Forward looking statements

This presentation includes forward-looking statements that involve substantial risks and uncertainties. All statements, other than statement of historical facts, included in this presentation are forward-looking statements. Examples of such statements include, but are not limited to, the potential benefits of subcutaneous administration of dalcinonacog alfa (formerly CB 2679d/ISU304) and marzeptacog alfa (activated), the potential for long-term dosing of dalcinonacog alfa to maintain FIX activity in the high-mild hemophilia range, statements relating to Catalyst's clinical trial timelines, including plans for a Phase 2b clinical trial of dalcinonacog alfa, including initiation in the first quarter of 2019 and presentation of data at ISTH, plans for a Phase 3 trial of dalcinonacog alfa, plans for the completion of the ongoing clinical trial of marzeptacog alpha (activated) and presentation of data at EAHAD and ISTH and for a Phase 3 trial of marzeptacog alfa (activated), and the potential market opportunities for these products. Actual results or events could differ materially from the plans and expectations and projections disclosed in these forward-looking statements.

Various important factors could cause actual results or events to differ materially from the forward-looking statements that Catalyst makes, including, but not limited to, the risk that trial initiation or enrollment may be delayed and that ongoing or future trials may not achieve their endpoints, that subsequent clinical trials will not replicate the results from earlier clinical studies on small numbers of patients, that potential adverse effects may arise from the testing or use of Catalyst's products, including the generation of antibodies or inhibitors, the risk that costs required to develop or manufacture Catalyst's products will be higher than anticipated, the risk of competition from other hemophilia treatments, including those in development, Catalyst's ability not to infringe third party intellectual property rights, and other factors described in the “Risk Factors” section of Catalyst’s Quarterly Report on Form 10-Q for the quarter ended September 31, 2018, which was filed with the Securities and Exchange Commission on November 1, 2018. Forward looking statements in this presentation speak only as of the date hereof. Catalyst does not assume any obligation to update any forward-looking statements, except as required by law.
We are working to establish a new standard of care in hemophilia prophylaxis by developing highly potent subcutaneous treatments that improve the quality of life for patients with hemophilia with inhibitors, acquired hemophilia & hemophilia B
Investment highlights

- Novel subcutaneous compounds with orphan drug designation
- Market: $3.4B in annual sales
- FVIIa & FIX SQ efficacy clinically demonstrated
- Experienced team
- ~134 worldwide patents – CBIO retains full ownership of all compounds
- Well funded
- $129 M cash (Q3 2018)
Life with hemophilia

Hemophilia A or B – inhibitors
- A complication in factor replacement therapy that neutralizes the treatment
- 30% of Hem A (FVIII) patients and 5% of Hem B (FIX) patients develop inhibitors
- Patients are at high risk for hemorrhagic stroke and premature mortality

Hemophilia B
- Rare disorder, FIX deficient, mostly inherited but can be caused by a spontaneous mutation
- Causes spontaneous bleeding, mostly into joints, resulting in disabling joint damage

Acquired Hemophilia
- Rare disorder, occurs spontaneously, bleeding caused by anti-FVIII nAbs
- Currently treated with immunosuppressants + IV bypass agents (FVIIa, FEIBA® or Obizur®)
- Unmet need to adequately treat & prevent re-bleeds
In 2017 over 2,400 US and EU5 patients were treated with FVIIa and bypassing agents for hemophilia with inhibitors, acquired hemophilia and factor VII deficiency

**Sources:** WFH Annual Global Survey, GlobalData, Roche, Novo Nordisk, Aptevo, SOBI, Bioverativ. *Hemlibra® had global sales of $58M in 1H 2018

In 2017 over 6,000 US and EU5 hemophilia B patients were treated with recombinant FIX
Available treatments

- Regular intravenous (IV) infusions are necessary to maintain higher clotting levels
- IV treatments are very unpleasant and time-consuming
- Inconvenience affects compliance, outcomes and quality of life
- Especially difficult for pediatric patients & their families
The Catalyst Biosciences solution

Our highly potent solution:

+ Quick & simple subcutaneous injection – allows for self-administration including in pediatric patients
+ Much higher & stable factor levels – keeps patients at safe levels for much longer
The new standard in hemophilia prophylaxis

Patients in high mild range are protected from spontaneous bleeds

- The concept of prophylactic treatment is to keep severe & moderate hemophilia patients in the high mild range
- Our subcutaneous treatment has the ability to build up over time, offering long-term stability in clotting levels

![Graph showing the new standard in hemophilia prophylaxis](catalystbiosciences.com)
### Pipeline

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<th>Hemostasis programs:</th>
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<th>Preclinical</th>
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# Team

**President & CEO**
Nassim Usman, Ph.D.

**Chief Medical Officer**
Howard Levy, M.B.B.Ch., Ph.D., M.M.M.

**Chief Financial Officer**
Fletcher Payne

**SVP, Technical Operations**
Andrew Hetherington, M.B.A.

**VP, Translational Research**
Grant Blouse, Ph.D.

**VP, Business Development**
Jeffrey Landau, M.B.A.

The team members have extensive experience in biotech and hematology, with varying years of experience in the field:

- **26 years in biotech**
- **18 years in hematology**
- **20 years in biotech**
- **12 years in biotech**
- **16 years in biotech**
- **18 years in biotech**

catalystbiosciences.com
December 18th 2018

Dalcinonacog alfa
Dalcninonacog alfa

Dalcinonacog alfa, a novel clinical stage SQ FIX product candidate differentiated from IV market leaders:

+ Simpler, less painful, small dose
+ SQ enhances pharmacokinetics
+ Potential to maintain continuous protective levels
+ Disruptive to all current intravenous products
+ Especially well suited for children

Three point mutations in two loops within the FIX protein:

+ Catalytic activity increased
+ Affinity for activated factor VIII increased
+ Resistance to inhibition by antithrombin improved

Best-in-class high-potency recombinant FIX product

+ 22-fold more potent than BeneFIX in man

Orphan Drug Designation in US & EU
Retrospective immunogenicity assessment

A comprehensive assessment of immunogenicity addressed several key hypotheses

Key Hypotheses Tested

- The DalcA molecule is inherently immunogenic
- Drug product quality or formulation induce ADAs
- HLA and genotype are risk factors
- ISRs increased the risk of ADAs

“Considering our global and regional *in silico* analysis alongside whole protein and peptide *in vitro* experiments … we find the risk that wildtype FIX and therapeutic candidate DalcA will create or contribute to anti-therapeutic immune response to be minimal.”

EpiVax
DalcA has low immunogenicity & should proceed to P2b

Moving forward with dalcinonacog alfa after preclinical immunogenicity risk assessment

- In Silico and in vitro risk is equivalent to that of competitors such as BeneFIX
- Drug product characterization shows DalcA comparable to other rFIX products
- No significant ISRs were observed in a 7d monkey PK/tox study
- Clinical, regulatory and immunology KOLs provided positive opinions
- Back in the clinic: Preclinical immunogenicity profile is similar to commercial FIX products
Dalcinonacog Phase 1/2 open label design

Subcutaneous treatment of hemophilia B

DalcA IV vs BeneFIX IV
Cohort 1 (n=3)
- BeneFIX IV 70 IU/kg
- DalcA IV 70 IU/kg

DalcA IV to SQ crossover ascending dose cohorts 2 - 3
Cohort 2 (n=3)
- DalcA IV 70 IU/kg
- DalcA SQ 70 IU/kg
Cohort 3 (n=3)
- DalcA IV 70 IU/kg
- DalcA SQ 140 IU/kg

DalcA multi-dose SQ
Cohort 5 (n=5)
- DalcA SQ 140 IU/kg
  6 daily-doses

DalcA IV + multi-dose SQ
Cohort 6 (n=2)
- DalcA IV 70 IU/kg
- DalcA SQ 140 IU/kg
  9 daily-doses

3-month interval
Phase 1/2: Cohort 5 & 6 FIX activity results

6/7 patients had trough levels >12%, sufficient to protect against spontaneous joint bleeds
Phase 1/2: Cohort 6 FIX nAb development timeline

Time course of neutralizing antibody development after prior exposure in Cohort 5

![Graph showing the development of neutralizing antibody levels over time](catalystbiosciences.com)
## The DalcA drug product is not inherently immunogenic

### Investigation Hypothesis

<table>
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<th>Conclusion</th>
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<td><strong>In Silico &amp; In vitro Immunogenicity</strong> (Molecule is inherently immunogenic)</td>
<td>Same profile as WT FIX &amp; BeneFIX</td>
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<td><strong>HLA Typing / Immunogenicity</strong> (Certain HLA types increase risk of ADAs)</td>
<td>Restrict genotype &amp; potential at risk HLAs</td>
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<td><strong>DP Quality Characterization</strong> (Drug quality induces ADAs)</td>
<td>Same as BeneFIX &amp; RIXUBIS</td>
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<tr>
<td><strong>DP Formulation Characterization</strong> (Formulation induces ADAs)</td>
<td>No consistent ISRs in NHP 7-day SQ study</td>
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<td><strong>SQ Dosing</strong> (Route of Administration induces ADAs)</td>
<td>No issues with MarzAA with &gt;325 days dosing &amp; Idelvion with 15 exposure days</td>
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## HLA and genotyping

### HLA and genotyping of 7/11 Korean subjects in the P1/2 trial

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+ The two subjects in cohort 6 that developed the nAbs are cousins and have the same genotype
  - Genotype is an Arg to Gln mutation at amino acid -4 (defective propeptide cleavage site)

+ Only common HLA type is DPB1 02:01
Preclinical toolkit for evaluation of immunogenicity

DC T-Cell Assay

T-Cell Proliferation

Effector T-Cell

Antigen Presenting Cell

Designed Peptides

Uptake
Preclinical toolkit for evaluation of immunogenicity

- DC T-Cell Assay
- T-Cell Proliferation
- Effector T-Cell
- Antigen Presenting Cell
- Processing
- Display
- Uptake
- MAPPS Peptide Presentation
- In Silico Analysis

EpiVax
www.proimmune.com
The *in silico* immunogenicity assessment shows low risk

**In Silico immunogenicity risk assessment**

- Overall immunogenicity risk is low and on par with BeneFIX.
- Factor IX protein sequence contains fewer putative Class II T cell epitopes than would be expected in a randomly generated sequence of similar length of -42.54 (BeneFIX -41.65).
- These scores fall in the lower range of the scale, indicating a weak potential for immunogenicity.
DalcA shows a similar *in silico* risk as BeneFIX at R318Y

**In Silico** immunogenicity assessment at the R318Y site

<table>
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<tr>
<th>Frame Start</th>
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<th>Hydrophobicity</th>
<th>DRB1*0101 Z-Score</th>
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DalcA shows a similar risk as BeneFIX at R338E

*In Silico* immunogenicity assessment at the R338E site

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**BeneFIX**

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**DalcA**

**EpiVax**

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DalcA shows a similar risk as BeneFIX at T343R

**In Silico** immunogenicity assessment at the T343R site

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<tr>
<th>Frame Start</th>
<th>AA Sequence</th>
<th>Frame Stop</th>
<th>Hydrophobicity</th>
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**BeneFIX**

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Peptides from DalcA show low immunogenicity risk

% Responding Donors

DC-T cell stimulation: Peptides

+ Overall immunogenicity risk profile for the individual peptides is low and on par with BeneFIX

+ Peptides covered all three amino acid substitutions and selected from *in silico* data

+ Peptides identified in MAPPS experiment have partial or full overlap with tested peptides

- BeneFIX derived peptide
- DalcA derived peptide
- Control peptide or protein
Peptides from DalcA show low immunogenicity risk

**Response Index**

- **R318Y**
  - GRVFHKG8SAVLQLQY
  - GRVFHKGYSALQY
  - HKG8SAVLQLQYLRVP
  - HKGYSALQLQYLRVP
  - WGRVFHKG8SAVLQLQ
  - WGRVFHKGYSALQLQ
  - VDRATC—STKFIY
  - VDRATĆSTKFTIY
  - VPLVRATCBSKTF
  - VPLVRATCBSKT
  - CLRSTKFIYNNMFCAG
  - LSRTKFIYNNMFCAG
  - RSTKFIYNNMFCAG
  - RSTKFIYNNMFCAG
  - STKFIYNNMFCAG
  - STKFBYYNNMFCAG
  - ATCLRSTKFIYNNM
  - ATCLŚSTKFBYYN
  - YLRVLPVRATCBS-
  - YLRVLPVDRATCBS

- **R338E**

- **R338E/T343R**

- **T343R**

**DC-T cell stimulation: Peptides**

- Overall immunogenicity risk profile for the individual peptides is low and on par with BeneFIX
- Peptides covered all three amino acid substitutions and selected from *in silico* data
- Peptides identified in MAPPS experiment have partial or full overlap with tested peptides

- BeneFIX derived peptide
- DalcA derived peptide
- Control peptide or protein

---

Catalyst Biosciences, Inc.

Nasdaq: CBIO

www.proimmune.com

Response Index

0.00 0.25 0.50 0.75 1.00

Index

0 10 20 30 40 50 60 70 80 90 ... Responders
The DalcA drug product shows low immunogenicity risk

Responding Donors

DC-T cell stimulation: Drug Product

- Overall immunogenicity risk profile risk is low and on par with BeneFIX
  - Formulation buffer was at background
- 8/52 responders to DalcA and 5/52 responders to BeneFIX (52/52 responders for both controls)
- No significant HLA association was evident
The DalcA drug product shows low immunogenicity risk

DC-T cell stimulation: Drug Product

+ Overall immunogenicity risk profile risk is low and on par with BeneFIX
  - Formulation buffer was at background
+ Clinical therapeutics with low risk have Response Index values (RI) between 0.1 and 0.4
  - Consistent with range of responses observed for other clinical grade therapeutics with low risk (less than an RI of 0.4)
+ No significant HLA association was evident
Presented peptides are comparable for DalcA & BeneFIX

No peptides identified from Gla domain or EGF 1
Presented peptides are comparable for DalcA & BeneFIX

No peptides identified from Gla domain or EGF 1
Presented peptides are comparable for DalcA & BeneFIX

Overlap HLA-DR

Donors

- Donor presented BeneFIX only
- Donor presented to DalcA only
- Donor presented both DalcA and BeneFIX

Donors:
- D1581
- D1714
- D1837
- D1842
- D1858
- D1863
- D1867
- D1869
- D1871
- D1894
- D1895
- D1896

Peptides:
- TEGYRLAENQKSCEPA
- DVDYVNSTEAETILDN
- TEQKRNVIRIPHINNAINK
- AAINKYNHDIALLELDEPL
- ELDEPLVLYSYVTPICIADK
- IADKEYTNIFLKFGSYVS
- GYSALVLQYLVRPLVDRAT
- ESKFRIYNMNFCAGFH
- AMKGKYGIYTKVSYVN

Donors:
- D1581
- D1714
- D1837
- D1842
- D1858
- D1863
- D1867
- D1869
- D1871
- D1894
- D1895
- D1896
Presented peptides are comparable for DalcA & BeneFIX

### HLA-DP profile

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### Donors

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</table>
Comparable peptide presentation by HLA-DR and HLA-DP

Peptide presentation by HLA-DR

Peptide presentation by HLA-DP
Epitope mapping identified nAb binding to the T343R region

Overview of native western blot analysis

+ Neutralizing antibody epitopes are centered on R338E and T343R

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Consistent ISRs were not observed in the 7-day tox study

Lack of consistent response across sites within an animal and between animals indicate that the monkey model does not show ISRs as recorded in ISU 304 P1/2 trial.

No ISRs were observed in a previous minipig SQ multidose study.

One observed mild ISR in >325 doses of MarzAA in man and no ISRs in a similar NHP study.
DalcA is comparable to BeneFIX & RIXUBIS

Multiple industry standard characterizations performed

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<td>Product Purity</td>
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<td>Biophysical and Structural Properties</td>
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<td>Post Translational Modifications</td>
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<td>Host Cell Impurities</td>
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<tr>
<td>Product and Process Related Impurities</td>
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<tr>
<td>Thermal Stability upon Reconstitution</td>
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Product quality & stability attributes are comparable to marketed rFIX products
What may have led to the development of nAbs?

The DalcA molecule is not inherently immunogenic – What now to consider in the clinic

- The nAbs were associated with the rare genotype and/or certain HLA types
- The nAbs did not cross-react with BeneFIX or RIXUBIS so do not present a safety risk
- The nAbs were a rare event observed early in the trial within a restricted population

Conclusion – Evaluate further safety & efficacy in a Phase 2b trial

+ Broaden the subject population to have a diverse ethnic and genotypic background
+ Exclude the rare genotype of the two subjects who developed nAbs in the P1/2 trial
+ Consider HLA profile and exclude those with HLA types that may be deemed at risk
+ Execute the P2b trial (28 days of dosing) with careful monitoring for development of nAbs
DalcA Phase 2b SQ clinical trial design: DLZ-201

Moving forward with the phase 2b study: DLZ-201

- Enrollment: 6 patients
- Single IV dose followed by 28 day SQ dosing

+ Primary endpoint: Steady state FIX activity level above 12% with daily dosing
+ Secondary endpoints: no inhibitor formation, pharmacokinetics, pharmacodynamics

Initial | 35 min Post-IV | Daily SQ Dosing to Day 28 | Wash-out

DalcA IV 50 IU/kg | DalcA SQ 100 IU/kg

DalcA SQ 100 IU/kg

Daily FIX activity levels measured for 5 days

endpoint achieved with steady state FIX activity levels > 12%
DalcA regulatory next steps

Next steps to Phase 3 & agency approvals

CBIO has obtained the perspective of ex-FDA experts on nAb
+ Proceed with care with Phase 2b in 6 patients
+ Preclinical immunogenicity assessment was comprehensive – no issues identified
  • Complementary on the completeness of CBIO’s investigation of nAb

CBIO received scientific advice from MHRA
+ Additional data (Phase 2b) is needed to assess nAb
+ Global Phase 3 clinical study design:
  • 20 adult patients with Hemophilia B
  • 6 months prophylactic dosing
+ Toxicology package is sufficient

Pre-IND meeting with FDA will be scheduled after completion of the Phase 2b study
Final Phase 3 clinical study design will incorporate EMA, MHRA and FDA guidance
Conclusions on the dalcinonacog alfa program

Moving forward in clinical development after an extensive immunogenicity risk assessment

Preclinical immunogenicity assessment shows that dalcinonacog alfa is equivalent to that of competitors such as BeneFIX

A comprehensive evaluation of the drug product shows comparable quality to marketed rFIX products

KOLs and subject experts agree with the immunogenicity risk assessment and proceeding with the P2b to evaluate the safety and efficacy of dalcinonacog alfa
December 18th 2018

Marzeptacog alfa (activated)
Marzeptacog alfa (activated), a novel clinical stage SQ FVIIa product candidate differentiated from IV market leaders:

+ Simpler, less painful, small dose
+ SQ enhances pharmacokinetics
+ Potential to maintain continuous protective levels
+ Disruptive to current intravenous bypass products
+ Especially well suited for children

Four point mutations within the FVIIa protein

+ Catalytic activity increased

Best-in-class high-potency rFVIIa product

+ 9-fold more potent than NovoSeven RT

Orphan Drug Designation in US
MarzAA phase 2 SQ clinical trial design

Hemophilia with inhibitors: FVIIa

- Open label SQ study with individual dose escalation if needed
- Hemophilia A or B with inhibitors
- Up to 12 adult patients with documented annual bleeding rate (ABR) >12

- Primary endpoint: reduction in annual bleed rate
- Secondary endpoints: safety and tolerability, no inhibitor formation
Subject demographics & disposition

High pre-treatment ABRs reduced to a median of 0

+ 13 subjects have been consented and 9 enrolled (Median ABR 16.25; Range 12.2-27.7)
+ 5 subjects have completed dosing with clinically significant reduction in ABR
+ 4 subjects had no bleeds at their final dose level
+ IV half-life of 3.9 hours was increased to SQ half-life of 13.1 hours
+ No anti-drug antibodies have been detected to date
+ After more than 325 SQ injections, only one injection site reaction of swelling that resolved without sequelae
## Subject demographics & disposition

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<td>26</td>
<td>A</td>
<td>18.3</td>
<td>Fatal unrelated SAE</td>
<td>11%</td>
<td>Fatal unrelated SAE</td>
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<tr>
<td>6430201</td>
<td>29</td>
<td>4.2</td>
<td>27</td>
<td>A</td>
<td>15.9</td>
<td>Zero</td>
<td>12%</td>
<td>Zero</td>
</tr>
<tr>
<td>6430202</td>
<td>35</td>
<td>4.7</td>
<td>35</td>
<td>A</td>
<td>16.6</td>
<td>Zero</td>
<td>11%</td>
<td>Zero</td>
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<tr>
<td>0510101</td>
<td>43</td>
<td>5.5</td>
<td>39</td>
<td>A</td>
<td>22.2</td>
<td>Untreated traumatic hematoma Day 4. ABR 7.3</td>
<td>22%</td>
<td>2%</td>
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<tr>
<td>0510104</td>
<td>31</td>
<td>1.73</td>
<td>31</td>
<td>B</td>
<td>27.7</td>
<td>Dosing</td>
<td>Dosing</td>
<td>Dosing</td>
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<tr>
<td>6430204</td>
<td>18</td>
<td>56</td>
<td>6</td>
<td>A</td>
<td>15.9</td>
<td>Dosing</td>
<td>Dosing</td>
<td>Dosing</td>
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<tr>
<td>6430203</td>
<td>23</td>
<td>4.5</td>
<td>21</td>
<td>A</td>
<td>15.2</td>
<td>Zero</td>
<td>4%</td>
<td>Zero</td>
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<tr>
<td>7100101</td>
<td>23</td>
<td>2.94</td>
<td>19</td>
<td>A</td>
<td>In screening</td>
<td>In screening</td>
<td>In screening</td>
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</tbody>
</table>
MarzAA Phase 2 study interim PK results

FVIIa functional activity after IV or SQ administration
# MarzAA Pharmacokinetics

<table>
<thead>
<tr>
<th>Route</th>
<th>Half-Life alpha (hr)</th>
<th>Half-Life beta (hr)</th>
<th>Mean Residence Time (hr)</th>
<th>Cmax (ng/mL)</th>
<th>Tmax (hr)</th>
<th>$\text{AUC}_{0-t}$ (ng/mL*hr)</th>
<th>$\text{AUC}_{0-inf}$ (ng/mL*hr)</th>
<th>Bioavailability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>1.1 ± 1.2</td>
<td>3.9 ± 1.4</td>
<td>4.5 ± 2.5</td>
<td>309.5 ± 267.0</td>
<td>0.083 ± 1.5</td>
<td>1042.0 ± 410.4</td>
<td>1048.3 ± 497.8</td>
<td>22 ± 25</td>
</tr>
<tr>
<td>Median ± Interquartile Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQ</td>
<td>13.1 ± 12.2</td>
<td>20.6 ± 16.5</td>
<td>22.0 ± 20.3</td>
<td>22.0 ± 20.3</td>
<td>6 ± 3.5</td>
<td>332.5 ± 253.6</td>
<td>411.1 ± 179.5</td>
<td></td>
</tr>
<tr>
<td>Median ± Interquartile Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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</table>
MarzAA reduces annualized bleed rate (ABR)

The width of the red bar represents bleed duration: 1 to 9 days

6-month recorded bleeds

Treatment Period

Follow-up Period

Consent Withdrawn
Dosing
Completed @
60mcg/kg day

3 Day Bleed 16 days post end of dosing

Unrelated SAE @ day 11
Dosing Completed
Dosing Completed
Dosing Completed
Dosing

MarzAA 30 µg/kg & 60 µg/kg
Pre-treatment ABR & ABR during treatment
The average percentage of days of bleeding in the pre-treatment period was 13.2% (standard deviation 6.3%) [median 11.9%]

In the treatment period, these percentages were reduced to 1.9% (standard deviation 3.2%) [median 0.5%]

The analysis of these pairwise differences by a randomization paired t-test yields $p=0.03$ (and $p=0.036$ by Wilcoxon signed-rank test)
Mean First SQ dose PK and trough & 7h post-dose FVIIa

- Part 1b 30 µg/kg
- Daily dosing 30 µg/kg
- Daily dosing 60 µg/kg
Mean First SQ dose PK and trough & 7h post-dose FVIIa level by dose
MarzAA regulatory

Next Steps to Phase 3 & Agency Approvals

MarzAA Phase 3 trial design based on EMA and MHRA feedback
+ An end of Phase 2 meeting with FDA to be scheduled after completing clinical study report

Global Phase 3 clinical study:
+ 20-40 adult patients with Hemophilia
+ 6 Hemophilia B patients
+ 6 months lead in and 6 months treatment
+ The primary end point - significant reduction in ABR and population of patients with zero bleeds

Non-clinical strategy developed with four experts ex CBER reviewers
A PK/PD clinical study will start in 2019 – based on MHRA feedback
Conclusions on the marzeptacog alfa (activated) program

Moving forward in clinical development after clinical proof of concept

Clinical efficacy and tolerability demonstrated

Additional clinical data at EAHAD 2019 and ISTH 2019

Trial guidance obtained from EMA & MHRA, will confirm at FDA end-of-phase 2 in late 2019
December 18th 2018

Financial Information
MarzAA US Revenue Forecast $196M (~$400M Worldwide)

Target Product Profile Strongly Resonates Across Multiple Indications

- **Factor VII Deficiency**
  >50% “very willing” to use MarzAA

- **Hemophilia B Inhibitors**
  >70% “very willing” to use MarzAA

- **Acquired Hemophilia A**
  >75% “very willing” to use MarzAA

- **Hemophilia A Inhibitors**
  ~50% “willing” or “very willing” to use MarzAA

- **$25M**

- **$54M**

- **$57M**

- **$60M**
## Financial information

### Selected data

<table>
<thead>
<tr>
<th>Operating Results</th>
<th>Q3 2018</th>
<th>Q3 YTD</th>
</tr>
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<tbody>
<tr>
<td>Operating Expense</td>
<td>$8.3 M</td>
<td>$22.1 M</td>
</tr>
<tr>
<td>Net Loss</td>
<td>($7.7 M)</td>
<td>($19.2 M)</td>
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<tr>
<td>Net Loss per share</td>
<td>($0.64)</td>
<td>($1.75)</td>
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</table>

<table>
<thead>
<tr>
<th>2018 Forecast</th>
<th>2019 Est.</th>
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</thead>
<tbody>
<tr>
<td>OpEx &gt;$30M</td>
<td>OpEx ~$56M</td>
</tr>
<tr>
<td>Cash ~$120M</td>
<td>Cash Burn ~ $50M</td>
</tr>
</tbody>
</table>

### Share Data

- Common Stock Outstanding: 11,942,729
- Fully Diluted Shares: 14,623,688
- Average Volume: 166,084
- Market Capitalization as of 17 December 2018: $111 M

### Financial Strength

- Cash & Cash Equivalents Q3/2018: $129.2 M
Catalyst / ISU DalcA Collaboration

ISU gains Korean commercial rights, CBIO to pay ISU a fixed low-single-digit royalty

Prior Agreement
+ ISU had a option for first right of refusal on Korean commercial rights and a profit share
+ Catalyst responsible for worldwide development, regulatory and commercialization

Restructured Agreement
+ Catalyst maintains global development, regulatory and ex-Korea commercialization rights
+ ISU granted:
  - Korean commercial rights
  - Up to $19.5M in development, regulatory and sales based milestones
  - Single digit net-sales royalty
  - Option for profit share removed
## Milestones

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<thead>
<tr>
<th></th>
<th>2018</th>
<th>2019</th>
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<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td><strong>MarzAA</strong> (FVIIa)</td>
<td></td>
<td></td>
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<tr>
<td>P2 Initiated</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ISTH Interim P2 data</td>
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<td></td>
</tr>
<tr>
<td>ASH P2 data</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>DalcA</strong> (FIX)</td>
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<tr>
<td>EAHAD Top-line multidose clinical data (oral)</td>
<td>✓</td>
<td></td>
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<tr>
<td>WFH Final Cohort 5 data</td>
<td></td>
<td>✓</td>
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<tr>
<td>Initiate Cohort 6 data</td>
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<tr>
<td>ISTH Phase 1/2 Cohort 6 data</td>
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<tr>
<td><strong>Anti-C3</strong> (dAMD)</td>
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</tbody>
</table>
Summary

**Disruptive approach to a $3.5 billion market**
Subcutaneous prophylactic dosing designed to be less painful and much more convenient, especially for children

- Clinical proof of efficacy demonstrated for both Marzeptacog alfa (activated) & Dalcinonacog alfa

**FVIIa: Marzeptacog alfa (activated)**
~$2.2 Billion market
Phase 2 of a Phase 2/3 program enrolling 90% reduction in ABR on treatment
No ADAs or nAbs observed to date
- Phase 2 data at EAHAD & ISTH 2019
- EoP2 in 2019

**FIX: Dalcinonacog alfa**
~$1.2 billion market
>30% activity levels achieved with daily SQ dosing
Potential to maintain long-term FIX activity in the mild hemophilia range to be explored in P2b
- Initiate Phase 2b in Q1 2019

**Anti-C3 for Dry AMD:**
multi-billion market opportunity
C3 is a clinically validated target, potential to generate a best-in-class molecule
- Pre-clinical proof-of-concept in 2018

**Strong financial position, ~2.5 years cash**
THANK YOU

Nasdaq: CBIO
catalystbiosciences.com