	479	1,222	1,222
Total current assets	21,229	187,123	187,123
Property and equipment, net	1,725	1,843	1,843
Restricted cash	275	275	275
Other long-term assets	13	64	64
Total assets	$ 23,242	$ 189,305	$ 189,305
Liabilities			
Current liabilities:			
Accounts payable	$ 883	$ 1,745	$ 1,745
Accrued expenses	1,296	3,239	3,239
Deferred revenue, current portion	—	29,862	29,862
Long term debt, current portion	315	—	—
Deferred rent, current portion	23	57	57
Total current liabilities	2,517	34,903	34,903
Long-term liabilities:			
Deferred revenue, net of current portion	—	66,781	66,781
Long-term debt, net of current portion	315	—	—
Accrued interest payable	30	—	—
Deferred rent, net of current portion	367	306	306
Other long-term liabilities	19	58	32
Total liabilities	3,248	102,048	102,022
Preferred units:			
Series Seed convertible preferred units, 11,987,661 units authorized, 11,927,889 units issued and outstanding as of December 31, 2017 (aggregate liquidation preference of $8,980 at December 31, 2017); no units authorized, issued, or outstanding pro forma (unaudited)	8,658	—	—
Series A convertible preferred units, 49,047,619 units authorized and 39,238,094 units issued and outstanding as of December 31, 2017 (liquidation preference of $41,200 as of December 31, 2017); no units authorized, issued, or outstanding pro forma (unaudited)	41,029	—	—
Preferred shares:			
Series Seed convertible preferred shares, $0.0001 par value, 11,967,689 shares authorized, 11,927,889 shares issued and outstanding as of December 31, 2018 (aggregate liquidation preference of $8,980 at December 31, 2018); no shares issued or outstanding pro forma (unaudited)	—	8,658	—
Series A convertible preferred shares, $0.0001 par value, 49,047,619 shares authorized, issued, and outstanding as of December 31, 2018 (liquidation preference of $51,500 as of December 31, 2018); no shares issued or outstanding pro forma (unaudited)	—	51,320	—
Series B convertible preferred shares, $0.0001 par value, 61,538,454 shares authorized, issued, and outstanding as of December 31, 2018 (liquidation preference of $80,000 as of December 31, 2018); no shares issued or outstanding pro forma (unaudited)	—	79,831	—
Stockholders' (Deficit) Equity			
Common units, 77,000,000 units authorized, 5,896,584 units issued and outstanding as of December 31, 2017; no units authorized, issued or outstanding pro forma (unaudited)	—	—	—
Common shares, $0.0001 par value, 151,000,000 shares authorized, 10,687,985 shares issued and outstanding as of December 31, 2018; 133,201,947 shares issued and outstanding, pro forma (unaudited)	—	1	14
Additional paid-in capital	661	1,632	141,454
Accumulated deficit	(30,354)	(54,185)	(54,185)
Total stockholders' (deficit) equity	(29,693)	(52,552)	87,283
Total liabilities and stockholders' (deficit) equity	$ 23,242	$ 189,305	$ 189,305

The accompanying notes are an integral part of these consolidated financial statements.

MORPHIC HOLDING, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

	Year Ended December 31,	
	2017	2018
	(In thousands, except unit, share, per unit, and per share data)	
Collaboration revenue — related party	$ —	$ 3,358
Operating expenses:		
Research and development	14,103	22,631
General and administrative	2,826	5,355
Total operating expenses	16,929	27,986
Loss from operations	(16,929)	(24,628)
Other income (expense):		
Interest income, net	14	871
Other expense, net	(5)	(74)
Total other income	9	797
Net loss	$ (16,920)	$ (23,831)
Net loss per unit, basic and diluted	$ (2.87)	
Net loss per share, basic and diluted		$ (3.82)
Weighted average common units outstanding, basic and diluted	5,896,584	
Weighted average common shares outstanding, basic and diluted		6,237,889
Pro-forma net loss per share, basic and diluted (unaudited)		$ (0.31)
Pro-forma weighted average common shares outstanding, basic and diluted (unaudited)		77,596,055
Comprehensive loss:		
Net loss	$ (16,920)	$ (23,831)
Other comprehensive income (loss):	—	—
Comprehensive loss	$ (16,920)	$ (23,831)

The accompanying notes are an integral part of these consolidated financial statements.

MORPHIC HOLDING, INC.

CONSOLIDATED STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' (DEFICIT) EQUITY

(In thousands, except unit and share data)

	Series Seed Convertible Preferred Units		Series Seed Convertible Preferred Shares		Series A Convertible Preferred Units		Series A Convertible Preferred Shares		Series B Convertible Preferred Units		Series B Convertible Preferred Shares		Common Units		Common Shares		Addit'l Paid-in	Accum
	Units	Amount	Shares	Amount	Units	Amount	Shares	Amount	Units	Amount	Shares	Amount	Units	Amount	Shares	Amount	Capital	Defi
Balance at December 31, 2016	**11,668,345**	**$ 8,507**	**—**	**$ —**	**19,619,047**	**$ 20,435**	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**5,896,584**	**$ —**	**—**	**$ —**	**$ 347**	**$**
Issuance of Series A Preferred Units in exchange for services rendered	259,544	151	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Issuance of Series A Preferred Units October 31, 2017, net of offering costs of $6	—	—	—	—	19,619,047	20,594	—	—	—	—	—	—	—	—	—	—	—	
Reclassification of warrants to purchase preferred units to member's equity	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	
Equity-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	289	
Net loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Balance at December 31, 2017	**11,927,889**	**8,658**	**—**	**—**	**39,238,094**	**41,029**	**—**	**—**	**—**	**—**	**—**	**—**	**5,896,584**	**—**	**—**	**—**	**661**	
Issuance of Series A Preferred Units August 10, 2018, net of offering costs of $9	—	—	—	—	9,809,525	10,291	—	—	—	—	—	—	—	—	—	—	—	
Issuance of Series B Preferred Units September 25, 2018, net of offering costs of $169	—	—	—	—	—	—	—	—	61,538,454	79,831	—	—	—	—	—	—	—	
Effect of Reorganization	(11,927,889)	(8,658)	11,927,889	8,658	(49,047,619)	(51,320)	49,047,619	51,320	(61,538,454)	(79,831)	61,538,454	79,831	(5,896,584)	—	5,896,584	1	(1)	
Exchange of incentive units for common stock in connection with the reorganization	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4,606,872	—	—	
Vesting of restricted shares	—	—	—	—	—	—	—	—	—	—	—	—	—	—	184,529	—	—	
Equity-based compensation expense	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	997	
Reclassification of warrants to purchase preferred units to liability																	(25)	
Net Loss	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Balance at December 31, 2018	**—**	**—**	**11,927,889**	**8,658**	**—**	**—**	**49,047,619**	**51,320**	**—**	**—**	**61,538,454**	**79,831**	**—**	**—**	**10,687,985**	**1**	**1,632**	
Conversion of convertible preferred stock into common stock	—	—	(11,927,889)	(8,658)			(49,047,619)	(51,320)	—	—	(61,538,454)	(79,831)	—	—	122,513,962	13	139,796	
Reclassification of warrants to purchase preferred units to stockholders' equity	—	—			—	—			—	—			—	—	—	—	26	
Pro forma balance at December 31, 2018 (unaudited)	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**—**	**$ —**	**133,201,947**	**$ 14**	**$141,454**	**$**

The accompanying notes are an integral part of these consolidated financial statements.

MORPHIC HOLDING, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Year Ended December 31, 2017	2018
Cash flows from operating activities:		
Net loss	$ (16,920)	$ (23,831)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:		
Depreciation and amortization	434	539
Equity-based compensation	289	997
Fair value of seed preferred units issued for services rendered	151	—
Loss on disposal of property and equipment	5	1
Non-cash interest expense	18	43
Loss on early debt extinguishment	—	28
Change in operating assets and liabilities:		
Prepaid expenses and other current assets	(296)	(743)
Other long-term assets	(13)	(51)
Accounts payable	285	862
Accrued expenses	388	1,888
Deferred revenue	—	96,643
Deferred rent	227	(27)
Other long-term liabilities	17	(12)
Net cash (used in) provided by operating activities	(15,415)	76,337
Cash flows from investing activities:		
Purchase of property and equipment	(945)	(659)
Proceeds from the disposal of lab equipment	38	3
Net cash used in investing activities	(907)	(656)
Cash flows from financing activities:		
Proceeds from issuance of preferred units, net of issuance costs	20,594	90,122
Repayment of debt	(333)	(652)
Net cash provided by financing activities	20,261	89,470
Net increase in cash and cash equivalents and restricted cash	3,939	165,151
Cash and cash equivalents and restricted cash, beginning of period	17,086	21,025
Cash and cash equivalents and restricted cash, end of period	$ 21,025	$ 186,176
Supplemental cash flow information:		
Cash paid for interest	$ 31	$ 68

The accompanying notes are an integral part of these consolidated financial statements.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Nature of the Business and Basis of Presentation

Organization

Morphic Holding, Inc. was formed under the laws of the State of Delaware in August 2014 under the name Integrin Rock, LLC. The Company subsequently changed its name to Morphic Rock Holding, LLC in October 2014 and then to Morphic Holding, LLC in June 2016. As more fully described in Note 6 below, on December 5, 2018, the Company completed a series of transactions (the "Reorganization") pursuant to which Morphic Holding, LLC was converted in a tax free reorganization into Morphic Holding, Inc. and three wholly-owned subsidiaries, namely Lazuli, Inc., Tourmaline, Inc, and Phyllite, Inc, were merged with and into another wholly-owned subsidiary, Morphic Therapeutic, Inc. As part of the Reorganization, all convertible preferred units and common units of Morphic Holding, LLC issued and outstanding immediately prior to the Reorganization were exchanged for shares of Morphic Holding, Inc. capital stock of the same class or series on a one-for-one basis. Previously outstanding vested and unvested incentive units were exchanged for an equal number of shares of common stock or restricted common stock, respectively. The restricted common stock was issued with the same vesting terms as the unvested incentive units held immediately prior to the Reorganization.

Upon consummation of the Reorganization, the reporting entity that these financial statements relate became Morphic Holding, Inc. At the time of the Reorganization, the Company created a Massachusetts Securities Corporation (the "Security Corporation") to take advantage of the favorable tax treatment of income earned on securities held within such entity. As of December 31, 2018, all of the Company's excess funds were temporarily invested through the Security Corporation.

The Company is a biopharmaceutical company applying proprietary insights into integrins to discover and develop first-in-class oral small-molecule integrin therapeutics. Integrins are validated targets with multiple approved drugs for the treatment of serious chronic diseases, including autoimmune, cardiovascular and metabolic diseases, fibrosis and cancer. Despite significant unsuccessful efforts, we believe tremendous untapped potential remains for us to develop oral integrin therapies. The Company has created the Morphic integrin technology platform, on MInT Platform, by leveraging our unique understanding of integrin structure and biology to develop novel product candidates designed to achieve the potency, high selectivity, and pharmaceutical properties required for oral administration.

The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including, but not limited to, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Product candidates currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company's drug development efforts are successful, it is uncertain when, if ever, the Company will realize significant revenue from product sales.

The accompanying financial statements have been prepared on the basis of continuity of operations, realization of assets and the satisfaction of liabilities and commitments in the ordinary course of business. Through December 31, 2018, the Company has funded its operations with the sales of convertible preferred stock, payments received in connection with collaboration agreements, and borrowings under loan agreements. Since inception, the Company has incurred recurring losses, including net losses of $16.9 million for the year ended December 31, 2017 and $23.8 million for the year ended December 31,

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

1. Nature of the Business and Basis of Presentation (Continued)

2018. As of December 31, 2018, the Company had an accumulated deficit of $54.2 million. The Company expects to continue to generate operating losses for the foreseeable future. As of April 12, 2019, the Company expected that its cash and cash equivalents would be sufficient to fund its operating expenses and capital expenditure requirements through at least 12 months from the issuance date of the annual financial statements.

Basis of Presentation

The consolidated financial statements prior to the Reorganization include the accounts of Morphic Holding, LLC and its wholly owned subsidiaries, Lazuli, Inc., Tourmaline, Inc., and Phyllite, Inc. The consolidated financial statements subsequent to the Reorganization include the accounts of Morphic Holding, Inc. and its wholly owned subsidiaries of Morphic Therapeutic, Inc. and Massachusetts Securities Corporation described above. All intercompany balances have been eliminated in consolidation.

These consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States ("GAAP"). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States generally accepted accounting principles as found in the Accounting Standards Codification ("ASC") and Accounting Standards Update ("ASU") of the Financial Accounting Standards Board ("FASB").

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in accordance with GAAP requires management to make estimates and judgments that may affect the reported amounts of assets and liabilities and related disclosures of contingent assets and liabilities at the date of the financial statements and the related reporting of revenues and expenses during the reporting period. Significant estimates of accounting reflected in these consolidated financial statements include, but are not limited to, estimates related to revenue recognition, accrued expenses, the valuation of equity-based compensation, including incentive units, restricted common stock, and stock options, and income taxes. Actual results could differ from those estimates.

Concentration of Credit Risk and Off-Balance Sheet Risk

Financial instruments that potentially expose the Company to concentrations of credit risk consist primarily of cash and cash equivalents. The Company has all cash and cash equivalents at one accredited financial institution, in amounts that exceed federally insured limits. The Company does not believe that it is subject to unusual credit risk beyond the normal credit risk associated with commercial banking relationships.

The primary objectives for the Company's investment portfolio are the preservation of capital and maintenance of liquidity. In 2016, the Company adopted its investment policy which allows funds to be held outside bank accounts, but to be invested only in fixed income instruments denominated and payable in U.S. dollars including obligations of the U.S. government and its agencies and money market funds registered according to SEC Rule 2a-7 of the Investment Company Act of 1940. Investments in the money market fund shall be consistent with approved instruments and assets under management must be at least $10.0 billion.

All securities must have a readily ascertainable market value, must be readily marketable, and be U.S. dollar denominated.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

The Company has no off-balance sheet risk, such as foreign exchange contracts, option contracts, or other foreign-hedging arrangements.

Cash and Cash Equivalents and Restricted Cash

The Company considers highly liquid investments with a maturity of three months or less when purchased to be cash equivalents. At December 31, 2017 and 2018, cash and cash equivalents include bank demand deposits and money market funds that invest primarily in U.S. government-backed securities and treasuries. Cash equivalents are stated at the fair value.

Restricted cash consists of a letter of credit in the amount of $275,000 issued to the landlord of the Company's facility lease. The terms of the letter of credit extend beyond one year. The following table reconciles cash and cash equivalents and restricted cash per the balance sheet to the statements of cash flows:

	As of December 31,	
	2017	2018
Cash and cash equivalents	$ 20,750	$ 185,901
Restricted cash	275	275
Total cash, cash equivalents, and restricted cash	$ 21,025	$ 186,176

Property and Equipment, net

Property and equipment are recorded at cost. Expenditures for major renewals or betterments that extend the useful lives of property and equipment are capitalized; expenditures for maintenance and repairs are charged to expense as incurred. Depreciation is calculated on a straight-line basis over the estimated useful lives of the related asset. Property and equipment are depreciated as follows:

	Estimated Useful Life (in Years)
Laboratory equipment	5
Computers and software	3 - 5
Leasehold improvements	Shorter of the useful life or the remaining term of the lease

Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. Long-lived assets to be held and used are tested for recoverability whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable. Factors that the Company considers in deciding when to perform an impairment review include significant underperformance of the business in relation to expectations, significant negative industry or economic trends, and significant changes or planned changes in the use of the assets. If an impairment review is performed to evaluate a long-lived asset for recoverability, the Company compares forecasts of undiscounted cash flows expected to result from the use and eventual

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

disposition of the long-lived asset to its carrying value. An impairment loss would be recognized when estimated undiscounted future cash flows expected to result from the use of an asset are less than its carrying amount. The impairment loss would be based on the excess of the carrying value of the impaired asset over its fair value, determined based on discounted cash flows. To date, the Company has not recorded any impairment losses on long-lived assets.

Fair Value Measurements

ASC Topic 820, *Fair Value Measurement* ("ASC 820"), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and the Company's own assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability and are developed based on the best information available in the circumstances. ASC 820 identifies fair value as the exchange price, or exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As a basis for considering market participant assumptions in fair value measurements, ASC 820 establishes a three-tier fair value hierarchy that distinguishes between the following:

Level 1 — Quoted market prices in active markets for identical assets or liabilities.

Level 2 — Inputs other than Level 1 inputs that are either directly or indirectly observable, such as quoted market prices, interest rates and yield curves.

Level 3 — Unobservable inputs developed using estimates of assumptions developed by the Company, which reflect those that a market participant would use.

To the extent the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair values requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized as Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

The Company believes that the carrying amounts of the Company's consolidated financial instruments, including prepaid expenses and other current assets, accounts payable, and accrued expenses approximate fair value due to the short-term nature of those instruments.

Segment Information

Operating segments are defined as components of an entity about which separate discrete information is available for evaluation by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. The Company's Chief Executive Officer is its chief operating decision-maker and views operations and manages the Company's business in one operating segment operating exclusively in the United States.

Revenue Recognition

Effective January 1, 2018, the Company adopted the provisions of ASC 606 using the full retrospective transition method.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

To date all revenue has been generated from the Company's collaboration agreement with AbbVie, which was executed in October, 2018. As a result, there was no impact of the adoption of ASC 606 to the Company's financial statements. Please refer to Note 11 below for details of ASC 606 application to the Company's collaboration agreement with AbbVie.

The Company first evaluates collaboration arrangements to determine whether the arrangement (or part of the arrangement) represents a collaborative arrangement pursuant to ASC Topic 808, *Collaborative Arrangements*, based on the risks and rewards and activities of the parties pursuant to the contractual arrangement. The Company accounts for any collaborative arrangement or elements within the contract that are deemed to be a collaborative arrangement, and not a customer relationship, in accordance with ASC 808. Through December 31, 2018, the Company entered into one agreement that has been accounted for pursuant to ASC 606.

Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine the appropriate amount of revenue to be recognized for arrangements determined to be within the scope of ASC 606, the Company performs the following five steps: (i) identification of the contract(s) with the customer, (ii) identification of the promised goods or services in the contract and determination of whether the promised goods or services are performance obligations, (iii) measurement of the transaction price, (iv) allocation of the transaction price to the performance obligations, and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. The Company only applies the five-step model to contracts when it is probable that the entity will collect consideration it is entitled to in exchange for the goods or services it transfers to the customer.

The Company accounts for a contract with a customer that is within the scope of ASC 606 when all of the following criteria are met: (i) the arrangement has been approved by the parties and the parties are committed to perform their respective obligations, (ii) each party's rights regarding the goods or services to be transferred can be identified, (iii) the payment terms for the goods or services to be transferred can be identified, (iv) the arrangement has commercial substance and (v) collection of substantially all of the consideration to which the Company will be entitled in exchange for the goods or services that will be transferred to the customer is probable.

Performance obligations are promised goods or services in a contract to transfer a distinct good or service to the customer. Promised goods or services are considered distinct when: (i) the customer can benefit from the good or service on its own or together with other readily available resources and (ii) the promised good or service is separately identifiable from other promises in the contract. Options to purchase additional goods or services are considered to be marketing offers and are to be accounted for as separate contracts when the customer elects such options, unless the Company determines the option provides a material right which would not be provided without entering into the contract. If, however, an option is determined to provide a material right that would not be provided without entering into a contract, a portion of the transaction price is allocated to such option.

The Company estimates the transaction price based on the amount of consideration the Company expects to receive for transferring the promised goods or services in the contract. The consideration may include both fixed consideration and variable consideration. At the inception of each arrangement that includes variable consideration, the Company evaluates the amount of the potential payments and the likelihood that the payments will be received. The Company utilizes either the most likely amount method or expected value

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

method to estimate the transaction price based on which method better predicts the amount of consideration expected to be received. If it is probable that a significant revenue reversal would not occur, the variable consideration is included in the transaction price.

The Company also evaluates whether instances in which the timing of payments by customers do not match the timing of performance obligation satisfaction contain an element of financing and adjusts the transaction price for the effect of the financing component, if any.

The Company's transactions with customers may include development and regulatory milestone payments. The Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the Company's control or the customer's control, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. At the end of each reporting period, the Company re-evaluates the probability of achievement of such milestones and any related constraint, and if necessary, adjusts the estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect collaboration revenue and net income (loss) in the period of adjustment.

For sales-based royalties, including milestone payments based on the level of sales, the Company determines whether the sole or predominant item to which the royalties relate is a license. When the license is the sole or predominant item to which the sales-based royalty relates, the Company recognizes revenue at the later of: (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

The Company allocates the transaction price based on the estimated standalone selling price of the identified performance obligations. The Company must develop assumptions that require judgment to determine the standalone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction, and the estimated costs. Certain variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated to each performance obligation are consistent with the amounts the Company would expect to receive for each performance obligation.

The Company receives payments from customers based on billing schedules established in each contract. Up-front payments and fees are recorded as deferred revenue upon receipt or when due until the Company performs its obligations under these arrangements. Amounts are recorded as accounts receivable when the Company's right to consideration is unconditional.

Research and Development Expenses

Research and development expenses are expensed as incurred and consist of costs incurred in performing research and development activities, including compensation related expenses for research and development personnel, preclinical and clinical activities including cost of supply, overhead expenses including facilities expenses, materials and supplies, amounts paid to consultants and outside service providers, and depreciation of equipment. Upfront license payments related to acquired technologies which have not yet

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

reached technological feasibility and have no alternative future use are also included in research and development expense.

Research Contract Costs and Accruals

The Company has entered into various research service arrangements under which vendors perform various services. The Company records accrued expenses for estimated costs incurred under the arrangements. When evaluating the adequacy of the accrued expenses, the Company analyzed the progress of the studies, trials or other services performed, including invoices received and contracted costs. Judgments and estimates are made in determining the accrued expense balances at the end of each reporting period.

Equity-Based Compensation

The Company accounts for equity awards, including common stock, incentive units, and common stock options, granted to employees as equity award compensation in accordance with ASC Topic 718, *Compensation — Stock Compensation* ("ASC 718"). ASC 718 requires all equity-based payments to employees, which includes grants of employee equity awards, to be recognized as expense in the statements of operations based on their grant date fair values. The Company estimates the fair value of common stock and common units using an appropriate valuation methodology, in accordance with the framework of the 2013 American Institute of Certified Public Accountants Technical Practice Aid, *Valuation of Privately-Held Company Equity Securities Issued as Compensation*. Each valuation methodology includes estimates and assumptions that require the Company's judgment. These estimates and assumptions include a number of objective and subjective factors, including external market conditions, guideline public company information, the prices at which the Company sold convertible preferred units, the superior rights and preferences of securities senior to the Company's common units at the time, and the likelihood of achieving a liquidity event such as an initial public offering or sale. Significant changes to the assumptions used in the valuations could result in different fair values of common units, restricted common stock, and stock options at each valuation date, as applicable.

The fair value of each incentive unit and stock option award is estimated using the Black-Scholes option-pricing model, using inputs which include the fair value of the Company's common stock and certain subjective assumptions, the expected stock price volatility, the expected term of the award, the risk-free rate, and expected dividends. Expected volatility is calculated based on reported volatility data for a representative group of publicly traded companies for which historical information was available. The historical volatility is generally calculated based on a period of time commensurate with the expected term assumptions. The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant commensurate with the expected term assumption. The Company uses the simplified method, under which the expected term is presumed to be the midpoint between the vesting date and the end of the contractual term. The Company utilizes this method due to lack of historical exercise data and the plain-vanilla nature of its stock-based awards. The expected dividend yield is assumed to be zero as the Company has never paid dividends and has no current plans to pay any dividends on common stock.

Compensation expense related to equity awards to employees that are subject to graded vesting is recognized on a straight-line basis, based on the grant date fair value, over the requisite service period of the award, which is generally the vesting term. All awards granted to employees and the Board members to date contain only service vesting conditions. The Company recognizes forfeitures when they occur.

For equity awards granted to non-employees, the Company accounts for the related equity award compensation in accordance with the provisions of ASU 2018-07 (codified within ASC 718) and recognizes

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

equity award compensation expense over the related service period of the non-employee award. Equity awards issued to non-employees are recorded at their fair values at the grant date, using the Black-Scholes option-pricing model.

All awards granted to date were equity-classified as of December 31, 2018.

The Company classifies equity-based compensation expense in its consolidated statements of operations in the same manner in which the award recipient's salary and related costs are classified or in which the award recipient's service payments are classified.

Comprehensive Loss

Comprehensive loss is the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive loss includes net loss and the change in accumulated other comprehensive loss for the period. For the years ended December 31, 2017 and 2018, comprehensive loss equaled net loss.

Net Loss per Share

The Company applies the two-class method to compute basic and diluted net loss per share because it has issued instruments that meet the definition of participating securities. The two-class method determines net income (loss) per share for each class of common and participating securities according to dividends declared or accumulated and participation rights in undistributed earnings. The two-class method requires income (losses) available to common unit holders and common stockholders for the period to be allocated between common and participating securities based upon their respective rights to share in the earnings as if all income (losses) for the period had been distributed. During periods of loss, there is no allocation required under the two-class method since the participating securities do not have a contractual obligation to fund the losses of the Company.

Prior to the Reorganization, the Company calculated basic net loss per unit by dividing net loss by the weighted average number of common units outstanding. Subsequent to the Reorganization, the Company calculates basic net loss per share by dividing net loss by the weighted average number of common shares outstanding, excluding unvested restricted common stock. The Company calculates diluted net loss per unit and diluted net loss per share by dividing net loss by the weighted average number of common units outstanding or weighted average number of common shares outstanding, as applicable, after giving consideration to the dilutive effect of convertible preferred units, convertible preferred stock, incentive units, restricted common stock, warrants, and stock options that are outstanding during the period. The Company has generated a net loss in all periods presented, so the basic and diluted net loss per unit and net loss per share are the same, as the inclusion of the potentially dilutive securities would be anti-dilutive.

Income Taxes

Since inception, the Company recorded income taxes in accordance with FASB Accounting Standards Codification Topic 740, *Income Taxes* ("ASC 740"), which provides for deferred taxes using an asset and liability approach. Under this method, deferred tax assets and liabilities are determined based on temporary differences between the financial statement basis and tax basis of assets and liabilities and net operating loss and credit carryforwards using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date. Valuation allowances are established when it is more likely than not that some portion of the deferred tax assets will not be realized.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

The Company accounts for uncertainty in income taxes recognized in the financial statements by applying a two-step process to determine the amount of tax benefit to be recognized. First, the tax position must be evaluated to determine the likelihood that it will be sustained upon external examination by the taxing authorities. If the tax position is deemed more-likely-than-not to be sustained, the tax position is then assessed to determine the amount of benefit to recognize in the financial statements. The amount of the benefit that may be recognized is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. At December 31, 2018, the Company had not identified any significant uncertain tax positions.

Prior to the Reorganization, Morphic Holding, LLC elected to be treated under the partnership provisions of the Internal Revenue Service code. Accordingly, all income and deductions of Morphic Therapeutic, LLC were recorded on the members' individual tax returns and no taxes were recorded by Morphic Holding, LLC. The wholly-owned subsidiaries of Morphic Holding, LLC — Morphic Therapeutic, Inc., Lazuli, Inc., Tourmaline, Inc., and Phyllite, Inc. — were taxed as C-corporations for federal income tax purposes and filed separate corporate income tax returns from the LLC entity.

As part of the Reorganization, the parent Company made the election to be treated as C-corporation for federal and state income tax purposes, and subsequently legally converted the parent Company to a corporation. Following the Reorganization, the Company has elected to file consolidated tax returns.

The Company is open to examination by the Internal Revenue Service for the tax years ended December 31, 2015 to December 31, 2018. The Company is currently not under examination by the Internal Revenue Service or any other jurisdictions for any tax years. The Company has not recorded any interest or penalties on any unrecognized tax benefits since its inception.

Pro forma financial information (unaudited)

On April 11, 2019, the Company's board of directors authorized management of the Company to file a registration statement with the Securities and Exchange Commission to sell shares of its common stock to the public. Upon the closing of an initial public offering (as defined in the Company's Certificate of Incorporation), all of the Company's outstanding shares of convertible preferred stock will automatically convert into shares of common stock and the outstanding warrant for the purchase of shares of convertible preferred stock will automatically convert into a warrant for the purchase of shares of common stock. The accompanying unaudited pro forma consolidated balance sheet and consolidated statements of convertible preferred stock and stockholders' (deficit) equity as of December 31, 2018 have been prepared to give effect to (1) the automatic conversion of all outstanding shares of convertible preferred stock into 122,513,962 shares of common stock and (2) the automatic conversion of the outstanding warrant to purchase 39,800 shares of convertible preferred stock into a warrant to purchase 39,800 shares of common stock, resulting in the reclassification of the warrant liability to additional paid-in capital, as if the Company's proposed IPO had occurred on December 31, 2018. The shares of common stock issuable and the proceeds expected to be received in the proposed IPO are excluded from such pro forma financial information.

The unaudited pro forma basic and diluted net loss per share in the accompanying consolidated statements of operations and comprehensive loss for the year ended December 31, 2018 has been computed to give effect to the automatic conversion of all outstanding shares of convertible preferred stock into shares of common stock and the automatic conversion of the warrant to purchase shares of convertible preferred stock into a warrant to purchase shares of common stock. The unaudited pro forma basic and diluted net

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

loss per share for the year ended December 31, 2018 was computed using the weighted average number of shares of common stock outstanding, including the pro forma effect of the conversion of all outstanding shares of convertible preferred stock into shares of common stock, as if the Company's proposed IPO had occurred on the later of January 1, 2018 or the original issuance dates of the convertible preferred units or convertible preferred stock. The unaudited pro forma net loss used in the calculation of unaudited basic and diluted pro forma net loss per share for the year ended December 31, 2018 excludes the impact of the change in fair value of the warrant liability that was recorded by the Company during such period. The unaudited pro forma net loss per share does not include the shares expected to be sold or related proceeds to be received in the proposed IPO.

Subsequent Events

The Company considers events or transactions that occur after the balance sheet date but prior to the issuance of the consolidated financial statements for potential recognition or disclosure in the consolidated financial statements. Subsequent events have been evaluated through the date these consolidated financial statements were issued for potential recognition or disclosure in the consolidated financial statements.

Recently Adopted Accounting Pronouncements

In October 2016, the FASB issued ASU No. 2016-16, *Income Taxes (Topic 740): Intra-Entity Transfer of Assets Other than Inventory* ("ASU 2016-16"), which requires the recognition of the income tax consequences of an intra-entity transfer (sales) of an asset, other than inventory, when the transfer occurs. The Company adopted this standard on January 1, 2018 using the full retrospective approach. Adoption of this standard did not have a material impact on the Company's consolidated financial statements as the Company does not engage in sale transactions with its wholly owned subsidiaries.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation — Stock Compensation ("Topic 718"): Improvements to Employee Share-Based Payment Accounting* ("ASU 2016-09"). The new standard involves several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities and classification on the statement of cash flows, and making an accounting policy election regarding accounting for forfeitures. The Company adopted ASU 2016-09 on January 1, 2018 using the full retroactive approach. The adoption of ASU 2016-09 did not have a material impact on the Company's consolidated financial statements.

In November 2015, the FASB issued ASU No. 2015-17, *Balance Sheet Classification of Deferred Taxes* ("ASU 2015-17"), which requires deferred tax liabilities and assets to be classified as noncurrent in the consolidated balance sheet. The Company adopted this guidance on January 1, 2018 using the full retroactive approach by classifying all previously recognized deferred tax assets and liabilities as noncurrent. The adoption of ASU 2015-17 did not have a material impact on the Company's consolidated financial statements as the Company recorded a full valuation allowance on deferred tax assets in all periods.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

In November 2016, the FASB issued Accounting Standards Update No. 2016-18, *Statement of Cash Flows (Topic 230): Restricted Cash* ("ASU 2016-18"), which requires companies to include amounts generally described as restricted cash and restricted cash equivalents in cash and cash equivalents when reconciling beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The Company adopted ASU 2016-18 on January 1, 2018 using the full retrospective method. The Company reflected the effect of adoption of ASU 2016-18 by the conforming presentation of changes in cash and cash equivalents, including the restricted cash as of December 31, 2017 and 2018 in its statement of cash flows.

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230): *Classification of Certain Cash Receipts and Cash Payments* ("ASU 2016-15") to clarify guidance on the classification of certain cash receipts and payments in the statement of cash flows. The Company adopted ASU 2016-15 on January 1, 2018 using full retrospective method. The adoption of ASU 2016-15 did not have a material impact on the consolidated financial statements.

In May 2017, the FASB issued ASU 2017-09, *Compensation-Stock Compensation (Topic 718): Scope of Modification Accounting,* ("ASU 2017-09") which clarifies when to account for a change to the terms or conditions of a share-based payment award as a modification. The new standard does not change the accounting for modifications but clarifies that modification accounting guidance should only be applied if the fair value, vesting conditions, or classification of the award changes as a result of the change in terms or conditions. The Company adopted ASU 2017-09 on January 1, 2018 using the prospective approach. Initial adoption of ASU 2017-09 did not have any impact on the Company's consolidated financial statements. In October 2018, in connection with the Reorganization described in Note 6, the Company modified certain equity-based awards and the effect of such modification has been reflected in the consolidated financial statements for the year ended December 31, 2018.

In May 2014, the FASB issued Accounting Standards Update ("ASU") No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* ("ASU 2014-09"), which modifies how all entities recognize revenue, and consolidates into one ASC (ASC Topic 606, *Revenue from Contracts with Customers*) the current guidance found in ASC Topic 605, and various other revenue accounting standards for specialized transactions and industries. ASU 2014-09 outlines a comprehensive five-step revenue recognition model based on the principle that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. On January 1, 2018, the Company elected to early adopt ASU 2014-09 using the full retrospective approach. The statement of operations and comprehensive loss for years ended December 31, 2017 and 2018 is presented in accordance with the provisions of ASC 606.

In June 2018, the FASB issued ASU 2018-07, *Compensation — Stock Compensation (Topic 718) — Improvements to Nonemployee Share-Based Payment Accounting* that largely aligns the accounting for share-based payment awards issued to employees and nonemployees, with certain exceptions. The new guidance expands the scope of Accounting Standards Codification (ASC) 718 to include share-based payments granted to nonemployees in exchange for goods or services used or consumed in an entity's own operations and supersedes the guidance in ASC 505-30. Under the guidance, the measurement of equity-classified nonemployee awards will be fixed at the grant date, which may lower their cost and reduce volatility in the income statement. The Company adopted ASU 2018-07 on January 1, 2018 using the modified retroactive approach. The Company's awards to nonemployees were immaterial as of the date of adoption.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

Recently Issued Accounting Pronouncements not yet Adopted

In November 2018, the FASB issued Accounting Standards Update 2018-18 ("ASU 2018-18"), *Collaborative Arrangements (topic 808): Clarifying the Interaction between Topic 808 and Topic 606*. ASU 2018-18 clarifies that certain transactions between participants in a collaborative arrangement should be accounted for under ASC 606 when the counterparty is a customer. The guidance precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer for that transaction. The guidance amends ASC 808 to refer to the unit-of-account guidance in ASC 606 and requires it to be used only when assessing whether a transaction is in the scope of ASC 606. The Company is currently evaluating the impact of ASU 2018-18 on the consolidated financial statements.

In August 2018, the FASB issued Accounting Standards Update 2018-15 ("ASU 2018-15), *Intangibles — Goodwill and Other — Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* requiring a customer in a cloud computing arrangement that is a service contract to follow the internal use software guidance in Accounting Standards Codification (ASC) 350-402 to determine which implementation costs to capitalize as assets. The guidance is effective for the Company in annual periods beginning after December 15, 2020, and interim periods in 2021. The Company has the option to apply the guidance prospectively to all implementation costs incurred after the date of adoption or retrospectively in accordance with ASC 250-10-45-5 through ASC 250-10-45-10. The new guidance requires certain disclosures in the interim and annual period of adoption. The Company does not expect the adoption of this guidance to have a material impact on the consolidated financial statements due to limited use in its operations of cloud computing arrangements that are service contracts requiring integration.

In August 2018, the FASB issued Accounting Standards Update 2018-13 ("ASU 2018-13"), *Fair Value Measurement (Topic 820): Disclosure Framework — Changes to the Disclosure Requirements for Fair Value Measurement*, removing the requirements to disclose:

- The amount of and reasons for transfers between Level 1 and Level 2 of the fair value hierarchy
- The policy for timing of transfers between levels
- The valuation processes for Level 3 fair value measurements

and clarifying certain aspects of disclosures regarding uncertainty in measurement of the reporting date. The guidance is effective for the Company in annual periods beginning after December 15, 2019, and interim periods within those annual periods. The Company does not expect the adoption of this guidance to have a material impact on the consolidated financial statements as the Company does not currently have and does not anticipate, based on its conservative investment policy and nature of operations, to have assets or liabilities transferring between Level 1 and Level 2 or falling within Level 3 of the fair value hierarchy.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"), which requires a lessee to recognize most leases on the balance sheet but recognize expenses on the income statement in a manner similar to current practice. The update states that a lessee will recognize a lease liability for the obligation to make lease payments and a right-to-use asset for the right to use the underlying assets for the lease term. Leases will continue to be classified as either financing or operating, with classification affecting the recognition, measurement, and presentation of expenses and cash flows arising from a lease. The standard, and amendments by additional issued guidance described below, will be

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. Summary of Significant Accounting Policies (Continued)

effective for the Company for interim and annual periods beginning on or after January 1, 2020, with early adoption permitted. ASU 2016-02 initially required Topic 842 be adopted on a modified retrospective transition approach for leases existing, or entered into after, the beginning of the earliest comparative period presented in the financial statements. In July 2018, the FASB issued Accounting Standards Update 2018-11 ("ASU 2018-11"), Leases (Topic 842) — *Targeted Improvements.* In ASU 2018-11, the Board decided to provide another transition method by allowing entities to initially apply the new leases standard at the adoption date and recognize a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption consistent with preparers' requests. Additionally, in July 2018, the FASB issued Accounting Standards Update 2018-10 ("ASU 2018-10") *Codification Improvements to Topic 842, Leases.* ASU 2018-10 provides a number of improvements and clarifications to the guidance of ASC 842. The Company is currently evaluating the impact that the adoption of Topic 842 will have on its consolidated financial statements, the impact of ASU 2018-10, and whether to adopt the guidance in ASU 2018-11 or follow other acceptable method on transitioning to the guidance of Topic 842.

The Company has considered other recent accounting pronouncements and concluded that they are either not applicable to the business, or that the effect is not expected to be material to the consolidated financial statements as a result of future adoption.

3. Fair Value of Financial Assets and Liabilities

The following tables summarize the assets and liabilities measured at fair value on a recurring basis at December 31, 2017 and 2018 (in thousands):

	Fair Value Measurements at December 31, 2017			
	Total	Level 1	Level 2	Level 3
Assets:				
Money market funds, included in cash and cash equivalents	$ 20,461	$ 20,461	$ —	$ —
Total assets	$ 20,461	$ 20,461	$ —	$ —

	Fair Value Measurements at December 31, 2018			
	Total	Level 1	Level 2	Level 3
Assets:				
Money market funds, included in cash and cash equivalents	$ 185,676	$ 185,676	$ —	$ —
Total assets	$ 185,676	$ 185,676	$ —	$ —

The money market funds included in the table above invest in U.S. government securities that are valued using quoted market prices. Accordingly, money market funds are categorized as Level 1 as of December 31, 2017 and 2018. The warrant to purchase convertible preferred shares is classified as a liability within Level 3 of the fair value hierarchy and is valued using the Black-Scholes option pricing

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

3. Fair Value of Financial Assets and Liabilities (Continued)

model. The change in value of the warrant was immaterial for the years ended December 31, 2017 and 2018.

4. Property and Equipment, Net

At December 31, 2017 and 2018, property and equipment, net consists of the following (in thousands):

	As of December 31,	
	2017	2018
Laboratory equipment	$ 1,779	$ 2,415
Computers and software	152	163
Leasehold improvements	465	475
	2,396	3,053
Less: Accumulated depreciation and amortization	(671)	(1,210)
	$ 1,725	$ 1,843

Depreciation and amortization expense was $434,000 and $539,000 for the years ended December 31, 2017 and 2018, respectively.

5. Accrued Expenses

At December 31, 2017 and 2018, accrued expenses consist of the following (in thousands):

	As of December 31,	
	2017	2018
Accrued payroll and related expenses	974	2,012
Accrued research and development costs	322	715
Miscellaneous accrued expenses	—	512
	$ 1,296	$ 3,239

6. Stockholders' Equity

Prior to the Reorganization, all interests of members in distributions and other amounts were represented by their units of membership in the Company as specified in its operating agreement. There were two classes of units: capital units and incentive units. Capital units were comprised of common units and convertible preferred units, which represent a capital interest in the Company, while incentive units represent profits interests within the meaning of IRS Revenue Procedures 93-27 and 2001-43. The various classes of capital units are described below.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

Convertible Preferred Units

As of December 31, 2017, the total authorized capital units of the Company were 138,035,280 units, which consisted of 77,000,000 Common Units and 61,035,280 Preferred Units, of which 11,987,661 were designated Series Seed Preferred Units and 49,047,619 were designated Series A Preferred Units. During 2018, 61,538,454 units were designated Series B Preferred Units. Issuance of Series Seed Preferred Units, Series A Preferred Units, and Series B Preferred Units (collectively the "Preferred Units") is described below.

In June 2015 and January 2016, the Company issued Series Seed Preferred Units at $0.75286 per unit for proceeds of $6,555,746, net of issuance costs of $44,254. In June 2015, the Company issued additional Preferred Series Seed Units at $0.75286 per unit valued at $2,380,000 in exchange for external research efforts, with certain units subject to clawback for failure of the third party to provide the external research services through April 2017. As of December 31, 2017, there was no remaining clawback on Series Seed Preferred Units.

In June 2016, the Company issued Series A Preferred Units at $1.05 per unit for proceeds of $20,435,269, net of issuance costs of $164,730. In October 2017, the Company achieved a research milestone and issued the first tranche of the Series A Preferred Units at $1.05 per unit for proceeds of $20,594,107, net of issuance costs of $5,894.

In August 2018, in accordance with the terms of the Series A Preferred Unit Purchase Agreement, the Company issued additional Series A Preferred Units to the Series A Investors for proceeds of $10,290,962, net of issuance costs of $9,038.

In September 2018, the Company issued Series B Preferred Units at $1.30 per unit for proceeds of $79,831,491, net of issuance costs of $168,499.

The Company amended rights, preferences, and privileges of the Series Seed Preferred Units with the issuance of the Series A Preferred Units in June 2016 and accounted for it as a modification of the Series Seed Preferred Units due to the lack of significance of the modifications to the substantive contractual terms of the Series Seed Preferred Units. The Company amended rights, preferences, and privileges of the Series Seed and Series A Preferred Units with the issuance of the Series B Preferred Units in September 2018 and accounted for it as a modification of the Series Seed and Series A Preferred Units due to the lack of significance of the modifications to the substantive contractual terms of the Series Seed and Series A Preferred Units.

The rights of each class of preferred and common units is presented below:

Conversion

The Preferred Units are convertible at any time, at the election of each holder thereof, into Common Units at a one-for-one ratio, which ratio may be adjusted for certain dilutive issuances of additional units.

Liquidation Preference

In the event of a liquidation, including deemed liquidation or dissolution of the Company, distributions shall be made in the following order and priority:

- First, 100% to the members holding outstanding Series B Preferred Units, if any, in an amount equal to the aggregate original issue price less distributions previously paid to such holders;

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

- Second, 100% to the members holding outstanding Series A Preferred Units, if any, in an amount equal to the aggregate original issue price less distributions previously paid to such holders;
- Third, 100% to the members holding outstanding Series Seed Preferred Units, if any, in an amount equal to the aggregate original issue price less distributions previously paid to such holders; and
- Fourth, after payment in full to the holders of outstanding Preferred Units, 100% to the members holding outstanding common units and preferred units, in proportion to the respective number of outstanding common units (determined on an as-converted basis) held by such member.

No holder of an incentive unit shall participate in any distributions until the cumulative amount distributed to common unit holders exceeds the threshold amount with respect to such incentive unit.

A deemed liquidation event is defined as a merger or consolidation (unless the units outstanding prior to the transaction represent a majority of the post transaction voting rights) or the sale or transfer of substantially all of the assets of the Company, unless the holders of a majority of the then outstanding preferred units, voting together, including at least (i) a majority of the Series A Preferred Units and (ii) 63% of the Series B Preferred Units elect otherwise.

Voting Rights

An affirmative vote of a majority of the outstanding Preferred Units and Common Units, voting together as a single class on an as converted basis, is required on all matters.

Deemed Redemption

The Company's Convertible Preferred Units have been classified as temporary equity on the accompanying consolidated balance sheets in accordance with authoritative guidance for the classification and measurement of redeemable securities as the Convertible Preferred Units are redeemable upon the occurrence of a deemed liquidation event. The carrying value of the Company's Convertible Preferred Units was not adjusted because a liquidation event was not probable and did not occur.

Upon issuance, and amendment, of each class of Preferred Unit, the Company assessed the features of the Preferred Unit, including additional issuances, embedded conversion and liquidation features and determined that such features did not require the Company to separately account for these features. The Company also concluded that no beneficial conversion feature existed upon the issuance date of each class of Preferred Units.

Common Units

As of December 31, 2016, the Company had outstanding 5,896,584 common units. There were no additional common units issued during the years ended December 31, 2017 and 2018.

An affirmative vote of a majority of the outstanding Preferred Units and Common Units, voting together as a single class on an as converted basis, is required on all matters.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

Reorganization and Convertible Preferred Stock

On December 5, 2018, the Company completed a series of transactions, or the Reorganization, pursuant to which Morphic Holding, LLC was converted in a tax-free exchange into Morphic Holding, Inc. and three subsidiaries, namely Lazuli, Inc., Tourmaline, Inc. and Phyllite, Inc. were merged with and into Morphic Therapeutic, Inc. In connection with the Reorganization:

- Holders of Morphic Holding, LLC Series B convertible preferred units received one share of Morphic Holding, Inc. Series B convertible preferred stock for each outstanding Series B convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 61,538,454 shares of Morphic Holding, Inc. Series B convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC Series A convertible preferred units received one share of Morphic Holding, Inc. Series A convertible preferred stock for each outstanding Series A convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 49,047,619 shares of Morphic Holding, Inc. Series A convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC Series Seed convertible preferred units received one share of Morphic Holding, Inc. Series Seed convertible preferred stock for each outstanding Series Seed convertible preferred unit held immediately prior to the Reorganization, with an aggregate of 11,927,889 shares of Morphic Holding, Inc. Series Seed convertible preferred stock issued in the Reorganization;
- Holders of Morphic Holding, LLC common units received one share of Morphic Holding, Inc. common stock for each outstanding common unit held immediately prior to the Reorganization, with an aggregate of 5,896,584 shares of common stock issued in the Reorganization;
- Holders of Morphic Holding, LLC vested and unvested incentive units, exchanged one incentive unit for one share of common stock or restricted common stock, respectively. Threshold amounts on all vested and unvested incentive units were decreased to $0. The restricted common stock was issued with the same vesting terms as the unvested incentive units held immediately prior to the Reorganization. A total of 9,182,834 shares of common stock and restricted common stock were issued to the prior holders of incentive units; and
- The outstanding warrant to purchase 39,800 Series Seed convertible preferred units at an exercise price of $0.75286 per unit was converted to a warrant to purchase 39,800 shares of Series Seed convertible preferred stock at the same exercise price per share.

The Company's Series B convertible preferred stock, Series A convertible preferred stock, Series Seed convertible preferred stock are designated as convertible preferred stock under the amended and restated certificate of incorporation. All outstanding shares of convertible preferred stock are convertible into shares of common stock at a one-to-one conversion ratio. The purpose of the Reorganization was to reorganize the Company's corporate structure so that Morphic Holding, Inc. would continue as a corporation and so that the Company's existing investors would own capital stock rather than equity interests in a limited liability company.

The Company evaluated the accounting for the Reorganization and specifically the exchange of (1) preferred and common units for preferred and common shares and (2) the modification to the terms of the incentive units. With respect to the exchange of preferred and common units for preferred and common shares, the Company considered that there were no changes to the ownership interest held by each unit/stockholder as a result of the Reorganization, there was no consideration exchanged to effect the exchange, and the significant terms of the preferred units and common units were substantially the same before and after the

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

Reorganization. Based on these considerations, the Company determined that the exchange of shares occurring in the Reorganization should be accounted for as a modification of equity securities. The accounting for the modification to the terms of the incentive units is described in Note 7.

Convertible Preferred Stock

The terms of the Convertible Preferred Stock, and Common Stock after Reorganization, are as follows:

Liquidation

In the event of any liquidation, dissolution or winding up of affairs of the Company (or upon a deemed liquidation event), distributions are first made to holders of the Series B Convertible Preferred Stock equal to the greater of (i) their original issuance price, plus any declared but unpaid dividends or (ii) the amount that the holder would be entitled upon conversion into common stock. The original issue price of Series B Convertible Preferred Stock is $1.30 per share. After distribution to the Series B Convertible Preferred Stockholders, distributions are made to holders of the Series A Convertible Preferred Stock equal to the greater of (i) their original issue price plus any declared but unpaid dividends or (ii) the amount that the holder would be entitled upon conversion into common stock. The original issue price of the Series A Convertible Preferred Stock is $1.05. After distribution to the Series A Convertible Preferred Stockholders, the holders of the Series Seed Convertible Preferred Stock, as a class, will receive a distribution equal to the greater of (i) their original issue price plus any declared but unpaid dividends or (ii) the amount that the holder would be entitled upon conversion into common stock. The original issue price of the Series Seed Convertible Preferred Stock is $0.75286. Upon completion of the preferential payments to holders of Convertible Preferred Stock, all of the remaining assets shall be distributed among the holders of common stock on a pro rata basis, calculated based on the number of shares of common stock held by each, assuming conversion of all outstanding shares of Convertible Preferred Stock.

A deemed liquidation event is defined as a merger (unless the shares of capital stock prior to the transaction represent a majority of the post merger voting rights) or the sale, lease, transfer or license of substantially all of the assets of the Company unless the holders of a majority of the then outstanding shares of preferred stock, voting together, including at least (i) a majority of the Series A Convertible Preferred Stock and (ii) 63% of the Series B Convertible Preferred Stock elect otherwise.

Dividends

The Company shall not declare, pay or set aside any dividends on shares of common stock unless the holders of preferred stock then outstanding shall first receive a dividend on each outstanding share of preferred stock.

Conversion

Shares of Convertible Preferred Stock may be converted, at the option of the holder, at any time into a number of common shares as is determined by dividing the original issue price by the conversion price in effect at the time of conversion. The conversion price is equal to the original issue price for all Convertible Preferred Stock, subject to adjustments in the event of any stock dividend, stock split, combination or other similar recapitalization, and other adjustments as set forth in the Company's certificate of incorporation.

In addition, upon either the closing of a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, or the occurrence of an event, specified by vote of a majority of the then outstanding shares of preferred stock, voting together, including at least (i) a majority of the Series A Convertible Preferred Stock and (ii) 63% of the Series B

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

Convertible Preferred Stock, all outstanding Convertible Preferred Stock will be automatically converted into common shares.

Voting

On any matter to be approved by the stockholders, holders of Convertible Preferred Stock have the right to cast a number of votes equal to the number of shares of common stock into which the shares of Convertible Preferred Stock held by such holder convert.

Redemption

The Company's Convertible Preferred Stock has been classified as temporary equity on the accompanying consolidated balance sheets in accordance with authoritative guidance for the classification and measurement of redeemable securities as the Convertible Preferred Stock is redeemable upon the occurrence of a deemed liquidation event. The carrying value of the Company's Convertible Preferred Stock is not being adjusted because a deemed liquidation event is not probable.

Upon issuance, and amendment, if any, of each class of Preferred Shares, the Company assessed the features of the Preferred Shares, including additional issuances, embedded conversion and liquidation features and determined that such features did not require the Company to separately account for these features. The Company also concluded that no beneficial conversion feature existed upon the issuance date of each class of Preferred Stock.

Common Stock

The voting, dividend, and liquidation rights of the holders of common stock are subject to and qualified by the rights, powers, and preferences of the holders of Convertible Preferred Stock. The common stock has the following characteristics:

Voting

The holders of common stock are entitled to one vote for each share of common stock held.

Dividends

The holders of shares of Common stock are entitled to receive dividends, if and when declared by the Company's board of directors. Cash dividends may not be declared or paid to holders of shares of common stock until all unpaid dividends on Convertible Preferred Stock have been paid in accordance with their terms. No dividends have been declared or paid by the Company to the holders of common stock since the issuance of the common stock.

Liquidation

Holders of the common shares are entitled to receive distributions of cash, including in the event of a liquidation or dissolution of the Company, which preference is junior to the liquidation preference of the Series B Preferred stock holders, Series A Preferred stock holders, and the Series Seed Preferred stock holders. After all preferred stock holders have received their respective preferred distributions, any assets remaining for distribution shall be distributed to the holders of Preferred or common shares determined on an as-converted basis.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

6. Stockholders' Equity (Continued)

Shares Reserved For Future Issuance

As of December 31, 2018, the Company had reserved common shares for the conversion of outstanding Convertible Preferred Stock and for future issuance under the 2018 Stock Option and Incentive Plan as follows:

	As of December 31, 2018
Common shares reserved for conversion of convertible preferred stock outstanding	122,513,962
Common shares reserved for conversion of convertible preferred shares issuable upon exercise of a warrant	39,800
Common shares reserved for exercise of outstanding stock options under the 2018 Plan	10,417,696
Common shares reserved for future issuance under the 2018 Plan	2,667,369
	135,638,827

7. Equity-Based Compensation

Prior to the Reorganization, the Company's operating agreement, as amended and restated, provided for the granting of incentive units to employees, officers, directors, and consultants, as determined by the Board of Directors. At December 31, 2017, 9,253,416 incentive units were authorized to be granted of which 319,360 were available for the future grants.

The terms of the incentive units granted prior to the Reorganization were determined by the Board of Directors and included vesting, forfeiture, repurchase, and other provisions. Incentive units had rights to dividends and were entitled to distributions. Incentive unit holders were not required to purchase or "exercise" their incentive units in order to receive such distributions. However, distributions to incentive unit holders began only after the cumulative amount distributed to common unit holders exceeded the threshold amount with respect to such incentive unit. Distributions were entitled to be made to incentive unit holders whether vested or unvested. Unvested distributions were to be held by the Company until the incentive units vest, at which time they would be released to the incentive unit holder. Unless otherwise approved by the Board of Directors, the incentive units generally vested over a four year period with the first 25% vesting following 12 months of employment or service and the remaining incentive units vesting in equal quarterly installments over the following 36 months. The incentive units had no contractual term.

In connection with the issuance of each incentive unit, the Board of Directors set a threshold amount based on the amount of distributions that the holders of a common unit would be entitled to receive in a hypothetical liquidation of the Company on the date of issuance of the incentive unit in which the Company sold its assets at fair market value, satisfied its liabilities, and distributed the net proceeds to the holders of units in liquidation of the Company.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

7. Equity-Based Compensation (Continued)

A summary of the Company's incentive unit activity in 2018 prior to the Reorganization and related information is as follows:

	Number of Units	Weighted Average Grant Date Fair Value per Unit	Weighted Average Threshold Price per Unit
Outstanding at December 31, 2017	8,934,056	$ 0.23	$ 0.19
Granted	354,000	0.41	0.33
Forfeited	(105,222)	0.32	0.27
Exchanged for common stock and restricted common stock pursuant to the Reorganization	(9,182,834)	0.24	0.20
Outstanding at December 31, 2018	—	—	—

A summary of vested incentive units is as follows:

	Number of Units
Vested at December 31, 2017	2,561,790
Vesting through the date of the Reorganization	2,045,082
Cancelled/Forfeited	—
Vested as of the Reorganization	4,606,872

The total fair value of incentive units vested during 2017 and 2018 through the date of the Reorganization was $296,000 and $473,000, respectively.

Reorganization

Pursuant to the Reorganization, all vested and unvested incentive units granted under the 2015 Compensatory Benefit Plan which were outstanding immediately prior to the Reorganization, were exchanged for an equal number of shares of common stock or restricted common stock, respectively, under the 2018 Stock Incentive Plan, described below. The threshold amount per incentive unit was decreased to $0 for all vested and unvested units outstanding immediately prior to the Reorganization. A total of 35 active employees of the Company were subject to the exchange of the incentive units for common shares and restricted common shares. The restricted common stock was issued with the same vesting terms as the unvested incentive units held immediately prior to the Reorganization.

The Company accounted for the exchange of incentive units in Morphic Holding, LLC for common stock and restricted common stock of Morphic Therapeutic, Inc. as a modification in accordance with the requirements of ASC 718. The Company determined the fair value of the common stock and restricted common stock using the market approach, including the guideline public company method and the precedent transaction method which "backsolves" to a preferred price. Accordingly, the Company determined there was an excess fair value of the replacement awards over the fair value of the incentive

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

7. Equity-Based Compensation (Continued)

units exchanged in connection with the Reorganization, which resulted in incremental compensation expense of $968,000 of which $365,000 was recognized in 2018.

The incremental fair value related to vested awards was recognized immediately as compensation expense. The incremental fair value of unvested awards and any remaining unrecognized compensation of the original awards will be recognized as compensation expense over the remaining vesting period.

Incentive Unit Compensation Expense Assumptions

The following weighted average assumptions were used in determining the fair value of incentive units granted to both employees and non-employees during 2017 and 2018:

	2017	2018
Risk-free interest rate	2.28%	2.79%
Expected dividend yield	—	—
Expected term (years to liquidity)	6.03	5.98
Expected volatility	70.77%	76.63%

Compensation Expense related to Incentive Units

The Company recorded equity-based compensation expense for incentive units granted to employees, directors and non-employees of $289,000 and $507,000 for the years ended December 31, 2017 and 2018, respectively.

2018 Stock Incentive Plan

The 2018 Stock Incentive Plan (the "2018 Plan"), instituted as part of the Reorganization, provides for the grant of incentive stock options, non-qualified stock options, and restricted stock awards. The 2018 Plan is administered by the Board of Directors, or at the discretion of the Board of Directors, by a committee of the board. The exercise prices, vesting, and other restrictions are determined at the discretion of the Board of Directors, or a committee if so delegated, except that the exercise price per share of stock options may not be less than 100% of the fair market value of the share of common stock on the date of grant and the term of stock option may not be greater than ten years. Stock options granted under the 2018 Plan to employees generally vest over four years. The number of shares initially reserved for issuance under the 2018 Plan was 13,045,265 shares of common stock. The shares of common stock underlying any awards that are forfeited, cancelled, repurchased, or are otherwise terminated by the Company under the 2018 Plan will be added back to the shares of common stock available for issuance under the 2018 Plan up to the number of shares of common stock subject to awards granted prior to the effectiveness of the 2018 Plan. Options generally vest over a four year period with the first 25% vesting following 12 months of employment or service and the remaining award vesting in equal quarterly installments over the following 36 months. All options have a contractual term of 10 years.

As of December 31, 2018, there were 2,667,369 available for future issuance under the 2018 Plan.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

7. Equity-Based Compensation (Continued)

The following table summarizes the common stock and restricted common stock activity under the 2018 Plan:

	Number of Shares	Weighted Average Fair Value per Share at Issuance
Common stock and restricted common stock issued as part of the Reorganization	9,182,834	$ 0.74
Vested as of the Reorganization	4,606,872	0.74
Unvested restricted common stock as of the Reorganization	4,575,962	0.74
Granted	—	—
Vested	184,529	0.74
Forfeited	—	—
Unvested restricted common stock as of December 31, 2018	4,391,433	$ 0.74

As of December 31, 2018, the Company had unrecognized equity-based compensation expense of $1,775,000, which includes $603,000 related to the modification described above, for the restriced common shares issued to employees and non-employees, which is expected to be recognized over a weighted average period of 1.73 years.

The aggregate fair value of restricted stock awards that vested subsequent to the Reorganization during the year ended December 31, 2018, based on estimated fair values of stock underlying the restricted stock awards on the date of vesting was $137,000.

Stock Options

The Company granted stock option awards under the 2018 Plan. The following table summarizes the Company's stock option activity under the 2018 Plan:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
			(in years)	(in thousands)
Outstanding as of December 31, 2017	—	$ —	—	$ —
Granted	10,417,696	0.74	9.96	—
Vested	—	—	—	—
Forfeited	—	—	—	—
Outstanding as of December 31, 2018	10,417,696	0.74	9.96	—
Options exercisable as of December 31, 2018	—	$ —	—	$ —

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

7. Equity-Based Compensation (Continued)

The weighted average grant-date fair value per share of stock options granted to employees and non-employees for stock option awards with service-based vesting conditions through December 31, 2018 was $0.50 per share.

The following table summarizes assumptions used in determining the fair value of the options granted in 2018:

	Year ended December 31, 2018
Risk-free interest rate	2.75%
Expected dividend yield	—%
Expected term (in years)	6.03
Expected volatility	75.33%

Compensation Expense related to Stock Options

The Company recorded equity-based compensation expense for stock options granted to employees and non-employees of $104,000 for the year ended December 31, 2018, with no comparable amount in the year ended December 31, 2017.

As of December 31, 2018, the Company had unrecognized equity-based compensation expense of $5,091,000 related to stock options issued to employees and non-employees, which is expected to be recognized over a weighted average period of 3.8 years.

Total Equity-based Compensation Expense

The Company recorded equity-based compensation expense related to all equity-based awards for employees and non-employees, which was allocated as follows in the consolidated statements of operations (in thousands):

	Year Ended December 31,	
	2017	2018
Research and development expense	$ 123	$ 520
General and administrative expense	166	477
	$ 289	$ 997

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

8. Income Taxes

The effective income tax rate differed from the amount computed by applying the federal statutory rate to the Company's loss before income taxes as follows:

	Year Ended December 31,	
	2017	2018
Tax effected at statutory rate	34.00%	21.00%
State taxes	6.53	2.89
Stock compensation	(0.58)	(0.84)
Non-taxable income	0.38	0.29
Non deductible expenses	(0.14)	—
Impact of federal rate change on net deferred taxes	(21.28)	—
Federal research and development credits	1.38	1.89
Change in valuation allowance	(20.29)	(25.23)
	—%	—%

Deferred tax assets consist of the following at December 31, 2017 and 2018 (in thousands):

	As of December 31,	
	2017	2018
Deferred tax assets:		
Net operating loss carryforwards	$ 6,140	$ 8,631
Research and development credit carryforwards	726	938
Intangible assets	1,760	4,670
Reserves and accruals	384	692
Stock-based compensation	—	11
Total deferred tax assets:	9,010	14,942
Valuation allowance	(8,947)	(14,710)
Subtotal	63	232
Fixed assets	(63)	(232)
Total net deferred tax assets	$ —	$ —

As required by ASC 740, the Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are composed principally of NOL carryforwards and research and development credit carryforwards. The Company has determined that it is more likely than not that the Company will not realize the benefits of its federal and state deferred tax assets, and, as a result, a valuation allowance of $8,947,000 and $14,710,000 has been established at December 31, 2017 and 2018, respectively. The change in the valuation allowance was $3,433,000 and $5,763,000 for the years ended December 31, 2017 and 2018.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

8. Income Taxes (Continued)

The Company has incurred NOLs from inception. At December 31, 2018, the Company has federal and state NOL carryforwards of approximately $34,672,000 and $21,364,000, respectively, available to reduce future taxable income, that expire beginning in 2036. As of December 31, 2018, the Company also has federal and state research and development tax credit carryforwards of approximately $617,000 and $406,000 respectively, to offset future income taxes, which will begin to expire beginning in December 2031. The Company's NOL carryforwards are subject to review and possible adjustment by the appropriate taxing authorities. These NOL carryforwards that may be utilized in any future period may be subject to limitations based upon changes in the ownership of the Company's stock in a prior or future period. The Company has not quantified the amount of such limitations, if any.

On December 22, 2017, the Tax Cuts and Jobs Act ("the Act") was signed into law. The Act, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a marginal rate of 34% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits.

The Company recognizes the changes in tax law, including the Act, in the period the law is enacted. Accordingly, the effects of the Act have been recognized in the financial statements for the year ended December 31, 2017. As a result of the change in law, the Company recorded a reduction to its deferred tax assets and a corresponding reduction to its valuation allowance. As a result, there was no impact to the Company's income statement due to the reduction in the U.S. corporate tax rate. The Company also had no investments in foreign corporations as of December 31, 2017 or 2018. The Company's reporting of the Act was complete as of December 31, 2018 and no adjustment to the provisional amounts recorded as of December 31, 2017 was recorded.

The Company follows the provisions of ASC 740-10, "Accounting for Uncertainty in Income Taxes," which specifies how tax benefits for uncertain tax positions are to be recognized, measured, and recorded in financial statements; requires certain disclosures of uncertain tax matters; specifies how reserves for uncertain tax positions should be classified on the balance sheet; and provides transition and interim period guidance, among other provisions. As of December 31, 2017 and 2018, the Company had no unrecognized tax benefits. The Company has not, as of yet, conducted a study of its research and development credit carryforwards. Such a study may result in an adjustment to the Company's research and development credit carryforwards; however, until a study is completed and any adjustment is known, no amount is being presented as an uncertain tax position. A full valuation allowance has been provided against the Company's research and development credits, and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the balance sheet or statement of operations and comprehensive loss if an adjustment were required.

The Company's policy is to recognize interest and penalties accrued on any uncertain tax positions as a component of income tax expense, if any, in its statements of operations.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

8. Income Taxes (Continued)

For the years ended December 31, 2017 and 2018, no estimated interest or penalties were recognized on uncertain tax positions. The Company does not expect any significant change in its uncertain tax positions in the next 12 months.

The Company files U.S. federal and state income tax returns and is generally subject to income tax examinations by these authorities for all tax years. Currently, no federal or state income tax returns are under examination by the respective income tax authorities.

9. Commitments and Contingencies

Guarantees and Indemnifications

As permitted under Delaware law, Morphic Holding, Inc indemnifies its officers, directors, and employees for certain events, occurrences while the officer, or director is, or was, serving at the Company's request in such capacity. The term of the indemnification is for the officer's or director's lifetime.

The Company has standard indemnification arrangements in its leases for laboratory and office space that require it to indemnify the landlord against any liability for injury, loss, accident, or damage from any claims, actions, proceedings, or costs resulting from certain acts, breaches, violations, or non-performance under the Company's lease.

Through December 31, 2018, the Company had not experienced any losses related to these indemnifications obligations, and no material claims were outstanding. The Company does not expect significant claims related to these indemnification obligations and, consequently, concluded that the fair value of these obligations is negligible, and no related reserves were established.

Operating Leases

Facility Lease

In August 2015, the Company leased approximately 11,000 square feet of office and laboratory space, and obtained services (facilities management, office, and laboratory services) under an operating lease that expires in December 2020. The lease has monthly lease payments of $34,429 the first 12 months with annual rent escalations thereafter and provides a rent abatement of $9,762 per month for the first three months. The Company has an option to extend the lease by three years at a rate of at least the amount paid in the last year of the current lease or the then-current market rate, whichever is higher. In accordance with the lease, the Company entered into a cash-collateralized irrevocable standby letter of credit naming the landlord as beneficiary and the amount is included in restricted cash in the consolidated balance sheets.

In June 2017, the Company leased approximately 21,000 square feet of additional laboratory and office space by amending the existing lease and extending the lease to May 2022. As a result of the amendment, the additional space has monthly rent payments of $56,371 for the first twelve months with annual rent escalations thereafter for the remaining term of the lease and provides a rent abatement for the first three months. The amendment also required the Company to increase the restricted cash by amending the letter of credit to $275,189.

In November 2017, the Company subleased approximately 2,000 square feet of office & lab space to a subtenant. The subtenant will pay the Company $6,351 per month for the first twelve months with annual rent escalations thereafter through April 2020. The Company received a $16,594 security deposit from the subtenant which the Company has included in other long-term liabilities and will be returned to the

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

9. Commitments and Contingencies (Continued)

subtenant upon vacancy of the premises and the subtenant's performance of its obligations under the sublease.

The Company recognizes rent expense for the space it currently occupies and records a deferred rent obligation representing the cumulative difference between actual rent payments and rent expense recognized ratably over the lease period, which is included in the Company's consolidated balance sheets as of December 31, 2017 and 2018.

Minimum annual rent payments under this lease for the remaining term of the amended lease, excluding operating expenses and taxes which are not fixed for future periods as of December 31, 2018, are as follows (in thousands):

Year ending December 31,	Total Minimum Lease Payments	Sublease Income	Net Minimum Lease Payments
2019	$ 1,087	$ (159)	$ 928
2020	1,122	(110)	1,012
2021	1,175	—	1,175
2022	495	—	495
Total minimum lease payments	$ 3,879	$ (269)	$ 3,610

The Company recorded approximately $849,000 and $941,000 in rent expense for the years ended December 31, 2017 and 2018, respectively.

Legal Proceedings

The Company is not currently a party to any material legal proceedings.

10. Extinguishment of Notes Payable

In December 2018, the Company extinguished its obligation under the 2016 Loan and Security Agreement with Silicon Valley Bank (the "SVB Agreement"). As part of extinguishment, the Company paid the 5% of amounts drawn fee, originally agreed upon, certain other fees required by the Silicon Valley Bank, and recognized charges related to unaccreted issuance discount and unamortized debt issuance costs, resulting in the aggregate loss of $28,000. Notes payable balance was $630,000 and $0 at December 31, 2017 and 2018, respectively.

In 2016, in connection with obtaining funding under the SVB Agreement, the Company issued a warrant to purchase 19,881 Series Seed Preferred Units at $0.75286 unit on March 31, 2016 and a warrant to purchase 19,919 Series Seed Preferred Units at $0.75286 per unit on December 31, 2016. The warrants were outstanding on December 31, 2018 and were included in other long-term liabilities.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

11. Option and License Agreement

Overview

In October 2018, the Company entered into a 5-year collaboration and option agreement with AbbVie, a research-based global biopharmaceutical company and a related party holding in aggregate approximately 5% of outstanding Series A and Series B Convertible Preferred Shares of the Company. Pursuant to this agreement, AbbVie paid the Company an upfront, non-refundable amount of $100.0 million. In exchange, the Company: (i) assumed the obligation to perform research and development activities to identify and develop compounds directed at multiple fibrosis indications (grouped into four research programs) through completion of Investigational New Drug (IND)-enabling studies, and (ii) granted AbbVie options to license the results of R&D in exchange for separate upfront option-exercise fees.

At any time during the five-year period, AbbVie holds the right to exercise its license options for molecules with the selected pharmacological profiles by providing written notice to the Company and paying an option exercise fee of $20.0 million per option exercised (up to three in total). The Company's obligations to perform R&D activities for the molecules with selected pharmacological profile cease after AbbVie exercises the option(s) and accepts the results of R&D activities. Upon exercise of an option, AbbVie assumes full responsibility for further development of the molecules at its sole cost, and the Company is obligated to transfer any and all manufacturing related activities to AbbVie at AbbVie's cost. In addition, after AbbVie exercises its options, it is obligated to pay the Company certain development milestones totaling up to $80.0 million per indication, launch milestones totaling up to $110.0 million per indication, and net sales milestones totalling up to $160.0 million per indication. Development milestones are triggered upon the initiation of various phases of clinical trials. Launch milestones are achieved by recording first commercial sale in each of the specified markets. The net sales milestones are achieved by reaching the agreed upon volume of sales in certain territories. The Company is also entitled to royalty payments ranging in high single digit to low double-digit percentage of sales in a calendar year. The Company retained cost-sharing rights in the development of compounds for the liver fibrosis indications, including non-alcoholic steatohepatitis, and may opt into paying a percentage of AbbVie's development costs in exchange for enhanced royalties. As of December 31, 2018, AbbVie has not exercised any options.

Accounting Analysis

The Company has concluded that the performance obligations in the agreement include the research services for the four research programs. The Company has concluded that the unexercised license options were marketing offers as the options did not provide any discounts or other rights that would be considered a material right in the arrangement. All other performance obligations were determined to be immaterial in the context of the contract.

The Company estimated the standalone selling price of each research program based on internal and external costs to perform the research plus a reasonable profit margin of 10%. The total estimated cost of the research and development services reflects the nature of the services to be performed and the Company's best estimate of the length of time required to perform the services. The Company recognizes revenue as research and development services are provided based on the costs incurred to date, as such costs have direct relationship between the Company's effort and the progress made towards satisfying its performance obligations to AbbVie. Changes in estimates of total internal and external costs expected to be incurred are recognized in the period of change as a cumulative catch-up adjustment. There have been no changes to the Company's estimates to date.

The Company determined that the transaction price included only the non-refundable up-front payment of $100.0 million. The option exercise payments were not included in the transaction price, as the Company

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

11. Option and License Agreement (Continued)

determined that the agreed upon fees represent fair value of such options. Exercise of any of the options will be accounted for as contract modification if and when AbbVie delivers the written exercise notice. The milestone payments were fully constrained, as a result of the uncertainty regarding whether AbbVie would exercise any of the options and whether any of the associated milestones would be achieved. There have been no changes to the transaction price in 2018.

The Company also considered the existence of any significant financing component within the AbbVie Agreement given its upfront payment structure. Based upon this assessment, the Company concluded that the up-front payment was provided for valid business reasons and not for the purpose of providing financing. Accordingly, the Company has concluded that the upfront payment structure of the AbbVie Agreement does not result in the existence of a significant financing component.

During the year ended December 31, 2018, the Company recorded the upfront payment of $100.0 million as deferred revenue and recognized revenue of $3.4 million related to research services performed during 2018. As of December 31, 2018, the Company has $96.6 million of deferred revenue, which is classified as either current or net of current portion in the accompanying consolidated balance sheets based on the period over which the revenue is expected to be recognized. This deferred revenue balance represents the aggregate amount of the transaction price allocated to the performance obligations that are partially unsatisfied as of December 31, 2018. The Company expects to recognize revenue related to these performance obligations through 2024.

12. Net Loss per Unit and Share

Basic and diluted net loss per unit is calculated as follows (in thousands, except unit and per unit data):

	Year Ended December 31, 2017
Net loss	$ (16,920)
Weighted average common units outstanding, basic and diluted	5,896,584
Net loss per unit, basic and diluted	$ (2.87)

Following the Reorganization, the Company calculates net loss per share based on its outstanding shares of common stock. For the year ended December 31, 2018, the weighted average number of common shares outstanding includes the weighted average number of common units outstanding prior to the Reorganization.

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

12. Net Loss per Unit and Share (Continued)

Basic and diluted net loss per share is calculated as follows (in thousands, except share and per share data):

	Year Ended December 31, 2018
Net loss	$ (23,831)
Weighted average common shares outstanding, basic and diluted	6,237,889
Net loss per share, basic and diluted	$ (3.82)

The following table sets forth the outstanding common unit or common stock equivalents, presented based on amounts outstanding at each period end, that have been excluded from the calculation of diluted net loss per unit or share for the periods indicated because their inclusion would have been anti-dilutive (in common unit or common stock equivalent shares, as applicable):

	Year Ended December 31,	
	2017	2018
Convertible preferred units	51,165,983	—
Convertible preferred stock	—	122,513,962
Incentive units	2,561,790	—
Restricted common stock	—	4,391,433
Warrant	39,800	39,800
Stock options	—	10,417,696
	53,767,573	137,362,891

13. Employee Benefit Plan

In 2016, the Company adopted a qualified retirement plan, the Morphic Therapeutic, Inc. 401(k) Plan (the "Plan") to provide retirement income for eligible employees through employee contributions and employer matching contributions. The Company matches 50% up to the first 6% contributed by a participant. Contributions totaled $112,000 and $182,000 for the year ended December 31, 2017 and 2018, respectively.

14. Subsequent Events

In February 2019, the Company entered into a research and development collaboration with Janssen Pharmaceuticals, Inc. ("Janssen") to discover and develop novel integrin therapeutics for patients with conditions not adequately addressed by current therapies. The Janssen collaboration initially focuses on three integrin targets with the ability to substitute integrin targets not explored by the Company and will explore both inhibitors and activators of integrin function in the aI domain, a distinct structural subset of

MORPHIC HOLDING, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

14. Subsequent Events (Continued)

the 24-member integrin family. This collaboration agreement extends the Company's discovery efforts into all four quadrants of the integrin receptor family.

Under the terms of the agreement, the Company and Janssen will collaborate through preclinical development to identify and advance candidates. Upon completing IND-enabling studies, Janssen may exclusively option the licensed compounds, at which time Janssen will be responsible for global clinical development and commercialization. In consideration of the rights granted, Janssen paid us an upfront fee of $10.0 million for each of the first two research programs, and will pay us an additional $5.0 million fee upon commencement of the third research program, and will fund research activities. Pursuant to the terms of the agreement, we are also eligible to receive additional milestone and royalty payments. Research milestones are based on late lead optimization and option activities. Development milestones are triggered upon the initiation of various phases of clinical trials. The net sales milestones are achieved by reaching the agreed upon volume of sales in certain territories. The Company is also entitled to royalty payments ranging in mid-single digit on worldwide net sales for any products resulting from the collaboration.

Shares

Morphic Holding, Inc.

Common Stock

PRELIMINARY PROSPECTUS

Joint Book-Running Managers

Jefferies
Cowen
BMO Capital Markets
Wells Fargo Securities

, 2019

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 13. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION.

The following table sets forth all costs and expenses, other than underwriting discounts and commissions, paid or payable by the Registrant in connection with the sale of the common stock being registered. All amounts shown are estimates except for the Securities and Exchange Commission, or SEC, registration fee, the Financial Industry Regulatory Approval, or FINRA, filing fee and the Nasdaq Global Market listing fee:

	Amount Paid or To Be Paid
SEC registration fee	$ *
FINRA filing fee	*
The Nasdaq Global Market listing fee	*
Printing and engraving expenses	*
Legal fees and expenses	*
Accounting fees and expenses	*
Blue Sky, qualification fees and expenses	*
Transfer agent and registrar fees and expenses	*
Miscellaneous expenses	*
Total	$ *

* To be completed by amendment.

ITEM 14. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Section 145 of the Delaware General Corporation Law, or DGCL, authorizes a court to award, or a corporation's board of directors to grant, indemnity to directors and officers under certain circumstances and subject to certain limitations. The terms of Section 145 of the DGCL are sufficiently broad to permit indemnification under certain circumstances for liabilities, including reimbursement of expenses incurred, arising under the Securities Act of 1933, as amended, or the Securities Act.

As permitted by the DGCL, the Registrant's restated certificate of incorporation to be effective in connection with the completion of this offering contains provisions that eliminate the personal liability of its directors for monetary damages for any breach of fiduciary duties as a director, except liability for the following:

- any breach of the director's duty of loyalty to the Registrant or its stockholders;
- acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law;
- under Section 174 of the DGCL (regarding unlawful dividends and stock purchases); or
- any transaction from which the director derived an improper personal benefit.

As permitted by the DGCL, the Registrant's restated bylaws to be effective in connection with the completion of this offering, provide that:

- the Registrant is required to indemnify its directors and executive officers to the fullest extent permitted by the DGCL, subject to limited exceptions;
- the Registrant may indemnify its other employees and agents as set forth in the DGCL;

- the Registrant is required to advance expenses, as incurred, to its directors and executive officers in connection with a legal proceeding to the fullest extent permitted by the DGCL, subject to limited exceptions; and
- the rights conferred in the restated bylaws are not exclusive.

Prior to the completion of this offering, the Registrant intends to enter into indemnification agreements with each of its current directors and executive officers to provide these directors and executive officers additional contractual assurances regarding the scope of the indemnification set forth in the Registrant's restated certificate of incorporation and restated bylaws and to provide additional procedural protections. There is no pending litigation or proceeding involving a director or executive officer of the Registrant for which indemnification is sought. Reference is also made to the underwriting agreement to be filed as Exhibit 1.1 to this registration statement, which provides for the indemnification of executive officers, directors and controlling persons of the Registrant against certain liabilities. The indemnification provisions in the Registrant's restated certificate of incorporation, restated bylaws and the indemnification agreements entered into or to be entered into between the Registrant and each of its directors and executive officers may be sufficiently broad to permit indemnification of the Registrant's directors and executive officers for liabilities arising under the Securities Act.

The Registrant has directors' and officers' liability insurance for securities matters.

ITEM 15. RECENT SALES OF UNREGISTERED SECURITIES.

The following lists set forth information regarding all securities sold or granted by the Registrant from April 1, 2016 through March 31, 2019 that were not registered under the Securities Act, and the consideration, if any, received by the Registrant for such securities:

(a) The Reorganization

On December 5, 2018, the Registrant completed a reorganization whereby it converted from a Delaware limited liability company under the name Morphic Holding, LLC to a Delaware corporation under the name Morphic Holding, Inc. In conjunction with the reorganization, (i) all of the Registrant's outstanding common units converted on a one-for-one basis into 5,896,584 shares of common stock; (ii) all of the Registrant's outstanding preferred units converted on a one-for-one basis into 122,513,962 shares of convertible preferred stock; and (iii) all of the Registrant's outstanding vested and unvested incentive units converted on a one-for-one basis into 9,182,834 shares of common stock and restricted common stock, respectively. The restricted common stock was issued with the same vesting terms as the incentive units held immediately prior to the reorganization. The securities issued in this transaction were exempt from the registration requirements of the Securities Act in reliance on Sections 4(a)(2) and/or 3(a)(9) of the Securities Act or Rule 701 promulgated under the Securities Act.

(b) Stock Option Grants

Since April 1, 2016 and through March 31, 2019, the Registrant has granted to its employees, directors, consultants and other service providers options to purchase an aggregate of 10,417,696 shares of common stock under the 2018 Plan, with exercise prices of $0.74 per share. The issuances of the securities described above were deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act or Rule 701 promulgated under the Securities Act as transactions pursuant to compensatory benefit plans. The shares of common stock issued upon the exercise of options are deemed to be restricted securities for purposes of the Securities Act.

(c) Preferred Stock

In September 2018, the Registrant issued and sold to 13 accredited investors an aggregate of 61,538,454 shares of Series B convertible preferred stock at a purchase price of $1.30 per share, for aggregate consideration of approximately $80.0 million. In connection with the completion of this offering, these shares of Series B convertible preferred stock will convert into 61,538,454 shares of the Registrant's

common stock. This transaction was exempt from the registration requirements of the Securities Act in reliance upon Section 4(2) of the Securities Act or Regulation D promulgated under the Securities Act.

In June 2016, September 2017 and August 2018, the Registrant issued and sold to 12 accredited investors an aggregate of 49,047,619 shares of Series A convertible preferred stock at a purchase price of $1.05 per share, for aggregate consideration of approximately $51.5 million. In connection with the completion of this offering, these shares of Series A convertible preferred stock will convert into 49,047,619 shares of the Registrant's common stock. This transaction was exempt from the registration requirements of the Securities Act in reliance upon Section 4(2) of the Securities Act or Regulation D promulgated under the Securities Act.

(d) Warrant to Purchase Preferred Stock

In March 2016, in connection with the Registrant's Loan and Security Agreement with Silicon Valley Bank, the Registrant issued to Silicon Valley Bank a warrant to purchase an aggregate of 39,800 Series Seed preferred units at a price per unit of $0.75286. On December 5, 2018, in connection with the Registrant's reorganization into a Delaware corporation, the warrant automatically became exercisable for an aggregate of 39,800 shares of the Registrant's Series Seed convertible preferred stock at a per share exercise price of $0.75286, for an aggregate consideration of approximately $29,864. This warrant will automatically convert into a warrant to purchase shares of the Registrant's common stock upon the completion of this offering. The securities issued in this transaction were exempt from the registration requirements of the Securities Act in reliance on Section 4(a)(2) of the Securities Act.

None of the foregoing transactions involved any underwriters, underwriting discounts or commissions or any public offering, and the Registrant believes each transaction was exempt from the registration requirements of the Securities Act as stated above. All recipients of the foregoing transactions either received adequate information about the Registrant or had access, through their relationships with the Registrant, to such information. Furthermore, the Registrant affixed appropriate legends to the share certificates and instruments issued in each foregoing transaction setting forth that the securities had not been registered and the applicable restrictions on transfer.

ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

(a) Exhibits.

Exhibit Number	Description of Document
1.1*	Form of Underwriting Agreement.
3.1	Certificate of Incorporation, as currently in effect.
3.2*	Form of Restated Certificate of Incorporation to be effective upon the completion of this offering.
3.3	Bylaws, as amended to date, as currently in effect.
3.4*	Form of Restated Bylaws to be effective upon the completion of this offering.
4.1*	Form of Common Stock Certificate.
4.2	Investors' Rights Agreement, dated December 5, 2018, by and among the Registrant and certain of its stockholders.
4.3	Warrant by and between the Registrant and Silicon Valley Bank.
5.1*	Opinion of Fenwick & West LLP.
10.1*	Form of Indemnity Agreement.

Exhibit Number	Description of Document
10.2	2018 Stock Incentive Plan, and forms of award agreements.
10.3*	2019 Equity Incentive Plan, to become effective on the date immediately prior to the date the registration statement is declared effective, and forms of award agreements.
10.4*	2019 Employee Stock Purchase Plan, to become effective on the date the registration statement is declared effective, and forms of award agreements.
10.5*	Offer Letter, dated , 2019, by and between Morphic Therapeutic, Inc. and Praveen P. Tipirneni, MD.
10.6*	Offer Letter, dated , 2019, by and between Morphic Therapeutic, Inc. and Bruce N. Rogers, Ph.D.
10.7*	Offer Letter, dated , 2019, by and between Morphic Therapeutic, Inc. and Alexey A. Lugovskoy, Ph.D.
10.8	Consulting Agreement, dated June 1, 2015, by and between the Registrant and Timothy A. Springer, Ph.D.
10.9*	Lease, dated August 5, 2015, by and between the Registrant and AstraZeneca Pharmaceuticals Limited Partnership, as amended.
10.10*†	Research Collaboration and Option Agreement, dated February 15, 2019, by and among Janssen Pharmaceuticals, Inc. and the Registrant.
10.11*†	Collaboration and Option Agreement, dated October 16, 2018, by and between AbbVie Biotechnology Ltd and the Registrant.
10.12*†	Collaboration Agreement, dated June 10, 2015, by and between Morphic Rock Therapeutic, Inc. and Schrödinger, LLC, as amended.
10.13*†	Exclusive License Agreement, dated October 7, 2015, by and between Children's Medical Center Corporation and the Registrant, as amended.
21.1	Subsidiaries of the Registrant.
23.1*	Consent of Ernst & Young LLP, an independent registered public accounting firm.
23.2*	Consent of Fenwick & West LLP (included in Exhibit 5.1).
24.1*	Power of Attorney (included in the signature page to this registration statement).

* To be filed by amendment.

† Registrant has omitted portions of the exhibit as permitted under Item 601(b)(10) of Regulation S-K.

(b) Financial Statement Schedules.

No financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or notes.

ITEM 17. UNDERTAKINGS.

The undersigned Registrant hereby undertakes to provide to the underwriters at the completion specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned Registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant has duly caused this registration statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Waltham, State of Massachusetts, on the day of , 2019.

MORPHIC HOLDING, INC.

By: _____

Praveen P. Tipirneni, M.D.
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Praveen P. Tipirneni and William D. DeVaul, and each of them, as his or her true and lawful attorneys-in-fact, proxies and agents, each with full power of substitution and resubstitution and full power to act without the other, for him or her in any and all capacities, to sign any and all amendments to this registration statement (including post-effective amendments or any abbreviated registration statement and any amendments thereto filed pursuant to Rule 462(b) increasing the number of securities for which registration is sought), and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact, proxies and agents full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact, proxies and agents, or their or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement on Form S-1 has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
_____ Praveen P. Tipirneni, M.D.	President, Chief Executive Officer and Director (Principal Executive Officer)	, 2019
_____ Robert E. Farrell, Jr., CPA	Vice President of Finance and Operations and Treasurer (Principal Accounting and Financial Officer)	, 2019
_____ Gustav Christensen	Director	, 2019
_____ Barbara J. Dalton, Ph.D.	Director	, 2019

Signature	Title	Date
_____ Ramy Farid, Ph.D	Director	, 2019
_____ Vikas Goyal	Director	, 2019
_____ Nilesh Kumar, Ph.D.	Director	, 2019
_____ Amir Nashat	Director	, 2019
_____ Timothy A. Springer, Ph.D.	Director	, 2019
_____ Otello Stampacchia, Ph.D.	Director	, 2019

CERTIFICATE OF INCORPORATION
OF
MORPHIC HOLDING, INC.

FIRST: The name of this corporation is Morphic Holding, Inc. (the "Corporation").

SECOND: The address of the registered office of the Corporation in the State of Delaware is 1209 Orange Street, in the City of Wilmington, Delaware 19801, County of New Castle. The name of its registered agent at such address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware (the "General Corporation Law").

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) 151,000,000 shares of Common Stock, $0.0001 par value per share ("Common Stock") and (ii) 122,553,762 shares of Preferred Stock, $0.0001 par value per share ("Preferred Stock").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth herein.

2. Voting. The holders of the Common Stock are entitled to one vote for each share of Common Stock held at all meetings of stockholders (and written actions in lieu of meetings). There shall be no cumulative voting. The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by (in addition to any vote of the holders of one or more series of Preferred Stock that may be required by the terms of this Certificate of Incorporation) the affirmative vote of the holders of shares of capital stock of the Corporation representing a majority of the votes represented by all outstanding shares of capital stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law.

B. PREFERRED STOCK

11,967,689 shares of the authorized and unissued Preferred Stock of the Corporation are hereby designated "Series Seed Preferred Stock", 49,047,619 shares of the authorized and unissued Preferred Stock of the Corporation are hereby designated "Series A Preferred Stock", and 61,538,454 shares of the authorized and unissued Preferred Stock of the Corporation are hereby designated "Series B Preferred Stock." The Series Seed Preferred Stock, Series A Preferred Stock and Series B Preferred Stock have the following rights, preferences, powers,

privileges and restrictions, qualifications and limitations. Unless otherwise indicated, references to "Sections" or "Subsections" in this Part B of this Article Fourth refer to sections and subsections of Part B of this Article Fourth.

1. Dividends.

The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock) unless (in addition to the obtaining of any consents required elsewhere in the Certificate of Incorporation) the holders of the Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Preferred Stock in an amount at least equal to (i) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Preferred Stock as would equal the product of (A) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (B) the number of shares of Common Stock issuable upon conversion of a share of Series Seed Preferred Stock, Series A Preferred Stock or Series B Preferred Stock, as applicable, in each case calculated on the record date for determination of holders entitled to receive such dividend or (ii) in the case of a dividend on any class or series that is not convertible into Common Stock, at a rate per share of Series Seed Preferred Stock, Series A Preferred Stock or Series B Preferred Stock, as applicable, determined by (A) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (B) multiplying such fraction by an amount equal to the applicable Original Issue Price (as defined below); provided that, if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of Preferred Stock pursuant to this Section 1 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Preferred Stock dividend. The "Original Issue Price" shall mean $0.75286 per share for the Series Seed Preferred Stock, $1.05 per share for the Series A Preferred Stock and $1.30 per share for the Series B Preferred Stock, subject in each case to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series Seed Preferred Stock, Series A Preferred Stock or Series B Preferred Stock, as applicable.

2. Liquidation, Dissolution or Winding Up; Certain Mergers, Consolidations and Asset Sales.

2.1 Preferential Payments to Holders of Series B Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the holders of shares of Series B Preferred Stock then outstanding shall be entitled to receive an amount, to be paid first out of the assets of the Corporation available for distribution to the holders of the capital stock of all classes, before any payment shall be made to the holders of Series A Preferred Stock, Series Seed Preferred Stock or Common Stock, by reason of their ownership thereof, an amount per share equal to the greater of (a) the Original Issue Price for the Series B Preferred Stock, plus any dividends declared but unpaid thereon, or (b) such

amount per share of Series B Preferred Stock as would have been payable had all shares of Series B Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution or winding-up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the "Series B Liquidation Amount"). If the assets of the Corporation shall be insufficient to permit the payment in full to the holders of the Series B Preferred Stock of all amounts distributable to them under this Section 2.1, then the entire assets of the Corporation available for such distribution shall be distributed ratably among the holders of the Series B Preferred Stock on a pari passu basis in proportion to the full preferential amount each such holder is otherwise entitled to receive.

2.2 Preferential Payments to Holders of Series A Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the holders of shares of Series A Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, after payment of the Series B Liquidation Amount in full to all holders of Series B Preferred Stock but before any payment shall be made to the holders of Series Seed Preferred Stock or Common Stock, by reason of their ownership thereof, on a *pari passu* basis, an amount per share equal to the greater of (i) the Original Issue Price for the Series A Preferred Stock, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of Series A Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the "Series A Liquidation Amount"). If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series A Preferred Stock the full amount to which they shall be entitled under this Subsection 2.2, the holders of shares of Series A Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.3 Preferential Payments to Holders of Series Seed Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the holders of shares of Series Seed Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, after payment of the Series B Liquidation Amount in full to all holders of Series B Preferred Stock and payment of the Series A Liquidation Amount in full to all holders of Series A Preferred Stock but before any payment shall be made to the holders of Common Stock, by reason of their ownership thereof, on a *pari passu* basis, an amount per share equal to the greater of (i) the Original Issue Price for the Series Seed Preferred Stock, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of Series Seed Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence, together with the Series B Liquidation Amount and the Series A Liquidation Amount, is hereinafter referred to as the "Liquidation Amount"). If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets

of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series Seed Preferred Stock the full amount to which they shall be entitled under this Subsection 2.3, the holders of shares of Series Seed Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.4 Payments to Holders of Common Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, after the payment of all preferential amounts required to be paid to the holders of shares of Preferred Stock, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of shares of Common Stock, pro rata based on the number of shares held by each such holder.

2.5 Deemed Conversion. Notwithstanding any other provision of this Section 2, for purposes of determining the amount to be distributed in respect of shares of any given series of Preferred Stock in the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, and for purposes of Subsection 2.7.4, all shares of such series of Preferred Stock shall be deemed to have been converted into shares of Common Stock in accordance with Section 4 immediately prior to such event if the amount that would have been distributable in respect of such shares of Common Stock had such conversion actually occurred (and assuming the like conversion of all shares of each other series of Preferred Stock deemed converted pursuant to this Subsection 2.5) is greater than the amount that would have been distributable pursuant to this Section 2 in such event in respect of the shares of such series of Preferred Stock had such conversion not been deemed to have occurred pursuant to this Subsection 2.5.

2.6 No Preferential Payments Following Conversion to Common Stock. Upon conversion of shares of Preferred Stock into shares of Common Stock pursuant to Section 4 or Section 5, below, the holder of such Common Stock shall not be entitled to any preferential payment or distribution in case of any liquidation, dissolution or winding-up of the Corporation, but shall share ratably in any distribution of the assets of the Corporation to the holders of Common Stock in accordance with Section 2.4.

2.7 Deemed Liquidation Events.

2.7.1 Definition. Each of the following events shall be considered a "Deemed Liquidation Event" unless the holders of a majority of the then-outstanding shares of Preferred Stock, voting together, which holders must include (i) the holders of a majority of the shares of Series A Preferred Stock then outstanding and (ii) the holders of at least sixty-three percent (63%) of the shares of Series B Preferred Stock then outstanding (the "Investor Majority") elect otherwise by written notice sent to the Corporation at least fifteen 15 days prior to the effective date of any such event:

(a) a merger or consolidation in which

(i) the Corporation is a constituent party or

(ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation,

except for any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation; or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation, in each case in substantially the same proportions and with substantially the same rights and preferences; or

(b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of all or substantially all the assets of the Corporation and its subsidiaries taken as a whole, or the sale or disposition (whether by merger, consolidation or otherwise, and whether in a single transaction or a series of related transactions) of one or more subsidiaries of the Corporation if substantially all of the assets of the Corporations and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary.

2.7.2 Effecting a Deemed Liquidation Event.

(a) The Corporation shall not have the power to effect a Deemed Liquidation Event referred to in Subsection 2.7.1(a)(i) unless the agreement or plan of merger or consolidation for such transaction (the "Merger Agreement") provides that the consideration payable to the stockholders of the Corporation in such Deemed Liquidation Event shall be paid to the holders of capital stock of the Corporation in accordance with Subsections 2.1 through 2.4.

(b) In the event of a Deemed Liquidation Event referred to in Subsection 2.7.1(a)(ii) or 2.7.1(b), if the Corporation does not effect a dissolution of the Corporation under the General Corporation Law within 90 days after such Deemed Liquidation Event, then (i) the Corporation shall send a written notice to each holder of Preferred Stock no later than the 90th day after the Deemed Liquidation Event advising such holders of their right (and the requirements to be met to secure such right) pursuant to the terms of the following clause (ii) to require the redemption of such shares of Preferred Stock, and (ii) if the holders of a majority of the then outstanding shares of Preferred Stock so request in a written instrument delivered to the Corporation not later than 120 days after such Deemed Liquidation Event, the Corporation shall use the consideration received by the Corporation for such Deemed Liquidation Event (net of any retained liabilities associated with the assets sold or technology licensed, as determined in

good faith by the Board of Directors of the Corporation), together with any other assets of the Corporation available for distribution to its stockholders, all to the extent permitted by Delaware law governing distributions to stockholders (the "Available Proceeds"), on the 150th day after such Deemed Liquidation Event, to redeem all outstanding shares of Preferred Stock at a price per share equal to the applicable Liquidation Amount. Notwithstanding the foregoing, in the event of a redemption pursuant to the preceding sentence, if the Available Proceeds are not sufficient to redeem all outstanding shares of Preferred Stock, the Corporation shall redeem a pro rata portion of each holder's shares of Preferred Stock to the fullest extent of such Available Proceeds in accordance with the allocation among holders of capital stock of the Corporation set forth in Subsections 2.1 through 2.4, and shall redeem the remaining shares to have been redeemed as soon as it may lawfully do so under Delaware law governing distributions to stockholders. Prior to the distribution or redemption provided for in this Subsection 2.7.2(b), the Corporation shall not expend or dissipate the consideration received for such Deemed Liquidation Event, except to discharge expenses incurred in connection with such Deemed Liquidation Event or in the ordinary course of business.

2.7.3 Amount Deemed Paid or Distributed. In any Deemed Liquidation Event, if Available Proceeds are in a form of property other than in cash, the value of such distribution shall be deemed to be the fair market value of such property. The determination of fair market value of such property shall be made in good faith by the Board of Directors of the Corporation, including the approval of a majority of the Preferred Directors (including at least one Series B Director), provided that to the extent such property consists of securities, the fair market value of such securities shall be determined as follows:

(a) For securities not subject to investment letters or other similar restrictions on free marketability covered by Subsection 2.7.3(b) below,

(i) if traded on a national securities exchange or the Nasdaq Stock Market (or a similar national quotation system), the value shall be deemed to be the average of the closing prices of the securities on such exchange or system over the thirty (30) trading day period ending three (3) days prior to the closing of the Deemed Liquidation Event;

(ii) if actively traded over-the-counter, the value shall be deemed to be the average of the closing bid or sale prices (whichever is applicable) over the thirty (30) trading day period ending three (3) days prior to the closing of such transaction; or

(iii) if there is no active public market, the value shall be the fair market value thereof, as determined in good faith by the Board of

Directors of the Corporation (including at least one Series B Director).

For the purposes of this Subsection 2.7.3, "trading day" shall mean any day which the exchange or system on which the securities to be distributed are traded is open and "closing prices" or "closing bid or sales prices" shall be deemed to be: (A) for securities traded primarily on the New York Stock Exchange or Nasdaq Stock Market, the last reported trade price or sale price, as the case may be, at 4:00 p.m., New York time, on that day and (B) for securities listed or traded on other exchanges, markets and systems, the market price as of the end of the regular hours trading period that is generally accepted as such for such exchange, market or system. If, after the date hereof, the benchmark times generally accepted in the securities industry for determining the market price of a stock as of a given trading day shall change from those set forth above, the fair market value shall be determined as of such other generally accepted benchmark times.

(b) The method of valuation of securities subject to investment letters or other similar restrictions on free marketability (other than restrictions arising solely by virtue of a stockholder's status as an affiliate or former affiliate) shall take into account an appropriate discount (as determined in good faith by the Board of Directors of the Corporation) from the market value as determined pursuant to Subsections 2.7.3(a)(i), (ii), or (iii) above so as to reflect the approximate fair market value thereof.

2.7.4 Allocation of Escrow and Contingent Consideration. In the event of a Deemed Liquidation Event pursuant to Subsection 2.7.1(a)(i), if any portion of the consideration payable to the stockholders of the Corporation is payable only upon satisfaction of contingencies (the "Additional Consideration"), the Merger Agreement shall provide that (a) the portion of such consideration that is not Additional Consideration (such portion, the "Initial Consideration") shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 through 2.4 as if the Initial Consideration were the only consideration payable in connection with such Deemed Liquidation Event; and (b) any Additional Consideration which becomes payable to the stockholders of the Corporation upon satisfaction of such contingencies shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 through 2.4 after taking into account the previous payment of the Initial Consideration as part of the same transaction. For the purposes of this Subsection 2.7.4, consideration placed into escrow or retained as a holdback to be available for satisfaction of indemnification or similar obligations in connection with such Deemed Liquidation Event shall be deemed to be Additional Consideration.

3. Voting.

3.1 General. On any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of Common Stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of this Certificate of Incorporation, holders of Preferred Stock

shall vote together with the holders of Common Stock as a single class and on an as-converted to Common Stock basis.

3.2 Election of Directors. (i) For so long as at least 15,384,613 shares of Series B Preferred Stock are outstanding (subject to appropriate adjustment in the event of any stock dividend, stock split, combination, or other similar recapitalization with respect to the Series B Preferred Stock), the holders of record of the shares of Series B Preferred Stock, exclusively and as a separate class, shall be entitled to elect two directors of the Corporation (the "Series B Directors"); and (ii) for so long as at least 12,261,904 shares of Series A Preferred Stock are outstanding (subject to appropriate adjustment in the event of any stock dividend, stock split, combination, or other similar recapitalization with respect to the Series A Preferred Stock), the holders of record of the shares of Series A Preferred Stock, exclusively and as a separate class, shall be entitled to elect three directors of the Corporation (the "Series A Directors" and, together with the Series B Directors, the "Preferred Directors"). Any director elected as provided in the preceding sentence may be removed, with or without cause, by, and only by, the affirmative vote of the holders of the shares of the class or series of capital stock entitled to elect such director or directors, given either at a special meeting of such stockholders duly called for that purpose or pursuant to a written consent of stockholders. If the holders of shares of a series of Preferred Stock, fail to elect a sufficient number of directors to fill all directorships for which they are entitled to elect directors, voting exclusively and as a separate class, pursuant to the first sentence of this Subsection 3.2, then any directorship not so filled shall remain vacant until such time as the holders of such series elect a person to fill such directorship by vote or written consent in lieu of a meeting; and no such directorship may be filled by stockholders of the Corporation other than by the stockholders of the Corporation that are entitled to elect a person to fill such directorship, voting exclusively and as a separate class. The holders of record of the shares of Common Stock and of any other class or series of voting stock (including the Preferred Stock), exclusively and voting together as a single class, shall be entitled to elect the balance of the total number of directors of the Corporation. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director. Except as otherwise provided in this Subsection 3.2, a vacancy in any directorship filled by the holders of any class or series shall be filled only by vote or written consent in lieu of a meeting of the holders of such class or series or by any remaining director or directors elected by the holders of such class or series pursuant to this Subsection 3.2.

3.3 Preferred Stock Protective Provisions. At any time when shares of Preferred Stock are outstanding, the Corporation shall not, either directly or indirectly (including through any subsidiary of the Corporation) by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or this Certificate of Incorporation) the written consent or affirmative vote of the Investor Majority given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a class on an as-converted basis, and any such act or transaction entered into without such consent or vote shall be null and void *ab initio*, and of no force or effect.

3.3.1 liquidate, dissolve or wind-up the business and affairs of the Corporation, effect any merger or consolidation or any other Deemed Liquidation Event, or consent to any of the foregoing;

3.3.2 amend, alter or repeal any provision of this Certificate of Incorporation or Bylaws of the Corporation;

3.3.3 purchase or redeem (or permit any subsidiary to purchase or redeem) or pay or declare any dividend or make any distribution on, any shares of capital stock, other than repurchases of Common Stock from former employees, officers, directors, consultants or other service providers to the Corporation (or any subsidiary) in connection with the cessation of such employment or service at the lower of the original purchase price or the then-current fair market value thereof;

3.3.4 (i) create or authorize the creation of or issue or obligate itself to issue any equity security having rights, preferences or privileges senior to or on parity with any series of Preferred Stock, (ii) create or authorize the creation of or issue or obligate itself to issue any other security convertible into or exercisable for any equity security, having rights, preferences or privileges senior to or on parity with any series of Preferred Stock, or (iii) increase the authorized number of shares of any series of Preferred Stock;

3.3.5 create, or authorize the creation of, or issue, or authorize the issuance of any debt security, or permit any subsidiary to take any such action with respect to debt security, if the aggregate indebtedness of the Corporation and its subsidiaries for borrowed money following such action would exceed $100,000, unless such debt security has received the prior approval of the Board of Directors;

3.3.6 increase or decrease the authorized number of members of the Corporations's Board of Directors;

3.3.7 create, or hold capital stock in, any subsidiary that is not wholly owned (either directly or through one or more other subsidiaries) by the Corporation, or sell, transfer or otherwise dispose of any capital stock of any direct or indirect subsidiary of the Corporation, or permit any direct or indirect subsidiary to sell, lease, transfer, exclusively license or otherwise dispose (in a single transaction or series of related transactions) of all or substantially all of the assets of such subsidiary; or

3.3.8 enter into any agreement to do any of the foregoing that is not expressly made conditional on obtaining the affirmative vote or written consent of the Investor Majority.

3.4 Series A Preferred Stock Protective Provisions. In addition to the restrictions set forth in Section 3.3, at any time when any shares of Series A Preferred Stock are outstanding, the Corporation shall not, either directly or indirectly (including through any subsidiary of the Corporation) by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or the Certificate of Incorporation) the written consent or affirmative vote of the holders of a majority of the then outstanding shares

of Series A Preferred Stock, given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a single class on an as-converted basis, and any such act or transaction entered into without such consent or vote shall be null and void ab initio, and of no force or effect:

3.4.1 increase or decrease the aggregate number of authorized shares of Series A Preferred Stock; or

3.4.2 amend, alter or repeal any provision of the Certificate of Incorporation or Bylaws of the Corporation if such amendment, alteration or repeal would alter or change the rights, powers, privileges or preferences of the Series A Preferred Stock in a manner that adversely affects the Series A Preferred Stock in a manner different from any other series of Preferred Stock, it being understood and agreed that neither the authorization or creation by the Corporation of any new class or series of Preferred Stock having rights, powers, privileges or preferences that are senior to or on parity with a series of Preferred Stock nor the authorization or creation of any security convertible into or exercisable for any such new class or series of Preferred Stock, shall, on its own, be deemed to alter, waive or change the rights, powers, privileges or preferences of any series of Preferred Stock; and (ii) a series of Preferred Stock shall not be affected differently for purposes of this Section 3.4.2 merely because of the difference in amounts of respective issuance prices and liquidation preferences that arise from the differences in the original issuance price vis-à-vis other series of Preferred Stock.

4. Optional Conversion. The holders of Preferred Stock shall have conversion rights as follows (the "Conversion Rights"):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing the applicable Original Issue Price by the applicable Conversion Price (as defined below) in effect at the time of conversion. The conversion price for the Series Seed Preferred Stock shall initially be $0.75286 (the "Series Seed Conversion Price"), the conversion price for the Series A Preferred Stock shall initially be $1.05 (the "Series A Conversion Price"), and the conversion price for the Series B Preferred Stock shall initially be $1.30 (the "Series B Conversion Price"). Each such initial Conversion Price shall be subject to adjustment from time to time in accordance with this Section 4 and all references to a Conversion Price herein shall mean such initial Conversion Price, as so adjusted.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the fair market value of a share of Common Stock as determined in good faith by the Board of Directors of the Corporation. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Preferred Stock to voluntarily convert shares of Preferred Stock into shares of Common Stock, such holder shall surrender the certificate or certificates for such shares of Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent), together with written notice that such holder elects to convert all or any number of the shares of the Preferred Stock represented by such certificate or certificates and, if applicable, any event on which such conversion is contingent. Such notice shall state such holder's name or the names of the nominees in which such holder wishes the certificate or certificates for shares of Common Stock to be issued. If required by the Corporation, certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such certificates (or lost certificate affidavit and agreement) and notice shall be the time of conversion (the "Conversion Time"), and the shares of Common Stock issuable upon conversion of the shares represented by such certificate shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time, (i) issue and deliver to such holder of Preferred Stock, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and a certificate for the number (if any) of the shares of Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) pay all declared but unpaid dividends on the shares of Preferred Stock converted.

4.3.2 Reservation of Shares. The Corporation shall at all times when the Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to the Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Conversion Price below the then par value of the shares of Common Stock issuable upon conversion of the Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and nonassessable shares of Common Stock at such adjusted Conversion Price.

4.3.3 Effect of Conversion. All shares of Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in Subsection 4.2 and to receive payment of any dividends declared but unpaid thereon. Any shares of Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to the Conversion Price shall be made for any declared but unpaid dividends on the Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Preferred Stock pursuant to this Section 4. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.

4.4 Adjustments to Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth, the following definitions shall apply:

(a) "Option" shall mean rights, options or warrants to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) "Series B Original Issue Date" shall mean the date on which the first share of Series B Preferred Stock was issued.

(c) "Convertible Securities" shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) "Additional Shares of Common Stock" shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.3.3 below, deemed to be issued) by the Corporation after the Series B Original Issue Date, other than (1) the following shares of Common Stock and (2) shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (the securities described in clauses (1) and (2), collectively, "Exempted Securities"):

(i) shares of Common Stock, Options, previously outstanding debentures, warrants or Convertible Securities issued upon conversion of, or as a dividend on, shares of Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7, or 4.8**;**

(iii) shares of Common Stock or Options issued to employees or directors of, or consultants or advisors to, the Corporation or any of its subsidiaries pursuant to a plan, agreement or arrangement approved by the Board of Directors of the Corporation, including a majority of the Preferred Directors (including at least one Series B Director, if any Series B Directors are then serving on the Board of Directors); or

(iv) shares of Common Stock or Convertible Securities actually issued upon the exercise of Options or shares of Common Stock actually issued upon the conversion or exchange of Convertible Securities, in each case provided such issuance is pursuant to the terms of such Option or Convertible Security and such Option or Convertible Security was previously taken into account in determining the Conversion Price of each series of Preferred Stock in accordance with this Section 4.4.

4.4.2 No Adjustment of Conversion Price. No adjustment in the Series B Conversion Price shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives written notice from the holders of a majority of the then-outstanding shares of Series B Preferred Stock, voting separately as a single class, agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock. No adjustment in the Series A Conversion Price or the Series Seed Conversion Price, as applicable, shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives written notice from, in either case, the holders of a majority of the then-outstanding shares of Series A Preferred Stock and Series Seed Preferred Stock, voting together as a single class, agreeing that

no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.

(a) If the Corporation at any time or from time to time after the Series B Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to the Conversion Price of any series of Preferred Stock pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Corporation upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, the Conversion Price of such series of Preferred Stock computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Conversion Price of such series of Preferred Stock as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing the Conversion Price of any series of Preferred Stock to an amount which exceeds the lower of (i) the Conversion Price of such series of Preferred Stock in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) the Conversion Price that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to the Conversion Price of any series of Preferred Stock pursuant to the terms of Subsection 4.4.4 (either because the consideration per share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject

thereto was equal to or greater than the Conversion Price of such series of Preferred Stock then in effect, or because such Option or Convertible Security was issued before the Series B Original Issue Date), are revised after the Series B Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any decrease in the consideration payable to the Corporation upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.3(a)) shall, with respect to such series of Preferred Stock be deemed to have been issued effective upon such increase or decrease becoming effective.

(d) Upon the expiration or termination of any unexercised Option or unconverted or unexchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to the Conversion Price of a series of Preferred Stock pursuant to the terms of Subsection 4.4.4, the Conversion Price of such series of Preferred Stock shall be readjusted to such Conversion Price as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to adjustment based upon subsequent events, any adjustment to the Conversion Price of a series of Preferred Stock provided for in this Subsection 4.4.3 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.3). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to the Conversion Price of a series of Preferred Stock that would result under the terms of this Subsection 4.4.3 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to the applicable Conversion Price that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Corporation shall at any time after the Series B Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.3), without consideration or for a consideration per share less than the Conversion Price for a series of Preferred Stock in effect immediately prior to such issue, then the Conversion Price for such series of Preferred Stock shall

be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the following formula:

$$CP_2 = CP_1 * (A + B) \div (A + C).$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) "CP_2" shall mean the Conversion Price in effect with respect to such series of Preferred Stock immediately after such issue of Additional Shares of Common Stock

(b) "CP_1" shall mean the Conversion Price in effect with respect to such series of Preferred Stock immediately prior to such issue of Additional Shares of Common Stock;

(c) "A" shall mean the number of shares of Common Stock outstanding immediately prior to such issue of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issue or upon conversion or exchange of Convertible Securities (including the Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) "B" shall mean the number of shares of Common Stock that would have been issued if such Additional Shares of Common Stock had been issued at a price per share equal to CP_1 (determined by dividing the aggregate consideration received by the Corporation in respect of such issue by CP_1); and

(e) "C" shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Corporation for the issue of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property: Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Corporation, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors of the Corporation; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Corporation for consideration which covers both, be the proportion of such consideration so received, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors of the Corporation.

(b) Options and Convertible Securities. The consideration per share received by the Corporation for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.3, relating to Options and Convertible Securities, shall be determined by dividing (i) the total amount, if any, received or receivable by the Corporation as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Corporation upon the exercise in full of such Options or the conversion or exchange in full of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise in full of such Options for Convertible Securities and the conversion or exchange in full of such Convertible Securities, by (ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Corporation shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an adjustment to the Conversion Price with respect to any series of Preferred Stock pursuant to the terms of Subsection 4.4.4 then, upon the final such issuance, each such Conversion Price shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series B Original Issue Date effect a subdivision of the outstanding Common Stock, the Conversion Price of each series of Preferred Stock in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series of Preferred Stock shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series B Original Issue Date combine the outstanding shares of Common Stock, the Conversion Price with respect to each series of Preferred Stock in effect immediately before the combination shall be proportionately increased so that the number of shares of Common Stock issuable on conversion of each share of such series of Preferred Stock shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this

subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.6 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event the Conversion Price with respect to each series of Preferred Stock in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Conversion Price then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing, (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Conversion Price with respect to each series of Preferred Stock shall be recomputed accordingly as of the close of business on such record date and thereafter the Conversion Price with respect to each series of Preferred Stock shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) no such adjustment shall be made if the holders of all outstanding shares of Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions hereof do not apply to such dividend or distribution, then and in each such event the holders of each series of Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.8 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.7, if there shall occur any reorganization, recapitalization,

reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not the Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.4, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors of the Corporation) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Conversion Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of the Preferred Stock.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of any Conversion Price pursuant to this Section 4, the Corporation at its expense shall, as promptly as reasonably practicable but in any event not later than twenty (20) days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Preferred Stock so affected a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Preferred Stock (but in any event not later than twenty (20) days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Conversion Price with respect to each Series of Preferred Stock then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of each series of Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any Deemed Liquidation Event; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Corporation,

then, and in each such case, the Corporation will send or cause to be sent to the holders of the Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Preferred Stock and the Common Stock. Such notice shall be sent at least ten (10) days prior to the record date or effective date for the event specified in such notice.

5. Mandatory Conversion.

5.1 Trigger Events. Upon either (a) the closing of the sale of shares of Common Stock to the public in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, after which the Common Stock is listed on the New York Stock Exchange or the NASDAQ Stock Market (a "Qualified Public Offering") or (b) the date and time, or the occurrence of an event, specified by vote or written consent of the Investor Majority (the time of such closing or the date and time specified or the time of the event specified in such vote or written consent is referred to herein as the "Mandatory Conversion Time"), (i) all outstanding shares of Preferred Stock shall automatically be converted into shares of Common Stock, at the then effective conversion rate and (ii) such shares may not be reissued by the Corporation.

5.2 Procedural Requirements. All holders of record of shares of Preferred Stock shall be sent written notice of the Mandatory Conversion Time and the place designated for mandatory conversion of all such shares of Preferred Stock pursuant to this Section 5. Such notice need not be sent in advance of the occurrence of the Mandatory Conversion Time. Upon receipt of such notice, each holder of shares of Preferred Stock shall surrender his, her or its certificate or certificates for all such shares (or, if such holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation at the place designated in such notice. If so required by the Corporation, certificates surrendered for conversion shall be endorsed or accompanied by written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. All rights with respect to the Preferred Stock converted pursuant to Subsection 5.1, including the rights, if any, to receive notices and vote (other than as a holder of Common Stock), will terminate at the Mandatory Conversion Time (notwithstanding the failure of the holder or holders thereof to surrender the certificates at or prior to such time), except only the rights of the holders thereof, upon surrender of their certificate or certificates (or lost certificate affidavit and agreement) therefor, to receive the items provided for in the next sentence of this Subsection 5.2. As soon as practicable after the Mandatory Conversion Time and the surrender of the certificate or certificates (or lost certificate affidavit and agreement)

for Preferred Stock, the Corporation shall issue and deliver to such holder, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable on such conversion in accordance with the provisions hereof, together with cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and the payment of any declared but unpaid dividends on the shares of Preferred Stock converted. Such converted Preferred Stock shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock accordingly.

6. Redeemed or Otherwise Acquired Shares. Any shares of Preferred Stock that are redeemed or otherwise acquired by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Preferred Stock following redemption.

7. Waiver. Any of the rights, powers, preferences and other terms of any series of Preferred Stock set forth herein may be waived on behalf of all holders of such series of Preferred Stock by the affirmative written consent or vote of the holders of a majority of the shares of such series or Preferred Stock then outstanding, voting together as a single class, unless the provision being waived, by its terms, requires a higher threshold for actions taken thereunder, in which case such higher threshold shall be required for any waiver thereof.

8. Notices. Any notice required or permitted by the provisions of this Article Fourth to be given to a holder of shares of Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

FIFTH: Subject to any additional vote required by Certificate of Incorporation or Bylaws, in furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to adopt, repeal, alter, amend and rescind any or all of the Bylaws of the Corporation, provided that any such adoption, repeal, alteration, amendment or rescission shall require the affirmative vote or written consent of a majority of the Preferred Directors, including at least one Series B Director.

SIXTH: Subject to any additional vote required by this Certificate of Incorporation, the number of directors of the Corporation shall be determined in the manner set forth in the Bylaws of the Corporation.

SEVENTH: Elections of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.

EIGHTH: Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may be

kept outside the State of Delaware at such place or places as may be designated from time to time by the Board of Directors or in the Bylaws of the Corporation.

NINTH: To the fullest extent permitted by law, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the General Corporation Law or any other law of the State of Delaware is amended after approval by the stockholders of this Article Ninth to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law as so amended.

Any repeal or modification of the foregoing provisions of this Article Ninth by the stockholders of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of, or increase the liability of any director of the Corporation with respect to any acts or omissions of such director occurring prior to, such repeal or modification.

TENTH: To the fullest extent permitted by applicable law, the Corporation is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Corporation (and any other persons to which General Corporation Law permits the Corporation to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise, in excess of the indemnification and advancement otherwise permitted by Section 145 of the General Corporation Law.

Any amendment, repeal or modification of the foregoing provisions of this Article Tenth shall not (a) adversely affect any right or protection of any director, officer or other agent of the Corporation existing at the time of such amendment, repeal or modification or (b) increase the liability of any director of the Corporation with respect to any acts or omissions of such director, officer or agent occurring prior to, such amendment, repeal or modification.

ELEVENTH: The Corporation renounces, to the fullest extent permitted by law, any interest or expectancy of the Corporation in, or in being offered an opportunity to participate in, any Excluded Opportunity. An "Excluded Opportunity" is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of (i) any director of the Corporation who is not an employee of the Corporation or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director, stockholder, employee, affiliate or agent of any such holder, other than someone who is an employee of the Corporation or any of its subsidiaries (collectively, the persons referred to in clauses (i) and (ii) are "Covered Persons"), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person's capacity as a director of the Corporation. Any repeal or modification of this Article Eleventh will only be prospective and will not affect the rights under this Article Eleventh in effect at the time of the occurrence of any actions or omissions to act giving rise to liability. To the fullest extent permitted by law, and solely in connection therewith, the Company hereby waives any claim against a Covered Person, and agrees to

indemnify all Covered Persons against any claim, that is based on fiduciary duties, the corporate opportunity doctrine or any other legal theory which could limit any Covered Person from pursuing or engaging in any Excluded Opportunity.

TWELFTH: Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery in the State of Delaware shall be the sole and exclusive forum for any stockholder (including a beneficial owner) to bring (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation's stockholders, (iii) any action asserting a claim against the Corporation, its directors, officers or employees arising pursuant to any provision of the Delaware General Corporation Law or the Corporation's certificate of incorporation or bylaws or (iv) any action asserting a claim against the Corporation, its directors, officers or employees governed by the internal affairs doctrine, except for, as to each of (i) through (iv) above, any claim as to which the Court of Chancery determines that there is an indispensable party not subject to the jurisdiction of the Court of Chancery (and the indispensable party does not consent to the personal jurisdiction of the Court of Chancery within ten days following such determination), which is vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery, or for which the Court of Chancery does not have subject matter jurisdiction. If any provision or provisions of this Article Twelfth shall be held to be invalid, illegal or unenforceable as applied to any person or entity or circumstance for any reason whatsoever, then, to the fullest extent permitted by law, the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Article Twelfth (including, without limitation, each portion of any sentence of this Article Twelfth containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) and the application of such provision to other persons or entities and circumstances shall not in any way be affected or impaired thereby.

THIRTEENTH: For purposes of Section 500 of the California Corporations Code (to the extent applicable), in connection with any repurchase of shares of Common Stock permitted under this Certificate of Incorporation from employees, officers, directors or consultants of the Corporation in connection with a termination of employment or services pursuant to agreements or arrangements approved by the Board of Directors (in addition to any other consent required under this Certificate of Incorporation), such repurchase may be made without regard to any "preferential dividends arrears amount" or "preferential rights amount" (as those terms are defined in Section 500 of the California Corporations Code). Accordingly, for purposes of making any calculation under California Corporations Code Section 500 in connection with such repurchase, the amount of any "preferential dividends arrears amount" or "preferential rights amount" (as those terms are defined therein) shall be deemed to be zero (0).

FOURTEENTH: The name of the sole incorporator of the Corporation is Praveen Tipirneni. The sole incorporator's mailing address is Morphic Holding, LLC, 35 Gatehouse Drive A2, Waltham, MA 02451.

IN WITNESS WHEREOF, I have hereunto set my hand as of December 5, 2018.

By: /s/ Praveen Tipirneni
Praveen Tipirneni, *Sole Incorporator*

Exhibit 3.3

BYLAWS

OF

MORPHIC HOLDING, INC.

Section 1 CERTIFICATE OF INCORPORATION AND BYLAWS

1.1 These bylaws are subject to the certificate of incorporation of the corporation of the corporation. In these bylaws, references to the certificate of incorporation and bylaws mean the provisions of the certificate of incorporation and the bylaws as are from time to time in effect. Whenever these bylaws may conflict with the certificate of incorporation, such conflict shall be resolved in favor of the certificate of incorporation.

Section 2 OFFICES

2.1 Registered Office; Principal Place of Business. The registered office of the corporation shall be in the City of Wilmington, County of New Castle, State of Delaware. The principal office and place of business of the corporation shall initially be 35 Gatehouse Drive A2, Waltham, Massachusetts 02451. The corporation may locate its place of business at any other place or places as the board of directors may, from time to time, deem advisable.

2.2 Other Offices. The corporation may also have offices at such other places both within and without the State of Delaware as the board of directors may from time to time determine or the business of the corporation may require.

2.3 Qualification in Other Jurisdictions. The board of directors shall cause the corporation to be qualified or registered under applicable laws of any jurisdiction in which the corporation owns property or engages in activities and shall be authorized to execute, deliver and file any certificates and documents necessary to effect such qualification or registration, including, without limitation, the appointment of agents for service of process in such jurisdictions, if such qualification or registration is necessary or desirable to permit the corporation to own property and engage in the corporation's business in such jurisdictions.

Section 3 STOCKHOLDERS

3.1 Location of Meetings. All meetings of the stockholders shall be held at such place either within or without the State of Delaware as shall be designated from time to time by the board of directors, or if not so designated, at the registered office of the corporation. Notwithstanding the foregoing, the board of directors may, in its sole discretion, determine that the meeting shall not be held at any place, but may instead be held solely by means of remote communication as authorized by Section 211(a)(2) of the Delaware General Corporation Law. If so authorized, and subject to such guidelines and procedures as the board of directors may adopt, stockholders and proxyholders not physically present at a meeting of stockholders may, by means of remote communication, participate in a meeting of stockholders whether such meeting is to be held at a designated place or solely by means of remote communication, provided that (i) the corporation shall implement reasonable measures to verify that each person deemed present

and permitted to vote at the meeting by means of remote communication is a stockholder or proxyholder, (ii) the corporation shall implement reasonable measures to provide such stockholders and proxyholders a reasonable opportunity to participate in the meeting and to vote on matters submitted to the stockholders, including an opportunity to read or hear the proceedings of the meeting substantially concurrently with such proceedings, and (iii) if any stockholder or proxyholder votes or takes other action at the meeting by means of remote communication, a record of such vote or other action shall be maintained by the corporation. Any adjourned session of any meeting shall be held at the place designated in the vote of adjournment.

3.2 Annual Meeting. The annual meeting of stockholders shall be held at 10:00 a.m. on the second Wednesday in May in each year, unless that day be a legal holiday at the place where the meeting is to be held, in which case the meeting shall be held at the same hour on the next succeeding day not a legal holiday, or at such other date and time as shall be designated from time to time by the board of directors, at which they shall elect a board of directors and transact such other business as may be required by law or these bylaws or as may properly come before the meeting.

3.3 Special Meeting in Place of Annual Meeting. If the election for directors shall not be held on the day designated by these bylaws, the directors shall cause the election to be held as soon thereafter as convenient, and to that end, if the annual meeting is omitted on the day herein provided therefor or if the election of directors shall not be held thereat, a special meeting of the stockholders may be held in place of such omitted meeting or election, and any business transacted or election held at such special meeting shall have the same effect as if transacted or held at the annual meeting, and in such case all references in these bylaws to the annual meeting of the stockholders, or to the annual election of directors, shall be deemed to refer to or include such special meeting. Any such special meeting shall be called and the purposes thereof shall be specified in the call, as provided in Section 3.5.

3.4 Notice of Annual Meeting. Written notice of the annual meeting stating the place, date and hour of the meeting shall be given to each stockholder entitled to vote at such meeting not less than three nor more than forty-five days before the date of the meeting. Such notice may specify the business to be transacted and actions to be taken at such meeting. No action shall be taken at such meeting unless such notice is given or unless waiver of such notice is given in accordance with Section 5.2 by each stockholder entitled to such notice to whom such notice was not given.

3.5 Other Special Meetings. Special meetings of the stockholders, for any purpose or purposes, unless otherwise prescribed by law or by the certificate of incorporation, may be called by any member of the board of directors or at the request in writing of the holders of more than fifty percent of all capital stock of the corporation issued and outstanding and entitled to vote at such meeting. Such request shall state the purpose or purposes of the proposed meeting and business to be transacted at any special meeting of the stockholders.

3.6 Notice of Special Meeting. Written notice of a special meeting stating the place, date and hour of the meeting and the purpose or purposes for which the meeting is called, shall be given not less than three nor more than forty-five days before the date of the meeting, to each

stockholder entitled to vote at such meeting. No action shall be taken at such meeting unless such notice is given or unless waiver of such notice is given in accordance with Section 5.2 by each stockholder entitled to such notice to whom such notice was not given.

3.7 Stockholder List. The officer who has charge of the stock ledger of the corporation shall prepare and make, at least three days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting for a period of at least three days prior to the meeting, either (i) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (ii) during ordinary business hours, at the principal place of business of the corporation. In the event that the corporation determines to make the list available on an electronic network, the corporation may take reasonable steps to ensure that such information is available only to stockholders of the corporation. If the meeting is to be held at a place, then the list shall be produced and kept at the time and place of the meeting during the whole time thereof, and may be inspected by any stockholder who is present. If the meeting is to be held solely by means of remote communication, then the list shall also be open to examination of any stockholder during the entire meeting on a reasonably accessible electronic network, and the information required to access such list shall be provided with the notice of the meeting.

3.8 Quorum of Stockholders. The holders of a majority of the stock issued and outstanding and entitled to vote thereat, present in person or represented by proxy, shall constitute a quorum at all meetings of the stockholders for the transaction of business except as otherwise required by law, by the certificate of incorporation or by these bylaws. Except as otherwise provided by law, no stockholder present at a meeting may withhold his shares from the quorum count by declaring his shares absent from the meeting.

3.9 Adjournment. Any meeting of stockholders may be adjourned from time to time to any other time and to any other place at which a meeting of stockholders may be held under these bylaws, which time and place shall be announced at the meeting, by a majority of votes cast upon the question, whether or not a quorum is present, or, if no stockholder is present or represented by proxy, by any officer entitled to preside at or to act as secretary of such meeting. At such adjourned meeting at which a quorum shall be present or represented any business may be transacted which might have been transacted at the original meeting. If the adjournment is for more than thirty days, or if after the adjournment a new record date is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

3.10 Proxy Representation. Every stockholder may authorize another person or persons to act for him by proxy in all matters in which a stockholder is entitled to participate, whether by waiving notice of any meeting, objecting to or voting or participating at a meeting, or expressing consent or dissent without a meeting. Every proxy must be signed by the stockholder or by his attorney-in-fact. No proxy shall be voted or acted upon after three years from its date unless such proxy provides for a longer period. Except as provided by law, a revocable proxy shall be deemed revoked if the stockholder is present at the meeting for which the proxy was

given. A duly executed proxy shall be irrevocable if it states that it is irrevocable and, if, and only as long as, it is coupled with an interest sufficient in law to support an irrevocable power. A proxy may be made irrevocable regardless of whether the interest with which it is coupled is an interest in the stock itself or an interest in the corporation generally. The authorization of a proxy may, but need not be limited to specified action, provided, however, that if a proxy limits its authorization to a meeting or meetings of stockholders, unless otherwise specifically provided such proxy shall entitle the holder thereof to vote at any adjourned session but shall not be valid after the final adjournment thereof.

3.11 Inspectors. The directors or the person presiding at the meeting may, but need not unless required by law, appoint one or more inspectors of election and any substitute inspectors to act at the meeting or any adjournment thereof. Each inspector, before entering upon the discharge of his duties, shall take and sign an oath faithfully to execute the duties of inspector at such meeting with strict impartiality and according to the best of his ability. The inspectors, if any, shall determine the number of shares of stock outstanding and the voting power of each, the shares of stock represented at the meeting, the existence of a quorum and the validity and effect of proxies, and shall receive votes, ballots or consents, hear and determine all challenges and questions arising in connection with the right to vote, count and tabulate all votes, ballots or consents, determine the result, and do such acts as are proper to conduct the election or vote with fairness to all stockholders. On request of the person presiding at the meeting, the inspectors shall make a report in writing of any challenge, question or matter determined by them and execute a certificate of any fact found by them.

3.12 Action by Vote. When a quorum is present at any meeting, whether the same be an original or an adjourned session, a plurality of the votes properly cast for election to any office shall elect to such office. Any other action to be taken by the stockholders requires the vote of holders of more than fifty percent of all capital stock of the corporation issued and outstanding and entitled to vote at such meeting, except when a larger vote is required by law, by the certificate of incorporation or by these bylaws. No ballot shall be required for any election unless requested by a stockholder present or represented at the meeting and entitled to vote in the election.

3.13 Action Without Meetings. Unless otherwise provided in the certificate of incorporation, any action required to be taken at any annual or special meeting of stockholders of the corporation, or any action which may be taken at any annual or special meeting of such stockholders, may be taken without a meeting, without prior notice and without a vote, if a consent in writing, setting forth the action so taken shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted. Prompt notice of the taking of the corporate action without a meeting by less than unanimous written consent shall be given to those stockholders who have not consented in writing. Consent may be given by electronic transmission to the extent permitted by the Delaware General Corporation Law. Without limiting any method for delivery of consent given under this Section 3.13 that is permitted by the Delaware General Corporation Law, any consent given by electronic transmission shall be deemed to be delivered to the corporation by its delivery to (i) an officer, or (ii) an authorized agent of the corporation having custody of the book in which proceedings of

meetings of stockholders or members are recorded, whether or not such consent is reduced to paper form.

3.14 Organization. Meetings of stockholders shall be presided over by the chairperson of the board of directors, if any, or in his absence by the president, or in his absence by a vice president, or in the absence of the foregoing persons by a chairperson chosen at the meeting by the board. The secretary shall act as secretary of the meeting, but in his absence the chairperson of the meeting may appoint any person to act as secretary of the meeting. The chairperson of the meeting shall announce at the meeting of stockholders the date and time of the opening and the closing of the polls for each matter upon which the stockholders will vote.

3.15 Conduct of Meetings. The board of directors of the corporation may adopt by resolution such rules and regulations for the conduct of the meeting of stockholders as it shall deem appropriate. Except to the extent inconsistent with such rules and regulations as adopted by the board of directors, the chairperson of any meeting of stockholders shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairperson, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the board of directors or prescribed by the chairperson of the meeting, may include, without limitation, the following: (i) the establishment of an agenda or order of business for the meeting; (ii) rules and procedures for maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders of record of the corporation, their duly authorized and constituted proxies or such other persons as the chairperson of the meeting shall determine; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (v) limitations on the time allotted to questions or comments by participants. Unless and to the extent determined by the board of directors or the chairperson of the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.

Section 4 DIRECTORS

4.1 Number. The number of directors which shall constitute the whole board shall not be less than one. The first board shall consist of nine (9) directors. Thereafter, the stockholders at the annual meeting shall determine the number of directors, and the number of directors may be increased or decreased at any time or from time to time by the stockholders or by the directors by vote of a majority of directors then in office, except that any such decrease by vote of the directors shall only be made to eliminate vacancies existing by reason of the death, resignation or removal of one or more directors, *provided that*, in each case, any increase or decrease in the number of directors shall be subject to any additional consent or vote of the stockholders, or of the holders of any particular class or series of capital stock, required by the certificate of incorporation. The directors shall be elected at the annual meeting of the stockholders, except as provided in the certificate of incorporation or these bylaws. Directors need not be stockholders.

4.2 Tenure. Except as otherwise provided by law, by the certificate of incorporation or by these bylaws, each director shall hold office until the next annual meeting and until his successor is elected and qualified, or until he sooner dies, resigns, is removed or becomes disqualified.

4.3 Powers. The business of the corporation shall be managed by or under the direction of the board of directors which shall have and may exercise all the powers of the corporation and do all such lawful acts and things as are not by law, the certificate of incorporation or these bylaws directed or required to be exercised or done by the stockholders.

4.4 Vacancies. Vacancies and any newly created directorships resulting from any increase in the number of directors may be filled by vote of the stockholders at a meeting called for the purpose, or by a majority of the directors then in office, although less than a quorum, or by a sole remaining director. When one or more directors shall resign from the board, effective at a future date, a majority of the directors then in office, including those who have resigned, shall have power to fill such vacancy or vacancies, the vote or action in writing thereon to take effect when such resignation or resignations shall become effective. The directors shall have and may exercise all their powers notwithstanding the existence of one or more vacancies in their number, subject to any requirements of law or of the certificate of incorporation or of these bylaws as to the number of directors required for a quorum or for any vote or other actions. This Section 4.4 shall be subject in all respects to the terms and conditions of that certain Voting Agreement, dated as of December 5, 2018, by and among the Company and certain of its stockholders, as the same may be amended or amended and restated from time to time (as so amended or restated, the "Voting Agreement"), and in the event of a conflict or inconsistency between this Section 4.4 and such Voting Agreement, the terms of the Voting Agreement shall prevail over this Section 4.4.

4.5 Committees. The board of directors may, by vote of a majority of the whole board, (a) designate, change the membership of or terminate the existence of any committee or committees, each committee to consist of one or more of the directors; (b) designate one or more directors as alternate members of any such committee who may replace any absent or disqualified member at any meeting of the committee; and (c) determine the extent to which each such committee shall have and may exercise the powers and authority of the board of directors in the management of the business and affairs of the corporation, including the power to authorize the seal of the corporation to be affixed to all papers which require it and the power and authority to declare dividends or to authorize the issuance of stock; excepting, however, such powers which by law, by the certificate of incorporation or by these bylaws they are prohibited from so delegating. In the absence or disqualification of any member of such committee and his alternate, if any, the member or members thereof present at any meeting and not disqualified from voting, whether or not constituting a quorum, may unanimously appoint another member of the board of directors to act at the meeting in the place of any such absent or disqualified member. Except as the board of directors may otherwise determine, any committee may make, alter and repeal rules for the conduct of its business, but unless otherwise provided by the board or such rules, its business shall be conducted as nearly as may be in the same manner as is provided by these bylaws for the conduct of business by the board of directors. Each committee shall keep regular minutes of its meetings and report the same to the board of directors upon request. Any such committee shall include at least one Series A Director (as defined in the certificate of incorporation) and at least one Series B Director (as defined in the certificate of incorporation) , *provided that* each Series B Director shall be entitled to such person's discretion to be a member of any committee of the board of directors.

4.6 Regular Meeting. Regular meetings of the board of directors may be held without call or notice at such place within or without the State of Delaware and at such times as the board may from time to time determine, provided that notice of the first regular meeting following any such determination shall be given to absent directors. A regular meeting of the directors may be held without call or notice immediately after and at the same place as the annual meeting of the stockholders.

4.7 Special Meetings. Special meetings of the board of directors may be held at any time and at any place within or without the State of Delaware designated in the notice of the meeting, when called by the president, the chairman of the board of directors or by at least two of the directors, reasonable notice thereof being given to each director by the secretary or by the president or by any one of the directors calling the meeting.

4.8 Notice. It shall be reasonable and sufficient notice to a director to send notice by telegram or telecopy or other form of electronic transmission at least twenty-four hours before the meeting, addressed to him at his usual or last known business or residence address or to give notice to him in person or by telephone at least twenty-four hours before the meeting, or by written notice mailed to his business or home address at least seventy-two hours before the meeting. Notice of a meeting need not be given to any director if a written waiver of notice, executed by him before or after the meeting. The attendance of a director at a meeting shall constitute a waiver of notice of such meeting by such director, except where a director attends a meeting for the express purpose of objecting at the beginning of the meeting to the transaction of any business because such meeting is not lawfully called or convened. Neither notice of a meeting nor a waiver of a notice need specify the purposes of the meeting.

4.9 Quorum. Except as may be otherwise provided by law, by the certificate of incorporation or by these bylaws, at any meeting of the directors a majority of the directors then in office shall constitute a quorum. A quorum shall not in any case be less than one-third of the total number of directors constituting the whole board. Any meeting may be adjourned from time to time by a majority of the votes cast upon the question, whether or not a quorum is present, and the meeting may be held as adjourned without further notice.

4.10 Action by Vote. Except as may be otherwise provided by law, by the certificate of incorporation or by these bylaws, when a quorum is present at any meeting the vote of a majority of the directors present shall be the act of the board of directors.

4.11 Action Without a Meeting. Unless otherwise restricted by the certificate of incorporation or these bylaws, any action required or permitted to be taken at any meeting of the board of directors or of any committee thereof may be taken without a meeting if all the members of the board or of such committee, as the case may be, consent thereto in writing (including by means of an authorized electronic, stamped or other facsimile signature, email message, or by electronic transmission), and such writing or writings and such electronic transmission or transmissions are filed with the records of the meetings of the board or of such committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form. Such consent shall be treated for all purposes as the act of the board or of such committee, as the case may be.

4.12 Participation in Meetings by Conference Telephone. Unless otherwise restricted by the certificate of incorporation or these bylaws, members of the board of directors or of any committee thereof may participate in a meeting of such board or committee by means of conference telephone or similar communications equipment by means of which all persons participating in the meeting can hear each other. Such participation shall constitute presence in person at such meeting.

4.13 Compensation. Unless otherwise restricted by the certificate of incorporation or these bylaws, the board of directors shall have the authority to fix from time to time the compensation of directors. The directors may be paid their expenses, if any, of attendance at each meeting of the board of directors and the performance of their responsibilities as directors and may be paid a fixed sum for attendance at each meeting of the board of directors and/or a stated salary as director. No such payment shall preclude any director from serving the corporation or its parent or subsidiary corporations in any other capacity and receiving compensation therefor. The board of directors may also allow compensation for members of special or standing committees for service on such committees.

4.14 Interested Directors and Officers.

(a) No contract or transaction between the corporation and one or more of its directors or officers, or between the corporation and any other corporation, partnership, association, or other organization in which one or more of the corporation's directors or officers are directors or officers, or have a financial interest, shall be void or voidable solely for this reason, or solely because the director or officer is present at or participates in the meeting of the board or committee thereof which authorizes the contract or transaction, or solely because his or their votes are counted for such purpose, if:

(1) The material facts as to his relationship or interest and as to the contract or transaction are disclosed or are known to the board of directors or the committee, and the board or committee in good faith authorizes the contract or transaction by the affirmative votes of a majority of the disinterested directors, even though the disinterested directors be less than a quorum; or

(2) The material facts as to his relationship or interest and as to the contract or transaction are disclosed or are known to the stockholders entitled to vote thereon, and the contract or transaction is specifically approved in good faith by vote of the stockholders; or

(3) The contract or transaction is fair as to the corporation as of the time it is authorized, approved or ratified by the board of directors, a committee thereof, or the stockholders.

(b) Common or interested directors may be counted in determining the presence of a quorum at a meeting of the board of directors or of a committee which authorizes the contract or transaction.

4.15 Resignation or Removal of Directors. Unless otherwise restricted by the certificate of incorporation or by law, any director or the entire board of directors may be

removed, with or without cause, by the holders of a majority of the stock issued and outstanding and entitled to vote at an election of directors. Any director may resign at any time by delivering his resignation in writing to the president or the secretary or to a meeting of the board of directors. Such resignation shall be effective upon receipt unless specified to be effective at some other time and without in either case the necessity of its being accepted unless the resignation shall so state. No director resigning and no director removed shall have any right to receive compensation as such director for any period following his resignation or removal, except where a right to receive compensation shall be expressly provided in a duly authorized written agreement with the corporation, or any right to damages on account of such removal, whether his compensation be by the month or by the year or otherwise; unless in the case of a resignation, the directors, or in the case of removal, the body acting on the removal, shall in their or its discretion provide for compensation.

Section 5 NOTICES

5.1 Form of Notice. Whenever, under the provisions of law, of the certificate of incorporation or of these bylaws, notice is required to be given to any director or stockholder, such notice may be given by mail, addressed to such director or stockholder, at his address as it appears on the records of the corporation, with postage thereon prepaid, and such notice shall be deemed to be given three days after the time when the same shall be deposited in the United States mail. Unless written notice by mail is required by law, written notice may also be given by telegram, telecopy, commercial delivery service or similar means, addressed to such director or stockholder at his address as it appears on the records of the corporation, in which case such notice shall be deemed to be given when delivered into the control of the persons charged with effecting such transmission, the transmission charge to be paid by the corporation or the person sending such notice and not by the addressee. Notice may also be given to any stockholder and to any director by any form of electronic transmission, to the same extent permitted by Section 232 of the Delaware General Corporation Law with respect to stockholders, and will be deemed given at the time provided therein. Oral notice or other in-hand delivery (in person or by telephone) shall be deemed given at the time it is actually given.

5.2 Waiver of Notice. Whenever notice is required to be given under the provisions of law, the certificate of incorporation or these bylaws, a written waiver thereof, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before or after the time stated therein, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any meeting of the stockholders, directors or members of a committee of the directors need be specified in any written waiver of notice.

Section 6 OFFICERS AND AGENTS

6.1 Enumeration; Qualification. The officers of the corporation shall be a president, a treasurer, a secretary and such other officers, if any, as the board of directors from time to time may in its discretion elect or appoint including without limitation a chairperson of the board of directors and one or more vice presidents. Any officer may be, but none need be, a director or

stockholder. Any two or more offices may be held by the same person. Any officer may be required by the board of directors to secure the faithful performance of his duties to the corporation by giving bond in such amount and with sureties or otherwise as the board of directors may determine.

6.2 Powers. Subject to law, to the certificate of incorporation and to the other provisions of these bylaws, each officer shall have, in addition to the duties and powers herein set forth, such duties and powers as are commonly incident to his office and such additional duties and powers as the board of directors may from time to time designate.

6.3 Election. The board of directors at its first meeting after each annual meeting of stockholders shall choose a president, a secretary and a treasurer. Other officers may be appointed by the board of directors at such meeting, at any other meeting or by written consent. At any time or from time to time, the directors may delegate to any officer their power to elect or appoint any other officer or any agents.

6.4 Tenure. Each officer shall hold office until the first meeting of the board of directors following the next annual meeting of the stockholders and until his successor is elected and qualified unless a shorter period shall have been specified in terms of his election or appointment, or in each case until he sooner dies, resigns, is removed or becomes disqualified. Each agent of the corporation shall retain his authority at the pleasure of the directors, or the officer by whom he was appointed or by the officer who then holds agent appointive power.

6.5 Chairperson of the Board of Directors. The chairperson of the board of directors, if any, shall have such duties and powers as shall be designated from time to time by the board of directors. References in these bylaws to a chairperson shall include references to persons designated by the board of directors with the title chairman, chairwoman or chair or any similar title.

6.6 President and Vice Presidents. Unless a separate chief executive officer has been elected by the board of directors, the President shall be the chief executive officer of the corporation and shall, subject to the direction of the board of directors, have general supervision and control of the's corporation's business. Unless otherwise provided by the Board of Directors, he or she shall preside, when present, at all meetings of the board of directors or stockholders. Any action taken by the President (or by any separately elected chief executive officer), and the signature of such officer on any agreement, contract, instrument or other document on behalf of the corporation shall, with respect to any third party, be sufficient to bind the corporation and shall conclusively evidence the authority of such officer and the corporation with respect thereto.

The president or treasurer shall execute bonds, mortgages and other contracts requiring a seal, under the seal of the corporation, except where required or permitted by law to be otherwise signed and executed and except where the signing and execution thereof shall be expressly delegated by the board of directors to some other officer or agent of the corporation.

Any vice presidents shall have such duties and powers as shall be designated from time to time by the board of directors or by the president.

6.7 Treasurer and Assistant Treasurers. The treasurer shall be the chief financial officer of the corporation and shall, subject to the direction of the board of directors, have general charge of the financial affairs of the corporation and shall cause to be kept accurate books of account. He shall have custody of all funds, securities, and valuable documents of the corporation, except as the board of directors or president may otherwise provide.

Any assistant treasurers shall have such duties and powers as shall be designated from time to time by the board of directors, the president or the treasurer.

6.8 Secretary and Assistant Secretaries. The secretary shall record all proceedings of the stockholders, of the board of directors and of committees of the board of directors in a book or series of books to be kept therefor and shall file therein all writings of, or related to, action by stockholder or director consent. In the absence of the secretary from any meeting, an assistant secretary, or if there is none or he is absent, a temporary secretary chosen at the meeting, shall record the proceedings thereof. Unless a transfer agent has been appointed, the secretary shall keep or cause to be kept the stock and transfer records of the corporation, which shall contain the names and record addresses of all stockholders and the number of shares registered in the name of each stockholder. The secretary shall have such other duties and powers as may from time to time be designated by the board of directors or the president.

Any assistant secretaries shall have such duties and powers as shall be designated from time to time by the board of directors, the president or the secretary.

6.9 Resignation and Removal. Any officer may resign at any time by delivering his resignation in writing to the president or the secretary or to a meeting of the board of directors. Such resignation shall be effective upon receipt unless specified to be effective at some other time, and without in any case the necessity of its being accepted unless the resignation shall so state. The board of directors may at any time remove any officer either with or without cause. The board of directors may at any time terminate or modify the authority of any agent. No officer resigning and no officer removed shall have any right to any compensation as such officer for any period following his resignation or removal, except where a right to receive compensation shall be expressly provided in a duly authorized written agreement with the corporation, or any right to damages on account of such removal, whether his compensation be by the month or by the year or otherwise; unless in the case of a resignation, the directors, or in the case of removal, the body acting on the removal, shall in their or its discretion provide for compensation.

6.10 Vacancies. If the office of the president or the treasurer or the secretary becomes vacant, the directors may elect a successor. If the office of any other officer becomes vacant, any person or body empowered to elect or appoint that office may choose a successor. Each such successor shall hold office for the unexpired term of his predecessor, and in the case of the president, the treasurer and the secretary until his successor is chosen and qualified, or in each case until he sooner dies, resigns, is removed or becomes disqualified.

Section 7 CAPITAL STOCK

7.1 Stock Certificates. The shares of stock of the corporation shall be represented by certificates; provided that the board of directors may provide by resolution or resolutions that some or all of any class or series shall be uncertificated shares that may be evidenced by a book-entry system maintained by the registrar of such stock. If shares are represented by certificates, such certificates shall be in such form, which may include electronic form, as may be approved by the board of directors. The certificates representing shares of stock of each class shall be signed by, or in the name of, the corporation by any two authorized officers of the corporation. Any or all such signatures may be facsimiles. Although any officer, transfer agent, or registrar whose manual or facsimile signature is affixed to such a certificate ceases to be such officer, transfer agent, or registrar before such certificate has been issued, it may nevertheless be issued by the corporation with the same effect as if such officer, transfer agent, or registrar were still such at the date of its issue.

7.2 Lost Certificates. The board of directors may direct a new certificate or certificates to be issued in place of any certificate or certificates theretofore issued by the corporation alleged to have been lost, stolen or destroyed, upon the making of an affidavit of that fact by the person claiming the certificate of stock to be lost, stolen or destroyed. When authorizing such issue of a new certificate or certificates, the board of directors may, in its discretion and as a condition precedent to the issuance thereof, require the owner of such lost, stolen or destroyed certificate or certificates, or his legal representative, to advertise the same in such manner as it shall require and/or to give the corporation a bond in such sum as it may direct as indemnity against any claim that may be made against the corporation with respect to the certificate alleged to have been lost, stolen or destroyed.

Section 8 TRANSFER OF SHARES OF STOCK

8.1 Transfer on Books. Subject to any restrictions with respect to the transfer of shares of stock, shares of stock may be transferred on the books of the corporation by the surrender to the corporation or its transfer agent of the certificate therefor properly endorsed or accompanied by a written assignment and power of attorney properly executed, with necessary transfer stamps affixed, and with such proof of the authenticity of signature as the board of directors or the transfer agent of the corporation may reasonably require. Except as may be otherwise required by law, by the certificate of incorporation or by these bylaws, the corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to receive notice and to vote or to give any consent with respect thereto and to be held liable for such calls and assessments, if any, as may lawfully be made thereon, regardless of any transfer, pledge or other disposition of such stock until the shares have been properly transferred on the books of the corporation.

It shall be the duty of each stockholder to notify the corporation of his post office address.

Section 9 GENERAL PROVISIONS

9.1 Record Date. In order that the corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, or to

express consent to corporate action in writing without a meeting, or entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the board of directors may fix, in advance, a record date, which shall not be more than forty-five days nor less than three days before the date of such meeting, nor more than forty-five days prior to any other action to which such record date relates. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the board of directors may fix a new record date for the adjourned meeting. If no record date is fixed,

(a) The record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held;

(b) The record date for determining stockholders entitled to express consent to corporate action in writing without a meeting, when no prior action by the board of directors is necessary, shall be the day on which the first written consent is expressed; and

(c) The record date for determining stockholders for any other purpose shall be at the close of business on the day on which the board of directors adopts the resolution relating to such purpose.

9.2 Dividends. Dividends upon the capital stock of the corporation may be declared by the board of directors at any regular or special meeting or by written consent, pursuant to law. Dividends may be paid in cash, in property, or in shares of the capital stock, subject to the provisions of the certificate of incorporation.

9.3 Payment of Dividends. Before payment of any dividend, there may be set aside out of any funds of the corporation available for dividends such sum or sums as the directors from time to time, in their absolute discretion, think proper as a reserve or reserves to meet contingencies, or for equalizing dividends, or for repairing or maintaining any property of the corporation, or for such other purpose as the directors shall think conducive to the interest of the corporation, and the directors may modify or abolish any such reserve in the manner in which it was created.

9.4 Checks. All checks or demands for money and notes of the corporation shall be signed by such officer or officers or such other person or persons as the board of directors may from time to time designate.

9.5 Fiscal Year. The fiscal year of the corporation shall begin on the first of January in each year and shall end on the last day of December next following, unless otherwise determined by the board of directors.

9.6 Seal. The board of directors may, by resolution, adopt a corporate seal. The corporate seal shall have inscribed thereon the name of the corporation, the year of its organization and the word “Delaware.” The seal may be used by causing it or a facsimile thereof

to be impressed or affixed or reproduced or otherwise. The seal may be altered from time to time by the board of directors.

Section 10 INDEMNIFICATION

10.1 Right to Indemnification. It being the intent of the corporation to provide maximum protection available under the law to its officers and directors, the corporation shall indemnify each Indemnified Person, to the fullest extent permissible under the Delaware General Corporation Law, as amended, against all expenses incurred by such Indemnified Persons in connection with any proceeding in which an Indemnified Person is involved as a result of serving in the capacity by reason of which such person is deemed to be an "Indemnified Person" pursuant to Subsection 10.07. Subject to the foregoing limitation, such indemnification shall be provided by the corporation with respect to a proceeding in which it is claimed that the Indemnified Person received an improper personal benefit by reason of his or her position, regardless of whether the claim arises out of the Indemnified Person's service in such capacity, except for matters as to which it is finally judicially determined that an improper personal benefit was received by the Indemnified Person. Notwithstanding the other provisions of this Section 10, indemnification shall not be paid (or, if previously advanced, shall be repaid by the applicable Indemnified Person) with respect to any matter as to which an Indemnified Person shall have been determined by a court of competent jurisdiction in any action, suit or proceeding to which such Indemnified Person is a party, which determination has become final and is not subject to further appeal, rehearing or reconsideration, that the action or omission giving rise to such indemnification request was primarily attributable to such Indemnified Person's bad faith, gross negligence or willful misconduct.

10.2 Indemnification of Appointing Stockholder. If (i) an Indemnified Person is or was affiliated with one or more entities that has invested in the corporation (an "Appointing Stockholder"), (ii) the Appointing Stockholder is, or is threatened to be made, a party to or a participant in any action, suit or proceeding, and (iii) the Appointing Stockholder's involvement in the action, suit or proceeding results from any claim based on the Indemnified Person's service to the corporation as a director or other fiduciary of the corporation, or as a result of the Appointing Stockholder being (or being alleged to be) a controlling person of the corporation, the Appointing Stockholder will be entitled to indemnification hereunder for expenses incurred due to the action, suit or proceeding (the "Expenses") to the same extent as the Indemnified Person, and the terms of this Section 10 as they relate to procedures for indemnification of the Indemnified Person and advancement of the Expenses shall apply to any such indemnification of the Appointing Stockholder.

10.3 Primary Indemnification. Any Indemnified Person may have certain rights to indemnification, advancement of expenses or insurance available to such Indemnified Person pursuant to other agreements or arrangements with one or more third parties, including, without limitation, a stockholder or its affiliates (collectively, "Other Indemnitors"). Nevertheless, the corporation shall be the indemnitor of first resort (i.e., its obligations to an Indemnified Person are primary and any obligation of any Other Indemnitor to advance expenses or to provide indemnification for the same expenses or liabilities incurred by an Indemnified Person are secondary) in connection with any claims or losses arising from any matter referred to in this Section 10 in which an Indemnified Person may be involved or threatened to be involved, as a

party or otherwise, arising out of or incident to the business or operations of the corporation or any subsidiary. The corporation shall advance the full amount of expenses incurred by an Indemnified Person and shall be liable for the full amount of all such losses to the extent legally permitted and required by the terms of these bylaws (or any other agreement between the corporation and an Indemnified Person), without regard to any rights an Indemnified Person may have against any Other Indemnitor. The corporation irrevocably waives, relinquishes and releases the Other Indemnitors from any claim against the Other Indemnitors for contribution, subrogation or any other recovery of any kind in respect of any amount paid or advanced by the corporation pursuant to this provision. No advancement or payment by any Other Indemnitor on behalf of an Indemnified Person with respect to any claim for which an Indemnified Person has sought indemnification from the corporation shall affect the corporation's obligation as primary obligor and to the extent of such advancement or payment by any of the Other Indemnitors, the Other Indemnitors shall have a right of contribution and shall be subrogated to all of the rights of recovery of an Indemnified Person against the corporation. The Other Indemnitors are express third party beneficiaries of the terms of this Section 10. An Indemnified Person may notify the corporation in writing of the existence of any Other Indemnitor in respect of such Indemnified Person, provided that the failure of an Indemnified Person to so notify the corporation shall not adversely impact the rights of any Other Indemnitor under this Section 10.

10.4 Award of Indemnification. The determination of whether the corporation is authorized to indemnify an Indemnified Person hereunder and any award of indemnification shall be made in each instance by (i) a majority of the directors who are not party to the proceedings in question or (ii) by Independent Counsel appointed by such directors or by a holders of a majority of voting power of the shares of capital stock then outstanding. The corporation shall be obliged to pay indemnification provided for by these bylaws and applied for by the Indemnified Persons unless there is an adverse determination within forty-five (45) days after the application. If indemnification is denied by the corporation pursuant, the applicant may seek an independent determination of its right to indemnification by a court, and in such event, the corporation shall have the burden of proving that the applicant was ineligible for indemnification under this Section 10. Notwithstanding the foregoing, in the case of a proceeding by or in the right of the corporation in which the Indemnified Person is finally adjudged liable to the corporation, indemnification hereunder shall be provided only upon a determination by a court having jurisdiction that in view of all the circumstances of the case, the Indemnified Person is fairly and reasonably entitled to indemnification for such expenses as the court shall deem proper.

10.5 Successful Defense. Notwithstanding any contrary provisions of this Section 10, to the extent that the Indemnified Person has been successful on the merits in the defense of any proceeding in which it was involved by reason of its position as an Indemnified Person or as a result of serving in such capacity (including termination of investigative or other proceedings without a finding of fault on the part of the Indemnified Person), the Indemnified Person shall be indemnified by the corporation against all expenses incurred by the Indemnified Person in connection therewith.

10.6 Advance Payments. Except as limited by law, expenses incurred by the Indemnified Person in defending any proceeding, including a proceeding by or in the right of the corporation, shall be paid by the corporation to the Indemnified Person in advance of final

disposition of the proceeding upon receipt of its written undertaking to repay such amount if the Indemnified Person is determined pursuant to this Section 10 or adjudicated to be ineligible for indemnification, which undertaking shall be an unlimited general obligation but need not be secured and may be accepted without regard to the financial ability of the Indemnified Person to make repayment.

10.7 Definitions. For purposes of this Section 10 only:

(a) "expenses" means all expenses, including attorneys' fees and disbursements, actually and reasonably incurred in defense of a proceeding or in seeking indemnification under this Section 10, and except for proceedings by or in the right of the corporation or alleging that the Indemnified Person received an improper personal benefit (unless it is judicially determined that the Indemnified Person satisfied the standard of conduct set forth above for indemnification), any judgments, awards, fines, penalties and reasonable amounts paid in settlement of a proceeding;

(b) "Indemnified Person" includes (i) an individual serving as a director, or an Officer of the corporation or in a similar executive capacity appointed by the board of directors and exercising rights and duties delegated by the board of directors, (ii) an individual serving at the request of the corporation as a director, manager, officer, employee or other agent of another organization, including, without limitation, any subsidiary of the corporation, and (iii) any individual who formerly served in any of the foregoing capacities (with respect to matters relating to such services);

(c) "Independent Counsel" means a law firm, or a member of a law firm, that is experienced in matters of corporation law and neither presently is, nor in the past five (5) years has been, retained to represent: (i) the corporation or the Indemnified Person in any matter material to either such party (other than with respect to matters concerning the Indemnified Person under this Section 10, or of other indemnitees under similar indemnification agreements), or (ii) any other party to the proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the corporation or the Indemnified Person in an action to determine the Indemnified Person's rights under these bylaws; and

(d) "proceeding" means any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, and any claim which could be the subject of a proceeding.

10.8 Insurance. The corporation shall have the power to purchase and maintain insurance on behalf of any director, officer, agent or employee against any liability or cost incurred by such person in any such capacity or arising out of its status as such, whether or not the corporation would have power to indemnify against such liability or cost. No insurer of any such insurance maintained by the corporation shall be considered an Other Indemnitor for purposes of these bylaws. The corporation shall obtain and maintain Directors and Officers liability insurance from insurers and in an amount satisfactory to the board of directors, including a majority of the Preferred Directors, including at least one Series B Director, if any Series B

Directors are then serving on the Board of Directors (in each case as defined in the certificate of incorporation), which shall not be less than $3 million, and on other terms and conditions satisfactory to the board of directors, and will use commercially reasonable efforts to cause such insurance policy to be maintained and to cover such risks as are adequate and customary for the corporation's size and business, with financially sound and reputable insurance companies or associations, until such time as the board of directors determines that such insurance should be discontinued.

10.9 Successor Indemnification. The indemnification provided by this Section 10 shall inure to the benefit of the heirs and personal representatives of the Indemnified Persons. If the corporation or any of its successors or assignees consolidates with or merges into any other person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the corporation assume the obligations of the corporation with respect to indemnification of the Indemnified Persons as in effect immediately before such transaction, whether such obligations are contained in these bylaws, or elsewhere, as the case may be.

10.10 Non-Exclusivity. The provisions of this Section 10 shall not be construed to limit the power of the corporation to indemnify its or any subsidiary's directors, members, stockholders, partners, officers, employees or agents to the full extent that would have been permitted by law, or to enter into specific agreements, commitments or arrangements for indemnification that would have been or are so permitted. The absence of any express provision for indemnification herein shall not limit any right of indemnification existing independently of this Section 10.

10.11 Amendment. The provisions of this Section 10 may be amended or repealed in accordance with Section 11, subject to any applicable provision of the certificate of incorporation; provided, however, that no amendment or repeal of such provisions that adversely affects the rights of a director or Appointing Stockholder under this Section 10 with respect to his, her or its acts or omissions at any time prior to such amendment or repeal shall apply to the director or Appointing Stockholder without his, her or its consent.

Section 11 AMENDMENTS

11.1 These bylaws may be altered, amended or repealed or new bylaws may be adopted by the stockholders or by the board of directors when such power is conferred upon the board of directors by the certificate of incorporation, at any regular meeting of the stockholders or of the board of directors or at any special meeting of the stockholders or of the board of directors. If the power to adopt, amend or repeal bylaws is conferred upon the board of directors by the certificate of incorporation, it shall not divest or limit the power of the stockholders to adopt, amend or repeal bylaws.

Exhibit 4.2

INVESTORS' RIGHTS AGREEMENT

THIS INVESTORS' RIGHTS AGREEMENT (this "**Agreement**"), is made as of the 5th day of December, 2018, by and among Morphic Holding, Inc., a Delaware corporation (the "**Company**"), and each of the investors listed on Schedule A hereto, each of which is referred to in this Agreement as an "**Investor**."

RECITALS

WHEREAS, The Company has been converted pursuant to and in accordance with the terms of that certain Plan of Conversion (the "**Plan of Conversion**") of Morphic Holding, LLC, dated on or about the date hereof (the "**Plan of Conversion**"), from a limited liability company duly organized under the laws of the State of Delaware (the "**Predecessor LLC**") into a Delaware corporation (the "**Conversion**"), in accordance with applicable provisions of the Delaware Limited Liability Company Act and the Delaware General Corporation Law (the "**DGCL**");

WHEREAS, By virtue of the Conversion, the membership interest of each Investor in the Predecessor LLC was converted and changed into shares of one or more series of the Preferred Stock of the Corporation, pursuant to and in accordance with the terms of the Plan of Conversion, and the Company and the Investors wish to, among other things, provide Investors holding such shares of Preferred Stock with the rights set forth herein, consistent with certain rights and obligations formerly set forth in the operating agreement of the Predecessor LLC, in each case subject to the terms and in accordance with the provisions of this Agreement.

NOW, THEREFORE, the parties agree as follows:

1. Definitions. For purposes of this Agreement:

1.1 "**Affiliate**" means a Person that directly, or indirectly through one or more intermediaries, Controls, is Controlled by or is under common Control with the Person specified. With respect to a Person that is a limited liability company, a limited partnership or a registered investment company, the following shall be considered affiliates of such Person: (i) any entity that is a nominee for such limited liability company, limited partnership, or registered investment company, (ii) any fund or entity managed by the same manager, managing member, general partner, management company, or investment adviser of such Person, or (iii) any entity controlling, controlled by, or under common control with such manager, managing member, general partner, management company or investment adviser of such Person.

1.2 "**Board of Directors**" means the board of directors of the Company.

1.3 "**Certificate of Incorporation**" means the Certificate of Incorporation of the Company, as amended and/or restated from time to time.

1.4 "**Common Stock**" means shares of the Company's common stock, par value $0.0001 per share.

1.5 "**Control**" of a Person means the possession, direct or indirect, of the power to vote in excess of fifty percent (50%) of the voting power of such Person, to appoint the majority of the managers, general partners or the equivalent of such Person, or to direct or cause the direction of the management and policies of such Person whether through ownership of voting securities, by contract or otherwise (e.g., as managing member or in a similar capacity but not including an advisory or management agreement (in the case of a managed account)).

1.6 "**Damages**" means any loss, damage, claim or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, claim or liability (or any action in respect thereof) arises out of or is based upon: (i) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (ii) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (iii) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

1.7 "**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.8 "**Excluded Registration**" means (i) a registration relating to the sale or grant of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, equity incentive or similar plan; (ii) a registration relating to an SEC Rule 145 transaction; (iii) a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or (iv) a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.

1.9 "**Form S-1**" means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

1.10 "**Form S-3**" means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits forward incorporation of substantial information by reference to other documents filed by the Company with the SEC.

1.11 "**Holder**" means any holder of Registrable Securities who is a party to this Agreement.

1.12 "**Immediate Family Member**" means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including, adoptive relationships, of a natural person referred to herein.

1.13 "**Initiating Holders**" means, collectively, Holders who properly initiate a registration request under this Agreement.

1.14 "**IPO**" means the Company's first underwritten public offering of its Common Stock under the Securities Act pursuant to an effective registration statement filed under the Securities Act, other than an Excluded Registration.

1.15 "**Major Investor**" means (i) any Investor that, individually or together with such Investor's Affiliates, holds at least 2,000,000 shares of Registrable Securities (as adjusted for any stock split, stock dividend, combination, or other recapitalization or reclassification effected after the date hereof); or (ii) Children's Medical Center Corporation, a charitable corporation organized and existing under the laws of The Commonwealth of Massachusetts ("**CMCC**"), so long as CMCC holds any Registrable Securities.

1.16 "**New Securities**" means any equity securities (or securities exercisable for or convertible into equity securities) of any kind or class issued by the Company or any subsidiary of the Company after the date hereof, including shares of Preferred Stock, other than: (i) Exempted Securities (as defined in the Certificate of Incorporation) issued after the date hereof; and (ii) any equity securities of a subsidiary of the Company issued to the Company.

1.17 "**Person**" means any individual, corporation, partnership, limited liability company, firm, joint venture, association, joint-stock company, trust, estate, unincorporated organization, governmental or regulatory body or other entity.

1.18 "**Preferred Director**" means, collectively, any Series A Director(s) and Series B Director(s).

1.19 "**Preferred Stock**" means, collectively, shares of the Company's Series Seed Preferred Stock, Series A Preferred Stock and Series B Preferred Stock.

1.20 "**Registrable Securities**" means (i) the Common Stock issuable or issued upon conversion of the Preferred Stock; and (ii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clauses (i) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Subsection 7.1, and excluding for purposes of

Section 2 any shares for which registration rights have terminated pursuant to Section 2.12 of this Agreement.

1.21 "**Registrable Securities then outstanding**" means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

1.22 "**Restricted Securities**" means the securities of the Company required to be notated with the legend set forth in Subsection 2.11(b) hereof.

1.23 "**SEC**" means the Securities and Exchange Commission.

1.24 "**SEC Rule 144**" means Rule 144 promulgated by the SEC under the Securities Act.

1.25 "**SEC Rule 145**" means Rule 145 promulgated by the SEC under the Securities Act.

1.26 "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.27 "**Selling Expenses**" means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Subsection 2.6.

1.28 "**Series A Director**" means any director of the Company that the holders of record of the Series A Preferred Stock are entitled to elect, exclusively and as a separate class, pursuant to the Certificate of Incorporation.

1.29 "**Series B Director**" means any director of the Company that the holders of record of the Series B Preferred Stock are entitled to elect, exclusively and as a separate class, pursuant to the Certificate of Incorporation.

1.30 "**Series Seed Preferred Stock**" means shares of the Company's Series Seed Preferred Stock, par value $0.0001 per share.

1.31 "**Series A Preferred Stock**" means shares of the Company's Series A Preferred Stock, par value $0.0001 per share.

1.32 "**Series B Preferred Stock**" means shares of the Company's Series B Preferred Stock, par value $0.0001 per share.

2. Registration Rights. The Company covenants and agrees as follows:

2.1 Demand Registration.

(a) Form S-1 Demand. If at any time after the earlier of (i) five (5) years after the date of this Agreement or (ii) one hundred eighty (180) days after the effective date of the registration statement for the IPO, the Company receives a request from Holders of not less than forty percent (40%) of the Registrable Securities then outstanding that the Company file a Form S-1 registration statement with respect to Registrable Securities then outstanding, the anticipated aggregate offering price of which, net of Selling Expenses, would exceed $10 million, then the Company shall (x) within ten (10) days after the date such request is given, give notice thereof (the "**Demand Notice**") to all Holders other than the Initiating Holders; and (y) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-1 registration statement under the Securities Act covering all Registrable Securities that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(b) Form S-3 Demand. If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Holders of at least ten percent (10%) of the Registrable Securities then outstanding that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Holders having an anticipated aggregate offering price, net of Selling Expenses, of at least $3 million, then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within forty-five (45) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Holders requesting a registration pursuant to this Subsection 2.1 a certificate signed by the Company's chief executive officer stating that in the good faith judgment of the Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the

Company shall have the right to defer taking action with respect to such filing for a period of not more than 120 days after the request of the Initiating Holders is given; provided, however, that the Company may not invoke this right more than twice in any twelve (12) month period; and provided further that the Company shall not register any securities for its own account or that of any other stockholder during such 120-day period other than an Excluded Registration.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(a)(i) during the period that is ninety (90) days before the Company's good faith estimate of the date of filing of, and ending on a date that is one hundred eighty (180) days after the effective date of, a Company-initiated registration, provided that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two registrations pursuant to Subsection 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Subsection 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(b) (i) during the period that is thirty (30) days before the Company's good faith estimate of the date of filing of, and ending on a date that is ninety (90) days after the effective date of, a Company-initiated registration to which the rights of holders of Registrable Securities under the provisions of Section 2.2 apply, provided that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two registrations pursuant to Subsection 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall be counted as "effected" for purposes of this Subsection 2.1(d) if (x) the applicable registration statement has been declared effective by the SEC and all Registrable Securities requested to be registered pursuant to such registration are so registered, and (y) the distribution contemplated in such registration statement has been completed or (z) such registration is withdrawn at the request of the Initiating Holders, unless either (i) the Initiating Holders elect to reimburse the Company for the registration expenses therefor or (ii) such withdrawal is made reasonably promptly after the Initiating Holders learn of a material adverse change in the condition, business, or prospects of the Company from that known to the Initiating Holders at the time of their request.

(e) The rights to cause the Company to register Registrable Securities pursuant to this Section 2.1 may be assigned by a Holder to a transferee or assignee of Registrable Securities (for so long as such securities remain Registrable Securities) that (i) is a subsidiary, parent, general partner, limited partner, retired partner, member or retired member, of a Holder that is a corporation, partnership or limited liability company, (ii) is a Holder's family member or trust for the benefit of an individual Holder, (iii) acquires at least five percent of the then-outstanding Registrable Securities or (iv) is an Affiliate of such Holder; provided, however, that (A) the transferor shall, within ten days after such transfer, furnish to the Company written notice of the name and address of such transferee or assignee and the securities with respect to which such registration rights are being assigned and (B) such transferee shall agree to be subject to all restrictions set forth in this Agreement.

2.2 Company Registration. If the Company proposes to register any of its Registrable Securities under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each such Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Section 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Section 2.2 before the effective date of such registration, whether or not any holder of Registrable Securities has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Section 2.6.

2.3 Underwriting Requirements.

(a) If, pursuant to Subsection 2.1, the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Subsection 2.1, and the Company shall include such information in the Demand Notice. The underwriter(s) will be selected by the Company and shall be reasonably acceptable to a majority in interest of the Initiating Holders. In such event, the right of any Holder to include such Holder's Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall (together with the Company as provided in Subsection 2.4(e)) enter into an underwriting agreement in customary form with the underwriter(s) selected for such underwriting. Notwithstanding any other provision of this Subsection 2.3, if the underwriter(s) advise the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Holders of Registrable Securities that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Holders of Registrable Securities, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Holder or in such other proportion as shall mutually be agreed to by all such selling Holders; provided, however, that the number of Registrable Securities held by the Holders to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares.

(b) In connection with any offering involving an underwriting of shares of the Company's capital stock pursuant to Subsection 2.2, the Company shall not be required to include any of the Holders' Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable

Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable to) the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below thirty percent 30% of the total number of securities included in such offering, unless such offering is the IPO, in which case the selling Holders may be excluded further if the underwriters make the determination described above and no other stockholder's securities are included in such offering. For purposes of the provision in this Subsection 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such "selling Holder," as defined in this sentence.

(c) For purposes of Subsection 2.1, a registration shall not be counted as "effected" if, as a result of an exercise of the underwriter's cutback provisions in Subsection 2.3(a), fewer than fifty percent (50%) of the total number of Registrable Securities that Holders have requested to be included in such registration statement are actually included.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that (i) such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at

the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration;

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; provided that the Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any managing underwriter(s) participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company's officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

In addition, the Company shall ensure that, at all times after any registration statement covering a public offering of securities of the Company under the Securities Act shall have become effective, its insider trading policy shall provide that the Company's directors may implement a trading program under Rule 10b5-1 of the Exchange Act.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers' and accounting fees; fees and disbursements of counsel for the Company; and the reasonable fees and disbursements, not to exceed $75,000, of one counsel for the selling Holders ("**Selling Holder Counsel**"), shall be borne and paid by the Company; provided, however, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Subsection 2.1 if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Holders of a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b), as the case may be; provided further that if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Holders shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.

(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and provided further that in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Subsections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Subsection 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Subsection 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the

defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either: (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Subsection 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this Subsection 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Subsection 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim, damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; provided, however, that, in any such case (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and provided further that in no event shall a Holder's liability pursuant to this Subsection 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Subsection 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Subsection 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144, at all times after the effective date of the registration statement filed by the Company for the IPO;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of SEC Rule 144 (at any time after ninety (90) days after the effective date of the registration statement filed by the Company for the IPO), the Securities Act, and the Exchange Act (at any time after the Company has become subject to such reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after the Company so qualifies); (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company; and (iii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Lock-Up.

(a) Solely with respect to the IPO, each Holder hereby agrees that, during the Lock-up Period (as defined below) it will not, without the prior written consent of the managing underwriter(s) of the IPO, and ending on the date specified by the Company (or any successor thereto) and the managing underwriter (i) lend, offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any equity securities of the Company held immediately before the effective date of the registration statement for the IPO or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of the equity securities of the Company, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of equity securities of the Company or other securities, in cash or otherwise. As used herein, the "**Lock-up Period**" means that period of time (i) commencing on the date of the final prospectus relating to the IPO (the "**Final Prospectus Date**") and (ii) ending not later than one hundred eighty (180) days after

the Final Prospectus Date; provided however, that if the Company is not an Emerging Growth Company (as defined in the Securities Act), then the Lock-up Period shall end on such later date (but in no event later than 212 days after the Final Prospectus Date) as may be reasonably requested by the Company (or any successor thereto) or an underwriter to accommodate any applicable regulatory restrictions on (1) the publication or other distribution of research reports and (2) analyst recommendations and opinions. The foregoing provisions of this Section 2.10 (i) shall apply only to the IPO, (ii) shall not apply to the sale of any equity securities to an underwriter pursuant to an underwriting agreement, (iii) shall not apply to shares of any existing or future class or series of capital stock of the Company purchased in the open market or from the underwriters in the IPO and (iv) shall not apply to the transfer of any equity securities by a Holder to an Affiliate of such Holder; and provided further that the foregoing obligations of Investors under this Section 2.10 shall be applicable to the Holders who are holders of Preferred Stock as of immediately prior to the closing of the IPO only if all officers and directors of the Company and any other Holder who holds one percent (1%) or more of the Company's then outstanding Common Stock (treating for this purpose all Common Stock issuable upon exercise of or conversion of outstanding options, warrants or convertible securities (including without limitation any Preferred Stock of the Company), as if exercised or converted in full and outstanding for this purpose) are subject to agreements imposing restrictions substantially the same as the restrictions set forth in this Section 2.10. The underwriters in connection with the IPO are intended third party beneficiaries of this Section 2.10 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in the IPO that are consistent with this Section 2.10 or that are necessary to give further effect thereto. Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply pro rata to all Holders subject to such agreements, based on the number of equity securities subject to such agreements.

(b) In order to enforce the covenant in Section 2.10(a) above, the Company may impose stop-transfer instructions with respect to the capital stock of each Holder (and transferees and assignees thereof) until the end of such restricted period.

2.11 Restrictions on Transfer.

(a) The Preferred Stock and the Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Preferred Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement.

(b) Each certificate, instrument, or book entry representing (i) the Preferred Stock, (ii) the Registrable Securities, and (iii) any other securities issued in respect of

the securities referenced in clauses (i) and (ii), upon any stock split, stock dividend, recapitalization, merger, consolidation, or similar event, shall (unless otherwise permitted by the provisions of Subsection 2.12(c)) be notated with a legend substantially in the following form:

THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.

THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.

The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Subsection 2.11.

(c) The holder of such Restricted Securities, by acceptance of ownership thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction, the Holder thereof shall give notice to the Company of such Holder's intention to effect such sale, pledge, or transfer. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder's expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a "no action" letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a legal opinion or "no action" letter (x) in any transaction in compliance with SEC Rule 144; or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; provided that each transferee agrees in writing to be subject to the terms of this Subsection 2.11. Each certificate, instrument, or book entry representing the Restricted Securities transferred as above provided shall be notated with, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Subsection 2.12(b), except that such certificate instrument, or book entry shall not be notated with such restrictive legend if, in the opinion of counsel for such Holder

and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.12 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Section 2.1 or Section 2.2 shall terminate upon the earliest to occur of:

(a) the closing of a Deemed Liquidation Event;

(b) with respect to a particular Holder, at such time as Rule 144 or another similar exemption under the Securities Act is available for the sale of all of such Holder's Registrable Securities without limitation during a three-month period without registration; and

(c) the seventh anniversary of the IPO.

3. Information and Observer Rights.

3.1 Operating Plan. Each year as soon as reasonably practicable following preparation thereof, and in any event at least 30 days prior to the commencement of each fiscal year of the Company (each, a "**Fiscal Year**"), the appropriate officers of the Company shall cause to be furnished to and approved by the Board of Directors the proposed capital and operating budget of the Company and any subsidiary of the Company for such Fiscal Year (the "**Operating Plan**"), forecasting the Company's revenues, expenses, and cash position on a month-to-month basis for the upcoming Fiscal Year, as well as any other detail reasonably requested by the Board of Directors.

3.2 Maintenance of Books and Records. The Company will maintain true books and records of account in which full and correct entries will be made of all its business transactions pursuant to a system of accounting established and administered in accordance with GAAP (except as noted therein), and will set aside on its books all such proper accruals and reserves as shall be required under GAAP.

3.3 Delivery of Financial Statements. The Company shall deliver or cause its appropriate officers to deliver to each Major Investor the following:

(a) as soon as reasonably practicable, but in no event more than one hundred eighty (180) days after the end of each Fiscal Year, a report of the activities of the Company for the preceding Fiscal Year, including a comparison to the amounts budgeted for such Fiscal Year, and audited financial statements for the Fiscal Year of the Company consisting of a balance sheet, a statement of income, a statement of cash flows and a report of independent certified public accountants, all prepared in accordance with GAAP, except as the auditors of the Company shall otherwise specify;

(b) as soon as reasonably practicable, but in any event within thirty (30) days after the end of each of the first three (3) quarters of each Fiscal Year of the Company, unaudited statements of income and of cash flows for such fiscal quarter, and an unaudited balance sheet as of the end of such fiscal quarter, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(c) as soon as reasonably practicable, but in no event more than thirty (30) days after the end of each calendar month, unaudited statements of income and of cash flows for such calendar month, and an unaudited balance sheet as of the end of such calendar month, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(d) as soon as reasonably practicable, but in no event more than 15 days after the end of each fiscal quarter, an updated capitalization table;

(e) as soon as reasonably practicable following approval thereof by the Board of Directors, but in no event later than 30 days prior to the commencement of the Fiscal Year, the Operating Plan for such Fiscal Year;

(f) through the end and in respect of the Fiscal Year of 2018, or any period thereof, any information required pursuant to Section 2.09 of that certain Third Amended and Restated Operating Agreement of the Predecessor LLC, as amended, to be delivered to the Major Members (as defined therein); and

(g) such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as any Major Investor may from time to time reasonably request; provided, however, that the Company shall not be obligated under this Section 3.3(g) to provide information (i) that the Company reasonably determines in good faith to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in a form acceptable to the Company); or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

(h) If, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries.

(i) Notwithstanding anything else in this Subsection 3.3 to the contrary, the Company may cease providing the information set forth in this Subsection 3.3 during the period starting with the date thirty (30) days before the Company's good-faith estimate of the date of filing of a registration statement if it reasonably concludes it must do so to comply with the SEC rules applicable to such registration statement and related offering; provided that the Company's covenants under this Subsection 3.3 shall be reinstated at such time as the Company is no longer

actively employing its commercially reasonable efforts to cause such registration statement to become effective.

3.4 Inspection Rights. Each Major Investor shall have the right to visit and inspect any of the properties of the Company or any subsidiary described in Subsection 3.3(h), and to discuss the affairs, finances and accounts of the Company or any such subsidiary with its officers, to review such information as is reasonably requested, and, if and to the extent the Company is in breach of Section 3.3 which breach remains uncured thirty (30) days following written notification thereof by a Major Investor, at such Major Investor's own expense to cause an audit of the books of the Company or any such subsidiary to be made by a certified public accountant of its own selection, all at such reasonable times and as often as may be reasonably requested in accordance with the terms of this Section 3.4; provided, however, that the Company shall not be obligated under this Section 3.4 with respect to (i) a Person whom the Board of Directors reasonably determines is a competitor of the Company (ii) information which the Board of Directors determines, in consultation with the Company's legal counsel, is attorney-client privileged and should not, therefore, be disclosed or (iii) information that could result in disclosure of a trade secret (unless covered by an enforceable confidentiality agreement, in a form acceptable to the Company). It is agreed that on and as of the Effective Date, for purposes of this Section 3.4, none of the Major Investors or their respective Affiliates will be deemed to be competitors of the Company. In addition, no Investor that is an investment fund shall be deemed to be a competitor of the Company by reason of the activities of any direct or indirect portfolio company of such Investor. In making a determination as to whether any Investor is a competitor for purposes of this paragraph (and with respect to excluding any Major Investor from the receipt of any information in accordance with the terms of this Section 3.4), the Board of Directors shall apply a reasonable and uniform standard to all Investors so as to not discriminate against any one Investor with respect to such determination or with respect to the receipt of such information. For as long as Schrödinger, Inc. ("**Schrödinger**") holds any shares of capital stock (and regardless of whether or not it is a Major Investor), for any given fiscal period that Schrödinger's independent auditor determines that Company or Subsidiary information is needed for the purposes of properly auditing or completing Schrödinger's financial statements, Schrödinger shall be entitled to the information provided to Major Investors pursuant to Section 3.3, and shall have the right granted to the Major Investors pursuant to this Section 3.4, in each case subject to the conditions of such Section.

3.5 Board Observers. Each of Pfizer Inc. ("**Pfizer**"), S.R. One, Limited ("**S.R. One**"), AbbVie Inc. ("**AbbVie**"), Novo Holding A/S ("**Novo**"), Omega Fund V, L.P. ("**Omega**"), EcoR1 Capital Fund, L.P. ("**EcoR1**") and Timothy A. Springer ("**Springer**") shall have the right, in consultation with the appropriate officers of the Company to appoint one individual to attend any meetings of the Board of Directors in a nonvoting observer capacity, and, in this respect, the Company shall provide each such observer with copies of all notices, minutes, consents, and other materials that are provided to its directors; provided, however, any such information received by such observer shall be subject to the terms and conditions of Section 3.7, and any Investor appointing an observer shall be responsible for any unauthorized use or disclosure of such information by its appointed observer; and

provided further, that the Company reserves the right to withhold in its discretion any such information, notice, minutes, consents and other materials and to exclude such observer from any meeting or portion thereof if access to such information or attendance at such meeting could adversely affect the attorney-client privilege between the Company and its counsel or a conflict of interest or if such observer is (or represents or is affiliated with) a competitor of the Company. For purposes of this Section 3.5, it is agreed that no Investor that is an investment fund shall be deemed to be a competitor of the Company by reason of the activities of any direct or indirect portfolio company of such Investor. In making a determination as to whether any observer is (or represents or is affiliated with) a competitor for purposes of this paragraph (and with respect to excluding any observer from participation in any meeting or receipt of any information), the Board of Directors shall apply a reasonable and uniform standard so as to not discriminate against any one observer with respect to such determination or with respect to the receipt of such information or participation in any such meeting as compared to any other observer or any other member of the Board of Directors. In making a determination as to whether any observer's presence would present a conflict of interest, the Board of Directors shall apply a reasonable and uniform standard so as to only request an observer not participate in portions of a meeting due to a conflict of interest to the same extent as it would ask another observer or a board member to not participate in portions of a meeting for a similar conflict of interest. Reimbursement for travel and other expenses incurred by such observers will be at the discretion of the Company provided that any reimbursement policy adopted by the Company will be applied uniformly among all observers.

3.6 Termination of of Covenants. The covenants set forth in Subsection 3.1, Subsection 3.3, and Subsection 3.4 shall terminate and be of no further force or effect (i) immediately before the consummation of the IPO, or (ii) upon the closing of (A) a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation or (B) a transaction or series of related transactions in which a Person, or group of related Persons, aquires from stockholders of the Company shares representing more than 50% of the outstanding voting power of the Company, whichever event occurs first.

3.7 Confidentiality.

(a) The Company and each Investor shall not use or disclose to third parties any Confidential Information received from the Company or from any other Investor (to the extent related to the Company or the Company's business) for any purpose other than (i) for the benefit of the Company, as determined in good faith by the Board of Directors, (ii) the use of Confidential Information by a Investor in connection with such Investor's monitoring or exercising its rights with respect to its investment in the Company, (iii) as required by law, legal process, order of court, government authority or arbitrator or in connection with any legal proceedings to which a Investor (or any assignee) and the Company are parties, (iv) to legal counsel and accountants for Investors or any assignee, (v) to other professional advisors to a Investor or any assignee, (vi) to regulatory officials having jurisdiction over a Investor or any assignee, (vii) in

connection with the enforcement of this Agreement or rights under this Agreement, and (viii) in connection with a disposition or proposed disposition in any or all of an Investor's Registrable Securities, rights and obligations hereunder that is permitted under this Agreement and applicable law. Notwithstanding the foregoing, a Investor that is an entity holding Preferred Stock (or Common Stock issued upon conversion of Preferred Stock) may in addition disclose Confidential Information to (I) any former partners, members or others who retain an economic interest in the Investor, (II) any current or prospective partners, members or other equity owners or managers, officers or employees of, or lenders to, the Investor or any subsequent partnership, fund or other entity under common investment management with such Investor, (III) any management company or wholly-owned Affiliate of the Investor or any director, officer, manager or employee thereof, and (IV) any employee, officer or representative of the Investor or any of the Persons identified in the foregoing clauses (I) through (III) with a bona fide need to know such information in connection with any purpose permitted in the foregoing clauses (i) through (viii) (each of the Persons identified in the foregoing clauses (I) through (IV), a "**Permitted Disclosee**"); provided that any Permitted Disclosee to whom Confidential Information is disclosed shall be subject to confidentiality restrictions substantially similar to the restrictions applicable to the Investor hereunder. For purposes of this Agreement, "**Confidential Information**" means all documents and information, whether written or oral (including, without limitation, confidential and proprietary information with respect to customers, sales, marketing, production, costs, business operations and assets), of the Company.

(b) The restrictions imposed by this Section 3.7 shall continue to apply to any Investor following the date of its disposition of all Registrable Securities held by such Investor, notwithstanding such disposition of Registrable Securities.

(c) Notwithstanding the foregoing:

(i) the restrictions on disclosure set forth in this Section 3.7 shall not apply to any Confidential Information to the extent that such information can be shown to have been: (A) generally available to the public other than as a result of a breach of the provisions of this Agreement; (B) already in the possession of the receiving Person, without any restriction on disclosure, prior to any disclosure of such information to the receiving Person by or on behalf of the Company or any Investor pursuant to the terms of this Agreement or otherwise, as evidenced by written records; (C) lawfully disclosed, without any restriction on additional disclosure, to the receiving Person by a third party who is not known by the receiving party to be subject to confidentiality restrictions; (D) independently developed by the receiving Person without use of any Confidential Information, as evidenced by written records; or (E) required by law or government regulation to be disclosed, provided that, the Investor shall notify the Company of any such disclosure requirement as soon as practicable and reasonably cooperate with the Company (at the Company's cost) if the Company seeks a protective order or other remedy in respect of any such disclosure; and furnish only that portion of the Confidential Information which the Investor is legally required to disclose;

(ii) nothing in this Agreement prohibits, or is intended in any manner to prohibit, a report of a possible violation of federal law or regulation to any governmental agency or entity, including but not limited to the Department of Justice, the Securities and

Exchange Commission, the Congress, and any agency Inspector General, or making other disclosures that are protected under whistleblower provisions of federal law or regulation. No Person subject to the restrictions set forth in this Section 3.7 shall require the prior authorization of anyone at the Company or the Company's legal counsel to make any such reports or disclosures, and no such Person is required to notify the Company that it has made such reports or disclosures. Additionally, nothing in this Agreement is intended to interfere with or restrain the immunity provided under 18 U.S.C. section 1833(b) for confidential disclosures of trade secrets to government officials, or lawyers, solely for the purpose of reporting or investigating a suspected violation of law; or in a sealed filing in court or other proceeding; and

(iii) nothing in this Agreement shall be deemed to prohibit an Investor or any of its respective Affiliates from disclosing the fact of its investment in the Company and providing such other information about the Company to its Affiliates and its Affiliates' investors in the ordinary course of its business (provided that such information shall not include technical or proprietary information of the Company).

(d) The Company may, subject to applicable provisions of the Company's bylaws, Certificate of Incorporation and the DGCL, become party to one or more separate agreements with certain Investors, which separate agreements may contain terms and conditions governing the use and disclosure of information. The Company and each Investor acknowledge and agree that the terms and conditions of this Section 3.7 shall be in addition to, and shall not supersede, any confidentiality obligations set forth in any other such separate agreement.

4. Rights to Future Stock Issuances.

4.1 Right of First Offer. Subject to the terms and conditions of this Subsection 4.1 and applicable securities laws, if the Company proposes to offer or sell any New Securities, it shall first have received a bona fide, arms' length written offer to purchase such New Securities from one or more Persons (each, a "**Prospective Purchaser**"), and the Company shall first offer such New Securities to each Major Investor who is then an "accredited investor" within the meaning of Regulation D promulgated under the Securities Act (any such Investor, a "**Qualified Investor**"). A Qualfied Investor shall be entitled to apportion the right of first offer hereby granted to it in such proportions as it deems appropriate, among (i) itself, (ii) its Affiliates and (iii) its beneficial interest holders, such as limited partners, members or any other Person having "beneficial ownership," as such term is defined in Rule 13d-3 promulgated under the Exchange Act, of such Qualified Investor ("**Investor Beneficial Owners**"); provided that each such Affiliate or Investor Beneficial Owner agrees to enter into this Agreement and each of the Voting Agreement and Right of First Refusal and Co-Sale Agreement of even date herewith among the Company, the Investors and the other parties named therein, as an "**Investor**" under each such agreement.

(a) The Company shall give each Qualified Investor a written notice (the "**Offer Notice**"), which shall describe (i) the number of New Securities for which the

Company has received a bona fide, arms' length written offer and the name(s) of the Prospective Purchaser(s) and (ii) the price and a summary of the terms and conditions upon which the Prospective Purchaser(s) have offered to purchase such New Securities. The Offer Notice shall be accompanied by a copy of the written offer, letter of intent or other written document signed by the Prospective Purchaser(s) setting forth the proposed terms and conditions of the sale. The date on which the Company gives the Offer Notice is hereinafter referred to as the "**Notice Date**."

(b) For a period of twenty (20) days following the Notice Date (the "**Offer Acceptance Period**"), each Qualified Investor shall have the right to purchase (the "**Purchase Right**"), at the price and on the terms and conditions stated in the Offer Notice, up to such Qualified Investor's pro rata share of the New Securities (as determined pursuant to the last sentence of this Section 4.1(b)). Any Qualified Investor that desires to exercise its Purchase Right shall give written notice (the "**Offer Acceptance Notice**") to the Company within the Offer Acceptance Period. The Offer Acceptance Notice shall state that such Qualified Investor desires to exercise its Purchase Right and the number of New Securities that such Qualified Investor elects to purchase upon exercise of such Purchase Right up to such Qualified Investor's full pro rata share. Failure by a Qualified Investor to give the Offer Acceptance Notice within the Offer Acceptance Period shall be deemed, without any further action by the Company or the Qualified Investor, the irrevocable waiver of such Qualified Investor's Purchase Right with respect to the New Securities set forth in the Offer Notice and any other securities issuable, directly or indirectly, upon conversion, exercise or exchange of such New Securities. For purposes of this Section 4, a Qualified Investor's pro rata share of the New Securities shall equal to the number of New Securities multiplied by the quotient of (x) the sum of (i) the number of shares of outstanding Common Stock then held by such Qualified Investor plus (ii) the number of shares of Common Stock then issuable upon the conversion in full of all then outstanding Preferred Stock then held by such Qualified Investor plus (iii) the number of Common Stock ultimately issuable upon the exercise or conversion of all then outstanding options, warrants or rights to acquire capital stock from the Company (other than outstanding Preferred Stock) then held by such Qualified Investor, divided by (y) the sum of (i) the total number of shares of Common Stock then outstanding, plus (ii) the total number of shares of Common Stock then issuable upon the conversion in full of all then outstanding shares of Preferred Stock, plus (iii) the total number of shares of Common Stock ultimately issuable upon the exercise or conversion of all then outstanding vested options, warrants or other rights to acquire capital stock from the Company (other than outstanding Preferred Stock).

(c) Each Qualified Investor may, in such Qualified Investor's Offer Acceptance Notice, offer to purchase more than its pro rata share of the New Securities. If less than all of the Qualified Investors elect to purchase their pro rata share of the New Securities (the "**Unsubscribed New Securities**"), the Unsubscribed New Securities shall be allocated pro rata (based on the number of outstanding shares of Preferred Stock owned by each Qualified Investor that offers to oversubscribe) among the Qualified Investors that offer to oversubscribe up to the number of New Securities specified in such Qualified Investor's Offer Acceptance Notice or on such other basis as such Qualified Investors may agree.

(d) Following the expiration of the Offer Acceptance Period, the Company shall be entitled, during the period of sixty (60) days following the expiration of the Offer Acceptance Period (the "**Unrestricted Period**"), to sell to the Prospective Purchaser(s) up

to the full amount of the New Securities set forth in the Offer Notice on the terms set forth in the Offer Notice, less the number of New Securities, if any, which the Qualified Investors have elected to purchase upon exercise of their Purchase Rights in accordance with this Section 4 (the "**Remainder Securities**"). The Company shall give five (5) days' prior written notice to each Qualified Investor that has elected to purchase New Securities of any such sale to a Prospective Purchaser, which sale shall be at the price and upon terms and conditions no more favorable to the Prospective Purchaser(s) than those described in the Offer Notice. At and upon the closing of the sale of such Remainder Securities to such Prospective Purchaser(s), which shall include full payment to the Company, the Qualified Investors shall purchase from the Company, and the Company shall sell to the Qualified Investors, the New Securities elected to be purchased pursuant to this Section 4 on the terms specified in the Offer Notice.

(e) If the Company does not complete the sale of the Remainder Securities to the Prospective Purchaser(s) within the Unrestricted Period, the Purchase Right provided hereunder shall be deemed to be revived and such Remainder Securities shall not be sold unless the Company shall comply with this Section 4 as if the Prospective Purchaser(s) had made a new offer to purchase such New Securities. In the event that the closing of the sale of all of the Remainder Securities to the Prospective Purchaser(s) does not occur during the Restricted Period, each Qualified Investor shall have the right, but not the obligation, to purchase the New Securities, if any, such Qualified Investor elected to purchase pursuant to this Section 4.

(f) The right of first offer in this Subsection 4.1 shall not be applicable to (i) Exempted Securities (as defined in the Certificate of Incorporation); and (ii) shares of Common Stock issued in the IPO.

4.2 Termination. The covenants set forth in Subsection 4.1 shall terminate and be of no further force or effect (i) immediately before the consummation of the IPO, or (ii) upon the closing of (A) a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation or (B) a transaction or series of related transactions in which a Person, or group of related Persons, aquires from stockholders of the Company shares representing more than 50% of the outstanding voting power of the Company, whichever event occurs first.

5. Matters Requiring Board Approval.

5.1 In addition to any other actions that require the consent of the Board of Directors by law, under the Corporate Documents (as defined below) or by customary practice of companies incorporated in Delaware, the Company shall not take any of the following actions without having first obtained the consent of the Board of Directors:

(a) approve the Operating Plan;

(b) subject to Subsection 5.4(g), hire any employee for the Company or any Company subsidiary with a compensation package greater than $250,000 per annum, unless provided for in the Operating Plan;

(c) pledge or grant a security interest in any assets of the Company or any Company Subsidiary, except in the ordinary course of business when all such pledges or grants in the ordinary course of business (excluding pledges or grants provided for in the Operating Plan) do not secure indebtedness of more than $100,000 in the aggregate;

(d) issue any shares of capital stock;

(e) enter into any agreements, including but not limited to leases, that obligate the Company or any Company subsidiary to make aggregate annual payments in excess of $250,000, unless provided for in the Operating Plan;

(f) acquire any asset or assets with a value in excess of $250,000 in a single transaction or a series of related transactions, unless provided for in the Operating Plan; or

(g) create any subsidiary or transfer any of the Company's assets to any subsidiary of the Company.

5.2 Matters Requiring Investor Director Approval. The Company shall not take the following actions without having first obtained the consent of the Board of Directors, which consent, so long as the holders of Preferred Units are entitled to elect one or more Preferred Directors, must include the affirmative vote of a majority of the Preferred Directors then serving on the Board of Directors (including at least one Series B Director, if any Series B Directors are then serving on the Board of Directors):

(a) make any loan or advance to, or own any stock or other securities of, any subsidiary or other corporation, partnership, or other entity unless it is wholly owned by the Company;

(b) make any loan or advance to any person, including, any employee or director, except advances and similar expenditures in the ordinary course of business or under the terms of an employee equity compensation plan approved by the Board of Directors including a majority of the Preferred Directors (including at least one Series B Director, if any Series B Directors are then serving on the Board of Directors);

(c) guarantee any indebtedness except for trade accounts of the Company or any Company subsidiary arising in the ordinary course of business;

(d) make any investment inconsistent with any investment policy approved by the Board of Directors;

(e) incur any aggregate indebtedness in excess of $100,000 that is not already included in the Operating Plan, other than trade credit incurred in the ordinary course of business;

(f) enter into or be a party to any transaction with any director, officer, executive or holder of more than 5% of the Company's Common Stock (calculated on an as-converted to Common Stock basis, assuming full exercise and/or conversion of all exercisable and/or convertible securities outstanding) or any "associate" (as defined in Rule 12b-2 promulgated under the Exchange Act) of any such person except transactions made in the ordinary course of business and pursuant to reasonable requirements of the Company's business and upon fair and reasonable terms, in each case approved by a majority of the directors disinterested with respect to such transaction;

(g) hire or change the compensation of any executive-level employee (including vice president-level positions), including approving any grants of equity compensation;

(h) change the principal business of the Company, enter new lines of business, or exit the current line of business;

(i) sell, assign, license, pledge or encumber material technology or intellectual property, other than licenses granted in the ordinary course of business;

(j) enter into any corporate strategic relationship involving the payment, contribution or assignment by the Company or to the Company of assets greater than $100,000;

(k) establish or amend any employee incentive plan or similar equity compensation plan;

(l) initiate its IPO; or

(m) grant any registration rights unless junior to those held by the holders of the Registrable Securities under this Agreement.

6. Additional Terms Applicable to the Company and Investors.

6.1 Insurance. The Company shall maintain Directors and Officers liability insurance provided by financially sound and reputable insurers as required by Section 6.08 of the Company's Bylaws.

6.2 Employee Agreements. The Company will cause each employee, officer and consultant, who was, is now or hereafter is engaged by the Company or any subsidiary of the Company, to enter into the Company's form of non-disclosure, non-solicitation and proprietary information and inventions assignment agreement.

6.3 Board Matters. The Company shall reimburse the nonemployee directors for all reasonable out-of-pocket travel expenses incurred (consistent with the Company's travel policy) in connection with attending meetings of the Board of Directors or any committee thereof.

6.4 Successor Indemnification. If the Company or any of its successors or assignees consolidates with or merges into any other Person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board of Directors as in effect immediately before such transaction, whether such obligations are contained in the Company's Bylaws, the Certificate of Incorporation, or elsewhere, as the case may be.

6.5 Intentionally Omitted.

6.6 Limitation of Liability of Investors; Freedom to Operate Affiliates.

(a) No Investor shall be obligated personally for any debt, obligation or liability of the Company, whether arising in contract, tort or otherwise, solely by reason of being a stockholder of the Company. Except as otherwise provided under the DGCL or expressly in this Agreement or by another writing signed by an Investor, and as further described in Section 6.7 below, such Investor shall have no fiduciary or other duty with respect to the business and affairs of the Company, and such Investor shall not be liable to the Company for acting in good faith reliance upon the provisions of this Agreement, the Certificate of Incorporation, the Company's Bylaws, the Voting Agreement or the Co-Sale Ageeement (the Certificate of Incorporation, Bylaws and such other agreements, collectively, the "**Corporate Documents**"). No Investor shall have any obligation to contribute to, or in respect of, the liabilities or obligations of the Company or return dividends or distributions made by the Company except as required by the DGCL or other applicable law. The failure of the Company to observe any formalities or requirements relating to the exercise of its powers or the management of its business or affairs under the Corporate Documents or the Act shall not be grounds for making any Investor responsible for the liabilities of the Company.

(b) Each Investor acknowledges that it has not relied upon any person, firm or corporation, other than the Company and its officers and directors, in making any investment or decision to invest in the Company. Subject to Section 6.7, each Investor agrees that no Investor, nor the respective controlling persons, officers, directors, partners, agents or employees of any Investor shall be liable to any other stockholder of the Company for any action heretofore or

hereafter taken or omitted to be taken by any of them in connection with any Corporate Document, which limitation is intended to apply to any and all monetary liabilities or causes of action however alleged or arising, unless otherwise prohibited by law; provided, however, that this Section 6.6(b) shall not (i) in any way limit any party's right to equitable relief, including injunctive relief and specific performance, (ii) apply to breaches of any Investor's confidentiality obligations, or (iii) limit liability for any Investor's conduct that is judicially determined to be in bad faith, fraud or willful misconduct.

(c) The total liability, in the aggregate, of any Investor and its respective officers, directors, employees and agents, for any and all monetary claims, losses, costs or damages, including attorneys' and accountants' fees and expenses and costs of any nature whatsoever or claims or expenses resulting from or in any way related to any Corporate Document from any cause or causes shall be several and not joint with the other stockholder of the Company and, except in the case of fraud, intentional misrepresentation or a breach of confidentiality obligations set forth herein, shall not exceed the total purchase price paid to the Company by such Investor for any Preferred Stock held by it. It is intended that this limitation apply to any and all monetary liabilities or causes of action however alleged or arising, unless otherwise prohibited by law; provided, however, that this Section 6.6(c) shall not (i) in any way limit the Company's right to equitable relief, including injunctive relief and specific performance from an Investor, (ii) apply to breaches of an Investor's confidentiality obligations, or (iii) limit liability for an Investor's conduct that is judicially determined to be in bad faith, fraud or willful misconduct. Nothing in this Agreement shall restrict the freedom of any Investor to operate any of its affiliates (including any such affiliate that is a potential competitor of the Company); it being agreed that nothing in this Section 6.6(c) shall be deemed to (A) excuse any Investor, or any affiliate thereof, from confidentiality obligations with respect to Company information or (B) excuse any director designated by any Investor from his or her fiduciary duties in connection with his or her service as a director of the Company or of any Company subsidiary.

6.7 No Fiduciary Duties Owed by the Investors. To the fullest extent permitted by applicable law, no Investor or Affiliate of an Investor acting under the Corporate Documents shall have any fiduciary or similar duty, at law or in equity, or any liability relating thereto, to the Company or any other stockholder of the Company or Affiliate thereof, with respect to or in connection with the Company or the Company's business or affairs; and, without limitation, each Investor when approving or disapproving any action, shall be entitled to consider only such interests and factors as such Investor desires and may consider such Investor's own interests or the interests of the other Investors and shall have no other duty or obligation, fiduciary or otherwise, to give any consideration to any interest of or factors affecting the Company or any other stockholder of the Company or Affiliate thereof. The provisions of this Agreement, to the extent that they restrict the duties and liabilities of an Investor or Affiliate of an Investor otherwise existing at law or in equity, are agreed by the parties hereto to replace such other duties and liabilities of such Investor or Affiliate of an Investor. For the sake of clarity, the provisions of the DGCL and other applicable law regarding fiduciary duties shall continue to apply to directors of the Company designated by any Investor. This Section 6.7 shall not apply to any Investor or Affiliate of such Investor acting in his or her capacity as an officer of the Company.

6.8 Publicity. From and after the date hereof, the Company will not, and will not cause, direct or permit any of its representatives to make or originate any publicity, news release or other public announcement, written or oral (a "**Release**"), that mentions any Investor by name, including any publicity, news release or other announcement regarding the existence of such Investor's investment in the Company or any other arrangement between the Company or any Company subsidiary and any Investor, or any arrangement between any other stockholder and any Investor without, in each case, such Investor's prior written consent, except (a) the Company may disclose an Investor's status as a holder of Preferred Stock and its designee on the Company's Board of Directors (if applicable) to other stockholders in communications in the ordinary course of business consistent with past practice, and (b) where such Release is, based upon the advice of outside counsel to the Company, required by applicable law; provided, however, that in the event of a legally required Release, the Company will (i) consult with such Investor to the extent permitted by applicable law under the circumstances with respect to the text or content of such Release and (ii) provide such Investor with a copy of the Release as promptly as practicable but in no event less than forty-eight (48) hours prior to its publication.

6.9 Anti-Corruption Matters.

(a) The Company shall not, and shall not permit any Company subsidiary or any of its or their respective directors, officers, managers, employees, independent contractors, representatives or agents (collectively, "**Representatives**") to, promise, authorize or make any payment to, or otherwise contribute any item of value to, directly or indirectly, any non-U.S. government official, in each case, in violation of the U.S. Foreign Corrupt Practices Act ("**FCPA**") or any other applicable anti-bribery or anti-corruption law. The Company shall, and shall cause each Company subsidiary to, cease all of its or their respective activities, as well as remediate any actions taken by the Company, any such subsidiary or any of its or their respective Representatives in violation of the FCPA or any other applicable anti-bribery or anti-corruption law. The Company shall, and shall cause each of its subsidiaries to, maintain systems or internal controls (including, but not limited to, accounting systems, purchasing systems and billing systems) to ensure compliance with the FCPA or any other applicable anti-bribery or anti-corruption law.

(b) The Company shall use commercially reasonable efforts to (i) cause the Company and any of its Affiliates to operate to the same standards of conduct set forth in "Prevention of Corruption — Third Party Guidelines" of GlaxoSmithKline plc ("**GSK**") provided to the Company in writing on or before the date hereof and (ii) notify S.R. One if it becomes aware of any activities or proposed activities to be conducted by itself or any of its Affiliates that may be contrary to GSK's publicly announced ethical standards or the principles set forth in the "Prevention of Corruption — Third Party Guidelines" of which the Company is aware or has been notified.

6.10 Termination of Covenants. The covenants set forth in this Section 6, except for Subsections 6.4, shall terminate and be of no further force or effect (i) immediately before the consummation of the IPO

or (ii) upon a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, whichever event occurs first.

7. Miscellaneous.

7.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that (i) is an Affiliate of a Holder; (ii) is a Holder's Immediate Family Member or trust for the benefit of an individual Holder or one or more of such Holder's Immediate Family Members; or (iii) after such transfer, holds at least 2,000,000 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations); provided, however, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement. For the purposes of determining the number of shares of Registrable Securities held by a transferee, the holdings of a transferee (1) that is an Affiliate or stockholder of a Holder; (2) who is a Holder's Immediate Family Member; or (3) that is a trust for the benefit of an individual Holder or such Holder's Immediate Family Member shall be aggregated together and with those of the transferring Holder; provided further that all transferees who would not qualify individually for assignment of rights shall, as a condition to the applicable transfer, establish a single attorney-in-fact for the purpose of exercising any rights, receiving notices, or taking any action under this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

7.2 Governing Law. This Agreement shall be governed by the internal law of the State of Delaware, without regard to conflict of law principles that would result in the application of any law other than the law of the State of Delaware.

7.3 Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, *e.g.*, www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

7.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

7.5 Notices.

(a) Except as expressly set forth to the contrary in this Agreement, all notices, requests, or consents required or permitted to be given under this Agreement must be in writing and shall be deemed to have been given (i) three (3) days after the date mailed by registered or certified mail, addressed to the recipient, with return receipt requested, (ii) upon delivery to the recipient in person or by courier, or (iii) upon receipt by the recipient of a facsimile transmission or email. Such notices, requests and consents shall be given (x) to the Investors at the addresses set forth on the records of the Company or such other address as may be specified by notice to the Board, and (y) to the Company or the Board at the address of the principal office of Company. Whenever any notice is required to be given by law, the Certificate of Incorporation or this Agreement, a written waiver thereof, signed by the Person entitled to notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice. If notice is given to the Company, a copy shall also be sent to Foley Hoag LLP, 155 Seaport Boulevard, Boston, MA 02210, Attention Mark A. Haddad.

(b) Consent to Electronic Notice. Each Investor consents to the delivery of any stockholder notice pursuant to the DGCL, as amended or superseded from time to time, by electronic transmission pursuant to Section 232 of the DGCL (or any successor thereto) at the electronic mail address or the facsimile number as on the books of the Company. Each Investor agrees to promptly notify the Company of any change in such stockholder's electronic mail address, and that failure to do so shall not affect the foregoing.

7.6 Amendments and Waivers. Any term of this Agreement may be amended, modified or terminated and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the (a) Company and (b) the holders of a majority of the shares of Common Stock then issued or issuable upon conversion of the shares of Preferred Stock then outstanding (which holders must include (i) the holders of a majority of the shares of Common Stock issued or issuable upon conversion of the then-outstanding shares of Series A Preferred Stock and (ii) the holders of at least sixty-three percent (63%) of the shares of Common Stock issued or issuable upon conversion of the then-outstanding shares of Series B Preferred Stock (voting together as a single class)); provided that the Company may in its sole discretion waive Investor's compliance with Subsection 2.11(c) (and the Company's failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Subsection 2.11(c) shall be deemed to be a waiver); and provided further that any provision hereof may be waived by any waiving party on such party's own behalf, without the consent of any other party. Notwithstanding the foregoing, (a) no amendment, modification,

termination or waiver, including any amendment, modification, termination or waiver of this Section 7.6, that by its terms has an adverse or disproportionate effect on the rights and obligations of any Investor may be made without the affirmative vote or written consent of such Investor, unless such amendment, modification, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 4 with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms, notwithstanding the fact that certain Investors may nonetheless, by agreement with the Company, purchase securities in such transaction so long as (x) such waiver does so by its terms and (y) each Major Investor is given the opportunity to purchase his, her or its pro rata portion of all New Securities made available for purchase by any Major Investor in such transaction, based on the total number of shares then help by such Major Investor); (b) without the consent of Novo, Pfizer, Omega, S.R. One, AbbVie or Timothy Springer, Section 3.5 shall not be modified, waived or amended as to such Investor for so long, in each case, as such Investor is entitled to appoint an observer under such Section; (c) without the consent of each affected Major Investor Section 3.3, Section 3.4 or Section 6.6 shall not be modified, waived or ameneded, and (d) without the consent of each affected Major Investor, the definition of "Major Investor" shall not be amended to increase the number of Registrable Securities required to qualify as a Major Investor, for so long as such Investor holds at least the number of Registrable Securities required to qualify as a Major Investor as of the date hereof. Notwithstanding the foregoing, Schedule A hereto may be amended by the Company from time to time to add transferees of any Registrable Securities in compliance with the terms of this Agreement without the consent of the other parties; and Schedule A hereto may also be amended by the Company after the date of this Agreement without the consent of the other parties to add information regarding any additional Investor who becomes a party to this Agreement in accordance with Subsection 7.1. The Company shall give prompt notice of any amendment, modification or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, modification, termination, or waiver. Any amendment, modification, termination, or waiver effected in accordance with this Subsection 7.6 shall be binding on all parties hereto, regardless of whether any such party has consented thereto. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision. The Company will at all times, in good faith assist in the carrying out of all the provisions of the Corporate Documents and in the taking of all such actions as may be necessary or appropriate in order to protect the rights of the Investors thereunder.

7.7 Severability. In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

7.8 Aggregation of Stock. All shares of Registrable Securities held or acquired by Affiliates shall be aggregated together for the purpose of determining the availability of any rights under this

Agreement and such Affiliated persons may apportion such rights as among themselves in any manner they deem appropriate.

7.9 Additional Investors. Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of the Company's Preferred Stock after the date hereof in accordance with the terms and conditions of the Corporate Documents, any purchaser of such shares of Preferred Stock may become a party to this Agreement by executing and delivering an additional counterpart signature page to this Agreement, and thereafter shall be deemed an "Investor" for all purposes hereunder. No action or consent by the Investors shall be required for such joinder to this Agreement by such additional Investor, so long as such additional Investor has agreed in writing to be bound by all of the obligations as an "Investor" hereunder.

7.10 Entire Agreement. This Agreement constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled.

7.11 Dispute Resolution. The parties (a) hereby irrevocably and unconditionally submit to the jurisdiction of the state courts of Delaware and to the jurisdiction of the United States District Court for the District of Delawre for the purpose of any suit, action or other proceeding arising out of or based upon this Agreement, (b) agree not to commence any suit, action or other proceeding arising out of or based upon this Agreement except in the state courts of Delaware or the United States District Court for the District of Delaware, and (c) hereby waive, and agree not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above-named courts, that its property is exempt or immune from attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court.

7.12 Legal Counsel. The Company has engaged Foley Hoag LLP ("**Foley**") as legal counsel to the Company. Moreover, Foley has previously represented or concurrently represents the interests of the Company and parties related thereto in connection with matters other than the preparation of this Agreement and the other Corporate Documents and may represent such Persons in the future. Each Investor hereby approves Foley's representation of the Company in the preparation of this Agreement the other Corporate Documents and acknowledges that (a) actual or potential conflicts of interest may exist among the Investors in connection with the preparation of this Agreement and the other Corporate Documents, (b) whether or not Foley has in the past represented or is currently representing such Investor with respect to other matters, Foley has not represented the interests of any Investor in the preparation and negotiation of any Corporate Document, and (c) Foley does not represent any Investor in its capacity as a stockholder of

the Company or as a party to any Corporate Document in the absence of a clear and explicit written agreement to such effect between such Investor and Foley (and then, only to such extent as set forth in such agreement) and, in the absence of any such agreement, Foley shall owe no duties directly to such Investor. In the event any dispute or controversy arises between any Investor and the Company, then each Investor agrees that Foley may represent the Company in any such dispute or controversy to the extent permitted under the Massachusetts Rules of Professional Conduct or similar rules in any other jurisdiction or other laws and ethical rules governing the conduct of attorneys, and each Investor hereby consents to such representation.

7.13 Other Business Activities of Investors. The Company acknowledges that certain of the Investors are in the business of venture capital investing and therefore review the business plans and related proprietary information of many enterprises, including enterprises that may have products or services that compete directly or indirectly with those of the Company. Nothing in this Agreement or any Corporate Document shall preclude or in any way restrict the Investors from investing or participating in any particular enterprise, whether or not such enterprise has products or services that compete with those of the Company. Further, the Company and each Investor acknowledges and agrees that (i) certain of the Investors (or the Affiliates of such Investors) (each, a "**Strategic Investor**") may presently have, or may engage in the future in, internal development programs, or may receive information from third parties that relates to, and may develop and commercialize products independently or in cooperation with such third parties, that are similar to or that are directly or indirectly competitive with, the Company's development programs, products or services, and (ii) any employee of such Strategic Investor serving on the Board of Directors is serving in such capacity at the request, and for the benefit, of the Company. Accordingly, such Strategic Investor's designation of any individual to the Board of Directors (the "**Board Designee**"), the service of such Board Designee on the Board of Directors, or the exercise by such Strategic Investor of any rights under this Agreement or any Corporate Document, shall not in any way preclude or restrict such Strategic Investor from conducting any development program, commercializing any product or service or otherwise engaging in any enterprise, whether or not such development program, product, service or enterprise, competes with those of the Company, so long as such activities do not result in a violation of (x) the confidentiality provisions of this Agreement or any other Corporate Document or (y) the fiduciary obligations of such Board Designee. Nothing herein or in any Corporate Document shall be construed to impose on such Strategic Investor or any Board Designee any restriction, duty or obligation other than as expressly set forth herein or therein.

7.14 Delays or Omissions. No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All

remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

MORPHIC HOLDING, INC.

By: /s/ Praveen Tipirneni
Name: Praveen Tipirneni
Title: Chief Executive Officer

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

/s/ Timothy A. Springer
Timothy A. Springer

TAS PARTNERS, LLC

By: /s/ Timothy A. Springer
Name: Timothy A. Springer
Title: Manager

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

POLARIS PARTNERS VII, L.P.
By: Polaris Management Company VII, L.L.C.,
Its General Partner

By: /s/ Max Eisenberg
Max Eisenberg
Attorney-in-fact

POLARIS ENTREPRENEURS' FUND VII, L.P.

By: Polaris Management Company VII, L.L.C.,
Its General Partner

By: /s/ Max Eisenberg
Max Eisenberg
Attorney-in-fact

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

SCHRÖDINGER, INC.

By: /s/ Ramy Farid
Name: Ramy Farid
Title: President & CEO

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

S.R. ONE, LIMITED,
a Pennsylvania Business Trust

By: /s/ Jens Eckstein
Name: Jens Eckstein
Title: President

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

PFIZER VENTURES (US) LLC

By: /s/ Andrew Muratore
Name: ANDREW MURATORE
Title: Vice President

Address: 235 East 42nd Street
New York, NY 10028
Attention: Chief Counsel, Pfizer Ventures

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

Pfizer Inc.

By: /s/ Barbara Dalton
Name: Barbara Dalton
Title: VP Pfizer Ventures, Worldwide Business Development

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

OMEGA FUND V, L.P.

By: Omega Fund V GP, L.P., its General Partner

By: Omega Fund V GP Manager, Ltd., its General Partner

By: Anne-Mari Paster
Name: Anne-Mari Paster
Title: Director

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

NOVO HOLDINGS A/S

By: /s/ Thomas Dyrberg
Name: Thomas Dyrberg, under specific power of attorney
Title: Managing Partner

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

Artal Treasury Ltd.

By: /s/ Keith R. Le Poidevin
Name: Keith R. Le Poidevin
Title: Director

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

EcoR1 Capital Fund, L.P.
By: EcoR1 Capital, LLC, its General Partner

By: /s/ Oleg Nodelman
Name: Oleg Nodelman,
Title: Managing Director

EcoR1 Capital Fund Qualified, L.P.
By: EcoR1 Capital, LLC, its General Partner

By: /s/ Oleg Nodelman
Name: Oleg Nodelman,
Title: Managing Director

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

MNGBF Corporation

By: /s/ Junkyu Park
Name: Junkyu Park
Title: Director

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

ABBVIE INC.

By: /s/ Scott C. Brun M.D.
Name: Scott C. Brun M.D.
Title: Head AbbVie Ventures

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

/s/ Alan Crane
Alan Crane

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

/s/ Yi Zhang
Yi Zhang

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

/s/ Gustav Christensen
Gustav Christensen

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

ShangPharma Investment Group Limited

By: /s/ Michael Hui
Name: Michael Hui
Title: CEO

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

CHILDREN'S MEDICAL CENTER CORPORATION

By: /s/ Bruce Baller
Name: Bruce Baller
Title: Assistant Treasurer

SIGNATURE PAGE TO INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

/s/ Praveen Tipirneni
Praveen Tipirneni

SCHEDULE A

Investors

Timothy A. Springer

TAS Partners, LLC

Polaris Partners VII, L.L.C.

Polaris Entrepreneurs' Fund VII, L.P.

Schrödinger, Inc.

S.R. One, Limited

Pfizer Ventures (US) LLC

Pfizer Inc.

Omega Fund V, L.P.

Novo Holdings A/S

Artal Treasury Ltd.

EcoR1 Capital Fund, L.P.

EcoR1 Capital Fund Qualified, L.P.

MNGBF Corporation

Abbvie Inc.

Alan Crane

Yi Zhang

Gustav Christensen

ShangPharma Investment Group Limited

Children's Medical Center Corporation

Praveen Tipirneni

Exhibit 4.3

THIS WARRANT AND THE UNITS ISSUABLE HEREUNDER HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN SECTIONS 5.3 AND 5.4 BELOW, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE ISSUER, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

WARRANT TO PURCHASE LIMITED LIABILITY COMPANY INTERESTS

Company: Morphic Rock Holding, LLC, a Delaware limited liability company
Number of Units: As set forth in Paragraph A below
Type/Series of Units: Preferred Units
Warrant Price: $0.75286 per Unit, subject to adjustment
Issue Date: March 31, 2016
Expiration Date: March 30, 2026 **See also Section 5.1(b).**
Credit Facility: This Warrant to Purchase Limited Liability Company Interests ("**Warrant**") is issued in connection with that certain Loan and Security Agreement of even date herewith among Silicon Valley Bank, the Company and Morphic Rock Therapeutic, Inc. (as amended and/or modified and in effect from time to time, the "**Loan Agreement**").

THIS WARRANT CERTIFIES THAT, for good and valuable consideration, SILICON VALLEY BANK (together with any successor or permitted assignee or transferee of this Warrant or of any units issued upon exercise hereof, "**Holder**") is entitled to purchase the number of fully paid and non-assessable units of limited liability company interest of the Class (as defined below) of the above-named company (the "**Company**") as determined pursuant to Paragraph A below, at the above-stated Warrant Price per Unit, all as set forth above and as adjusted pursuant to Section 2 of this Warrant, subject to the provisions and upon the terms and conditions set forth in this Warrant. Reference is made to Section 5.4 of this Warrant whereby Silicon Valley Bank shall transfer this Warrant to its parent company, SVB Financial Group.

The type and series of limited liability company interests or units for which this Warrant shall be exercisable (as may be adjusted from time to time pursuant to the provisions of this Warrant, the "**Class**") shall be Preferred Units as defined in, and having the relative rights, powers, preferences and privileges as set forth in, the Company's Amended and Restated Operating Agreement dated as of June 10, 2015, as amended and/or restated and in effect from time to time (the "**Operating Agreement**"). As used herein, "**units**" refers generally to limited liability company interests in the Company, whether such interests be styled as units, percentage interests, shares or otherwise in the Operating Agreement.

A. Number of Units. Upon the making of each Equipment Advance (as defined in the Loan Agreement) to Borrower (as defined in the Loan Agreement), this Warrant automatically shall become exercisable for such number of units of the Class (cumulatively, and as may be adjusted from time to time in accordance with the provisions of this Warrant, the "**Units**") as shall equal (i)(a) 0.03, multiplied by (b) the amount of such Equipment Advance, divided by (ii) the Warrant Price in effect on and as of the date of such Equipment Advance, subject to adjustment thereafter from time to time in accordance with the provisions of this Warrant.

SECTION 1. EXERCISE.

1.1 Method of Exercise. Holder may at any time and from time to time exercise this Warrant, in whole or in part, by delivering to the Company the original of this Warrant together with a duly executed Notice of Exercise in substantially the form attached hereto as Appendix 1 and, unless Holder is exercising this Warrant pursuant to a cashless exercise set forth in Section 1.2, a check, wire transfer of same-day funds (to an account designated by the Company), or other form of payment acceptable to the Company for the aggregate Warrant Price for the Units being purchased.

1.2 Cashless Exercise. On any exercise of this Warrant, in lieu of payment of the aggregate Warrant Price in the manner as specified in Section 1.1 above, but otherwise in accordance with the requirements of Section 1.1, Holder may elect to receive Units equal to the value of this Warrant, or portion hereof as to which this Warrant is being exercised. Thereupon, the Company shall issue to the Holder such number of fully paid and non-assessable Units as are computed using the following formula:

$$X = Y(A-B)/A$$

where:

X = the number of Units to be issued to the Holder;

Y = the number of Units with respect to which this Warrant is being exercised (inclusive of the Units surrendered to the Company in payment of the aggregate Warrant Price);

A = the Fair Market Value (as determined pursuant to Section 1.3 below) of one Unit; and

B = the Warrant Price.

1.3 Fair Market Value. If the Company's common or ordinary units are then traded or quoted on a nationally recognized securities exchange, inter-dealer quotation system or over-the-counter market (a "**Trading Market**") and the Class is common or ordinary units, the fair market value of a Unit shall be the closing price or last sale price of a common or ordinary unit reported for the Business Day immediately before the date on which Holder delivers this Warrant together with its Notice of Exercise to the Company. If the Company's common or ordinary units are then traded in a Trading Market and the Class is a series of convertible preferred units or other units convertible into common or ordinary units, the fair market value of a Unit shall be the closing price or last sale price of a common or ordinary unit reported for the Business Day immediately before the date on which Holder delivers this Warrant together with its Notice of Exercise to the Company multiplied by the number of common or ordinary units into which a unit of the Class is then convertible. If the Company's common or ordinary units are not then traded in a Trading Market, the Manager or Managers of the Company shall determine the fair market value of a Unit in its, his or their reasonable good faith judgment.

1.4 Delivery of Certificate and New Warrant. Within a reasonable time after Holder exercises this Warrant in the manner set forth in Section 1.1 or 1.2 above, if units of the Class are then certificated by the Company,, the Company shall deliver to Holder a certificate representing the Units issued to Holder upon such exercise and, if this Warrant has not been fully exercised and has not expired, a new warrant of like tenor representing the Units not so acquired. If units of the Class are not

then certificated by the Company, the Company will deliver to Holder such evidence of the issuance of such Units to Holder as required or permitted under the Operating Agreement or, if there be none, such evidence as Holder may reasonably request.

1.5 Replacement of Warrant. On receipt of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant and, in the case of loss, theft or destruction, on delivery of an indemnity agreement reasonably satisfactory in form, substance and amount to the Company or, in the case of mutilation, on surrender of this Warrant to the Company for cancellation, the Company shall, within a reasonable time, execute and deliver to Holder, in lieu of this Warrant, a new warrant of like tenor and amount.

1.6 Treatment of Warrant Upon Acquisition of Company.

(a) Acquisition. For the purpose of this Warrant, "**Acquisition**" means any transaction or series of related transactions involving: (i) the sale, lease, exclusive license, or other disposition of all or substantially all of the assets of the Company; (ii) any merger or consolidation of the Company into or with another person or entity (other than a merger or consolidation effected exclusively to change the Company's domicile), or any other corporate reorganization, in which the members and other holders of units of the Company in their capacity as such immediately prior to such merger, consolidation or reorganization, own less than a majority of the Company's (or the surviving or successor entity's) outstanding voting power (even if such voting power be limited solely to such matters as required by applicable law) immediately after such merger, consolidation or reorganization (or, if such Company members and other holders of units beneficially own a majority of the outstanding voting power (even if such voting power be limited solely to such matters as required by applicable law) of the surviving or successor entity as of immediately after such merger, consolidation or reorganization, such surviving or successor entity is not the Company); or (iii) any sale or other transfer by the members and/or other holders of units of the Company of units representing at least a majority of the Company's then-total outstanding combined voting power (even if such voting power be limited solely to such matters as required by applicable law).

(b) Treatment of Warrant at Acquisition. In the event of an Acquisition in which the consideration to be received by the Company's members and other holders of units consists solely of cash, solely of Marketable Securities or a combination of cash and Marketable Securities (a "**Cash/Public Acquisition**"), and the fair market value of one Unit as determined in accordance with Section 1.3 above would be greater than the Warrant Price in effect on such date immediately prior to such Cash/Public Acquisition, and Holder has not exercised this Warrant pursuant to Section 1.1 above as to all Units, then this Warrant shall automatically be deemed to be Cashless Exercised pursuant to Section 1.2 above as to all Units effective immediately prior to and contingent upon the consummation of a Cash/Public Acquisition. In connection with such Cashless Exercise, Holder shall be deemed to have restated each of the representations and warranties in Section 4 of the Warrant as the date thereof and the Company shall promptly notify the Holder of the number of Units (or such other securities) issued upon exercise. In the event of a Cash/Public Acquisition where the fair market value of one Unit as determined in accordance with Section 1.3 above would be less than the Warrant Price in effect immediately prior to such Cash/Public Acquisition, then this Warrant will expire immediately prior to the consummation of such Cash/Public Acquisition.

(c) Upon the closing of any Acquisition other than a Cash/Public Acquisition, the acquiring, surviving or successor entity shall assume the obligations of this Warrant, and this Warrant shall thereafter be exercisable for the same securities and/or other property as would have been paid for

the Units issuable upon exercise of the unexercised portion of this Warrant as if such Units were outstanding on and as of the closing of such Acquisition, subject to further adjustment from time to time in accordance with the provisions of this Warrant.

(d) As used in this Warrant, "**Marketable Securities**" means securities meeting all of the following requirements: (i) the issuer thereof is then subject to the reporting requirements of Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), and is then current in its filing of all required reports and other information under the Act and the Exchange Act; (ii) the class and series of shares or other security of the issuer that would be received by Holder in connection with the Acquisition were Holder to exercise this Warrant on or prior to the closing thereof is then traded in a Trading Market, and (iii) following the closing of such Acquisition, Holder would not be restricted from publicly re-selling all of the issuer's shares and/or other securities that would be received by Holder in such Acquisition were Holder to exercise this Warrant in full on or prior to the closing of such Acquisition, except to the extent that any such restriction (x) arises solely under federal or state securities laws, rules or regulations, and (y) does not extend beyond six (6) months from the closing of such Acquisition..

SECTION 2. ADJUSTMENTS TO THE SHARES AND WARRANT PRICE.

2.1 Unit Dividends, Splits, Etc. If the Company declares or pays a dividend or distribution on the outstanding units of the Class payable in additional units of the Class or other units, securities or property (other than cash), then upon exercise of this Warrant, for each Unit acquired, Holder shall receive, without additional cost to Holder, the total number and kind of units, securities and property which Holder would have received had Holder owned the Units of record as of the date the dividend or distribution occurred. If the Company subdivides the outstanding units of the Class by reclassification or otherwise into a greater number of units, the number of Units purchasable hereunder shall be proportionately increased and the Warrant Price shall be proportionately decreased. If the outstanding units of the Class are combined or consolidated, by reclassification or otherwise, into a lesser number of units, the Warrant Price shall be proportionately increased and the number of Units shall be proportionately decreased.

2.2 Reclassification, Exchange, Combinations or Substitution. Upon any event whereby all of the outstanding units of the Class are reclassified, exchanged, combined, substituted, or replaced for, into, with or by Company securities of a different class and/or series, then from and after the consummation of such event, this Warrant will be exercisable for the number, class and series of Company securities that Holder would have received had the Units been outstanding on and as of the consummation of such event, and subject to further adjustment thereafter from time to time in accordance with the provisions of this Warrant. The provisions of this Section 2.2 shall similarly apply to successive reclassifications, exchanges, combinations substitutions, replacements or other similar events.

2.3 Conversion to Corporation. If the Company converts to a corporation pursuant to Section 10.06(b) of the Operating Agreement, including, without limitation, in connection with the Company's initial, underwritten public offering pursuant to an effective registration statement under the Act (the "**IPO**"), then from and after the date of such conversion, this Warrant shall be exercisable for such number and class of equity securities into which the Units would have been converted had the Units been outstanding on the date of such conversion, and the Warrant Price shall equal the Warrant Price in effect as of immediately prior to such conversion divided by the number of securities into which one Unit would have been converted, all subject to further adjustment thereafter from time to time in accordance with the provisions of this Warrant.

2.4 No Fractional Unit. No fractional Unit shall be issuable upon exercise of this Warrant and the number of Units to be issued shall be rounded down to the nearest whole Unit. If a fractional Unit interest arises upon any exercise of the Warrant, the Company shall eliminate such fractional Unit interest by paying Holder in cash the amount computed by multiplying the fractional interest by (i) the fair market value (as determined in accordance with Section 1.3 above) of a full Unit, less (ii) the then-effective Warrant Price.

2.5 Notice/Certificate as to Adjustments. Upon each adjustment of the Warrant Price, Class and/or number of Units, the Company, at the Company's expense, shall notify Holder in writing within a reasonable time setting forth the adjustments to the Warrant Price, Class and/or number of Units and facts upon which such adjustment is based. The Company shall, upon written request from Holder, furnish Holder with a certificate of its Manager, including computations of such adjustment and the Warrant Price, Class and number of Units in effect upon the date of such adjustment.

SECTION 3. REPRESENTATIONS AND COVENANTS OF THE COMPANY.

3.1 Representations and Warranties. The Company represents and warrants to, and agrees with, the Holder as follows:

(a) The initial Warrant Price referenced on the first page of this Warrant is not greater than the price per unit at which units of the Class were last sold and issued prior to the Issue Date hereof in an arms-length transaction in which at least $500,000 of such units were sold.

(b) All Units which may be issued upon the exercise of this Warrant, and all units and/or other securities, if any, issuable upon conversion of the Units, shall, upon issuance, be duly authorized, validly issued, fully paid and non-assessable, and free of any liens and encumbrances except for restrictions on transfer provided for herein, under the Operating Agreement or under applicable federal and state securities laws. The Company covenants that it shall at all times cause to be reserved and kept available out of its authorized and unissued units such number of units of the Class, common or ordinary units and other securities as will be sufficient to permit the exercise in full of this Warrant and the conversion of the Units into common or ordinary units or such other securities, if any.

(c) The Company's capitalization table attached hereto as Schedule 1 is true and complete, in all material respects, as of the Issue Date.

3.2 Notice of Certain Events. If the Company proposes at any time to:

(a) declare any dividend or distribution upon the outstanding units of the Class or, if units of the Class are then convertible into common or ordinary units, such common or ordinary units, whether in cash, property, units, or other securities and whether or not a regular or periodic cash dividend or distribution (other than a distribution of cash upon the outstanding units of the Class and/or common or ordinary units made solely for the purpose of permitting the holders thereof to satisfy their respective federal and state tax obligations in respect of the taxable income of the Company);

(b) offer for subscription or sale pro rata to the holders of the outstanding units of the Class any additional Company units of any type, class, series or other designation (other than pursuant to contractual pre-emptive rights);

(c) effect any reclassification, exchange, combination, substitution, reorganization or recapitalization of the outstanding units of the Class;

(d) effect an Acquisition or to liquidate, dissolve or wind up; or

(e) effect an IPO;

then, in connection with each such event, the Company shall give Holder:

(1) in respect of the matters referred to in (a) and (b) above, at least seven (7) Business Days prior written notice of the earlier to occur of (i) the date on which a record will be taken for such dividend, distribution, or subscription rights (and specifying the date on which the holders of outstanding units of the Class will be entitled thereto) or for determining rights to vote, if any, or (ii) the closing or effective date of such event;

(2) in the case of the matters referred to in (c) and (d) above at least seven (7) Business Days prior written notice of the date when the same will take place (and specifying the date on which the holders of outstanding units of the Class will be entitled to exchange their units for the securities or other property deliverable upon the occurrence of such event and such reasonable information as Holder may reasonably require regarding the treatment of this Warrant in connection with such event giving rise to the notice); and

(3) with respect to the IPO, at least seven (7) Business Days prior written notice of the date on which the Company proposes to file its registration statement in connection therewith.

The Company will also provide information requested by Holder that is reasonably necessary to enable Holder to comply with Holder's accounting or reporting requirements.

3.3 Tax Treatment of Warrant.

(a) Application of Noncompensatory Option Treasury Regulations. The parties hereto acknowledge and agree that at the time of the execution of this Warrant, the Company and Holder intend that the Warrant be treated as a "noncompensatory option" within the meaning of Treasury Regulations Section 1.721-2(f). Therefore, unless and until this Warrant is exercised in accordance with its terms, or there is superseding authority under which the Company's tax counsel determines in writing (and a copy thereof provided to Holder) such treatment is not appropriate, or a Final Determination (as defined below) to the contrary has been made, for federal and applicable state and local income tax purposes, the parties hereto agree to (i) treat the issuance of the Warrant as an open transaction and not as the issuance of a partnership or membership interest in the Company, (ii) treat each Holder, with respect to ownership of the Warrant, as the holder of a warrant or option exercisable for limited liability company units or interests and not as a partner or a Member of the Company, and (iii) consistent with the regulations promulgated by the Treasury Department ("**Treasury Regulations**") under the Internal Revenue Code of 1986, as amended, or any successor statute (the "**Code**") regarding noncompensatory partnership options, not allocate any profits or losses or other items of income, gain,

deduction, loss or credit hereunder to a Holder of this Warrant with respect to this Warrant or the limited liability company interests issuable on exercise hereof prior to the exercise of this Warrant. The parties shall file all tax returns and information reports in a manner consistent with the foregoing, except to the extent otherwise required by the adoption of any superseding authority under which the Company's tax counsel determines in writing (and a copy thereof provided to Holder) such treatment is not appropriate or a Final Determination. To the extent the Company, after consultation with its tax counsel, determines that it is required to make any disclosure regarding the treatment of this Warrant described above under Code Section 6662 or otherwise on its tax returns or other tax filings, the Company shall promptly notify Holder and, prior to filing, give Holder and its agents and representatives an opportunity to review and comment on any such disclosure. For purposes of this Section 3.3, "**Final Determination**" means, with respect to any issue, (x) a decision, judgment, decree or other order by any court of competent jurisdiction, which decision, judgment, decree or other order has become final and not subject to further appeal, (y) a closing agreement entered into under Code Section 7121 or any other binding settlement agreement entered into in connection with or in contemplation of an administrative or judicial proceeding, or (z) the completion of the highest level of administrative proceedings if a judicial contest is not or is no longer available.

(b) Exercise of Warrant. Upon exercise of this Warrant, the parties agree to treat the exercise of this Warrant consistently with applicable Treasury Regulations, including, without limitation, to the extent allowed thereunder (i) establishing an initial Capital Account (as defined in the Operating Agreement) for Holder equal to the consideration paid or deemed paid to the Company for the issuance of this Warrant plus the fair market value of any property contributed to the Company upon exercise of this Warrant, if any, (ii) revaluing all Company assets and property immediately following exercise of this Warrant and allocating built-in gain or loss in the Company's assets and property to Holder and then to the historic Members as contemplated under the Treasury Regulations and, to the extent such allocation is insufficient to adjust Holder's Capital Account in accordance with its right to share in capital, shifting capital between Holder and the historic Members as contemplated under the Treasury Regulations, and (iii) making associated Code Section 704(c) and "corrective allocations" as described in the Treasury Regulations.

(c) Effect on Tax Distributions. For purposes of determining the amount of any tax distribution made under the Operating Agreement to an exercising Holder who becomes a Member, any Code Section 704(c) allocations or "corrective allocations" made as contemplated in Section 3.3(b) to such Member shall be treated as taxable income allocated to such Member by the Company, a tax distribution shall be made with respect to such allocations, and any and all tax distributions to an exercising Holder (whether made pursuant to this Section 3.3(c) or the Operating Agreement) shall be computed in accordance with the Operating Agreement. If, pursuant to a Final Determination or otherwise, Holder is allocated taxable income with respect to this Warrant in respect of any period prior to exercise hereof and such Holder has not otherwise received a tax distribution under the Operating Agreement with respect to such amounts, and/or if Holder is with respect to any period prior to exercise hereof treated by federal or state tax authorities as a Member and the Units issuable upon exercise hereof treated as outstanding pursuant to Treasury Regulation 1.761-3 and/or any corresponding applicable state tax regulation, then promptly upon making such required allocation of taxable income to Holder or receipt of Holder's written notice of such Final Determination, as applicable, the Company shall indemnify Holder from and against, and shall either make a payment to all appropriate taxing authorities (if required) in satisfaction of, or shall make a distribution of cash to Holder to cover, such Holder's aggregate federal and state tax liabilities in respect of such amount of taxable income or treatment (which shall include, without limitation, (x) all interest, penalties and fines thereon, (y) and all penalties, fines and interest thereon, if any, in respect of Holder's liability for failure

to file tax returns in all applicable jurisdictions with respect to such periods for which such taxing authorities treat Holder as the owner of the Units, and (z) all amounts necessary for Holder to satisfy its aggregate federal and state tax liabilities in respect of such Company payments or distributions to Holder), and such payment or distribution shall be made prior to making any other subsequent distributions under the Operating Agreement. If Holder is allowed a refund or credit of taxes actually paid by the Company or with respect to which the Company made a tax distribution to Holder pursuant to this Section 3.3(c), (i) Holder shall claim such overpayment as a refund (rather than as a credit) to the extent permitted under applicable laws and (ii) such refund shall be for the account of the Company and shall be paid over to the Company, within thirty (30) days of receipt of such amount.

(d) Survival. The provisions of this Section 3.3 shall survive (i) the exercise of this Warrant and the sale or other disposition by Holder of the Units, and (ii) the expiration or earlier termination of this Warrant.

SECTION 4. REPRESENTATIONS, WARRANTIES OF THE HOLDER.

The Holder represents and warrants to the Company as follows:

4.1 Purchase for Own Account. This Warrant and the securities to be acquired upon exercise of this Warrant by Holder are being acquired for investment for Holder's account, not as a nominee or agent, and not with a view to the public resale or distribution within the meaning of the Act. Holder also represents that it has not been formed for the specific purpose of acquiring this Warrant or the Units.

4.2 Disclosure of Information. Holder is aware of the Company's business affairs and financial condition and has received or has had full access to all the information it considers necessary or appropriate to make an informed investment decision with respect to the acquisition of this Warrant and its underlying securities. Holder further has had an opportunity to ask questions and receive answers from the Company regarding the terms and conditions of the offering of this Warrant and its underlying securities and to obtain additional information (to the extent the Company possessed such information or could acquire it without unreasonable effort or expense) necessary to verify any information furnished to Holder or to which Holder has access.

4.3 Investment Experience. Holder understands that the purchase of this Warrant and its underlying securities involves substantial risk. Holder has experience as an investor in securities of companies in the development stage and acknowledges that Holder can bear the economic risk of such Holder's investment in this Warrant and its underlying securities and has such knowledge and experience in financial or business matters that Holder is capable of evaluating the merits and risks of its investment in this Warrant and its underlying securities and/or has a preexisting personal or business relationship with the Company and certain of its officers, directors or controlling persons of a nature and duration that enables Holder to be aware of the character, business acumen and financial circumstances of such persons.

4.4 Accredited Investor Status. Holder is an "accredited investor" within the meaning of Regulation D promulgated under the Act.

4.5 The Act. Holder understands that this Warrant and the Units issuable upon exercise hereof have not been registered under the Act in reliance upon a specific exemption therefrom,

which exemption depends upon, among other things, the bona fide nature of the Holder's investment intent as expressed herein. Holder understands that this Warrant and the Units issued upon any exercise hereof must be held indefinitely unless subsequently registered under the Act and qualified under applicable state securities laws, or unless exemption from such registration and qualification are otherwise available. Holder is aware of the provisions of Rule 144 promulgated under the Act.

4.6 Rights as Member; Operating Agreement. Without limiting any provision of this Warrant, Holder agrees that, as a Holder of this Warrant, it will not be a Member (as defined in the Operating Agreement) and will have none of the rights or obligations of a Member unless and until the exercise of this Warrant, and then only with respect to the Units issued upon such exercise. Upon exercise of this Warrant, the Company agrees that Holder shall automatically and without further action by any person be admitted as a Member (as defined in the Operating Agreement) under the Operating Agreement with respect to the Units issued upon such exercise, and Holder and such Units shall, subject to the provisions of Section 3.3 above, thereupon be subject to and bound by the Operating Agreement. Holder shall execute and deliver a counterpart signature page, joinder agreement, instrument of accession or similar instrument to the Operating Agreement upon the Company's request following exercise hereof.

SECTION 5. MISCELLANEOUS.

5.1 Term; Automatic Cashless Exercise Upon Expiration.

(a) Term. Subject to the provisions of Section 1.6 above, this Warrant is exercisable in whole or in part at any time and from time to time on or before 6:00 PM, Pacific time, on the Expiration Date and shall be void thereafter.

(b) Automatic Cashless Exercise upon Expiration. In the event that, upon the Expiration Date, the fair market value of one Unit (or other security issuable upon the exercise hereof) as determined in accordance with Section 1.3 above is greater than the Warrant Price in effect on such date, then this Warrant shall automatically be deemed on and as of such date to be exercised pursuant to Section 1.2 above as to all Units (or such other securities) for which it shall not previously have been exercised, and the Company shall, within a reasonable time, deliver a certificate representing the Units (or such other securities) issued upon such exercise to Holder.

5.2 Legends. Each certificate evidencing Units (and each certificate evidencing securities issued upon conversion of any Units, if any) shall be imprinted with a legend in substantially the following form:

THE UNITS EVIDENCED BY THIS CERTIFICATE HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE "**ACT**"), OR THE SECURITIES LAWS OF ANY STATE AND, EXCEPT AS SET FORTH IN THAT CERTAIN WARRANT TO PURCHASE LIMITED LIABILITY COMPANY INTERESTS ISSUED BY THE ISSUER TO SILICON VALLEY BANK DATED MARCH 31, 2016, MAY NOT BE OFFERED, SOLD, PLEDGED OR OTHERWISE TRANSFERRED UNLESS AND UNTIL REGISTERED UNDER SAID ACT AND LAWS OR, IN THE OPINION OF LEGAL COUNSEL IN FORM AND SUBSTANCE SATISFACTORY TO THE ISSUER, SUCH OFFER, SALE, PLEDGE OR OTHER TRANSFER IS EXEMPT FROM SUCH REGISTRATION.

5.3 Compliance with Securities Laws on Transfer. This Warrant and the Units issued upon exercise of this Warrant (and the securities issuable, directly or indirectly, upon conversion of the Units, if any) may not be transferred or assigned in whole or in part except in compliance with applicable federal and state securities laws by the transferor and the transferee (including, without limitation, the delivery of investment representation letters and legal opinions reasonably satisfactory to the Company, as reasonably requested by the Company). The Company shall not require Holder to provide an opinion of counsel if the transfer is to SVB Financial Group (Silicon Valley Bank's parent company) or any other affiliate of Holder, provided that any such transferee is an "accredited investor" as defined in Regulation D promulgated under the Act. Additionally, the Company shall also not require an opinion of counsel if there is no material question as to the availability of Rule 144 promulgated under the Act.

5.4 Transfer Procedure. After receipt by Silicon Valley Bank of the executed Warrant, Silicon Valley Bank will transfer all of this Warrant to its parent company, SVB Financial Group. By its acceptance of this Warrant, SVB Financial Group hereby makes to the Company each of the representations and warranties set forth in Section 4 hereof and agrees to be bound by all of the terms and conditions of this Warrant as if the original Holder hereof. Subject to the provisions of Section 5.3 and upon providing the Company with written notice, SVB Financial Group and any subsequent Holder may transfer all or part of this Warrant or the Units issued upon exercise of this Warrant (or the securities issued upon conversion of the Units, if any) to any transferee, provided, however, in connection with any such transfer, SVB Financial Group or any subsequent Holder will give the Company notice of the portion of the Warrant and/or Units (and/or securities issued upon conversion of the Units, if any) being transferred with the name, address and taxpayer identification number of the transferee and Holder will surrender this Warrant to the Company for reissuance to the transferee(s) (and Holder if applicable); and provided further, that any subsequent transferee other than SVB Financial Group shall agree in writing with the Company to be bound by all of the terms and conditions of this Warrant; and provided, further, that any transfer of Units (or of securities issued upon conversion of the Units, if any), shall be subject to the restrictions and other provisions of the Operating Agreement. Notwithstanding any contrary provision herein, at all times prior to the IPO, Holder may not, without the Company's prior written consent, transfer this Warrant or any portion hereof, or any Units issued upon any exercise hereof, or any units or other securities issued upon any conversion of any Units issued upon any exercise hereof, to any person or entity who directly competes with the Company, except in connection with an Acquisition of the Company by such a direct competitor.

5.5 Notices. All notices and other communications hereunder from the Company to the Holder, or vice versa, shall be deemed delivered and effective (i) when given personally, (ii) on the third (3rd) Business Day after being mailed by first-class registered or certified mail, postage prepaid, (iii) upon actual receipt if given by facsimile or electronic mail and such receipt is confirmed in writing by the recipient, or (iv) on the first Business Day following delivery to a reliable overnight courier service, courier fee prepaid, in any case at such address as may have been furnished to the Company or Holder, as the case may be, in writing by the Company or such Holder from time to time in accordance with the provisions of this Section 5.5. All notices to Holder shall be addressed as follows until the Company receives notice of a change of address in connection with a transfer or otherwise:

SVB Financial Group
Attn: Treasury Department
3003 Tasman Drive, HC 215
Santa Clara, CA 95054

Telephone: (408) 654-7400
Facsimile: (408) 988-8317
Email address: derivatives@svb.com

Notice to the Company shall be addressed as follows until Holder receives notice of a change in address:

Morphic Rock Holding, LLC
Attn: Chief Financial Officer
35 Gatehouse Drive,
Suite A2
Waltham, MA 02451
Telephone:
Facsimile:
Email:

With a copy (which shall not constitute notice) to:

Foley Hoag LLP
Attn: Arlene L. Bender, Esq.
155 Seaport Boulevard
Boston, MA 02210-2600
Telephone: (617) 832-1000
Facsimile: (617) 832-7000
Email: abender@foleyhoag.com

5.6 Waiver. This Warrant and any term hereof may be changed, waived, discharged or terminated (either generally or in a particular instance and either retroactively or prospectively) only by an instrument in writing signed by the party against which enforcement of such change, waiver, discharge or termination is sought.

5.7 Attorneys' Fees. In the event of any dispute between the parties concerning the terms and provisions of this Warrant, the party prevailing in such dispute shall be entitled to collect from the other party all costs incurred in such dispute, including reasonable attorneys' fees.

5.8 Counterparts; Facsimile/Electronic Signatures. This Warrant may be executed in counterparts, all of which together shall constitute one and the same agreement. Any signature page delivered electronically or by facsimile shall be binding to the same extent as an original signature page with regards to any agreement subject to the terms hereof or any amendment thereto.

5.9 Governing Law. This Warrant shall be governed by and construed in accordance with the laws of the State of California, without giving effect to its principles regarding conflicts of law.

5.10 Headings. The headings in this Warrant are for purposes of reference only and shall not limit or otherwise affect the meaning of any provision of this Warrant.

5.11 Business Days. "**Business Day**" is any day that is not a Saturday, Sunday or a day on which Silicon Valley Bank is closed.

IN WITNESS WHEREOF, the parties have caused this Warrant to Purchase Limited Liability Company Interests to be executed by their duly authorized representatives effective as of the Issue Date written above.

"COMPANY"

MORPHIC ROCK HOLDING, LLC

By: /s/ Robert E. Farrell Jr.

Name: Robert E. Farrell Jr.
(Print)
Title: VP Finance + Ops, Treasurer + Assistant Secretary

"HOLDER"

SILICON VALLEY BANK

By: /s/ Ryan Roller

Name: Ryan Roller
(Print)
Title: Vice President

APPENDIX 1

NOTICE OF EXERCISE

1. The undersigned Holder hereby exercises its right purchase units of the [CLASS OR OTHER DESIGNATION] Units of (the "**Company**") in accordance with the attached Warrant To Purchase Limited Liability Company Interests, and tenders payment of the aggregate Warrant Price for such units as follows:

[ ] check in the amount of $ payable to order of the Company enclosed herewith

[ ] Wire transfer of immediately available funds to the Company's account

[ ] Cashless Exercise pursuant to Section 1.2 of the Warrant

[ ] Other [Describe]

2. If units of the above-stated Class are currently certificated by the Company, please issue a certificate or certificates representing the Units in the name specified below:

Holder's Name

(Address)

3. By its execution below and for the benefit of the Company, Holder hereby restates each of the representations and warranties in Section 4 of the Warrant to Purchase Limited Liability Company Interests as of the date hereof.

HOLDER:

By:

Name:

Title:

(Date):

SCHEDULE 1

Company Capitalization Table

See attached

Exhibit 10.2

2018 Stock Incentive Plan

1. Purpose.

The purpose of this plan (the "Plan") is to secure for Morphic Holding, Inc., a Delaware corporation (the "Company") and its shareholders the benefits arising from capital stock ownership by employees, officers and directors of, and consultants or advisors to, the Company and its parent and subsidiary corporations who are expected to contribute to the Company's future growth and success. Under the Plan recipients may be awarded both (i) Options (as defined in Section 2.1) to purchase the Company's common stock, par value $0.0001 ("Common Stock") and (ii) shares of Common Stock ("Restricted Stock Awards"). Except where the context otherwise requires, the term "Company" shall include any parent and all present and future subsidiaries of the Company as defined in Sections 424(e) and 424(f) of the Internal Revenue Code of 1986, as amended or replaced from time to time (the "Code"). Those provisions of the Plan which make express reference to Section 422 of the Code shall apply only to Incentive Stock Options (as that term is defined below).

2. Types of Awards and Administration.

2.1 **Options.** Options granted pursuant to the Plan ("Options") shall be authorized by action of the Board of Directors of the Company (the "Board" or "Board of Directors") and may be either incentive stock options ("Incentive Stock Options") meeting the requirements of Section 422 of the Code or non-statutory Options which are not intended to meet the requirements of Section 422. All Options when granted are intended to be non-statutory Options, unless the applicable Option Agreement (as defined in Section 5.1) explicitly states that the Option is intended to be an Incentive Stock Option. The vesting of Options may be conditioned upon the completion of a specified period of employment with the Company and/or such other conditions or events as the Board may determine. The Board may also provide that Options are immediately exercisable subject to certain repurchase rights in the Company dependent upon the continued employment of the optionee and/or such other conditions or events as the Board may determine.

2.1.1 **Incentive Stock Options.** Incentive Stock Options may only be granted to employees of the Company. For so long as the Code shall so provide, Options granted to any employee under the Plan (and any other incentive stock option plans of the Company) which are intended to constitute Incentive Stock Options shall not constitute Incentive Stock Options to the extent that such Options, in the aggregate, become exercisable for the first time in any one calendar year for shares of Common Stock with an aggregate fair market value (determined as of the respective date or dates of grant) of more than $100,000. If an Option is intended to be an Incentive Stock Option, and if for any reason such Option (or any portion thereof) shall not qualify as an Incentive Stock Option, then, to the extent of such nonqualification, such Option (or portion thereof) shall be regarded as a non-statutory Option appropriately granted under the Plan provided that such Option (or portion thereof) otherwise meets the Plan's requirements relating to non-statutory Options.

2.2 **Restricted Stock Awards.** The Board in its discretion may grant Restricted Stock Awards, entitling the recipient to acquire, for a purchase price determined by

the Board, shares of Common Stock subject to such restrictions and conditions as the Board may determine at the time of grant ("Restricted Stock"), including continued employment and/or achievement of pre-established performance goals and objectives.

2.3 **Administration.** The Plan shall be administered by the Board, whose construction and interpretation of the terms and provisions of the Plan shall be final and conclusive. The Board may in its sole discretion authorize issuance of Restricted Stock, the grant of Options and the issuance of shares upon exercise of such Options as provided in the Plan. The Board shall have authority, subject to the express provisions of the Plan, to construe Restricted Stock Agreements, Option Agreements and the Plan, to prescribe, amend and rescind rules and regulations relating to the Plan, to determine the terms and provisions of Restricted Stock Agreements and Option Agreements, and to make all other determinations in the judgment of the Board necessary or desirable for the administration of the Plan. The Board may correct any defect or supply any omission or reconcile any inconsistency in the Plan or in any Restricted Stock Agreement or Option Agreement in the manner and to the extent it shall deem expedient to carry the Plan into effect and it shall be the sole and final judge of such expediency. No director or person acting pursuant to authority delegated by the Board shall be liable for any action or determination under the Plan made in good faith. The Board may, to the full extent permitted by or consistent with applicable laws or regulations, delegate any or all of its powers under the Plan to a committee (the "Committee") appointed by the Board, and if the Committee is so appointed, to the extent of such delegation, all references to the Board in the Plan shall mean and relate to such Committee, other than references to the Board in this sentence and in Section 18 (as to amendment or termination of the Plan) and Section 22.

3. Eligibility.

Options may be granted, and Restricted Stock may be issued, to persons who are, at the time of such grant or issuance, employees, officers or directors of, or consultants or advisors to, the Company; *provided*, that the class of persons to whom Incentive Stock Options may be granted shall be limited to employees of the Company.

3.1 **10% Shareholder**. If any employee to whom an Incentive Stock Option is to be granted is, at the time of the grant of such Option, the owner of stock possessing more than 10% of the total combined voting power of all classes of stock of the Company (after taking into account the attribution of stock ownership rules of Section 424(d) of the Code) (a "Greater Than 10% Shareholder"), any Incentive Stock Option granted to such individual must: (i) have an exercise price per share of not less than 110% of the fair market value of one share of Common Stock at the time of grant; and (ii) expire by its terms not more than five years from the date of grant.

4. Stock Subject to Plan.

Subject to adjustment as provided in Section 14.2 below, the maximum number of shares of Common Stock which may be issued under the Plan is 13,045,265 shares plus an additional number of shares equal to the number of shares of Common Stock subject to awards granted prior to the effectiveness of this Plan that are forfeited to or otherwise repurchased by the Company, up to a maximum of 9,222,634 shares, all of which may be issued with respect to

Incentive Stock Options. If an Option shall expire or terminate for any reason without having been exercised in full, the unpurchased shares subject to such Option shall again be available for subsequent Option grants or Restricted Stock Awards under the Plan. If shares of Restricted Stock shall be forfeited to, or otherwise repurchased by, the Company pursuant to a Restricted Stock Agreement, such repurchased shares shall again be available for subsequent Option grants or Restricted Stock Awards under the Plan. If shares otherwise issuable upon exercise of an Option are withheld by the Company in payment of the exercise price of an Option or to satisfy tax withholding obligations with respect to such exercise, such withheld shares shall again be available for subsequent Option grants or Restricted Stock Awards under the Plan.

5. Forms of Restricted Stock Agreements and Option Agreements.

5.1 **Option Agreement.** Each recipient of an Option shall execute an option agreement ("Option Agreement") in such form not inconsistent with the Plan as may be approved by the Board of Directors. Such Option Agreements may differ among recipients.

5.2 **Restricted Stock Agreement.** Each recipient of a grant of Restricted Stock shall execute an agreement ("Restricted Stock Agreement") in such form not inconsistent with the Plan as may be approved by the Board of Directors. Such Restricted Stock Agreements may differ among recipients.

5.3 **"Lock-Up" Agreement.** Unless the Board specifies otherwise, each Restricted Stock Agreement and Option Agreement shall provide that upon the request of the Company or the managing underwriter(s) of any offering of securities of the Company that is the subject of a registration statement filed under the United States Securities Act of 1933, as amended from time to time (the "Act"), the holder of any Option or the purchaser of any Restricted Stock shall, in connection therewith, agree in writing (in such form as the Company or such managing underwriter(s) shall request) to the general effect that for a period of time (not to exceed 180 days) from the effective date of the registration statement under the Act for such offering, the holder or purchaser will not sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any shares of the common stock of the Company owned or controlled by him or her.

6. Purchase Price.

6.1 **General.** The purchase price per share of Restricted Stock and per share of stock deliverable upon the exercise of an Option shall be determined by the Board, provided, however, that in the case of any Option, the exercise price shall not be less than 100% of the fair market value of such stock, as determined by the Board, at the time of grant of such Option, or less than 110% of such fair market value in the case of any Incentive Stock Option granted to a Greater Than 10% Shareholder.

6.2 **Payment of Purchase Price.** Option Agreements may provide for the payment of the exercise price by delivery of cash or a check to the order of the Company in an amount equal to the exercise price of such Options, or, to the extent provided in the applicable Option Agreement, by one of the following methods:

(i) with the consent of the Board, by delivery to the Company of shares of Common Stock; such surrendered shares shall have a fair market value equal in amount to the exercise price of the Options being exercised,

(ii) with the consent of the Board, a personal recourse note issued by the optionee to the Company in a principal amount equal to such aggregate exercise price and with such other terms, including interest rate and maturity, as the Company may determine in its discretion; provided, however, that the interest rate borne by such note shall not be less than the lowest applicable federal rate, as defined in Section 1274(d) of the Code,

(iii) with the consent of the Board, if the class of Common Stock is registered under the Securities Exchange Act of 1934 at such time, subject to rules as may be established by the Board, by delivery to the Company of a properly executed exercise notice along with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price,

(iv) with the consent of the Board, by reducing the number of Option shares otherwise issuable to the optionee upon exercise of the Option by a number of shares of Common Stock having a fair market value equal to such aggregate exercise price,

(v) with the consent of the Board, by any combination of such methods of payment.

The fair market value of any shares of Common Stock or other non-cash consideration which may be delivered upon exercise of an Option shall be determined by the Board of Directors. Restricted Stock Agreements may provide for the payment of any purchase price in any manner approved by the Board of Directors at the time of authorizing the issuance thereof.

7. Option Period.

Notwithstanding any other provision of the Plan or any Option Agreement, each Option and all rights thereunder shall expire on the date specified in the applicable Option Agreement, provided that such date shall not be later than ten years after the date on which the Option is granted (or five years in the case of an Incentive Stock Option granted to a Greater Than 10% Shareholder), and in either case, shall be subject to earlier termination as provided in the Plan or Option Agreement.

8. Exercise of Options.

8.1 **General.** Each Option shall be exercisable either in full or in installments at such time or times and during such period as shall be set forth in the Option Agreement evidencing such Option, subject to the provisions of the Plan. To the extent not exercised, installments shall accumulate and be exercisable, in whole or in part, at any time after becoming exercisable, but not later than the date the Option expires.

8.2 **Notice of Exercise.** An Option may be exercised by the optionee by delivering to the Company on any business day a written notice specifying the number of shares of Common Stock the optionee then desires to purchase and specifying the address to which the certificates for such shares are to be mailed (the "Notice"), accompanied by payment for such shares. In addition, the Company may require any individual to whom an Option is granted, as a condition of exercising such Option, to give written assurances (the "Investment Letter") in a substance and form satisfactory to the Company to the effect that such individual is acquiring the Common Stock subject to the Option for his or her own account for investment and not with a view to the resale or distribution thereof, and to such other effects as the Company deems necessary or advisable in order to comply with any securities law(s).

8.3 **Delivery.** As promptly as practicable after receipt of the Notice, the Investment Letter (if required) and payment, the Company shall deliver or cause to be delivered to the optionee certificates for the number of shares with respect to which such Option has been so exercised, issued in the optionee's name; provided, however, that such delivery shall be deemed effected for all purposes when the Company or a stock transfer agent shall have deposited such certificates in the United States mail, addressed to the optionee, at the address specified in the Notice.

9. Transferability of Options.

No Option shall be assignable or transferable by the person to whom it is granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and during the life of an optionee, an Option shall be exercisable only by the optionee. Notwithstanding the foregoing, the Board may, in its discretion, allow for transfer of a non-statutory Option, subject to such terms and conditions as determined by the Board.

10. Termination of Employment; Disability; Death. Except as may be otherwise expressly provided in the terms and conditions of the Option Agreement, Options shall terminate on the earliest to occur of:

(i) the date of expiration thereof;

(ii) 90 days after termination of the optionee's employment with, or provision of services to, the Company by the Company for Cause (as hereinafter defined);

(iii) 90 days after the date of voluntary termination of the optionee's employment with, or provision of services to, the Company by the optionee (other than for death or permanent disability as defined below); or

(iv) 90days after the date of termination of the optionee's employment with, or provision of services to, the Company by the Company without Cause (other than for death or permanent disability as defined below).

Until the date on which the Option so expires, the optionee may exercise that portion of his or her Option which is exercisable at the time of termination of the employment or service relationship.

An employment or service relationship between the Company and the optionee shall be deemed to exist during any period during which the optionee is employed by or providing services to the Company. Whether an authorized leave of absence or an absence due to military or government service shall constitute termination of the employment relationship between the Company and the optionee shall be determined by the Board at the time thereof.

For purposes of this Section 10, the term "Cause" shall mean (a) any material breach by the optionee of any agreement to which the optionee and the Company are both parties, (b) any act (other than retirement) or omission to act by the optionee which may have a material and adverse effect on the Company's business or on the optionee's ability to perform services for the Company, including, without limitation, the commission of any crime (other than minor traffic violations), or (c) any material misconduct or material neglect of duties by the optionee in connection with the business or affairs of the Company. An optionee's employment shall be deemed to have been terminated for Cause if the Company determines within thirty (30) days of the termination of employment (whether such termination was voluntary or involuntary) that termination for Cause was warranted.

In the event of the permanent and total disability or death of an optionee while in an employment or other relationship with the Company, any Option held by such optionee shall terminate on the earlier of the date of expiration of the Option or 180 days following the date of such disability or death. After disability or death, the optionee (or in the case of death, his or her executor, administrator or any person or persons to whom this option may be transferred by will or by laws of descent and distribution) shall have the right, at any time prior to such termination of an Option , to exercise the Option to the extent the optionee was entitled to exercise such Option as of the date of his or her disability or death. An optionee is permanently and totally disabled if he or she is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to last for a continuous period of not less than 12 months; permanent and total disability shall be determined in accordance with Section 22(e)(3) of the Code and the regulations issued thereunder.

11. Rights as a Shareholder. The holder of an Option shall have no rights as a shareholder with respect to any shares covered by the Option (including, without limitation, any rights to receive dividends or non-cash distributions with respect to such shares) until the date of issue of a stock certificate to him or her for such shares. No adjustment shall be made for dividends or other rights for which the record date is prior to the date such stock certificate is issued.

12. Conflict with Other Rights. Certain recipients of Options or grants of Restricted Stock may be required to enter into that certain Voting Agreement and/or that certain Right of First Refusal and Co-Sale Agreement of the Company, each dated as of December , 2018 (such agreements, respectively, as the same may be amended from time to time, the "Voting Agreement," and the "ROFR Agreement"), which agreements contain rights of first refusal in favor of the Company and other terms and conditions. For so long as the Voting Agreement or ROFR Agreement remain in existence, the terms and conditions of such agreements shall supersede any conflicting provisions contained in this Plan or in any Option Agreement or Restricted Stock Agreement to which a recipient is a party; provided, however, that any other provisions of the Plan and such recipient's Option Agreement(s) and/or Restricted Stock Agreement(s) shall remain in full force and effect. If, however, the Voting Agreement or ROFR Agreement shall terminate, any provisions of the Plan or such recipient's Option Agreement(s) or Restricted Stock Agreement(s) that were previously superseded by either such terminated agreement shall be in full force and effect in accordance with their terms.

13. Additional Provisions. The Board of Directors may, in its sole discretion, include additional provisions in Restricted Stock Agreements and Option Agreements, including, without limitation, restrictions on transfer, rights of the Company to repurchase shares of Restricted Stock or shares of Common Stock acquired upon exercise of Options, commitments to pay cash bonuses, to make, arrange for or guaranty loans or to transfer other property to optionees upon exercise of Options, or such other provisions as shall be determined by the Board of Directors; *provided that* such additional provisions shall not be inconsistent with any other term or condition of the Plan and such additional provisions shall not be such as to cause any Incentive Stock Option to fail to qualify as an Incentive Stock Option within the meaning of Section 422 of the Code.

14. Acceleration, Extension, Etc. The Board of Directors may, in its sole discretion, (i) accelerate the date or dates on which all or any particular Option or Options may be exercised or (ii) extend the period or periods of time during which all, or any particular, Option or Options may be exercised.

15. Adjustment Upon Changes in Capitalization

15.1 **No Effect of Options upon Certain Corporate Transactions.** The existence of outstanding Options shall not affect in any way the right or power of the Company to make or authorize any or all adjustments, recapitalizations, reorganizations or other changes in the Company's capital structure or its business, or any merger or consolidation, or any issue of Common Stock, or any issue of bonds, debentures, preferred or prior preference stock ahead of or affecting the Common Stock or the rights thereof, or the dissolution or liquidation of the Company, or any sale or transfer of all or any part of its assets or business, or any other corporate act or proceeding, whether of a similar character or otherwise.

15.2 **Adjustment Provisions.** If, through or as a result of any merger, consolidation, sale of all or substantially all of the assets of the Company, reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar transaction, (i) the outstanding shares of Common Stock are increased, decreased or exchanged for a different number or kind of shares or other securities of the Company, or (ii) additional

shares or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to such shares of Common Stock or other securities, an appropriate and proportionate adjustment shall be made in (x) the maximum number and kind of shares reserved for issuance under the Plan, (y) the number and kind of shares or other securities subject to any then outstanding Options, and (z) the price for each share or other security subject to any then outstanding Options, so that upon exercise of such Options, in lieu of the shares of Common Stock for which such Options were then exercisable, the relevant optionee shall be entitled to receive, for the same aggregate consideration, the same total number and kind of shares or other securities, cash or property that the owner of an equal number of outstanding shares of Common Stock immediately prior to the event requiring adjustment would own as a result of the event. If any such event shall occur, appropriate adjustment shall also be made in the application of the provisions of this Section 14 and Section 15 with respect to Options and the rights of optionees after the event so that the provisions of such Sections shall be applicable after the event and be as nearly equivalent as practicable in operation after the event as they were before the event.

15.3 **No Adjustment in Certain Cases.** Except as hereinbefore expressly provided, the issue by the Company of shares of stock of any class, or securities convertible into shares of stock of any class, for cash or property or for labor or services, either upon direct sale or upon the exercise of rights or warrants to subscribe therefor, or upon conversion of shares or obligations of the Company convertible into such shares or other securities, shall not affect, and no adjustment by reason thereof shall be made with respect to, the number or price of shares of Common Stock then subject to outstanding options.

15.4 **Board Authority to Make Adjustments.** Any adjustments under this Section 14 will be made by the Board of Directors, whose determination as to what adjustments, if any, will be made and the extent thereof will be final, binding and conclusive. No fractional shares will be issued under the Plan on account of any such adjustments.

16. Effect of Certain Transactions

16.1 **General.** Except as provided in any Option Agreement or Restricted Stock Agreement to the contrary, if the Company is merged with or into or consolidated with another corporation under circumstances where the stockholders of the Company immediately prior to such merger or consolidation do not own after such merger or consolidation shares representing at least fifty percent (50%) of the voting power of the Company or the surviving or resulting corporation, as the case may be, or if shares representing fifty percent (50%) or more of the voting power of the Company are transferred to an Unrelated Third Party, as hereinafter defined, or if the Company is liquidated, or sells or otherwise disposes of all or substantially all its assets (each such transaction is referred to herein as a "Change in Control Transaction"), the Board, or the board of directors of any corporation assuming the obligations of the Company, may, in its discretion, take any one or more of the following actions, as to some or all outstanding Options or Restricted Stock Awards (and need not take the same action as to each such Option or Restricted Stock Award): (i) provide that such Options shall be assumed, or equivalent Options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), *provided that* any such Options substituted for Incentive Stock Options shall meet the requirements of Section 424(a) of the Code, (ii) upon written notice to the optionees, provide that all unexercised Options (whether vested or unvested) will terminate immediately

prior to the consummation of the Change in Control Transaction unless exercised by the optionee to the extent otherwise then exercisable within a specified period following the date of such notice, (iii) upon written notice to the grantees, provide that all unvested shares of Restricted Stock shall be repurchased at cost, (iv) make or provide for a cash payment to the optionees equal to the difference between (A) the fair market value of the per share consideration (whether cash, securities or other property or any combination of the above) the holder of a share of Common Stock will receive upon consummation of the Change in Control Transaction (the "Per Share Transaction Price") times the number of shares of Common Stock subject to outstanding vested Options (to the extent then exercisable at prices not equal to or in excess of the Per Share Transaction Price) and (B) the aggregate exercise price of such outstanding vested Options, in exchange for the termination of such Options, or (v) provide that all or any outstanding Options shall become exercisable and all or any outstanding Restricted Stock Awards shall vest in part or in full immediately prior to such event. To the extent that any Options are exercisable at a price equal to or in excess of the Per Share Transaction Price, the Board may provide that such Options shall terminate immediately upon the consummation of the Change in Control Transaction without any payment being made to the holders of such Options. "Unrelated Third Party" shall mean any person who is not, on the date of adoption of this Plan by the Board, a holder of stock of any class or preference or any stock option of the Company**.**

16.2 **Substitute Options.** The Company may grant Options in substitution for options held by employees, officers or directors of, or consultants or advisors to, another corporation who become employees, officers or directors of, or consultants or advisors to, the Company, as the result of a merger or consolidation of the employing corporation with the Company or as a result of the acquisition by the Company of property or stock of the employing corporation. The Company may direct that substitute Options be granted on such terms and conditions as the Board considers appropriate in the circumstances.

16.3 **Restricted Stock.** In the event of a business combination or other transaction of the type detailed in Section 15.1, any securities, cash or other property received in exchange for shares of Restricted Stock shall continue to be governed by the provisions of any Restricted Stock Agreement pursuant to which they were issued, including any provision regarding vesting, and such securities, cash, or other property may be held in escrow on such terms as the Board of Directors may direct, to insure compliance with the terms of any such Restricted Stock Agreement.

17. No Special Employment Rights. Nothing contained in the Plan or in any Option Agreement or Restricted Stock Agreement shall confer upon any optionee or holder of Restricted Stock any right with respect to the continuation of his or her employment by the Company or interfere in any way with the right of the Company at any time to terminate such employment or to increase or decrease his or her compensation.

18. Other Employee Benefits. The amount of any compensation deemed to be received by an employee as a result of the issuance of shares of Restricted Stock or the grant or exercise of an Option or the sale of shares received upon issuance of a Restricted Stock Award or exercise of an Option will not constitute compensation with respect to which any other employee benefits of such employee are determined, including, without limitation, benefits under any bonus, pension, profit-sharing, life insurance or salary continuation plan, except as otherwise specifically determined by the Board of Directors.

19. Amendment of the Plan.

19.1 The Board may at any time, and from time to time, modify or amend in any respect or terminate the Plan. If shareholder approval is not obtained within twelve months after any amendment increasing the number of shares authorized under the Plan or changing the class of persons eligible to receive Options under the Plan, no Options granted pursuant to such amendments shall be deemed to be Incentive Stock Options and no Incentive Stock Options shall be issued pursuant to such amendments thereafter.

19.2 The termination or any modification or amendment of the Plan shall not, without the consent of an optionee or the holder of Restricted Stock, adversely affect his or her rights under an Option or Restricted Stock Award previously granted to him or her. With the consent of the recipient of Restricted Stock or optionee affected, the Board may amend outstanding Restricted Stock Agreements or Option Agreements in a manner not inconsistent with the Plan.

20. Withholding. The Company shall have the right to deduct from payments of any kind otherwise due to the optionee or recipient of Restricted Stock, any federal, state or local taxes of any kind required by law to be withheld with respect to issuance of any shares of Restricted Stock or shares issued upon exercise of Options. Prior to delivery of any Common Stock pursuant to the terms of this Plan, the Board has the right to require that the optionee or recipient of Restricted Stock remit to the Company an amount sufficient to satisfy any minimum tax withholding obligation. Subject to the prior approval of the Company, which may be withheld by the Company in its sole discretion, the obligor may elect to satisfy any minimum withholding obligations, in whole or in part, (i) by causing the Company to withhold shares of Common Stock otherwise issuable, or (ii) by delivering to the Company a sufficient number of shares of Common Stock. The shares so withheld shall have a fair market value equal to such minimum withholding obligation. The fair market value of the shares used to satisfy such minimum withholding obligation shall be determined by the Company as of the date that the amount of tax to be withheld is to be determined. A person who has made an election pursuant to this Section 19 may only satisfy his or her withholding obligation with shares of Common Stock which are not subject to any repurchase, forfeiture, unfulfilled vesting or other similar restrictions.

21. Effective Date and Duration of the Plan.

21.1 **Effective Date.** The Plan shall become effective when adopted by the Board of Directors. If shareholder approval is not obtained within twelve months after the date of the Board's adoption of the Plan, no Options previously granted under the Plan shall be

deemed to be Incentive Stock Options and no Incentive Stock Options shall be granted thereafter. Amendments to the Plan not requiring shareholder approval shall become effective when adopted by the Board. Amendments requiring shareholder approval shall become effective when adopted by the Board, but if shareholder approval is not obtained within twelve months of the Board's adoption of such amendment, any Incentive Stock Options granted pursuant to such amendment shall be deemed to be non-statutory Options provided that such Options are authorized by the Plan. Subject to this limitation, Options may be granted under the Plan at any time after the effective date and before the date fixed for termination of the Plan.

21.2 **Termination.** Unless sooner terminated by action of the Board of Directors, the Plan shall terminate upon the close of business on the day next preceding the tenth anniversary of the date of its adoption by the Board of Directors.

22. Provision for Foreign Participants. The Board of Directors may, without amending the Plan, modify the terms of Option Agreements or Restricted Stock Agreements to differ from those specified in the Plan with respect to participants who are foreign nationals or employed outside the United States to recognize differences in laws, rules, regulations or customs of such foreign jurisdictions with respect to tax, securities, currency, employee benefit or other matters.

23. Requirements of Law. The Company shall not be required to sell or issue any shares under any Option or Restricted Stock Award if the issuance of such shares shall constitute a violation by the optionee, the Restricted Stock Award recipient, or by the Company of any provision of any law or regulation of any governmental authority. In addition, in connection with the Act, the Company shall not be required to issue any shares upon exercise of any Option unless the Company has received evidence satisfactory to it to the effect that the holder of such Option will not transfer such shares except pursuant to a registration statement in effect under the Act or unless an opinion of counsel satisfactory to the Company has been received by the Company to the effect that such registration is not required in connection with any such transfer. Any determination in this connection by the Board shall be final, binding and conclusive. In the event the shares issuable on exercise of an Option are not registered under the Act or under the securities laws of each relevant state or other jurisdiction, the Company may imprint on the certificate(s) appropriate legends that counsel for the Company considers necessary or advisable to comply with the Act or any such state or other securities law. The Company may register, but in no event shall be obligated to register, any securities covered by the Plan pursuant to the Act; and in the event any shares are so registered the Company may remove any legend on certificates representing such shares. The Company shall not be obligated to take any affirmative action in order to cause the exercise of an Option, the grant of any Restricted Stock Award or the issuance of shares pursuant thereto to comply with any law or regulation of any governmental authority.

24. Conversion of Incentive Stock Options into Non-Qualified Options; Termination. The Board of Directors, with the consent of any optionee, may in its discretion take such actions as may be necessary to convert such optionee's Incentive Stock Options (or any installments or portions of installments thereof) that have not been exercised on the date of conversion into non-statutory Options at any time prior to the expiration of such Incentive Stock Options, regardless of whether the optionee is an employee of the Company or a parent or subsidiary of the Company at the time of such conversion. At the time of such conversion, the

Board of Directors (with the consent of the optionee) may impose such conditions on the exercise of the resulting non-statutory Options as the Board of Directors in its discretion may determine, provided that such conditions shall not be inconsistent with this Plan. Nothing in this Plan shall be deemed to give any optionee the right to have such optionee's Incentive Stock Options converted into non-statutory Options, and no such conversion shall occur until and unless the Board of Directors takes appropriate action. The Board of Directors, with the consent of the optionee, may also terminate any portion of any Incentive Stock Option that has not been exercised at the time of such termination.

25. Non-Exclusivity of this Plan; Non-Uniform Determinations. Neither the adoption of this Plan by the Board of Directors nor the approval of this Plan by the stockholders of the Company shall be construed as creating any limitations on the power of the Board of Directors to adopt such other incentive arrangements as it may deem desirable, including, without limitation, the granting of stock options otherwise than under this Plan, and such arrangements may be either applicable generally or only in specific cases.

The determinations of the Board of Directors under this Plan need not be uniform and may be made by it selectively among persons who receive or are eligible to receive Options or Restricted Stock Awards under this Plan (whether or not such persons are similarly situated). Without limiting the generality of the foregoing, the Board of Directors shall be entitled, among other things, to make non-uniform and selective determinations, and to enter into non-uniform and selective Option Agreements and Restricted Stock Agreements, as to (a) the persons to receive Options or Restricted Stock Awards under this Plan, (b) the terms and provisions of Options or Restricted Stock Awards, (c) the exercise by the Board of Directors of its discretion in respect of the exercise of Options pursuant to the terms of this Plan, and (d) the treatment of leaves of absence pursuant to Section 10 hereof.

26. Governing Law. This Plan and each Option or Restricted Stock Award shall be governed by the laws of Massachusetts, without regard to its principles of conflicts of law.

STANDARD FORM

INCENTIVE STOCK OPTION

Granted by

Morphic Holding, Inc. (the "Company")

Under the 2018 Stock Incentive Plan

This Option is and shall be subject in every respect to the provisions of the Company's 2018 Stock Incentive Plan, as amended from time to time (the "Plan"), which is incorporated herein by reference and made a part hereof. The holder of this Option (the "Holder") hereby accepts this Option subject to all the terms and provisions of the Plan and agrees that (a) in the event of any conflict between the terms hereof and those of the Plan, the latter shall prevail, and (b) all decisions under and interpretations of the Plan by the Board or the Committee shall be final, binding and conclusive upon the Holder and his or her heirs and legal representatives.

1. **Name of Holder:**

2. **Date of Grant:**

3. **Maximum number of shares for which this Option is exercisable:**

4. **Exercise (purchase) price per share:** ***[Note: must be at least fair market value, or 110% of fair market value in case of ISO granted to Greater Than 10% Shareholder]***

5. **Method of Exercise:** This Option may be exercised by the delivery of written notice to the Company setting forth the number of shares with respect to which the Option is to be exercised, together with payment by one of the following methods:

   cash or a personal, certified or bank check or postal money order payable to the order of the Company for an amount equal to the exercise price of the shares being purchased; or

   with the consent of the Company, any of the other methods set forth in the Plan.

   [Note: in the alternative, may specify methods allowed]

   As an additional condition to exercise of this Option, the Holder shall deliver to the Company an investment letter in form and substance satisfactory to the Company and its counsel. No such investment letter shall be required as a condition to such exercise at any time when there shall be an effective registration statement under the Securities Act of 1933, as amended (the "Act") covering the shares for which this Option may be exercised.

6. **Expiration Date of Option:** ***[Note: for ISO, cannot be longer than 10 years from date of grant, or 5 years in case of a Greater Than 10% Shareholder]***

7. **Vesting Schedule:** ***[Note: Company to elect vesting schedule; following is an example of a standard vesting provision]*** This Option shall become exercisable for 25% of the maximum number of shares granted on the first anniversary of the Date of Grant, and shall become exercisable for an additional 2.0833$^{1}/_{3}$% of the maximum number of shares granted on the last day of each one month period thereafter; so that the Option shall be fully vested on the fourth anniversary of the Date of Grant. All vesting shall cease upon the date of termination of employment.

8. **Termination of Employment.** This Option shall terminate on the earliest to occur of:

   (i) the date of expiration hereof;

   (ii) **[0-90]** days after termination of the Holder's employment with the Company by the Company for Cause (as defined in the Plan);

   (iii) **[0-90]** days after the date of voluntary termination of employment by the Holder (other than for death or permanent and total disability as defined in the Plan);

   (iv) **[0-90]** days after the date of termination of the Holder's employment with the Company by the Company without Cause (other than for death or permanent and total disability as defined in the Plan); or

   (v) [ ] days after the "permanent and total disability"(as defined at Section 10 of the Plan) or death of the Holder.

9. **Company's Right of First Refusal.** Prior to the effective date of a registration statement under the Act, any shares of stock issued pursuant to exercise of this Option shall be subject to the Company's right of first refusal as set forth at Appendix A.

10. **Lock-Up Agreement.** The Holder agrees that upon the request of the Company or the managing underwriter(s) of any offering of securities of the Company that is the subject of a registration statement filed under the Act, for a period of time (not to exceed 180 days) from the effective date of the registration statement under the Act for such offering, the Holder will not sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any shares of Common Stock issued pursuant to the exercise of this Option, without the prior written consent of the Company and such underwriters.

11. **Incentive Stock Option; Disqualifying Disposition.** Although this Option is intended to qualify as an incentive stock option under the Internal Revenue Code of 1986 (the "Code"), the Company makes no representation as to the tax treatment upon exercise of this Option or sale or other disposition of the shares covered by this Option, and the Holder is advised to consult a personal tax advisor. Upon a Disqualifying Disposition of shares received upon exercise of this Option, the Holder will forfeit the favorable income

tax treatment otherwise available with respect to the exercise of this Option. A "Disqualifying Disposition" shall have the meaning specified in Section 421(b) of the Code; as of the date of grant of this Option a Disqualifying Disposition is any disposition (including any sale) of such shares before the later of (a) the second anniversary of the date of grant of this Option and (b) the first anniversary of the date on which the Holder acquired such shares by exercising this Option, *provided* that such holding period requirements terminate upon the death of the Holder. The Holder shall notify the Company in writing immediately upon making a Disqualifying Disposition of any shares of Common Stock received pursuant to the exercise of this Option, and shall provide the Company with any information that the Company shall request concerning any such Disqualifying Disposition.

12. **Notice.** Any notice to be given to the Company hereunder shall be deemed sufficient if addressed to the Company and delivered to the office of the Company, Morphic Holding, Inc. 35 Gatehouse Drive A2, Waltham, MA 02451, attention of the president, or such other address as the Company may hereafter designate.

Any notice to be given to the Holder hereunder shall be deemed sufficient if addressed to and delivered in person to the Holder at his or her address furnished to the Company or when deposited in the mail, postage prepaid, addressed to the Holder at such address.

IN WITNESS WHEREOF, the parties have executed this Option, or caused this Option to be executed, as of the Date of Grant.

Morphic Holding, Inc.

By: _____

The undersigned Holder hereby acknowledges receipt of a copy of the Plan and this Option (including Appendix A hereto), and agrees to the terms of this Option and the Plan.

_____
Holder

Right of First Refusal

1. General. Prior to the effective date of a registration statement under the Securities Act of 1933, as amended (the "Act"), covering any shares of the Company's Common Stock and until such time as the Company shall have effected a public offering of its Common Stock registered under the Act, in the event that, at any time when the Holder (which term for purposes of this section shall mean the Holder and his or her executors, administrators and any other person to whom this Option may be transferred by will or the laws of descent and distribution) is permitted to do so, the Holder desires to sell, assign or otherwise transfer any of the shares issued upon the exercise of this Option, the Holder shall first offer such shares to the Company by giving written notice of the Holder's desire so to sell, assign or transfer such shares.

2. Notice of Intended Transfer. The notice shall state the number of shares offered, the name of the person or persons to whom it is proposed to sell, assign or transfer such shares and the price at which such shares are intended to be sold, assigned or transferred. Such notice shall constitute an offer to the Company for the Company to purchase the number of shares set forth in the notice at a price per share equal to the price stated therein.

3. Company to Accept or Decline Within 30 Days. The Company may accept the offer as to all, but not less than all, such shares by notifying the Holder in writing within 30 days after receipt of such notice of its acceptance of the offer. If the offer is accepted, the Company shall have 60 days after such acceptance within which to purchase the offered shares at a price per share as aforesaid. If within the applicable time periods the Holder does not receive notice of the Company's intention to purchase the offered shares, or if payment in full of the purchase price is not made by the Company, the offer shall be deemed to have been rejected and the Holder may transfer title to such shares within 90 days from the date of the Holder's written notice to the Company of the Holder's intention to sell, but such transfer shall be made only to the proposed transferee and at the proposed price as stated in such notice and after compliance with any other provisions of this Option applicable to the transfer of such shares.

4. Transferred Shares to Remain Subject to Right of First Refusal. Shares that are so transferred to such transferee shall remain subject to the rights of the Company set forth in this Appendix A. As a condition to such transfer, such transferee shall execute and deliver all such documents as the Company may require to evidence the binding agreement of such transferee so to remain subject to the rights of the Company.

5. Remedies of Company. No sale, assignment, pledge or other transfer of any of the shares covered by this Option shall be effective or given effect on the books of the Company unless all of the applicable provisions of this Appendix A have been duly complied with, and the Company may inscribe on the face of any certificate representing any of such shares a legend referring to the provisions of this Appendix A. If any transfer of shares is made or attempted in violation of the foregoing restrictions, or if shares are not offered to the Company as required hereby, the Company shall have the right to purchase such shares from the owner thereof or his transferee at any time before or after the transfer, as herein provided. In addition to

any other legal or equitable remedies which it may have, the Company may enforce its rights by actions for specific performance (to the extent permitted by law) and may refuse to recognize any transferee as one of its stockholders for any purpose, including, without limitation, for purposes of dividend and voting rights, until all applicable provisions hereof have been complied with.

6. Shares Subject to Right of First Refusal. For purposes of the Right of First Refusal pursuant to this Appendix A, the term "shares" shall mean any and all new, substituted or additional securities or other property issued to the Holder, by reason of his or her ownership of Common Stock pursuant to the exercise of this Option, in connection with any stock dividend, liquidating dividend, stock split or other change in the character or amount of any of the outstanding securities of the Company, or any consolidation, merger or sale of all or substantially all of the assets of the Company.

7. Legends on Stock Certificates. Any certificate representing shares of stock subject to the provisions of this Appendix A may have endorsed thereon one or more legends, substantially as follows:

(i) "Any disposition of any interest in the securities represented by this certificate is subject to restrictions, and the securities represented by this certificate are subject to certain transfer restrictions, contained in a certain agreement between the record holder hereof and the Company, a copy of which will be mailed to any holder of this certificate without charge upon receipt by the Company of a written request therefor."

(ii) "The shares of stock represented by this certificate have not been registered under the Securities Act of 1933 or under the securities laws of any state and may not be pledged, hypothecated, sold or otherwise transferred unless such shares have been registered under the Act or unless the Company has received an opinion of counsel satisfactory to the Company, in form and substance satisfactory to the Company, that such registration is not required."

8. Right of First Refusal to Lapse Upon Registration. The restrictions imposed by this Appendix A shall terminate in all respects upon the effective date of a registration statement under the Act covering any of the Company's Common Stock.

STANDARD FORM

NON-STATUTORY STOCK OPTION

Granted by

Morphic Holding, Inc. (the "Company")

Under the 2018 Stock Incentive Plan

This Option is and shall be subject in every respect to the provisions of the Company's 2018 Stock Incentive Plan, as amended from time to time (the "Plan"), which is incorporated herein by reference and made a part hereof. The holder of this Option (the "Holder") hereby accepts this Option subject to all the terms and provisions of the Plan and agrees that (a) in the event of any conflict between the terms hereof and those of the Plan, the latter shall prevail, and (b) all decisions under and interpretations of the Plan by the Board or the Committee shall be final, binding and conclusive upon the Holder and his or her heirs and legal representatives.

1. **Name of Holder:**

2. **Date of Grant:**

3. **Maximum number of shares for which this Option is exercisable:**

4. **Exercise (purchase) price per share:** ***[must be at least fair market value]***

5. **Method of Exercise**: This Option may be exercised by the delivery of written notice to the Company setting forth the number of shares with respect to which the Option is to be exercised, together with payment by one of the following methods:

cash or a personal, certified or bank check or postal money order payable to the order of the Company for an amount equal to the exercise price of the shares being purchased; or

with the consent of the Company, any of the other methods set forth in the Plan.

[Note: in the alternative, may specify methods allowed]

As an additional condition to exercise of this Option, the Holder shall deliver to the Company an investment letter in form and substance satisfactory to the Company and its counsel. No such investment letter shall be required as a condition to such exercise at any time when there shall be an effective registration statement under the Securities Act of 1933, as amended (the "Act") covering the shares for which this Option may be exercised.

6. **Expiration Date of Option:**

7. **Vesting Schedule:** ***[Note: Company to elect vesting schedule; following is an example of a standard vesting provision]*** This Option shall become exercisable for 25% of the maximum number of shares granted on the first anniversary of the Date of Grant, and shall become exercisable for an additional 2.0833$^{1}/_{3}$% of the maximum number of shares granted on the last day of each one month period thereafter; so that the Option shall be fully vested on the fourth anniversary of the Date of Grant. All vesting shall cease upon the date of termination of employment or provision of services.

8. **Termination of Employment.** This Option shall terminate on the earliest to occur of:

   (i) the date of expiration thereof;

   (ii) **[0-90]** days after termination of the Holder's employment with or services to the Company by the Company for Cause (as defined in the Plan);

   (iii) **[0-90]** days after the date of voluntary termination of employment or services by the Holder (other than for death or permanent and total disability as defined in the Plan);

   (iv) **[0-90]** days after the date of termination of the Holder's employment with or services to the Company by the Company without Cause (other than for death or permanent and total disability as defined in the Plan); or

   (v) [ ] days after the "permanent and total disability"(as defined at Section 10 of the Plan) or death of the Holder.

9. **Company's Right of First Refusal.** Prior to the effective date of a registration statement under the Act, any shares of stock issued pursuant to exercise of this Option shall be subject to the Company's right of first refusal as set forth at Appendix A.

10. **Lock-Up Agreement.** The Holder agrees that upon the request of the Company or the managing underwriter(s) of any offering of securities of the Company that is the subject of a registration statement filed under the Act, for a period of time (not to exceed 180 days) from the effective date of the registration statement under the Act for such offering, the Holder will not sell, make any short sale of, loan, grant any option for the purchase of, or otherwise dispose of any shares of Common Stock issued pursuant to the exercise of this Option, without the prior written consent of the Company and such underwriters.

11. **Tax Withholding.** The Company's obligation to deliver shares shall be subject to the Holder's satisfaction of any federal, state and local income and employment tax withholding requirements.

12. **Notice.** Any notice to be given to the Company hereunder shall be deemed sufficient if addressed to the Company and delivered to the office of the Company, Morphic Holding, Inc., 35 Gatehouse Drive A2, Waltham, MA 02451, attention of the president, or such other address as the Company may hereafter designate.

Any notice to be given to the Holder hereunder shall be deemed sufficient if addressed to and delivered in person to the Holder at his or her address furnished to the Company or when deposited in the mail, postage prepaid, addressed to the Holder at such address.

IN WITNESS WHEREOF, the parties have executed this Option, or caused this Option to be executed, as of the Date of Grant.

Morphic Holding, Inc.

By: _____

The undersigned Holder hereby acknowledges receipt of a copy of the Plan and this Option (including Appendix A hereto), and agrees to the terms of this Option and the Plan.

_____
Holder

Right of First Refusal

1. General. Prior to the effective date of a registration statement under the Securities Act of 1933, as amended (the "Act"), covering any shares of the Company's Common Stock and until such time as the Company shall have effected a public offering of its Common Stock registered under the Act, in the event that, at any time when the Holder (which term for purposes of this section shall mean the Holder and his or her executors, administrators and any other person to whom this Option may be transferred by will or the laws of descent and distribution) is permitted to do so, the Holder desires to sell, assign or otherwise transfer any of the shares issued upon the exercise of this Option, the Holder shall first offer such shares to the Company by giving written notice of the Holder's desire so to sell, assign or transfer such shares.

2. Notice of Intended Transfer. The notice shall state the number of shares offered, the name of the person or persons to whom it is proposed to sell, assign or transfer such shares and the price at which such shares are intended to be sold, assigned or transferred. Such notice shall constitute an offer to the Company for the Company to purchase the number of shares set forth in the notice at a price per share equal to the price stated therein.

3. Company to Accept or Decline Within 30 Days. The Company may accept the offer as to all, but not less than all, such shares by notifying the Holder in writing within 30 days after receipt of such notice of its acceptance of the offer. If the offer is accepted, the Company shall have 60 days after such acceptance within which to purchase the offered shares at a price per share as aforesaid. If within the applicable time periods the Holder does not receive notice of the Company's intention to purchase the offered shares, or if payment in full of the purchase price is not made by the Company, the offer shall be deemed to have been rejected and the Holder may transfer title to such shares within 90 days from the date of the Holder's written notice to the Company of the Holder's intention to sell, but such transfer shall be made only to the proposed transferee and at the proposed price as stated in such notice and after compliance with any other provisions of this Option applicable to the transfer of such shares.

4. Transferred Shares to Remain Subject to Right of First Refusal. Shares that are so transferred to such transferee shall remain subject to the rights of the Company set forth in this Appendix A. As a condition to such transfer, such transferee shall execute and deliver all such documents as the Company may require to evidence the binding agreement of such transferee so to remain subject to the rights of the Company.

5. Remedies of Company. No sale, assignment, pledge or other transfer of any of the shares covered by this Option shall be effective or given effect on the books of the Company unless all of the applicable provisions of this Appendix A have been duly complied with, and the Company may inscribe on the face of any certificate representing any of such shares a legend referring to the provisions of this Appendix A. If any transfer of shares is made or attempted in violation of the foregoing restrictions, or if shares are not offered to the Company as required hereby, the Company shall have the right to purchase such shares from the owner thereof or his transferee at any time before or after the transfer, as herein provided. In addition to

any other legal or equitable remedies which it may have, the Company may enforce its rights by actions for specific performance (to the extent permitted by law) and may refuse to recognize any transferee as one of its stockholders for any purpose, including, without limitation, for purposes of dividend and voting rights, until all applicable provisions hereof have been complied with.

6. Shares Subject to Right of First Refusal. For purposes of the Right of First Refusal pursuant to this Appendix A, the term "shares" shall mean any and all new, substituted or additional securities or other property issued to the Holder, by reason of his or her ownership of Common Stock pursuant to the exercise of this Option, in connection with any stock dividend, liquidating dividend, stock split or other change in the character or amount of any of the outstanding securities of the Company, or any consolidation, merger or sale of all or substantially all of the assets of the Company.

7. Legends on Stock Certificates. Any certificate representing shares of stock subject to the provisions of this Appendix A may have endorsed thereon one or more legends, substantially as follows:

(i) "Any disposition of any interest in the securities represented by this certificate is subject to restrictions, and the securities represented by this certificate are subject to certain options, contained in a certain agreement between the record holder hereof and the Company, a copy of which will be mailed to any holder of this certificate without charge upon receipt by the Company of a written request therefor."

(ii) "The shares of stock represented by this certificate have not been registered under the Securities Act of 1933 or under the securities laws of any state and may not be pledged, hypothecated, sold or otherwise transferred unless such shares have been registered under the Act or unless the Company has received an opinion of counsel satisfactory to the Company, in form and substance satisfactory to the Company, that such registration is not required."

8. Right of First Refusal to Lapse Upon Registration. The restrictions imposed by this Appendix A shall terminate in all respects upon the effective date of a registration statement under the Act covering any of the Company's Common Stock.

MORPHIC HOLDING, INC.

STOCK RESTRICTION AGREEMENT

This Stock Restriction Agreement (this "***Agreement***") is made by and between Morphic Holding, Inc., a Delaware corporation previously organized as Morphic Holding, LLC, a Delaware limited liability company (the "***Company***"), and the undersigned Stockholder **(**the "***Stockholder***").

WHEREAS, the Company and the Stockholder entered into a certain Incentive Unit Grant Agreement on [ ] (the "***Incentive Unit Grant Agreement***"), pursuant to which the Stockholder was granted [ ] Incentive Units (the "***Incentive Units***"), as defined pursuant to the Company's Third Amended and Restated Operating Agreement, as amended (as so amended, the "***Operating Agreement***"), subject to certain terms and conditions;

WHEREAS, the Company made an election on IRS Form 8832 to elect for the Company to be classified as an association taxable as a corporation with an effective date of October 10, 2018; and

WHEREAS, the Company is converting, for Delaware state law purposes and not tax law purposes and while retaining the same employer identification number, from a Delaware limited liability company (taxable as a corporation) to a Delaware corporation effective as of the Date of this Agreement and the Incentive Units are being exchanged for shares of Common Stock, par $0.0001 per share (the "***Common Stock***"), of the Company in the amount specified in the table below (the "***Shares***") subject to vesting if and to the extent such Incentive Units were subject to vesting pursuant to the Incentive Unit Grant Agreement.

NOW, THEREFORE, in consideration of the mutual promises and covenants contained in this Agreement, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Stockholder and the Company hereby agree that from and after the Date of this Agreement, the Shares shall be subject to the terms and conditions of this Agreement, which shall include the terms and conditions stated below and those attached hereto, all of which terms and conditions are incorporated herein and made a part hereof.

Name of Stockholder:	
Address of Stockholder:	
Date of this Agreement:	
Number of Shares (Same as Number of Incentive Units):	
Repurchase Price per Share:	$0.0001
Number of Shares that are Vested Shares as of the Vesting Start Date:	
Number of Shares that are Unvested Shares as of the Vesting Start Date:	
Vesting Start Date:	

Vesting Schedule:

The Shares shall vest as follows:

25% of the Shares will vest on the first anniversary of the Vesting Start Date and the balance of the total Shares will thereafter vest in equal monthly installments on the last day of each of the next thirty-six (36) one-month periods, all subject to the vesting conditions herein.

Acknowledgement

By signing below, the Stockholder agrees to and accepts the terms and conditions set forth above and attached hereto.

Signed as an agreement under seal as of the Date of this Agreement.

Stockholder:

_____
[Name of Stockholder]

Morphic Holding, Inc.

By: _____
Name:
Title:

MORPHIC HOLDING, INC.

Stock Restriction Agreement — Incorporated Terms and Conditions

1. Restrictions on Shares. The term "***Shares***" (as defined on the first page of this Agreement) shall also include any shares of capital stock of the Company issued to the Stockholder by virtue of Stockholder's ownership of the Shares, by stock dividend, stock split, recapitalization, merger, combination, reorganization or otherwise. Shares that are subject to the Company's repurchase right as described in Section 4 of this Agreement are referred to as "***Unvested Shares***," and Shares that are not subject to such repurchase right, or as to which such repurchase right has lapsed, are referred to as "***Vested Shares***."

2. Representations of Stockholder. The Stockholder represents and warrants to the Company as follows:

(a) The Stockholder understands that the Shares have not been registered under the Securities Act of 1933, as amended (the "***Act***"), or registered or qualified under the securities or "Blue Sky" laws of any jurisdiction, and are being sold pursuant to exemptions contained in the Act and exemptions contained in other applicable securities or "Blue Sky" laws. The Stockholder understands further that the Company's reliance on these exemptions is based in part on the representations made by the Stockholder in this Agreement. The offer and issuance of the Shares has been made to the Stockholder solely in the state shown in the address set forth below the Stockholder's name on the first page of this Agreement.

(b) The Stockholder has acquired the Shares for the Stockholder's own account for investment, and not for, with a view to, or in connection with the resale or distribution thereof. The Stockholder has no present intention to sell, hypothecate, distribute or otherwise transfer (hereafter, "***Transfer***") any of the Shares or any interest therein. The nature and amount of the Stockholder's investment in the Shares are consistent with the Stockholder's investment objectives, abilities and resources. The Stockholder understands that the Shares are an illiquid investment, which will not become freely transferable by reason of any change of circumstances whatsoever. The Stockholder has adequate means of providing for the Stockholder's current needs and possible contingencies and has no need for liquidity in the Stockholder's investment.

(c) The Stockholder understands that the Shares will constitute "restricted securities" within the meaning of Rule 144 promulgated under the Act and that, as such, the Shares must be held indefinitely unless they are subsequently registered under the Act or unless an exemption from the registration requirements thereof is available. The Stockholder has been advised that Rule 144, which permits the resale, subject to various terms and conditions, of such "restricted securities" after they have been held for specified periods of time does not now apply to the Company, because the Company is not now required to file, and does not file, periodic reports under the Securities Exchange Act of 1934, as amended, and because information concerning the Company substantially equivalent to that which would be available if the Company were required to file such reports is not now publicly available. The Company may become a reporting entity at some future date, but no assurance can be given that it will do so.

(d) The Stockholder accepts the condition that the Company will maintain stop transfer orders with respect to the Shares and that each certificate or other document evidencing the Shares will bear a conspicuous legend in substantially the form set forth in Section 6 of this Agreement.

(e) The Stockholder has consulted the Stockholder's attorney or the Stockholder's accountant with respect to the issuance of the Shares. The Stockholder and such attorney or accountant have fully investigated the Company and its business and financial condition and have knowledge of the Company's current activities. The Company has granted the Stockholder and the Stockholder's attorney or accountant access to all information about the Company which they have requested and has offered each of them access to all further information which they deemed relevant to an investment decision with respect to the Shares. The Stockholder and the Stockholder's attorney or accountant have had the opportunity to ask questions of, and receive answers from, representatives of the Company concerning such information and the Company's financial condition and prospects.

3. Restrictions on Transfer. The following restrictions on Transfer of the Shares shall apply.

(a) No Shares, or any interest therein, may be Transferred at any time or under any circumstances unless (i) the Shares proposed to be Transferred have been registered under the Act and registered or qualified under applicable state securities laws, or (ii) the Company has received an opinion of counsel acceptable to the Company to the effect that such Transfer may be effected without registration under the Act and registration or qualification under the securities laws of relevant states and the proposed transferee has made such representations and agreements as the Company shall require to assure compliance with the Act and such laws.

(b) No Unvested Share, and no interest in an Unvested Share, may be Transferred except to the Company pursuant to Section 4 of this Agreement.

(c) Permitted Transfers. If the Stockholder is a natural person, all, or any portion of, the Shares may, without compliance with the provisions of this Section 3, be Transferred by the Stockholder for bona fide estate planning purposes to a member of the Stockholder's immediate family, to a family partnership or to a family trust or, on the Stockholder's death, may be Transferred to the Stockholder's estate or to those entitled to a distribution of the Shares under the laws of descent and distribution; provided, that Shares that are so Transferred shall remain subject to this Agreement and, as a condition to any Transfer, the Stockholder or the Stockholder's legal representative shall obtain a written agreement from the proposed transferee or transferees by which such transferee agrees or transferees agree to be bound by this Agreement.

(d) No Transfer of Shares shall be effective or given effect on the books of the Company unless all of the applicable provisions of this Section 3 have been duly complied with. The Company shall not be required to recognize as one of its stockholders any purported transferee of Shares which have been attempted to have been Transferred in violation of this Agreement, including, without limitation, for purposes of dividend and voting rights. The restrictions on transfer imposed by this Agreement shall apply not only to voluntary transfers but

also to involuntary transfers, by operation of law or otherwise. The Stockholder shall pay all legal fees and expenses of the Company arising out of or relating to any purported sale, assignment or transfer of any Shares in violation of this Agreement.

(e) Lock-Up. The Stockholder agrees that, for a period of up to 180 days from the effective date of any registration of securities of the Company plus up to an additional 35 days to comply with any applicable FINRA requirements (upon request of the Company or the underwriters managing any underwritten offering of the Company's securities), the Stockholder will not Transfer any Shares held by the Stockholder without the prior written consent of the Company or such underwriters, as the case may be. The Stockholder further agrees to execute such agreements as may be reasonably requested by the underwriters that are consistent with this Section 3(f) or that are necessary to give further effect thereto.

(f) The rights of the Company and the obligations of the Stockholder under this Section 3 are in addition to all rights and obligations which the Stockholder may have under other Sections of this Agreement or under other agreements between the Company and the Stockholder regarding the Shares (the "***Other Agreements***"), and this Section 3 shall not give the Stockholder any right to make any Transfer of any Shares which is otherwise prohibited by any other Section of this Agreement or the Other Agreements.

(g) Notwithstanding anything contained herein to the contrary, at no time shall the Stockholder Transfer any Shares or any interest therein to a competitor of the Company.

4. Vesting of Shares; Repurchase of Unvested Shares.

(a) If the Stockholder is providing services for the benefit of the Company as an active employee or consultant of the Company or any of its subsidiaries and is in good standing continuously from the date hereof through the vesting dates specified on the first page of this Agreement, Unvested Shares shall become Vested Shares (or shall "***vest***") on such dates and in such amounts as are specified on the first page of this Agreement. For the avoidance of doubt, the Board of Directors of the Company, in its discretion, may accelerate any vesting dates or waive any of the requirements for vesting.

(b) In the event that the Stockholder ceases for any reason to provide services for the benefit of the Company as an active employee or consultant of the Company or any of its subsidiaries before all of the Shares have become Vested Shares (a "***Termination Event***"), then the Company shall have the right to purchase (the "***Repurchase Option***") for a period of ninety (90) days from the date of such Termination Event (the "***Termination Date***") any or all of the Shares that are Unvested Shares at the Termination Date. The purchase of each Unvested Share pursuant to this Section 4(b) shall be effected at the Repurchase Price Per Share set forth on the first page of this Agreement, in each case, appropriately adjusted in the event of a stock dividend, stock split, recapitalization, merger, combination, reorganization or exchange of shares or other similar event occurring subsequent to the Date of this Agreement.

(c) Unless the Company notifies the Stockholder within ninety (90) days from the Termination Date that it does not intend to exercise its Repurchase Option with respect to some or all of the Unvested Shares, the Repurchase Option shall be deemed automatically exercised by

the Company as of the ninetieth (90th) day following the Termination Date, provided, that the Company may notify the Stockholder that it is exercising its Repurchase Option as of a date prior to such 90th day. Unless the Stockholder is otherwise notified by the Company pursuant to the preceding sentence that the Company does not intend to exercise its Repurchase Option as to some or all of the Unvested Shares to which it applies as of the Termination Date, execution of this Agreement by the Stockholder constitutes written notice to the Stockholder of the Company's intention to exercise its Repurchase Option with respect to all Unvested Shares to which such Repurchase Option applies. As a result of any repurchase of Unvested Shares pursuant to this Section 4, the Company shall become the legal and beneficial owner of the Unvested Shares being repurchased and shall have all rights and interest therein or related thereto, and the Company shall have the right to Transfer to its own name the number of Unvested Shares being repurchased by the Company, without further action by the Stockholder. Any failure by the Company to exercise its Repurchase Option shall in no way affect any rights, including repurchase rights, the Company may have under any of the Other Agreements.

(d) Fractional Shares. No fractional shares shall vest under this Agreement. Any calculation of Shares scheduled to vest on any date except for the last date on which vesting is contemplated under this Agreement (the "***Final Vesting Date***") that results in a fractional share shall be rounded down to the nearest whole Share. On the Final Vesting Date, all remaining Unvested Shares shall vest and become Vested Shares.

5. Custody of Certificates.

(a) In order to facilitate the exercise of the Company's repurchase rights under Section 4 of this Agreement, simultaneously with the execution of this Agreement, the Stockholder shall deposit with the Company or its attorneys the certificate or certificates representing in whole or in part Unvested Shares and shall promptly upon acquisition of any additional Unvested Shares, deposit with the Company the certificate or certificates for such additional shares. To all certificates deposited by the Stockholder with the Company, there shall be attached a stock power or stock powers, duly executed by the Stockholder in blank, constituting and appointing the Company or its designee the Stockholder's attorney to transfer such stock on the books of the Company. The Stockholder shall continue to be the owner of the Shares, despite such deposit and stock powers, and shall be entitled to exercise all rights of ownership in such Shares, subject, however, to the provisions of this Agreement.

(b) In the event that a dispute should arise with respect to the delivery, right to possession, and/or ownership of the certificates held by the Company representing the Shares, the Company is authorized to retain such certificates and evidences in its possession, or any portion thereof, without liability to anyone, until such dispute shall have been settled either by mutual written agreement of the parties concerned or by final order, decree or judgment of a court of competent jurisdiction after the time for appeal has expired and no appeal has been perfected, but the Company shall be under no duty whatsoever hereunder to institute or defend any such proceedings.

(c) The Company shall have the right to cause Transfers of Unvested Shares to be effected pursuant to Section 4 notwithstanding any failure of the Stockholder to take the action required of the Stockholder pursuant to this Agreement; provided, however, that no Transfer of

Unvested Shares shall be effected hereunder unless payment therefor has been made or tendered to the Stockholder or the Stockholder's executor or other legal representative. The Stockholder hereby appoints each of the President, Treasurer and Secretary of the Company as the Stockholder's attorney-in-fact for purposes of effecting any such Transfer.

6. Legends. Each certificate representing Shares shall prominently bear legends to the following effect:

"The shares represented by this certificate have been acquired for investment and have not been registered under the Securities Act of 1933, as amended. Such shares may not be sold, transferred, pledged or hypothecated unless the registration provisions of said Act have been complied with or unless the Company has received an opinion of its counsel that such registration is not required.

The shares represented by this certificate are subject to restrictions on transfer and repurchase rights pursuant to the terms of a Stock Restriction Agreement, a copy of which will be furnished to the holder hereof without charge upon written request."

7. Miscellaneous.

(a) Entire Agreement. This Agreement, including the signature page hereto and these Incorporated Terms and Conditions, constitutes the entire agreement between the parties with respect to the subject matter hereof, and supersedes all prior agreements, negotiations, representations and proposals, written or oral, relating to such subject matter.

(b) Amendments. Neither this Agreement nor any provision hereof may be changed or modified except by an agreement in writing executed by the Stockholder and on behalf of the Company.

(c) Binding Effect of the Agreement. This Agreement shall inure to the benefit of, and be binding upon, the Company, the Stockholder and their respective estates, heirs, executors, transferees, successors, assigns and legal representatives.

(d) Notices. All notices to any party under this Agreement shall be contained in a written instrument addressed to such party at the address set forth below or such other address as may hereafter be designated in writing by the addressee to the addressor and shall be deemed given (i) when delivered in person or duly sent by e-mail or fax, with confirmation of receipt, (ii) three days after being duly sent by first class mail postage prepaid (other than in the case of notices to or from any non-U.S. resident, which notices must be sent in the manner specified in clause (i) or (iii)), or (iii) two days after being duly sent by UPS, Federal Express or other recognized express international courier service:

(i) if to the Stockholder, to the Address or E-Mail Address of Stockholder set forth on the first page of this Agreement; and

(ii) if to the Company, to:

Morphic Holding, Inc.
35 Gatehouse Drive A2
Waltham, MA 02451

With a copy to:

Foley Hoag LLP
155 Seaport Boulevard
Boston, MA 02210
Attention: Mark A. Haddad, Esq.
Fax: (617) 832-7000

(e) Consent to Electronic Notices. The Stockholder hereby agrees and consents that the Company may provide the Stockholder, at the Company's option, all notices which are required to be delivered, whether under this Agreement, pursuant to the General Corporation Law of the State of Delaware or other applicable law or regulation, or otherwise, in electronic form to the E-Mail Address set forth on the signature page of this Agreement.

(f) Relationship with Company. The Company is not by reason of this Agreement or the issuance of any Shares obligated to continue the Stockholder's relationship with the Company as an employee, consultant, advisor, officer, director, or in any other capacity (other than as a stockholder).

(i) Remedies. The Stockholder acknowledges that money damages alone will not adequately compensate the Company for breach of any of the Stockholder's covenants and agreements herein and, therefore, agrees that in the event of the breach or threatened breach of any such covenant or agreement, in addition to all other remedies available to the Company, at law, in equity or otherwise, the Company shall be entitled to injunctive relief compelling specific performance of, or other compliance with, the terms hereof. The rights and remedies of the Company hereunder shall be cumulative and in addition to all other rights and remedies the Company may have, at law, in equity, by contract or otherwise.

(j) Reliance; Liability. In performing its duties under this Agreement, the Company shall be entitled to rely upon any statement, notice, or other writing which it shall in good faith believe to be genuine and to be signed or presented by a proper party or parties or on other evidence or information deemed by the Stockholder to be reliable. In no event shall the Company be liable for any action taken or omitted in good faith. The Company may consult with its counsel or counsel of any of the other parties hereto and, without limiting the generality of the preceding sentence, shall not be held liable for any action taken or omitted in good faith on advice of such counsel.

(k) Awaiting Final Settlement. If any controversy arises between the parties hereto or with any third person with respect to the Shares, this Agreement or its subject matter, the Company shall not be required to take any actions in the premises, but may await the settlement of any such controversy by final appropriate legal proceedings or otherwise as it may require, notwithstanding anything in this Agreement to the contrary, and, in such event, the Company shall not be liable for interest or damages.

(l) Construction. The headings and subheadings of this Agreement have been inserted for convenience only, and shall not affect the construction of the provisions hereof. All references to sections of this Agreement shall be deemed to refer as well to all subsections which form a part of such section. The words "***include***," "***includes***" and "***including***" when used herein shall be deemed in each case to be followed by the words "without limitation."

(m) Severability. In the event that any one or more of the provisions contained herein shall, for any reason, be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provisions of this Agreement and all other provisions shall remain in full force and effect. If any provision of this Agreement is held to be excessively broad, it shall be reformed and construed by limiting and reducing it so as to be enforceable to the maximum extent permitted by law.

(n) No Waiver. No modification, renewal, extension, waiver or termination of this Agreement or any of the provisions herein contained shall be binding upon the Company unless made in writing and signed by a duly authorized officer of the Company.

(o) Further Assurances. The parties agree to execute such further instruments and to take such further actions as may reasonably be necessary to carry out the intent of this Agreement.

(p) Counterparts. This Agreement may be executed in counterparts, each such counterpart shall be deemed to be an original instrument, and all of which together shall for all purposes constitute one Agreement, binding on each of the parties hereto notwithstanding that each such party shall not have signed the same counterpart. A signature of any party to this Agreement transmitted by facsimile, electronic mail (including pdf) or other electronic means shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

(q) Applicable Law. This Agreement shall be construed and enforced in accordance with the laws of The State of Delaware, without regard to its principles of conflicts of laws. All litigation arising from or relating to this Agreement shall be filed and prosecuted before any court of competent subject matter jurisdiction located in The State of Delaware. The Stockholder consents to service of process in any such action by certified or registered mail, return receipt requested. The Stockholder consents to the jurisdiction of such courts over the Stockholder, stipulates to the convenience, efficiency and fairness of proceeding in such courts, and covenants not to allege or assert the inconvenience, inefficiency or unfairness of proceeding in such courts.

(r) Disposition of Shares; Purchase by Nominee or Designee. Any Shares that the Company elects to purchase hereunder may be disposed of by it in such manner as it deems appropriate with or without restrictions on the transfer thereof, and the Company may require their transfer to a nominee or designee as part of any purchase of Shares from the Stockholder.

(s) Withholding Taxes. The Stockholder agrees that the Stockholder shall be fully liable for any taxes owed by the Stockholder with regard to the issuance of the Shares, whether owed at the time of issuance or at the time that the Shares vest pursuant to the vesting schedule set forth above. The Stockholder acknowledges and agrees that the Company has the right to

deduct from payments of any kind otherwise due to the Stockholder any federal, state or local taxes of any kind required by law to be withheld with respect to the issuance, vesting or otherwise as a result of the ownership of the Shares by the Stockholder. The Stockholder further agrees that, if the Company does not withhold an amount sufficient to satisfy the withholding obligation of the Company with respect to the issuance of the Shares, the Stockholder will make reimbursement on demand, in cash, for the amount underwithheld, provided that the Company has provided the Stockholder with written detail concerning the basis for and amount of the withholding obligation of the Company.

* * * * *

STOCK POWER

FOR VALUE RECEIVED, [Name of Stockholder], hereby assigns and transfers to Morphic Holding, Inc., a Delaware corporation (the "***Company***"), a total of shares of the Common Stock of the Company standing in the name of the stockholder named above on the books of the Company represented by stock certificate number to be delivered herewith, and does hereby irrevocably constitute and appoint Foley Hoag LLP as attorney to transfer said shares on the books of the Company with full power of substitution in the premises.

Dated:

[Name of Stockholder]

In the Presence of:

Name:

Exhibit 10.8

MORPHIC ROCK HOLDING, LLC

CONSULTING AGREEMENT
(Timothy A. Springer, Ph.D.)

This Consulting Agreement (this "**Agreement**") is made effective as of June 1, 2015. In consideration for retaining Timothy A. Springer, Ph.D. ("**Consultant**") by Morphic Rock Holding, LLC, f/k/a Integrin Rock, LLC (the "**Company**"), a Delaware limited liability company. For good and valuable consideration, the parties hereby agree as follows:

1. Retention as Consultant; Services. The Company hereby retains Consultant and Consultant hereby agrees to perform such consulting services for the Company (or for any of its subsidiaries designated by the Company to receive such services) as the Company or any such subsidiary may from time to time reasonably request (the "**Services**"), including the services specified on Schedule A attached hereto.

2. Availability; Time Commitment. Consultant will make himself available to render the Services, at such time or times and location or locations as may be mutually agreed, from time to time as requested by the Company or by its designated subsidiary, or as necessary to fulfill his duties. Consultant will devote his best efforts to performing the Services. Consultant will devote at least six (6) days per year to performing the Services.

3. Compensation. As of the day first written above, Consultant (together with certain family members and one or more family trusts) holds 5,000,000 Common Units of the Company, representing a 70% equity interest in the Company. Apart from such equity interest, Consultant will not be entitled to receive, and the Company will not be obligated to pay or provide to Consultant any fee, salary, benefits or other compensation of any kind, except for reasonable out-of-pocket expenses incurred by Consultant in the performance of the Services that the Company approves in advance. After the Company's first equity financing, or the formation of a corporate partnership, with aggregate value in gross proceeds and services in kind, in excess of $5,000,000 (together, the "**Financing Event**"), the Company will pay Consultant $80,000 per year, paid in quarterly installments of $20,000 per quarter commencing within 30 days of the closing of the Financing Event.

4. Relationship of Consultant to Others.

4.1. The Company recognizes that as of the date first written above Consultant is a member of the faculty of Boston Children's Hospital ("**BCH**") and Harvard Medical School, and may become a member of or contributor to other not-for-profit institutions or associations in the future (the "**Institutions**"), and that Consultant's activities are and will be subject to the policies and regulations of the Institutions (the "**Applicable Policies**").

4.2. Consultant and Company agree to abide by the BCH Mandatory Uniform Consulting Terms as incorporated into this Agreement as Exhibit A and to provide Services which fall, at all times, outside the "Scope of BCH Activities" as set forth on Exhibit A.

4.3. Consultant agrees not to solicit employees of the Company or any Company subsidiary to become Consultant or BCH employees. Consultant further agrees not to enter into any agreement with an entity which may reasonably be considered a Company competitor, to the extent that the agreement would embrace services which would overlap with the Services described herein.

4.4. During the term of this Agreement, Consultant will not directly or indirectly (i) provide advice or services to any for-profit third party in the Field (as defined on Schedule A), or (ii) become an owner, partner, shareholder, consultant, agent, employee or co-venturer of any for-profit third party that has committed or intends to commit (by itself or through any affiliates or collaborators) resources to the Field (other than in Consultant's capacity as a holder of not more than one percent (1%) of the combined voting power of the outstanding stock of such a third party that is a publicly held company). The foregoing restrictions will not prohibit Consultant from providing any services, including but not limited to conducting research at or providing educational services to an Institution.

4.5. During the term of this Agreement and for one (1) year thereafter, Consultant will not (i) solicit, encourage, or take any other action which is intended to induce any employee of, or consultant to, the Company or any Company subsidiary to terminate his or her relationship with the Company or with such subsidiary, or (ii) solicit, endeavor to entice away from the Company or any Company Subsidiary or otherwise interfere with the relationship of the Company or any Company subsidiary with any third party who is, or was within the then-most recent twelve month period, a licensor to or customer, collaborator or licensee of the Company or any Company subsidiary.

5. Intellectual Property.

5.1. Subject to the BCH Mandatory Uniform Consulting Terms, Consultant will promptly disclose in confidence to the Company all inventions, discoveries, ideas, concepts, processes, products, formulas, trademarks, service marks, logos, computer programs or software, source codes, object codes, algorithms, machines, apparatuses, items of manufacture or compositions of matter, or any new uses therefor or improvements thereon, or any new designs or modifications or configurations of any kinds or works of authorship of any kind, including, without limitation, compilations and derivative works, whether or not patentable or copyrightable and know-how that Consultant makes, conceives, develops or reduces to practice, from the effective date of this Agreement through the expiration or termination of this Agreement and for six (6) months thereafter, and that (i) arise from the Services or other work performed by Consultant for the Company, or (ii) arise from use of facilities, equipment, supplies, materials or Confidential Information of the Company, (along with all patent and other intellectual property rights arising therefrom, collectively, "**Developments**"). Consultant will neither make any use of any funds, space, personnel, facilities, equipment or other resources of any Institution or other third party in performing the Services hereunder nor take any other action that would result in any Institution or other third party owning or having a right in any Developments under the Applicable Policies or otherwise.

5.2. Consultant will make and maintain adequate and current written records of all Developments, which records will be available to and remain the property of the Company at all times. All Developments will be the sole property of the Company. For purposes of the copyright laws of the United States, all Developments will constitute works made for hire as applicable. Consultant hereby assigns and, to the extent any such assignment cannot be made at present, hereby agrees to assign to the Company, without further compensation, all right, title and interest in and to all Developments.

5.3. Consultant will assist the Company in any reasonable manner to obtain for its own benefit patent and other intellectual property rights in any and all countries with respect to the Developments, and Consultant will execute and deliver, when requested, patent and other applications and assignments therefor. Consultant will further assist the Company in every way to enforce any such patent rights and other rights, including testifying in any suit or proceeding.

Consultant will perform Consultant's obligations under this Section without further compensation, except for reimbursement of expenses incurred at the Company's request and, with respect to any performance after the term of this Agreement or in excess of Consultant's time commitment during the term of this Agreement (other than reviewing and executing documents), compensation at a reasonable rate for time actually spent by Consultant at the Company's request. In the event the Company is unable after reasonable effort to obtain Consultant's signature on any document which Consultant may be required to sign pursuant to this Section, whether because of Consultant's physical or mental incapacity or for any other reason whatsoever, Consultant hereby irrevocably appoints each of the President and the Secretary of the Company (whether now or hereafter in office) as Consultant's attorney-in-fact to execute any such document on Consultant's behalf.

5.4. Consultant shall not, in connection with the Services to be performed under this Agreement, disclose to Company any information which is confidential or proprietary to Consultant or any third party including but not limited to any Institution.

6. Confidential Information.

6.1. As used in this Agreement, "**Confidential Information**" means all trade secrets, inventions, Developments and confidential or proprietary or other information owned, possessed or used by the Company or any Company subsidiary whether prepared, conceived or developed by a consultant or employee of the Company (including Consultant in the course of performing the Services), including (i) all Developments, know-how, technology, business strategies and plans, financial, technical or business information, personnel information and customer lists (an any tangible evidence, record or representation thereof) of the Company and its subsidiaries, (ii) all materials furnished by the Company or its subsidiaries, and (iii) all information of third parties that the Company or any Company subsidiary has an obligation to keep confidential. In addition, the terms and conditions of this Agreement will be treated by Consultant as Confidential Information hereunder, provided that such terms and conditions may be disclosed to an Institution upon its request.

6.2. During the term of this Agreement and at all times thereafter, Consultant will keep and hold all Confidential Information in strict confidence, and Consultant will not use or disclose any of such Confidential Information without the prior written consent, and with the authorization, of the Company, except as may be necessary to perform the Services. Consultant will not disclose to the Company or any Company Subsidiary, or induce the Company or any Company Subsidiary to use any confidential information or material belonging to any third party. In the event that Consultant is authorized to disclose any Confidential Information to anyone outside the Company or its subsidiaries in performing the Services, Consultant will take adequate steps, consistent with the policies and practices of the Company, to require that the recipient maintain the confidentiality of the Confidential Information.

6.3. The term "Confidential Information" hereunder will not include information that Consultant can establish by competent written evidence (i) is or becomes generally known within the Company's industry through no fault of Consultant; (ii) was known to Consultant at the time it was disclosed, (iii) is lawfully and in good faith made available to Consultant by a third party who did not derive it from the Company or any Company subsidiary and who imposes no obligation of confidence on Consultant; or (iv) is required to be disclosed by order of a governmental authority or a court of competent jurisdiction, provided that such disclosure is subject to all applicable governmental or judicial protection available for like material and reasonable advance notice of the pendency of any such order is given to the Company. For the purpose of this Section, Confidential Information will not be deemed to fall within any of the foregoing exceptions merely because such

information is embraced by general disclosures or because individual features or combinations thereof are publicly available.

6.4. Upon termination of this Agreement or at any other time upon the request of the Company, Consultant will promptly deliver to the Company all records and materials documenting, evidencing or embodying any Confidential Information.

7. No Conflicts.

7.1. Consultant agrees to the best of his knowledge that Consultant is permitted to enter into this Agreement and to perform the obligations contemplated hereby, and that this Agreement and the terms and obligations hereof are not inconsistent or otherwise in conflict with any other obligations Consultant may have, under and as modified by the Applicable Policies or otherwise. In addition, Consultant will not enter into any agreement or modification of any existing agreement (whether written or oral) that are inconsistent with or otherwise conflict with Consultant's obligations under this Agreement.

7.2. Consultant represents and warrants that Consultant has disclosed to the Institutions all aspects of Consultant's relationship with the Company which are required to be disclosed under the Applicable Policies, and that Consultant has obtained any required consents or approvals of the Institutions concerning such relationship and this Agreement.

8. Publication.

Consultant shall not publish Confidential Information.

9. Term and Termination.

9.1. Subject to earlier termination as expressly provided herein, this Agreement will commence on the date first written above and will continue until the fourth anniversary of that date. If either party breaches in any material respect any of its material obligations under this Agreement, in addition to any other right or remedy, the non-breaching party may terminate this Agreement in the event that the breach is not cured within thirty days after receipt by such party of written notice of such breach. Either party may terminate this Agreement for convenience, but only upon six months advance written notice to the other party.

9.2. No expiration or termination of this Agreement will relieve or affect any rights or liabilities of the parties which may have accrued prior to the date of expiration or termination. Notwithstanding anything herein to the contrary, upon any expiration or termination of this Agreement, the provisions of Sections 5, 6, 7, 8, 9 and 10 will survive such expiration or termination and continue in effect in accordance with their terms.

10. General.

10.1. Consultant recognizes that, in the event of a breach or threatened breach by Consultant of this Agreement, the Company may suffer irreparable harm, and Consultant therefore agrees that, in addition to all other rights and remedies available to the Company at law or in equity, the Company will be entitled to seek injunctive relief to restrain any such breach and to enforce the provisions hereof, without showing or proving any actual damage to the Company.

10.2. The Services to be rendered by Consultant are personal in nature, and Consultant may not assign or transfer this Agreement or any of Consultant's rights or obligations. In no event will Consultant assign or delegate responsibility for actual performance of the Services. Company may not assign or otherwise transfer this Agreement without the prior written consent of Consultant, except to any wholly owned subsidiary of the Company or in connection with the sale of substantially all of the Company's assets, including by way of merger, asset sale, stock sale, or other transaction type having the same purpose. This Agreement will be binding upon and inure to the benefit of the parties and their respective legal representatives, heirs, successors and permitted assigns.

10.3. All notices and other communications hereunder will be delivered by hand or sent by registered or certified mail, or by reputable package delivery service, return receipt requested, addressed to the Company at its regular place of business or to Consultant at the address set forth below, or to such other address as such party may designate in writing to the other.

10.4. This Agreement, together with Schedule A and Exhibit A attached hereto, constitutes the entire agreement between the parties as to the subject matter hereof, and supersedes any previous oral or written communications, representations, understandings, or agreements between them as to such subject matter. No provision of this Agreement will be waived, altered or canceled except in writing signed by the party against whom such waiver, alteration or cancellation is asserted. Any such waiver will be limited to particular instance and the particular time when and for which it is given.

10.5. It is understood and agreed that Consultant's relationship to the Company is that of an independent contractor and that neither this Agreement nor the Services to be rendered hereunder will for any purpose whatsoever or in any way or manner create any employer-employee relationship between the parties. Consultant understands that Consultant will not be entitled to participate in or to receive any benefit or right under any of the Company's employee benefit, welfare or like plans. Consultant will be responsible for paying all withholding and other taxes arising from consideration payable by Company hereunder when they become due and payable.

10.6. During the term of this Agreement and at all times thereafter, Consultant will execute and deliver all such documents and will perform all such lawful acts, as the Company considers necessary or advisable to secure its rights hereunder and to carry out the intent of this Agreement.

10.7. This Agreement will be governed by, and construed and enforced in accordance with, the laws of The Commonwealth of Massachusetts, without regard to its principles of conflicts of laws. All litigation arising from or relating to this Agreement will be filed and prosecuted before any court of competent subject matter jurisdiction in Boston, Massachusetts. Consultant hereby consents to the jurisdiction of such courts over him, stipulates to the convenience, efficiency and fairness of proceeding in such courts, and covenants not to allege or assert the inconvenience, inefficiency or unfairness of proceeding in such courts.

10.8. The invalidity or unenforceability of any provision hereof as to an obligation of a party will in no way affect the validity or enforceability of any other provision of this Agreement, provided that if such invalidity or unenforceability materially adversely affects the benefits the other party reasonably expected to receive hereunder, that party will have the right to terminate this Agreement. Moreover, if one or more of the provisions contained in this Agreement will for any reason be held to be excessively broad as to scope, activity or subject so as to be unenforceable at law, such provision or provisions will be construed by limiting or reducing it or them, so as to be enforceable to the extent compatible with the then-applicable law.

10.9. The titles and headings herein are for reference purposes only and will not in any manner limit the construction of this Agreement which will be considered as a whole. As used in this Agreement, “herein” and “hereof” will refer to this Agreement as a whole, and “including” and “include” means “including but not limited to” and “includes, without limitation”, respectively. This Agreement will not be interpreted or construed against a party because that party or any attorney or representative for that party drafted or participated in the drafting of this Agreement.

* * *

IN WITNESS WHEREOF, the parties hereto have duly executed this Consulting Agreement under seal as of the date first set forth above.

MORPHIC ROCK HOLDING, LLC

By: /s/ Robert E. Farrell Jr.

Name: Robert E. Farrell Jr.

Title: VP Finance and Operations

CONSULTANT

/s/ Timothy A. Springer, Ph.D.

Print Name: Timothy A. Springer, Ph.D.

Address: [Personally identifiable information withheld]

Facsimile:

SCHEDULE A
SERVICES AND FIELD

"**Field**" means research, discovery, design, manufacture, clinical development, seeking of regulatory approvals, marketing and/or commercialization of small molecules that target any member of the integrin family of cell adhesion molecules.

Specific Services will include:

- Contribute to the development of the R&D plan of the Company or its designated subsidiaries
- Contribute to the development of the patent rights and other intellectual property of the Company or its designated subsidiaries
- At the Company's request, participate in the Company's strategic planning (or that of its designated subsidiaries) and attend Scientific Advisory Board meetings of the Company or its designated subsidiaries
- Be available to represent the Company or its designated subsidiaries to investors and potential partners

EXHIBIT A — BCH Mandatory Uniform Consulting Terms.

1. Mandatory and superseding nature of these terms

These terms must be attached to and incorporated into any personal Consulting Agreement that involves services by any member of the medical or research staff, or any officer or employee, of Boston Children's Hospital or its supporting affiliated foundations (collectively referred to as BCH). They apply regardless of the nature of the consulting services, and regardless of the corporate or other nature of the other party to the consulting agreement. They are incorporated in and enforceable as a term and condition of the Consulting Agreement; supersede any conflicting provisions; and may not be limited, amended or superseded by any other agreement. They are not negotiable.

2. Definitions

(a) Consultant: the BCH staff member, officer of employee who is a party to the consulting agreement.
(b) Consulting Agreement: the set of agreements, oral and written, that together comprise the complete set of rights and obligations between the Consultant and the Company.
(c) Company: the party or parties retaining the Consultant, and any other third party referred to in the Consulting Agreement as the recipient of Consultant services or legal obligations.
(d) Services: the services included within the Consulting Agreement.
(e) HMS: Harvard Medical School.
(f) Scope of BCH Activities: (1) any activities undertaken by Consultant at BCH or using BCH resources (excluding de minimis uses of BCH computer resources, e-mail, calendaring, and telephone); and (2) any activities described within the professional role of the Consultant at BCH, or by BCH, its departments or divisions, as reflected in (i) activities actually or historically undertaken by Consultant at their request or direction or on their behalf; (ii) obligations, whether or not currently undertaken, under directives and assignments of the pertinent chief, the terms of appointment, the Consultant's job description, sponsored research agreements, customary responsibilities, and other indicators of expectations for the scope of Consultant's BCH or HMS role.
(g) BCH and HMS Policies: Policies of BCH, its departments and divisions, and of HMS if Consultant is a member of the HMS faculty, concerning ethical conduct, conflicts of interest, intellectual property, confidentiality, compliance with federal and state laws, regulations and policies, and any other matter relating to the Consultant's appointment or employment.

3. Supremacy of Consultant's BCH and HMS Obligations

Company acknowledges that Consultant has pre-existing and on-going obligations to HMS, BCH, and the sponsors of research at BCH (including obligations under BCH and HMS Policies, grants, contracts, collaborative agreements, and a "participation agreement" assigning to BCH all inventions within the Scope of BCH Activities). In order to enter into this Consulting Agreement, Company therefore acknowledges and agrees that in the event that any conflict should arise between the Consulting Agreement and Consultant's obligations to HMS, BCH or sponsors of research at BCH, Consultant shall necessarily notify BCH immediately, and that Consultant's obligations to BCH, HMS and sponsors of research at BCH shall take precedence over the terms of the Consulting Agreement. Without limiting the foregoing, Company shall have no rights in any publication, invention, discovery, improvement, or other intellectual property whatsoever, whether or not publishable, patentable, or copyrightable, developed by

Consultant *in whole or in part* within the Scope of BCH Activities, even if arising in part from Services. It is understood that the Scope of BCH Activities may change from time to time, and the Consulting Agreement may not restrict such changes. Services shall exclude disclosure of information derived from the Scope of BCH Activities of Consultant, and information that is confidential under BCH and HMS Policy. Services for the Company shall consist only of the exchange of ideas and provision of advice. Consultant shall not conduct research for or on behalf of the Company, act as a Company executive, or take a position with Company that entails fiduciary obligations to Company in conflict with primary obligations to BCH.

4. Assignment of Consultant Intellectual Property

Subject to the terms of paragraph 3, above, it is the Consultant's own choice whether to assign, or to decline to assign, to the Company any right, title and interest the Consultant may have in any invention, discovery, improvement, or other intellectual property that Consultant develops in the course of and arising from Consultant performing Services for the Company under the Consulting Agreement.

5. Confidentiality and Disclosure

The Consulting Agreement shall not restrict the Consultant from disclosing to BCH, Consultant's department or division chief, and other staff or employees of BCH to whom disclosure of Consulting Agreements is required, any aspect of the Consulting Agreement, including an unredacted copy of the Consulting Agreement, compensation and reimbursement paid to Consultant in any form, the nature of Services actually provided, and, for purposes of assessing compliance with paragraph 3 of Exhibit A, any intellectual property disclosed by Consultant to Company. BCH, and all BCH staff and employees to whom it is disclosed, shall treat such information as confidential business information under BCH policies.

6. No Consultant Warranties.

Any provision of the Consulting Agreement purporting to impose a warranty obligation on Consultant is superseded and void. Without limiting the foregoing: Consultant shall use reasonable efforts not to use any facilities, funds, or equipment owned or administered by BCH in the performance of the Services. Any provision of the Consultant Agreement which imposes a higher obligation is void and superseded by this provision.

7. Non-competition

Company and Consultant may agree on provisions which restrict Consultant from soliciting Company's employees to become Consultant employees. However, any provision requiring Consultant to refrain from entering into agreements with competing organizations, to the extent it relates to or overlaps the present or future Scope of BCH Activities, is void.

8. Use of names, depictions and logos

Company shall not use Consultant's name or depiction, or the name, logos, trademarks, or depictions of BCH, HMS, or any officer, director, employee, appointee, medical staff member or employee of either, or any adaptation thereof, in any promotional, advertising or marketing literature, or in any other way without the prior written consent of BCH, the individual, or HMS, as appropriate, provided however that in neutral circumstances that do not imply endorsement or advocacy, or otherwise misrepresent the terms of the Consulting Agreement or Consultant's role, Company may accurately state that Consultant is a consultant to Company, and list his or her professional degrees and titles.

9. Consultant’s personal activity.

Each party to the Consulting Agreement acknowledges that Consultant is entering into the Agreement, and providing Services, in the Consultant’s personal capacity and not as an employee or agent of BCH; BCH is not a party to the Consulting Agreement and has no liability or obligation thereunder except as its own policies create an obligation of confidentiality as described in paragraph 5; and BCH is an intended, third-party beneficiary of this Agreement, and certain provisions of this Agreement are for the benefit of BCH and are enforceable by BCH in its own name.

10. Termination

In addition to any provision for termination, the Consulting Agreement shall be terminable without cause on thirty days notice at the request of the BCH Office of General Counsel, operating on the request of the Consultant’s department or division chief or supervisor.

Exhibit 21.1

Subsidiaries of Morphic Holding, Inc.

Name of Subsidiary	Jurisdiction
Morphic Therapeutic, Inc.	Delaware
Morphic Security Corporation	Massachusetts