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

May 1, 2023 Date of Report (Date of earliest event reported)

CABALETTA BIO, INC.

(Exact name of Registrant as Specified in its Charter)

Delaware (State or other jurisdiction of incorporation)

2929 Arch Street, Suite 600, Philadelphia, PA (Address of principal executive offices) 001-39103 (Commission File Number) 82-1685768 (I.R.S. Employer Identification No.)

> 19104 (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)

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

Derecommencement 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:

	Trading	Name of Each Exchange
Title of Each Class	Symbol(s)	on Which Registered
Common Stock, par value \$0.00001 per share	CABA	The Nasdag 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 \boxtimes

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 May 1, 2023, Cabaletta Bio, Inc. (the "Company" or "Cabaletta") 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.

On May 1, 2023, the Company issued a Press Release announcing that the U.S. Food and Drug Administration ("FDA") has granted Fast Track Designation for CABA-201, a 4-1BB-containing fully human CD19-CAR T cell investigational therapy, to deplete CD19-positive B cells and improve disease activity in patients with systemic lupus erythematosus (SLE) and lupus nephritis (LN) (the "Press Release"). A copy of the Press Release is attached hereto as Exhibit 99.2 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, including Exhibits 99.1 and 99.2 attached hereto, 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 8.01 Other Events.

On May 1, 2023, the Company issued the Press Release announcing that the FDA has granted Fast Track Designation for CABA-201, a 4-1BB-containing fully human CD19-CAR T cell investigational therapy, designed to deplete CD19-positive B cells and improve disease activity in patients with SLE and LN. Cabaletta has been cleared to initiate a Phase 1/2 clinical trial of CABA-201 for the treatment of 6 SLE patients with active LN, and in a separate parallel cohort, 6 patients with active SLE without renal involvement.

SLE is a chronic, potentially severe, autoimmune disease in which the immune system attacks healthy tissue throughout the body, most commonly impacting young women between the ages of 15 and 40 with higher frequency and greater severity in people of color. It is characterized by abnormal B cell function and autoantibody production resulting in a range of clinical manifestations including end organ damage and an increased risk of death. SLE affects an estimated 160,000-320,000 patients in the U.S, with LN as the most commonend-organ manifestation, affecting approximately 40% of SLE patients. Among these patients, the risk of end-stage renal disease is approximately 17% and the risk of death is approximately 12%, each within 10 years of diagnosis.

CABA-201 is designed to be given as a one-time infusion, to evaluate its potential to transiently, but fully, eliminate B cells, enabling an "immune system reset" with durable remission in patients with SLE. The Phase 1/2 clinical trial is an open-label study designed to evaluate CABA-201 in SLE subjects with active LN or active SLE without renal involvement. CABA-201 will be administered at a dose of 1.0 x 10⁶ cells/kg. This study will enroll 6 subjects in an active LN cohort and 6 subjects in an active SLE without renal involvement cohort, in parallel. Subjects will be treated with a standard preconditioning regimen consisting of fludarabine and cyclophosphamide prior to CABA-201 infusion. This represents the first trial assessing Cabaletta's CARTA (Chimeric Antigen Receptor T cells for Autoimmunity) strategy.

Forward-Looking Statements

This 8-K contains "forward-looking statements" of Cabaletta within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including without limitation, express or implied statements regarding: expectations regarding: Cabaletta's ability to retain and recognize the intended incentives conferred Fast Track Designation for CABA-201 to deplete CD19-positive B cells and improve disease activity in patients with SLE and LN; Cabaletta's ability to grow its autoimmune-focused pipeline; the Company's business plans and objectives; Cabaletta Bio's expectations around the potential success and therapeutic benefits of CABA-201, including its belief that CABA-201 may enable an "immune system reset" and provide deep and durable responses for patients with SLE and potentially for patients diagnosed with other autoimmune disease; the Company's plans to initiate a Phase 1/2 clinical trial of CABA-201 in patients, development; Cabaletta's ability to envolve development; Cabaletta's ability to accelerate Cabaletta's pipeline and develop meaningful therapies for patients, including in collaboration with academic and industry partners and the ability to optimize such collaborations on its development programs.

Any forward-looking statements in this 8-K are based on management's current expectations and beliefs of future events, and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to: the risk that signs of biologic activity or persistence may not inform long-term results; Cabaletta's ability to demonstrate sufficient evidence of safety, efficacy and tolerability in its preclinical studies and clinical trials of DSG3-CAART, MuSK-CAART and CABA-201; the risk that the results observed with the similarly-designed construct employed in the recentNature Medicine publication, including due to the dosing regimen, are not indicative of the results we seek to achieve withCABA-201; risks related to clinical trial site activation or enrollment rates that are lower than expected; risks related to unexpected safety or efficacy data observed during clinical studies; risks related to volatile market and economic conditions; risks related to the impact of public health epidemics affecting countries or regions in which Cabaletta has operations or does business, such as COVID-19; Cabaletta's ability to retain and recognize the intended incentives conferred by Orphan Drug Designation and Fast Track Designation for its product candidates, as applicable; risks related to Cabaletta's ability to protect and maintain its intellectual property position; risks related to fostering and maintaining successful relationships with Cabaletta's collaboration and manufacturing partners; uncertainties related to the initiation and conduct of studies and other development requirements for its product candidates; the risk that any one or more of Cabaletta's product candidates will not be successfully developed and/or commercialized; and the risk that the initial or interim results of preclinical studies or clinical studies will not be predictive of future results in connection with future studies. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause Cabaletta's actual results to differ from those contained in the forward-looking statements, see the section entitled "Risk Factors" in Cabaletta's most recent annual report on Form 10-K as well as discussions of potential risks, uncertainties, and other important factors in Cabaletta's other filings with the Securities and Exchange Commission. All information in this 8-K is as of the date hereof, and Cabaletta undertakes no duty to update this information unless required by law.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

- 99.1 Cabaletta Bio, Inc. Corporate Presentation, dated May 1, 2023, furnished herewith.
- 99.2 Press Release issued by the registrant on May 1, 2023, furnished herewith.
- 104 Cover Page Interactive Data File (embedded within the Inline XBRL Document).

SIGNATURE

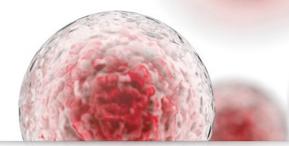
Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this report to be signed on its behalf by the undersigned, hereunto duly authorized.

CABALETTA BIO, INC.

Date: May 1, 2023

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

Cabaletta Bio®



Corporate Presentation

MAY 2023

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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, "st, "su," "Cabaletta" or the "Company") and is made for information plaup spess only. This Presentation all are the dist of the information talt the information you may desire. Statements contained herein are made as of the date of this Presentation and subsequently becomes available or changes occurring after the date hereio. This Presentation and subsequently specification to deplete OT to deplete OT to other systemic tupus crystemics and the meaning of the Private Securities. Litigation the information that ubsequently becomes available or changes future peritode is and improve disease activity in patients with systemic tupus enphritis (Lity); our business, our plans and strategies for our CAAR T and CARTA technologies and CABATM platform; our ability to grow our autoimmune-focused pipeline; the ability to capitalize on and potential benefits resulting from the translational research partnership with Professor Georg Schett and the exclusive license agreement with IASO Bio; our expectations around the potential bignosed with other autoimmune disease; our plans to initiate a Phase 1/2 clinical trial of CABA-201 in patients with SLE, including our anticipated progress, clinical trial of CABA-201 in patients with SLE and purpose or cave and the requisite number expenses of patients, we can be assigned to curve translational data of cohorts from our DesCAARTesTM trial, including the algoing and the explasite or there are allowed to represent the requisite and the contains and strategies or patients with SLE, including and any and strategies or allowed to entry and any descent and the potential ability to enhanee in vivo DSG3-

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. 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, risks related to our ability to genostrate sufficient evidence of safety, efficica; and tolerability in our preclinical studies and clinical trials of CABA-201, DSG3-CAART and MuSK-CAART, the risk that the results observed with the similarly-designed construct employed in the recent *Nature Medicine* publication, the risk that signs of biologic activity or persistence may not inform long-term results, the risk that persistence observed with effective CART-19 oncology studies in combination with lymphodepletion is not indicative of, or applicable to, clinical responses in patients with mPV, risks related to cur relationship with third parties, uncertainties related to regulatory fillings and other information related to our ability to product candidates, our ability to product andidates, our ability to product andidates, or ability to relation and recorginze the infended incentives conferred by any Orphan Drug Designation and Fast Track Designations, the risk that any one or ore of our product candidates will not be successfully developed and commercialized, the risks related to a cur prelation so to those of our clinical studes, manufacturers, suppliers, or other vendors resulting from the COVID-19 pandemic or review 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 contained herein, whether as a result of any new information, future events, changed circumstances or otherwise. Although we believe the expectat Develop and launch the first curative targeted cellular therapies for patients with autoimmune diseases

Cabaletta®: Pursuing cures for a broad range of autoimmune diseases

Leveraging years of experience with clinical sites to initiate Phase 1/2 trial of CABA-201 in SLE & LN

CARTA Strategy | CABA-201 (4-1BB CD19-CAR T) to be evaluated in a Phase 1/2 study in SLE

Efficient clinical trial design - including initial dose and number of patients in each cohort $\mathbf{\Sigma}$

- 1.0 x 10⁶ cells/kg initial dose of CABA-201 is identical to dose used in academic SLE¹ and myositis² studies
- Two parallel cohorts with 6 patients each 1) lupus nephritis (LN) and 2) SLE without renal involvement; FDA Fast Track Designation

CABA-201 has been specifically engineered for patients with autoimmune diseases

- Fully human CD19 binder with data in ~20 oncology patients with safety profile supporting further evaluation in autoimmunity
- Same 4-1BB costimulatory domain and similar CD19 binder affinity⁴ as used in the academic SLE¹ & myositis studies²

Potential to cure a broad range of autoimmune diseases where B cells have a role initiating or maintaining disease $\mathbf{\Sigma}$

CAART Strategy | DSG3-CAART & MuSK-CAART clinical studies evaluating combination regimens

 $\mathbf{\Sigma}$ DesCAARTes™ trial in mucosal pemphigus vulgaris – 1 month safety & persistence data anticipated 1H23⁴ • Enrolling in combination sub-study using pre-treatment with IVIg & cyclophosphamide

MusCAARTes™ trial in MuSK myasthenia gravis – leveraging insights from experience with DSG3-CAART

• Initiated in 4Q22; received FDA Fast Track Designation & Orphan Drug Designation

Initial CABA-201 clinical data & 6-mo combination data from CAART trials expected by 1H24⁴

CAART - Chimeric AutoAntibody Receptor T cells: CARTA - Chimeric Antioen Receptor T cells for Autoimmunity: IND - Investigational New Drug: SLE - Systemic lupus ervthematosus

Mackensen, Andreas, et al. "Anti-CDI9 CAR T cell therapy for refractory systemic lupus erythematosus." Nature Medicine (2022): 1-9.
 Müller, Fabian, et al. "CDI9-targeted CAR T cells in refractory antisynthetase syndrome." The Lancet (2023).
 Assumes no dose-limiting toxicities are observed in the cohort and uninterrupted enrollment occur in the trials.

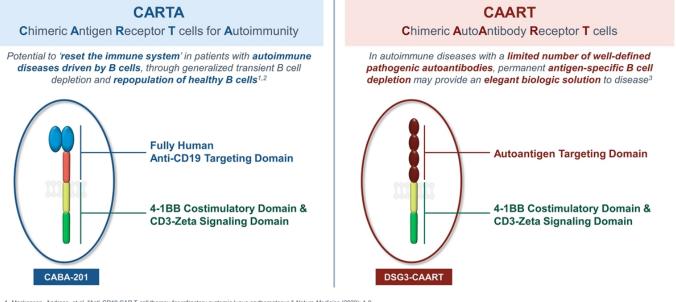
- 4. Dai, Zhenyu, et al. "Development and functional characterization of novel fully human anti-CD19 CARs for T-cell therapy." Journal of Cellular Physiology 236.8 (2021): 5832-5847.

Cabaletta Bio*

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One CABA[™] platform, two strategies to address autoimmune diseases

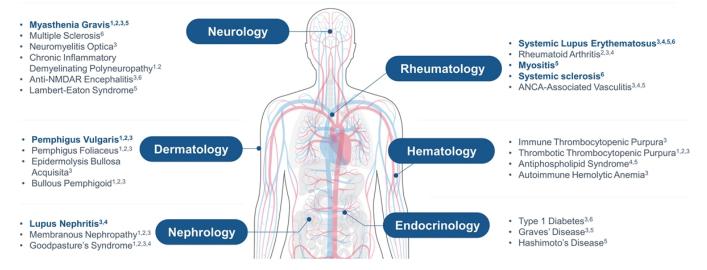
Complementary strategies to optimize clinical outcomes using cellular therapies in autoimmune diseases



Mackensen, Andreas, et al. "Anti-CD19 CAR T cell therapy for refractory systemic lupus erythematosus." *Nature Medicine* (2022): 1-9.
 Müller, Fabian, et al. "CD19-targeted CAR T cells in refractory antisynthetase syndrome." The Lancet (2023).
 Ellebrecht, Christoph T., et al. "Reengineering chimeric antigen receptor T cells for targeted therapy of autoimmune disease." *Science* 353.6295 (2016): 179-184.

CABA[™] platform may apply across a range of autoimmune diseases

Biologic opportunity for cure or treatment may be possible in dozens of autoimmune diseases*



Illustrative list of autoimmune diseases where B cells may play a role in initiating or maintaining disease, and where biologic opportunity for cure or treatment with CAART or CARTA approach may be possible.
 Diseases in bold represent where clinical studies are underway or plan to be initiated by Cabalietta or by Professor Schett
 Noneczny, Inga. "Update on IgG4-mediated autoimmune diseases: new insights and new family members." Autoimmunity Reviews (2020): 102646.
 Luijbers, Maartje G., et al. "Mechanisms of autoantibody-induced pathology." Frontiers in immunology 8 (2017): 603.
 Sudwig, Ralf J., et al. "Mechanisms of autoantibody-induced pathology." Frontiers in immunology 8 (2017): 603.
 Sudwig, Ralf J., et al. "Mechanisms of autoantibodies in systemic autoimmune diseases: specificity and pathogenicity." The Journal of clinical investigation 125.6 (2015): 2194-2202.
 Suday, Ca Xiu, Joseph S. Miller, and Song Guo Zheng. "An updated advance of autoantibodies in autoimmune diseases." Autoimmunet diseases." Autoimmunity Reviews (2020): 102743.
 Hampe, Christiane S. "B cells in autoimmune diseases." Scientifica 2012 (2012).



Pipeline targeting autoimmune diseases where cure is possible

CABA [™] Platform	Indication		Program	Discovery	Preclinical	Phase 1	Phase 2/3
CARTA	Systemic Lupus Nephritis				IND cleared		
Chimeric Antigen Receptor T cells	Erythematous (SLE) ¹	Non-Renal SLE	CABA-201 4-1BB CD19-CAR T			IND cleared	
for A utoimmunity	Multiple Un Indica						
	Mucosal Pemphigus Vulgaris		DSG3-CAART				
CAART ² Chimeric	MuSK Myasthenia Gravis		MuSK-CAART				
AutoAntibody Receptor T cells	PLA2R Membranous Nephropathy		PLA2R-CAART				
	Mucocutaneous Pemphigus Vulgaris		DSG3/1-CAART				

Being evaluated in a single clinical trial for CABA-201.
 Additional CAART disease targets in discovery stage include two undisclosed indications.

Chimeric Antigen Receptor T Cells for Autoimmunity CABA-201

Academic data: Immune system reset in SLE & myositis patients^{1,2}

Exclusive translational research partnership with lead investigator informing our CD19 clinical strategy

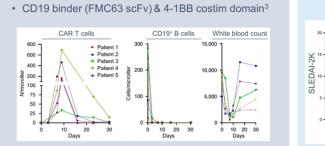
4-1BB CD19-CAR T³ resulted in rapid, deep & transient CD19⁺ B cell depletion • 1x10⁶ cells/kg preceded by standard Flu/Cy regimen

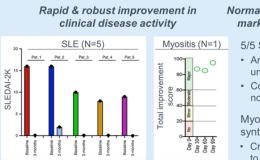
Clinical & serologic responses within 3 mo. of CD19-CAR T therapy in refractory patients with SLE¹ & patient with myositis²

Durable clinical responses^{1,2}

· Off other immunosuppressive medications

· 5-17 months of follow up





Normalization of serum markers of disease



- undetectable
- · Complement levels normalized
- Myositis patient (anti-
- synthetase syndrome): · Creatinine kinase dropped to normal

Promising safety data^{1,2}

Repopulation of healthy B cells^{1,2}

- · Grade 1 CRS (fever) in 4/6 patients · New B cells in 6/6 patients in 2-5 months · No ICANS of any grade
 - · Limited decline in vaccination titers

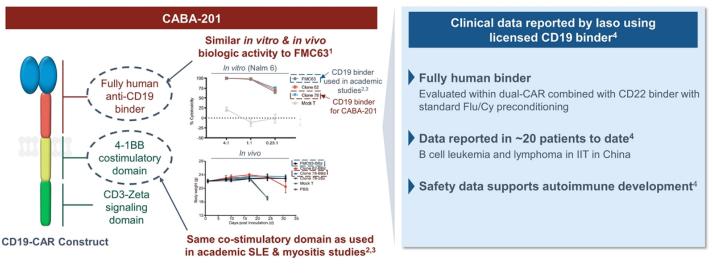
SLE – Systemic lupus erythematosus; ASyS – Anti-synthetase syndrome; scFv – Single chain variable fragment; SLEDAI-2K – Systemic Lupus Erythematosus Disease Activity Index 2000; CRS – Cytokine release syndrome; ICANS – Immune effector cell-associated neurotoxicity syndrome; Anti-dsDNA Abs – Anti-double-stranded deoxyribonucleic acid antibodies

Mackensen, Andreas, et al. "Anti-CD19 CAR T cell therapy for refractory systemic lupus erythematosus." Nature Medicine (2022): 1-9.
 Müller, Fabian, et al. "CD19-targeted CAR T cells in refractory antisynthetase syndrome." The Lancet (2023).
 The construct utilized in this study has a similar design to CABA-201, sharing the 4-1BB costimulatory domain, but is a different construct.

CABA-201

CABA-201: CD19-targeting CAR T therapy for autoimmune diseases

Cabaletta's CD19 binder with similar in vitro & in vivo activity to FMC631 (binder used in academic studies^{2,3})



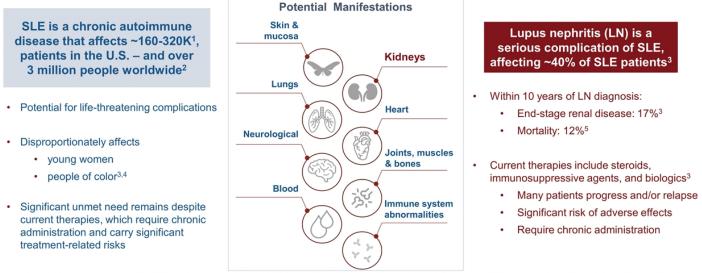
SLE - Systemic lupus erythematosus; IIT - Investigator-initiated trial; Flu/Cy - Fludarabine/Cyclophosphamide; CRS - Cytokine release syndrome; ICANS - Immune effector cell-associated neurotoxicity syndrome

Dai, Zhenyu, et al. "Development and functional characterization of novel fully human anti-CD19 chimeric antigen receptors for T-cell therapy." Journal of Cellular Physiology 236.8 (2021): 5832-5847.
 Mackensen, Andreas, et al. "Anti-CD19 CAR T cell therapy for refractory systemic lupus erythematosus." Nature Medicine (2022): 1-9.
 Miller, Fabian, et al. "CD19-Jargeted CAR T cells in refractory antisynthese syndrome." The Lancet (2023).
 Evaluated as part of CT120, a dual-CD19xCD22 CAR T product candidate under development by Nanjing IASO Biotherapeutics, Co., Ltd. (IASO Bio).

CABA-201

SLE & Lupus Nephritis: High unmet clinical need

Up to 320,000 SLE patients in the U.S., ~40% with LN, who face increased risk of kidney failure & death



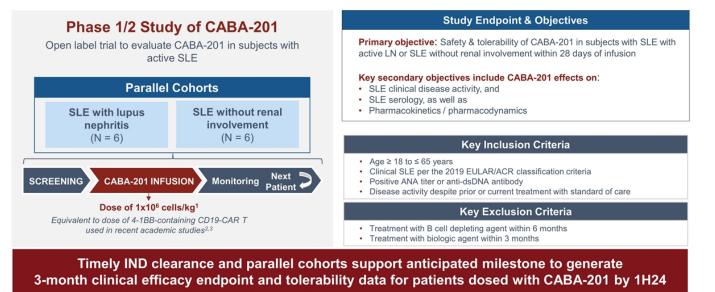
1. Helmick CG, Felson DT, Lawrence RC, Gabriel S, Hirsch R, Kwoh CK, Liang MH, Kremers HM, Mayes MD, Merkel PA, Pillemer SR, Reveille JD, Stone JH; National Arthritis Data Workgroup. Estimates of the prevalence of arthritis and other rheumatic

 Heimick CG, Felson DJ, Lawrence RC, Gabriel S, Hirsch R, Kwoh CK, Liang MH, Kremers HM, Mayes MD, Merkel PA, Pillemer SN, Reveille JD, Stone JH; National Arthritis Data Workgroup. Estimates of the prevalence of a conditions in the United States. Part I. Arthritis Rheum. 2008 Jan;58(1):15-25.
 Tian, J., Zhang, D., Yao, X., Huang, Y., & Lu, Q. (2023). Global epidemiology of systemic lupus erythematosus: a comprehensive systematic analysis and modelling study. Annals of the Rheumatic Diseases, 82(3). 351-356.
 Hoover PJ, Costenbader KH. Insights into the epidemiology and management of lupus nephritis from the US fheumatologist perspective. Kindow Int. 2016 Sec;950(3):487-92.
 Lewis, M. J., & Jawad, A. S. (2017). The effect of ethnicity and genetic ancestry on the epidemiology, clinical features and outcome of systemic lupus erythematosus. Rheumatology; 56(suppl_1), i67-477.
 Hahn, B. H., Mcmahon, M. A., Wilkinson, A., Wallace, W. D., Daikh, D. L., Fitzgerald, J. D., ... & Grossman, J. M. (2012). American College of Rheumatology guidelines for screening, treatment, and management of lupus nephritis. Arthritis care & research, 64(6), 797-808. Cabaletta Bio® 11

Planned Phase 1/2 study of CABA-201 in patients with SLE

CABA-201 to be evaluated in patients with active SLE with or without renal involvement





SLE – Systemic lupus erythematosus; EULAR – European League Against Rheumatism; ACR – American College of Rheumatology 1. Subjects will be treated with a standard preconditioning regimen consisting of fludarabine and cyclophosphamide prior to a single dose CABA-201. 2. Mackensen, Andreas, et al. "Anh-CD19 CART Cell therapy for refractory systemic lupus erythematosus." Nature Medicine (2022): 1-9. 3. Müller, Fabian, et al. "CD19-targeted CAR T cells in refractory antisynthetase syndrome." The Lancet (2023).

CABA-201

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Accelerating development of CABA-201 for autoimmune diseases

Our product candidate, people and partnership enable accelerated progress while integrating unique insights

Efficient clinical trial design for CABA-201 facilitates rapid and broad development program

Product – Candidate with 4-1BB co-stim domain; similar binding activity to academic CD19-CAR T^{1,2,3}

- CABA-201 fully human binder clinical tolerability profile based on use in ~20 oncology patients
- 4-1BB co-stimulatory domain identical to that used in academic CD19-CAR T study^{1,2}

People – Singular focus on potentially curative cell therapies for autoimmune disease since 2018

- Deep understanding and experience with complicated cell therapy programs in autoimmune patients
 - Novel insights on clinical designs from prior FDA discussions and 3 timely submitted and cleared IND filings
 - Track record at a dozen US sites with implementation of complicated cell therapy logistics in autoimmune patients
 - Leadership with experience developing both SLE products that were FDA approved in the past 65 years ٠

Partnership – Exclusive translational research partnership has provided early, actionable insights 3

· Scientific and clinical data sharing has already impacted our clinical strategy and design

SLE - Systemic lupus erythematosus

Dai, Zhenyu, et al. "Development and functional characterization of novel fully human anti-CD19 chimeric antigen receptors for T-cell therapy." Journal of Cellular Physiology 236.8 (2021): 5832-5847.
 Mackensen, Andreas, et al. "Anti-CD19 CAR T cell therapy for refractory systems in Jupus erythematosus." Nature Medicine (2022): 1-9.
 Müller, Fabian, et al. "CD19 Tealing ter Carls" role is in refractory antisynthese syndrome." The Lancet (2023).

Chimeric AutoAntibody Receptor T Cells DSG3-CAART & MuSK-CAART

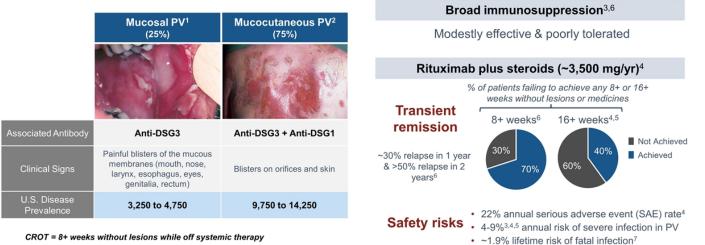
Cabaletta Bio®

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DSG3-CAART

Overview of pemphigus vulgaris & current treatment landscape

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



CROT = 8+ weeks without lesions while off systemic therapy

 Image credit: D@nderm.
 Image credit: D@ 15 DSG3-CAART

Ongoing DesCAARTes[™] study in patients with mucosal PV



Monotherapy DSG3-CAART with favorable tolerability to date, but persistence plateaus

DesCAARTes[™] study of DSG3-CAART

DSG3-CAART Persistence to 29d in Cohorts A1-A5

Ongoing open-label Phase 1 study¹ to determine the maximum tolerated dose & to evaluate safety of DSG3-CAART

Part A Cohorts ¹	Subjects	Dose*
A1 – A6m ^{2,3}	3 (+3) per cohort	20M to 15B

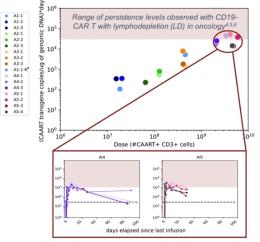
Primary objective:

Determine the maximum tolerated dose of DSG3-CAART

Primary endpoint:

Adverse events, including dose-limiting toxicities (DLTs), related to DSG3-CAART within 3 months of infusion

Combination Sub-study	Subjects	Dose*
IVIG / Cyclophosphamide ³	3 (+3) per cohort	2.5B



* A1-1-R refers to a subject in cohort A1 who was retreated at the cohort A3 dose (500M).

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. 2. Cohort A6m reflects a two-dose regimen of 5.0 to 7.5 billion cells, 3 weeks apart, for a total of 10 to 15 billion cells, which is designed to prolong exposure time of DSG3-CAART *in vivo*. 3. Combination cohort has been prioritized relative to A6m based on energing data in cohorts A4 and A5. 4. Mueller, Karen Thudium, et al. "Cellular kinetics of CTL019 in relapsed/refractory B-cell acute lymphoblastic leukemia and chronic lymphocytic leukemia." Blood. 130.21 (2017): 2317-2325. 5. Schuster SJ, Bishop MR, Tam CS, et al. Tisagenlecleucel in Adult Relapsed or Refractory Diffuse Large B-Cell Lymphoma. N Engl J Med. 2019;380(1):45-56. doi:10.1056/NEJMoa1804980. 6. The range of persistence observed with anti-CD19 CART therapy in noclogy has not been confirmed to be necessary or sufficient for chincing responses in patients with mPV. * 2004, 1004, 500M, 2.58, 5.08 to 7.5B and 108 to 15B refers to the number of DSG3-CAART cells infused for patients in dosing cohorts A1 to A6m (M – millions; B – billions).

DSG3-CAART

Combination sub-study prioritized to increase CAART exposure

Combination strategy designed to enhance cytokine and/or diminish autoantibody effects on CAART activity

Combination sub-study cohort

A4 dose (2.5x10⁹ cells) + cyclophosphamide (CY) & IVIg

- Dose-dependent increase in CAART persistence as monotherapy plateaued with Cohort A5 · no clear pattern in antibody levels and disease activity observed in cohort A5 dose
- CY + IVIg preconditioning regimen may:
 - · reduce anti-DSG3 autoantibodies, addressing a potential efficacy barrier
 - reduce 'cytokine sink,' potentially enhancing CAART activation & proliferation
 - provide transient improvement in first few months after infusion^{1,2,3,4,5}
 - · which may require 6-9 months to determine DSG3-CAART clinical effect

Cohort A6m | 2x A5 dose (1-1.5x10¹⁰ cells) – lower priority

- · Two infusions at the A5 dose level 3 weeks apart
 - · To potentially increase the duration of maximal exposure to DSG3-CAART

Amagai, Masayuki, et al. "A randomized double-blind trial of intravenous immunoglobulin for pemphigus." Journal of the American Academy of Dermatology 60.4 (2009): 595-603.
 Arnold, D. F., et al. "An 'n-of-1'placebo-controlled crossover trial of IVIg as adjuvant therapy in refractory pemphigus vulgaris." British Journal of Dermatology 160.5 (2009): 1098-1102.
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 Fleischi, Mary E., Rachel H. Valek, and Amit G. Pandya." Pulse intravenous cyclophosphamide therapy in pemphigus." Archives of dermatology 135.1 (1999): 57-61.
 Lolis, Margarita, et al. "Effect of IVIg with or without cytotoxic drugs on pemphigus intercellular antibodies." Journal of the American Academy of Dermatology 64.3 (2011): 484-489.

MuSK-CAART

High unmet need in MuSK myasthenia gravis

Strategy for first-in-human trial informed by learnings from DesCAARTes™ study

Compelling biologic rationale, similar to PV

- · IgG4-dominant disease
- Autoantibody titers drop after rituximab^{1,2}
- Pathogenic B cells incompletely eliminated by rituximab • and persist during relapse³
- Circulating anti-MuSK antibody titers may be ~90% lower than anti-DSG3 antibody in PV4,5,6

Differentiated market opportunity

- Total U.S. MG prevalence 50,000 to 80,000 patients
- MuSK+ MG comprises 6-7.5% of total MG population
- Compared to AChR+ MG, MuSK+ disease is typically • more severe with limited treatment options
- MuSK+ disease has early onset, 7:1 females

MusCAARTes[™] study of MuSK-CAART

Ongoing open-label study to determine the maximum tolerated dose & to evaluate safety of MuSK-CAART

Part	Cohort	Subjects	
A – Monotherapy Dose Escalation ⁷ Dose increasing from 500M with 2 (+4) design	A1-A3	2 (+4) per cohort	
A – Adaptive Combination Cohorts ⁷ Combination cohorts ⁸ , starting at A2 dose	A4+	2 (+4) per cohort	
B – Expansion Expanded subject enrollment at final selected dose	В	~12	

Study Endpoint & Objectives

Primary Endpoint: Adverse Events, including DLT

Secondary & Tertiary Objectives: CAART expansion/persistence, effect on serum anti-MuSK antibody titer, use of concomitant systemic medications, effect on clinical symptoms, manufacturing success rate

* 500M refers to the number of MuSK-CAART cells infused for patients in dosing cohort A1 (M - millions).
1. Hain, Berit, et al. "Successful treatment of MuSK antibody-positive MG with riturimab." Muscle & Nerve. 3.3 (2006); 575-580.
2. Illa, Isabel, et al. "Sustiand response to fitturimab in anti-ACRR and anti-MuSK positive My asthenia Gravis patients." Journal of neuroimmunology 201 (2008); 90-94.
3. Jiang, Ruoyi, et al. "Sustiand response to fitturimab in anti-ACRR and anti-MuSK positive My asthenia Gravis patients." Journal of neuroimmunology 201 (2008); 90-94.
4. Matthews, Ian, et al. "Muscle-specific receptor tyrosine kinase autoantibodies—a new immuroprecipitation assay." Clinica chimica acta 348.1-2 (2004); 95-99.
5. McCornitle, John, et al. "Detection and characterization of MuSK antibodies in seronegative myasthenia gravis." Annals of neurology 55.4 (2004); 50-584.
6. Marino, Mariapaola, et al. "Long-lasting rituximab-induced reduction of specific—but not total—IgG4 in MuSK-positive myasthenia gravis." *Frontiers in immunology* 11 (2020): 613.
7. A total of 6 subjects will need to have received the final selected dose in Jort A of the study.
8. Cohorts A3 and A4 will be enrolled concurrently after cohort A2 is well-loterated with a preference for enrollment into A4.



Corporate Summary

Manufacturing strategy

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

Stage 1: Penn	Stage 2: CDMOs & CABA Process	Stage 3: Commercialization & Scale-Up
2019 –	2021 -	Data-gated, staged investment
 Cell processing capacity secured through Penn partnership SOPs previously used to develop multiple clinical stage CAR T products Clinical vector validated 	CDMOs for vector and cell processing with commercial support capabilities ¹ Coxford Signature Biomedica	 Leasing followed by engineering and build out of Cabaletta-owned manufacturing facility, and/or Establishment of a strategic partnership to rapidly & reliably scale manufacturing, leveraging the partner's manufacturing expertise
	🔑 WuXi AppTec	Cabaletta Bio°

1. CDMOs shown are currently contracted for select CAART product candidates.

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Cabaletta Bio leadership



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Multiple potential clinical catalysts anticipated in next 12-18 months¹

	Expected Timing	Expected Milestone	
CABA-201	1H 2023	IND clearance \checkmark Fast Track granted \checkmark	
4-1BB CD19-CAR T	1H 2024	Initial clinical data	
DSG3-CAART	1H 2023	1-month safety & persistence data for combination cohort in DesCAARTes [™] trial	
Mucosal-dominant pemphigus vulgaris	2H 2023	6-month data for combination cohort	
MuSK-CAART	4Q 2022	Initiate first-in-human MusCAARTes [™] trial ✓	
MuSK-associated myasthenia gravis	1H 2024	6-month data for combination cohort	
Cash runway into 1Q25			

1. Assumes no dose-limiting toxicities are observed in any cohort and uninterrupted enrollment occurs in the trials.

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Corporate Presentation

MAY 2023

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Cabaletta Bio Receives FDA Fast Track Designation for CABA-201

PHILADELPHIA, May 1, 2023 — Cabaletta Bio, Inc. (Nasdaq: CABA), a clinical-stage biotechnology company focused on developing and launching the first curative targeted cell therapies for patients with autoimmune diseases, today announced that the U.S. Food and Drug Administration (FDA) has granted Fast Track Designation for CABA-201, a 4-1BB-containing fully human CD19-CAR T cell investigational therapy, designed to deplete CD19-positive B cells and improve disease activity in patients with systemic lupus erythematosus (SLE) and lupus nephritis (LN). Cabaletta has been cleared to initiate a Phase 1/2 clinical trial of CABA-201 for the treatment of 6 SLE patients with active LN, and in a separate parallel cohort, 6 patients with active SLE without renal involvement, with an initial dose that is equivalent to the dose used in the September 2022 *Nature Medicine* publication of a 4-1BB containing CD19-CAR T construct evaluated in patients with SLE.

"Despite advances over the last few decades, treatment options for SLE remain inadequate. There are currently no curative options available that achieve durable disease remission. Existing therapies typically result in general immunosuppression, require chronic administration, and are often administered in conjunction with steroids and other immunosuppressive medications to reduce disease burden, which can leave patients with continued disease activity, treatment-associated side effects, and impaired quality of life," said David J. Chang, M.D., Chief Medical Officer of Cabaletta. "We believe the FDA's decision to grant Fast Track Designation for CABA-201 underscores the unmet need for a treatment that has the potential to provide deep and durable responses for people living with lupus and potentially other autoimmune diseases where B cells contribute to disease. We look forward to initiating the Phase 1/2 trial for CABA-201 and further evaluating its therapeutic potential for patients in need."

CABA-201 is designed to be given as a one-time infusion, to evaluate its potential to transiently, but fully, eliminate B cells, enabling an "immune system reset" with durable remission in patients with SLE. The Phase 1/2 clinical trial is an open-label study designed to evaluate CABA-201 in SLE subjects with active LN or active SLE without renal involvement. CABA-201 will be administered at a dose of 1.0 x 10 cells/kg and the study will enroll 6 subjects in an active LN cohort and 6 subjects in an active SLE without renal involvement cohort, in parallel. Subjects will be treated with a standard preconditioning regimen consisting of fludarabine and cyclophosphamide prior to CABA-201 infusion. This represents the first trial assessing Cabaletta's CARTA (Chimeric Antigen Receptor T cells for Autoimmunity) strategy.

About Fast Track Designation

The FDA's Fast Track process is intended to facilitate the expedited development and review of therapeutics intended to treat serious or life-threatening conditions and to address unmet medical needs. Companies that receive Fast Track Designation are eligible for several potential benefits, including the opportunity for more frequent meetings and interactions with the FDA during clinical development as well as eligibility for accelerated approval and/or priority review, if relevant criteria are met. Companies may also be allowed to submit sections of their Biologics License Application on a rolling basis.

About Systemic Lupus Erythematosus

SLE is a chronic, potentially severe, autoimmune disease in which the immune system attacks healthy tissue throughout the body, most commonly impacting young women between the ages of 15 and 40 with higher frequency and greater severity in people of color. It is characterized by abnormal B cell function and autoantibody production resulting in a range of clinical manifestations including end organ damage and an increased risk of death. SLE affects an estimated 160,000-320,000 patients in the U.S, with LN as the most commoned-organ manifestation, affecting approximately 40% of SLE patients. Among these patients, the risk of end-stage renal disease is approximately 17% and the risk of death is approximately 12%, each within 10 years of diagnosis.

About Cabaletta Bio

Cabaletta Bio (Nasdaq: CABA) is a clinical-stage biotechnology company focused on the discovery and development of engineered T cell therapies that have the potential to provide a deep and durable, perhaps curative, treatment for patients with autoimmune diseases. The CABA[™] platform encompasses two strategies: the CARTA (Chimeric Antigen Receptor T cells for Autoimmunity) strategy, with CABA-201, a 4-1BB-containing fully human CD19-CAR T, as the lead product candidate being evaluated in lupus nephritis and systemic lupus erythematosus without renal involvement, and the CAART (Chimeric AutoAntibody Receptor T cells) strategy, with multiple clinical-stage candidates, including DSG3-CAART for mucosal pemphigus vulgaris and MuSK-CAART for MuSK myasthenia gravis. The expanding CABA[™] platform is designed to develop potentially curative therapies for patients with a broad range of autoimmune diseases. Cabaletta Bio's headquarters and labs are located in Philadelphia, PA.

Forward-Looking Statements

This press release contains "forward-looking statements" of Cabaletta Bio within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including without limitation, express or implied statements regarding: Cabaletta's ability to retain and recognize the intended incentives conferred Fast Track Designation for CABA-201 to deplete CD19-positive B cells and improve disease activity in patients with SLE and LN; Cabaletta's ability to grow its autoimmune-focused pipeline; the Company's business plans and objectives; Cabaletta Bio's expectations around the potential success and therapeutic benefits of CABA-201, including its belief that CABA-201 may enable an "immune system reset" and provide deep and durable responses for patients with SLE and potentially for patients diagnosed with other autoimmune disease; the Company's plans to initiate a Phase 1/2 clinical trial of CABA-201 in patients with SLE, including its anticipated progress, clinical trial design, ability to leverage its experience in autoimmune cell therapy and lupus product development; Cabaletta's ability to erroll the requisite number of patients, dose each dosing cohort in the intended manner and advance the trial as planned in its Phase 1/2 clinical trial of CABA-201; and the ability to accelerate Cabaletta's pipeline and develop meaningful therapies for patients, including in collaboration with academic and industry partners and the ability to optimize such collaborations on its development programs.

Any forward-looking statements in this press release are based on management's current expectations and beliefs of future events, and are subject to a number of risks and uncertainties that could cause actual results to differ materially and adversely from those set forth in or implied by such forward-looking statements. These risks and uncertainties include, but are not limited to: the risk that signs of biologic activity or persistence may not inform long-term results; Cabaletta's ability to demonstrate sufficient evidence of safety, efficacy and tolerability in its preclinical studies and clinical trials of DSG3-CAART, MuSK-CAART and CABA-201; the risk that the results observed with the similarly-designed construct employed in the recent*Nature*

Medicine publication, including due to the dosing regimen, are not indicative of the results we seek to achieve withCABA-201; risks related to clinical trial site activation or enrollment rates that are lower than expected; risks related to unexpected safety or efficacy data observed during clinical studies; risks related to volatile market and economic conditions; risks related to the impact of public health epidemics affecting countries or regions in which Cabaletta has operations or does business, such as COVID-19; Cabaletta's ability to retain and recognize the intended incentives conferred by Orphan Drug Designation and Fast Track Designation for its product candidates, as applicable; risks related to Cabaletta's ability to protect and maintain its intellectual property position; risks related to fostering and maintaining successful relationships with Cabaletta's collaboration and manufacturing partners; uncertainties related to the initiation and conduct of studies and other development requirements for its product candidates; the risk that any one or more of Cabaletta's product candidates will not be successfully developed and/or commercialized; and the risk that the initial or interim results of preclinical studies or clinical studies will not be predictive of future results in connection with future studies. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause Cabaletta's actual results to differ from those contained in the forward-looking statements, see the section entitled "Risk Factors" in Cabaletta's most recent annual report on Form 10-K as well as discussions of potential risks, uncertainties, and other important factors in Cabaletta's other and subsequent filings with the Securities and Exchange Commission. All information in this press release is as of the date of the release, and Cabaletta undertakes no duty to update this information unless required by law.

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