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

FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d)
of The Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): April 6, 2021

CABALETTA BIO, INC.
(Exact name of Registrant as Specified in its Charter)

Delaware	001-39103	82-1685768
(State or other jurisdiction of incorporation)	(Commission File Number)	(I.R.S. Employer Identification No.)

2929 Arch Street, Suite 600, Philadelphia, PA	19104
(Address of principal executive offices)	(Zip Code)

(267) 759-3100
(Registrant's telephone number, including area code)

Not Applicable
(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common Stock, par value $0.00001 per share	**CABA**	**The Nasdaq Global Select Market**

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

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 13(a) of the Exchange Act. ☐

Item 7.01 Regulation FD Disclosure.

On April 6, 2021, Cabaletta Bio, Inc., a Delaware corporation (the "Company") posted to the "Investors & Media" section of the Company's website at *www.cabalettabio.com* an updated corporate presentation providing a corporate overview and updated development plan (the "Corporate Presentation"). A copy of the Corporate Presentation is attached hereto as Exhibit 99.1 and is incorporated by reference into this Item 7.01 of this Current Report on Form 8-K.

The information contained in Item 7.01 of this Current Report on Form8-K is being furnished and shall not be deemed to be "filed" for the purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liabilities of that section and shall not be incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act, except as shall be expressly set forth by specific reference in such filing.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

99.1 Cabaletta Bio, Inc. Corporate Presentation, dated April 6, 2021.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this report to be signed on its behalf by the undersigned, hereunto duly authorized.

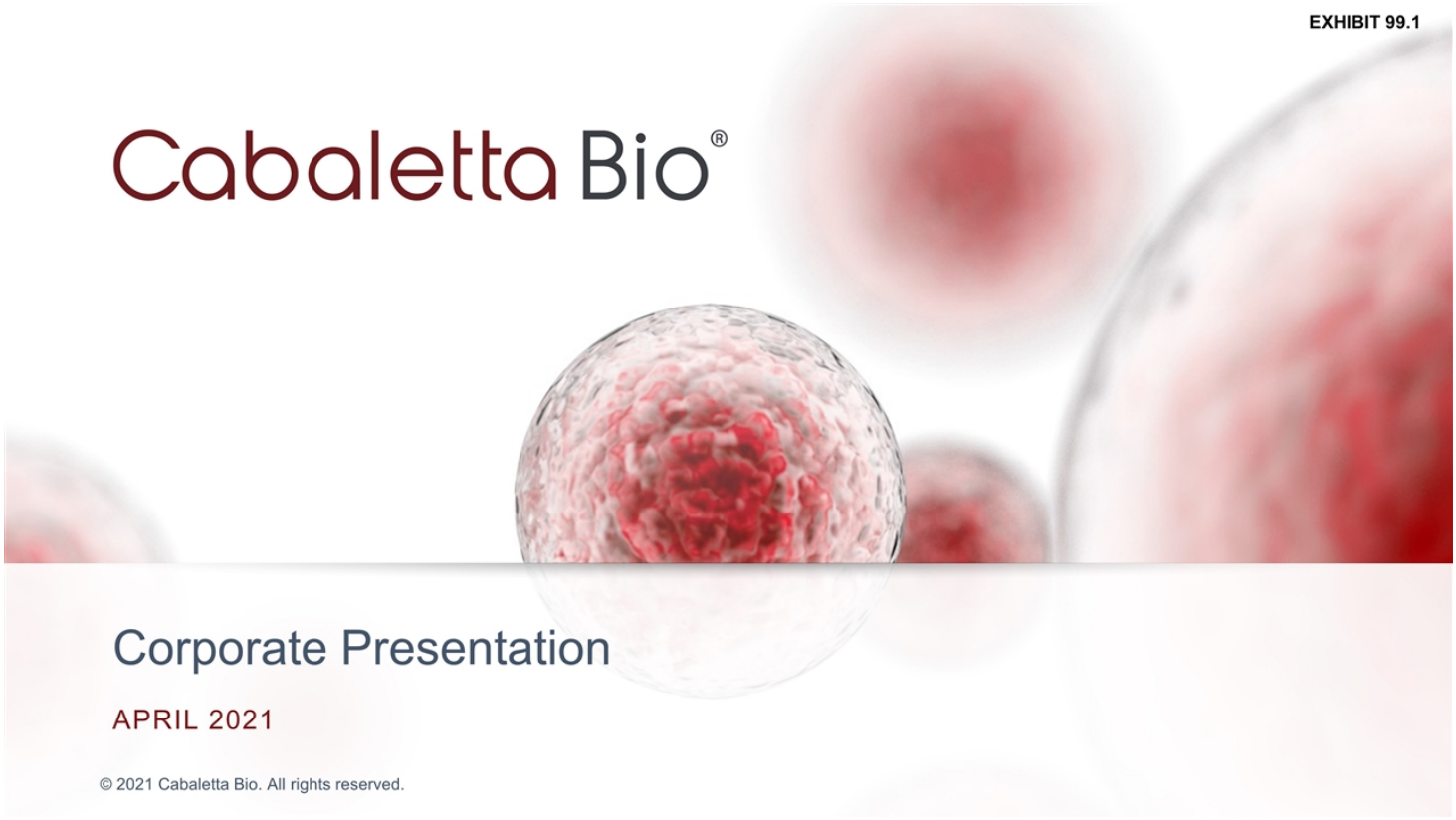
CABALETTA BIO, INC.

Date: April 6, 2021

By: /s/ Steven Nichtberger
Steven Nichtberger, M.D.
President and Chief Executive Officer

EXHIBIT 99.1

Cabaletta Bio®



Corporate Presentation

APRIL 2021

Disclaimer

The following presentation, including any printed or electronic copy of these slides, the talks given by the presenters, the information communicated during any delivery of the presentation and any question and answer session and any document or material distributed at or in connection with the presentation (collectively, the "Presentation") has been prepared by Cabaletta Bio, Inc. ("we," "us," "our," "Cabaletta" or the "Company") and is made for informational purposes only and does not constitute an offer to sell or a solicitation of an offer to buy securities, nor shall there be any sale of any securities in any state or jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state or jurisdiction. This Presentation does not purport to be a prospectus, to be complete or to contain all of the information you may desire. Statements contained herein are made as of the date of this Presentation unless stated otherwise, and neither this Presentation, nor any sale of securities, shall under any circumstances create an implication that the information contained herein is correct as of any time after such date or that information will be updated or revised to reflect information that subsequently becomes available or changes occurring after the date hereof. This Presentation may contain "forward-looking statements" relating to our business, operations, and financial conditions, including, but not limited to, current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, our development plans, our preclinical and clinical results and other future conditions. Words such as, but not limited to, "look forward to," "believe," "expect," "anticipate," "estimate," "intend," "plan," "would," "should" and "could," and similar expressions or words, identify forward-looking statements. Factors which could cause actual results to differ materially from those in the forward-looking statements include, among others, the success, cost, and timing of our product candidate development activities and preclinical studies and clinical trials, our ability to obtain and maintain regulatory approval for our product candidates, our ability to commercialize our product candidates, future agreements with third parties in connection with the development or commercialization of our product candidates, the size and growth potential of the market for our product candidates, our ability to contract with third-party suppliers and manufacturers and our ability to develop internal manufacturing capabilities and facilities, the accuracy of our estimates regarding expenses, future revenue, capital requirements, and needs for additional financing, and our ability to obtain and maintain intellectual property protection for our product candidates. Various risks, uncertainties and assumptions could cause actual results to differ materially from those anticipated or implied in our forward-looking statements. Such risks and uncertainties include, but are not limited to, uncertainties caused by adverse economic conditions, including, without limitation, as a result of extraordinary events or circumstances such as the COVID-19 pandemic, and any business interruptions to our operations or to those of our clinical sites, manufacturers, suppliers, or other vendors resulting from the COVID-19 pandemic or similar public health crisis. New risks and uncertainties may emerge from time to time, and it is not possible to predict all risks and uncertainties. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise. Although we believe the expectations reflected in such forward-looking statements are reasonable, we can give no assurance that such expectations will prove to be correct. Accordingly, you are cautioned not to place undue reliance on these forward-looking statements. No representations or warranties (expressed or implied) are made about the accuracy of any such forward-looking statements. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause our actual results to differ materially from those contained in the forward-looking statements, see the section entitled "Risk Factors" in our 2020 annual report on Form 10-K, as well as discussions of potential risks, uncertainties, and other important factors in our other filings with the Securities and Exchange Commission. Certain information contained in this Presentation relates to or is based on studies, publications, surveys and other data obtained from third-party sources and the Company's own internal estimates and research. While the Company believes these third-party sources to be reliable as of the date of this Presentation, it has not independently verified, and makes no representation as to the adequacy, fairness, accuracy or completeness of, any information obtained from third-party sources. The Company is the owner of various trademarks, trade names and service marks. Certain other trademarks, trade names and service marks appearing in this Presentation are the property of third parties. Solely for convenience, the trademarks and trade names in this Presentation are referred to without the ® and TM symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Cabaletta Bio®

Cabaletta overview

Developing highly specific CAAR T products to treat B cell-mediated autoimmune diseases

- Where there is a biologic opportunity for deep and durable, perhaps curative, responses
- Leveraging a clinically validated CAR T product design and manufacturing process through Penn alliance

Phase 1 DesCAARTes™ trial ongoing for patients with mucosal pemphigus vulgaris (mPV)

- Acute safety data from initial cohort of the DesCAARTes™ trial expected in 1H21 followed by additional cohort data in 2H21[1]
- First patient dosed without observing any dose limiting toxicity (DLT)

Preclinical pipeline led by MuSK-CAART for myasthenia gravis - IND filing planned in 2H21[1]

- Product portfolio[2] currently targeting diseases that affect over 80,000 patients in the US

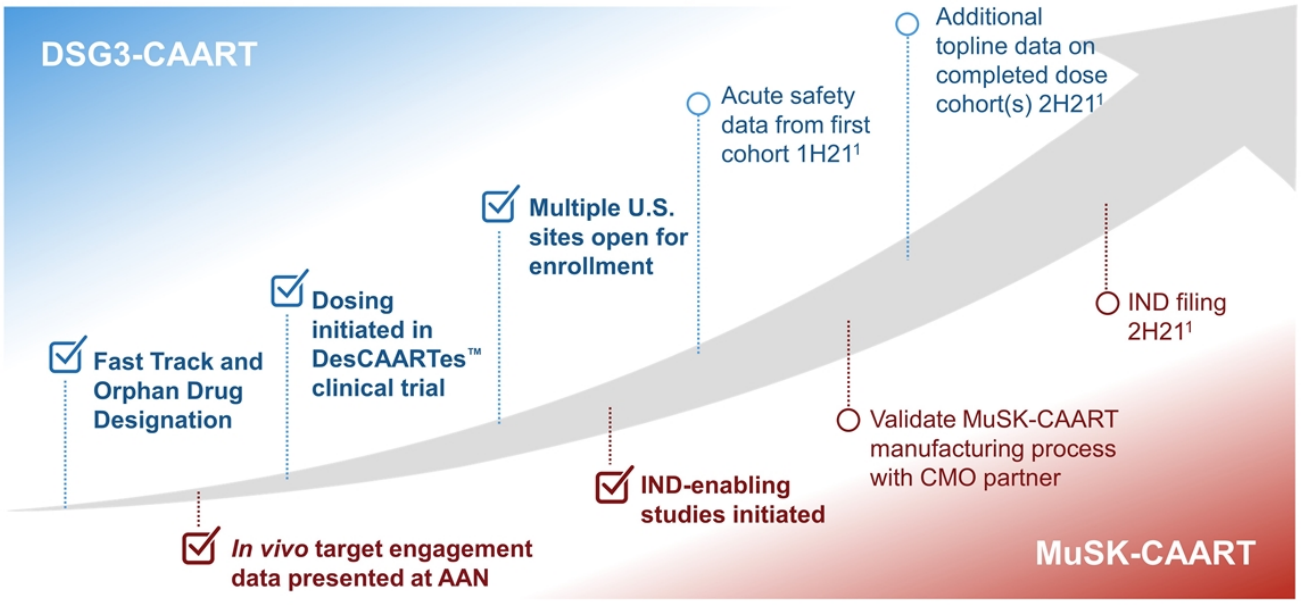
Issued U.S. patent on lead clinical program with emerging differentiated IP portfolio

- First issued CAAR T product patent covers all or any part of the relevant human antigens (DSG3 and DSG1)

Cash runway through at least 3Q22 with $109M in cash and investments as of December 31, 2020

1. Assumes no future impact due to COVID-19.
2. Includes four disclosed product candidates and three undisclosed disease targets in our pipeline through expansion of our Sponsored Research Agreement with the University of Pennsylvania.

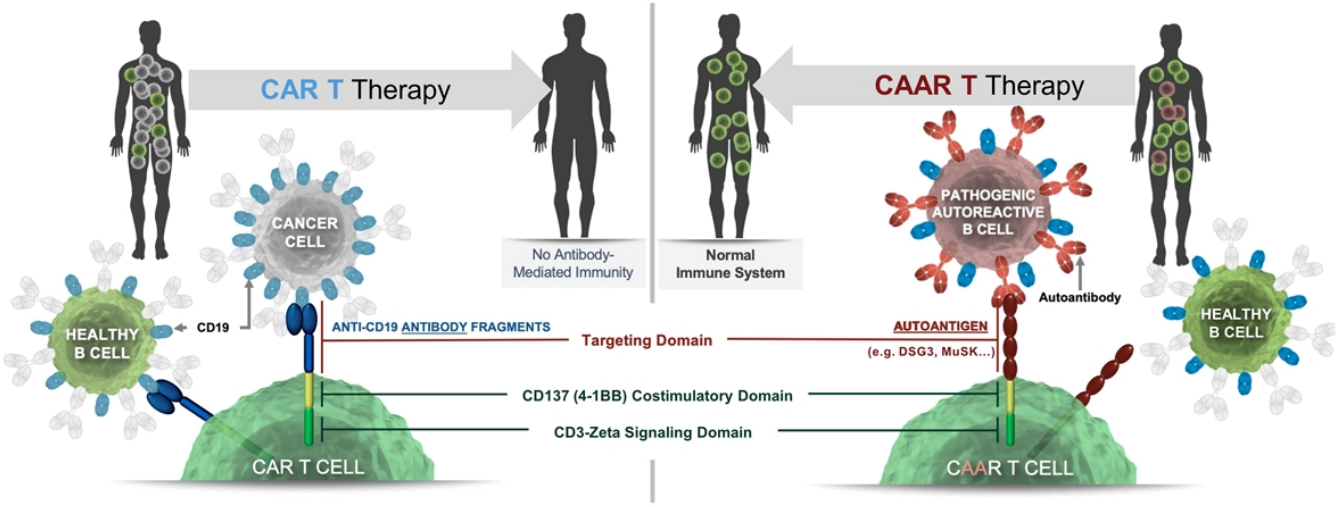
2020 progress and anticipated 2021 milestones



1. Assumes no future impact due to COVID-19.

Our scientific platform leverages clinically validated CAR T technology

CAAR T product candidates are designed for selective and specific elimination of the pathogenic B cells



Chimeric **A**ntigen **R**eceptor **T** cell

Kymriah

Chimeric **A**uto**A**ntibody **R**eceptor **T** cell

CABA CAAR T

CABA™ (Cabaletta Approach for Selective B cell Ablation) platform

Scientific, clinical and commercial assessment

to inform product candidate development

Epitope mapping

to determine regions targeted by autoantibodies

Optimize CAAR construct / design

with the goal of selectively ablating reactive B cells

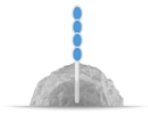
Preclinical *in vitro* and *in vivo* testing

to evaluate efficacy and safety

Vector & Clinical Cell manufacturing

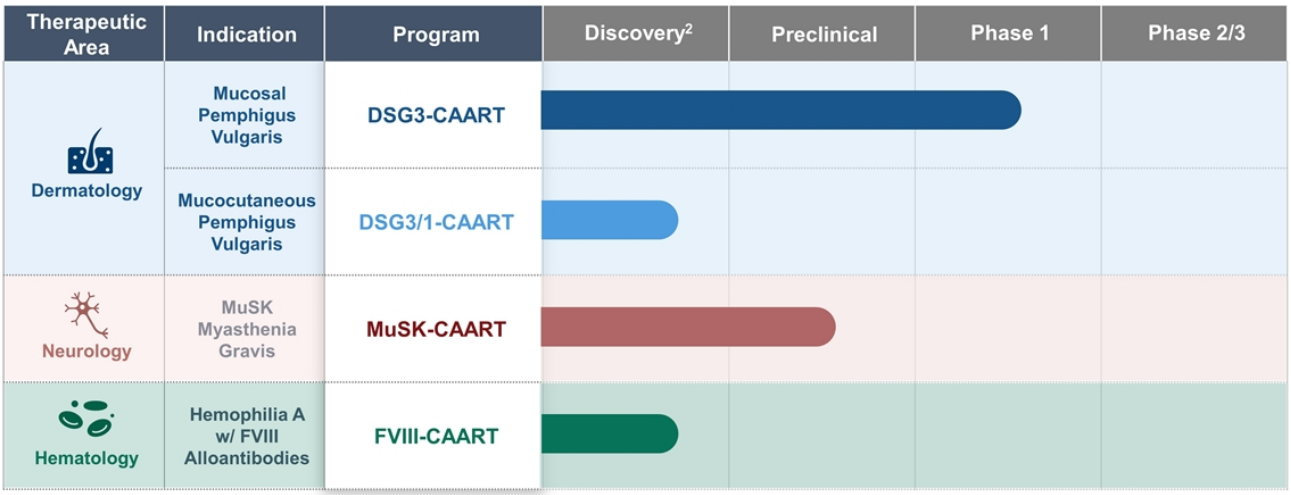
MuSK-CAART

Clinical trials



DSG3-CAART

Pipeline[1] includes multiple disease targets where cure is possible



Current pipeline includes 7 programs targeting diseases affecting >80,000 patients in the US

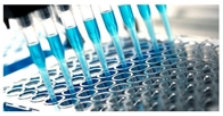
1. Three additional undisclosed disease targets added to our pipeline portfolio through expansion of our Sponsored Research Agreement with the University of Pennsylvania are not shown
2. In our discovery stage, we perform epitope mapping and optimize CAAR construct and design.

Cabaletta Bio®

PV is an optimal lead indication for CAAR T therapy

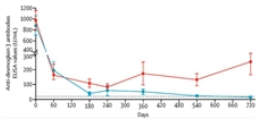
DSG3 antibodies are widely considered to be necessary and sufficient to cause PV[1]

1



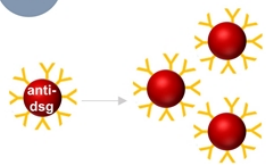
Serum anti-DSG3 **antibodies are 98 - 100% sensitive *and* specific**[2]

2



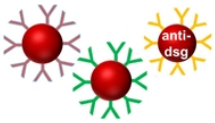
Depletion of B cells by rituximab[3] or antibody by plasmapheresis **transiently improves clinical disease**

3



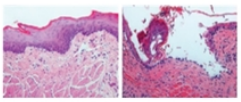
Incomplete B cell depletion by rituximab leads to PV recurrences, with **identical disease-causing B cell clones**[4,5]

4



The B cell repertoire and **antigenic epitopes** on DSG1/3 **are well understood**[6], and formed the basis for DSG3 and DSG1 CAAR designs

5

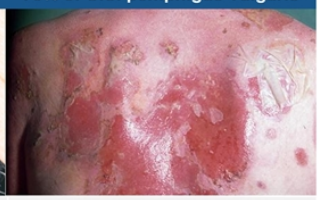


The DSG3 CAAR has **published animal model** proof-of-concept validation[7]

1. Spindler, Volker, et al. "Mechanisms causing loss of keratinocyte cohesion in pemphigus." Journal of Investigative Dermatology 138.1 (2018): 32-37.
2. Schmidt, Enno, et al. "Novel ELISA systems for antibodies to desmoglein 1 and 3." Experimental dermatology 19.5 (2010): 458-463.
3. Joly, Pascal, et al. "First-line rituximab combined with short-term prednisone versus prednisone alone for the treatment of pemphigus (Ritux 3): a prospective, multicentre, parallel-group, open-label randomised trial." The Lancet 389.10083 (2017): 2031-2040.
4. Mouquet, Hugo, et al. "B-cell depletion immunotherapy in pemphigus: effects on cellular and humoral immune responses." Journal of Investigative Dermatology 128.12 (2008): 2859-2869.
5. Hammers, Christoph M., et al. "Persistence of anti-desmoglein 3 IgG+ B-cell clones in pemphigus patients over years." Journal of Investigative Dermatology 135.3 (2015): 742-749.
6. Ohyama, Bungo, et al. "Epitope spreading is rarely found in pemphigus vulgaris by large-scale longitudinal study using desmoglein 2–based swapped molecules." Journal of investigative dermatology 132.4 (2012): 1158-1168.
7. Ellebrecht, Christoph T., et al. "Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease." Science 353.6295 (2016): 179-184.

Overview of Pemphigus Vulgaris

Current treatments require broad immunosuppression associated with safety risks and transient efficacy

	Mucosal PV[1] 25% of U.S. pemphigus vulgaris	Mucocutaneous PV[1] 75% of U.S. pemphigus vulgaris
		
Associated Antibody	**Anti-DSG3**	**Anti-DSG3 + Anti-DSG1**
Clinical Signs	Painful blisters of the mucous membranes (mouth, nose, larynx, esophagus, eyes, genitalia, rectum)	Blisters on orifices and skin
US Disease Prevalence	**3,250 to 4,750**	**9,750 to 14,250**

Current Treatment Landscape

Broad immunosuppression[3,4]

- Modestly effective
- Poorly tolerated

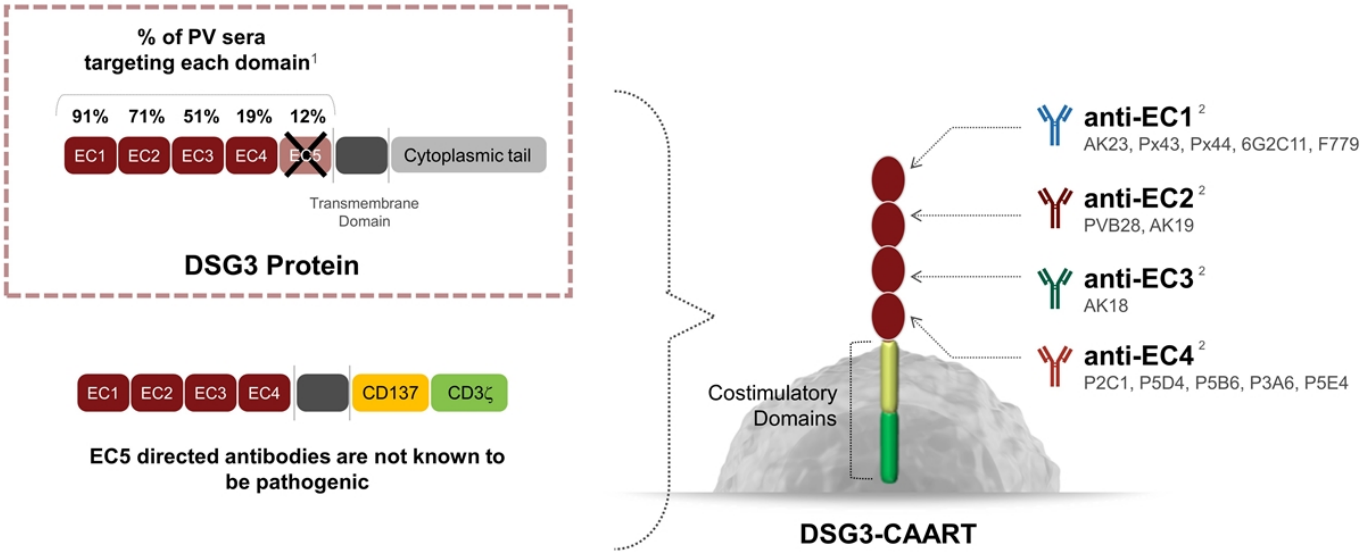
Rituximab plus steroids (~2,800mg/yr)[2]

- Response: ~40% of patients achieved a 16-week period with no lesions or medicines during 1 yr[2]
- 5-9%[2,3] annual risk of severe infection in PV
- Real world data indicate:
  - *Transient* remission ~ 70% CROT[4]:
    - ~30% relapse in 1 year[4]
    - >50% relapse within 2 years[4]
  - ~30% never achieve CROT[4]
  - ~1.9% lifetime risk of fatal infection[5]

CROT = 8+ weeks without lesions while off systemic therapy

1. Image credit: D@nderm.
2. Rituximab label, 08/2020 revision.
3. Joly, Pascal, et al. "First-line rituximab combined with short-term prednisone versus prednisone alone for the treatment of pemphigus (Ritux 3): a prospective, multicentre, parallel-group, open-label randomised trial." The Lancet 389.10083 (2017): 2031-2040.
4. Kushner, Carolyn J., et al. "Factors Associated With Complete Remission After Rituximab Therapy for Pemphigus." JAMA dermatology (2019).
5. Tony, Hans-Peter, et al. "Safety and clinical outcomes of rituximab therapy in patients with different autoimmune diseases: experience from a national registry (GRAID)." Arthritis research & therapy 13.3 (2011): 1-14.

DSG3-CAART encompasses all known pathogenic epitopes



1. Ohyama, Bungo, et al. "Epitope spreading is rarely found in pemphigus vulgaris by large-scale longitudinal study using desmoglein 2–based swapped molecules." Journal of investigative dermatology 132.4 (2012): 1158-1168.
2. Antibodies that target the specific extracellular domain are shown below each extracellular domain.

DSG3-CAART preclinical data[1,2]

No evidence of toxicity at clinically relevant doses with selective and specific target engagement

	INDICATOR	RESULTS
Tolerability	***In vitro* off-target toxicity**	No specific cytotoxicity at clinically relevant cell numbers vs FcγR-expressing cells No confirmed interactions with human membrane proteins
	***In vivo* off-target toxicity**	No off-target effects detected at clinically relevant doses
Target Engagement	**Anti-DSG3 autoantibody titer**	Serologic 'remission' – dose-dependent elimination of anti-DSG3 B cells and antibodies
	CAAR T cell engraftment	Dose-dependent increase in CAAR-positive cells observed via flow cytometry
	Tissue blistering	Histologic 'remission' – no blistering of oral mucosa
	Anti-DSG3 hybridoma outgrowth	Significantly delayed outgrowth despite soluble anti-DSG antibodies

1. Ellebrecht, Christoph T., et al. "Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease." Science 353.6295 (2016): 179-184.
2. Lee, Jinmin, et al. "Antigen-specific B-cell depletion for precision therapy of mucosal pemphigus vulgaris." The Journal of Clinical Investigation (2020).

DesCAARTes™:

Phase 1 clinical trial in mucosal-dominant PV (mPV) patients

Open-label study to determine the maximum tolerated dose & fractionation of DSG3-CAART

Major Inclusion Criteria

- Age: ≥18
- Inadequately managed by standard immunosuppressive therapies
- Confirmed diagnosis
- Active disease
- Anti-DSG3 antibody positive

Major Exclusion Criteria

- Rituximab recently administered
- Prednisone > 0.25mg/kg/day
- Other autoimmune disorder requiring immunosuppressive therapies
- Recent investigational treatment
- ALC < 1,000 at screening

SCREENING PERIOD → **TREATMENT PERIOD** (1-3 WEEKS) → **FOLLOWED** (2-4 WEEKS) → **Next Patient**

Part	Cohort	# Subjects
A – Dose Escalation Fractionated infusion at increasing dose levels	A1-A4	3 (+3) per cohort
B – Dose Consolidation Consolidating selected dose fractions into a single infusion	B1-B2	3 (+3) per cohort
C – Expansion[1] Expanded subject enrollment at final selected dose	C	~12
	Total	**~30 (+18)**

Study Endpoint & Objectives

Primary Endpoint: Adverse Events, including Dose Limiting Toxicity (DLT)

- DLTs include any grade 3 or 4 CRS or neurotoxicity, or any grade 2 CRS or neurotoxicity that failed to improve to ≤ Grade 1 or baseline within 7 days

Secondary Objectives: **DSG3 ELISA titer changes**, rate of/time to/duration of remission, manufacturing success rate, CAAR T expansion/persistence

1. FDA has requested, and the Company has agreed, that we will share data from part A to inform a discussion on the optimal design of part C. According to FDA advice, the submission of part A data is not gating to planned enrollment in part B.

DesCAARTes™ clinical trial assessments and timeframes

Safety assessed acutely (Day 8) and at 3 months, with ability to measure CAAR T engagement by 6 months

Day 8 acute safety data

Monitors for key risks:

- CRS / neurotoxicity
- Impact of soluble antibody
- Other adverse events

Primary safety endpoint at 3 months

Potential for disease flare during planned steroid taper

Target engagement to be assessed by declining anti-DSG3 titers[1,2]

- We believe initial signal would be evidenced by ~20% or more reduction in anti-DSG3 titers, and a more robust decline would be expected with greater target engagement
- Translational program evaluating potential for *in vivo* expansion and threshold dose effect[3,4]

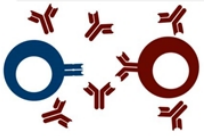
Other key potential efficacy measures[2]

- Disease activity (clinical)
- Steroid / immunosuppressive use

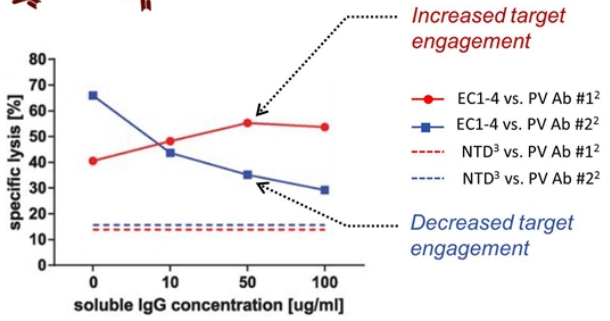
1. Spindler, Volker, et al. "Mechanisms causing loss of keratinocyte cohesion in pemphigus." Journal of Investigative Dermatology 138.1 (2018): 32-37.
2. This information represents data that we believe can be used to inform potential efficacy endpoints in future clinical development.
3. Dasyam, Nathaniel, Philip George, and Robert Weinkove. "Chimeric antigen receptor T-cell therapies: Optimising the dose." British journal of clinical pharmacology 86.9 (2020): 1678-1689.
4. Raje, Noopur, et al. "Anti-BCMA CAR T-cell therapy bb2121 in relapsed or refractory multiple myeloma." New England Journal of Medicine 380.18 (2019): 1726-1737.

Soluble antibodies may alter the dynamics of DSG3-CAART proliferation

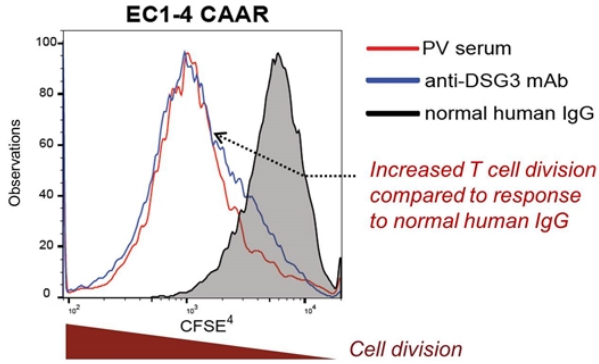
Preclinical studies demonstrated DSG3-CAART target engagement in the presence of soluble antibodies



Inhibitory antibodies may reduce, but do not prevent, DSG3-CAART target engagement



Soluble anti-DSG3 induced CAAR T cell proliferation

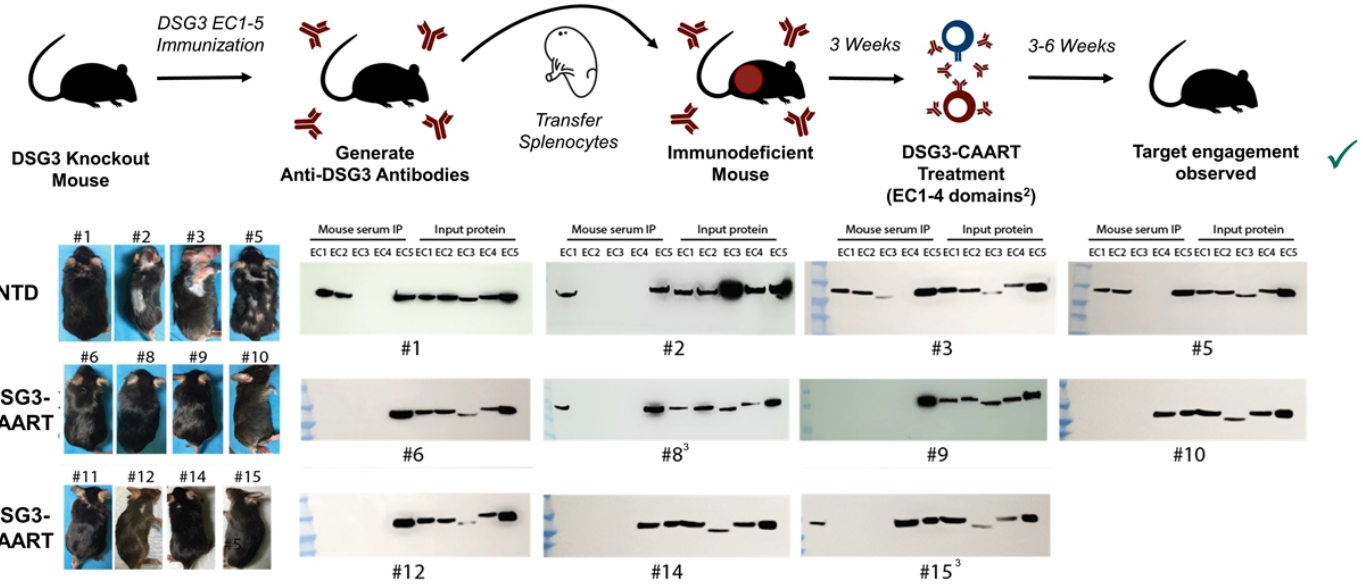


Additionally, in an active immune model, DSG3-CAART demonstrated* in vivo *target engagement in the presence of physiologic DSG3 antibodies[5]

1. Ellebrecht, Christoph T., et al. "Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease." Science 353.6295 (2016): 179-184.
2. Antibodies derived from a hybridoma model.
3. Non-transduced T cell.
4. CFSE (carboxyfluorescein diacetate succinimidyl ester) is a dye used in flow cytometric monitoring that reduces in intensity as it is distributed in actively dividing cells. Non-dividing cells will retain more CFSE dye.
5. Lee, Jinmin, et al. "Antigen-specific B-cell depletion for precision therapy of mucosal pemphigus vulgaris." The Journal of Clinical Investigation (2020).

Active Immune Model: Target engagement despite soluble antibody[1]

DSG3-CAART demonstrated target engagement in presence of physiologic DSG3 antibody titer



1. Lee, Jinmin, et al. "Antigen-specific B-cell depletion for precision therapy of mucosal pemphigus vulgaris." The Journal of Clinical Investigation (2020).
2. The DSG3 protein is made of up of 5 extracellular (EC) domains, EC1-5. Antibodies against EC1-4 can be pathogenic, but antibodies against EC5 are not. Therefore, antibodies against EC5 are not targeted by the CAAR by design.
3. In this model, the human DSG3-CAART product is rapidly rejected. In these two animals, an incomplete response against EC1 was observed, which correlated with loss of persistence.

Preconditioning regimens in CAAR T cell therapy may not be required

Past successes in HIV and multiple myeloma without preconditioning plus differences in patient populations are relevant[1,2]

- Data suggest preconditioning may not be necessary beyond leukemia / lymphoma
  - Similar efficacy at 10x cell dose increase without lymphodepletion in multiple myeloma[1]
  - Over a decade of persistence of CAR T cells in patients with HIV[2]
- Potential activating effect of soluble antibody is a key consideration in autoimmune patients[3]
- Rationale for preconditioning in oncology may not apply to autoimmune patients, such as[4,5]:
  - Tumor "debulking"
  - Removal of suppressor or regulatory cells
  - Modification of the tumor microenvironment

1. Cohen, Adam D., et al. "B cell maturation antigen–specific CAR T cells are clinically active in multiple myeloma." The Journal of Clinical Investigation 129.6 (2019).
2. Scholler, John, et al. "Decade-long safety and function of retroviral-modified chimeric antigen receptor T cells." Science translational medicine 4.132 (2012): 132ra53-132ra53.
3. Ellebrecht, Christoph T., et al. "Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease." Science 353.6295 (2016): 179-184.
4. Gattinoni et al. "Removal of homeostatic cytokine sinks by lymphodepletion enhances the efficacy of adoptively transferred tumor specific CD8+ T cells." The Journal of Experimental Medicine 202(7):907 912
5. Wang, Shu and Plautz "Host lymphodepletion augments T cell adoptive immunotherapy through enhanced intratumoral proliferation of effector cells": Cancer Research 65(20):9547 54.

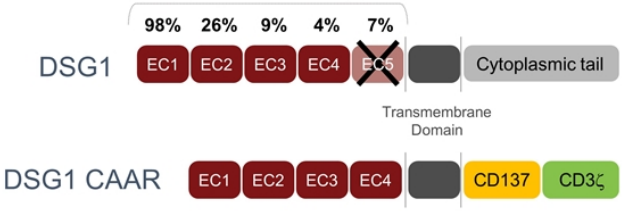
DSG3/1 CAART for mucocutaneous PV (mcPV)

Plan to potentially submit an IND after review of safety and target engagement data from DSG3-CAART

DSG3/1 CAARs designed for mcPV

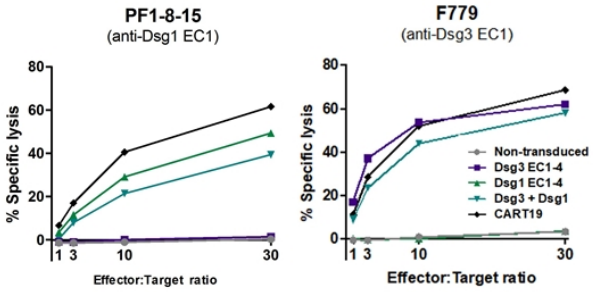
- DSG3 and DSG1 autoantibodies
- Most severe and common form of PV (~75%)
- Mucosal blistering, plus skin erosion and blistering
- Managed with immune suppression, similar to mPV
  - High risk of relapse
  - Potential for hospitalizations and fatal infections

% of PV sera targeting each domain[1]



DSG1-CAART and DSG3-CAART both demonstrated specific cytotoxicity *in vitro*[2]

- Together, DSG1-CAART and DSG3-CAART demonstrated cytotoxicity towards anti-DSG3 and anti-DSG1 B cells



1. Ohyama, Bungo, et al. "Epitope spreading is rarely found in pemphigus vulgaris by large-scale longitudinal study using desmoglein 2–based swapped molecules." Journal of investigative dermatology 132.4 (2012): 1158-1168.
2. As presented at the 2018 International Investigative Dermatology conference.

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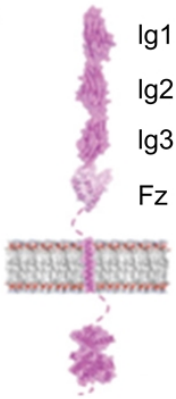
High unmet need in MuSK myasthenia gravis; a valuable CAAR target

All known extracellular domains can be included in the CAAR design

Similarities to pemphigus support clinical potential of CAAR T in MuSK MG

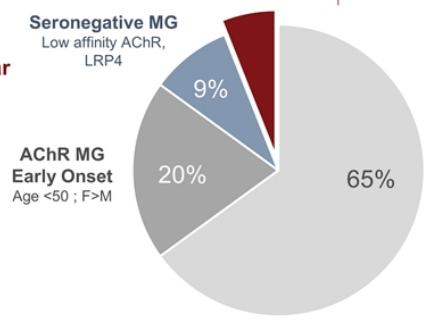
1. Autoantibody titers drop after rituximab[1,2]
2. Pathogenic B cells are incompletely eliminated by rituximab and persist during relapse[3]



MuSK has similar modular structure and size as DSG3

MuSK MG
6.0 - 7.5%

- Typically more severe
- Limited treatment options
- Early onset – 7:1 females

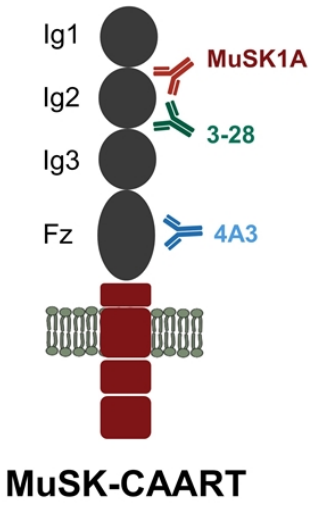


Total US MG Prevalence: 50,000 to 80,000 patients

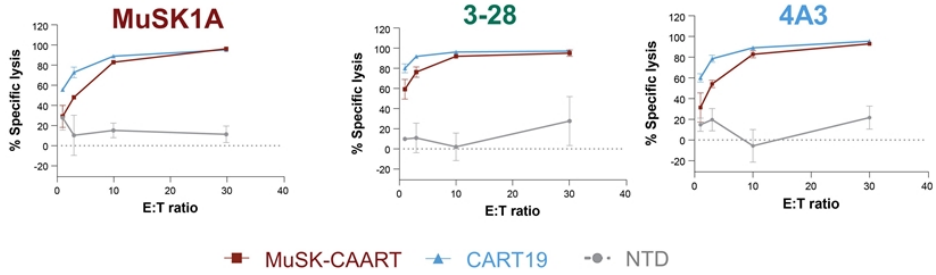
1. Hain, Berit, et al. "Successful treatment of MuSK antibody–positive myasthenia gravis with rituximab." Muscle & Nerve: Official Journal of the American Association of Electrodiagnostic Medicine 33.4 (2006): 575-580.
2. Illa, Isabel, et al. "Sustained response to Rituximab in anti-AChR and anti-MuSK positive Myasthenia Gravis patients." Journal of neuroimmunology 201 (2008): 90-94.
3. Jiang, Ruoyi, et al. "Single-cell repertoire tracing identifies rituximab-resistant B cells during myasthenia gravis relapses." JCI insight 5.14 (2020).

MuSK-CAART showed *in vitro* selective & specific target engagement[1]

Additional *in vitro* studies demonstrated no confirmed off-target toxicity observed with MuSK-CAART to date



MuSK-CAART



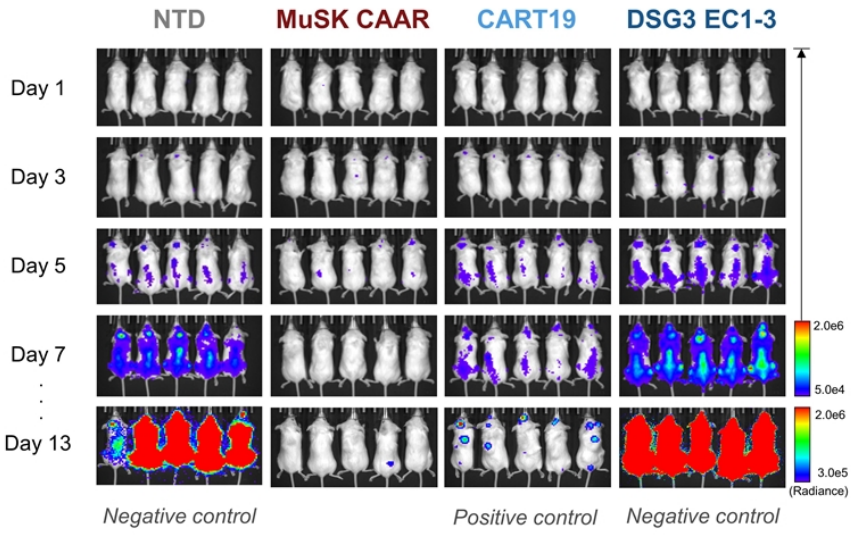
Human membrane protein array (MPA) with MuSK-CAART

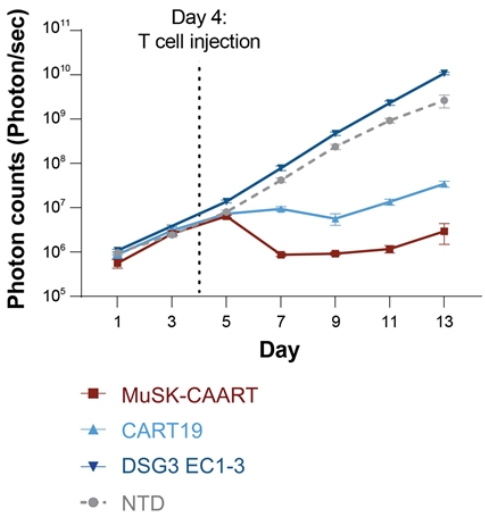
- No off-target toxicity observed *in vitro*
  - ~6,000 human membrane proteins evaluated

1. https://cslide-us.ctimeetingtech.com/aan2020/attendee/eposter/poster/2402?q=payne.

MuSK-CAART demonstrated specific *in vivo* target engagement[1]

MuSK-CAART eliminated anti-MuSK target cells[2] in an animal model where CART19 cells were a positive control





1. https://cslide-us.ctimeetingtech.com/aan2020/attendee/eposter/poster/2402?q=payne.
2. Target cells represent a B cell tumor line (CD19 positive) that has been modified to express the anti-MuSK antibody.

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Manufacturing strategy

Three-stage approach allows for efficient allocation of capital while leveraging experienced partners

Stage 1: Penn DSG3-CAART Phase 1[1]	**Stage 2:** CDMOs & CABA Process MuSK-CAART Phase 1	**Stage 3:** Cabaletta Facility Commercialization & Scale-Up
2019 –	2021 –	Data-gated investment
Penn; Children's Hospital of Philadelphia	brammer bio; OxfordBioMedica; WuXi AppTec	Cabaletta Bio™
• Cell processing capacity secured through Penn partnership • SOPs previously used to develop an FDA approved product • Clinical vector validated	• CDMOs for vector and cell processing with commercial support capabilities	• Build out Cabaletta-owned manufacturing facility

1. Penn-sponsored CD19 CAR IND CMC data has been cross-referenced in DSG3-CAART IND to provide additional data reflecting alignment.

Parallel steps in manufacturing process[1] for CAR T vs CAAR T

Vector production and cell processing are key risks mitigated by strategy, partnership, process and people

Utilizing a clinically validated CART19 cell manufacturing process mitigates risks

- Cross referenced Penn CART19 IND including CMC process[1]
- Penn process, not Novartis process, avoiding Kymriah release challenges[2]
- Engineering runs have demonstrated efficient manufacture of DSG3-CAART cells from PV patients[3]

Multiple runs contractually secured each month at Penn

- Subject to future COVID-19 impact

DSG3 vector supply validated and secured

1. Penn-sponsored CD19 CAR IND CMC data has been cross-referenced in DSG3-CAART IND to provide additional data.
2. Manufacturing challenges were due to release specifications: https://www.biopharmadive.com/news/novartis-hits-car-t-manufacturing-snag-as-kymriah-sales-disappoint/528202/.
3. T cells isolated from patients with a range of treatment regimens of low to high intensity were tested; the highest intensity regimen and patients with ALC<1000 cells/uL expanded less well and will be excluded from the trial design.

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Leadership team

LEADERSHIP TEAM

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Anticipated 2021 milestones

DSG3-CAART: DesCAARTes™ Clincal Trial

- **1H21: Acute safety data from 1st cohort[1]**
- **2H21: Additional topline data on completed dose cohort(s)[1]**

MuSK-CAART

- **Validate manufacturing process with CMO partner**
- **2H21: MuSK-CAART IND filing**

1. Assumes no future impact due to COVID-19.

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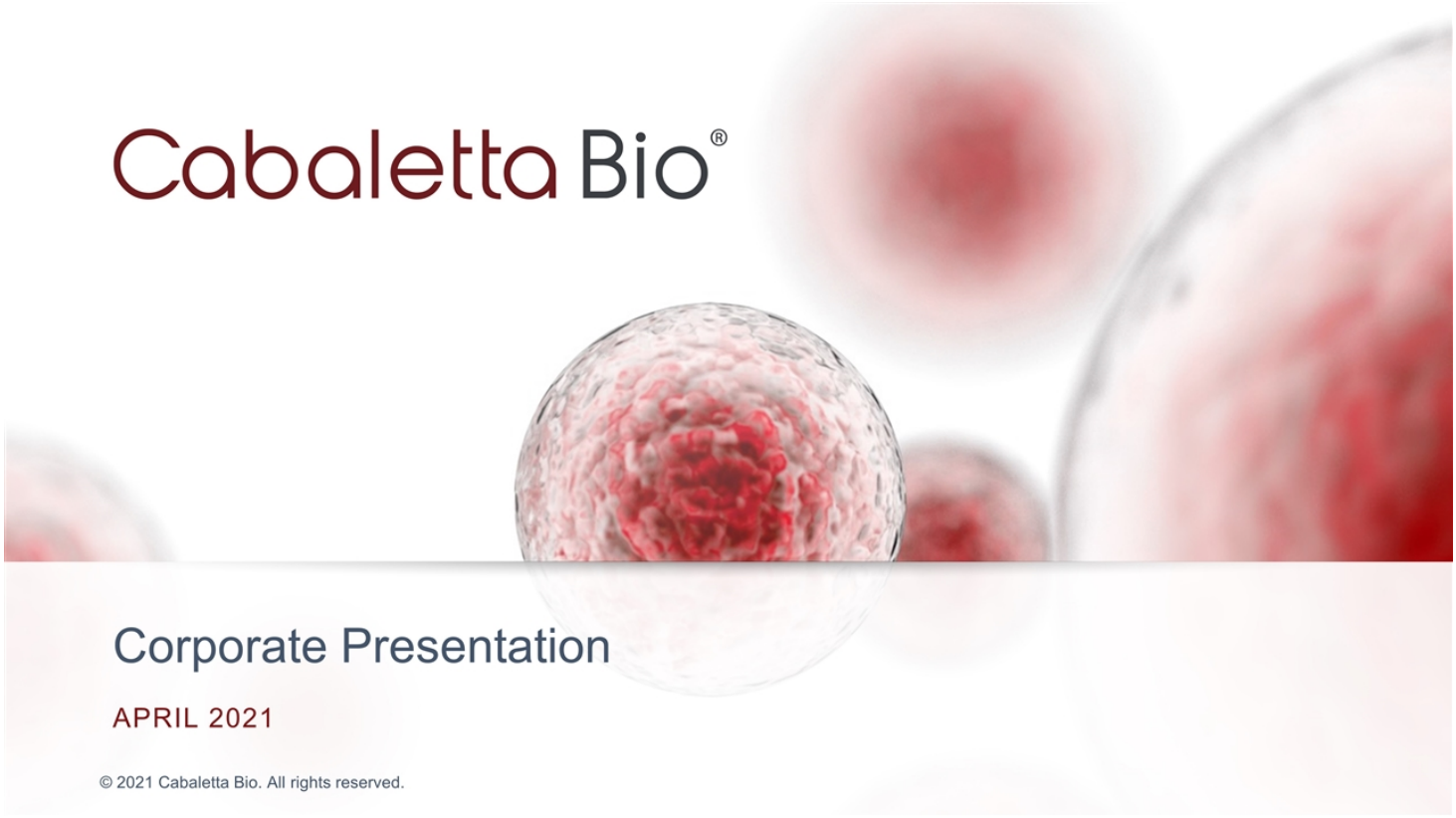

Corporate Presentation

APRIL 2021