DELIVERING A NEW GENERATION OF INTEGRIN MEDICINES

July, 2020
Forward Looking Statements

This presentation contains “forward-looking” statements within the meaning of the “safe harbor” provisions of the Private Securities Litigation Reform Act of 1995, including, but not limited to: Morphic’s plan to develop and commercialize oral small-molecule integrin therapeutics and Morphic’s expectations about timing and ability to obtain regulatory approvals for MORF-720, MORF-057, and other candidates in development and the sufficiency of our cash, cash equivalents and investments to fund our operations. Statements including words such as “believe,” “plan,” “continue,” “expect,” “will be,” “develop,” “signal,” “potential,” or “ongoing” and statements in the future tense are forward-looking statements. These forward-looking statements involve risks and uncertainties, as well as assumptions, which, if they do not fully materialize or prove incorrect, could cause our results to differ materially from those expressed or implied by such forward-looking statements. Forward-looking statements are subject to risks and uncertainties that may cause Morphic’s actual activities or results to differ significantly from those expressed in any forward-looking statement, including risks and uncertainties related to Morphic’s ability to develop, obtain regulatory approval for and commercialize MORF-720, MORF-057, and other product candidates, the timing and results of preclinical studies and clinical trials, Morphic’s ability to protect intellectual property; and other risks set forth in our filings with the Securities and Exchange Commission. These forward-looking statements speak only as of the date hereof and Morphic specifically disclaims any obligation to update these forward-looking statements or reasons why actual results might differ, whether as a result of new information, future events or otherwise, except as required by law.
Morphic: A New Chapter In Integrin History

- Springer discovers integrins
- Heavy Big Pharma Investment
- 1990

- 3 non-oral approvals

- Phase III failures for oral drugs
- 2000

- Drug withdrawal

- Heavy Springer Lab Investment
- 2010

- Entyvio® approved
- 2015

- Morphic founded on Springer IP for oral integrin drug design

- Morphic oral candidates to enter clinic
- 2020

- Morphic oral candidates to enter clinic
## Unique Opportunity to Mine Integrins: Well Validated Target Class

<table>
<thead>
<tr>
<th>Validated Target Class with Large Market Opportunity</th>
</tr>
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<tbody>
<tr>
<td>• All approved integrin therapies are non-oral options for a wide variety of serious chronic diseases</td>
</tr>
<tr>
<td>• Estimated 2018 sales of at least $4.6 billion¹</td>
</tr>
<tr>
<td>THE Integrin Platform</td>
</tr>
<tr>
<td>• Leveraging proprietary databases, world-class know-how and decades of Springer laboratory research</td>
</tr>
<tr>
<td>• Designed to target and modulate every known human integrin</td>
</tr>
<tr>
<td>Potential First-in-Class Pipeline</td>
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<td>• Oral integrin therapies have historically failed in development due to poorly understood biology</td>
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<tr>
<td>• Morphic’s goal: deliver the first generation of approved oral integrin drugs in IBD, fibrosis and other indications</td>
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<td>Transformational Partnerships</td>
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<tr>
<td>• AbbVie ($100 million upfront); Morphic eligible for enhanced royalties in liver fibrosis with opt in</td>
</tr>
<tr>
<td>• Janssen (up to $729 million in milestones in addition to potential royalties)</td>
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<tr>
<td>Strong Cash Position</td>
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<td>• 3/31/20 cash position: $219 million, through at least 2022</td>
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¹Global Data
Morphic Integrin Technology (MInT) Platform

Proprietary Integrin Structure Determination

Tunable Product Candidate Design Engine

Blood and Disease Translation Capability

αβ1

αβ6

αβ2

α4β7

MORPHIC THERAPEUTIC
PDB 3V4V Structural Model
FAMILY: Leukocyte receptor

LIGANDS: MACAM-1, VCAM-1,
fibronectin, osteopontin

FUNCTION: Recruit activated
T cells with to the mucosal surfaces
in the gastrointestinal tract

GENES: ITGAM, ITGB7
PROTEINS: A482/446, P36/610
CHROMOSOMES: 2q37.3, 12q13.13

RELEVANCE IN DISEASE: ulcerative colitis, Crohn’s disease

J Cell Biol, 2012
Morphic: Focused on Major Chronic Conditions

Development Pipeline

<table>
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<tr>
<th>Our Programs</th>
<th>Indication</th>
<th>Status</th>
<th>Product Rights</th>
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<tr>
<td>MORF-057</td>
<td>Inflammatory bowel disease (IBD)</td>
<td></td>
<td>Wholly Owned</td>
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<tr>
<td>Target: α₄β₇</td>
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<td>MR β₆ #2</td>
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<td>Morphic/AbbVie</td>
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Research Pipeline

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<th>Focus</th>
<th>α₄β₁ inhibition for fibrotic disease</th>
<th>TGF-β activation for solid tumors</th>
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<th>Undisclosed targets, including α₁I domain integrins</th>
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MORF-057
Targeting $\alpha_4\beta_7$
for Inflammatory Bowel Disease
α₄β₇: A Proven Mechanism of Action in IBD

Approved vedolizumab: IV only

- IBD involves trafficking of α₄β₇+ leukocytes to gut tissue via MAdCAM-1 binding, causing inflammation
- Vedolizumab (IV) inhibits this action and was approved for Ulcerative Colitis and Crohn’s Disease in 2014
- 150,000 patients dosed since approval in 2014¹
- $3.2B sales in FY19²

¹Takeda
²Global Data
MORF-057: Pre-clinical Data Dose-dependent Anti-inflammatory Activity

T lymphocyte homing into mesenteric lymph nodes
Mean ± SEM

- p<0.05, ** p<0.01, ***p<0.001, and ****p<0.0001 vs. vehicle by One Way Anova followed by Dunnett’s multiple comparisons
- DATK32 is a mouse surrogate of the α4β7 antibody vedolizumab
MORF-057: Specifically Designed to be Highly Selective for $\alpha_4\beta_7$

- MORF-057 is highly selective for $\alpha_4\beta_7$ over $\alpha_4\beta_1$ in cell adhesion assays in 50% human serum (over 3 orders of magnitude)

- MORF-057 has high selectivity against other integrins in fluorescence polarization assays with purified proteins

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<th>Inhibitor</th>
<th>$\alpha_4\beta_7$ IC$_{50}$ RPMI8866 MADCAM</th>
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<th>Fold selectivity</th>
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Jurkat cell line traditionally used for $\alpha_4\beta_1$

Presented at ECCO’20 Vienna Congress by Jamie Wong, Morphic Therapeutic
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Window of opportunity to alter course of disease

MORF-057 Goal: Oral Vedolizumab

In addition to later-stage treatment, an oral option could intervene much earlier in disease progression.

Aminosalicylate
Oral/Topical Budesonide

Early treatment slows disease progression and prevent damage to the digestive system

Mild

Moderate

Severe

Corticosteroid Immunosuppressant

Anti-TNF+/−IS

Vedolizumab+/−IS

MORF-057

This figure is illustrative and not based on actual data.
IBD: A Complex Disease Exacerbated by Complex Times

MORF-720

Targeting $\alpha_v\beta_6$ to block TGF-\(\beta\)-driving fibrosis in multiple diseases with AbbVie
αₐβ₆: Essential Activator of TGF-β Signaling

Chronic injury → TGF-β activation → Fibrogenesis

Latent TGF-β → Active TGF-β

αₐβ₆
Morphic Oral $\alpha_v\beta_6$ Inhibitor: Strong Support for Mechanism of Action and Design

- MORF-720 delivers dose-dependent reductions in liver fibrosis in mice model
- Shown to stabilize closed conformation of $\alpha_v\beta_6$
- Excellent multi-species PK
- Highly potent and selective

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**COL1A1**
Mean ± SEM

**Total Bilirubin**
Mean ± SEM

- p<0.05, ** p<0.01, ***p<0.001, and ****p<0.0001 vs. vehicle by One Way Anova followed by Dunnett’s multiple comparisons
Morphic Oral Integrin Inhibitor: Activity in Anti-\(\alpha_v\beta_6\) mAb in Collagen Model of Fibrosis

Collagen Deposition in Chronic Liver Fibrosis Model

- Healthy Control
- Disease Control
- Morphic \(\alpha_v\beta_6\) Inhibitor Treated
- Anti-\(\alpha_v\beta_6\) mAb Treated
**Morphic Oral Integrin Inhibitor: Superior in Bilirubin Model of Fibrosis**

* Bilirubin is a marker of liver tissue damage

![Graph showing Total Plasma Bilirubin](image)

- Total Plasma Bilirubin Mean ± SEM

* p<0.05, ** p<0.01, ***p<0.001, and ****p<0.0001 vs. vehicle by One Way Anova followed by Dunnett’s multiple comparisons
Building the Future of Integrin Medicines

Deep specialist expertise across management, Board and Advisors

Well capitalized, partnered and poised to advance oral integrins

Launch  Series A  Series B  abbvie  janssen  IPO  Planned clinical trials in 2020
APPENDIX
Integrins: Conformation is Key to Function

- Integrins shift between an open and closed conformation
- Morphic develops small molecules designed to lock “healthy” integrin conformations in place
- Previous oral integrin inhibitors locked conformation in a “diseased” active state, leading to clinical failures
- This was a key discovery of the Springer Lab that led to the first small molecules targeting conformational change, and the formation of Morphic
Integrin Therapies Are Applicable across a Broad Range of Chronic Diseases

- Abciximab
- Eptifibatide
- Tirofiban
- Natalizumab
- Vedolizumab
- Lifitegrast
- Efalizumab

FY 2018 Sales\(^{(1)}\) $4.6B
- \(\alpha_4\beta_7\) \(\alpha_1\beta_1\)
- \(\alpha_4\beta_1\) \(\alpha_2\beta_1\)
- \(\alpha_5\beta_7\) \(\alpha_10\beta_1\)
- \(\alpha_4\beta_2\) \(\alpha_5\beta_1\)
- \(\alpha_6\beta_2\) \(\alpha_v\beta_8\)

Inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, asthma, dry eye, disease, uveitis, chronic obstructive pulmonary disease

Cancer
- \(\alpha_v\beta_8\) \(\alpha_v\beta_2\)
- \(\alpha_v\beta_8 / \alpha_v\beta_6\) \(\alpha_9\beta_1\)
- pan-\(\alpha_v\) \(\alpha_3\beta_1\)
- \(\alpha_5\beta_1\) \(\alpha_11\beta_1\)

Gastrointestinal cancers, immuno-oncology indications

Metabolic
- \(\alpha_{11}\beta_1\)
- \(\alpha_v\beta_1\)
- \(\alpha_2\beta_1\)
- \(\alpha_3\beta_1\)

Chronic kidney disease, nonalcoholic steatohepatitis, diabetic macular edema

Cardiovascular
- \(\alpha_{11}\beta_3\)
- \(\alpha_5\beta_1\)
- \(\alpha_v\beta_1 / \alpha_v\beta_3 / \alpha_v\beta_5\)

Acute coronary syndrome, pulmonary arterial hypertension

\(\alpha_v\beta_8\) (1) Evaluate Pharma. Combined revenue in respective FY2018.
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April, 2020