Second Quarter 2018
Operating and Financial Results

August 2, 2018

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Acceleron Forward-Looking Statements

THIS PRESENTATION CONTAINS FORWARD-LOOKING STATEMENTS ABOUT THE COMPANY'S STRATEGY, FUTURE PLANS and prospects, including statements regarding the development of the Company's compounds, the timeline for clinical development and regulatory approval of the Company's compounds and the expected timing for reporting of data from ongoing clinical trials. The words "anticipate," "believe," "could," "estimate," "expect," "goal," "intend," "may," "plan," "potential," "project," "should," "target," "will," "would," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

ACTUAL RESULTS COULD DIFFER MATERIALLY FROM THOSE INCLUDED IN THE FORWARD-LOOKING STATEMENTS DUE to various factors, risks and uncertainties, including, but not limited to, that preclinical testing of the Company's compounds and data from clinical trials may not be predictive of the results or success of ongoing or later clinical trials, that the results of any clinical trial may not be predictive of the results or success of other clinical trials of the same product candidate, that the development of the Company's compounds will take longer and/or cost more than planned, that the Company will be unable to successfully complete the clinical development of the Company's compounds, that the Company may be delayed in initiating, enrolling or completing any clinical trials, and that the Company's compounds will not receive regulatory approval or become commercially successful products. These and other risks and uncertainties are identified under the heading "Risk Factors" included in the Company's most recent Annual Report on Form 10-K, and other filings that the Company has made and may make with the SEC in the future.

THE FORWARD-LOOKING STATEMENTS CONTAINED IN THIS PRESENTATION ARE BASED ON MANAGEMENT'S CURRENT views, plans, estimates, assumptions and projections with respect to future events, and the Company does not undertake and specifically disclaims any obligation to update any forward-looking statements.

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Habib Dable
Chief Executive Officer

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Q2 Clinical Program Highlights

Hematology

- ✓ MEDALIST and BELIEVE Topline Results

Neuromuscular

- ✓ ACE-083 Presentations at the AAN Meeting and PNS Meeting from Part 1 of the Phase 2 trials in FSHD and CMT, respectively
- ✓ ACE-083 initiated Part 2 of the Phase 2 trials in patients with FSHD and CMT

Pulmonary

- ✓ PULSAR Phase 2 trial initiated in PAH

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MEDALIST and BELIEVE Phase 3 Topline Results

MEDALIST

Phase 3

Low-to-Intermediate Risk MDS, RS+

N = 229

BELIEVE

Phase 3

β-Thalassemia, Transfusion-Dependent

N = 336

- Luspatercept met all primary and key secondary endpoints
- Data will be submitted to a future medical meeting in late 2018
- Regulatory applications planned in the US and EU in the first half of 2019

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Luspatercept Phase 2 Presentations

2018 ASCO®
ANNUAL MEETING

June 1-5, 2018
McCormick Place | Chicago, IL | #ASCO18

STOCKHOLM
23RD CONGRESS
JUNE 14 - 17 | 2018
European Hematology Association

- Updated results from ongoing Phase 2 trials in MDS and beta-thalassemia
- Multiple patients remain on treatment through 3 years, and continue to sustain clinically meaningful increases in hemoglobin and RBC transfusion reduction

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Additional Luspatercept Trials Planned and Underway

COMMANDS

Phase 3

Lower-Risk MDS, Treatment-Naïve

- On track to start in Q3 2018

BEYOND

Phase 2

β-Thalassemia, Non-Transfusion-Dependent

- Enrolling up to 150 patients

MYELOFIBROSIS

Phase 2

Monotherapy / Combination Therapy

- Enrolling up to 70 patients

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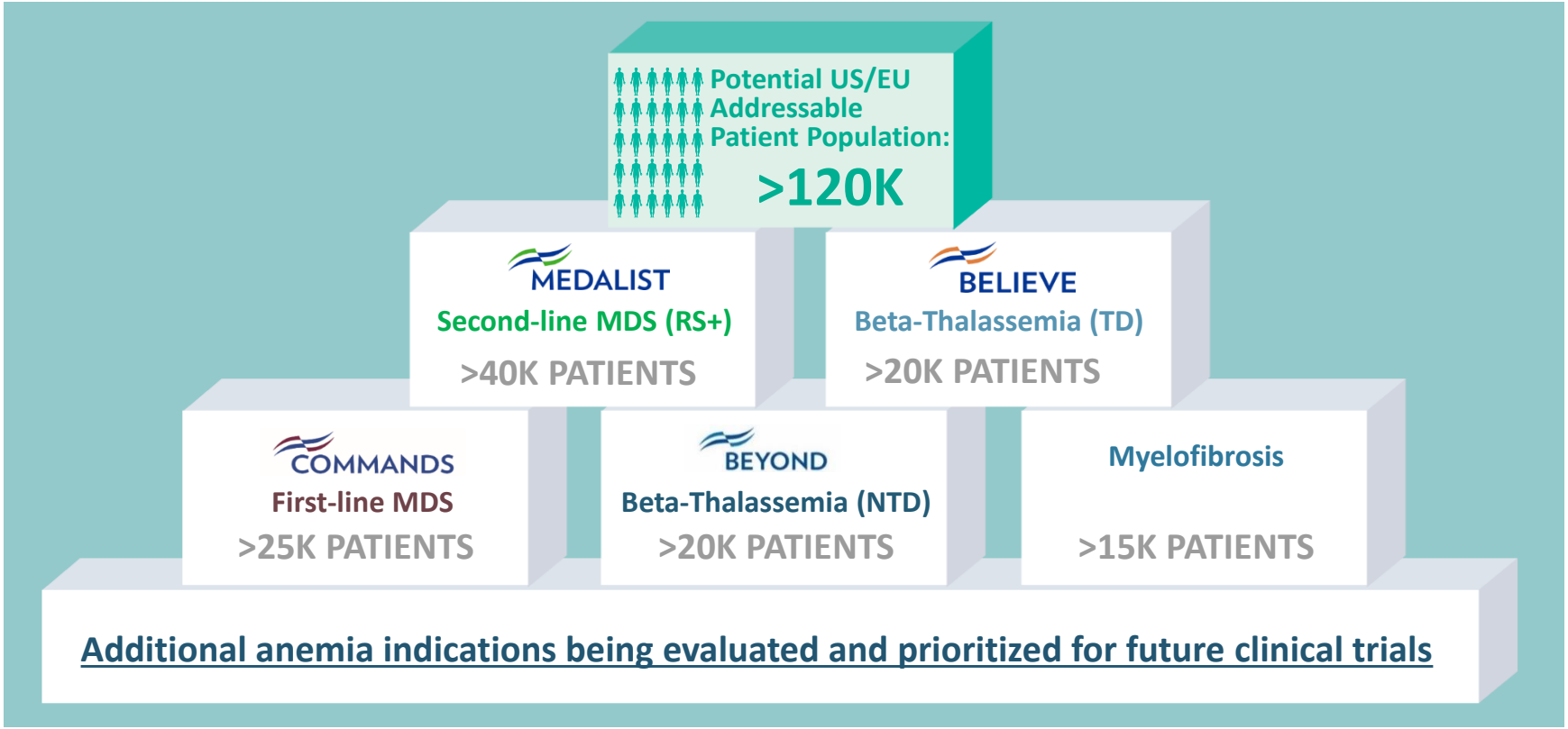
A Potential Platform Treatment for Chronic Anemias



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Robert K. Zeldin, M.D.
Chief Medical Officer

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Neuromuscular: Q2 Highlights

ACE-083

FSHD

- Granted FDA Fast Track status and Orphan Drug designation
- Full Part 1 dose-escalation results expected in October
- Part 2 of the Phase 2 trial is ongoing

CMT

- Presented preliminary results from Part 1 of the Phase 2 trial at the PNS Meeting
- Part 2 of the Phase 2 trial was recently initiated

ACE-2494

- Phase 1 trial in healthy volunteers is ongoing

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Pulmonary: Q2 Highlights

PAH Phase 2 Trial Initiated

PULSAR

6-Month Primary Treatment Period

Enrolling up to 90 patients

Upcoming:

- PAH R&D Deep Dive Event
- Initiate exploratory imaging study

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Kevin McLaughlin
Chief Financial Officer

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Q2 2018 Financial Results

Cash	
Cash, cash equivalents and investments	$332.3M
Revenue	
Collaboration Revenue	$3.7M
Costs, Expenses and Other Income	
Total Costs and Expenses	$33.6M
R&D Expenses	$25.9M
G&A Expenses	$7.7M
Net Loss	
Net Loss	$28.9M

Current cash, cash equivalents and investments provide sufficient funding into **2021**

Note: Numbers may not foot due to rounding

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Upcoming Corporate Priorities

HEMATOLOGY

- **Luspatercept**
  - MEDALIST and BELIEVE Phase 3 data to be presented at major medical meeting by **YE 2018**
  - Planned application submissions to US and EU regulatory authorities in **1H 2019**
  - Initiate the COMMANDS Phase 3 trial in **Q3 2018**

NEUROMUSCULAR

- **ACE-083**
  - FSHD Part 1 of the Phase 2 trial preliminary results from all dose-escalation cohorts in **October 2018**
  - FSHD Part 2 of the Phase 2 trial preliminary results in **2H 2019**
  - CMT Part 2 of the Phase 2 trial preliminary results by **YE 2019**
- **ACE-2494**
  - Phase 1 healthy volunteer trial results in **1H 2019**

PULMONARY

- **Sotatercept**
  - PULSAR Phase 2 trial preliminary results in **1H 2020**
  - Initiate exploratory imaging study in **Q1 2019**

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Q2 2018: Financial Results Q&A Session

Habib Dable	Chief Executive Officer
Robert Zeldin, M.D.	Chief Medical Officer
John Quisel, Ph.D., J.D.	Chief Business Officer
Kevin McLaughlin	Chief Financial Officer
Sujay Kango	Chief Commercial Officer
Todd James, IRC	VP, Investor Relations and Corp. Comm.

THANK YOU

www.acceleronpharma.com
NASDAQ: XLRN