# CATALYST BIOSCIENCES

**Corporate Overview**
**7 February 2020**

CATALYST BIOSCIENCES

# Forward looking statements



This presentation includes forward-looking statements that involve substantial risks and uncertainties. All statements included in this presentation, other than statement of historical facts, are forward-looking statements. Examples of such statements include, but are not limited to, potential markets for MarzAA, DalcA and CB 2782-PEG, potential benefits of subcutaneous dosing, potential use of MarzAA as a subcutaneous therapy for patients with hemophilia A or B with inhibitors and other bleeding disorders, potential use of DalcA as a subcutaneous therapy for patients with hemophilia B, potential benefits of CB 2679d-GT as gene therapy, clinical trial results, plans for a registrational trial for MarzAA in second half of 2020, plans for final Phase 2b clinical trial data for DalcA in the second quarter of 2020, plans for non-human primate data for CB 2679d-GT in the second quarter of 2020, and potential milestone and royalty payments from Biogen. Actual results or events could differ materially from the plans, expectations and projections disclosed in these forward-looking statements.

Various important factors could cause actual results or events to differ materially, including, but not limited to, the risk that additional human trials will not replicate the results from earlier trials or animal studies, that potential adverse effects may arise from the testing or use of MarzAA or DalcA, including the generation of antibodies, which has been observed in patients treated with DalcA, that clinical trials will take longer than anticipated to be completed, that costs required to develop or manufacture the Company's products will be higher than anticipated, that Biogen will discontinue development of CB 2782-PEG, competition and other factors that affect our ability to establish collaborations on commercially reasonable terms and other risks described in the "Risk Factors" section of the Company's quarterly report on Form 10-Q filed with the Securities and Exchange Commission on November 7, 2019, and in other filings with the Securities and Exchange Commission. The Company does not assume any obligation to update any forward-looking statements, except as required by law.

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## Essential Medicines – Superior Outcomes

### Late-Stage Asset

SQ Marzeptacog alfa (activated)
MarzAA (FVIIa)

**Phase 3 Ready**

### Hemophilia

SQ MarzAA

SQ Dalcinonacog alfa – DalcA (FIX)

Factor IX Gene Therapy

Factor Xa

### Complement

IVT Anti-C3
CB 2782-PEG

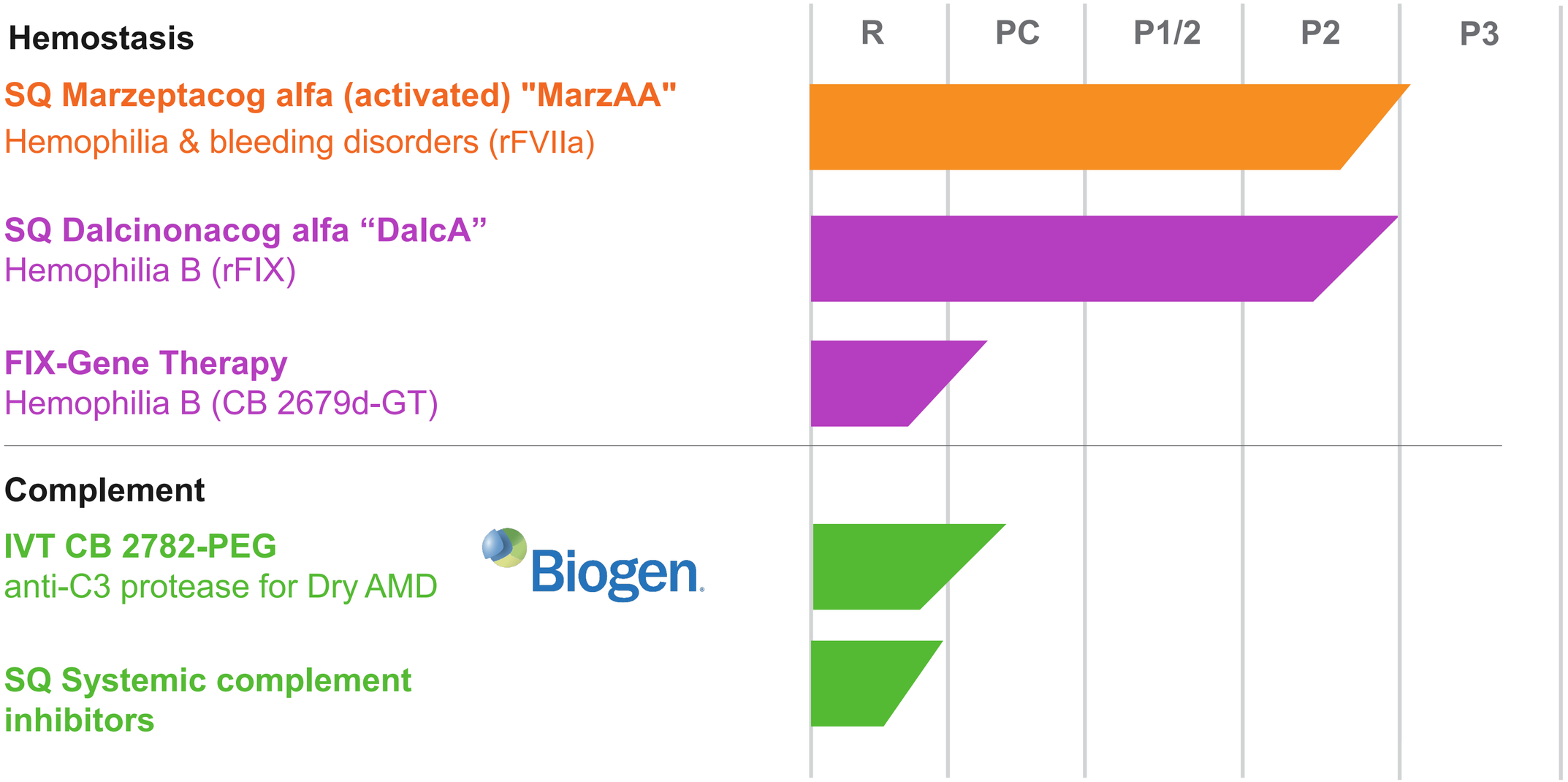
Biogen

SQ Systemic Complement Inhibitors

Protease Engineering Platform

# Pipeline

Nasdaq: CBIO



# Investment highlights

Nasdaq: CBIO


Novel subcutaneous factors with orphan drug designation, MarzAA & DalcA – SQ P2b clinical efficacy demonstrated

Multi-billion-dollar market opportunities

Anti-C3 collaboration with Biogen

SQ systemic complement inhibitors research program

Experienced team

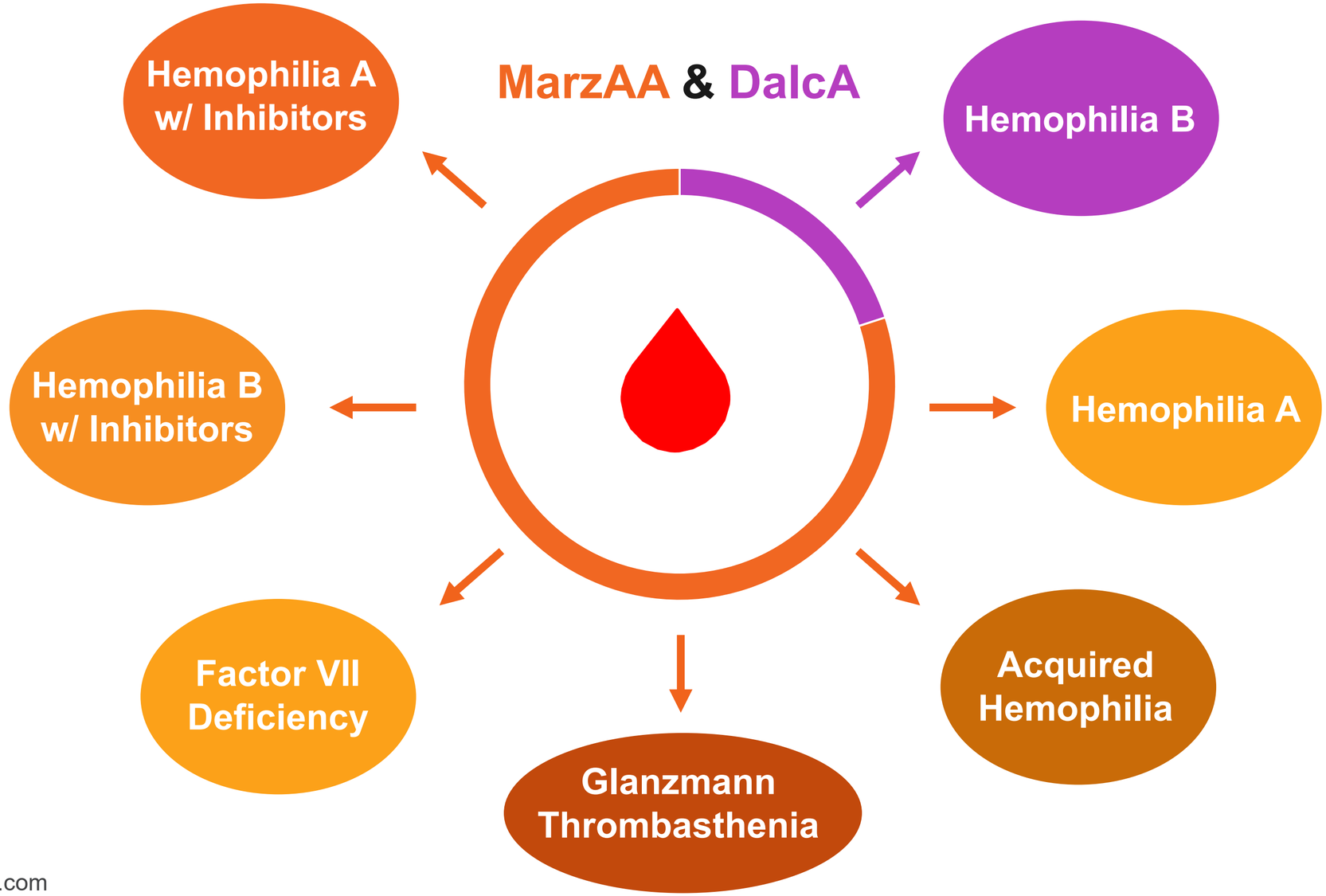
~134 worldwide patents – CBIO retains full ownership of all compounds

Well funded
$85 M cash (Q3 2019)

# Addressing unmet needs in orphan bleeding disorders

Nasdaq: CBIO

## SQ treatment of bleeds and prophylaxis – $3.7B market



# The Catalyst Biosciences subcutaneous solution

Nasdaq: CBIO

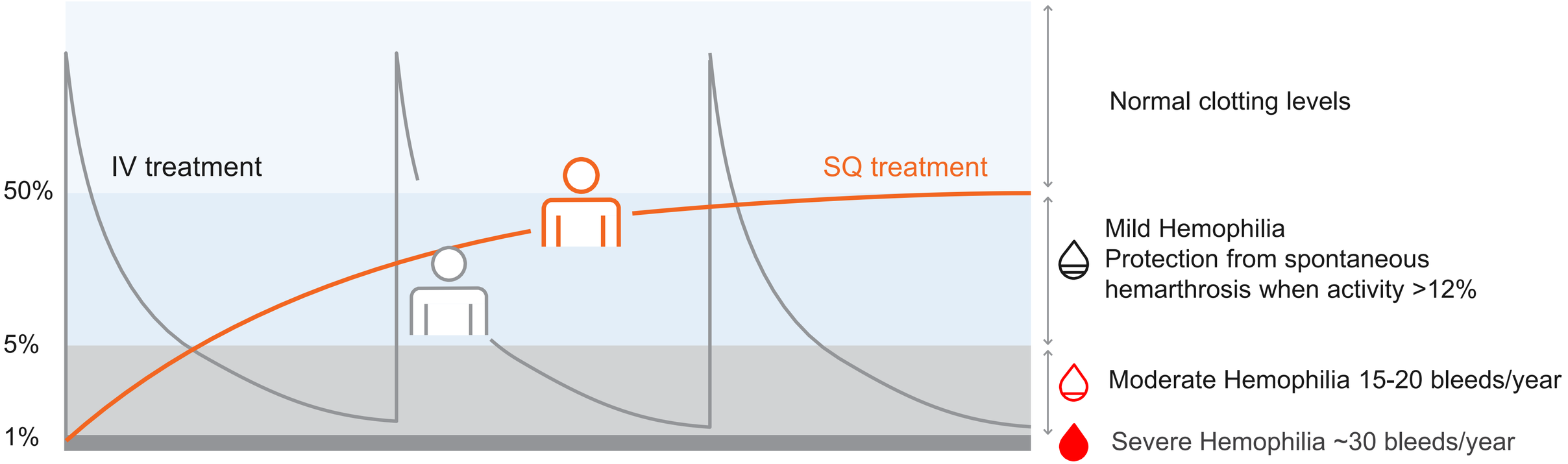
## Our highly potent candidates

+ Quick & simple self-administered SQ injection
+ SQ dosing is the future in hemophilia and other rare hematology indications
+ Ideal for pediatric patients
+ Significantly increases half-life
+ Much higher & more stable factor levels for prophylaxis
+ Enable SQ treatment of bleeding

# The new standard in hemophilia prophylaxis

Nasdaq: CBIO

## Patients in high mild range are protected from spontaneous bleeds




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

# MarzAA is only bypass agent for **both** SQ prophylaxis and SQ treatment of bleeds



## Attractive commercial profile targeting an existing $2.2B bypass agent market

IV NovoSeven ($1.2B 2018 sales) validates rFVIIa in multiple rare bleeding disorders

+ Hemophilia A or B with inhibitors
+ Severe Factor VII Deficiency
+ Glanzmann Thrombasthenia
+ Acquired Hemophilia A

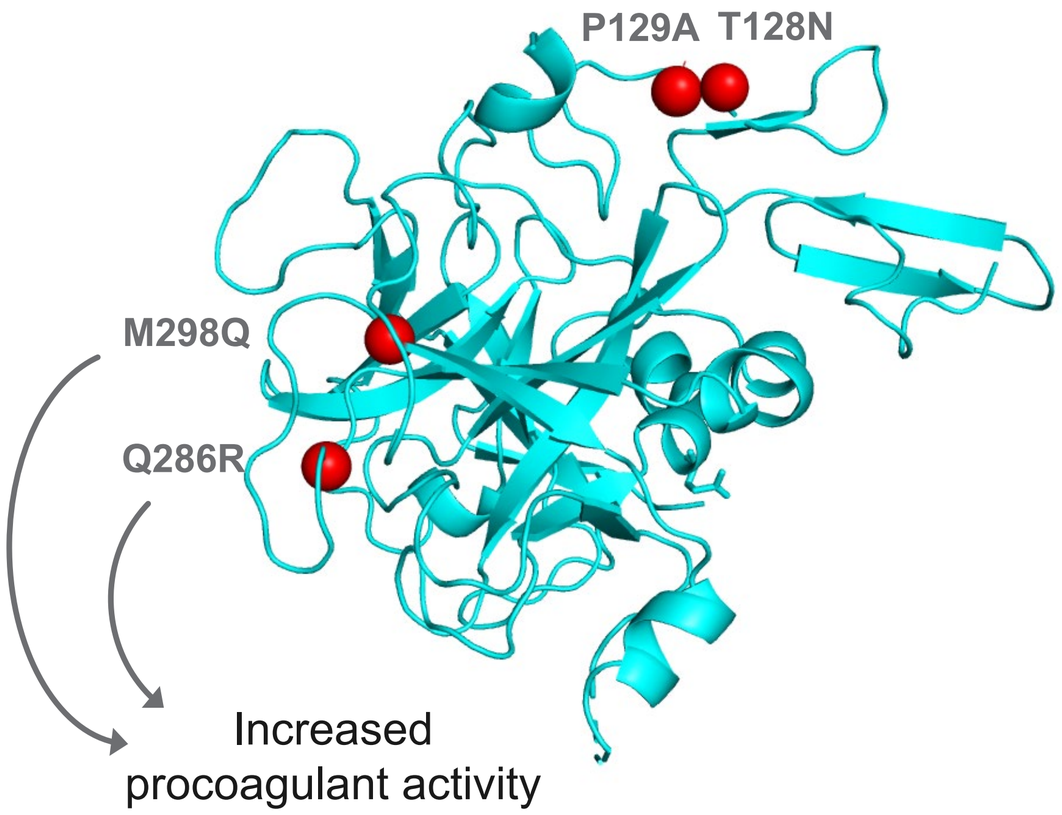
**SQ MarzAA has a superior profile to IV NovoSeven – over 100 clinicians surveyed:**

+ All physicians surveyed indicated a preference for SQ MarzAA over IV N7 in one or more settings
+ SQ MarzAA can create & expand multiple prophylaxis markets

# Marzeptacog alfa (activated): MarzAA rFVIIa



## SQ prophylaxis and SQ treatment of a bleed are clear unmet needs in hemophilia and other bleeding disorders




- Four engineered amino acid substitutions within the FVIIa protein
- 9-fold more potent catalytic activity than NovoSeven RT
- **Allows subcutaneous dosing**
- Half-life prolonged when using subcutaneous dosing

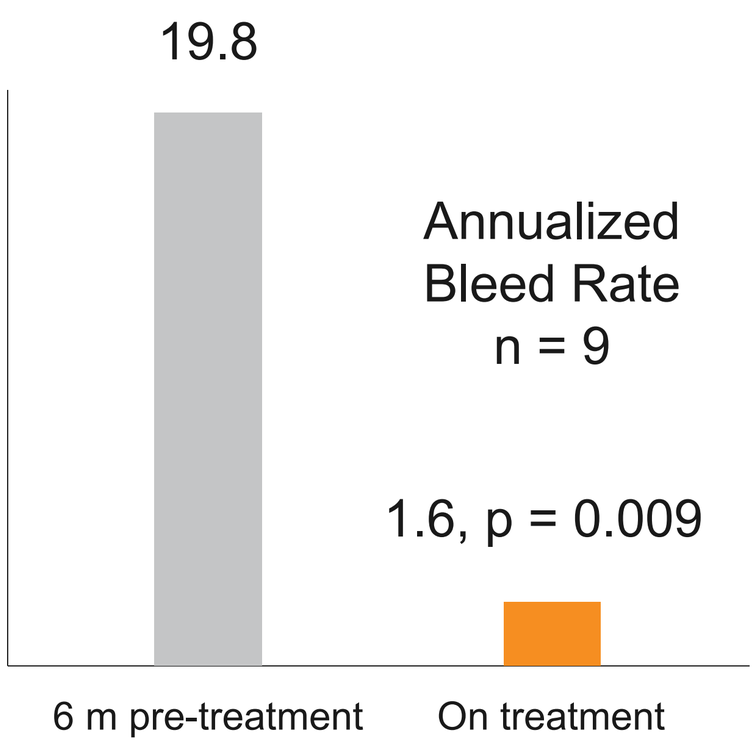
**Orphan Drug Designation**

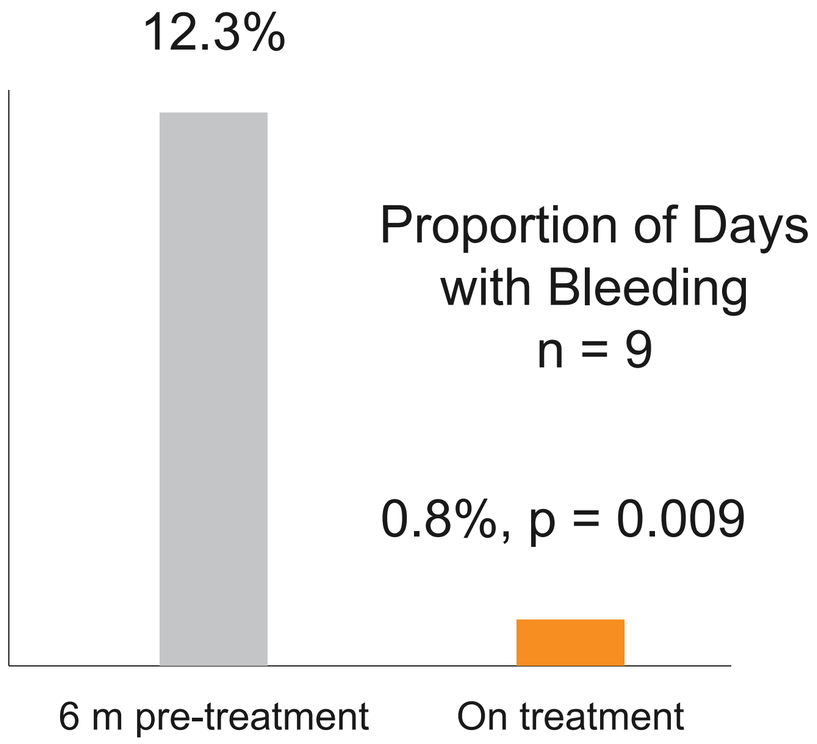
**Granted in the US and EU**

# MarzAA Phase 2 demonstrates clinical efficacy



## Greater than 90% reduction in all bleeding; Median ABR zero; Median bleeding days zero




Mean Annualized Bleeding Rates (ABR) significantly reduced from 19.8 to 1.6

Mean Proportion of Days with Bleeding (PDB) significantly reduced from 12.3% to 0.8%

Safe & well tolerated, ~1% ISRs (6/517 SQ doses) and **no ADAs**

# In a world of SQ prophylaxis:



## Patients need a SQ treatment of a bleed option

Individuals on Hemlibra® need additional treatments

NovoSeven® is safe but is administered IV

FEIBA lacks a safety margin and is administered IV

SQ MarzAA meets the profile for an **Ideal Solution**

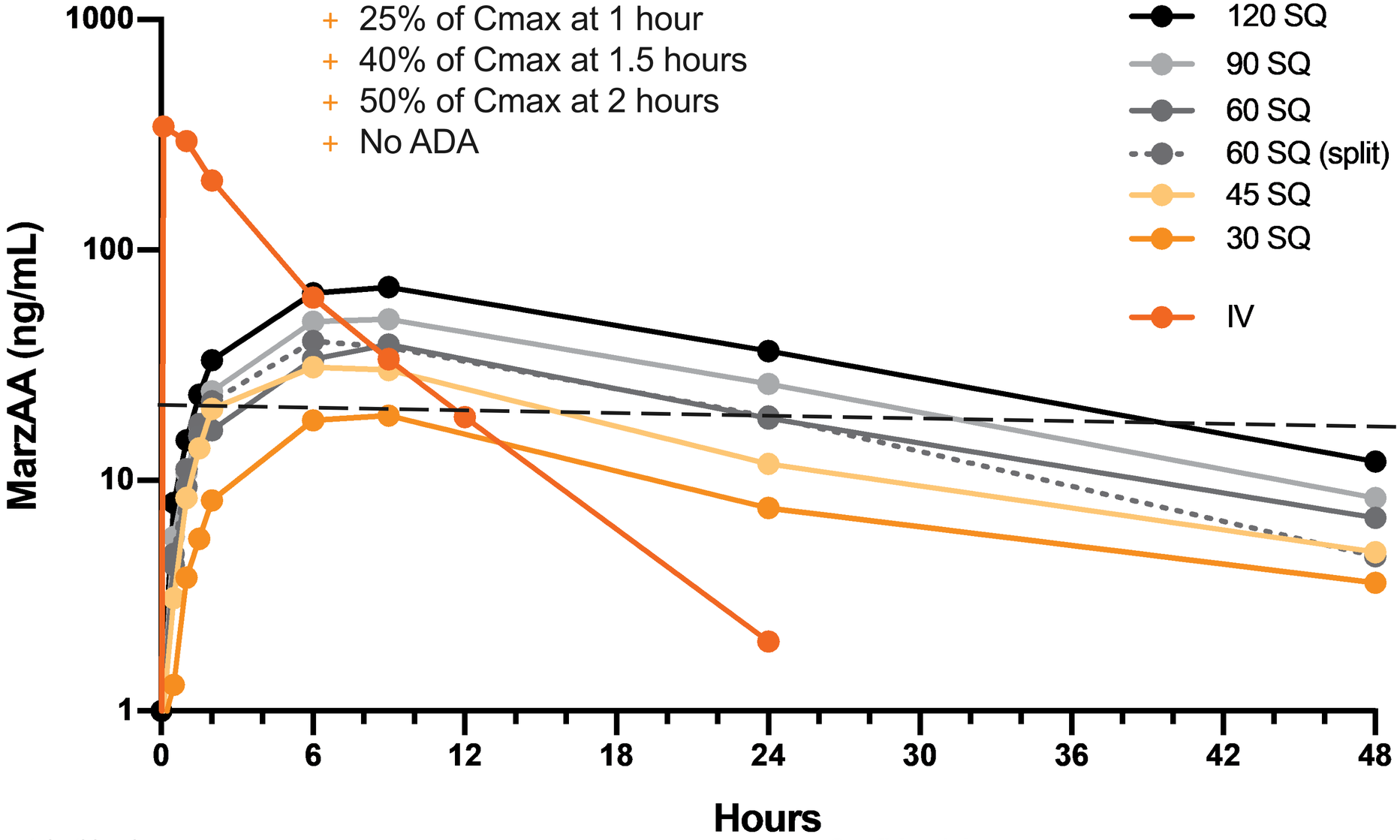
- ✓ Fast & easy to administer
- ✓ Stops bleeding in a validated preclinical model
- ✓ Can be safely combined with Hemlibra

Blouse *et al.* ASH 2019

# MAA-102 PK dose levels supports treatment of a bleed



+ Dose-proportional increases in Cmax and AUC
+ 25% of Cmax at 1 hour
+ 40% of Cmax at 1.5 hours
+ 50% of Cmax at 2 hours
+ No ADA



# Marzeptacog alfa (activated)



## Phase 3 studies to initiate in 2020

- Large commercial opportunity across multiple rare bleeding disorders
- Demonstrated P2 Clinical efficacy & tolerability for prophylaxis indications
- Demonstrated preclinical PoC for SQ treatment of a bleed
- MarzAA can be safely combined with Hemlibra
- SQ dose escalation PK/PD study supports treatment of a bleed – final data in Q2 2020
- P3 guidance from EMA & MHRA received

# Dalcinonacog alfa:  a novel SQ FIX product



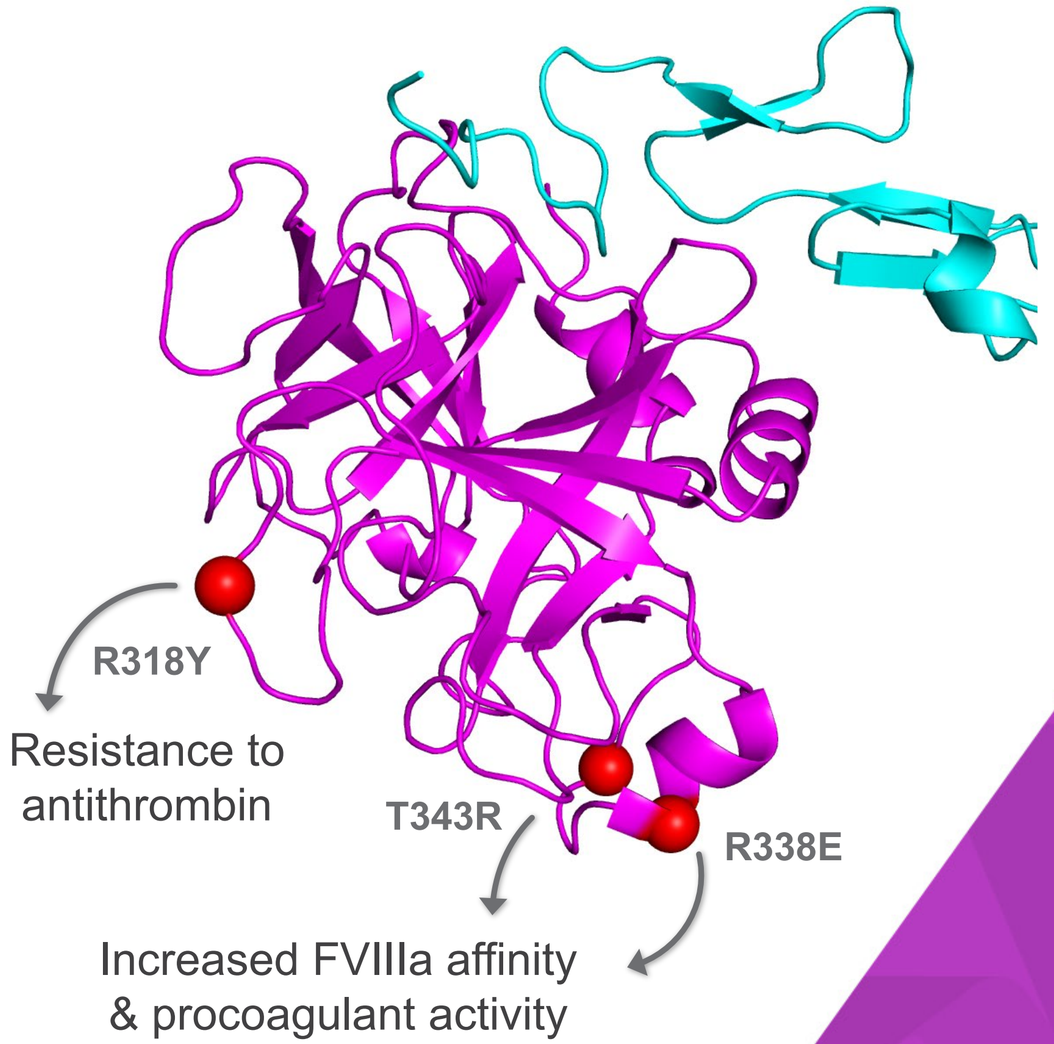
**Three substitutions within the FIX protein:**

+ Increased catalytic activity
+ Higher affinity for FVIIIa
+ Resistance to antithrombin inhibition
+ 22-fold increased potency over BeneFIX

**Differentiated from marketed IV FIXs:**

+ Simple SQ administration
+ Potential to maintain continuous protective levels
+ Small volume injection
+ Enhanced pharmacokinetics with prolonged half-life

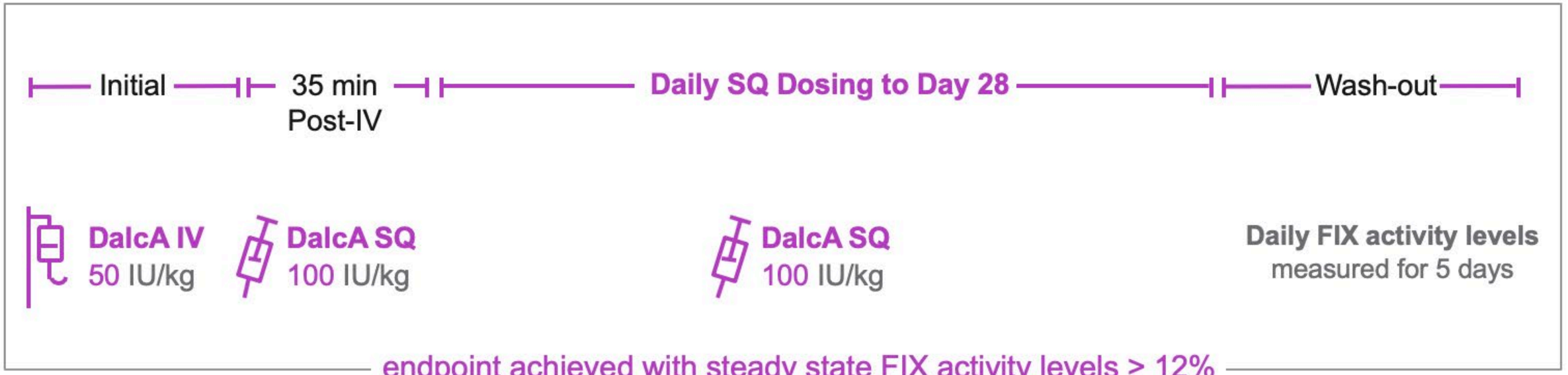
**Orphan Drug Designation in US & EU**



# Dalcinonacog alfa phase 2b SQ clinical trial design

Nasdaq: CBIO

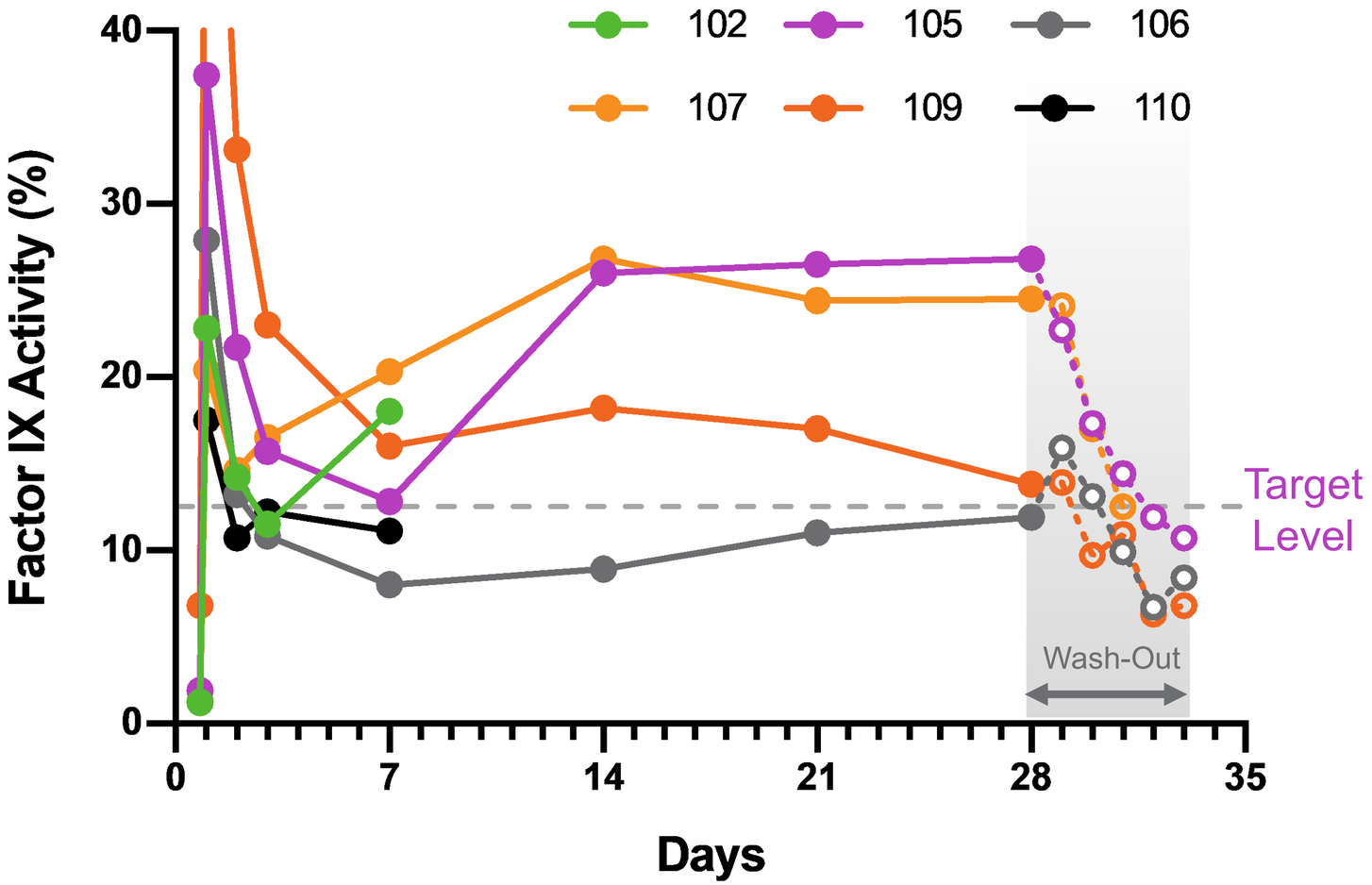
## Enrollment complete




- Primary endpoint: **Steady state FIX activity** level above 12% with daily dosing
- Secondary endpoints: **safety including weekly ADA testing**, pharmacokinetics, pharmacodynamics, bleeding events,
- 10 severe HB patients screened; 6 dosed
- Rare propeptide mutation excluded

# Target levels achieved with 100 IU/kg dosing for 28 Days

Nasdaq: CBIO




## Target FIX >12% Achieved

+ Dosed 6 severe HB subjects
  - 110 continues dosing*
  - 102 withdrew on Day 7
+ **Steady state FIX levels up to 27%** achieved after 14 days
+ Consistent PK profiles
+ Terminal half-life is 70-112 hr
+ **No breakthrough bleeds**
+ **No ADAs**

*Data cutoff 05 Feb 2020

# Conclusions



+ **SQ dalcinonacog alfa provides stable therapeutic levels of Factor IX**
+ **Demonstrates the potential to be an effective prophylaxis treatment for individuals with Haemophilia B**

Trial enrollment complete

Excellent & consistent therapeutic FIX activity levels attained

Prolonged half-life with SQ administration

No SAEs, systemic hypersensitivity, ADAs or nAb to DalcA or wild-type FIX

Mild to moderate ISR’s primarily with initial injections

No bleeding events during treatment demonstrates effective prophylaxis

# FIX gene therapy: CB 2679d-GT for hemophilia B



## CB 2679d-GT in combination with a novel chimeric AAV capsid provides significant improvements

+ Stable high activity levels in a mouse hemophilia B model – **no nAbs**
+ Vector dose reduced 10-fold compared to current constructs
+ Potential for an improved efficacy & safety profile
+ AAV license and sponsored research agreement with Stanford University School of Medicine

## Superior preclinical efficacy of CB 2679d-GT *vs* Padua

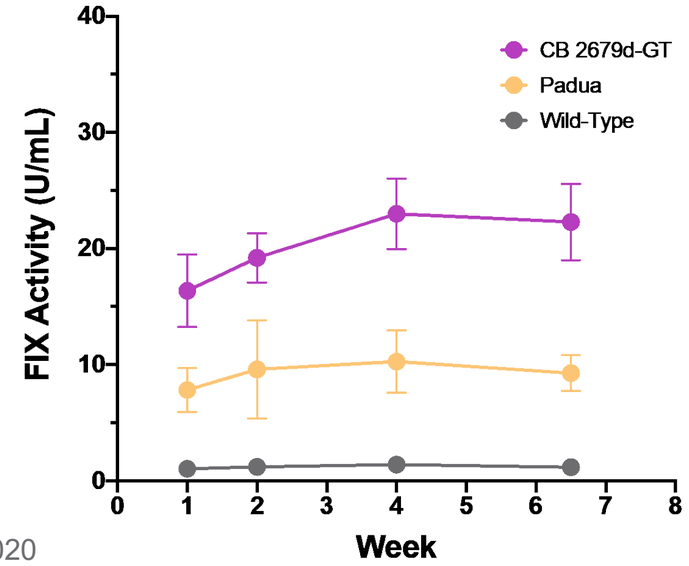
+ 4-5-fold reduction in bleeding time
+ Activity levels elevated throughout the study - **no nAbs**

## Wholly-owned & issued patents covering gene therapy

## The $8x10^{10}$ vg/kg in hemophilia B mice

| FIX Transgene | AAV Capsid | Study Dose (vg/kg) | FIX Activity (U/mL) |
|---|---|---|---|
| **CB 2679d-GT** | **Novel Chimeric** | **$8.0x10^{10}$** | **20** |
| | | | |
| Padua | TAK-748* | $7.4x10^{11}$ | 20 |
| Padua | TAK-748* | $7.4x10^{10}$ | 1 |

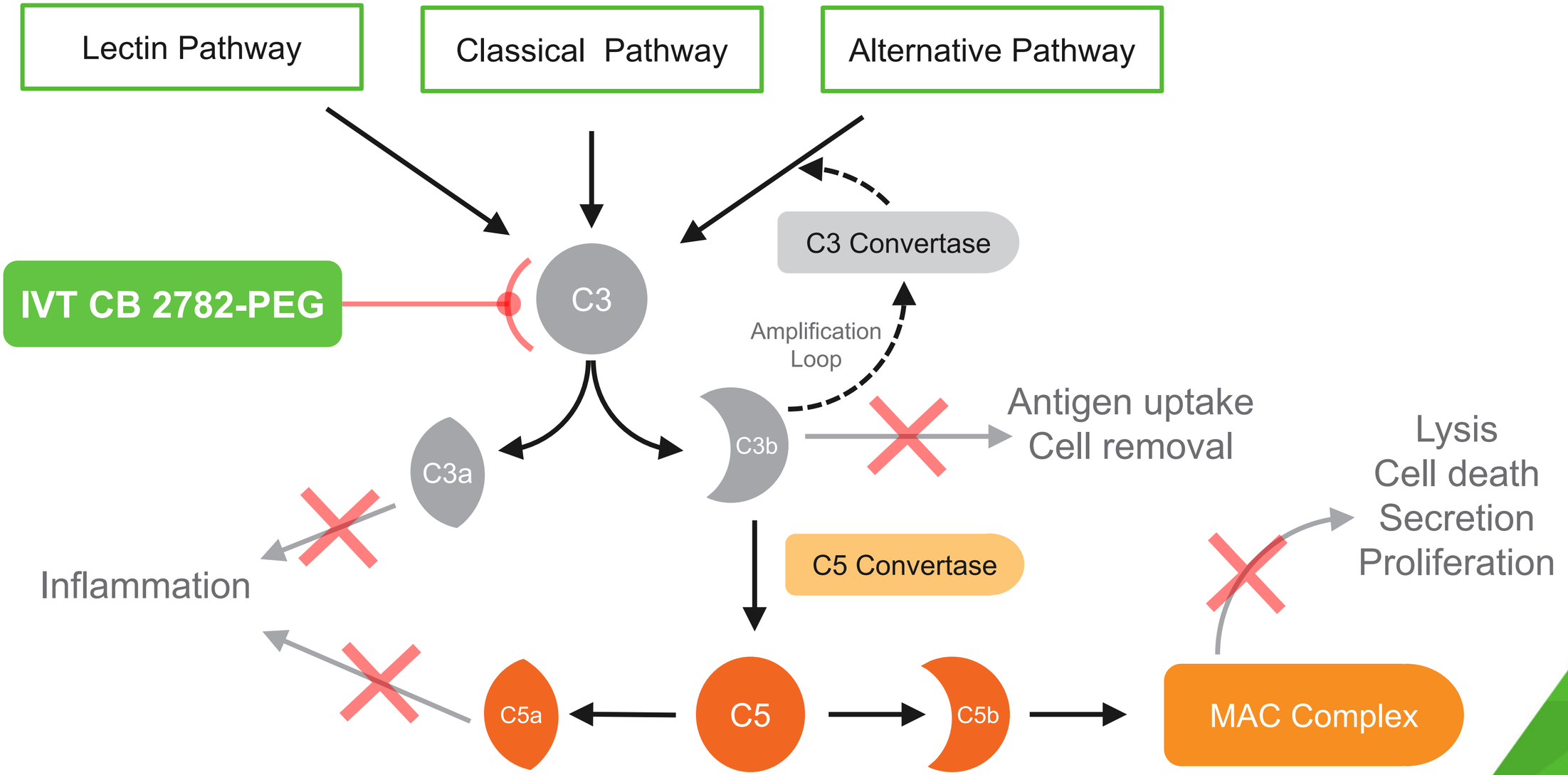
*Weiller *et al.* (2019) *Blood* Vol. 134, Supplement S1 P4633




Blouse *et al.* EAHAD 2020

# Targeting C3 blocks the downstream complement cascade

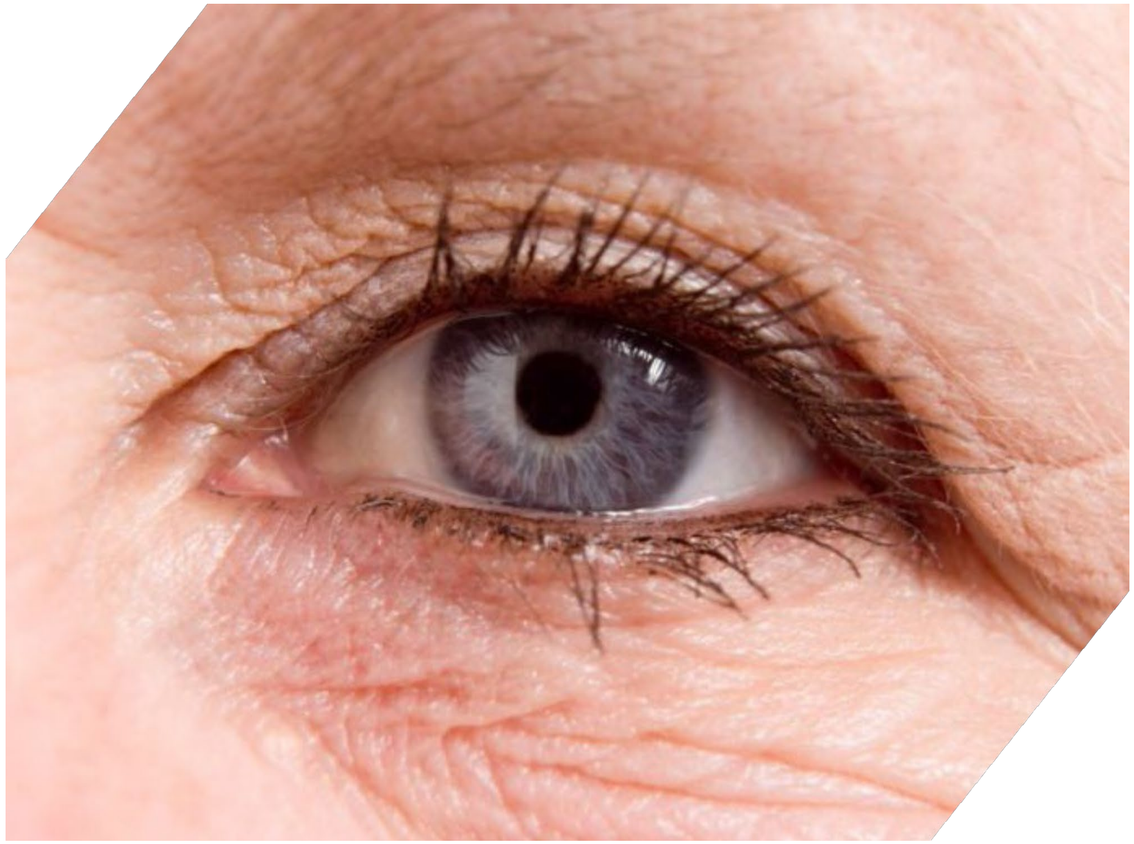




# CB 2782-PEG anti-complement factor 3 (C3) protease

Nasdaq: CBIO

## Geographic Atrophy in Dry AMD



- Geographic atrophy is an advanced stage of dry age-related macular degeneration that results in the irreversible loss of retina and leads to blindness
- Dry AMD affects a million people in the United States and over five million people worldwide
- Global market is estimated at >$5B with no approved drugs
- C3 is the only clinically validated target for the treatment of Dry AMD

Sources: National Eye Institute. Facts About Age-Related Macular Degeneration, Tufail 2015, The Eye Diseases Prevalence Research Group 2004, GlobalData

# CB 2782-PEG long acting anti-C3 protease

Nasdaq: CBIO

## Best-in-class anti-C3 profile for dry AMD

+ Generated from Catalyst's proprietary protease engineering platform
+ Potent, selective and long acting anti-C3 protease that degrades C3 into inactive fragments
+ Preclinical PK & PD data predict best-in-class human intravitreal dosing three or four times a year
+ Dry AMD is a $5B+ market opportunity with no approved drugs

## Biogen Collaboration

+ Announced December 19, 2019
+ $15M upfront, up to $340M in milestones and tiered royalties up to low double digits
+ Catalyst to perform fully funded pre-clinical and manufacturing activities
+ Biogen responsible for IND-enabling activities, worldwide clinical development & commercialization

Biogen®

# Milestones



| | 2019 | Q1 | Q2 | H2 |
|---|---|---|---|---|
| **MarzAA** (FVIIa) | **P2 efficacy** ✓ | EoP2 | ToB enabling PK/PD ✓ | Registration Trial |
| **DalcA** (FIX) | **Positive P2b Interim data** ✓ | P2b Update ✓ | Final P2b data | |
| **CB 2679d-GT** (FIX Gene Therapy) | **Preclinical efficacy** ✓ | NextGen Vector ✓ | NHP Efficacy | |
| **CB 2782-PEG** (dAMD) | **Partnership** Biogen ✓ | | | |

# Financial information

Nasdaq: CBIO

## Selected data

| Financial results | Q3 2019 |
|---|---|
| Cash & Cash Equivalents | $85.0 M |
| Operating Expense (YTD) | $43.3 M |
| Net Loss (YTD) | ($41.6M) |
| Net Loss per share (YTD) | ($3.47) |

### Share data

| | |
|---|---|
| Common Stock Outstanding | 12,029,992 |
| Officer & Director ownership | 7.0% |
| Fully Diluted Shares* | 14,859,051 |

* Includes ~1M options available for issuance

# Team



## President & CEO

**Nassim Usman**, Ph.D.

Massachusetts Institute of Technology · RPI · Sirna Therapeutics · PRINCIPIA

**26** years in biotech

## SVP, Technical Operations

**Andrew Hetherington**, M.B.A.

gsk · BAYER · NOVARTIS

**20** years in biotech

## Chief Medical Officer

**Howard Levy**, M.B.B.Ch., Ph.D., M.M.M.

Sangart · novo nordisk · CSL · Lilly · Inspiration BIOPHARMACEUTICALS

**18** years in hematology

## VP, Translational Research

**Grant Blouse**, Ph.D.

novo nordisk · CATALYST BIOSCIENCES · WAYNE STATE UNIVERSITY SCHOOL OF MEDICINE · AARHUS UNIVERSITY DEPARTMENT OF MOLECULAR BIOLOGY AND GENETICS · Henry Ford HEALTH SYSTEM

**12** years in biotech

## VP, Business Development

**Jeffrey Landau**, M.B.A.

Jazz Pharmac · ONYX PHARMACEUTICALS · Lilly · THRESHOLD PHARMACEUTICALS

**16** years in biotech

# Summary



## Disruptive approach to billion-dollar markets – protease engineering platform

### FVIIa: SQ MarzAA ~$2.2B market

+ P2 efficacy & safety demonstrated
+ P1/2 PK/PD supports ToB
+ FDA EoP2 in early 2020, P3 expected in 2020

### FIX: SQ DalcA >$1.5B market

+ Phase 2b efficacy & safety demonstrated
+ Final Phase 2b data in 2Q 2020

### FIX Gene Therapy: CB 2679d-GT

+ Proprietary preclinical gene therapy asset with superior activity *vs* current clinical constructs

### Anti-C3 dAMD: IVT CB 2782-PEG >$5B market

+ Biogen collaboration
+ $15M upfront, up to $340M in milestones and tiered royalties up to low double digits

### SQ systemic complement inhibitor program

+ Large orphan disease opportunity
+ Builds complement franchise

### Strong financial position

# THANK YOU

**Nasdaq: CBIO**

**catalystbiosciences.com**

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