

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549**

FORM 10-Q

(Mark One)

QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended September 30, 2022

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number: 001-39103

CABALETTA BIO, INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware

(State or other jurisdiction of
incorporation or organization)

2929 Arch Street, Suite 600

Philadelphia, PA

(Address of principal executive offices)

82-1685768

(I.R.S. Employer
Identification No.)

19104

(Zip Code)

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

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 (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
Emerging growth company	<input checked="" type="checkbox"/>		

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.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

As of November 4, 2022, the registrant had 29,013,995 shares of common stock, \$0.00001 par value per share, outstanding.

Table of Contents

	Page
PART I.	
	FINANCIAL INFORMATION
Item 1.	Financial Statements (Unaudited) 4
	Condensed Balance Sheets 4
	Condensed Statements of Operations and Comprehensive Loss 5
	Condensed Statements of Stockholders' Equity 6
	Condensed Statements of Cash Flows 8
	Notes to Unaudited Condensed Financial Statements 9
Item 2.	Management's Discussion and Analysis of Financial Condition and Results of Operations 22
Item 3.	Quantitative and Qualitative Disclosures About Market Risk 32
Item 4.	Controls and Procedures 32
PART II.	
	OTHER INFORMATION
Item 1.	Legal Proceedings 34
Item 1A.	Risk Factors 34
Item 2.	Unregistered Sales of Equity Securities and Use of Proceeds 94
Item 3.	Defaults Upon Senior Securities 94
Item 4.	Mine Safety Disclosures 94
Item 5.	Other Information 94
Item 6.	Exhibits 95
Signatures	96

Summary of the Material and Other Risks Associated with Our Business

- We are a clinical-stage company with a limited operating history, have incurred significant losses since our inception, and anticipate that we will continue to incur significant losses for the foreseeable future.
- We are highly dependent on our relationship with University of Pennsylvania, or Penn, for our preclinical research and development activities, key technology and our current manufacturing needs for our clinical trial of DSG3-CAART, or the DesCAARTes™ trial, and if Penn's manufacturing capacity is reduced or otherwise delayed or limited, this could adversely impact enrollment in our DesCAARTes™ trial.
- We are reliant on intellectual property licensed to us by Penn and termination of our license agreement with Penn would result in the loss of significant rights, which would have a material adverse effect on our business.
- If we are unable to obtain and maintain sufficient intellectual property protection for our current product candidates and technologies or any future product candidates, we may not be able to compete effectively in our markets.
- We will need to raise substantial additional funding before we can expect to complete development of any of our product candidates or generate any revenues from product sales.
- Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.
- If we are unable to successfully develop our current programs into a portfolio of product candidates, or experience significant delays in doing so, we may not realize the full commercial potential of our current and future product candidates.
- If we encounter difficulties enrolling patients in our DesCAARTes™ trial, our planned Phase 1 clinical trial for MuSK-CAART, or the MusCAARTes™ trial, or future clinical trials, including our planned clinical trial for CABA-201, these clinical development activities could be delayed or otherwise adversely affected.
- If we are unable to advance our product candidates through clinical development, obtain regulatory approval and ultimately commercialize our product candidates, or experience significant delays in doing so, our business will be materially harmed.
- Results of earlier studies may not be predictive of future study or trial results, and we may fail to establish an adequate safety and efficacy profile to conduct clinical trials or obtain regulatory approval for our product candidates.
- If serious adverse events, undesirable side effects or unexpected characteristics are identified during the development of any of our product candidates, we may need to delay, abandon or limit our further clinical development of those product candidates.
- The ongoing coronavirus disease, or COVID-19, pandemic and the future outbreak of other highly infectious or contagious diseases could seriously harm our research, development and potential future commercialization efforts, increase our costs and expenses and have a material adverse effect on our business, financial condition and results of operations.
- Manufacturing and administering our product candidates is complex and we may encounter difficulties in technology transfer from Penn to a contract manufacturing organization.
- We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do.
- We may establish our own manufacturing facility and infrastructure in addition to or in lieu of relying on third parties for the manufacture of our product candidates, which will be costly and time-consuming, and which may not be successful.
- Our future success depends in part upon our ability to retain our key employees, consultants and advisors and to attract, retain and motivate other qualified personnel.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q, including the sections entitled “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” contains express or implied forward-looking statements that are based on our management’s belief and assumptions and on information currently available to our management. Although we believe that the expectations reflected in these forward-looking statements are reasonable, these statements relate to future events or our future operational or financial performance, and involve known and unknown risks, uncertainties and other factors, including, without limitation, risks, uncertainties and assumptions regarding the impact of the COVID-19 pandemic on our business, operations, strategy, goals and anticipated timelines, our ongoing and planned preclinical activities, our ability to initiate, enroll, conduct or complete ongoing and planned clinical trials, our timelines for regulatory submissions and our financial position that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. Forward-looking statements in this Quarterly Report on Form 10-Q include, but are not limited to, statements about:

- the success, cost and timing and conduct of our clinical trial program, including our clinical trial of DSG3-CAART, or the DesCAARTes™ trial, our planned Phase 1 clinical trial of MuSK-CAART, or the MusCAARTes™ trial, our plans for clinical development of CABA-201, and our other product candidates, including statements regarding the timing of initiation and completion of the clinical trials and the period during which the results of the clinical trials will become available;
- the expected timing and significance around the announcement of safety, biologic activity and/or any additional clinical data from our DesCAARTes™ trial;
- the timing of and our ability to obtain and maintain regulatory approval of our product candidates, including DSG3-CAART, MuSK-CAART, CABA-201, FVIII-CAART, DSG3/1-CAART and PLA2R-CAART, in any of the indications for which we plan to develop them, and any related restrictions, limitations, and/or warnings in the label of an approved product candidate;
- our expectations for the tolerability and clinical activity of CABA-201 and ability to advance this product candidate through our license agreement with Nanjing IASO Biotherapeutics Co., Ltd., or IASO;
- the impact of any business interruptions to our operations, including the timing and enrollment of patients in our ongoing and planned clinical trials and our planned Investigational New Drug application submissions, or to those of our clinical sites, manufacturers, suppliers, or other vendors resulting from the COVID-19 pandemic or similar public health crisis;
- our expected use of proceeds from the initial public offering and from sales of our common stock in “at-the-market” offerings and the period over which such proceeds, together with existing cash, will be sufficient to meet our operating needs;
- our plans to pursue research and development of other product candidates;
- our plan to infuse our DSG3-CAART product candidate without lymphodepletion or other preconditioning agents initially in our DesCAARTes™ trial, and our plan to implement a cohort where a preconditioning regimen with a lymphodepleting agent and an immunomodulatory agent will be administered in the DesCAARTes™ and MusCAARTes™ trial;
- the potential advantages of our proprietary Cabaletta Approach for selective B cell Ablation platform, called our CABA™ platform, and our product candidates;
- the extent to which our scientific approach and CABA™ platform may potentially address a broad range of diseases;
- the potential benefits and success of our arrangements and our expanded sponsored research agreement with the Trustees of the University of Pennsylvania, or Penn, and the Children’s Hospital of Philadelphia, or CHOP, and our scientific co-founders, Drs. Milone and Payne;
- our ability to successfully commercialize our product candidates, including DSG3-CAART, MuSK-CAART, CABA-201 and our other product candidates;
- the potential receipt of revenue from future sales of DSG3-CAART, MuSK-CAART, CABA-201 and our other product candidates;
- the rate and degree of market acceptance and clinical utility of DSG3-CAART, MuSK-CAART, CABA-201 and our other product candidates;
- our estimates regarding the potential market opportunity for DSG3-CAART, MuSK-CAART, CABA-201 and our other product candidates, and our ability to serve those markets;
- our sales, marketing and distribution capabilities and strategy, whether alone or with potential future collaborators;
- our ability to establish and maintain arrangements or a facility for manufacture of DSG3-CAART, MuSK-CAART, CABA-201 and our other product candidates;
- our ability to obtain funding for our operations, including funding necessary to initiate and complete our DesCAARTes™ trial, our planned MusCAARTes™ trial and our ongoing preclinical studies of CABA-201, DSG3/1-CAART, FVIII-CAART and PLA2R-CAART;
- the potential achievement of milestones and receipt of payments under our collaborations;
- our ability to enter into additional collaborations with existing collaborators or other third parties;
- our expectations regarding our ability to obtain and maintain intellectual property protection for our product candidates and our ability to operate our business without infringing on the intellectual property rights of others;
- the success of competing therapies that are or become available, and our competitive position;
- the accuracy of our estimates regarding expenses, future revenues, capital requirements and needs for additional financing;
- the impact of government laws and regulations in the United States and foreign countries; and
- our ability to attract and retain key scientific or management personnel.

These factors should not be construed as exhaustive and should be read in conjunction with the other cautionary statements that are included in this Quarterly Report on Form 10-Q. The forward-looking statements contained in this Quarterly Report on Form 10-Q are made as of the date of this Quarterly Report on Form 10-Q, and we undertake no obligations to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise. Therefore, you should not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Quarterly Report on Form 10-Q.

PART I—FINANCIAL INFORMATION

Item 1. Financial Statements.

CABALETTA BIO, INC.
Condensed Balance Sheets
(in thousands, except share and per share amounts)

	September 30, 2022	December 31, 2021
Assets	(unaudited)	
Current assets:		
Cash and cash equivalents	\$ 61,163	\$ 122,222
Short-term investments	24,732	—
Prepaid expenses and other current assets	2,280	2,319
Total current assets	88,175	124,541
Property and equipment, net	2,811	1,438
Other assets	689	357
Total Assets	<u>\$ 91,675</u>	<u>\$ 126,336</u>
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	\$ 1,333	\$ 2,333
Accrued and other current liabilities	4,468	6,047
Total current liabilities	5,801	8,380
Commitments and Contingencies (see Note 6)		
Stockholders' equity:		
Preferred stock, \$0.00001 par value: 10,000,000 shares authorized as of September 30, 2022 and December 31, 2021; no shares issued or outstanding at September 30, 2022 and December 31, 2021	—	—
Voting and non-voting common stock, \$0.00001 par value: 150,000,000 (143,590,481 voting and 6,409,519 non-voting) shares authorized as of September 30, 2022 and December 31, 2021; 29,013,995 (25,601,495 voting and 3,412,500 non-voting) shares issued and outstanding as of September 30, 2022 and 28,927,129 (24,614,629 voting and 4,312,500 non-voting) shares issued and outstanding as of December 31, 2021	—	—
Additional paid-in capital	235,953	230,543
Accumulated other comprehensive loss	(209)	—
Accumulated deficit	(149,870)	(112,587)
Total stockholders' equity	85,874	117,956
Total liabilities and stockholders' equity	<u>\$ 91,675</u>	<u>\$ 126,336</u>

The accompanying notes are an integral part of these financial statements.

CABALETTA BIO, INC.
Condensed Statements of Operations and Comprehensive Loss
(in thousands, except share and per share amounts)
(unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
Operating expenses:				
Research and development	\$ 8,216	\$ 8,169	\$ 26,900	\$ 22,575
General and administrative				
	3,562	3,394	10,937	9,845
Total operating expenses	11,778	11,563	37,837	32,420
Loss from operations	(11,778)	(11,563)	(37,837)	(32,420)
Other income:				
Interest income	351	3	554	19
Net loss	\$ (11,427)	\$ (11,560)	\$ (37,283)	\$ (32,401)
Other comprehensive income:				
Net unrealized gain (loss) on available-for-sale investments, net of tax	40	(1)	(209)	(6)
Net comprehensive loss	<u>\$ (11,387)</u>	<u>\$ (11,561)</u>	<u>\$ (37,492)</u>	<u>\$ (32,407)</u>
Net loss per share of voting and non-voting common stock, basic and diluted	<u>\$ (0.39)</u>	<u>\$ (0.45)</u>	<u>\$ (1.29)</u>	<u>\$ (1.31)</u>

The accompanying notes are an integral part of these financial statements.

CABALETTA BIO, INC.
Condensed Statements of Stockholders' Equity
(in thousands, except share amounts)
(unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance—December 31, 2020	24,062,775	\$ —	\$ 175,836	\$ 6	\$ (66,298)	\$ 109,544
Stock-based compensation	—	—	1,310	—	—	1,310
Common stock issuance, net of \$67 of issuance costs	—	—	—	—	—	—
Net unrealized losses on available-for-sale securities	194,189	—	2,165	—	—	2,165
Net loss	—	—	—	(3)	—	(3)
Balance—March 31, 2021	24,256,964	\$ —	\$ 179,311	\$ 3	\$ (76,000)	\$ 103,314
Stock-based compensation	—	—	1,385	—	—	1,385
Common stock issuance, net of \$237 of issuance costs	701,469	—	7,665	—	—	7,665
Issuance of common stock in connection with exercise of stock options	9,563	—	60	—	—	60
Issuance of common stock under employee stock purchase plan	4,834	—	46	—	—	46
Net unrealized losses on available-for-sale securities	—	—	—	(2)	—	(2)
Net loss	—	—	—	—	(11,139)	(11,139)
Balance—June 30, 2021	24,972,830	\$ —	\$ 188,467	\$ 1	\$ (87,139)	\$ 101,329
Stock-based compensation	—	—	1,508	—	—	1,508
Common stock issuance, net of \$769 of issuance costs	2,710,347	—	24,880	—	—	24,880
Issuance of common stock in connection with exercise of stock options	48,461	—	459	—	—	459
Net unrealized losses on available-for-sale securities	—	—	—	(1)	—	(1)
Net loss	—	—	—	—	(11,560)	(11,560)
Balance—September 30, 2021	27,731,638	\$ —	\$ 215,314	\$ —	\$ (98,699)	\$ 116,615

The accompanying notes are an integral part of these financial statements.

CABALETTA BIO, INC.
Condensed Statements of Stockholders' Equity
(in thousands, except share amounts)
(unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance—December 31, 2021	28,927,129	\$ —	\$ 230,543	\$ —	\$ (112,587)	\$ 117,956
Stock-based compensation	—	—	1,811	—	—	1,811
Net unrealized losses on available-for-sale securities	—	—	—	(152)	—	(152)
Issuance of common stock in connection with exercise of stock options	50,000	—	51	—	—	51
Net loss	—	—	—	—	(12,946)	(12,946)
Balance—March 31, 2022	<u>28,977,129</u>	<u>\$ —</u>	<u>\$ 232,405</u>	<u>\$ (152)</u>	<u>\$ (125,533)</u>	<u>\$ 106,720</u>
Stock-based compensation	—	—	1,777	—	—	1,777
Net unrealized losses on available-for-sale securities	—	—	—	(97)	—	(97)
Issuance of common stock under employee stock purchase plan	36,866	—	40	—	—	40
Net loss	—	—	—	—	(12,910)	(12,910)
Balance—June 30, 2022	<u>29,013,995</u>	<u>\$ —</u>	<u>\$ 234,222</u>	<u>\$ (249)</u>	<u>\$ (138,443)</u>	<u>\$ 95,530</u>
Stock-based compensation	—	—	1,731	—	—	1,731
Net unrealized gains on available-for-sale securities	—	—	—	40	—	40
Net loss	—	—	—	—	(11,427)	(11,427)
Balance—September 30, 2022	<u>29,013,995</u>	<u>\$ —</u>	<u>\$ 235,953</u>	<u>\$ (209)</u>	<u>\$ (149,870)</u>	<u>\$ 85,874</u>

The accompanying notes are an integral part of these financial statements.

CABALETTA BIO, INC.
Condensed Statements of Cash Flows
(in thousands)
(unaudited)

	Nine Months Ended September 30,	
	2022	2021
Cash flows from operating activities:		
Net loss	\$ (37,283)	\$ (32,401)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	5,319	4,203
Amortization of discount/premium on investments	(177)	62
Depreciation	820	499
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	39	3,280
Other assets	(332)	(25)
Accounts payable	(1,055)	409
Accrued and other current liabilities	(1,580)	379
Net cash used in operating activities	(34,249)	(23,594)
Cash flows from investing activities:		
Purchases of property and equipment	(2,137)	(1,015)
Purchases of investments	(49,764)	—
Proceeds from maturities of investments	25,000	6,165
Net cash (used in) provided by investing activities	(26,901)	5,150
Cash flows from financing activities:		
Proceeds from issuance of common stock, net of issuance costs	—	34,710
Proceeds from issuance of common stock in connection with the exercise of stock options	51	519
Proceeds from issuance of common stock under employee stock purchase plan	40	46
Net cash provided by financing activities	91	35,275
Net (decrease) increase in cash and cash equivalents	(61,059)	16,831
Cash and cash equivalents—beginning of period	122,222	101,429
Cash and cash equivalents—end of period	<u>\$ 61,163</u>	<u>\$ 118,260</u>
Supplemental disclosures of non-cash investing and financing activities:		
Property and equipment purchases included in accounts payable	\$ 191	\$ 76

The accompanying notes are an integral part of these financial statements.

CABALETTA BIO, INC.

**Notes to Unaudited Condensed Financial Statements
(in thousands, except share and per share amounts)**

1. Basis of Presentation

Cabaletta Bio, Inc. (the Company or Cabaletta[®]) was incorporated in April 2017 in the State of Delaware as Tycho Therapeutics, Inc. and, in August 2018, changed its name to Cabaletta Bio, Inc. The Company is headquartered in Philadelphia, Pennsylvania. Cabaletta is a clinical-stage biotechnology company focused on the discovery and development of engineered T cell therapies for B cell-mediated autoimmune diseases.

Principal operations commenced in April 2018, when the Company executed sponsored research agreements with the Trustees of the University of Pennsylvania (Penn).

Risks and Uncertainties

The Company does not expect to generate revenue from sales of engineered T cell therapies for B cell-mediated autoimmune diseases or any other revenue unless and until the Company completes preclinical and clinical development and obtains regulatory approval for one or more product candidates. If the Company seeks to obtain regulatory approval for any of its product candidates, the Company expects to incur significant commercialization expenses.

The Company is subject to risks common to companies in the biotechnology industry including, but not limited to, new technological innovations, protection of proprietary technology, dependence on key personnel, compliance with government regulations and the need to obtain additional financing. As a result, the Company is unable to predict the timing or amount of increased expenses or when or if the Company will be able to achieve or maintain profitability. Further, the Company is currently dependent on Penn for much of its preclinical research, clinical research and development activities and initial manufacturing activities (Note 5). Product candidates currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval, prior to commercialization. Even if the Company is able to generate revenues from the sale of its product candidates, if approved, it may not become profitable. If the Company fails to become profitable or is unable to sustain profitability on a continuing basis, then it may be unable to continue its operations at planned levels and be forced to reduce its operations.

In December 2019, a novel strain of coronavirus (COVID-19) surfaced in Wuhan, China and proceeded to spread globally. The COVID-19 pandemic has led to various responses, including government-imposed quarantines, travel restrictions and other public health safety measures. The extent to which COVID-19 will continue to impact the Company's operations or those of its third party partners will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including new information that may emerge concerning the severity of COVID-19, the impact of new strains of the virus, the effectiveness, availability and utilization of vaccines and treatments and the actions to contain COVID-19 or treat its impact, among others. The Company's financial results to date have not been significantly impacted by COVID-19, however, the Company cannot at this time predict the specific extent, duration, or full impact that the ongoing COVID-19 pandemic will have on its financial condition, operations, and business plans, including its ability to raise additional capital, the timing and enrollment of patients in its ongoing and planned clinical trials, future financings and other expected milestones of its product candidates.

Liquidity

The Company has sustained annual operating losses since inception and expects to continue to generate operating losses for the foreseeable future. The Company's ultimate success depends on the outcome of its research and development activities. The Company had cash and cash equivalents and investments of \$85,895 as of September 30, 2022. Through September 30, 2022, the Company has incurred an accumulated deficit of \$149,870. Management expects to incur additional losses in the future as it continues its research and development and will need to raise additional capital to fully implement its business plan and to fund its operations.

The Company intends to raise such additional capital through a combination of equity offerings, debt financings, government funding arrangements, strategic alliances or other sources. However, if such financing is not available at adequate levels and on a timely basis, or such agreements are not available on favorable terms, or at all, as and when needed, the Company will need to reevaluate its operating plan and may be required to delay or discontinue the development of one or more of its product candidates or operational initiatives. The Company expects that its cash and cash equivalents as of September 30, 2022, will be sufficient to fund its projected operations for at least 12 months following the date the Company files this Quarterly Report on Form 10-Q with the Securities and Exchange Commission (SEC).

2. Summary of Significant Accounting Policies

Unaudited Interim Financial Information

The accompanying unaudited interim financial statements have been prepared in conformity with generally accepted accounting principles (GAAP) and the applicable rules and regulations of the SEC regarding interim financial reporting. Any reference in these notes to applicable guidance is meant to refer to GAAP as found in the Accounting Standards Codification and Accounting Standards Updates (ASU) of the Financial Accounting Standards Board (FASB). As permitted under these rules, certain footnotes and other financial information that are normally required by GAAP have been condensed or omitted.

In the opinion of management, the accompanying unaudited interim financial statements include all normal and recurring adjustments (which consist primarily of accruals and estimates that impact the financial statements) considered necessary to present fairly the Company's financial position as of September 30, 2022 and the results of its operations and its cash flows for the three and nine months ended September 30, 2022 and 2021. The results for the three and nine months ended September 30, 2022 are not necessarily indicative of results to be expected for the year ending December 31, 2022, any other interim periods, or any future year or period. The balance sheet as of December 31, 2021 included herein was derived from the audited financial statements as of that date. The unaudited interim financial statements, presented herein, do not contain the required disclosures under GAAP for annual financial statements. These unaudited financial statements should be read in conjunction with the Company's audited financial statements, which are included in the Company's 2021 Annual Report on Form 10-K, filed with the SEC on March 17, 2022 (2021 Annual Report).

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities as of the date of the financial statements and the reported amounts of expenses during the reporting period. Significant estimates and assumptions made in the accompanying financial statements include, but are not limited to, the fair value of stock-based compensation, the valuation allowance on the Company's deferred tax assets and certain accruals. The Company evaluates its estimates and assumptions on an ongoing basis using historical experience and other factors and adjusts those estimates and assumptions when facts and circumstances dictate. Actual results could differ from those estimates.

Off-Balance Sheet Risk and Concentrations of Credit Risk

Financial instruments, which potentially subject the Company to significant concentrations of credit risk, consist primarily of cash and cash equivalents, which are primarily invested in U.S. treasury-based money market funds, and available-for-sale debt securities, which are invested in U.S. government securities. A portion of the Company's cash is maintained at a federally insured financial institution. The deposits held at this institution are in excess of federally insured limits. The Company has not experienced any losses in such accounts and management believes that the Company is not exposed to significant credit risk due to the financial position of the depository institution in which those deposits are held. The cash in this account is swept daily into U.S. treasury-based and U.S. government-based money market funds. The Company has no off-balance sheet risk, such as foreign exchange contracts, option contracts, or other foreign hedging arrangements.

Significant Accounting Policies

There have been no significant changes to the Company's accounting policies during the nine months ended September 30, 2022, as compared to the significant accounting policies described in Note 2 of the "Notes to the Financial Statements" in the Company's audited financial statements included in its 2021 Annual Report.

Fair Value Measurement

Assets and liabilities recorded at fair value on a recurring basis in the balance sheets are categorized based upon the level of judgment associated with the inputs used to measure their fair values. Fair value is defined as the exchange price that would be received for an asset or an exit price that would be paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. Valuation techniques used to measure fair value must maximize the use of observable inputs and minimize the use of unobservable inputs. The authoritative guidance on fair value measurements establishes a three-tier fair value hierarchy for disclosure of fair value measurements as follows:

Level 1—Observable inputs such as unadjusted, quoted prices in active markets for identical assets or liabilities at the measurement date.

Level 2—Inputs (other than quoted prices included in Level 1) that are either directly or indirectly observable for the asset or liability. These include quoted prices for similar assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

Emerging Growth Company Status

The Company is an emerging growth company, as defined in the Jumpstart Our Business Startups Act of 2012 (the JOBS Act). Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act, until such time as those standards apply to private companies. The Company has elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date that it (i) is no longer an emerging growth company or (ii) affirmatively and irrevocably opts out of the extended transition period provided in the JOBS Act. As a result, these financial statements may not be comparable to companies that comply with the new or revised accounting pronouncements as of public company effective dates.

Recently Issued Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-02, *Leases* (Topic 842), with guidance regarding the accounting for and disclosure of leases. The update requires lessees to recognize the liabilities related all leases, including operating leases, with a term greater than 12 months on the balance sheet. This update also requires lessees and lessors to disclose key information about their leasing transactions. This guidance is effective for public companies for annual and interim periods beginning after December 15, 2018. In June 2020, the FASB issued ASU 2020-05, *Revenue from Contracts with Customers* (Topic 606) and *Leases* (Topic 842), which granted a one-year effective date delay for certain companies to fiscal years beginning after December 15, 2021, and interim periods within fiscal years beginning after December 15, 2022. As permitted for emerging growth companies, the Company will adopt Topic 842 under the private company transition guidance for the annual period ending December 31, 2022. The Company has not yet finalized the assessment of the impact that Topic 842 will have on its financial statements or financial statement disclosures.

3. Fair Value Measurements

Fair value of financial instruments

At September 30, 2022 and December 31, 2021, the Company's financial instruments included cash and cash equivalents, accounts payable and accrued expenses. The carrying amounts reported in the Company's financial statements for these instruments approximate their respective fair values because of the short-term nature of these instruments.

The following tables present financial information about the Company's financial assets measured at fair value on a recurring basis and indicate the level of the fair value hierarchy utilized to determine such fair values:

	September 30, 2022			
	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Financial assets				
Cash and Cash equivalents:				
Money market funds	\$ 61,163	\$ 61,163	\$ —	\$ —
Short-term investments:				
U.S. Government securities	24,732	—	24,732	—
Total	<u>\$ 85,895</u>	<u>\$ 61,163</u>	<u>\$ 24,732</u>	<u>\$ —</u>

	December 31, 2021			
	Total	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Financial assets				
Cash and Cash equivalents:				
Money market funds	\$ 122,222	\$ 122,222	\$ —	\$ —
Total	<u>\$ 122,222</u>	<u>\$ 122,222</u>	<u>\$ —</u>	<u>\$ —</u>

Money market funds are measured at fair value on a recurring basis using quoted prices and are classified as Level 1 inputs. Investments are measured at fair value based on inputs other than quoted prices that are derived from observable market data and are classified as Level 2 inputs.

For debt securities classified as available-for-sale investments, the Company records unrealized gains or losses resulting from changes in fair value between measurement dates as a component of other comprehensive income. The Company did not hold any available-for-sale securities as of December 31, 2021.

	September 30, 2022			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair value
Financial assets				
Money market funds				
<i>Included in cash and cash equivalents</i>	\$ 61,163	\$ —	\$ —	\$ 61,163
U.S. Government securities - due in one year or less				
<i>Included in short-term investments</i>	24,941	—	(209)	24,732
Total	<u>\$ 86,104</u>	<u>\$ —</u>	<u>\$ (209)</u>	<u>\$ 85,895</u>

4. Accrued and Other Current Liabilities

Accrued and other current liabilities consist of the following:

	September 30, 2022	December 31, 2021
Research and development services	\$ 1,880	\$ 2,836
General and administrative services	249	180
Compensation expense	2,268	2,977
Other	71	54
	<u>\$ 4,468</u>	<u>\$ 6,047</u>

5. Collaborations, Licensing Agreements and Other Agreements

Amended and Restated License Agreement with the Trustees of the University of Pennsylvania and Children's Hospital of Philadelphia

In August 2018, the Company entered into a license agreement with Penn, as amended and restated in July 2019 to include the Children's Hospital of Philadelphia (CHOP) as a party, and as amended in May 2020 and October 2021 (the License Agreement) pursuant to which the Company obtained (a) a non-exclusive, non-sublicensable worldwide license to certain of Penn's intellectual property to conduct research, product development, clinical trials, cell manufacturing and other activities, and (b) an exclusive, worldwide, royalty-bearing right and license, with a right to sublicense, on a target-by-target basis, under certain of Penn's intellectual property to make, use, sell, offer for sale, import, and otherwise commercialize products for the treatment of autoimmune and alloimmune diseases.

Unless earlier terminated, the License Agreement expires on the expiration or abandonment or other termination of the last valid claim in Penn's intellectual property licensed by the Company. The Company may terminate the License Agreement at any time for convenience upon 60 days written notice. In the event of an uncured, material breach, Penn may terminate the License Agreement upon 60 days written notice.

Under the terms of the License Agreement, the Company was obligated to pay \$2,000 annually for three years beginning August 2018 for funding to the laboratories of each of Drs. Milone and Payne (see *Sponsored Research Agreements*). During the term of the License Agreement until the first commercial sale of the first product, the Company is obligated to pay Penn a non-refundable, non-creditable annual license maintenance fee of \$10.

The Company is required to pay certain milestone payments upon the achievement of specified clinical and commercial milestones. Milestone payments are reduced by a certain percentage for the second product that achieves a milestone, by an additional percentage for the third product that achieves a milestone, and so on, for each subsequent product that achieves a milestone. In the event that the Company is able to successfully develop and launch multiple products under the License Agreement, total milestone payments could be approximately \$21,000. Penn is also eligible to receive tiered royalties at percentage rates in the low single-digits, subject to an annual minimum royalty, on annual worldwide net sales of any products that are commercialized by the Company or its sublicensees that contain or incorporate, or are covered by, the intellectual property licensed by the Company. To the extent the Company sublicenses its license rights under the License Agreement, Penn would be eligible to receive tiered sublicense income at percentage rates in the mid-single to low double-digits. There were no amounts due under the License Agreement as of September 30, 2022.

Sponsored Research Agreements

The Company has sponsored research agreements with two faculty members at Penn, who are also scientific co-founders of the Company and members of the Company's scientific advisory board. In May 2020, one of the agreements was amended to expand the scope of sponsored research. In August 2020, this agreement was further amended to extend the term of the original research plan. In December 2021, the Company further amended this SRA to extend the term and expand the workplan to include additional correlative studies related to the DesCAARTesTM trial. In April 2021 and October 2021, the other SRA was amended to extend the term of the original research plan.

Under the amended SRAs, the Company has committed to funding defined research plans through December 2024 and November 2022, respectively. The total estimated cost of \$12,560 under the SRAs satisfies the Company's annual obligation under the License Agreement (see *Amended and Restated License Agreement with the Trustees of the University of Pennsylvania* above). As of September 30, 2022, \$12,181 of cost has been incurred pursuant to these SRAs. Research and development expense related to these research agreements recognized in the accompanying statements of operations was \$615 and \$2,251 for the three and nine months ended September 30, 2022, respectively, and \$625 and \$2,260 for the three and nine months ended September 30, 2021, respectively. As of September 30, 2022 and December 31, 2021, \$355 and \$346 respectively, of advance payments are included in Prepaid expenses and other current assets in the accompanying balance sheets and there was \$228 and \$36 included in Accrued and other current liabilities in the accompanying balance sheets as of September 30, 2022 and December 31, 2021.

In December 2021, the Company entered into a SRA with Penn for the laboratory of Dr. Drew Weissman, or the Weissman SRA. Under the Weissman SRA, discovery-stage proof of concept studies for lipid nanoparticle mRNA for the delivery and/or enhancement of CAAR technology is being conducted. Under the Weissman SRA, Penn granted the Company a non-transferable, non-exclusive license to use certain intellectual property for specific internal research purposes and further grants the Company the first option to negotiate to acquire, subject to agreement on commercial terms, an exclusive or non-exclusive worldwide license to certain patent rights for specific CAAR products developed under the Weissman SRA. Unless earlier terminated, the Weissman SRA will expire in December 2023. Pursuant to the Weissman SRA, the Company also entered into an Option Agreement with Penn, or the Weissman Option, which grants the Company the option to negotiate to acquire a non-exclusive worldwide license to certain patent rights in connection with the Weissman SRA. This SRA has a remaining cost of approximately \$320.

Master Translational Research Services Agreement

In October 2018, the Company entered into a services agreement (the Services Agreement) with Penn for additional research and development services from various laboratories within Penn. The research and development activities are detailed in separately executed Penn organization-specific addenda. In May 2020, the Company amended its Addendum with the Center for Advanced Retinal and Ocular Therapeutics (CAROT) to expand access to vector manufacturing.

Research and development expense related to executed addenda under the master translational research service agreement with Penn recognized in the accompanying statements of operations was \$333 and \$1,934 for the three and nine months ended September 30, 2022, respectively, and \$418 and \$1,441 for the three and nine months ended September 30, 2021, respectively. The Company may incur additional expenses up to \$1,360 through the remaining term of the CAROT Amended Addendum.

Subscription and Technology Transfer Agreement

In July 2019, the Company entered into a subscription and technology transfer agreement pursuant to which the Company owed Penn an upfront subscription fee, which was paid in the third quarter of 2019, and a nominal non-refundable royalty on the net sales of products, a portion of which will be credited toward milestone payments and royalties, respectively, under the Amended License Agreement. Technology transfer activities will be at the Company's cost and subject to agreement as to the technology to be transferred. There was no expense recognized under this agreement in 2022. Expense recognized under this agreement was \$0 and \$150 during the three and nine months ended September 30, 2021, respectively.

Collaboration and License Agreement

In July 2020, the Company entered into a collaboration and license agreement with Artisan Bio, Inc. (Artisan), wherein the Company and Artisan agreed to collaborate to potentially enhance certain pipeline products of the Company at specific targets using Artisan's gene editing and engineering technology. If the Artisan technology is applied to any of the Company's products, the Company will be responsible for the development, manufacturing, and commercialization of any such products. Under the terms of the agreement, the Company was required to pay Artisan a nominal upfront fee, as well as costs associated with research and development activities. Artisan is eligible to receive future research, development and regulatory milestones, and is also eligible to receive sales milestones and tiered royalties on net sales of products that incorporate the Artisan technology. The Company can terminate the agreement at will upon advance written notice with payment of a nominal cancellation fee.

Licence and Supply Agreement with Oxford Biomedica

In December 2021, the Company entered into a Licence and Supply agreement (LSA) with Oxford Biomedica (UK) Limited, wherein the LSA grants the Company a non-exclusive license to Oxford's LentiVector® platform for its application in the Company's DSG3-CAART program and puts in place a multi-year vector supply agreement. Under the terms of the agreement, the Company is required to pay Oxford an upfront fee, as well as costs associated with initial vector manufacturing activities for a total cost of up to approximately \$4,000, of which \$1,100 was recognized in 2021. No expense was incurred in 2022. Oxford is eligible to receive

regulatory and sales milestones in the low tens of millions and royalties in the low single digits on net sales of products that incorporate the Oxford technology. The Company can terminate the agreement at will upon advance written notice and subject to certain manufacturing slot cancellation fees.

6. Commitments and Contingencies

Operating Lease Agreement

In February 2019, the Company entered into an operating lease agreement for new office space in Philadelphia, Pennsylvania. The lease term commenced in May 2019 and was set to expire in July 2022. The initial annual base rent was \$261, and increased by 2% annually on each anniversary of the commencement date. In February 2022, the Company amended this lease for an additional 35 months, through June 30, 2025. The annual base rent is \$279, starting on January 1, 2023 and such amount will increase by 2.5% annually. The Company records rent expense on a straight-line basis over the lease term.

The Company's lease for expanded lab space in Philadelphia, Pennsylvania commenced in the first quarter of 2022. This lease can be terminated by the Company with 90 days' notice. The Company expects to utilize this space through June 30, 2025.

Rent expense related to these leases recognized in the accompanying statements of operations was \$549 and \$1,127 for the three and nine months ended September 30, 2022 and \$69 and \$205 for the three and nine months ended September 30, 2021, respectively.

As of September 30, 2022, the future minimum payments for operating leases for lab and office space are as follows:

October 1, 2022 to December 31, 2022	\$	500
2023		2,279
2024		2,286
2025		1,146
Thereafter		—
	<u>\$</u>	<u>6,211</u>

In January 2021, the Company entered into a Development and Manufacturing Services Agreement (WuXi Agreement) with WuXi Advanced Therapies, Inc. (WuXi) to serve as the Company's cell processing manufacturing partner for the planned MuSK-CAART Phase 1 clinical trial, or MusCAARTes™ trial. The Company concluded the WuXi Agreement had an embedded lease as a dedicated manufacturing suite was to be used for the Company's cell processing manufacturing, with a monthly suite fee of \$125. In August 2022, the WuXi Agreement was amended, whereby the Company's dedicated suite arrangement was converted into a shared suite arrangement resulting in a lower monthly suite fee. Rent expense of \$810 was recognized in 2022 related to this lease in the accompanying statements of operations prior to the amendment of the WuXi agreement in August 2022. The Company recognized rent expense of \$180 and \$300 related to this lease in the accompanying statements of operations for the three and nine months ended September 30, 2021, respectively. The WuXi Agreement will expire the later of January 2024, or upon completion of WuXi's services related to the MusCAARTes™ trial. The Company has the right to terminate the WuXi Agreement for convenience or other reasons specified in the WuXi Agreement upon prior written notice. If the Company terminates the WuXi Agreement, it will be obligated to pay an early termination fee of up to \$1,500.

Research Service Agreement

In February 2021, the Company entered into a research service agreement with CHOP for vector manufacturing. In May 2021, this agreement was amended to provide additional vector manufacturing services. Research and development expense related to this research service agreement with CHOP recognized in the accompanying statements of operations was \$0 and \$166 for the three and nine months ended September 30, 2022, respectively, and \$250 and \$822 for the three and nine months ended September 30, 2021, respectively. As of September 30, 2022, this agreement has a remaining cost of up to \$480.

Other Purchase Commitments

In the normal course of business, the Company enters into various purchase commitments with third-party contract manufacturers for the manufacture and processing of its product candidates and related raw materials, contracts with contract research organizations for clinical trials and agreements with vendors for other services and products for operating purposes. These agreements generally provide for termination or cancellation, other than for costs already incurred.

Indemnification

The Company enters into certain types of contracts that contingently require the Company to indemnify various parties against claims from third parties. These contracts primarily relate to (i) the Company's Amended and Restated Bylaws, as amended, (bylaws) under which the Company must indemnify directors and executive officers, and may indemnify other officers and employees, for liabilities arising out of their relationship, (ii) contracts under which the Company must indemnify directors and certain officers and consultants for liabilities arising out of their relationship, (iii) contracts under which the Company may be required to indemnify partners against certain claims, including claims from third parties asserting, among other things, infringement of their intellectual property rights, and (iv) procurement, consulting, or license agreements under which the Company may be required to indemnify vendors, consultants or licensors for certain claims, including claims that may be brought against them arising from the Company's acts or omissions with respect to the supplied products, technology or services. From time to time, the Company may receive indemnification claims under these contracts in the normal course of business. In addition, under these contracts, the Company may have to modify the accused infringing intellectual property and/or refund amounts received.

In the event that one or more of these matters were to result in a claim against the Company, an adverse outcome, including a judgment or settlement, may have a material adverse effect on the Company's future business, operating results or financial condition. It is not possible to determine the maximum potential amount under these contracts due to the limited history of prior indemnification claims and the unique facts and circumstances involved in each particular agreement.

Litigation

On February 28, 2022, a purported stockholder of the Company filed a complaint against the Company and certain of the Company's current officers and certain of the Company's current and former directors in the United States District Court for the Eastern District of Pennsylvania captioned *Patterson v. Cabaletta Bio, Inc., et al.* No. 2:22-cv-00737 (E.D. Pa.). The complaint was filed on behalf of a putative class of persons and entities who purchased or otherwise acquired (a) Cabaletta common stock pursuant and/or traceable to the offering documents issued in connection with the Company's October 24, 2019 initial public offering; and/or (b) Cabaletta securities between October 24, 2019 and December 13, 2021 both dates inclusive. The complaint alleged claims under Sections 10(b) and 20(a) of the Exchange Act and Rule 10b-5 promulgated thereunder and under Sections 11 and 15 of the Securities Act based upon allegedly false or misleading statements and omissions regarding our DesCAARTes™ Phase 1 clinical trial of DSG3-CAART, clinical data for the DesCAARTes™ trial, the efficacy of DSG3-CAART, and the clinical and/or commercial prospects for DSG3-CAART. The complaint sought damages, prejudgment and post-judgment interest, and reasonable attorneys' fees, expert fees and other costs. On October 17, 2022, this complaint was voluntarily dismissed by the plaintiff. The Company may become subject to additional securities class action lawsuits in the future.

7. Common Stock

Common Stock

Pursuant to the Company's Third Amended and Restated Certificate of Incorporation (the amended and restated certificate of incorporation) filed in October 2019, the Company is authorized to issue 143,590,481 shares of voting common stock and 6,409,519 shares of non-voting common stock. Holders of voting common stock shall have the exclusive right to vote for the election of directors of the Company and on all other matters requiring stockholder action. Each share of the Company's non-voting common stock may be converted at any time into one share of common stock at the option of its holder by providing 61 days written notice to the Company, subject to certain limitations, as described in the amended and restated certificate of incorporation.

The Company has a Sales Agreement with Cowen and Company, LLC, to provide for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of common stock from time to time in "at-the-market" offerings (the ATM Program) pursuant to its shelf registration statement on Form S-3 (File No. 333-250006) and subject to the limitations thereof. During the nine months ended September 30, 2022, the Company did not sell any shares pursuant to the ATM Program.

2018 Stock Option and Grant Plan

In September 2018, the Company adopted the 2018 Stock Option and Grant Plan (the 2018 Plan), which provided for the Company to sell or issue common stock, or other stock-based awards, to employees, members of the board of directors and consultants of the Company. The Company generally granted stock-based awards with service conditions only (service-based awards), although there was one grant with performance conditions. There are no unvested options with performance conditions. Stock options granted under the 2018 Plan generally vest over three to four years. There were 1,959,411 options granted under the 2018 Plan prior to the Company's IPO in October 2019. No further grants may be made under the 2018 Plan subsequent to the IPO.

2019 Stock Option and Incentive Plan

The 2019 Stock Option and Incentive Plan (2019 Plan) was approved by the Company's board of directors on October 14, 2019, and became effective on October 23, 2019. The 2019 Plan provides for the grant of incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock units, restricted stock awards, unrestricted stock awards, cash-based awards and dividend equivalent rights to the Company's officers, employees, directors and consultants. The number of shares initially reserved for issuance under the 2019 Plan was 2,342,288, and such number of shares will be increased each January 1 thereafter by 4% of the number of shares of the Company's common stock outstanding on the immediately preceding December 31 or such lesser number of shares determined by the Company's board of directors or compensation committee of the board of directors. On January 1, 2022, the total number of shares under the 2019 Plan was increased by 1,157,085 shares. As of September 30, 2022, there were 1,135,802 shares remaining available for issuance.

A summary of stock option activity is presented below:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Outstanding as of January 1, 2022	4,257,213	\$ 8.49	8.2	\$ 2,367
Granted	2,053,000	3.05		
Exercised	(50,000)	1.01		101
Forfeited/Cancelled	(175,929)	6.48		
Outstanding as of September 30, 2022	<u>6,084,284</u>	\$ 6.77	8.1	\$ —
Options Exercisable at September 30, 2022	<u>2,603,250</u>	\$ 7.41	7.0	\$ —

The aggregate intrinsic value of options granted is calculated as the difference between the exercise price of the options and the estimated fair value of the Company's common stock. The weighted average grant-date fair value of stock options granted during the nine months ended September 30, 2022 and 2021 was \$2.10 and \$7.68, respectively.

The fair value of each award is estimated using Black-Scholes based on the following assumptions:

	Nine months ended September 30,	
	2022	2021
Risk-free interest rate	1.47%—3.36%	0.63%—1.55%
Expected term	5.5 years - 6.1 years	5.5 years - 6.1 years
Expected volatility	79%—83%	79%—81%
Expected dividend yield	0%	0%

Black-Scholes requires the use of subjective assumptions which determine the fair value of stock-based awards. These assumptions include:

Expected term—The expected term represents the period that stock-based awards are expected to be outstanding. The expected term for option grants is determined using the simplified method, which is the midpoint between the vesting period and the contractual term of the option.

Expected volatility—As a privately held company prior to the Company's IPO in October 2019, the Company has limited trading history for its common stock and, as such, the expected volatility is estimated based on the average volatility for comparable publicly traded biotechnology companies over a period equal to the expected term of the stock-based awards. The comparable companies were chosen based on their similar size, stage in the life cycle or area of specialty. The Company will continue to apply this process until a sufficient amount of historical information regarding the volatility of its own stock price becomes available.

Risk-free interest rate—The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of a stock-based award.

Expected dividend—The Company has never paid dividends on its common stock and has no plans to pay dividends on its common stock. Therefore, the Company used an expected dividend yield of zero.

Stock-based Compensation

The Company has recorded stock-based compensation in the accompanying statements of operations as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
Research and development	\$ 868	\$ 683	\$ 2,597	\$ 2,003
General and administrative	863	825	2,722	2,200
Total	<u>\$ 1,731</u>	<u>\$ 1,508</u>	<u>\$ 5,319</u>	<u>\$ 4,203</u>

As of September 30, 2022, there was \$13,403 of unrecognized compensation cost related to unvested option awards, which is expected to be recognized over a weighted-average period of 2.3 years.

2019 Employee Stock Purchase Plan

The 2019 Employee Stock Purchase Plan (2019 ESPP) was approved by the Company's board of directors on October 14, 2019, and became effective on October 23, 2019. A total of 234,229 shares of common stock were initially reserved for issuance under the 2019 ESPP, and such number of shares will be increased each January 1 thereafter through January 1, 2029 by the least of (i) 234,229 shares of common stock, (ii) 1% of the number of shares of the Company's common stock outstanding on the immediately preceding December 31 or (iii) such lesser number of shares determined by the 2019 ESPP's administrator. There was no increase to the total number of shares available under the 2019 ESPP on January 1, 2022.

Employee contributions are made through payroll deductions of up to 15% of eligible compensation over the offering period. A participant may not accrue rights to purchase more than \$25 worth of the Company's common stock for each calendar year in which such right is outstanding. At the end of each offering period, shares of the Company's common stock may be purchased at 85% of the lesser of the Company's common stock on (i) the first trading day of the relevant offering period and (ii) the last trading day of the relevant offering period. Each offering period will be six months in duration and will commence on each December 1 and June 1.

8. Income Taxes

The Company did not record an income tax benefit in its statements of operations for the three and nine months ended September 30, 2022 and 2021 as it is more likely than not that the Company will not recognize the federal and state deferred tax benefits generated by its losses. The Company has provided a valuation allowance for the full amount of its net deferred tax assets and liabilities as of September 30, 2022 and December 31, 2021, as management has determined it is more likely than not that any future benefit from deductible temporary differences and net operating loss and tax credit carryforwards would not be realized. The Company has not recorded any amounts for unrecognized tax benefits as of September 30, 2022 and December 31, 2021.

9. Net Loss Per Share

The Company calculates basic and diluted net loss per share attributable to common stockholders in conformity with the two-class method required for participating securities. As of September 30, 2022 and 2021, the Company had voting and non-voting common stock outstanding. Since the rights of the voting and non-voting common stock are identical, except with respect to voting, the

undistributed losses of the Company have been allocated on a proportionate basis to the two classes. Diluted net loss per share is calculated using the if-converted method, which assumes conversion of all non-voting common stock to voting common stock.

	Three months ended September 30, 2022		Nine months ended September 30, 2022	
	Voting common stock	Non-voting common stock	Voting common stock	Non-voting common stock
Basic net loss per share:				
Numerator				
Allocation of undistributed losses attributable to common stockholders	\$ (10,083)	\$ (1,344)	\$ (32,526)	\$ (4,757)
Denominator				
Weighted average number of shares used in basic per share computation	25,601,495	3,412,500	25,287,436	3,698,581
Net loss per share, basic	<u>\$ (0.39)</u>	<u>\$ (0.39)</u>	<u>\$ (1.29)</u>	<u>\$ (1.29)</u>
Diluted net loss per share:				
Numerator				
Allocation of undistributed losses for basic computation	\$ (10,083)	\$ (1,344)	\$ (32,526)	\$ (4,757)
Reallocation of undistributed losses as a result of conversion of non-voting to voting common shares	(1,344)	—	(4,757)	—
Allocation of undistributed losses	\$ (11,427)	\$ (1,344)	\$ (37,283)	\$ (4,757)
Denominator				
Weighted average number of shares used in basic per share computation	25,601,495	3,412,500	25,287,436	3,698,581
Add: conversion of non-voting to voting common shares outstanding	3,412,500	—	3,698,581	—
Weighted average number of shares used in diluted per share computation	29,013,995	3,412,500	28,986,017	3,698,581
Net loss per share, diluted	<u>\$ (0.39)</u>	<u>\$ (0.39)</u>	<u>\$ (1.29)</u>	<u>\$ (1.29)</u>

	Three months ended September 30, 2021		Nine months ended September 30, 2021	
	Voting common stock	Non-voting common stock	Voting common stock	Non-voting common stock
Basic net loss per share:				
Numerator				
Allocation of undistributed losses attributable to common stockholders	\$ (9,631)	\$ (1,929)	\$ (26,651)	\$ (5,750)
Denominator				
Weighted average number of shares used in basic per share computation	21,534,342	4,312,500	20,389,242	4,398,437
Net loss per share, basic	<u>\$ (0.45)</u>	<u>\$ (0.45)</u>	<u>\$ (1.31)</u>	<u>\$ (1.31)</u>
Diluted net loss per share:				
Numerator				
Allocation of undistributed losses for basic computation	\$ (9,631)	\$ (1,929)	\$ (26,651)	\$ (5,750)
Reallocation of undistributed losses as a result of conversion of non-voting to voting common shares	(1,929)	—	(5,750)	—
Allocation of undistributed losses	\$ (11,560)	\$ (1,929)	\$ (32,401)	\$ (5,750)
Denominator				
Weighted average number of shares used in basic per share computation	21,534,342	4,312,500	20,389,242	4,398,437
Add: conversion of non-voting to voting common shares outstanding	4,312,500	—	4,398,437	—
Weighted average number of shares used in diluted per share computation	25,846,842	4,312,500	24,787,679	4,398,437
Net loss per share, diluted	<u>\$ (0.45)</u>	<u>\$ (0.45)</u>	<u>\$ (1.31)</u>	<u>\$ (1.31)</u>

The following outstanding potentially dilutive shares have been excluded from the calculation of diluted net loss per share, as their effect is anti-dilutive:

	As of September 30,	
	2022	2021
Stock options to purchase common stock	6,084,284	4,038,981
Non-vested common stock	—	2,110
	<u>6,084,284</u>	<u>4,041,091</u>

10. Subsequent Event

On October 7, 2022, the Company entered into an Exclusive License Agreement (the IASO Agreement) with Nanjing IASO Biotherapeutics Co., Ltd. (IASO). Pursuant to the IASO Agreement, the Company received an exclusive, worldwide license under certain IASO intellectual property to use a novel clinical-stage anti-CD19 binder to develop, manufacture, commercialize and otherwise exploit T cell products directed to CD19 for the purpose of diagnosis, prevention or treatment of any autoimmune or alloimmune indications in humans. As partial consideration for the exclusive license, IASO will receive an upfront payment of \$2,500. IASO is also eligible to receive up to mid double digit millions in milestone payments based upon the achievement of specified pre-clinical, development and regulatory milestones, and up to an additional low triple digit millions in milestone payments based upon achievement of specified sales milestones, for a total consideration, inclusive of the upfront payment, of up to \$162,000, along with tiered mid-single digit royalties on future net sales for licensed products that may result from the IASO Agreement. IASO has the right of first negotiation if the Company desires to grant a third party an exclusive license to develop, manufacture, commercialize or otherwise exploit the licensed products in the Greater China region. Pursuant to the IASO Agreement, each of IASO and the Company have agreed, subject to certain exceptions, to refrain from engaging in certain competitive activities with respect to certain programs. The Company also may sublicense through multiple tiers the rights granted to it by IASO under the IASO Agreement at any time, however, it must pay IASO a low double-digit percentage of any revenue obtained from sublicenses or options to third parties, subject to certain customary exclusions. The IASO Agreement will continue on a country-by-country, licensed product-by-licensed product basis until the expiration of the royalty term as identified in the IASO Agreement, unless earlier terminated. Each of the Company and IASO may terminate the IASO

Agreement for a material, uncured breach or insolvency of the other party. The Company may also terminate the IASO Agreement at will upon advance written notice and in the event IASO rejects the IASO Agreement due to bankruptcy-related matters. IASO may also terminate the IASO Agreement if the Company fails to achieve certain specified diligence milestones in a timely manner and/or if the Company commences any patent challenges with respect to the patents and patent applications relating to the licensed sequence, in each case upon advance written notice.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

You should read the following discussion and analysis of our financial condition and results of operations together with the section entitled "Risk Factors" and our unaudited interim condensed financial statements and related notes appearing elsewhere in this Quarterly Report on Form 10-Q and with our audited financial statements and the notes thereto for the year ended December 31, 2021 included in our Annual Report on Form 10-K filed with the Securities and Exchange Commission. Some of the information contained in this discussion and analysis or set forth elsewhere in this Quarterly Report, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the section entitled "Risk Factors," our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis. You should carefully read the section entitled "Risk Factors" to gain an understanding of the important factors that could cause actual results to differ materially from our forward-looking statements.

We are 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 Cabaletta Approach to B cell Ablation, or our CABA™ platform, encompasses two approaches – chimeric antigen receptor T cells for autoimmunity, or CARTA, and our proprietary chimeric autoantibody receptor T cells, or CAART. Our lead CARTA product candidate, CABA-201, is a fully human, 4-1BB CD19-CAR T with the potential to transiently deplete B cells following a single infusion with applicability across a broad range of autoimmune diseases, including systemic lupus erythematosus (SLE), rheumatoid arthritis, myositis and systemic sclerosis. Our CAAR T product candidates are designed to selectively bind and eliminate only specific B cells that produce disease-causing autoantibodies, or pathogenic B cells, while sparing normal B cells, which we believe have the potential to provide responses that may be a safer and more effective option than current treatments. We believe the two approaches, which comprise our CABA™ platform, have applicability across a broad range of autoimmune diseases that we have identified, evaluated and prioritized.

On October 11, 2022, we announced CABA-201. We have obtained an exclusive, worldwide license from Nanjing IASO Biotherapeutics Co., Ltd. (IASO) for the CD19 binder in CABA-201. This CD19 binder is separately being used as part of a dual targeting CAR T therapy that has been evaluated in approximately 20 cancer patients to date in an investigator-initiated trial. We believe tolerability data generated in these patients support clinical development in patients with autoimmune diseases. In addition, we have established an exclusive translational research partnership with Dr. Georg Schett, a pioneer and global leader in the application of CD19-targeting cell therapies in autoimmunity. The collaboration is focused on generation of additional translational data to gain deeper understanding of the immunologic mechanisms of response and clinical insights from ongoing and continued clinical studies in multiple autoimmune disease indications. The construct utilized in these studies has a similar design to CABA-201, sharing the 4-1BB costimulatory domain and the binding region on the CD19 antigen. With the addition of CABA-201 to our cell therapy pipeline, we believe we can potentially address a broad range of autoimmune diseases in indications such as SLE, rheumatoid arthritis, myositis and systemic sclerosis, among others where B cells contribute to disease pathogenesis.

Our initial focus for the CAAR T approach is mucosal pemphigus vulgaris, or mPV, which is an autoimmune blistering disease. Our lead CAAR T product candidate, DSG3-CAART, is being evaluated for the treatment of mPV, a subtype of pemphigus vulgaris, or PV, that affects the mucous membrane. mPV is caused by autoantibodies against the cell adhesion protein desmoglein 3, or DSG3. DSG3-CAART is designed to selectively target and eliminate autoreactive B cells specific for DSG3, which may prevent these B cells from differentiating into antibody secreting plasma cells that produce anti-DSG3 antibodies that are the cause of mPV, while preserving general B cell immune function. DSG3-CAART is being evaluated in a Phase 1 trial, or the DesCAARTes™ trial, in which we are currently enrolling patients. During 2021, we reported acute and 28-day safety data from the first three cohorts of patients in the DesCAARTes™ trial, with no dose-limiting toxicities, or DLTs, or clinically relevant adverse events observed in the 28 days after infusion of DSG3-CAART. In November 2021, we reported that dose-dependent increases in DSG3-CAART persistence in the third cohort relative to the first two low dose cohorts throughout the 28 days following infusion had been observed. On December 14, 2021, we reported top-line biologic activity data for the first, two low dose cohorts, where no clear evidence of biologic activity was observed at doses that represented less than 2% of the current planned maximum dose in the trial, as well as the continued absence of any DLTs or clinically relevant adverse events. Furthermore, we announced the addition of a planned fifth cohort to receive a higher dose with a more consolidated dosing regimen. In January 2022, we announced that 28-day safety data for the fourth cohort was anticipated to be announced in the first quarter of 2022, and that other clinical data updates from the DesCAARTes™ trial were expected to be provided at scientific meetings throughout 2022 and 2023 with biologic activity data for cohorts A3 and A4 expected to be announced in mid-2022. In March 2022, we disclosed 28-day safety data for the fourth cohort with no DLTs observed in any patient during the 28 days after infusion of DSG3-CAART. In May 2022, abstracts for our posters presented on May 17, 2022 at the American Society of Gene & Cell Therapy 25th Annual Meeting (ASGCT) were made available publicly, which summarized clinical and translational data from the first three cohorts in the DesCAARTes™ trial where we reported no DLTs, serious adverse events or clinically relevant adverse events within three months of DSG3-CAART infusion. The observed dose-dependent increase in persistence indicated that DSG3-CAART cells were not eliminated by soluble anti-DSG3 Ab. Peak persistence in cohort A4 was at the lower end of the range observed with CART therapy in B cell cancers; however, the range of persistence observed with anti-CD19 CART therapy in oncology has not been confirmed to be necessary or sufficient for clinical response in patients with mPV. In August 2022, we announced that two additional dose cohorts are planned after cohort A5: A6m (multi-dose regimen at 10 to 15 billion cells) and a combination cohort (2.5 billion cells in addition to patient pre-treatment with intravenous immunoglobulin (IVIg) and cyclophosphamide). We also announced that the A5c cohort (enhanced manufacturing process at 5.0 to 7.5 billion cells) was no longer planned to occur immediately after cohort A5. In September 2022, we presented updated clinical and translational data through six months of follow-up in cohorts A1 through A4 as well

as 28-day safety data and DSG3-CAART persistence data through day 29 for cohorts A1 through A5 from the DesCAARTes™ trial at the 31st European Academy of Dermatology and Venereology (EADV) Congress. In October 2022, we presented additional clinical and translational data on those cohorts at the 29th European Society of Gene and Cell Therapy (ESGCT) Congress. Additionally, we have disclosed that no DLTs were observed through cohort A5, and that no clear trends in antibody levels or disease activity reduction were observed through cohort A4, though one subject in cohort A4 had no disease activity by three months post-infusion while reducing steroid usage during that period, an antibody titer that dropped more than 20% by three months post-infusion, and was the only patient in the first four cohorts that had detectable DSG3-CAART persistence at the three month time point following initial DSG3-CAART infusion. Based on the data observed from these cohorts, we announced that the combination sub-study would be prioritized to follow cohort A5.

Our MuSK-CAART product candidate is designed for the treatment of muscle-specific kinase myasthenia gravis, or MuSK MG. In the fourth quarter of 2021, we submitted an Investigational New Drug, or IND, application for the first-in-human studies to the United States Food and Drug Administration, or FDA, which became effective in January 2022. In February 2022, MuSK-CAART received fast track designation from the FDA for improving activities of daily living and muscle strength in patients with MuSK antibody-positive myasthenia gravis. In June 2022, we received a no objection letter from Health Canada, allowing us to initiate clinical trial activities in Canada. In October 2022, MuSK-CAART received orphan drug designation for the treatment of MuSK MG. We plan to initiate the MusCAARTes™ trial in the fourth quarter of 2022.

We are also advancing additional product candidates currently in discovery-stage or preclinical development for the treatment of mucocutaneous PV, or mCPV, PLA2R-associated membranous nephropathy, or PLA2R MN, and Hemophilia A with Factor VIII, or FVIII, alloantibodies, in addition to two undisclosed targets. We conducted a pre-IND interaction with the FDA to discuss the development path for PLA2R-CAART in the fourth quarter of 2021. Preclinical data indicating that PLA2R CAAR T cells specifically recognized and eliminated anti-PLA2R antibody-expressing B cells and that membrane proteome arrays screened with PLA2R CAAR candidates did not identify off-target interaction was presented at the American Society of Nephrology Kidney Week in the fourth quarter of 2021.

We were incorporated in April 2017. In August 2018, we entered into multiple agreements with Penn to develop the CAAR T technology to treat B cell-mediated autoimmune diseases. Our operations to date have been financed primarily by net proceeds of \$86.4 million from the sale of convertible notes and convertible preferred stock and net proceeds of \$71.0 million from the sale of common stock in our initial public offering, or IPO, in October 2019. In 2021, we raised \$49.7 million, with net proceeds of \$48.3 million, in “at-the-market” offerings, pursuant to a Sales Agreement, or the Sales Agreement, with Cowen and Company, LLC, or the Sales Agent, which provides for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of our common stock. As of September 30, 2022, we had \$85.9 million in cash and cash equivalents and investments.

Impact of the COVID-19 Pandemic

In December 2019, a novel strain of coronavirus (COVID-19) surfaced in Wuhan, China and proceeded to spread globally. The ongoing COVID-19 pandemic has led to the implementation of various responses, including government-imposed quarantines, travel restrictions and other public health safety measures, which have delayed the commencement of non-COVID-19-related clinical trials, among other restrictions.

We have been carefully monitoring the COVID-19 pandemic and its potential impact on our business and have taken important steps to help ensure the safety of employees and their families and to reduce the spread of COVID-19 community-wide. In March 2020, we established a flexible work-from-home policy for all employees, other than those performing or supporting business-critical operations, such as certain members of our laboratory staff. For those employees, we have implemented stringent safety measures designed to comply with applicable federal, state and local guidelines instituted in response to the COVID-19 pandemic. We have also maintained efficient communication with our partners and potential clinical sites as the COVID-19 situation has progressed. We have taken these precautionary steps while maintaining business continuity so that we can continue to progress our programs.

The extent to which COVID-19 will continue to impact our operations or those of our third party partners will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the pandemic, new information that may emerge concerning the severity of COVID-19, the impact of new strains of the virus, the effectiveness, availability and utilization of vaccines and treatments and the actions to contain COVID-19 or treat its impact, among others. Our financial results to date have not been significantly impacted by COVID-19, however, we cannot at this time predict the specific extent, duration, or full impact that the ongoing COVID-19 pandemic will have on our financial condition, operations, and business plans, including our ability to raise additional capital, the timing and enrollment of patients in our ongoing and planned clinical trials, future financings and other expected milestones of our product candidates.

Key Agreements

IASO Agreement

On October 7, 2022, we entered into an Exclusive License Agreement (the IASO Agreement) with IASO. Pursuant to the IASO Agreement, we received an exclusive, worldwide license under certain IASO intellectual property to use a novel clinical-stage anti-CD19 binder to develop, manufacture, commercialize and otherwise exploit T cell products directed to CD19 for the purpose of diagnosis, prevention or treatment of any autoimmune or alloimmune indications in humans. IASO has the right of first negotiation if we desire to grant a third party an exclusive license to develop, manufacture, commercialize or otherwise exploit the licensed products in the Greater China region. Pursuant to the IASO Agreement, we and IASO have agreed, subject to certain exceptions, to refrain from engaging in certain competitive activities with respect to certain programs. As partial consideration for the exclusive license, IASO will receive an upfront payment of \$2.5 million. IASO is also eligible to receive up to mid double digit millions in milestone payments based upon the achievement of specified pre-clinical, development and regulatory milestones, and up to an additional low triple digit millions in milestone payments based upon achievement of specified sales milestones, for a total consideration, inclusive of the upfront payment, of up to \$162 million, along with tiered mid-single digit royalties on future net sales for licensed products that may result from the IASO Agreement. We also may sublicense through multiple tiers the rights granted to it by IASO under the IASO Agreement at any time, however, we must pay IASO a low double-digit percentage of any revenue obtained from sublicenses or options to third parties, subject to certain customary exclusions. The IASO Agreement will continue on a country-by-country, licensed product-by-licensed product basis until the expiration of the royalty term as identified in the IASO Agreement, unless earlier terminated. We and IASO may terminate the IASO Agreement for a material, uncured breach or insolvency of the other party. We may also terminate the IASO Agreement at will upon advance written notice and in the event IASO rejects the IASO Agreement due to bankruptcy-related matters. IASO may also terminate the IASO Agreement if we fail to achieve certain specified diligence milestones in a timely manner and/or if we commence any patent challenges with respect to the patents and patent applications relating to the licensed sequence, in each case upon advance written notice.

Amended and Restated License Agreement with the Trustees of the University of Pennsylvania and the Children's Hospital of Philadelphia

In August 2018, we entered into a license agreement with Penn, which was amended and restated in July 2019 to include the Children's Hospital of Philadelphia, or CHOP, collectively, the Institutions, and collectively with such amendment, as amended in May 2020 and October 2021, the License Agreement, pursuant to which we obtained (a) a non-exclusive, non-sublicensable, worldwide research license to make, have made and use products in two subfields of use, (b) effective as of October 2018, an exclusive, worldwide, royalty-bearing license, with the right to sublicense, under certain of the Institutions' intellectual property to make, use, sell, offer for sale and import products in the same two subfields of use, and (c) effective as of October 2018, a non-exclusive, worldwide, royalty-bearing license, with limited rights to sublicense, under certain of Penn's know-how to make, have made, use, sell, offer for sale, import and have imported products in the same two subfields of use. Our rights are subject to the rights of the U.S. government and certain rights retained by the Institutions.

Unless earlier terminated, the License Agreement expires on the expiration or abandonment or other termination of the last valid claim in Penn's intellectual property licensed by us. We may terminate the License Agreement at any time for convenience upon 60 days written notice. In the event of an uncured, material breach, Penn may terminate the License Agreement upon 60 days written notice.

Sponsored Research Agreements

We have sponsored research agreements, or SRAs, with Penn for the laboratories of Drs. Payne and Milone, who are also our scientific co-founders and members of our scientific advisory board. In May 2020, the agreement with Dr. Payne, or the Payne SRA, was expanded to include CAAR design and optimization efforts in three additional B cell-mediated autoimmune diseases. In August 2020, the Payne SRA was further amended to extend the term of the original research plan. In April 2021 and October 2021, the Milone SRA was amended to extend the term of the original research plan through November 2022. In December 2021, we further amended the Payne SRA to extend the term through December 2024 and expand the workplan to include additional correlative studies related to the DesCAARTesTM trial. The total estimated cost of the agreements is \$12.6 million, which satisfies the \$2.0 million annual obligation under the License Agreement. As of September 30, 2022, \$12.2 million of cost has been incurred pursuant to these agreements.

In December 2021, we entered into a SRA with Penn for the laboratory of Dr. Drew Weissman, or the Weissman SRA. Under the Weissman SRA, discovery-stage proof of concept studies for lipid nanoparticle mRNA for the delivery and/or enhancement of CAAR technology is being conducted. Under the Weissman SRA, Penn granted us a non-transferable, non-exclusive license to use certain intellectual property for specific internal research purposes and further grants us the first option to negotiate to acquire, subject to agreement on commercial terms, an exclusive or non-exclusive worldwide license to certain patent rights for specific CAAR products developed under the Weissman SRA. Unless earlier terminated, the Weissman SRA will expire in December 2023. Pursuant to the

Weissman SRA, we also entered into an Option Agreement with Penn, or the Weissman Option, which grants us the option to negotiate to acquire a non-exclusive worldwide license to certain patent rights in connection with the Weissman SRA.

Master Translational Research Services Agreement

In October 2018, we entered into a Master Translational Services Agreement with Penn, or the Services Agreement, pursuant to which Penn agreed to perform certain services related to the research and development of the technology licensed to us under the License Agreement, as well as certain clinical, regulatory and manufacturing services. The Services Agreement will expire on the later of (i) October 19, 2021 or (ii) completion of the services for which we have engaged Penn under the Services Agreement. Either party may terminate this agreement with or without cause upon a certain number of days' prior written notice. The services encompassed by the Services Agreement are performed by different organizations at Penn pursuant to certain addenda to the Services Agreement, including the Center for Advanced Retinal and Ocular Therapeutics, or CAROT, Addendum, as amended in May 2020, and the CVPF Addendum.

Components of Operating Results

Revenue

To date, we have not generated any revenue from product sales and do not expect to generate any revenue from the sales of products for several years, if at all. If our development efforts for our current or future product candidates are successful and result in marketing approval, we may generate revenue in the future from product sales. We cannot predict if, when or to what extent we will generate revenue from the commercialization and sale of our product candidates. We may never succeed in obtaining regulatory approval for any of our product candidates.

We may also in the future enter into license or collaboration agreements for our product candidates or intellectual property, and we may generate revenue in the future from payments as a result of such license or collaboration agreements.

Operating Expenses

Research and Development

Our research and development expenses include:

- personnel costs, which include salaries, benefits and stock-based compensation expense;
- expenses incurred under agreements with consultants and third-party contract organizations that conduct research and development activities on our behalf;
- costs related to sponsored research service agreements;
- costs related to production of preclinical and clinical materials, including fees paid to contract manufacturers;
- licensing fees for intellectual property and know-how;
- laboratory and vendor expenses related to the execution of preclinical studies and ongoing and planned clinical trials; and
- laboratory supplies and equipment used for internal research and development activities and related depreciation expense.

We have not reported program costs since inception because historically we have not tracked or recorded our research and development expenses on a pre-clinical program-by-program basis. We use our personnel and infrastructure resources across the breadth of our research and development activities, which are directed toward identifying and developing product candidates.

We expense all research and development costs in the periods in which they are incurred. Costs for certain research and development activities are recognized based on an evaluation of the progress to completion of specific tasks using information and data provided to us by our vendors and third-party service providers.

We expect our research and development expenses to increase substantially for the foreseeable future as we continue to invest in research and development activities related to developing our product candidates, including investments in manufacturing, as our programs advance and we conduct clinical trials. The process of conducting the necessary clinical research to obtain regulatory approval is costly and time-consuming, and the successful development of our product candidates is highly uncertain. As a result, we are unable to determine the duration and completion costs of our research and development projects or when and to what extent we will generate revenue from the commercialization and sale of any of our product candidates.

Because of the numerous risks and uncertainties associated with product development, we cannot determine with certainty the duration and completion costs of the current or future preclinical studies and clinical trials or if, when, or to what extent we will generate revenues from the commercialization and sale of our product candidates. We may never succeed in achieving regulatory approval for our product candidates. The duration, costs and timing of preclinical studies and clinical trials and development of our product candidates will depend on a variety of factors, including:

- successful completion of preclinical studies and IND-enabling studies;
- development of chemistry, manufacturing and controls, or CMC, processes and procedures for purposes of IND applications;
- successful patient enrollment in, and the initiation and completion of, clinical trials;
- the impact of any business interruptions to our operations, including the timing and enrollment of patients in our ongoing and planned clinical trials, or to those of our clinical sites, manufacturers, suppliers, or other vendors resulting from the COVID-19 pandemic or similar public health crisis;
- receipt of regulatory approvals from applicable regulatory authorities;
- establishing commercial manufacturing capabilities or arrangements with third-party manufacturers;
- obtaining and maintaining patent and trade secret protection and non-patent exclusivity;
- launching commercial sales of our product candidates, if and when approved, whether alone or in collaboration with others;
- acceptance of our product candidates, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies and treatment options;
- a continued acceptable safety and efficacy profile following approval;
- enforcing and defending intellectual property and proprietary rights and claims; and
- achieving desirable medicinal properties for the intended indications.

We may never succeed in achieving regulatory approval for any of our product candidates. We may obtain unexpected results from our preclinical studies and clinical trials. We may elect to discontinue, delay or modify clinical trials of some product candidates or focus on others. A change in the outcome of any of these factors could mean a significant change in the costs and timing associated with the development of our current and future preclinical and clinical product candidates. For example, if the FDA or another regulatory authority, were to require us to conduct clinical trials beyond those that we currently anticipate will be required for the completion of clinical development, or if we experience significant delays in execution of or enrollment in any of our preclinical studies or clinical trials, we could be required to expend significant additional financial resources and time on the completion of preclinical and clinical development. We expect our research and development expenses to increase for the foreseeable future as we continue the development of product candidates.

General and Administrative Expenses

Our general and administrative expenses consist primarily of personnel costs, costs related to maintenance and filing of intellectual property, depreciation expense and other expenses for outside professional services, including legal, human resources, information technology, audit and accounting services. Personnel costs consist of salaries, benefits and stock-based compensation expense. We expect our general and administrative expenses to increase over the next several years to support our continued research and development activities, manufacturing activities, increased costs of operating as a public company and the potential commercialization of our product candidates. We anticipate our general and administrative costs will increase with respect to the hiring of additional personnel, developing commercial infrastructure, fees to outside consultants, lawyers and accountants, and increased costs associated with being a public company such as expenses related to services associated with maintaining compliance with Nasdaq listing rules and SEC requirements, insurance and investor relations costs.

Other Income

Other income consists of interest earned on our cash equivalents, amortization of bond discount or premium and investment gains and losses realized during the period.

Results of Operations for the Three Months ended September 30, 2022 and 2021

The following sets forth our results of operations for the three months ended September 30, 2022 and 2021:

	Three Months Ended September 30,		
	2022	2021	Change
	(in thousands)		
Statements of Operations Data:			
Operating expenses:			
Research and development	\$ 8,216	\$ 8,169	\$ 47
General and administrative	3,562	3,394	168
Total operating expenses	11,778	11,563	215
Loss from operations	(11,778)	(11,563)	(215)
Other income:			
Interest income	351	3	348
Net loss	<u>\$ (11,427)</u>	<u>\$ (11,560)</u>	<u>\$ 133</u>

Research and Development

Research and development expenses were \$8.2 million for both the three months ended September 30, 2022 and the three months ended September 30, 2021. The table below summarizes our research and development expenses:

	Three Months Ended September 30,		
	2022	2021	Change
	(in thousands)		
Sponsored research activities	\$ 695	\$ 684	\$ 11
Manufacturing of preclinical and clinical supplies	1,032	1,670	(638)
Clinical trials	848	935	(87)
Personnel	3,527	2,627	900
Development services	2,008	2,149	(141)
Other	106	104	2
	<u>\$ 8,216</u>	<u>\$ 8,169</u>	<u>\$ 47</u>

Specific changes in our research and development expenses year over year include a:

- \$0.9 million increase in personnel costs primarily driven by an increase in headcount to support overall growth, including an increase of \$0.2 million in stock-based compensation expense; partially offset by
- \$0.6 million lower manufacturing costs primarily due to timing of vector manufacturing.

General and Administrative

General and administrative expenses were \$3.6 million for the three months ended September 30, 2022 compared to \$3.4 million for the three months ended September 30, 2021. The increase of \$0.2 million in our general and administrative expenses includes:

- \$0.2 million of additional personnel costs, primarily driven by an increase in headcount to support overall growth; and
- \$0.2 million of professional services cost, including legal and accounting; partially offset by
- \$0.2 million lower director and officer insurance costs.

Other Income

Interest income increased by \$0.3 million for the three months ended September 30, 2022 compared to the three months ended September 30, 2021, primarily as a result of increasing interest rates.

Results of Operations for the nine months ended September 30, 2022 and 2021

The following sets forth our results of operations for the nine months ended September 30, 2022 and 2021:

	Nine Months Ended September 30,		Change
	2022	2021	
	(in thousands)		
Statements of Operations Data:			
Operating expenses:			
Research and development	\$ 26,900	\$ 22,575	\$ 4,325
General and administrative	10,937	9,845	1,092
Total operating expenses	37,837	32,420	5,417
Loss from operations	(37,837)	(32,420)	(5,417)
Other income:			
Interest income	554	19	535
Net loss	<u>\$ (37,283)</u>	<u>\$ (32,401)</u>	<u>\$ (4,882)</u>

Research and Development

Research and development expenses were \$26.9 million for the nine months ended September 30, 2022 as compared to \$22.6 million for the nine months ended September 30, 2021. The table below summarizes our research and development expenses:

	Nine Months Ended September 30,		Change
	2022	2021	
	(in thousands)		
Sponsored research activities	\$ 2,640	\$ 2,401	\$ 239
Manufacturing of preclinical and clinical supplies	4,144	4,360	(216)
Clinical trials	3,587	2,328	1,259
Personnel	10,451	7,228	3,223
Development services	5,668	6,005	(337)
Other	410	253	157
	<u>\$ 26,900</u>	<u>\$ 22,575</u>	<u>\$ 4,325</u>

Specific changes in our research and development expenses year over year include a:

- \$3.2 million increase in personnel costs primarily driven by an increase in headcount to support overall growth, including an increase of \$0.6 million in stock-based compensation expense;
- \$1.3 million increase in clinical trial costs for the DesCAARTes™ trial, including outsourced costs and investigator payments to clinical trial sites, and start-up costs for the planned MusCAARTes™ trial;
- \$0.2 million increase in costs under our sponsored research agreements, primarily due to an expanded scope of research including additional correlative studies related to the DesCAARTes™ trial; partially offset by
- \$0.3 million lower development services from decreased outsourced preclinical research activities; and a
- \$0.2 million decrease in manufacturing costs primarily due to timing of vector manufacturing.

General and Administrative

General and administrative expenses were \$10.9 million for the nine months ended September 30, 2022 compared to \$9.8 million for the nine months ended September 30, 2021. The increase of \$1.1 million in our general and administrative expenses includes:

- \$1.2 million of additional personnel costs, primarily driven by an increase in headcount to support overall growth, including an increase of \$0.5 million in stock-based compensation expense;
- \$0.5 million higher administrative costs, including legal, information technology and other administrative costs; partially offset by
- \$0.6 million lower director and officer insurance costs.

Other Income

Interest income increased by \$0.5 million for the nine months ended September 30, 2022 compared to the nine months ended September 30, 2021, primarily as a result of increasing interest rates.

Liquidity and Capital Resources

Since our inception in April 2017 through December 31, 2020, our operations have been financed by proceeds of \$86.4 million from the sale of convertible notes and our convertible preferred stock and proceeds of \$71.0 million from the sale of common stock in our initial public offering. In 2021, we raised \$49.7 million, with net proceeds of \$48.3 million, in “at-the-market” offerings, pursuant to our Sales Agreement which provides for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of our common stock. As of September 30, 2022, we had \$85.9 million in cash, cash equivalents and investments. Cash in excess of immediate requirements is invested in accordance with our investment policy, primarily with a view to liquidity and capital preservation.

We have incurred losses since our inception and, as of September 30, 2022, we had an accumulated deficit of \$149.9 million. Our primary use of cash is to fund operating expenses, which consist primarily of research and development expenditures, and to a lesser extent, general and administrative expenditures. Cash used to fund operating expenses is impacted by the timing of when we pay these expenses, as reflected in the change in our outstanding prepaid expenses and other current assets, accounts payable and accrued expenses.

Any product candidates we may develop may never achieve commercialization and we anticipate that we will continue to incur losses for the foreseeable future. We expect that our research and development expenses, general and administrative expenses, and capital expenditures will continue to increase. As a result, until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs through a combination of equity offerings, debt financings or other capital sources, including potentially collaborations, licenses and other similar arrangements. Our primary uses of capital are, and we expect will continue to be, compensation and related expenses, third-party clinical research, manufacturing and development services, costs relating to the build-out of our headquarters, laboratories and manufacturing facility, license payments or milestone obligations that may arise, laboratory and related supplies, clinical costs, manufacturing costs, legal and other regulatory expenses and general overhead costs.

Based upon our current operating plan, we believe that our existing cash, cash equivalents and investments as of September 30, 2022 will enable us to fund our operating expenses and capital expenditure requirements through the second quarter of 2024. We have based this estimate on assumptions that may prove to be wrong, and we could utilize our available capital resources sooner than we currently expect. We will continue to require additional financing to advance our current product candidates through clinical development, to develop, acquire or in-license other potential product candidates and to fund operations for the foreseeable future. We will continue to seek funds through equity offerings, debt financings or other capital sources, including potentially collaborations, licenses and other similar arrangements. However, we may be unable to raise additional funds or enter into such other arrangements when needed on favorable terms or at all. If we do raise additional capital through public or private equity offerings, the ownership interest of our existing stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect our stockholders’ rights. If we raise additional capital through debt financing, we may be subject to covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. Any failure to raise capital as and when needed could have a negative impact on our financial condition and on our ability to pursue our business plans and strategies. If we are unable to raise capital, we will need to delay, reduce or terminate planned activities to reduce costs.

At-The-Market Offering Sales Agreement

On November 10, 2020, we filed a registration statement on Form S-3 (File No. 333-250006) with the SEC, which was declared effective on November 18, 2020, or the Shelf Registration Statement, in relation to the registration of common stock, preferred stock, debt securities, warrants and/or units of any combination thereof for the purposes of selling, from time to time, our common stock, debt securities or other equity securities in one or more offerings. We also simultaneously entered into a Sales Agreement with Cowen and Company, LLC, to provide for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of our common stock from time to time in “at-the-market” offerings, or the ATM Program, under the Shelf Registration Statement and subject to the limitations thereof. We will pay to the Sales Agent cash commissions of 3.0 percent of the aggregate gross proceeds of sales of common stock under the Sales Agreement. In 2021, we sold 4,792,562 shares pursuant to the ATM Program for net proceeds of \$48.3 million, after deducting commissions of \$1.4 million. No shares have been sold pursuant to the ATM Program in 2022.

Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical products, we are unable to estimate the exact amount of our operating capital requirements. Our future funding requirements will depend on many factors, including, but not limited to:

- the scope, progress, results and costs of researching, developing and manufacturing our lead product candidates or any future product candidates, and conducting preclinical studies and clinical trials;
- the timing of, and the costs involved in, obtaining regulatory approvals or clearances for our lead product candidates or any future product candidates;
- the impact of any business interruptions to our operations or to those of our clinical sites, manufacturers, suppliers, or other vendors resulting from the COVID-19 outbreak or similar public health crisis;
- the number and characteristics of any additional product candidates we develop or acquire;
- the timing of any cash milestone payments if we successfully achieve certain predetermined milestones;
- the cost of manufacturing our lead product candidate or any future product candidates and any products we successfully commercialize, including costs associated with building-out our manufacturing capabilities;
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of any such agreements that we may enter into;
- the expenses needed to attract and retain skilled personnel;
- the costs associated with being a public company; and
- the timing, receipt and amount of sales of any future approved or cleared products, if any.

Further, our operating plans may change, and we may need additional funds to meet operational needs and capital requirements for clinical trials and other research and development activities. We currently have no credit facility or committed sources of capital. Because of the numerous risks and uncertainties associated with the development and commercialization of our product candidates, we are unable to estimate the amounts of increased capital outlays and operating expenditures associated with our current and anticipated product development programs.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Nine Months Ended September 30,	
	2022	2021
	(in thousands)	
Net cash provided by (used in):		
Operating activities	\$ (34,249)	\$ (23,594)
Investing activities	(26,901)	5,150
Financing activities	91	35,275
Net decrease (increase) in cash and cash equivalents	<u>\$ (61,059)</u>	<u>\$ 16,831</u>

Operating Activities

During the nine months ended September 30, 2022, cash used in operating activities of \$34.2 million was attributable to a net loss of \$37.3 million and a net change of \$2.9 million in our net operating assets and liabilities, partially offset by non-cash charges of \$6.0 million primarily from stock-based compensation and depreciation.

During the nine months ended September 30, 2021, cash used in operating activities of \$23.6 million was attributable to a net loss of \$32.4 million, partially offset by non-cash charges of \$4.8 million from stock-based compensation and depreciation and a net change of \$4.0 million in our net operating assets and liabilities.

Investing Activities

During the nine months ended September 30, 2022, cash used in investing activities of \$26.9 million was attributable to \$49.8 million of purchases of investments and \$2.1 million of purchases of property and equipment, partially offset by \$25.0 million of proceeds from maturities of investments.

During the nine months ended September 30, 2021, cash provided by investing activities of \$5.2 million was attributable to \$6.2 million of proceeds from maturities of investments, partially offset by \$1.0 million of purchases of property and equipment.

Financing Activities

During the nine months ended September 30, 2022, cash provided by financing activities of \$0.1 million was from the exercise of employee stock options and purchases of shares under our 2019 Employee Stock Purchase Plan, or 2019 ESPP.

During the nine months ended September 30, 2021, cash provided by financing activities of \$35.3 million was from \$34.7 million in sales of common stock, net of issuance costs and \$0.6 million from stock option exercises and purchases of shares under the 2019 Employee Stock Purchase Plan.

Contractual Obligations and Commitments

For a discussion of contractual obligations and other commitments affecting us, see the discussion under the heading “Management Discussion and Analysis of Financial Condition and Results of Operations – Contractual obligations and other commitments” included in our Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the SEC on March 17, 2022.

There have been no material changes to the Company’s contractual obligations and other commitments since December 31, 2021, except for those related to leases as described in Note 6 and the IASO Agreement described in Note 10 in the Notes to the Financial Statements in this Form 10-Q.

Critical Accounting Policies and Significant Judgments and Estimates

The Critical Accounting Policies and Significant Judgments and Estimates included in our Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the SEC on March 17, 2022, have not materially changed.

Emerging Growth Company Status

We are an emerging growth company, as defined in the Jumpstart Our Business Startup Act of 2012, or JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. Section 107 of the JOBS Act provides that an emerging growth company may take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act of 1933 for complying with new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. Section 107 of the JOBS Act provides that we can elect to opt out of the extended transition period at any time, which election is irrevocable. We have elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.

Subject to certain conditions, as an emerging growth company, we may rely on certain other exemptions and reduced reporting requirements, including without limitation (i) providing an auditor's attestation report on our system of internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act and (ii) complying with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the consolidated financial statements, known as the auditor discussion and analysis. We will remain an emerging growth company until the earlier of (a) the last day of the fiscal year in which we have total annual gross revenue of \$1.235 billion or more; (b) the last day of the fiscal year following the fifth anniversary of the date of the completion of our initial public offering; (c) the date on which we have issued more than \$1.0 billion in nonconvertible debt during the previous three years; or (d) the date on which we are deemed to be a large accelerated filer under the rules of the SEC.

Recently Issued Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board, or the FASB, issued ASU 2016-02, *Leases* (Topic 842), with guidance regarding the accounting for and disclosure of leases. The update requires lessees to recognize the liabilities related all leases, including operating leases, with a term greater than 12 months on the balance sheet. This update also requires lessees and lessors to disclose key information about their leasing transactions. This guidance was effective for public companies for annual and interim periods beginning after December 15, 2018. In June 2020, the FASB issued ASU 2020-05, *Revenue from Contracts with Customers* (Topic 606) and *Leases* (Topic 842), which granted a one-year effective date delay for certain companies with fiscal years beginning after December 15, 2021, and with interim periods within fiscal years beginning after December 15, 2022. As permitted for emerging growth companies, we will adopt Topic 842 under the private company transition guidance for the annual period ending December 31, 2022. We have not yet finalized the assessment of the impact that Topic 842 will have on our financial statements or financial statement disclosures.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

We are exposed to market risks in the ordinary course of our business. These risks primarily include interest rate sensitivities. We held cash and cash equivalents and investments of \$85.9 million as of September 30, 2022. We generally hold our cash in interest-bearing money market treasury fund accounts and our investments are available-for-sale debt securities, which are invested in U.S. government securities. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates. Due to the short-term maturities of our cash equivalents and the low risk profile of our investments, an immediate 100 basis point change in interest rates would not have a material effect on the fair market value of our cash equivalents. Declines in interest rates, however, would reduce future investment income.

We do not have any foreign currency or derivative financial instruments. Inflation generally affects us by increasing our cost of labor and program costs. Although we do not believe that inflation has had a material impact on our financial position or results of operations to date, we may experience some effect in the near future (especially if inflation rates continue to rise) due to an impact on the costs to conduct clinical trials, labor costs we incur to attract and retain qualified personnel, and other operational costs. Inflationary costs could adversely affect our business, financial condition and results of operations.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as amended, or the Exchange Act) as of the end of the period covered by this report. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures as of the end of the period covered by this report were effective at a reasonable assurance level in ensuring that information required to be disclosed by us in reports that we file or submit under the Exchange Act (i) is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and

forms and (ii) accumulated and communicated to management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely discussions regarding required disclosure. We believe that a control system, no matter how well designed and operated, cannot provide absolute assurance that the objectives of the control system are met, and no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within a company have been detected.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) and 15d-15(f) of the Exchange Act) that occurred during the fiscal quarter ended September 30, 2022 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting. As a result of the COVID-19 pandemic, since March 2020, many of our employees have been working remotely. We have not identified any material changes in our internal control over financial reporting as a result of these changes to the working environment. We are continually monitoring and assessing the COVID-19 situation to determine any potential impacts on the design and operating effectiveness of our internal controls over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

From time to time, our company may become involved in litigation or legal proceedings. While the outcome of any such proceedings cannot be predicted with certainty, as of September 30, 2022, we are not involved in any material litigation or legal proceedings that we would expect to have a material adverse impact on our financial position, results of operations, or cash flow, other than as described below.

On February 28, 2022, a purported stockholder of the Company filed a complaint against us and certain of our current officers and certain of our current and former directors in the United States District Court for the Eastern District of Pennsylvania captioned *Patterson v. Cabaletta Bio, Inc., et al.* No. 2:22-cv-00737 (E.D. Pa.). The complaint was filed on behalf of a putative class of persons and entities who purchased or otherwise acquired (a) Cabaletta common stock pursuant and/or traceable to the offering documents issued in connection with the Company's October 24, 2019 initial public offering; and/or (b) Cabaletta securities between October 24, 2019 and December 13, 2021 both dates inclusive. The complaint alleged claims under Sections 10(b) and 20(a) of the Exchange Act and Rule 10b-5 promulgated thereunder and under Sections 11 and 15 of the Securities Act based upon allegedly false or misleading statements and omissions regarding our DesCAARTes™ Phase 1 clinical trial of DSG3-CAART, clinical data for the DesCAARTes™ trial, the efficacy of DSG3-CAART, and the clinical and/or commercial prospects for DSG3-CAART. The complaint sought damages, prejudgment and post-judgment interest, and reasonable attorneys' fees, expert fees and other costs. On October 17, 2022, this complaint was voluntarily dismissed by the plaintiff. We may also become subject to additional securities class action lawsuits in the future. See Risk Factors — "The price of our stock may be volatile, and you could lose all or part of your investment" for additional information.

Item 1A. Risk Factors.

Our business involves material and other risks, some of which are summarized and described below. You should carefully consider the risks and uncertainties described below, together with all of the other information contained in this Quarterly Report on Form 10-Q, including "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the condensed financial statements and the related notes. If any of the following risks actually occur, it could harm our business, prospects, operating results and financial condition and future prospects. In such event, the market price of our common stock could decline and you could lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also impair our business operations. This Quarterly Report on Form 10-Q also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of factors that are described below and elsewhere in this Quarterly Report.

*The risk factors denoted with a "**", if any, are newly added or have been materially updated from our Annual Report on Form 10-K for the year ended December 31, 2021.*

Risks Related to Our Business, Technology and Industry

Risks Related to Clinical Development

We are early in our development efforts. If we are unable to advance our product candidates through clinical development, obtain regulatory approval and ultimately commercialize our product candidates, or experience significant delays in doing so, our business will be materially harmed.

We are early in our development efforts and we have not yet completed any clinical trials. Our ability to generate product revenues, which we do not expect will occur for many years, if ever, will depend heavily on the successful development and eventual commercialization of one or more of our product candidates. Even if we are able to develop and commercialize a marketable product, we may face challenges generating revenue from product sales. The success of our product candidates will depend on several factors, including the following:

- successful completion of preclinical studies resulting in data that is supportive of advancing to an IND submission;
- successful submission and acceptance of INDs or comparable applications;
- successful initiation of clinical trials;
- demonstration of adequate safety to progress to a therapeutic dose level;
- successful patient enrollment in and completion of clinical trials;
- receipt and related terms of regulatory and marketing approvals and licensures from applicable regulatory authorities;

- establishing commercial manufacturing capabilities or making arrangements with third-party manufacturers for clinical supply and commercial manufacturing of our product candidates;
- making arrangements with various medical divisions across hospitals for administration of our product candidates, including with cancer treatment centers to conduct leukapheresis and with the relevant hospital divisions to perform infusion;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- establishing sales, marketing and distribution and patient administration capabilities and launching commercial sales of our products, if and when licensed, whether alone or in collaboration with others;
- acceptance of our products, if and when licensed, by patients, the medical community and third-party payors;
- effectively competing with other therapies targeting the same indications as our product candidates;
- obtaining and maintaining third-party coverage and adequate reimbursement; and
- maintaining a continued acceptable safety profile of our products following licensure.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or be unable to successfully commercialize our product candidates, which would materially harm our business. If we do not receive regulatory approvals for our product candidates, we may not be able to continue our operations.

Cellular therapies, including our engineered chimeric antigen receptor T cell, or CAR T, chimeric antibody receptor T cell, or CAAR T, product candidates, represent a novel approach to the treatment of B cell-mediated autoimmune diseases, which creates significant challenges for us. Negative perception or increased regulatory scrutiny of any product candidates that we develop could adversely affect our ability to conduct our business or obtain regulatory approvals for such product candidates.

Cellular therapies are a novel approach and negative perception or increased regulatory scrutiny of any product candidates that we develop could adversely affect our ability to conduct our business or obtain regulatory approvals for such product candidates. Cellular therapies remain novel in general, and there are no cellular immunotherapies licensed to date in the United States or the European Union to treat autoimmune diseases or alloimmune responses. CAR T or CAAR T cell therapies for autoimmune or alloimmune diseases may not gain the acceptance of the public or the medical community. For example, CAR Ts and other cellular therapies have in some cases caused severe side effects, including death, and their broader use may therefore be limited. Even if CAR T therapies and other cellular therapies are accepted by the public and medical community in the short term, long-term adverse events observed in these therapies may increase negative perception and regulatory scrutiny. Although our CAAR Ts are different from CAR Ts and other cellular therapies, they may be viewed in the same vein, limiting their market acceptance. Public perception may be influenced by claims that gene therapy, including the insertion of a transgene, is unsafe, and products incorporating gene therapy may not gain the acceptance of the public or the medical community. The patient populations targeted by our product candidates are also typically not at risk of near-term death, even if they may suffer life-threatening symptoms, so patients will need to deem the benefits of cell therapy to be worth the risk of unknown potential adverse side effects. Our success will depend upon physicians who specialize in the treatment of B cell-mediated autoimmune diseases targeted by our product candidates prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments with which they are more familiar and for which greater clinical data may be available. Adverse events in clinical trials of our product candidates or in clinical trials of others developing similar products and the resulting publicity, as well as any other adverse events in the field of cellular therapies, could result in a decrease in demand for any product that we may develop.

We are developing a pipeline of CAR T and CAAR T product candidates that are intended for use in treating individuals with B cell-mediated autoimmune disease. Advancing these novel product candidates creates significant challenges for us, including:

- manufacturing our product candidates to our specifications and in a timely manner to support our clinical trials, and, if licensed, commercialization;
- sourcing clinical and, if licensed, commercial supplies for the materials used to manufacture our product candidates;
- understanding and addressing variability in the quality and quantity of a subject's T cells, which could ultimately affect our ability to manufacture clinical supply and, if licensed, commercial supply of our product candidates in a reliable and consistent manner;
- educating medical personnel regarding the potential side effect profile of our product candidates, if licensed, such as the potential adverse side effects related to pemphigus flare, MuSK MG flare or myasthenic crisis from infusion of activated T cells or medication taper, cytokine release syndrome, or CRS, or other unexpected adverse effects of therapy with our product candidates;
- facilitating patient access to the limited number of facilities able to administer our product candidates, if licensed;

- using medicines to manage adverse side effects of our product candidates that may not adequately control the side effects and/or may have a detrimental impact on the efficacy of the treatment;
- utilizing preconditioning agents in patients to enhance engraftment in advance of administering our product candidates, which may increase the risk of adverse side effects and potentially reduce the population eligible for therapy;
- obtaining and maintaining regulatory approval for our product candidates, as the FDA and other regulatory authorities have limited or no experience with development of engineered T cell therapies for the treatment of B cell-mediated autoimmune diseases;
- establishing sales and marketing capabilities upon obtaining any regulatory approval to gain market acceptance of a novel therapy; and
- managing costs of inputs and other supplies while scaling production.

In addition, preclinical murine and other animal models may not exist or be adequate for some or all of the B cell-mediated autoimmune diseases we choose to pursue in our programs, and because we are early in the clinical development process, we are unable to predict whether there may be short-term or long-term effects from treatment with any product candidates that we develop. In developing our product candidates, we have not exhaustively explored different options in the method for manufacturing CAR T or CAAR T cells. We may find our existing manufacturing process may be substantially improved with future design or process changes, necessitating further clinical testing, delaying commercial launch of our first products, and causing us to incur additional expenses. For example, while we have used a lentiviral vector in our manufacturing process, we may in the future find that another viral vector or non-viral vector-based process offers advantages. Switching from one lentiviral vector to another or switching from lentiviral to another delivery system would necessitate additional process development and clinical testing, and this may delay the development of existing product candidates.

In addition, we do not know the doses to be evaluated in pivotal trials or, if licensed, commercially. Finding a suitable dose may delay our anticipated clinical development timelines. Our expectations with regard to our scalability and costs of manufacturing may vary significantly as we develop our product candidates and understand these critical factors. We may experience delays in developing a sustainable, reproducible and scalable manufacturing process or transferring that process to commercial partners, which may prevent us from completing our clinical studies or commercializing our product candidates on a timely or profitable basis, if at all.

Moreover, our product candidates may not perform successfully in clinical trials or may be associated with adverse events that distinguish them from the chimeric antigen receptor T, or CAR T, therapies that have previously been licensed. For instance, subjects in our clinical trials will be infused with our proposed therapies, and may possess strongly activating soluble antibodies, which, are not present in oncology patients and when they interact with our infused product candidates, could result in potential adverse side effects, such as CRS. Unexpected side effects or clinical outcomes would significantly impact our business. Adverse side effects caused by even one of our product candidates could negatively affect our ability to develop future product candidates based on our CABA™ platform.

In addition, two of our current product candidates, DSG3/1-CAART and FVIII-CAART, and certain of our future product candidates may require introducing large transgenes into T cells, and lentiviral vectors may have too limited a genome capacity to accomplish this process. We currently use lentiviral vector transduction for transgene delivery. However, lentiviral vectors have a limited genome capacity that restricts the size of the transgene that can be delivered using this vector system. For example, designing a lentiviral vector that will have sufficient capacity to introduce DSG3 CAAR and DSG1 CAAR together into T cells may not be possible. In addition to reducing lentiviral vector titers that may substantially increase the cost of gene transfer, it may be entirely unsuccessful, thus necessitating use of alternative strategies for transfer of these larger transgenes into T cells.

Further, the clinical study requirements of the FDA and other regulatory agencies and the criteria they use to determine the safety, potency and purity of a product candidate are determined according to the type, complexity, novelty and intended use and market of the potential products. The regulatory approval process for novel product candidates such as ours is less clear, and can be more complex and consequently have higher development risk, be more expensive and take longer than for other, better known or extensively studied pharmaceutical or other product candidates. Approvals by the FDA for existing cell therapies treating B cell-mediated diseases, such as Kymriah (Novartis Pharmaceuticals Corporation) and Yescarta (Gilead Sciences, Inc.), may not be indicative of what the FDA may require for approval of our therapies. Approvals by any regulatory agency may not be indicative of what any other regulatory agency may require for approval or what such regulatory agencies may require for approval in connection with new product candidates. As we advance our product candidates, we will be required to consult with these regulatory agencies and comply with applicable requirements and guidelines. If we fail to do so, we may be required to delay or discontinue development of such product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. More restrictive statutory regimes, government regulations or negative public opinion would have an adverse effect on our business, financial condition, results of operations and prospects and may delay or impair the development and commercialization of our product candidates or demand for any products we may develop.

In addition, responses by agencies at the federal and state level to negative public perception or ethical concerns may result in new legislation or regulations that could limit our ability to develop or commercialize any product candidates, obtain or maintain regulatory approval or otherwise achieve profitability. The FDA has expressed interest in further regulating biotechnology products, such as cellular therapies. Agencies at both the federal and state level in the United States, as well as the U.S. Congressional committees and other government entities or governing agencies have also expressed interest in further regulating the biotechnology industry. Such action may delay or prevent commercialization of some or all of our product candidates. Adverse developments in clinical trials of cellular therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of any of our product candidates. These regulatory review agencies and committees and the new requirements or guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies or trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post-approval limitations or restrictions.

Patients receiving T cell-based immunotherapies, such as our product candidates, may experience serious adverse events, including neurotoxicity, CRS and killing of cells other than the intended B cells that express the autoantibodies. If our product candidates are revealed to have high and unacceptable severity and/or prevalence of side effects or unexpected characteristics, their clinical development, regulatory approval, and commercial potential will be negatively impacted, which will significantly harm our business, financial condition and prospects.

Our product candidates are CAR T or CAAR T cell-based immunotherapies. In other similarly designed cellular immunotherapies to treat cancer, there have been life threatening events related to severe neurotoxicity and CRS requiring intense medical intervention, such as intubation or medications to support blood pressure, and in several cases, resulted in death. Severe neurotoxicity is a condition that is currently defined clinically by cerebral edema, confusion, drowsiness, speech impairment, tremors, seizures or other central nervous system side effects, when such side effects are serious enough to lead to intensive care. CRS is a condition that is currently defined clinically by certain symptoms related to the release of cytokines, which can include fever, chills and low blood pressure, when such side effects are serious enough to lead to intensive care with mechanical ventilation or significant medications to support blood pressure. There is a possibility that our product candidates could have similarly life threatening serious adverse side effects, such as neurotoxicity and CRS.

Our product candidates may have serious and potentially fatal consequences due to the targeting of cells within the body due to unexpected protein interactions with the CAR or CAAR. Although we have completed multiple preclinical studies designed to screen for toxicity caused by unintended off-target recognition by the cell binding domain of the DSG3 CAAR and MuSK CAAR, our product candidates may still recognize and react with one or more proteins unrelated to the intended surface immunoglobulin target protein to which it is designed to link. If unexpected binding occurs in normal tissue, our product candidates may target and kill the normal tissue in a patient, leading to serious and potentially fatal adverse events, undesirable side effects, toxicities or unexpected characteristics. Detection of any unexpected targeting may halt or delay any ongoing clinical trials for our product candidates and prevent or delay regulatory approval. While we have developed a preclinical screening process to identify cross-reactivity of our product candidates, we cannot be certain that this process will identify all potential tissue that our product candidates may target. For example, a membrane protein array with DSG3-CAART yielded one weak signal against a protein that is designed to bind to glycoproteins and which was detected in both the test and control conditions. Further analysis of this protein in confirmatory cell-based assays repeatedly demonstrated that DSG3-CAART does not recognize nor activate against this protein. We performed similar preclinical studies for the MuSK CAAR and did not observe any confirmed off target activity for MuSK-CAART. However, this further analysis may prove to be inaccurate. Any unexpected targeting that impacts patient safety could materially impact our ability to advance our product candidates into clinical trials or to proceed to marketing approval and commercialization. Furthermore, in the event subjects are retreated, they may respond differently than other subjects given the same dose, and may not tolerate the dose or develop safety concerns.

Results of our studies could reveal a high and unacceptable severity and prevalence of side effects or unexpected characteristics. Undesirable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA. The FDA has requested and we have agreed to provide data on the subjects dosed in Part A of our DesCAARTes™ trial prior to dosing subjects in Part B. The FDA has communicated that the dosing of patients in Part B1 is not dependent on the review of Part A data and that they will provide feedback, if any, in a timely manner. In some cases, side effects such as neurotoxicity or CRS have resulted in clinical holds of ongoing clinical trials and/or discontinuation of the development of the product candidate. Given that the autoimmune and alloimmune diseases we are seeking to treat are, in some cases, less serious than the later stage cancers being treated with other immunotherapy products, we believe the FDA and other regulatory authorities likely will apply a different benefit-risk assessment thresholds such that even if our product candidate demonstrated a similar safety profile as current CAR T therapies, the FDA may ultimately determine that the harmful side effects outweigh the benefits and require us to cease clinical trials or deny approval of our product candidates. We believe tolerance for adverse events in the patient population being pursued with CAAR T cell therapies will be lower than it is in oncology, and the risks of negative impact from these toxicities may therefore be higher for us than for CAR T programs in oncology.

Furthermore, treatment-related side effects could also affect patient recruitment or the ability of enrolled patients to complete the studies or result in potential product liability claims. In addition, these side effects may not be appropriately recognized or managed by the treating medical staff, as toxicities resulting from T cell-based immunotherapies are not normally encountered in routine medical care. Medical personnel may need additional training regarding T cell-based immunotherapy product candidates to understand their side effects. Inadequate training in recognizing or failure to effectively manage the potential side effects of T cell-based immunotherapy product candidates could result in patient deaths. Any of these occurrences may harm our business, financial condition and prospects significantly.

In addition to side effects caused by our product candidates, any preconditioning, administration process or related procedures, which we evaluate from time to time as part of our process improvement and optimization efforts, may also cause adverse side effects. For example, prolonged or persistent cytopenias and severe neurotoxicity has been noted to be associated with the use of certain lymphodepleting regimens and CAR T therapies. While we initiated the DesCAARTes™ trial without a preconditioning regimen, we have implemented a cohort where a preconditioning regimen with a lymphodepleting agent and an immunomodulatory agent will be administered.

We have implemented a preconditioning regimen in the DesCAARTes™ trial where subjects are pre-treated with IVIg and cyclophosphamide prior to DSG3-CAART infusion, and included a planned dosing cohort in the MusCAARTes™ trial where subjects are pre-treated with cyclophosphamide prior to MuSK-CAART infusion, and we may in the future use a preconditioning regimen for our other CAR T or CAAR T cell product candidates, which may increase the risk of adverse side effects and impact our ability to accurately assess the efficacy of our product candidates.

In oncology patients receiving CAR T cell therapy, a lymphodepleting preconditioning regimen is typically used to condition the patient prior to CAR T cell infusion in order to improve tumor immunogenicity and to promote the expansion of the infused CAR T cells. Together, these effects have been shown to enhance the clinical activity of CAR T cells in oncology patients. These regimens often include cyclophosphamide and fludarabine and are usually administered within the week prior to infusion of CAR T cells. Serious adverse events have been observed in some patients following CAR T cell infusion, and these include infection, cytokine release syndrome and neurotoxicity. The lymphodepleting and immunomodulatory preconditioning regimen may contribute to the occurrence and severity of these adverse events due to its role in inducing lymphopenia, or low levels of lymphocytes in the blood, and regulating the activation and effector functions of other immune cells and antibodies, and enhanced CAR T cell activity.

Lymphodepleting preconditioning may not be required in all oncology settings for CAR T cell activity. A clinical trial in multiple myeloma patients published in 2019 in *The Journal of Clinical Investigation* showed similar clinical activity of CAR T cell infusions in patients with or without a lymphodepleting preconditioning regimen. Furthermore, the requirement for lymphodepleting preconditioning for potentiating engineered T cell therapy outside of oncology has not been well established. Specifically, the effect on tumor immunogenicity is not relevant in settings outside oncology, and therefore the contribution of this aspect to the potential enhancing effect of preconditioning would not apply.

In addition, a lymphodepleting regimen may eliminate pathogenic B cells targeted by our CAAR T cell product candidates. As a result, any lymphodepleting regimen for preconditioning that we use may delay or otherwise adversely affect our ability to use DSG3 or MuSK autoantibody titers, a standard clinical assay, to assess the activity of DSG3-CAART and MuSK-CAART, respectively. An inability to use DSG3 or MuSK autoantibody levels to demonstrate the specific activity of our CAAR T cell product candidates may require us to rely on the subjective measurement of blister formation in patients in the DesCAARTes™ trial or muscle weakness in the MusCAARTes™ trial, which can be a less sensitive and accurate measurement of CAAR T cell activity. This therefore could delay a signal of potential biologic activity attributable to CAAR and therefore may slow clinical development. Based on emerging clinical and translational data, in the setting of autoimmune patients, we believe the inclusion of such a regimen in the DesCAARTes™ trial and MusCAARTes™ trial is justified to further evaluate the DSG3-CAART and MuSK-CAART platforms. We will continue to evaluate emerging data from the DesCAARTes™ trial on an ongoing basis, as well as other relevant clinical trials in autoimmune disease, and may make additional modifications to the DesCAARTes™ trial or MusCAARTes™ trial, as appropriate.

In addition to lymphodepleting preconditioning, other preconditioning regimens with immunomodulatory effects may be considered to prepare the body for CAR T or CAAR T infusion. For example, if autoantibody is found to reduce or inhibit function of CAAR T in the body, then pretreatment of patients with antibody reducing therapies, such as FcRN inhibitors, IVIg, plasmapheresis, or treatment of post rituximab patients may be considered. Some of these types of preconditioning are standard of care for this autoimmune population and therefore are already considered to have a beneficial risk profile in this patient population. These other preconditioning regimens may cause serious adverse events, including hypotension, thromboembolism, and opportunistic infections.

While we initiated the DesCAARTes™ trial without a preconditioning regimen, we have now implemented a cohort where a preconditioning regimen with a lymphodepleting agent and an immunomodulatory agent will be administered. Our clinical patients may experience increased or more severe adverse effects specifically related to the preconditioning regimen, such as severe allergic reactions, difficulty breathing, severe headaches, serious infections, low blood counts, inflammation of the colon with bleeding, bladder irritation, blood clots, development of certain cancers, damage to the heart, lung or kidneys, and even death. These undesirable side effects, whether associated with the preconditioning regimen alone or in combination with our CAAR T cell product candidates, could cause

delays in patient enrollment in our clinical trials, could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a change to our clinical trial design, a more restrictive label or the delay or denial of regulatory approval by the FDA. Any of the foregoing may increase the duration and expense of the clinical development of our product candidates or limit market acceptance of such product candidates, if approved, any of which could have a material adverse effect on our business and financial condition.

Our business is highly dependent on the success of our initial product candidates targeting B cell-mediated autoimmune diseases, particularly CABA-201, DSG3-CAART and MuSK-CAART. All of our product candidates will require significant additional preclinical and/or clinical development before we can seek regulatory approval for and launch a product commercially.

Our business and future success depend on our ability to obtain regulatory approval of, and then successfully launch and commercialize our initial product candidates targeting B cell-mediated autoimmune diseases, including CABA-201, DSG3-CAART, MuSK-CAART, DSG3/1-CAART, PLA2R-CAART and others that may be selected from preclinical programs. Our product candidates are in the early stages of development and will require additional preclinical studies, clinical trials, regulatory review and licensure, substantial investment, access to sufficient commercial manufacturing capacity and significant marketing efforts before we can generate any revenue from product sales. There is no guarantee that we will be able to advance our product candidates through clinical development or obtain marketing approval for any of our product candidates. The process for obtaining marketing approval for any product candidate is very long and risky and there will be significant challenges for us to address in order to obtain marketing approval as planned, if at all.

However, the initial clinical results we have observed may not be predictive of results of subsequent cohorts in this clinical trial, or of any future clinical trials. Because DSG3-CAART and MuSK-CAART are the first and second product candidates that we are testing in the clinic, we may experience preliminary complications surrounding trial design, protocol establishment and execution, establishing trial protocols, patient recruitment and enrollment, quality and supply of clinical doses, or safety issues. For example, while the majority of oncology CAR T clinical trials have been conducted with a lymphodepleting or other preconditioning regimen prior to infusion, we have not used pre-infusion lymphodepletion or other preconditioning regimen in our Phase I trial to date. However, based on emerging clinical and translational data, we have now implemented a cohort where a preconditioning regimen with a lymphodepleting agent and an immunomodulatory agent will be administered in the DesCAARTEs™ trial, and we continue to evaluate whether the use of a lymphodepleting or other preconditioning regimen is necessary for our other product candidates to be successful, and if we determine that it is, it could result in delays in clinical development and will expose patients to the associated risks.

Additionally, a failure of our clinical trials of DSG3-CAART or MuSK-CAART could influence physicians' and regulators' opinions with regard to the viability of our CABA™ platform more broadly, particularly if treatment-related side effects are observed. The occurrence of any of these risks could significantly harm our development plans and business prospects. If treatment-related side effects are observed with the administration of DSG3-CAART or MuSK-CAART, or if they are viewed as less safe, potent or pure than other therapies, our ability to develop other CAAR T cell therapies may be significantly harmed.

We have never successfully completed any clinical trials, and we may be unable to do so for any product candidates we develop.

We have not yet demonstrated our ability to successfully complete any clinical trials, including large-scale, pivotal clinical trials, obtain regulatory approvals, manufacture a commercial scale product, or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful commercialization. Although our key employees have significant experience in leading clinical development programs, our experience conducting clinical trials with our product candidates is limited. We may not be able to file INDs for any of our other product candidates on the timelines we expect, if at all. For example, we cannot be certain that the IND-enabling studies for our future product candidates will be completed in a timely manner or be successful or that the manufacturing process will be validated in a timely manner. Even if we submit an IND for a future product candidate, the FDA may not clear the IND and allow us to begin clinical trials in a timely manner or at all. The timing of submissions on future product candidates will be dependent on further preclinical and manufacturing success. Moreover, we cannot be sure that submission of an IND will result in the FDA allowing further clinical trials to begin, or that, once begun, issues will not arise that require us to suspend or terminate clinical trials. Commencing each of these clinical trials is subject to finalizing the trial design based on discussions with the FDA and other regulatory authorities. Any guidance we receive from the FDA or other regulatory authorities is subject to change. These regulatory authorities could change their position, including, on the acceptability of our trial designs or the clinical endpoints selected, which may require us to complete additional clinical trials or impose stricter approval conditions than we currently expect.

If we are required to conduct additional clinical trials or other testing of our product candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;

- obtain approval for indications or patient populations that are not as broad as intended or desired;
- be subject to post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Risks Related to the Coronavirus (COVID-19) Pandemic

The ongoing COVID-19 pandemic and the future outbreak of other highly infectious or contagious diseases could seriously harm our research, development and potential future commercialization efforts, increase our costs and expenses and have a material adverse effect on our business, financial condition and results of operations.

Public health crises such as pandemics or similar outbreaks could adversely impact our business, the business operations of third parties on whom we rely and our ongoing or planned research and development activities. New variants of COVID-19 have been identified and spread, which have led to various responses, including government-imposed quarantines, travel restrictions and other public health safety measures in response to the emergence of new variants. The extent to which COVID-19 will continue to impact our operations or those of our third party partners will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the pandemic, new information that may emerge concerning the severity of COVID-19, the impact of new strains of the virus, the effectiveness, availability and utilization of vaccines and treatments and the actions to contain COVID-19 or treat its impact, among others. Further, since the beginning of the COVID-19 pandemic, several vaccines for COVID-19 have been developed, authorized or approved and additional vaccines may be authorized or approved in the future. The resultant demand for vaccines and potential for manufacturing facilities and materials to be commandeered under the Defense Production Act of 1950, or equivalent foreign legislation, may make it more difficult to obtain materials or manufacturing slots for the products needed for our clinical trials, which could lead to delays in these trials.

Additionally, timely enrollment in our ongoing and planned clinical trials is dependent upon clinical trial sites which may be adversely affected by global health matters, such as COVID-19. The ongoing COVID-19 pandemic could result in increased adverse events and deaths in our clinical trials due to COVID-19 related infections, and implementing a lymphodepleting and/or immunomodulatory preconditioning regimen may result in the likelihood that patients are more immunosuppressed and therefore at a greater risk of developing more severe symptoms from a COVID-19 infection. Some factors from the ongoing COVID-19 pandemic that have delayed and could further delay or otherwise adversely affect enrollment in the clinical trials of our product candidates, as well as our business generally, include:

- the potential diversion of healthcare resources away from the conduct of clinical trials to focus on pandemic concerns, including the attention of physicians serving as our clinical trial investigators, hospitals serving as our clinical trial sites and hospital staff supporting the conduct of our prospective clinical trials and the need for drugs, such as tocilizumab, and other supplies that clinical trial sites must have on hand to conduct our clinical trials to be used to treat COVID-19;
- limitations on travel that could interrupt key trial and business activities, such as clinical trial site initiations and monitoring, domestic and international travel by employees, contractors or patients to clinical trial sites, including any government-imposed travel restrictions or quarantines that will impact the ability or willingness of patients, employees or contractors to travel to our clinical trial sites or secure visas or entry permissions, a loss of face-to-face meetings and other interactions with potential partners, any of which could delay or adversely impact the conduct or progress of our prospective clinical trials;
- interruption in global shipping affecting the transport of clinical trial materials, such as patient samples, investigational drug product and conditioning drugs and other supplies used in our prospective clinical trials;
- interruptions in operations at our third-party manufacturers, which could result in delays or disruptions in the supply of our current product candidates and any future product candidates; and
- business disruptions caused by potential workplace, laboratory and office closures and an increased reliance on employees working from home, disruptions to or delays in ongoing laboratory experiments and operations, product manufacturing and supply, staffing shortages, travel limitations or mass transit disruptions, any of which could adversely impact our business operations or delay necessary interactions with local regulators, ethics committees and other important agencies and contractors.

These and other factors arising from the ongoing COVID-19 pandemic could worsen. Any of these factors, and other factors related to any such disruptions that are unforeseen, could have a material adverse effect on our business and our results of operation and financial condition. Further, uncertainty around these and related issues could lead to adverse effects on the economy of the United

States and other economies, which could impact our ability to raise the necessary capital needed to develop and commercialize our product candidates.

Risks Related to the Industry

Our product candidates may cause undesirable side effects or have other properties that could halt their clinical development, prevent their regulatory approval, limit their commercial potential or result in significant negative consequences.

Undesirable or unacceptable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA. Further, clinical trials by their nature utilize a sample of the potential patient population. With a limited number of subjects and limited duration of exposure, rare and severe side effects of our product candidates may only be uncovered with a significantly larger number of patients exposed to the drug. Undesirable side effects could also result in an expansion in the size of our clinical trials, increasing the expected costs and timeline of our clinical trials. Additionally, results of our clinical trials could reveal a high and unacceptable severity and prevalence of side effects or unexpected characteristics.

Licensed CAR T cell therapies and those under development have shown frequent rates of CRS and neurotoxicity, and adverse events have resulted in the death of patients. Similar adverse events could occur during treatment with our CAR T or CAAR T cell product candidates. For example, activation of CAAR T cells by patient autoantibodies or alloantibodies could stimulate CRS. When CAAR T cells are infused and the CAAR binds to soluble antibodies in the blood or tissues of treated patients, these soluble antibodies may cause the CAAR T cells to proliferate, resulting in an activation of the immune system that is too high, leading to CRS. Further, it is possible that patients will exhibit acute rejection of the CAAR T cells because of preexisting immunity to the antigen within the CAAR. This could render our product candidates ineffective.

If unacceptable toxicities or health risks, including risks inferred from other unrelated immunotherapy trials, arise in the development of our product candidates, we could suspend or terminate our trials or the FDA, the Data Safety Monitoring Board, or DSMB, or local regulatory authorities such as institutional review boards, or IRBs, could recommend or order us to cease clinical trials. Regulatory authorities, such as the FDA, could also deny approval of our product candidates for any or all targeted indications. Treatment-related side effects could also affect patient recruitment or the ability of enrolled subjects to complete the trial or result in potential product liability claims. In addition, these side effects may not be appropriately recognized or managed by the treating medical staff, as toxicities resulting from T cell therapy are not normally encountered in the general patient population and by medical personnel. We expect to have to train medical personnel using CAR T or CAAR T cell product candidates to understand the side effect profile of our product candidates for both our preclinical studies and clinical trials and upon any commercialization of any of our product candidates, if licensed. Inadequate training in recognizing or managing the potential side effects of our product candidates could result in patient deaths. Any of these occurrences may harm our business, financial condition and prospects significantly.

Our preclinical studies and clinical trials may fail to demonstrate the safety, potency and purity of any of our product candidates, which would prevent or delay regulatory approval and commercialization.

Before obtaining regulatory approvals for the commercial sale of any of our product candidates, we must demonstrate through lengthy, complex and expensive preclinical testing and clinical trials that our product candidates are safe, potent and pure for use in each target indication. Clinical trials are expensive and can take many years to complete, and their outcomes are inherently uncertain. Failure can occur at any time during the clinical trial process. The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials, including in any post-approval studies of our product candidates. In addition, initial success in any clinical trials may not be indicative of results obtained when such trials are completed. There is typically an extremely high rate of attrition from the failure of product candidates proceeding through clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety, potency and purity profile despite having progressed through preclinical studies and initial clinical trials.

A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of potency or efficacy, insufficient durability of potency or efficacy or unacceptable safety issues, notwithstanding promising results in earlier trials, and we cannot be certain that we will not face similar setbacks. These setbacks have been caused by, among other things, preclinical and other nonclinical findings made while clinical trials were underway, or safety or efficacy observations made in preclinical studies and clinical trials, including previously unreported adverse events. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain FDA or EMA approval. Most product candidates that commence clinical trials are never approved as products.

Any preclinical studies or clinical trials that we may conduct may not demonstrate the safety, potency and purity necessary to obtain regulatory approval to market our product candidates. If the results of our ongoing or future preclinical studies and clinical trials are inconclusive with respect to evaluations of efficacy, the safety, potency and purity of our product candidates, if we do not meet the clinical endpoints with statistical and clinically meaningful significance, or if there are safety concerns associated with our product candidates, we may be prevented or delayed in obtaining marketing approval for such product candidates. In some instances, there can

be significant variability in evaluations of efficacy, safety, potency or purity results between different preclinical studies and clinical trials of the same product candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations, changes in and adherence to the clinical trial protocols and the rate of dropout among clinical trial participants. For example, because our CAAR T cell product candidates only target approximately 0.01% to 1% of the B cells in a patient, they may not engage enough of the target to achieve adequate engraftment necessary for elimination of all pathogenic B cells. Insufficient safety or potency in clinical trials may delay product development to enable time to modify the product candidate for next generation approaches or make manufacturing changes or may lead us to discontinue development of the product candidate.

Additionally, our ongoing clinical trials utilize, and our planned trials may utilize, an “open-label” trial design. An “open-label” clinical trial is one where both the patient and investigator know whether the patient is receiving the investigational product candidate or either an active drug or placebo. Most typically, open-label clinical trials test only the investigational product candidate and sometimes may do so at different dose levels. Open-label clinical trials are subject to various limitations that may exaggerate any therapeutic effect as patients in open-label clinical trials are aware when they are receiving treatment. Open-label clinical trials may be subject to a “patient bias” where patients perceive their symptoms to have improved merely due to their awareness of receiving an experimental treatment. In addition, open-label clinical trials may be subject to an “investigator bias” where those assessing and reviewing the physiological outcomes of the clinical trials are aware of which patients have received treatment and may interpret the information of the treated group more favorably given this knowledge. The results from an open-label trial may not be predictive of future clinical trial results with any of our product candidates for which we include an open-label clinical trial when studied in a controlled environment with a placebo or active control.

In addition, for DSG3-CAART, MuSK-CAART and any future trials that may be completed, we cannot guarantee that the FDA will interpret the results as we do, and more trials could be required before we submit our product candidates for approval. To the extent that the results of the trials are not satisfactory to the FDA to support a marketing application, approval of our product candidates may be significantly delayed, or we may be required to expend significant additional resources, which may not be available to us, to conduct additional trials in support of potential approval of our product candidates.

****Interim, topline or preliminary data from any preclinical studies or clinical trials that we conduct may change as more data become available and are subject to audit and verification procedures that could result in material changes in the final data.***

Our DesCAARTes™ trial and our planned MusCAARTes™ trial are both designed as open-label trials. From time to time, we may publicly disclose interim, preliminary or topline data from our preclinical studies and clinical trials, including safety data and evaluations of efficacy, which will be based on a preliminary analysis of then-available data, and the results and related findings and conclusions are subject to change following our receipt of additional data or a more comprehensive review of the data related to the particular study or trial. We also make assumptions, estimations, calculations and conclusions as part of our analyses of data, and we may not have received or had the opportunity to fully and carefully evaluate all data. For example, we have disclosed clinical and translational data from the first four cohorts in the DesCAARTes™ trial where we reported no DLTs, serious adverse events or clinically relevant adverse events, within six months of DSG3-CAART infusion. Additionally, we have disclosed that no DLTs were observed through cohort A5, and that no clear trends in antibody levels or disease activity reduction were observed through cohort A4, though one subject in cohort A4 had no disease activity by three months post-infusion while reducing steroid usage during that period, an antibody titer that dropped more than 20% by three months post-infusion, and was the only patient in the first four cohorts that had detectable DSG3-CAART persistence at the 3 month time point following initial DSG3-CAART infusion. DSG3-CAART persistence through day 29 in cohort A5 was similar to that observed in cohort A4. However, the trial is in its early stages and additional data from these initial cohorts, data from subsequent patients and data from patients at higher dosing levels or different dosing regimens, such as our combination sub-study, may not be positive with respect to safety, target engagement or evidence of early signs of biologic activity.

As a result, the topline results that we report may differ from future results of the same studies, or different conclusions or considerations may qualify such results, once additional data have been received and fully evaluated. Topline data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, topline data should be viewed with caution until the final data are available. From time to time, we may also disclose interim data from planned interim analyses in our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Adverse differences between preliminary or interim data and final data could significantly harm our business prospects. Further, disclosure of interim data by us or our competitors, or by patients or caregivers who are aware that a patient is receiving investigational product, due to the open-label design of the trial, could result in volatility in the price of our common stock.

Regulatory agencies, including the FDA, may not accept or agree with our assumptions, estimates, calculations, conclusions or analyses or may interpret or weigh the importance of data differently, which could impact the value of the particular program, the approvability or commercialization of the particular product candidate or product and our company in general.

If the interim, topline or preliminary data that we report differ from actual results, or if others, including regulatory authorities, disagree with the conclusions reached, our ability to obtain approval for, and commercialize, our product candidates may be harmed, which could harm our business, operating results, prospects or financial condition.

The increasing use of social media platforms presents new risks and challenges.

Social media is increasingly being used to communicate about our clinical development programs and the diseases our product candidates are being developed to treat. We intend to utilize appropriate social media in connection with communicating about our development programs. Social media practices in the biopharmaceutical industry continue to evolve and regulations relating to such use are not always clear. This evolution creates uncertainty and risk of noncompliance with regulations applicable to our business. For example, patients may use social media channels to report an alleged adverse event during a clinical trial. When such disclosures occur, there is a risk that we fail to monitor and comply with applicable adverse event reporting obligations, or we may not be able to defend our business or the public's legitimate interests in the face of the political and market pressures generated by social media due to restrictions on what we may say about our investigational products. There is also a risk of inappropriate disclosure of sensitive information or negative or inaccurate posts or comments about us on any social networking website, or a risk that a post on a social networking website by any of our employees may be construed as inappropriate promotion. If any of these events were to occur or we otherwise fail to comply with applicable regulations, we could incur liability, face regulatory actions, or incur other harm to our business.

****We may encounter substantial delays in our clinical trials or may not be able to conduct our trials on the timelines we expect or at all.***

Clinical testing is expensive, time consuming and subject to uncertainty. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. Even if these trials begin as planned, issues may arise that could suspend or terminate such clinical trials. A failure of one or more clinical trials can occur at any stage of testing, and our ongoing and future clinical trials may not be successful. Events that may prevent successful or timely completion of clinical development include:

- inability to generate sufficient preclinical, toxicology or other *in vivo* or *in vitro* data to support the initiation of clinical trials;
- delays in sufficiently developing, characterizing or controlling a manufacturing process suitable for clinical trials;
- delays in developing suitable assays for screening patients for eligibility for clinical trials with respect to certain product candidates;
- delays in reaching a consensus with the FDA and other regulatory agencies on trial design;
- delays in reaching agreement on acceptable terms with prospective CMOs, CROs and clinical study sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CMOs, CROs and clinical trial sites;
- delays in obtaining required institutional review board, or IRB, approval at each clinical trial site;
- imposition of a temporary or permanent clinical hold by regulatory agencies for a number of reasons, including after review of an IND submission or amendment, or equivalent application or amendment; as a result of a new safety finding that presents unreasonable risk to clinical trial participants; a negative finding from an inspection of our clinical study operations or study sites; developments on trials conducted by competitors for related technology that raises FDA concerns about risk to patients of the technology broadly; or if FDA finds that the investigational protocol or plan is clearly deficient to meet its stated objectives;
- delays in recruiting eligible patients to participate in our clinical trials;
- delays in treating one or more patients, once enrolled, due to a patient's inability to accommodate parts of the complex study procedures schedule;
- difficulty collaborating with patient groups and investigators;
- failure by our CROs, other third parties or us to adhere to clinical trial requirements and the potential termination of ongoing agreements with our CROs;
- limitations on our recourse in our CRO relationship with Penn as compared to a CRO that is not an academic institution;
- failure to perform in accordance with the FDA's Good Clinical Practice, or GCP, requirements or applicable regulatory guidelines in other countries;
- transfer of manufacturing processes to any new CMO or our own manufacturing facilities or any other development or commercialization partner for the manufacture of product candidates;

- delays in having patients complete participation in a trial or return for post-treatment follow-up;
- patients dropping out of a trial;
- occurrence of adverse events associated with the product candidate that are viewed to outweigh its potential benefits;
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols;
- changes in the standard of care on which a clinical development plan was based, which may require new or additional trials;
- the cost of clinical trials of our product candidates being greater than we anticipate;
- clinical trials of our product candidates producing negative or inconclusive results, which may result in our deciding, or regulators requiring us, to conduct additional clinical trials or abandon product development programs;
- delays or failure to secure supply agreements with suitable raw material suppliers, or any failures by suppliers to meet our quantity or quality requirements for necessary raw materials; and
- delays in manufacturing or inability to manufacture sufficient clinical supply (for example, due to capacity constraints, supply interruption, or the need to engineer the process to meet higher dose requirements), testing, releasing, validating or importing/exporting sufficient stable quantities of our product candidates for use in clinical trials or the inability to do any of the foregoing.

Any inability to successfully complete preclinical and clinical development could result in additional costs to us or impair our ability to generate revenue. If we make manufacturing or formulation changes to our product candidates, we may be required to, or we may elect to, conduct additional trials to bridge our modified product candidates to earlier versions. Clinical trial delays could also shorten any periods during which our product candidates and products, if licensed, have patent protection and may allow our competitors to bring products to market before we do, which could impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

We could also encounter delays if a clinical trial is suspended or terminated by us, the FDA or other regulatory authority, or if the IRBs of the institutions in which such trials are being conducted suspend or terminate the participation of their clinical investigators and sites subject to their review. Such authorities may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product candidate, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial.

Delays in the initiation, conduct or completion of any clinical trial of our product candidates will increase our costs, slow down our product candidate development and approval process and delay or potentially jeopardize our ability to commence product sales and generate revenue. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates. In the event we identify any additional product candidates to pursue, we cannot be sure that submission of an IND will result in the FDA allowing clinical trials to begin in a timely manner, if at all.

In addition, from time to time, we may publicly announce the expected timing of various scientific, clinical, regulatory, manufacturing and other product development milestones. These milestones may include the commencement, completion or development of data from our preclinical studies and clinical trials or the submission of regulatory filings, such as an IND. All of these milestones are, and will be, based on a variety of assumptions. If any of the foregoing events impact our ability to meet the publicly announced timing of our milestones, we may experience adverse effects on our business, financial condition and prospects and the price of our common stock could decline.

Monitoring safety of patients receiving our product candidates will be challenging, which could adversely affect our ability to obtain regulatory approval and commercialize our product candidates.

For our clinical trials of CABA-201, DSG3-CAART, MuSK-CAART and our other product candidates, we expect to continue to contract with Penn and/or other academic medical centers and hospitals experienced in the assessment and management of toxicities arising during clinical trials. In the future, we may also contract with non-academic medical centers and hospitals with similar capabilities. Nonetheless, these centers and hospitals may have difficulty observing patients, including due to failure by patients to comply with post-clinical trial follow-up programs, and treating toxicities, which may be more challenging due to personnel changes, inexperience, shift changes, house staff coverage or related issues. This could lead to more severe or prolonged toxicities or even patient deaths, which could result in us or the FDA delaying, suspending or terminating one or more of our clinical trials, and which could

jeopardize regulatory approval. We also expect the centers using CABA-201, DSG3-CAART, MuSK-CAART and our other product candidates, if licensed, on a commercial basis could have similar difficulty in managing adverse events. Medicines used at centers to help manage adverse side effects of CABA-201, DSG3-CAART, MuSK-CAART and our other product candidates may not adequately control the side effects and/or may have a detrimental impact on the efficacy of the treatment.

If we encounter difficulties enrolling patients in our clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

We may experience difficulties in patient enrollment in our clinical trials for a variety of reasons. The timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who remain in the trial until its conclusion. The enrollment of patients depends on many factors, including:

- the size and nature of the patient population;
- the patient eligibility criteria defined in the protocol;
- the size of the patient population required for analysis of the trial's primary endpoints;
- recruiting an adequate number of suitable patients to participate in a clinical trial;
- reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and clinical trial sites;
- obtaining IRB and other required reviewing body approval at each clinical trial site;
- the proximity of patients to trial sites;
- the design of the trial and whether the FDA agrees to the design and implementation of the trial;
- our ability to identify clinical trial sites and recruit clinical trial investigators with the appropriate capabilities, competencies and experience;
- clinicians' and patients' perceptions as to the potential advantages and risks of the product candidate being studied in relation to other available therapies, including any new drugs that may be approved for the indications we are investigating;
- the occurrence of dose-limiting toxicity in the clinical trial;
- the efforts to facilitate timely enrollment in clinical trials;
- the patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment;
- our ability to obtain and maintain patient consents;
- the risk that patients enrolled in clinical trials will drop out of the trials before the infusion of our product candidates or trial completion; and
- the ability of patients to meet the complex follow-up requirements of the clinical trial.

In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Since the number of qualified clinical investigators is limited, some of our clinical trial sites may also be used by some of our competitors, which may reduce the number of patients who are available for our clinical trials in that clinical trial site.

Moreover, because our product candidates represent a departure from more commonly used methods for B cell-mediated autoimmune disease treatment, potential patients and their doctors may be inclined to use conventional therapies, such as corticosteroids or systemic immunosuppressive medications, rather than enroll patients in our clinical trial.

Delays in patient enrollment may result in increased costs or may affect the timing or outcome of our ongoing and planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates.

Our DesCAARTes™ trial, our planned MusCAARTes™ trial and any additional expected Phase 1 clinical trials for each of our product candidates will be pilot dose escalation studies with a limited number of patients. The activity and toxicity data from these clinical trials of our product candidates may differ from future results of Phase 2 and/or Phase 3 clinical trials that enroll a larger number of patients.

Since the number of patients that we plan to dose in our DesCAARTes™ trial and our planned MusCAARTes™ trial is small, the results from such clinical trials, once completed, may be less reliable than results achieved in larger clinical trials, which may hinder our efforts to obtain regulatory approval for our product candidates. In both our DesCAARTes™ trial and our planned MusCAARTes™ trial, we plan to evaluate the toxicity profile of our product candidates and establish the recommended dose for the next clinical trial. The preliminary results of clinical trials with smaller sample sizes, such as our DesCAARTes™ trial and our planned MusCAARTes™ trial, can be disproportionately influenced by various biases associated with the conduct of small clinical trials, such as the potential failure of the smaller sample size to accurately depict the features of the broader patient population, which limits the ability to generalize the results across a broader community, thus making the clinical trial results less reliable than clinical trials with a larger number of patients. As a result, there may be less certainty that such product candidates would achieve a statistically significant effect in any future clinical trials. If we conduct any future clinical trials of DSG3-CAART or MuSK-CAART, we may not achieve a statistically significant result or the same level of statistical significance, if any, that we might have anticipated based on the results observed in our DesCAARTes™ trial and our planned MusCAARTes™ trial, respectively.

Risks Related to Sales, Marketing and Competition

The market opportunities for our product candidates may be limited to those patients who are ineligible for or have failed prior treatments and may be small.

Our projections of both the number of people who have the B cell-mediated autoimmune diseases we are targeting, as well as the subset of people with these diseases in a position to receive second or later lines of therapy and who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, patient foundations, or market research and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these B cell-mediated autoimmune diseases. The number of patients may turn out to be lower than expected. Additionally, the potentially addressable patient population for our product candidates may be limited or may not be amenable to treatment with our product candidates. For instance, we expect DSG3-CAART to initially target a small patient population that suffers from mPV. Furthermore, patients for whom a preconditioning regimen is contraindicated, or is not acceptable to the patient, may not be eligible for treatment with the product candidate, further reducing the potential target population. Even if we obtain significant market share for our product candidates, because the potential target populations are small, we may never achieve profitability without obtaining regulatory approval for additional indications.

We face significant competition from other biotechnology and pharmaceutical companies, and our operating results will suffer if we fail to compete effectively.

The biopharmaceutical and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong focus on intellectual property. We face competition from many different players, including large and specialty pharmaceutical and biotechnology companies, academic research organizations and governmental agencies. Any therapeutic candidates we successfully develop and commercialize will compete with the existing standard of care as well as novel therapies that may gain regulatory approval in the future. Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations and well-established sales forces. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. We believe we are the first and only company developing CAAR T drug candidates, and one of only a few developing CAR T drug candidates, for the treatment of B cell-mediated autoimmune diseases. However, despite the significant differences in discovery, development and target populations between oncology and autoimmune targets, we recognize that companies with an investment and expertise in CAR T cell development for oncology indications could attempt to leverage their expertise into B cell-mediated autoimmune disease affected populations. Competition may increase further as a result of advances in the

commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors, either alone or with collaborative partners, may succeed in developing, acquiring or licensing on an exclusive basis drug or biologic products that are more effective, safer, more easily commercialized or less costly than our product candidates or may develop proprietary technologies or secure patent protection that we may need for the development of our technologies and products.

Specifically, while rituximab is the first drug for the treatment of PV, the target indication for DSG3-CAART to have received regulatory approval in the United States in over 60 years, we are aware that multiple biopharmaceutical companies have therapies in clinical development. We are also aware of other biopharmaceutical companies developing therapies for muscle-specific kinase myasthenia gravis, or MuSK MG, PLA2R-associated membranous nephropathy, or PLA2R MN, and Hemophilia A patients who develop alloantibodies against FVIII. While we do not expect these product candidates to be directly competitive to our product candidates, even if we obtain regulatory approval of our product candidates, the availability and price of these other products could limit the demand and the price we are able to charge for our product candidates. We may not be able to implement our business plan if the acceptance of our product candidates is inhibited by price competition or the reluctance of physicians to switch from existing methods of treatment to our product candidates, or if physicians switch to other new drug or biologic products or choose to reserve our product candidates for use in limited circumstances.

Even if we obtain regulatory approval of our product candidates, the products may not gain the market acceptance among physicians, patients, hospitals, treatment centers and others in the medical community necessary for commercial success.

The use of engineered T cells as a potential treatment for B cell-mediated autoimmune diseases is a recent development and may not become broadly accepted by physicians, patients, hospitals, treatment centers and others in the medical community. We expect physicians to be particularly influential and we may not be able to convince them to use our product candidates for many reasons. Additional factors will influence whether our product candidates are accepted in the market, including:

- the clinical indications for which our product candidates are licensed;
- physicians, hospitals, treatment centers and patients considering our product candidates as a safe and effective treatment;
- the potential and perceived advantages of our product candidates over alternative treatments;
- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA;
- the timing of market introduction of our product candidates as well as competitive products;
- the cost of treatment in relation to alternative treatments;
- the availability of coverage and adequate reimbursement and pricing by third-party payors and government authorities;
- the willingness of patients to pay out-of-pocket in the absence of coverage and adequate reimbursement by third-party payors and government authorities;
- relative convenience and ease of administration, including as compared to alternative treatments and competitive therapies; and
- the effectiveness of our sales and marketing efforts.

The product candidates we plan to develop and commercialize are premised on offering a potential cure for B cell-mediated autoimmune diseases, which may result in a high degree of uncertainty related to pricing and long-term demand for our product. Our target patient populations are relatively small. Because of this pricing and demand for our product candidates, if licensed, may not be adequate to support an extended period of commercial viability, which could adversely affect our continued ability to successfully produce and market our product or any follow-on products.

In addition, if our product candidates are licensed but fail to achieve market acceptance among physicians, patients, hospitals, treatment centers or others in the medical community, we will not be able to generate significant revenue. Even if our products achieve market acceptance, we may not be able to maintain that market acceptance over time if new products or technologies are introduced that are more favorably received than our products, are more cost effective or render our products obsolete.

Risks Related to Business Development

We may not be successful in our efforts to identify additional product candidates. Due to our limited resources and access to capital, we must prioritize development of certain product candidates, which may prove to be wrong and may adversely affect our business.

Although we intend to explore other therapeutic opportunities, in addition to the product candidates that we are currently developing, we may fail to identify viable new product candidates for clinical development for a number of reasons. If we fail to identify additional potential product candidates, our business could be materially harmed.

Research programs to pursue the development of our existing and planned product candidates for additional indications and to identify new product candidates and disease targets require substantial technical, financial and human resources whether or not they are ultimately successful. Our research programs may initially show promise in identifying potential indications and/or product candidates, yet fail to yield results for clinical development for a number of reasons, including:

- the research methodology used may not be successful in identifying potential indications and/or product candidates;
- potential product candidates may be identified but may not be able to be expressed on T cells in a manner that enables product activity;
- potential product candidates may, after further study, be shown to have harmful adverse effects or other characteristics that indicate they are unlikely to be effective drugs; or
- it may take greater human and financial resources than we will possess to identify additional therapeutic opportunities for our product candidates or to develop suitable potential product candidates through internal research programs, thereby limiting our ability to develop, diversify and expand our product portfolio.

Because we have limited financial and human resources, we intend to initially focus on research programs and product candidates for a limited set of indications. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential or a greater likelihood of success. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities.

Accordingly, there can be no assurance that we will ever be able to identify additional therapeutic opportunities for our product candidates or to develop suitable potential product candidates through internal research programs, which could materially adversely affect our future growth and prospects. We may focus our efforts and resources on potential product candidates or other potential programs that ultimately prove to be unsuccessful.

If we fail to develop additional product candidates, our commercial opportunity will be limited.

One of our core strategies is to pursue clinical development of additional product candidates beyond CABA-201, DSG3-CAART, MuSK-CAART, DSG3/1-CAART, FVIII-CAART and PLA2R-CAART. Developing, obtaining regulatory approval and commercializing additional CAAR T cell product candidates will require substantial additional funding and is prone to the risks of failure inherent in medical product development. We cannot provide you any assurance that we will be able to successfully advance any of these additional product candidates through the development process.

Even if we receive FDA approval to market additional product candidates for the treatment of B cell-mediated autoimmune diseases, we cannot assure you that any such product candidates will be successfully commercialized, widely accepted in the marketplace or more effective than other commercially available alternatives. If we are unable to successfully develop and commercialize additional product candidates, our commercial opportunity will be limited. Moreover, a failure in obtaining regulatory approval of additional product candidates may have a negative effect on the approval process of any other, or result in losing approval of any approved, product candidate.

We are highly dependent on our key personnel, and if we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.

Our ability to compete in the highly competitive biotechnology and pharmaceutical industries depends upon our ability to attract and retain highly qualified managerial, scientific and medical personnel. We are highly dependent on our management, scientific, and medical personnel, including our Chief Executive Officer and President, our Scientific Advisory Board members, our President, Science and Technology, our Chief Medical Officer, and our Chief Financial Officer. The loss of the services of any of our executive officers,

other key employees, and other scientific and medical advisors, and our inability to find suitable replacements could result in delays in product development and harm our business.

Competition for skilled personnel in our market is intense and may limit our ability to hire and retain highly qualified personnel on acceptable terms or at all. To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have provided stock options that vest over time. The value to employees of stock options that vest over time may be significantly affected by movements in our stock price that are beyond our control and may at any time be insufficient to counteract more lucrative offers from other companies. Despite our efforts to retain valuable employees, members of our management, scientific and development teams may terminate their employment with us on short notice. Although we have employment agreements with our key employees, these employment agreements provide for at-will employment, which means that any of our employees could leave our employment at any time, with or without notice. We do not maintain “key person” insurance policies on the lives of these individuals or the lives of any of our other employees. Our success also depends on our ability to continue to attract, retain and motivate highly skilled junior, mid-level and senior managers as well as junior, mid-level and senior scientific and medical personnel.

We expect to grow the size of our organization, and we may experience difficulties in managing this growth.

As of September 30, 2022, we had 57 full-time employees and two part-time employees. As our development and commercialization plans and strategies develop, and as we continue to broaden our operational capabilities, we expect to expand our employee base and continue to add managerial, operational, sales, research and development, marketing, financial and other personnel. For example, we are still dependent on Penn and certain Penn-affiliated entities to continue providing certain research and development as well as manufacturing services under that certain research services agreement. Current and future growth imposes significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, retaining and motivating additional employees in an increasingly competitive, inflationary market;
- managing our internal development efforts effectively, including the clinical and FDA review process for our product candidates, while complying with our contractual obligations to contractors and other third parties; and
- improving our operational, financial and management controls, reporting systems and procedures.

Our future financial performance and our ability to commercialize our product candidates will depend, in part, on our ability to effectively manage our growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants to provide certain services, including certain research and development as well as general and administrative support, pursuant to agreements which expire after a certain period of time. There can be no assurance that the services of independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed, or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval of our product candidates or otherwise advance our business. There can be no assurance that we will be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, or at all.

If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, or if we are not able to raise sufficient funds in the future to support our hiring efforts beyond our research and development personnel, we may not be able to successfully implement the tasks necessary to further develop and commercialize our product candidates and, accordingly, may not achieve our research, development and commercialization goals.

Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations, Penn's operations and those of any CMOs, CROs and other contractors and consultants that we may engage could be subject to earthquakes, power shortages, telecommunications failures, water shortages, floods, hurricanes, typhoons, fires, extreme weather conditions, medical epidemics and other natural or man-made disasters or business interruptions, for which we are predominantly self-insured. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses. We currently rely on Penn to produce and process DSG3-CAART and anticipate that in the future we will rely on a third-party CMO for the same. Our ability to obtain clinical supplies of our product candidates could be disrupted if the operations of these suppliers are affected by a man-made or natural disaster or other business interruption.

In addition, due to our adoption of a more flexible work model following the COVID-19 pandemic, our increased prevalence of personnel working from home may negatively impact productivity, or disrupt, delay, or otherwise adversely impact our business operations. Further, this could increase our cyber security risk, create data accessibility concerns, and make us more susceptible to communication disruptions, any of which could adversely impact our business operations or delay necessary interactions with local and federal regulators, ethics committees, manufacturing sites, research or clinical trial sites and other important agencies and contractors.

Risks Related to Litigation

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. For example, we may be sued if our product candidates cause or are perceived to cause injury or are found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- inability to bring our product candidates to the market;
- decreased demand for our product candidates;
- injury to our reputation;
- withdrawal of clinical trial participants;
- initiation of investigations by regulators;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- exhaustion of any available insurance and our capital resources;
- the inability to commercialize any product candidate; and
- a decline in our share price.

Since we have not yet commenced marketing of any products, we do not yet hold product liability insurance for commercialization of our product candidates. Our inability to obtain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop, alone or with corporate collaborators. Our insurance policies may also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. Assuming we obtained clinical trial insurance for our clinical trials, we may have to pay amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts. Even if our agreements with any future corporate collaborators entitle us to indemnification against losses, such indemnification may not be available or adequate should any claim arise.

Risks Related to Our Financial Condition and Capital Requirements

Risks Related to Past Financial Condition

We have incurred net losses in every period since our inception and anticipate that we will incur substantial net losses over the next several years, and may never achieve or maintain profitability.

Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval and become commercially viable. We initially licensed rights to the patents underlying our product candidates in August 2018 and initiated our DesCAARTes™ trial in June 2020. We have no products licensed for commercial sale, and we will continue to incur significant research and development and other expenses related to our ongoing operations. Our net losses may fluctuate significantly from quarter to quarter and year to year. We have to date financed our operations primarily through private placements of our preferred stock, the sale of common stock in our initial public offering and sales of our common stock from time to time in “at-the-market” offerings.

As a result, we are not profitable and have incurred net losses in each period since our inception. For the nine months ended September 30, 2022 and 2021, we recorded net losses of \$37.3 million and \$32.4 million, respectively. As of September 30, 2022, we had an accumulated deficit of \$149.9 million. We expect to incur significant losses for the foreseeable future, and we expect these losses to increase substantially if, and as, we:

- continue our research and development efforts and submit additional INDs for our product candidates;
- conduct preclinical studies and clinical trials for our current and future product candidates;
- further develop our product candidate platform;
- continue to discover and develop additional product candidates;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical, scientific manufacturing and commercial personnel;
- establish a commercial manufacturing source and secure supply chain capacity sufficient to provide commercial quantities of any product candidates for which we may obtain regulatory approval, whether through a CMO or through a manufacturing facility that we establish;
- acquire or in-license other product candidates and technologies, including advanced manufacturing and translational capabilities that we will need for the further development and possible commercialization of our product candidates;
- seek marketing approvals for any product candidates that successfully complete clinical trials;
- establish a sales, marketing and distribution infrastructure to support the sales and marketing of any product candidates for which we may obtain marketing approvals; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts, as well as to support our transition to a public company.

To become and remain profitable, we must succeed in developing, and eventually commercializing, a product or products that generate significant revenue. The ability to achieve this success will require us to be effective in a range of challenging activities, including completing preclinical testing and clinical trials of our product candidates, discovering additional product candidates, obtaining regulatory approval for these product candidates and manufacturing, marketing and selling any products for which we may obtain regulatory approval. We are only in the preliminary stages of most of these activities and have not yet demonstrated our ability to successfully develop any product candidate, obtain regulatory approvals, manufacture a commercial scale product or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. We may never be able to develop, manufacture or commercialize a marketable product.

Even if we are able to succeed in these activities, we may never generate revenues that are significant enough to achieve profitability. Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to achieve profitability. Our expenses will increase if, among other things:

- there are any delays in completing our clinical trials or the development of any of our product candidates;
- we are required by the FDA or other regulatory authorities to perform trials or studies in addition to, or different than, those expected; or
- there are any third-party challenges to our intellectual property or we need to defend against any intellectual property-related claim.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses we will incur or when, if ever, we will be able to achieve profitability. Even if we succeed in commercializing one or more of our product candidates, we will continue to incur substantial research and development and other expenditures to develop, seek regulatory approval for and market additional product candidates. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders' equity and working capital.

We have a limited operating history, which may make it difficult to evaluate the success of our business to date and to assess our future viability, and we may face significant challenges and expense as we test our product candidates and build our capabilities.

We were incorporated in 2017 and initially acquired rights to license certain patent rights from Penn in August 2018, and acquired rights to license certain patent rights from Nanjing IASO Biotherapeutics Co., Ltd., or IASO, in October 2022. We are early in our development efforts, have a limited operating history and are subject to the risks inherent to any newly-formed organization, including, among others, risks that we may not be able to hire sufficient qualified personnel and establish operating controls and procedures.

Our limited operating history, particularly in light of the rapidly evolving cell therapy field, may make it difficult to evaluate our technology and industry and predict our future performance. Our short history as an operating company makes any assessment of our future success or viability subject to significant uncertainty. We will encounter risks and difficulties frequently experienced by early-stage companies in rapidly evolving fields. If we do not address these risks successfully, our business will suffer. Similarly, we expect that our financial condition and operating results will fluctuate significantly from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. As a result, our shareholders should not rely upon the results of any quarterly or annual period as an indicator of future operating performance.

We currently do not have in-house resources sufficient to enable the development of our product candidates, including our CAR T and CAAR T cell platforms. We are reliant on several manufacturing and support services from Penn through a Master Translational Research Services Agreement, or the Services Agreement, as well as certain research and development and general and administrative services through three sponsored research agreements. We also rely on Penn for access to key technologies for current manufacturing of DSG3-CAART. As we build our own capabilities, and enter into agreements with third parties, we expect to encounter risks and uncertainties frequently experienced by growing companies in new and rapidly evolving fields, including the risks and uncertainties described herein. Our ability to rely on services from Penn is limited to a specified period of time, to specific capabilities, and is subject to Penn's right to terminate these services with or without cause. If we are unable to establish necessary relationships with third party partners and build our own capabilities, our operating and financial results could differ materially from our expectations, and our business could suffer.

All of our programs require additional preclinical research and development, clinical development, regulatory approval in multiple jurisdictions, obtaining manufacturing supply, capacity and expertise, building of a commercial organization, substantial investment and significant marketing efforts before we generate any revenue from product sales. Other programs of ours require additional discovery research and then preclinical and clinical development. In addition, our product candidates must be licensed for marketing by the FDA before we may commercialize any product.

In addition, as an early-stage company, we have encountered and may continue to encounter unforeseen expenses, difficulties, complications, delays and other known and unknown circumstances. As we advance our product candidates, we will need to transition from a company with a research focus to a company capable of supporting clinical development and if successful, commercial activities. We may not be successful in such a transition.

We have not generated any revenue from our product candidates and our ability to generate revenue from product sales and become profitable depends significantly on our success in a number of areas.

To become and remain profitable, we or any potential future collaborator must develop and eventually commercialize products with significant market potential at an adequate profit margin after cost of goods sold and other expenses. All of our product candidates are in the early stages of development and we will require additional preclinical studies, clinical development, regulatory review and approval, substantial investment, access to sufficient commercial manufacturing capacity and significant marketing efforts before we can generate any revenue from product sales. We initiated our DesCAARTes™ trial of DSG3-CAART, our most advanced product candidate, targeting pathogenic B-cells in patients with mucosal pemphigus vulgaris, or mPV, in June 2020. Our IND for MuSK-CAART, targeting pathogenic B cells in a subset of patients with myasthenia gravis, or MG, became effective in January 2022. Our other product candidates, which include CABA-201, targeting undisclosed autoimmune disease(s), DSG3/1-CAART, targeting pathogenic B cells in patients with mucocutaneous pemphigus vulgaris, or mcPV, FVIII-CAART, for potential use as an adjunctive therapy targeting a subset of patients with Hemophilia A who develop alloantibody resistance to Factor VIII, or FVIII, replacement therapy, and PLA2R-CAART, targeting pathogenic B cells in patients with PLA2R-associated membranous nephropathy, or PLA2R-associated MN, have yet to complete IND-enabling studies. We have not yet administered any of our product candidates other than DSG3-CAART in humans and, as such, we face significant translational risk as our product candidates advance to the clinical stage. Our ability to generate revenue depends on a number of factors, including, but not limited to:

- timely completion of our preclinical studies and clinical trials, which may be significantly slower or cost more than we currently anticipate and will depend substantially upon the performance of third-party academic and commercial contractors;
- our ability to complete IND-enabling studies and successfully submit INDs or comparable applications;
- whether we are required by the FDA to conduct additional clinical trials or other studies beyond those planned to support the licensure and commercialization of our product candidates or any future product candidates;
- our ability to demonstrate to the satisfaction of the FDA the safety, potency, purity and acceptable risk to benefit profile of our product candidates or any future product candidates;
- the prevalence, duration and severity of potential side effects or other safety issues experienced with our product candidates or future product candidates, if any;
- the cost of manufacturing and processing our product candidates being greater than we anticipate;
- the timely receipt of necessary marketing approvals from the FDA;
- the willingness of physicians, operators of clinics and patients to utilize or adopt any of our product candidates or future product candidates to treat B cell-mediated autoimmune diseases;
- our ability and the ability of third parties with whom we contract to manufacture adequate clinical and commercial supplies of our product candidates or any future product candidates, remain in good standing with regulatory authorities and develop, validate and maintain commercially viable manufacturing processes that are compliant with FDA's current Good Manufacturing Practices, or cGMP;
- our ability to successfully develop a commercial and competitive strategy and thereafter commercialize our product candidates or any future product candidates in the United States, if licensed for marketing, reimbursement, sale and distribution, whether alone or in collaboration with others;
- patient demand for our product candidates and any future product candidates, if licensed; and
- our ability to establish and enforce intellectual property rights in and to our product candidates or any future product candidates.

Many of the factors listed above are beyond our control and could cause us to experience significant delays or prevent us from obtaining regulatory approvals or commercialize our product candidates. Even if we are able to commercialize our product candidates, we may not achieve profitability soon after generating product sales, if ever. If we are unable to generate sufficient revenue through the sale of our product candidates or any future product candidates, we may be unable to continue operations without continued funding.

If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Additionally, even if we succeed in commercializing one or more of our product candidates, we will continue to incur substantial research and development and other expenditures to research, develop and market additional product candidates. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company also could cause you to lose all or part of your investment.

We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders' equity and working capital.

Risks Related to Future Financial Condition

****We will require substantial additional financing to develop and commercialize our product candidates and implement our operating plans. If we fail to obtain additional financing or cannot obtain financing at the levels we require due to we may be delayed in our plans or unable to complete the development and commercialization of our product candidates.***

Our operations have consumed substantial amounts of cash since inception. We expect to continue to spend substantial amounts to continue the preclinical and clinical development of our product candidates, including our DesCAARTes™ trial, our planned MusCAARTes™ trial, and our research and development, preclinical studies and clinical trials for CABA-201, PLA2R-CAART, DSG3/1-CAART and FVIII-CAART and any future product candidates, to seek regulatory approvals for our product candidates, to enable commercial production of our products, if licensed, and to initiate and complete registration trials for multiple products. While we currently expect our existing cash and cash equivalents and investments to be sufficient to fund our operations through the announcement of six month combination cohort data from the DesCAARTes™ and MusCAARTes™ clinical trials, as well as initial clinical data from the CABA-201 clinical trial, assuming the clearance of our CABA-201 IND by the FDA, we expect to require significant additional financing to complete these Phase 1 trials, and any future clinical trials of these and our other product candidates.

Further, if licensed, we will require significant additional amounts of cash to launch and commercialize our product candidates.

As of September 30, 2022, we had \$85.9 million of cash and cash equivalents and investments. On October 29, 2019, we completed an initial public offering of our common stock by issuing 7,275,501 shares of our common stock (including 475,501 shares of our common stock pursuant to the underwriters' option to purchase additional shares that we issued in November 2019), at \$11.00 per share, for gross proceeds of \$80.0 million, or net proceeds of \$71.0 million. In 2021, we raised \$49.7 million, or net proceeds of \$48.3 million, in "at-the-market" offerings, pursuant to a Sales Agreement with Cowen and Company, LLC which provides for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of our common stock. Based on our current operating plan, we believe that our existing cash and cash equivalents and investments will be sufficient to fund our operations through the second quarter of 2024. However, we have based this estimate on assumptions that may prove to be wrong. Additionally, changing circumstances may cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more money than currently expected because of circumstances beyond our control. We may require substantial additional capital for the further development and commercialization of our product candidates, including funding our internal manufacturing capabilities, and may need to raise additional funds sooner if we choose to expand more rapidly than we presently anticipate. Because the length of time and activities associated with development of our product candidates is highly uncertain, we are unable to estimate the actual funds we will require for development and any approved marketing and commercialization activities. Our future funding requirements, both near- and long-term, will depend on many factors, including, but not limited to:

- the initiation, progress, timing, costs and results of preclinical studies and clinical trials for our product candidates;
- the clinical development plans we establish for these product candidates;
- the number and characteristics of product candidates that we may develop or in-license;

- the terms of any collaboration agreements we may choose to conclude;
- the outcome, timing and cost of meeting regulatory requirements established by the FDA;
- the cost of filing, prosecuting, defending and enforcing our patent claims and other intellectual property rights;
- the cost of defending intellectual property disputes, including patent infringement actions brought by third parties against us or our product candidates;
- the effect of competing technological and market developments;
- the costs of establishing and maintaining a supply chain for the development and manufacture of our product candidates;
- the cost and timing of establishing, expanding and scaling manufacturing capabilities;
- the cost of maintaining the amount patient data for which we would be responsible following commercialization of one or more of our product candidates; and
- the cost of establishing sales, marketing and distribution capabilities for any product candidates for which we may receive regulatory approval in regions where we choose to commercialize our products on our own.

We cannot be certain that additional funding will be available on acceptable terms, or at all. As widely reported, global credit and financial markets have experienced extreme volatility and disruptions, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, inflation, increases in unemployment rates and uncertainty about economic stability. There can be no assurance that further deterioration in credit and financial markets and confidence in economic conditions will not occur. Until we are able to generate sufficient revenue to finance our cash requirements, we will need to finance our future cash needs through a combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing or distribution arrangements. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue our research and development initiatives and clinical development plans. We could be required to seek collaborators for our product candidates at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available or relinquish or license on unfavorable terms our rights to our product candidates in markets where we otherwise would seek to pursue development or commercialization ourselves.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause our stock price to fall.

We expect that significant additional capital may be needed in the future to continue our planned operations, including conducting clinical trials, commercialization efforts, expanded research and development activities and costs associated with operating a public company. To raise capital, we may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. If we sell common stock, convertible securities or other equity securities, investors may be materially diluted by subsequent sales. Such sales may also result in material dilution to our existing stockholders, and new investors could gain rights, preferences and privileges senior to the holders of our common stock.

Pursuant to our equity incentive plans, our management is authorized to grant stock options to our employees, directors and consultants. Additionally, the number of shares of our common stock reserved for issuance under the 2019 Stock Option and Incentive Plan automatically increased on January 1, 2022 and will automatically increase each January 1 thereafter through and including January 1, 2029, by 4% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. Unless our board of directors elects not to increase the number of shares available for future grant each year, our stockholders may experience additional dilution, which could cause our stock price to fall.

Any of the above events could significantly harm our business, prospects, financial condition and results of operations and cause the price of our common stock to decline.

Risks Related to Our Intellectual Property

We rely heavily on certain in-licensed patent and other intellectual property rights in connection with our development of our product candidates and, if we fail to comply with our obligations under our existing and any future intellectual property licenses with third parties, we could lose license rights that are important to our business.

Our ability to develop and commercialize our product candidates is heavily dependent on in-licenses to patent rights and other intellectual property granted to us by third parties. For example, we depend heavily on our License Agreement with Penn and CHOP, which was entered into in 2018, amended and restated in July 2019, and further amended in May 2020 and October 2021, pursuant to which we obtained (a) a non-exclusive, non-sublicensable, worldwide research license to intellectual property controlled by Penn and CHOP to make, have made and use products in two subfields of use, (b) effective as of October 2018, an exclusive, worldwide, royalty-bearing license, with the right to sublicense, under certain of such intellectual property to make, use, sell, offer for sale and import products in the same two subfields of use, and (c) effective as of October 2018, a non-exclusive, worldwide, royalty-bearing license, with limited rights to sublicense, under certain of Penn's know-how, which know-how satisfies certain criteria and is listed on a mutually agreed to schedule, to make, have made, use, sell, offer for sale, import and have imported products in the same two subfields of use. We also depend on our Exclusive License Agreement with IASO, which was entered into in October 2022, pursuant to which we obtained a worldwide, exclusive license under certain intellectual property to develop, manufacture, commercialize and otherwise exploit T cell products directed to CD19 for the purpose of diagnosis, prevention or treatment of an autoimmune or alloimmune indication in humans, or the IASO Agreement. We may enter into additional license agreements in the future. Our license agreements with Penn, CHOP and IASO impose, and we expect that future license agreements will impose, various diligence, milestone payment, royalty, insurance and other obligations on us. If we fail to comply with our obligations under these licenses, our licensors, including Penn, CHOP and IASO may have the right to terminate these license agreements, in which event we might not be able to market our product candidates. Termination of any of our license agreements or reduction or elimination of our licensed rights may also result in our having to negotiate new or reinstated licenses with less favorable terms.

We may need to obtain additional licenses from third parties to advance our research or allow commercialization of our product candidates, and we have done so from time to time. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop or commercialize the affected product candidates, which could harm our business significantly. We cannot provide any assurances that third-party patents do not exist which might be enforced against our current product candidates or future products, resulting in either an injunction prohibiting our sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation to third parties.

Furthermore, in many cases, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering technology that we in-license from third parties. For example, pursuant to our IASO Agreement, IASO controls such activities for the patent rights licensed to us under such agreement. Pursuant to our License Agreement with Penn and CHOP, Penn controls such activities for the patent rights licensed to us under such agreement. Therefore, although we provide input to IASO, Penn and CHOP on these activities, we cannot be certain that these patents will be prosecuted, maintained and enforced in a manner consistent with the best interests of our business. If our current or future licensors or collaboration partners fail to obtain, maintain or protect any patents or patent applications licensed to us, our rights to such patents and patent applications may be reduced or eliminated and our right to develop and commercialize any of our product candidates that are the subject of such licensed rights could be adversely affected.

Disputes may arise between us and our current and future licensors regarding intellectual property subject to a license agreement, including those related to:

- the scope of rights granted under the License Agreement or IASO Agreement and other interpretation-related issues;
- whether we have breached the License Agreement or IASO Agreement and whether any such breach is subject to a cure period;
- whether and the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- our right to sublicense patent and other rights to third parties under collaborative development relationships;
- our diligence obligations with respect to the use of the licensed technology in relation to our development and commercialization of our product candidates, and what activities satisfy those diligence obligations; and
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners.

Furthermore, disputes may arise between us and our current or future licensors regarding the ownership of intellectual property developed by us, such that we may be required to assign or otherwise transfer such intellectual property to such licensor. In the event that the assigned or transferred intellectual property is covered by an existing license agreement with such licensor we may be required

to make additional royalty or milestone payments, or both, to such licensor. If the assigned or transferred intellectual property is not covered by an existing license agreement, then we may be required to enter into an additional license agreement to advance our research or allow commercialization of our product candidates, which may not be available on commercially reasonable terms or at all.

If disputes over intellectual property that we have licensed, or license in the future, prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

If our efforts to protect the proprietary nature of the intellectual property related to our current and any future product candidates are not adequate, we may not be able to compete effectively in our market.

Our success depends in large part on our ability to obtain and maintain intellectual property protection in the United States and other countries with respect to our product candidates. If we do not adequately protect or enforce our intellectual property rights, competitors may be able to erode or negate any competitive advantage we may have, which could harm our business and ability to achieve profitability. To protect our proprietary position, we have in-licensed patent rights in the United States and abroad relating to the product candidates that are important to our business. The patent application and approval process is expensive, complex and time-consuming. Our licensors may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain. No consistent policy regarding the breadth of claims allowed in biotechnology and pharmaceutical patents has emerged to date in the United States or in many foreign jurisdictions. In addition, the determination of patent rights with respect to biological and pharmaceutical products commonly involves complex legal and factual questions, which has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Pending patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications. Assuming the other requirements for patentability are met, currently, the first to file a patent application is generally entitled to the patent. However, prior to March 16, 2013, in the United States, the first to invent was entitled to the patent. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that our licensors were the first to make the inventions claimed in the patents or pending patent applications we in-license, or that our licensors were the first to file for patent protection of such inventions.

Moreover, because the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, the patents or pending patent applications we in-license may be challenged in the courts or patent offices in the United States and abroad. For example, we may be subject to a third party preissuance submission of prior art to the U.S. Patent and Trademark Office, or USPTO, or become involved in post-grant review procedures, derivation proceedings, reexaminations, or *inter partes* review in the United States, or oppositions and other comparable proceedings in foreign jurisdictions, challenging our patent rights or the patent rights of others. An adverse determination in any such challenges may result in loss of exclusivity or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and product candidates. In addition, given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized.

Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of the patents we in-license or narrow the scope of our patent protection. In addition, the laws of foreign countries may not protect our rights to the same extent or in the same manner as the laws of the United States. For example, European patent law is more restrictive than U.S. patent law in connection with the patentability of methods of treatment of the human body and Chinese bankruptcy law may not provide a licensee the same protections as U.S. bankruptcy law. This could impact our in-license under the IASO Agreement with IASO, a China-based company, if IASO declared bankruptcy, and could have a material adverse effect on the development of CABA-201.

We cannot predict whether the patent applications we in-license currently being pursued will issue as patents, whether the claims of any patent that has or may issue will provide us with a competitive advantage or prevent competitors from designing around the claims to develop competing technologies in a non-infringing manner, or whether we or our licensors will be able to successfully pursue patent applications in the future relating to our current product candidates or future products and product candidates. Moreover, the patent application and approval process is expensive and time-consuming. We or our licensors may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. Furthermore, we, or any future partners, collaborators, or licensees, may fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Therefore, we may miss potential opportunities to seek additional patent protection.

It is possible that defects of form in the preparation or filing of patent applications may exist, or may arise in the future, for example with respect to proper priority claims, inventorship, claim scope, or requests for patent term adjustments. If we fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If there are material defects in the form, preparation, prosecution or enforcement of the patents or patent applications we in-license, such patents may be invalid and/or unenforceable, and such applications may never result in valid, enforceable patents. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

Even if the patent applications we in-license issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our patent rights by developing similar or alternative technologies or products in a non-infringing manner. Our competitors may also seek approval to market their own products similar to or otherwise competitive with our product candidates. Alternatively, our competitors may seek to market generic versions of any approved products by submitting abbreviated BLAs to the FDA during which process they may claim that patents licensed by us are invalid, unenforceable or not infringed. In these circumstances, we may need to defend or assert our intellectual property rights, or both, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or other agency with jurisdiction may find the patents we in-license invalid or unenforceable, or that our competitors are competing in a non-infringing manner. Thus, even if we have in-licensed valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives. Any of the foregoing could have a material adverse effect on our competitive position, business, financial conditions, results of operations, and prospects.

In the future, we likely will need to expand our patent portfolio to pursue patent coverage for new product candidates that we wish to develop. The patent prosecution process is competitive, and other companies, some which may have greater resources than we do in this area, may also be pursuing intellectual property rights that we may consider necessary or attractive in order to develop and commercialize future product candidates.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting, maintaining, defending and enforcing patents on our product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States could be less extensive than those in the United States. The deadline to pursue protection in foreign jurisdictions for some of the patent families licensed under the License Agreement with Penn has not yet expired. Prior to applicable deadlines, we and Penn will need to decide where to pursue protection, and we will not have the opportunity to pursue protection unless we do so in applicable jurisdictions prior to the deadlines. Although our License Agreement and IASO Agreement grant us worldwide rights, there can be no assurance that we will obtain or maintain patent rights in or outside the United States under any future license agreements. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States even in jurisdictions where we and our licensors pursue patent protection. Consequently, we and our licensors may not be able to prevent third parties from practicing our inventions in all countries outside the United States, even in jurisdictions where we and our licensors pursue patent protection, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we and our licensors have not pursued and obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we and our licensors have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our product candidates and the patents we in-license or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of the patents we in-license or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights, even if obtained, in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put the patents we in-license at risk of being invalidated or interpreted narrowly and the patent applications we in-license at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We or our licensors may be subject to claims challenging the inventorship or ownership of the patents and other intellectual property that we own or license.

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an ownership interest in the patents and intellectual property that we in-license or that we may own or in-license in the future. While it is our policy to require our employees and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own or such assignments may not be self-executing or may be breached. Our licensors may face similar obstacles. We or our licensors could be subject to ownership disputes arising, for example, from conflicting obligations of employees, consultants or others who are involved in developing our product candidates. For example, our scientific co-founders, Drs. Payne and Milone, are members of our scientific advisory board and are also employed by and subject to Penn's intellectual property policy. Litigation may be necessary to defend against any claims challenging inventorship or ownership. If we or our licensors fail in defending any such claims, we may have to pay monetary damages and may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property, which could adversely impact our business, results of operations and financial condition.

Some intellectual property which we have in-licensed was discovered through government funded programs and thus is subject to federal regulations such as "march-in" rights, certain reporting requirements, and a preference for U.S. industry. Compliance with such regulations may limit our exclusive rights and limit our ability to contract with non-U.S. manufacturers.

Certain of the intellectual property rights we have licensed, including rights licensed to us by Penn relating to our DSG3-CAART and DSG3/1-CAART product candidates, was generated through the use of U.S. government funding and may therefore be subject to certain federal laws and regulations. As a result, the U.S. government has certain rights to intellectual property embodied in our DSG3-CAART and DSG3/1-CAART product candidates and may have rights in future product candidates pursuant to the Bayh-Dole Act of 1980. These U.S. government rights in certain inventions developed under a government-funded program include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us to grant exclusive, partially exclusive, or non-exclusive licenses to any of these inventions to a third party if it determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; or (iii) government action is necessary to meet requirements for public use under federal regulations, also referred to as "march-in rights". The U.S. government also has the right to take title to these inventions if we, or the applicable licensor, such as Penn, fail to disclose the invention to the government and fail to file an application to register the intellectual property within specified time limits. Intellectual property generated under a government funded program is also subject to certain reporting requirements, compliance with which may require us or the applicable licensor to expend substantial resources. In addition, the U.S. government requires that products embodying the subject invention or produced through the use of the subject invention be manufactured substantially in the United States. The manufacturing preference requirement can be waived if the owner of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible. This preference for U.S. manufacturers may limit our ability to contract with non-U.S. product manufacturers for product candidates covered by such intellectual property.

We may become involved in lawsuits to protect or enforce our patent rights or other intellectual property rights, which could be expensive, time consuming and unsuccessful.

Competitors may infringe, misappropriate or otherwise violate patents, trademarks, copyrights or other intellectual property that we own or in-license. To counter infringement, misappropriation or other unauthorized use, we may be required to file claims, which can be expensive and time consuming and divert the time and attention of our management and scientific personnel. Any claims we assert against perceived violators could provoke these parties to assert counterclaims against us alleging that we infringe, misappropriate or otherwise violate their intellectual property, in addition to counterclaims asserting that the patents we in-license are invalid or unenforceable, or both. In any patent infringement proceeding, there is a risk that a court will decide that a patent we in-license is invalid or unenforceable, in whole or in part, and that we do not have the right to stop the other party from using the invention at issue. There is also a risk that, even if the validity of such patents is upheld, the court will construe the patent's claims narrowly or decide that we do not have the right to stop the other party from using the invention at issue on the grounds that the patent claims do not cover the invention. An adverse outcome in a litigation or proceeding involving the patents we in-license could limit our ability to assert the patent we in-license against those parties or other competitors and may curtail or preclude our ability to exclude third parties from making and selling similar or competitive products. Any of these occurrences could adversely affect our competitive business position, business prospects and financial condition.

Even if we establish infringement, misappropriation or another violation of our intellectual property rights, the court may decide not to grant an injunction against the offender and instead award only monetary damages, which may or may not be an adequate remedy. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our shares. Moreover, there can be no assurance that we will have sufficient financial or other resources to file and pursue such claims, which typically last for years before they are concluded. Even if we ultimately prevail in such claims, the monetary cost of such litigation and the diversion of the attention of our management and scientific personnel could outweigh any benefit we receive as a result of the proceedings. Any of the foregoing may have a material adverse effect on our business, financial condition, results of operations and prospects.

Changes in patent law in the United States and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our product candidates.

Changes in either the patent laws or the interpretation of the patent laws in the United States or other jurisdictions could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. When implemented, the Leahy-Smith Act included several significant changes to U.S. patent law that impacted how patent rights could be prosecuted, enforced and defended. In particular, the Leahy-Smith Act also included provisions that switched the United States from a "first-to-invent" system to a "first-to-file" system, allowed third-party submission of prior art to the USPTO during patent prosecution and set forth additional procedures to attack the validity of a patent by the USPTO administered post grant proceedings. Under a first-to-file system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The USPTO developed new regulations and procedures governing the administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. It remains unclear what impact, if any, the Leahy-Smith Act will have on the operation of our business. However, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of the patent applications we in-license and the enforcement or defense of the issued patents we in-license, all of which could have a material adverse effect on our business.

The patent positions of companies engaged in the development and commercialization of biologics are particularly uncertain. For example, the Supreme Court of the United States issued its decision in *Association for Molecular Pathology v. Myriad Genetics, Inc.*, or *Myriad*, a case involving patent claims held by Myriad Genetics, Inc. relating to the breast cancer susceptibility genes BRCA1 and BRCA2. Myriad held that an isolated segment of naturally occurring DNA, such as the DNA constituting the BRCA1 and BRCA2 genes, is not patent-eligible subject matter, but that complementary DNA, which is an artificial construct that may be created from RNA transcripts of genes, may be patent-eligible. Thereafter, the USPTO issued a guidance memorandum instructing USPTO examiners on the ramifications of the *Prometheus* and *Myriad* rulings and apply the *Myriad* ruling to natural products and principles including all naturally occurring nucleic acids. Certain claims of our in-licensed patent applications contain, and any future patents we may obtain may contain, claims that relate to specific recombinant DNA sequences that are naturally occurring at least in part and, therefore, could be the subject of future challenges made by third parties.

We cannot assure you that our efforts to seek patent protection for one or more of our product candidates will not be negatively impacted by this Supreme Court decision, rulings in other cases or changes in guidance or procedures issued by the USPTO. We cannot fully predict what impact the Supreme Court's decisions in *Myriad* may have on the ability of life science companies to obtain or enforce patents relating to their products in the future. These decisions, the guidance issued by the USPTO and rulings in other cases or changes in USPTO guidance or procedures could have a material adverse effect on our existing patent rights and our ability to protect and enforce our intellectual property in the future.

If we are unable to protect the confidentiality of trade secrets, our business and competitive position would be harmed.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect certain proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce, and any other elements of our product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect and some courts inside and outside the United States are less willing or unwilling to protect trade secrets. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors, and contractors. We cannot guarantee that we have entered into such agreements with each party that may have or has had access to our trade secrets or proprietary technology and processes. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach.

In addition, our trade secrets may otherwise become known or be independently discovered by competitors. Competitors and other third parties could infringe, misappropriate or otherwise violate our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If our trade secrets are not adequately protected or sufficient to provide an advantage over our competitors, our competitive position could be adversely affected, as could our business. Additionally, if the steps taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third parties for misappropriating our trade secrets.

Patent term may be inadequate to protect our competitive position on our product candidates for an adequate amount of time.

Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. In the United States, the Drug Price Competition and Patent Term Restoration Act of 1984 permits a patent term extension of up to five years beyond the normal expiration of the patent, which is limited to the approved indication (or any additional indications approved during the period of extension). However, a patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of the product's approval by the FDA, only one patent applicable to an approved drug is eligible for the extension, and only those claims covering the approved drug, a method for using it or a method for manufacturing it may be extended. In the future, if and when our product candidates receive FDA approval, we plan to apply for patent term extensions on patents covering those product candidates in any jurisdiction where these are available. However, the applicable authorities, including the FDA and the USPTO in the United States, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to the patents we in-license, or may grant more limited extensions than we request. Moreover, we may not receive an extension because of, for example, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. If this occurs, our competitors may be able to take advantage of our investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case.

We may be subject to claims asserting that our employees, consultants or advisors have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting ownership of what we regard as our own intellectual property.

Certain of our employees, consultants or advisors are currently, or were previously, employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and advisors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these individuals or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such individual's current or former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management. Our licensors may face similar risks, which could have an adverse impact on intellectual property that is licensed to us.

We may become subject to claims that we are infringing certain third-party patents or other third-party intellectual property rights, any of which may prevent or delay our development and commercialization efforts and have a material adverse effect on our business.

Our commercial success depends in part on avoiding infringing, misappropriating and otherwise violating the patents and other intellectual property and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, and administrative proceedings such as interferences, *inter partes* review and post grant review proceedings before the USPTO and opposition proceedings before foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned or controlled by third parties, including our competitors, exist in the fields in which we are pursuing product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we or our licensors are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, methods of manufacture or methods for treatment relating to our product candidates and, because patent applications can take many years to issue, there may be currently pending third party patent applications which may later result in issued patents, in each case that our product candidates, their manufacture or use may infringe or be alleged to infringe. We may fail to identify potentially relevant patents or patent applications, incorrectly conclude that a patent is invalid or does not cover our activities, or incorrectly conclude that a patent application is unlikely to issue in a form of relevance to our activities.

Parties making patent infringement claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defense of these claims, including demonstrating non-infringement, invalidity or unenforceability of the respective patent rights in question, regardless of their merit, is time-consuming, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. For example, in order to successfully challenge the validity of any U.S. patent in federal court, we would need to overcome a presumption of validity. This is a high burden requiring us to present clear and convincing evidence as to the invalidity of any such U.S. patent claim, and we can provide no assurance that a court of competent jurisdiction would invalidate the claims of any such U.S. patent. We may not have sufficient resources to bring these actions to a successful conclusion. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our shares.

In the event that a holder of any such patents seeks to enforce its patent rights against us with respect to one or more of our product candidates, and our defenses against the infringement of such patent rights are unsuccessful, we may be precluded from commercializing our product candidates, even if approved, without first obtaining a license to some or all of these patents, which may not be available on commercially reasonable terms or at all. Moreover, we may be required to pay significant fees and royalties to secure a license to the applicable patents. Such a license may only be non-exclusive, in which case our ability to stop others from using or commercializing technology and products similar or identical to ours may be limited. Furthermore, we could be liable for damages to the holder of these patents, which may be significant and could include treble damages if we are found to have willfully infringed such patents. In the event that a challenge to these patents were to be unsuccessful or we were to become subject to litigation or unable to obtain a license on commercially reasonable terms with respect to these patents, it could harm our business, financial condition, results of operations and prospects.

We are aware of third-party issued U.S. patents relating to the lentiviral vectors which may be used in the manufacture or use of our product candidates. If these patent rights were enforced against us, we believe that we have defenses against any such action, including that these patents would not be infringed by our product candidates and/or that these patents are not valid. However, if these patents were enforced against us and defenses to such enforcement were unsuccessful, unless we obtain a license to these patents, which may not be available on commercially reasonable terms, or at all, we could be liable for damages and precluded from commercializing any product candidates that were ultimately held to infringe these patents, which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Even in the absence of a finding of infringement, we may need or may choose to obtain licenses from third parties to advance our research or allow commercialization of our product candidates. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, or at all. In that event, we would be unable to further develop and commercialize our product candidates. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business. Any of the foregoing could materially adversely affect our business, results of operations and financial condition.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations and may not adequately protect our business or permit us to maintain our competitive advantage. For example:

- others may be able to make products that are similar to our product candidates or utilize similar cell therapy technology but that are not covered by the claims of our current or future patent portfolio;
- we, or our current or future licensors or collaborators, might not have been the first to make the inventions covered by the issued patent or pending patent application that we license now or that we may license or own in the future;
- we, or our current or future licensors or collaborators, might not have been the first to file patent applications covering certain of our or their inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our licensed intellectual property rights;
- it is possible that our current or future licensed patent applications will not lead to issued patents;
- issued patents that we hold rights to may be held invalid or unenforceable, including as a result of legal challenges by our competitors or other third parties;
- our competitors or other third parties might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may harm our business;
- we may choose not to file a patent application in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent application covering such intellectual property; and
- third-party patents may issue with claims covering our activities; we may have infringement liability exposure arising from such patents.

Should any of these events occur, they could have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Our Reliance on Third Parties

We are reliant on a research services agreement with Penn for a significant portion of our nonclinical research and development activities and current manufacturing activities.

If Penn and its affiliated entities were to fail to perform their obligations in accordance with the terms of the Services Agreement or terminate the Services Agreement with little notice, we may have difficulty continuing our normal business operations and our business prospects, financial condition and results of operations could be harmed. In addition, the termination of our relationship with Penn and the Services Agreement and any delay in appointing or finding a suitable replacement provider, if one exists, could make it difficult for us to operate our business for that period. Moreover, we will be reliant on Penn to assist us with any necessary technology transfer. Any delays or inadequacies in such technology transfer, or disputes regarding the scope of such technology transfer, could delay our operations, including our clinical trials, require us to expend additional resources and otherwise have an adverse effect on our business.

Additionally, over time we will need to transition from receiving the services that Penn currently provides to performing such services internally. The Services Agreement is scheduled to expire on the later of October 19, 2021 or completion of all research and development projects, and unless the Services Agreement is amended, Penn will not be obligated to provide any further services under the Services Agreement after that time. We currently anticipate that research and development projects under the Services Agreement will continue through at least 2023. In addition, Penn has the right to terminate the Services Agreement in whole at any time with 90 days' notice and to terminate any research and development project being performed under the Services Agreement if the Penn service provider appointed to lead such project is unavailable and Penn is unavailable to find a replacement within 60 days for such service provider. Penn also has the right to terminate certain manufacturing services being performed under the Services Agreement with 180 days' written notice. From time to time, we may enter into further addenda to the Services Agreement that provide Penn with the right to terminate such addenda with limited notice periods. If we do not have adequate personnel and capabilities at the time that we assume responsibilities for such services, we may not be successful in effectively or efficiently transitioning these services from Penn, which could disrupt our business and have a material adverse effect on our financial condition and results of operations. Further, we will incur costs relating to establishing our own financial, administrative, information technology and other support functions as well as running and maintaining such functions on a going-forward basis. In addition, the process of establishing such functions may distract our management from focusing on business and strategic opportunities and could result in disruptions to our business. Even if we are able to successfully transition these services, they may be more expensive or less efficient than the services we are receiving from Penn during the transition period.

We currently, and will likely continue to, rely on third parties to conduct our clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approval of or commercialize our product candidates.

We depend and will continue to depend upon third parties, including independent investigators and collaborators, such as universities, medical institutions, CROs and strategic partners, to conduct our preclinical studies and clinical trials under agreements with us. Specifically, we depend on clinical trial sites to enroll patients and conduct the DesCAARTesTM trial and planned MusCAARTesTM trial in a timely and appropriate manner. If our clinical trial sites do not conduct the trials on the timeline we expect or otherwise fail to support the trials, our clinical trial results could be significantly delayed, thereby adversely impacting our leadership position in the CAAR T industry and our ability to progress additional product candidates. Further, although we intend to transition our manufacturing needs to a CMO and eventually secure our own clinical manufacturing facility, we must currently rely on Penn to manufacture supplies and process our product candidates. As we open additional clinical trial sites, we expect to have to negotiate budgets and contracts with CROs and study sites, which may result in delays to our development timelines and increased costs.

We will rely heavily on these third parties, including Penn, to conduct our discovery efforts and manufacturing, and as a result, will have limited control over pace at which these activities are carried out. Nevertheless, we are responsible for ensuring that each of our trials is conducted in accordance with applicable protocol, legal, regulatory and scientific standards, and our reliance on third parties does not relieve us of our regulatory responsibilities. We and these third parties are required to comply with FDA's GCPs which are regulations and guidelines enforced by the FDA for product candidates in clinical development. Regulatory authorities enforce these GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of these third parties fail to comply with applicable GCP requirements, the clinical data generated in our clinical trials may be deemed unreliable and the FDA may require us to perform additional clinical trials before approving our marketing applications. We cannot provide assurance that, upon inspection, such regulatory authorities will not determine that some or all of our clinical trials do not fully comply with the GCP requirements. For any violations of laws and regulations during the conduct of our clinical trials, we could be subject to untitled and warning letters or enforcement action that may include civil penalties up to and including criminal prosecution. In addition, our clinical trials must be conducted with biologic product produced under cGMPs and will require a large number of test patients. We also are required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database within certain timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

As widely reported, global credit and financial markets have experienced extreme volatility and disruptions, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability. In the event that one or more of our current or future service providers, manufacturers and other partners do not successfully carry out their contractual duties, meet expected deadlines, or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, due to the economic downturn or for any other reasons, then we may not be able to obtain, or may be delayed in obtaining, marketing approvals for any product candidates we may develop and will not be able to, or may be delayed in our efforts to, successfully commercialize our medicines. Our failure or the failure of these third parties to comply with applicable regulatory requirements or our stated protocols could also subject us to enforcement action. Moreover, our business may be implicated if any of these third parties violates federal or state fraud and abuse or false claims laws and regulations or healthcare privacy and security laws.

Any third parties conducting our clinical trials will not be our employees and, except for remedies available to us under our agreements with such third parties, we cannot control whether or not they devote sufficient time and resources to our ongoing preclinical and clinical programs. These third parties may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical studies or other drug development activities, which could affect their performance on our behalf. If these third parties do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements or for other reasons, our clinical trials may be extended, delayed or terminated and we may not be able to complete development of, obtain regulatory approval of or successfully commercialize our product candidates. As a result, our financial results and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenue could be delayed.

If any of our relationships with trial sites, or any CRO that we may use in the future, terminates, we may not be able to enter into arrangements with alternative trial sites or CROs or do so on commercially reasonable terms. Switching or adding third parties to conduct our clinical trials involves substantial cost and requires extensive management time and focus. In addition, there is often a natural transition period when a new third party commences work. As a result, delays may occur, which can materially impact our ability to meet our desired clinical development timelines. For example, in October 2021, one of our CROs that provides data management, biostatistics and pharmacovigilance data services for the DesCAARTes™ trial, provided us a 60-day notice of termination for convenience, and as a result in December 2021 we transitioned to a new provider of data management, biostatistics and pharmacovigilance data services. Though we carefully manage our relationships with our CROs, there can be no assurance that we will not encounter similar challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition and prospects.

We also expect to rely on other third parties to store and distribute drug supplies for our clinical trials. Any performance failure on the part of our distributors could delay clinical development or marketing approval of any product candidates we may develop or commercialization of our medicines, producing additional losses and depriving us of potential product revenue.

We intend to rely on third parties to manufacture our clinical product supplies, and we may have to rely on third parties to produce and process our product candidates, if licensed.

Although we may eventually secure our own clinical manufacturing facility for any late phase clinical development that we undertake, we currently rely on third parties, including Penn, to supply raw materials and other important components that are used to manufacture our product candidates and intend in the future to rely on CMOs. In the case of any manufacturing performed for us by third parties, the services performed for us risk being delayed because of the competing priorities that such parties have for utilization of their manufacturing resources and any capacity issues that thereby arise.

We do not yet have sufficient information to reliably estimate the cost of the manufacturing and processing of our product candidates in clinical quantity or commercial quantity, and the actual cost to manufacture and process our product candidates could ultimately materially and adversely affect the commercial viability of our product candidates. As a result, we may never be able to develop a commercially viable product.

In addition, our anticipated reliance on a limited number of third-party manufacturers exposes us to the following risks:

- We may be unable to identify manufacturers on acceptable terms or at all because the number of potential manufacturers is limited and the FDA may have questions regarding any replacement contractor. This may require new testing and regulatory interactions. In addition, a new manufacturer would have to be educated in, or develop substantially equivalent processes for, production of our products after receipt of FDA questions, if any.
- Our third-party manufacturers might be unable to timely formulate and manufacture our product or produce the quantity and quality required to meet our clinical and commercial needs, if any.

- Contract manufacturers may not be able to execute our manufacturing procedures appropriately.
- Any contract manufacturers that we engage may not perform as agreed or may not remain in the contract manufacturing business for the time required to supply our clinical trials or to successfully produce, store and distribute our product candidates.
- Manufacturers are subject to ongoing periodic unannounced inspection by the FDA and corresponding state agencies to ensure strict compliance with cGMP and other government regulations. We do not have control over third-party manufacturers' compliance with these regulations and standards.
- We may not own, or may have to share, the intellectual property rights to any improvements made by our third-party manufacturers in the manufacturing process for our product candidates.
- Our third-party manufacturers could breach or terminate their agreement with us.

Furthermore, all of our contract manufacturers are engaged with other companies to supply and/or manufacture materials or products for such companies, which exposes our manufacturers to regulatory risks related to the production of such materials and products. As a result, failure to meet the regulatory requirements for the production of those materials and products may affect the regulatory clearance of our contract manufacturers' facilities generally. If the FDA does not approve these facilities for the manufacture of our product candidates or if any agency withdraws its approval in the future, we may need to find alternative manufacturing facilities, which would negatively impact our ability to develop, obtain regulatory approval for or market our product candidates, if licensed.

Our contract manufacturers would also be subject to the same risks we face in developing our own manufacturing capabilities, as described above. Each of these risks could delay our clinical trials, the approval, if any of our product candidates by the FDA or the commercialization of our product candidates or result in higher costs or deprive us of potential product revenue. In addition, we will rely on third parties to perform release tests on our product candidates prior to delivery to patients. If these tests are not appropriately done and test data are not reliable, patients could be put at risk of serious harm.

For more information, see "Risk Factors—Risks Related to Manufacturing and Supply".

We may form or seek strategic alliances or enter into additional licensing arrangements in the future, and we may not realize the benefits of such alliances or licensing arrangements.

We may form or seek strategic alliances, create joint ventures or collaborations or enter into additional licensing arrangements with third parties that we believe will complement or augment our development and commercialization efforts with respect to our product candidates and any future product candidates that we may develop. Any of these relationships may require us to incur non-recurring and other charges, increase our near and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. In addition, we face significant competition in seeking appropriate strategic partners and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish a strategic partnership or other alternative arrangements for our product candidates because they may be deemed to be at too early of a stage of development for collaborative effort and third parties may not view our product candidates as having the requisite potential to demonstrate safety, potency and purity. Any delays in entering into new strategic partnership agreements related to our product candidates could delay the development and commercialization of our product candidates in certain geographies for certain indications, which would harm our business prospects, financial condition and results of operations.

If we license products or businesses, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate them with our existing operations and company culture. For instance, our License Agreement with Penn and CHOP requires significant research and development commitments that may not result in the development and commercialization of our product candidates, including DSG3-CAART and our other product candidates. We cannot be certain that, following a strategic transaction or license, we will achieve the results, revenue or specific net income that justifies such transaction.

We may not realize the benefits of acquired assets or other strategic transactions, including any transactions whereby we acquire or license manufacturing and other advanced technologies.

In August 2018, we entered into a License Agreement with Penn and CHOP which was amended and restated in July 2019, and further amended in May 2020 and October 2021, or the License Agreement, pursuant to which we were granted licenses to certain patent rights for the research and development of products, as well as an exclusive license under those same patent rights to make, use, sell and import such products, in the autoimmune disease and alloimmune response subfields, in each case, for the treatment of humans. In October 2022, we entered into the IASO Agreement, pursuant to which we were granted worldwide license under certain intellectual

property to develop, manufacture, commercialize and otherwise exploit T cell products directed to CD19 for the purpose of diagnosis, prevention or treatment of an autoimmune or alloimmune indication in humans.

We actively evaluate various strategic transactions on an ongoing basis. We may acquire other businesses, products or technologies as well as pursue joint ventures or investments in complementary businesses. The success of our strategic transactions, including the License Agreement, and any future strategic transactions depends on the risks and uncertainties involved including:

- unanticipated liabilities related to acquired companies or joint ventures;
- difficulties integrating acquired personnel, technologies and operations into our existing business;
- retention of key employees;
- diversion of management time and focus from operating our business to management of strategic alliances or joint ventures or acquisition integration challenges;
- increases in our expenses and reductions in our cash available for operations and other uses;
- disruption in our relationships with collaborators or suppliers as a result of such a transaction; and
- possible write-offs or impairment charges relating to acquired businesses or joint ventures.

If any of these risks or uncertainties occur, we may not realize the anticipated benefit of any acquisition or strategic transaction. Additionally, foreign acquisitions and joint ventures are subject to additional risks, including those related to integration of operations across different cultures and languages, currency risks, potentially adverse tax consequences of overseas operations and the particular economic, political, legal and regulatory risks associated with specific countries. For example, IASO is based in China and we may not receive the same protections under Chinese law, including with respect to applicable bankruptcy, insolvency, liquidation, arrangement, moratorium or similar laws relating to or affecting our rights.

Future acquisitions or dispositions could result in potentially dilutive issuances of our equity securities, the incurrence of debt, contingent liabilities or amortization expenses or write-offs of goodwill, any of which could harm our financial condition.

Risks Related to Manufacturing and Supply

We currently rely upon Penn for our manufacturing needs, and we intend to rely on other third parties for our future manufacturing needs prior to establishing our own manufacturing facility.

We are currently reliant upon Penn for our cell product manufacturing for DSG3-CAART. We have entered into agreements with CMOs and initiated tech transfer activities to secure the manufacturing supply chain for current and future product candidates. We will need to develop relationships with suppliers, increase the scale of production and demonstrate comparability of the material produced at these facilities to the material that was previously produced. Transferring manufacturing processes and know-how is complex and involves review and incorporation of both documented and undocumented processes that may have evolved over time.

In addition, transferring production to different facilities may require utilization of new or different processes to meet the specific requirements of a given facility. We would expect additional comparability work will also need to be conducted to support the transfer of certain manufacturing processes and process improvements. We cannot be certain that all relevant know-how and data has been adequately incorporated into the manufacturing process until the completion of studies (and the related evaluations) intended to demonstrate the comparability of material previously produced with that generated by any CMO that we engage for our manufacturing needs. If we are not able to successfully transfer and produce comparable product candidates, our ability to further develop and manufacture our product candidates may be negatively impacted.

We plan to eventually establish our own manufacturing facility. While the addition of our own manufacturing facility would provide us with future flexibility within our manufacturing network, we still may need to identify additional CMOs for continued production of supply for some or all of our product candidates. Given the nature of our manufacturing processes, the number of CMOs who possess the requisite skill and capability to manufacture our CAAR T cell immunotherapy product candidates is limited.

Further, we may not be able to achieve clinical manufacturing and cell processing through Penn on a timely basis, on our own or at any future CMO. While our current manufacturing process is based off the validated process developed at Penn for CD19 CAR T, or CART19, we have limited experience as an organization in managing the CAR T or CAAR T engineering process. Finally, because clinical manufacturing and cell processing is highly complex and patient donor material is inherently variable, we cannot be sure that the manufacturing processes employed by Penn, any CMO that we engage in the future, or by us at a manufacturing facility that we establish will consistently result in T cells that will be safe and effective.

Our product candidates are uniquely manufactured. If we, Penn or any of our third-party manufacturers encounter difficulties in manufacturing our product candidates, our ability to provide supply of our product candidates for clinical trials or, if licensed, for commercial sale, could be delayed or stopped, or we may be unable to maintain a commercially viable cost structure.

The manufacturing process used to produce our product candidates is complex and novel, and it has not yet been validated for commercial production. Among the complex processes used in the manufacture of our product candidates is the manufacture of the lentiviral delivery vector used to deliver the applicable CAR or CAAR gene into the T cells. For example, the manufacture of our product candidates includes harvesting white blood cells from each patient, stimulating certain T cells from the white blood cells and thereby causing them to activate and proliferate, combining patient T cells with our lentiviral delivery vector through a process known as transduction, expanding the transduced T cells to obtain the desired dose, and ultimately infusing the modified T cells back into the patient's body. Notably, the manufacture of both DSG3/1-CAART and FVIII-CAART may be more challenging or require new gene delivery technology due to the need to deliver large transgenes for these programs, and vector delivery systems have size limitations. Because of these complexities, the cost to manufacture our product candidates is higher than traditional small molecule chemical compounds and monoclonal antibodies, and the manufacturing process is less reliable and is more difficult to reproduce. Furthermore, our manufacturing process development and scale-up is at an early stage. The actual cost to manufacture and process our product candidates could be greater than we expect and could materially and adversely affect the commercial viability of our product candidates.

Our manufacturing process may be susceptible to technical and logistics delays or failures due to the fact that each patient is an independent manufacturing lot, and also due to unique supply chain requirements. These include the collection of white blood cells from patients' blood, variability in the quality of white blood cells collected from patients' blood, cryopreservation of the white blood cells collected, packaging and shipment of frozen white blood cells to the manufacturing site in order to enable multi-site studies, procurement of lentiviral vectors that meet potency and purity requirements and shipment to the product candidate manufacturing site, shipment of the final product to clinical centers, manufacturing issues associated with interruptions in the manufacturing process, scheduling constraints for cell manufacturing slots, process contamination, equipment or reagent failure, improper installation or operation of equipment, vendor or operator error, and inconsistency in cell growth. Even minor deviations from normal manufacturing processes could result in reduced production yields, lot failures, product defects, product recalls, product liability claims and other supply disruptions. If microbial, viral, or other contaminations are discovered in our product candidates or in the manufacturing facilities in which our product candidates are made, production at such manufacturing facilities may be interrupted for an extended period of time to investigate and remedy the contamination. Further, as product candidates are developed through preclinical studies to late-stage clinical trials toward approval and commercialization, it is common that various aspects of the development program, such as manufacturing methods, are altered along the way in an effort to optimize processes and results. Such changes may result in the need to enroll additional patients or to conduct additional clinical studies to evaluate the impact of changes on product safety and efficacy. Penn has informed us that it will be unable provide clinical supply for any late-phase clinical trials of our product candidates that we may conduct. Therefore, we will need to enter into new agreements with CMOs to produce clinical supply of our product candidates for late-phase clinical trials. We cannot guarantee that we will be able to enter into such agreements on commercially acceptable terms, if at all. We will need to transfer the technology to manufacture our product candidates to these CMOs, and these CMOs may decide or be required to adopt different manufacturing protocols or processes, which may require us to amend any ongoing or proposed clinical trial protocols or perform additional preclinical studies to demonstrate the comparability of any such new manufacturing protocols or processes. We cannot provide any assurance that Penn will provide adequate support to efficiently and effectively transfer the technology or that disputes will not arise between us and Penn regarding the necessary scope of technology transfer, that the technology transfer will be successful, or that any CMO will be successful in producing our product candidates in sufficient quantities or of acceptable quality, if at all. Such changes carry the risk that they will not achieve these intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of ongoing and planned clinical trials or other future clinical trials.

Although we continue to optimize our manufacturing process for our product candidates, doing so is a difficult and uncertain task, and there are risks associated with scaling to the level required for advanced clinical trials or commercialization, including, among others, cost overruns, potential problems with process scale-up, process reproducibility, stability issues, lot consistency and timely availability of reagents and/or raw materials. We ultimately may not be successful in transferring our production system from our contract manufacturer to any manufacturing facilities we may establish ourselves, or our contract manufacturer may not have the necessary capabilities to complete the implementation and development process. If we are unable to adequately validate or scale-up the manufacturing process for our product candidates with our current manufacturer, we will need to transfer to another manufacturer and

complete the manufacturing validation process, which can be lengthy. If we are able to adequately validate and scale-up the manufacturing process for our product candidates with a contract manufacturer, we will still need to negotiate with such contract manufacturer an agreement for commercial supply and it is not certain we will be able to come to agreement on terms acceptable to us. As a result, we may ultimately be unable to reduce the cost of goods for our product candidates to levels that will allow for an attractive return on investment if and when those product candidates are commercialized.

In addition, many of the components which are required to support our cell manufacturing process, such as equipment, media, growth factors and disposables, are highly specialized and it is possible that the supply chain for these materials may be interrupted. If we are unable to promptly remedy such interruption, then there may be delays to our clinical development efforts.

The manufacturing process for any products that we may develop is subject to the FDA approval process, and we will need to contract with manufacturers who can meet all applicable FDA requirements on an ongoing basis.

The manufacturing process for any products that we may develop is subject to the FDA approval process, and we will need to contract with manufacturers who can meet all applicable FDA requirements on an ongoing basis. If we or our CMOs are unable to reliably produce products to specifications acceptable to the FDA, we may not obtain or maintain the approvals we need to commercialize such products. Even if we obtain regulatory approval for any of our product candidates, there is no assurance that either we or our CMOs will be able to manufacture the approved product in accordance with requirements from the FDA, to produce it in sufficient quantities to meet the requirements for the potential launch of the product, or to meet potential future demand. Any of these challenges could delay completion of clinical trials, require bridging clinical trials or the repetition of one or more clinical trials, increase clinical trial costs, result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, suspension of production or recalls of the product candidates or marketed biologics, operating restriction and criminal prosecutions, delay approval of our product candidates, impair commercialization efforts, increase our cost of goods, and have an adverse effect on our business, financial condition, results of operations and growth prospects. Our future success depends on our ability to manufacture our products, if licensed, on a timely basis with acceptable manufacturing costs, while at the same time maintaining good quality control and complying with applicable regulatory requirements, and an inability to do so could have a material adverse effect on our business, financial condition, and results of operations. In addition, we could incur higher manufacturing costs if manufacturing processes or standards change, and we could need to replace, modify, design, or build and install equipment, all of which would require additional capital expenditures. Specifically, because our product candidates may have a higher cost of goods than conventional therapies, the risk that coverage and reimbursement rates may be inadequate for us to achieve profitability may be greater.

The manufacture of viral vectors is complex and variable, and there are a limited number of manufacturers able to supply us with viral vectors.

Our DSG3-CAART and MuSK-CAART product candidates utilize a lentiviral delivery vector and some or all of our other product candidates may require a lentiviral delivery vector, a key drug substance that delivers the CAR or CAAR to the target T cells. We do not have the capability to manufacture lentiviral vector and plan to obtain the vector we require from third parties. The manufacturing process for lentiviral vector is variable and still evolving. It is not uncommon for manufacturing runs to fail, whether due to contamination, supplier error, or equipment failure, or to be delayed. To the extent our product candidates use a lentiviral delivery vector, a lack of vector supply will cause us to be unable to manufacture our CAR T or CAAR T cells as well as a delay in patient enrollment, which may have a negative impact on our ability to successfully develop our product candidates.

Further, there are a limited number of manufacturers capable of producing lentiviral vectors. It can be challenging to secure a relationship with any of these manufacturers, and the manufacturing and release process can take a significant amount of time. We have secured a supply of lentiviral vector from CHOP sufficient for a portion of the patients we plan to enroll in our DesCAARTesTM trial. We have also reserved additional vector manufacturing capacity at Penn and CHOP and in December 2021, we secured a license and supply agreement with Oxford Biomedica to establish a process and supply lentiviral vector for the clinical and commercial development of our DSG3-CAART candidate. There is no assurance that we will be able to secure adequate and timely supply of lentiviral vector. Moreover, we cannot be certain that our CAR T or CAAR T cell product candidates produced with lentiviral vector from different manufacturers will be comparable or that results of clinical trials will be consistent if conducted with lentiviral vector from different manufacturers.

Vector production also requires the production of high-quality DNA plasmids, for which there is also a limited number of suppliers. Although we have established relationships with multiple suppliers for lentiviral vector and plasmids, we do not yet have our own clinical-scale manufacturing facility established, and are therefore highly dependent on the ability of these suppliers to manufacture necessary materials and to deliver these materials to us on a timely and reliable basis.

If we are to operate our own manufacturing facility, significant resources will be required and we may fail to successfully operate our facility, which could adversely affect our clinical trials and the commercial viability of our product candidates.

If we establish our own manufacturing facility, our operations will be subject to review and oversight by the FDA and the FDA could object to our use of our manufacturing facility. We must first receive approval from the FDA prior to licensure to manufacture our product candidates, which we may never obtain. Even if licensed, we would be subject to ongoing periodic unannounced inspection by the FDA and corresponding state agencies to ensure strict compliance with cGMPs and other government regulations. Our license to manufacture product candidates will be subject to continued regulatory review.

Our cost of goods development is at an early stage. The actual cost to manufacture and process our product candidates could be greater than we expect and could materially and adversely affect the commercial viability of our product candidates.

The manufacture of biopharmaceutical products is complex and requires significant expertise, and can be impacted by resource constraints, labor disputes and workforce limitations.

The manufacture of biopharmaceutical products is complex and requires significant expertise, including the development of advanced manufacturing techniques and process controls. Manufacturers of cell therapy products often encounter difficulties in production, particularly in scaling out and validating initial production and ensuring the absence of contamination. These problems include difficulties with production costs and yields, quality control, including stability of the product, quality assurance testing, operator error, shortages of qualified personnel, as well as compliance with strictly enforced federal, state and foreign regulations. Furthermore, if contaminants are discovered in our supply of product candidates or in the manufacturing facilities upon which we currently or will rely, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. We cannot assure you that any stability or other issues relating to the manufacture of our product candidates, whether by Penn, by a third-party CMO, or at any manufacturing facility that we may establish, will not occur in the future.

Penn, third-party CMOs that we engage, or we may fail to manage the logistics of storing and shipping our product candidates. Storage failures and shipment delays and problems caused by us, our vendors or other factors not in our control, such as weather, could result in loss of usable product or prevent or delay the delivery of product candidates to patients.

Penn, third-party CMOs that we engage, or we may also experience manufacturing difficulties due to resource constraints, labor disputes or workforce limitations arising from the expanding need for manufacturing in the cell therapy field and the limited number of training programs for technical staff. If we were to encounter any of these difficulties, our ability to provide our product candidates to patients would be jeopardized.

We are dependent upon the availability of specialty raw materials and the production capabilities of small manufacturers to source the components of our product candidates.

Our product candidates require many specialty raw materials, some of which are manufactured by small companies with limited resources and experience to support a commercial product, and the suppliers may not be able to deliver raw materials to our specifications. In addition, those suppliers generally do not have the capacity to support commercial products manufactured under cGMP by biopharmaceutical firms. The suppliers may be ill-equipped to support our needs, especially in non-routine circumstances like an FDA inspection or medical crisis, such as widespread contamination. We also do not have contracts with many of these suppliers, and we may not be able to contract with them on acceptable terms or at all. Accordingly, we may experience delays in receiving key raw materials to support clinical or commercial manufacturing.

In addition, some raw materials are currently available from a single supplier, or a small number of suppliers. We cannot be sure that these suppliers will remain in business or that they will not be purchased by one of our competitors or another company that is not interested in continuing to produce these materials for our intended purpose. In addition, the lead time needed to establish a relationship with a new supplier can be lengthy, and we may experience delays in meeting demand in the event we must switch to a new supplier. The time and effort to qualify a new supplier could result in additional costs, diversion of resources or reduced manufacturing yields, any of which would negatively impact our operating results. Further, we may be unable to enter into agreements with a new supplier on commercially reasonable terms, which could have a material adverse impact on our business. We are also unable to predict how changing global economic conditions or global health concerns such as the ongoing COVID-19 pandemic will affect our third-party suppliers and manufacturers. Since the beginning of the COVID-19 pandemic, several vaccines for COVID-19 have received Emergency Use Authorization by the FDA and a number of those later received marketing approval. Additional vaccines may be authorized or approved in the future. The resultant demand for vaccines and potential for manufacturing facilities and materials to be commandeered under the Defense Production Act of 1950, or equivalent foreign legislation, may make it more difficult to obtain materials or manufacturing slots for the products needed for our clinical trials, which could lead to delays in these trials. Any negative impact of such matters on our third-party suppliers and manufacturers may also have an adverse impact on our results of operations or financial condition.

We may encounter difficulties in production, particularly with respect to process development or scaling up of our manufacturing capabilities. If we encounter such difficulties, our ability to provide supply of our CAR T or CAAR T cells for clinical trials or for commercial purposes could be delayed or stopped.

Establishing clinical and commercial manufacturing and supply is a difficult and uncertain task, and there are risks associated with scaling to the level required for advanced clinical trials or commercialization, including, among others, increased costs, potential problems with process scale-out, process reproducibility, stability issues, lot consistency, and timely availability of reagents or raw materials. For example, we may find it difficult to establish a manufacturing process that is consistent. If this occurs, we may need to complete more than one manufacturing run for each treated patient, which would impact the availability of adequate coverage and reimbursement from third-party payors. Competitors that have developed CAR T cell therapies have had difficulty reliably producing engineered T cell therapies in the commercial setting. If we experience similar challenges manufacturing product candidates to approved specifications, this may limit our product candidates' utilization and our ability to receive payment for these product candidates once licensed. Alternatively, these challenges may require changes to our manufacturing processes, which could require us to perform additional clinical studies, incurring significant expense. We may ultimately be unable to reduce the expenses associated with our product candidates to levels that will allow us to achieve a profitable return on investment.

If we or our third-party suppliers use hazardous, non-hazardous, biological or other materials in a manner that causes injury or violates applicable law, we may be liable for damages.

Our research and development activities involve the controlled use of potentially hazardous substances, including chemical and biological materials. We and our suppliers are subject to federal, state and local laws and regulations in the United States governing the use, manufacture, storage, handling and disposal of medical and hazardous materials. Although we believe that we and our suppliers' procedures for using, handling, storing and disposing of these materials comply with legally prescribed standards, we and our suppliers cannot completely eliminate the risk of contamination or injury resulting from medical or hazardous materials. As a result of any such contamination or injury, we may incur liability or local, city, state or federal authorities may curtail the use of these materials and interrupt our business operations. In the event of an accident, we could be held liable for damages or penalized with fines, and the liability could exceed our resources. We do not have any insurance for liabilities arising from medical or hazardous materials. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental regulations may impair our research, development and production efforts, which could harm our business, prospects, financial condition or results of operations.

Changes in product candidate manufacturing or formulation may result in additional costs or delay, which could adversely affect our business, results of operations and financial condition.

As product candidates are developed through preclinical studies to later-stage clinical trials towards approval and commercialization, it is common that various aspects of the development program, such as manufacturing methods or formulation, are altered along the way in an effort to optimize processes and results. Any of these changes could cause our product candidates to perform differently and affect the results of ongoing and planned clinical trials or other future clinical trials conducted with the altered materials or with materials made with the altered methods. Such changes may also require additional testing, or notification to, or approval by the FDA or other regulatory authorities. This could delay completion of clinical trials, require the conduct of bridging clinical trials or studies, require the repetition of one or more clinical trials, increase clinical trial costs, delay approval of our product candidates and/or jeopardize our ability to commence product sales and generate revenue.

Risks Related to Government Regulation

The FDA regulatory approval process is lengthy and time-consuming, and we may experience significant delays in the clinical development and regulatory approval of our product candidates.

The research, testing, manufacturing, labeling, approval, selling, import, export, marketing and distribution of drug products, including biologics, are subject to extensive regulation by the FDA and other regulatory authorities in the United States. We are not permitted to market any biological drug product in the United States until we receive approval of a Biologics License Application, or BLA, from the FDA. We have not previously submitted a BLA to the FDA, or similar licensure filings to comparable foreign authorities. A BLA must include extensive preclinical and clinical data and supporting information to establish the product candidate's safety, potency and purity for each desired indication. The BLA must also include significant information regarding the chemistry, manufacturing and controls for the product, including with respect to chain of identity and chain of custody of the product.

We expect the novel nature of our product candidates to create further challenges in obtaining regulatory approval. For example, to our knowledge, the FDA has not previously reviewed regulatory applications for the commercial development of CAR T cells for treatment of autoimmune disease or CAAR T cells for treatment of pemphigus, and there is no cell therapy currently approved by the FDA for the treatment of mPV or MuSK myasthenia gravis. Because of this, we have little guidance as to which endpoints will be accepted, how many clinical trials we may expect to conduct, and whether open-label clinical trials will be deemed acceptable, among other things. We may also request regulatory approval of future CAR T or CAAR T cell-based product candidates by target, regardless of disease type or origin, which the FDA may have difficulty accepting if our clinical trials only involved diseases of certain origins. The FDA may also require a panel of experts, referred to as an Advisory Committee, to deliberate on the adequacy of the safety, potency and purity data to support licensure. The opinion of the Advisory Committee, although not binding, may have a significant impact on our ability to obtain licensure of the product candidates based on the completed clinical trials, as the FDA often adheres to the Advisory Committee's recommendations. Further, given the rapidly evolving landscape of cell therapy, we could encounter a significant change in the regulatory environment for our product candidates once we have already begun one or more lengthy and expensive clinical trials for our product candidates. Accordingly, the regulatory approval pathway for our product candidates may be uncertain, complex, expensive and lengthy, and approval may not be obtained.

We may also experience delays in completing ongoing and planned clinical trials for a variety of reasons, including delays related to:

- obtaining regulatory authorization to begin a trial, if applicable;
- the availability of financial resources to commence and complete the planned trials;
- reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- obtaining approval at each clinical trial site by an independent IRB;
- recruiting suitable patients to participate in a trial;
- having patients complete a trial, including having patients enrolled in clinical trials dropping out of the trial before the product candidate is manufactured and returned to the site, or return for post-treatment follow-up;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- addressing any patient safety concerns that arise during a trial;
- adding new clinical trial sites; or
- manufacturing sufficient quantities of qualified materials under cGMPs and applying them on a patient by patient basis for use in clinical trials.

We could also encounter delays if physicians encounter unresolved ethical issues associated with enrolling patients in clinical trials of our product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles. If we experience delays in the completion of, any future clinical trial of our product candidates, the commercial prospects for our product candidates will be harmed, and our ability to generate product revenue will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow down our product development and approval process and jeopardize our ability to commence product sales and generate revenue. Many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may ultimately lead to the denial of regulatory approval of our product candidates.

We expect the product candidates we develop will be regulated as biological products, or biologics, and therefore they may be subject to competition.

The Biologics Price Competition and Innovation Act of 2009, or BPCIA, was enacted as part of the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, to establish an abbreviated pathway for the approval of biosimilar and interchangeable biological products. The regulatory pathway establishes legal authority for the FDA to review and approve biosimilar biologics, including the possible designation of a biosimilar as “interchangeable” based on its similarity to a licensed biologic. Under the BPCIA, an application for a biosimilar product cannot be licensed by the FDA until 12 years after the reference product was licensed under a BLA. The law is complex and is still being interpreted and implemented by the FDA.

We believe that any of the product candidates we develop that is licensed in the United States as a biological product under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to congressional action or otherwise, or that the FDA will not consider the subject product candidates to be reference products for competing products, potentially creating the opportunity for generic competition sooner than anticipated. Moreover, the extent to which a biosimilar, once licensed, will be substituted for any one of the reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing.

The regulatory landscape that will govern our product candidates is uncertain; regulations relating to more established cell therapies and other therapies for B cell-mediated autoimmune diseases are still developing, and changes in regulatory requirements could result in delays or discontinuation of development of our product candidates or unexpected costs in obtaining regulatory approval.

Because we are developing novel CAR T and CAAR T cell product candidates that are unique biological entities, the regulatory requirements that we will be subject to are not entirely clear. Even with respect to more established products that fit into the categories of gene therapies or cell therapies, the regulatory landscape is still developing. For example, regulatory requirements governing gene therapy products and cell therapy products have changed frequently and may continue to change in the future. Moreover, there is substantial, and sometimes uncoordinated, overlap in those responsible for regulation of existing gene therapy products and cell therapy products. For example, in the United States, the FDA established the Office of Tissues and Advanced Therapies, or OTAT, in 2016, within its Center for Biologics Evaluation and Research, or CBER, to consolidate the review of gene therapy and related products, and the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER on its review. In September 2022, the FDA announced retitling of OTAT to the Office of Therapeutic Products, or OTP, and elevation of OTP to a “Super Office” to meet its growing cell and gene therapy workload. In addition, under guidelines issued by the National Institutes of Health, or NIH, gene therapy clinical trials are also subject to review and oversight by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. Before a clinical trial can begin at any institution, that institution’s institutional review board, or IRB, and its IBC assesses the safety of the research and identifies any potential risk to public health or the environment. While the NIH guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. Although the FDA decides whether individual gene therapy protocols may proceed, review process and determinations of other reviewing bodies can impede or delay the initiation of a clinical study, even if the FDA has reviewed the study and approved its initiation. Conversely, the FDA can place an IND application on clinical hold even if such other entities have provided a favorable review. Furthermore, each clinical trial must be reviewed and approved by an independent IRB at or servicing each institution at which a clinical trial will be conducted. In addition, adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other regulatory bodies to change the requirements for approval of any of our product candidates.

Complex regulatory environments exist in other jurisdictions in which we might consider seeking regulatory approvals for our product candidates, further complicating the regulatory landscape. For example, in the European Union, a special committee called the Committee for Advanced Therapies was established within the EMA in accordance with Regulation (EC) No 1394/2007 on advanced-therapy medicinal products, or ATMPs, to assess the quality, safety and efficacy of ATMPs, and to follow scientific developments in the field. ATMPs include gene therapy products as well as somatic cell therapy products and tissue engineered products. These various regulatory review committees and advisory groups and new or revised guidelines that they promulgate from time to time may lengthen the regulatory review process, require us to perform additional studies, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post-approval limitations or restrictions. Because the regulatory landscape for our CAR T and CAAR T cell product candidates is new, we may face even more cumbersome and complex regulations than those emerging for gene therapy products and cell therapy products. Furthermore, even if our product candidates obtain required regulatory approvals, such approvals may later be withdrawn because of changes in regulations or the interpretation of regulations by applicable regulatory agencies. Delay or failure to obtain, or unexpected

costs in obtaining, the regulatory approval necessary to bring a potential product to market could decrease our ability to generate sufficient product revenue to maintain our business.

If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals for our product candidates, we will not be able to commercialize, or will be delayed in commercializing, our product candidates, and our ability to generate revenue will be materially impaired.

Our product candidates and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale, distribution, import and export are subject to comprehensive regulation by the FDA and other regulatory agencies in the United States. Before we can commercialize any of our product candidates, we must obtain marketing approval. We have not received approval to market any of our product candidates from regulatory authorities in any jurisdiction and it is possible that none of our product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval. We, as a company, have no experience in filing and supporting the applications necessary to gain regulatory approvals and expect to rely on third-party CROs and/or regulatory consultants to assist us in this process. Securing regulatory approval requires the submission of extensive preclinical and clinical data and supporting information to the various regulatory authorities for each therapeutic indication to establish the drug candidate's safety, potency and purity.

Securing regulatory approval also requires the submission of information about the drug manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Our product candidates may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use.

The process of obtaining regulatory approvals is expensive, may take many years if additional clinical trials are required, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted IND, BLA or equivalent application types, may cause delays in the approval or rejection of an application. The FDA has substantial discretion in the approval process and may refuse to accept any application or may decide that our data are insufficient for approval and require additional preclinical, clinical or other studies. Our product candidates could be delayed in receiving, or fail to receive, regulatory approval for many reasons, including the following:

- the FDA may disagree with the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA that a drug candidate is safe, potent and pure for its proposed indication or a related companion diagnostic is suitable to identify appropriate patient populations;
- the results of clinical trials may not meet the level of statistical significance required by the FDA for approval;
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of an BLA or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA may fail to approve the manufacturing processes, test procedures and specifications, or facilities that we may establish or of third-party manufacturers with which we may contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA may significantly change in a manner rendering our clinical data insufficient for approval.

Of the large number of drugs in development, only a small percentage successfully complete the FDA approval process and are commercialized. The lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market our product candidates, which would significantly harm our business, results of operations and prospects.

We expect the novel nature of our product candidates to create further challenges in obtaining regulatory approval. As a result, our ability to develop product candidates and obtain regulatory approval may be significantly impacted. For example, the general approach for FDA approval of a new biologic or drug is for sponsors to seek licensure or approval based on dispositive data from well-controlled, Phase 3 clinical trials of the relevant product candidate in the relevant patient population. Phase 3 clinical trials typically involve hundreds of patients, have significant costs and take years to complete. We believe that we may be able to utilize the FDA's

Regenerative Medicine Advanced Therapy designation for our product candidates given the limited alternatives for treatments for certain rare diseases and B cell-mediated autoimmune diseases, but the FDA may not agree with our plans.

Moreover, approval of genetic or biomarker diagnostic tests may be necessary to advance some of our product candidates to clinical trials or potential commercialization. In the future, regulatory agencies may require the development and approval of such tests. Accordingly, the regulatory approval pathway for such product candidates may be uncertain, complex, expensive and lengthy, and approval may not be obtained.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may not approve the price we intend to charge for our products, if licensed, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

If we experience delays in obtaining approval or if we fail to obtain approval of our product candidates, the commercial prospects for our product candidates may be harmed and our ability to generate revenues will be materially impaired.

Even though we may apply for orphan drug designation for our product candidates, we may not be able to obtain orphan drug marketing exclusivity.

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, defined as a disease or condition with a patient population of fewer than 200,000 in the United States, or a patient population of 200,000 or more in the United States when there is no reasonable expectation that the cost of developing and making available the drug or biologic in the United States will be recovered from sales in the United States for that drug or biologic. In order to obtain orphan drug designation, the request must be made before submitting a BLA. In the United States, orphan drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages, and user-fee waivers. After the FDA grants orphan drug designation, the generic identity of the drug and its potential orphan use are disclosed publicly by the FDA. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

If a product that has orphan drug designation subsequently receives the first FDA approval of that particular product for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications, including a BLA, to market the same biologic (meaning, a product with the same principal molecular structural features) for the same indication for seven years, except in limited circumstances such as a showing of clinical superiority to the product with orphan drug exclusivity or if FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. As a result, even if one of our product candidates receives orphan exclusivity, the FDA can still approve other biologics that do not have the same principal molecular structural features for use in treating the same indication or disease or the same biologic for a different indication or disease during the exclusivity period. Furthermore, the FDA can waive orphan exclusivity if we are unable to manufacture sufficient supply of our product or if a subsequent applicant demonstrates clinical superiority over our product.

We have obtained from the FDA orphan drug designation for DSG3-CAART for the treatment of pemphigus vulgaris and for MuSK-CAART for the treatment of MuSK MG. We may seek orphan drug designation for certain other of our product candidates, but may be unable to obtain orphan drug designation for some or all of our product candidates in specific orphan indications in which we believe there is a medically plausible basis for the use of these products. Even if we obtain orphan drug designation, exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan designated indication and may be lost if the FDA later determines that the request for designation was materially defective or if we are unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition, or if a subsequent applicant demonstrates clinical superiority over our products, if licensed. Although we may seek orphan drug designation for other product candidates, we may never receive such designations. In addition, the FDA may further reevaluate the Orphan Drug Act and its regulations and policies. We do not know if, when, or how the FDA may change the orphan drug regulations and policies in the future, and it is uncertain how any changes might affect our business. Depending on what changes the FDA may make to its orphan drug regulations and policies, our business could be adversely impacted.

A fast track designation by the FDA, even if granted, may not lead to a faster development or regulatory review or approval process, and does not increase the likelihood that our current product candidate and any future product candidates will receive marketing approval.

If a drug is intended for the treatment of a serious or life-threatening condition and the drug demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA fast track designation for a particular indication. Fast track

is a process designed to facilitate the development, and expedite the review of drugs to treat serious or life-threatening conditions and address an unmet medical need. We have received fast track designation for DSG3-CAART for improving healing of mucosal blisters in patients with mPV. We have also received fast track designation for MuSK-CAART for improving activities of daily living and muscle strength in patients with MuSK antibody-positive myasthenia gravis. We may also apply for fast track designation for certain of our other product candidates, but there is no assurance that the FDA will grant this status to any of our other current or future product candidates. Marketing applications filed by sponsors of products in fast track development may qualify for priority review under the policies and procedures offered by the FDA, but the fast track designation does not assure any such qualification or ultimate marketing approval by the FDA. The FDA has broad discretion whether or not to grant fast track designation, so even if we believe a particular product candidate is eligible for this designation, there can be no assurance that the FDA would decide to grant it. Even though we have received fast track designation for DSG3-CAART for improving healing of mucosal blisters in patients with mPV and for MuSK-CAART for improving activities of daily living and muscle strength in patients with MuSK antibody-positive myasthenia gravis, we may not experience a faster development process, regulatory review or approval compared to conventional FDA procedures, and receiving a fast track designation does not provide assurance of ultimate FDA approval. In addition, the FDA may withdraw fast track designation if it believes that the designation is no longer supported by data from our clinical development program. In addition, the FDA may withdraw any fast track designation at any time.

Although we may pursue expedited regulatory approval pathways for a product candidate, it may not qualify for expedited development or, if it does qualify for expedited development, it may not actually lead to a faster development or regulatory review or approval process.

Although we believe there may be an opportunity to accelerate the development of certain of our product candidates through one or more of the FDA's expedited programs, such as fast track, breakthrough therapy, Regenerative Medicine Advanced Therapy, accelerated approval or priority review, we cannot be assured that any of our product candidates will qualify for such programs.

For example, we may seek a Regenerative Medicine Advanced Therapy, or RMAT, designation for some of our product candidates. An RMAT is defined as cell therapies, therapeutic tissue engineering products, human cell and tissue products, and combination products using any such therapies or products. Gene therapies, including genetically modified cells that lead to a durable modification of cells or tissues may meet the definition of a Regenerative Medicine Therapy. The RMAT program is intended to facilitate efficient development and expedite review of RMATs, which are intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition. A new drug application or a BLA for an RMAT may be eligible for priority review or accelerated approval through (1) surrogate or intermediate endpoints reasonably likely to predict long-term clinical benefit or (2) reliance upon data obtained from a meaningful number of sites. Benefits of such designation also include early interactions with FDA to discuss any potential surrogate or intermediate endpoint to be used to support accelerated approval. A Regenerative Medicine Therapy that is granted accelerated approval and is subject to post-approval requirements may fulfill such requirements through the submission of clinical evidence, clinical studies, patient registries, or other sources of real world evidence, such as electronic health records; the collection of larger confirmatory data sets; or post-approval monitoring of all patients treated with such therapy prior to its approval. Although RMAT designation or access to any other expedited program may expedite the development or approval process, it does not change the standards for approval. If we apply for RMAT designation or any other expedited program for our product candidates, the FDA may determine that our proposed target indication or other aspects of our clinical development plans do not qualify for such expedited program. Even if we are successful in obtaining a RMAT designation or access to any other expedited program, we may not experience faster development timelines or achieve faster review or approval compared to conventional FDA procedures. Access to an expedited program may also be withdrawn by the FDA if it believes that the designation is no longer supported by data from our clinical development program. Additionally, qualification for any expedited review procedure does not ensure that we will ultimately obtain regulatory approval for such product candidate.

Disruptions at the FDA, the SEC and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire and retain key leadership and other personnel, prevent new products and services from being developed or commercialized in a timely manner or otherwise prevent those agencies from performing normal business functions on which the operation of our business may rely, which could negatively impact our business.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy changes. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of the SEC and other government agencies on which our operations may rely, including those that fund research and development activities, is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies may also slow the time necessary for new drugs or biologics to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years,

including most recently from December 22, 2018 to January 25, 2019, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA and the SEC, have had to furlough critical FDA, SEC and other government employees and stop critical activities. If a prolonged government shutdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

Since March 2020 when foreign and domestic inspections were largely placed on hold, the FDA has been working to resume pre-pandemic levels of inspection activities, including routine surveillance, bioresearch monitoring and pre-approval inspections. Should FDA determine that an inspection is necessary for approval and an inspection cannot be completed during the review cycle due to restrictions on travel, and the FDA does not determine a remote interactive evaluation to be adequate, FDA has stated that it generally intends to issue, depending on the circumstances, a complete response letter or defer action on the application until an inspection can be completed. During the COVID-19 public health emergency, a number of companies announced receipt of complete response letters due to the FDA's inability to complete required inspections for their applications. Regulatory authorities outside the U.S. may adopt similar restrictions or other policy measures in response to the COVID-19 pandemic and may experience delays in their regulatory activities.

Risks Related to Ongoing Regulatory Obligations

Even if we receive regulatory approval of our product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our product candidates.

Any regulatory approvals that we receive for our product candidates will require surveillance to monitor the safety, potency and purity of the product candidate. We believe it is likely that the FDA will require a Risk Evaluation and Mitigation Strategy, or REMS, in order to approve our product candidates, which could entail requirements for a medication guide, physician communication plans or additional elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA approves our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, import, export and recordkeeping for our product candidates will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGMPs and GCPs for any clinical trials that we conduct post-approval. As such, we and our contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any BLA, other marketing application and previous responses to inspectional observations. Additionally, manufacturers and manufacturers' facilities are required to comply with extensive FDA, and comparable foreign regulatory authority requirements, including ensuring that quality control and manufacturing procedures conform to cGMP regulations and applicable product tracking and tracing requirements. Accordingly, we and others with whom we work must continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production and quality control. In addition, the FDA could require us to conduct another study to obtain additional safety or biomarker information.

Further, we will be required to comply with FDA promotion and advertising rules, which include, among others, standards for direct-to-consumer advertising, restrictions on promoting products for uses or in patient populations that are not described in the product's approved uses (known as "off-label use"), limitations on industry-sponsored scientific and educational activities and requirements for promotional activities involving the internet and social media. Later discovery of previously unknown problems with our product candidates through follow-up programs with our clinical trial patients, including adverse events of unanticipated severity or frequency, or with our third-party suppliers or manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information, imposition of post-market studies or clinical studies to assess new safety risks, or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of our product candidates, withdrawal of the product from the market or voluntary or mandatory product recalls;
- fines, warning letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or suspension or revocation of license approvals;
- product seizure or detention, or refusal to permit the import or export of our product candidates; and
- injunctions or the imposition of civil or criminal penalties.

The FDA's policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action. For example, certain policies of the current U.S. President's administration may impact our business and industry. Namely, the current U.S. President's administration has taken several executive

actions, including the issuance of a number of Executive Orders, that could, for example, result in changes to the FDA's priorities and allocation of resources to respond to the COVID-19 pandemic. It is difficult to predict how these orders will be implemented, and the extent to which they will impact the FDA's ability to exercise its regulatory authority. If these executive actions impose restrictions on FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained, and we may not achieve or sustain profitability.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our research and development activities involve the use of biological and hazardous materials and produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials, which could cause an interruption of our commercialization efforts, research and development efforts and business operations, environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. Although we believe that the safety procedures utilized by our third-party manufacturers for handling and disposing of these materials generally comply with the standards prescribed by these laws and regulations, we cannot guarantee that this is the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages and such liability could exceed our resources and state or federal or other applicable authorities may curtail our use of certain materials and/or interrupt our business operations. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. Breach of certain environmental, health and safety laws and regulations could also in certain circumstances constitute a breach of our License Agreement with Penn. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Although we maintain workers' compensation insurance to cover us for costs and expenses, we may incur due to injuries to our employees resulting from the use of hazardous materials or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. We do not carry specific biological waste or hazardous waste insurance coverage, workers compensation or property and casualty and general liability insurance policies that include coverage for damages and fines arising from biological or hazardous waste exposure or contamination.

Our employees, independent contractors, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee fraud or other illegal activity by our employees, independent contractors, consultants, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to comply with the laws of the FDA, provide true, complete and accurate information to the FDA, comply with manufacturing standards we have established, comply with healthcare fraud and abuse laws in the United States and similar foreign fraudulent misconduct laws, or report financial information or data accurately or to disclose unauthorized activities to us. If we obtain FDA approval of any of our product candidates and begin commercializing those products in the United States, our potential exposure under such laws will increase significantly, and our costs associated with compliance with such laws are also likely to increase. These laws may impact, among other things, our current activities with principal investigators and research patients, as well as proposed and future sales, marketing and education programs.

Risks Related to Healthcare

Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, which could make it difficult for us to sell our product candidates, if licensed, profitably.

Successful commercialization of our product candidates, if licensed, will depend in part on the extent to which reimbursement for those drug products will be available from government health administration authorities, private health insurers, and other organizations. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which drug products they will pay for and establish reimbursement levels. The availability and extent of reimbursement by governmental and private payors is essential for most patients to be able to afford a drug product. Sales of drug products depend substantially, both domestically and abroad, on the extent to which the costs of drugs products are paid for by health maintenance, managed care, pharmacy benefit and

similar healthcare management organizations, or reimbursed by government health administration authorities, private health coverage insurers and other third-party payors. Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we obtain regulatory approval. Any product candidate for which we seek regulatory approval and reimbursement will need to meet or surpass our target product profile, or TPP, to be deemed a viable alternative to currently approved therapies. In addition, because our product candidates represent new approaches to the treatment of B cell-mediated autoimmune diseases, we cannot accurately estimate the potential revenue from our product candidates.

Third-party payors decide which drugs and treatments they will cover and the amount of reimbursement. Reimbursement by a third-party payor may depend upon a number of factors, including, but not limited to, the third-party payor's determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

Obtaining coverage and reimbursement of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide the payor with supporting scientific, clinical and cost-effectiveness data for the use of our products, if licensed. In the United States, the principal decisions about reimbursement for new drug products are typically made by the Centers for Medicare and Medicaid Services, or CMS, an agency within the U.S. Department of Health and Human Services, or HHS. CMS decides whether and to what extent a new drug product will be covered and reimbursed under Medicare, and private payors tend to follow CMS to a substantial degree. However, no uniform policy of coverage and reimbursement for drug products exists among third-party payors and coverage and reimbursement levels for drug products can differ significantly from payor to payor. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage for the product. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

Even if we obtain coverage for a given product, if the resulting reimbursement rates are insufficient, hospitals may not approve our product for use in their facility or third-party payors may require co-payments that patients find unacceptably high. Patients are unlikely to use our product candidates unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of our product candidates. Separate reimbursement for the product itself may or may not be available. Instead, the hospital or administering physician may be reimbursed only for providing the treatment or procedure in which our product is used. Further, from time to time, CMS revises the reimbursement systems used to reimburse health care providers, including the Medicare Physician Fee Schedule and Outpatient Prospective Payment System, which may result in reduced Medicare payments. In some cases, private third-party payors rely on all or portions of Medicare payment systems to determine payment rates. Changes to government healthcare programs that reduce payments under these programs may negatively impact payments from private third-party payors, and reduce the willingness of physicians to use our product candidates.

The marketability of any product candidates for which we receive regulatory approval for commercial sale may suffer if government and other third-party payors fail to provide coverage and adequate reimbursement. We expect downward pressure on pharmaceutical pricing to continue. Further, coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Healthcare legislative measures aimed at reducing healthcare costs may have a material adverse effect on our business and results of operations.

In the United States, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay regulatory approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain regulatory approval. We expect that current laws, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and in additional downward pressure on the price that we, or any collaborators, may receive for any approved products.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our product candidates. Such reforms could have an adverse effect on anticipated revenue from product candidates that we may successfully

develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates.

For example, in March 2010, the ACA was enacted in the United States. The ACA includes measures that have significantly changed, and are expected to continue to significantly change, the way healthcare is financed by both governmental and private insurers. Among the provisions of the ACA of greatest importance to the pharmaceutical industry are that the ACA: made several changes to the Medicaid Drug Rebate Program, including increasing pharmaceutical manufacturers' rebate liability by raising the minimum basic Medicaid rebate on average manufacturer price, or AMP, on most branded prescription drugs and adding a new rebate calculation for "line extensions" (*i.e.*, new formulations, such as extended release formulations) of solid oral dosage forms of branded products, as well as potentially impacting their rebate liability by modifying the statutory definition of AMP; imposed a requirement on manufacturers of branded drugs to provide a 50% point-of-sale discount (increased to 70% pursuant to the Bipartisan Budget Act of 2018, effective as of January 1, 2019) off the negotiated price of branded drugs dispensed to Medicare Part D beneficiaries in the coverage gap (*i.e.*, "donut hole") as a condition for a manufacturer's outpatient drugs being covered under Medicare Part D;

- extended a manufacturer's Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expanded the entities eligible for discounts under the 340B Drug Discount Program;
- established a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected;
- imposed an annual, nondeductible fee on any entity that manufactures or imports certain branded prescription drugs, apportioned among these entities according to their market share in certain government healthcare programs, and
- established a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research. The research conducted by the Patient-Centered Outcomes Research Institute may affect the market for certain pharmaceutical products. The ACA established the Center for Medicare and Medicaid Innovation within CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending. Funding has been allocated to support the mission of the Center for Medicare and Medicaid Innovation through 2019.

Since its enactment, there have been numerous judicial, administrative, executive, and legislative challenges to certain aspects of the ACA, and we expect there will be additional challenges and amendments to the ACA in the future. On June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Prior to the Supreme Court's decision, President Biden issued an executive order to initiate a special enrollment period from February 15, 2021 through August 15, 2021 for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how other healthcare reform measures of the Biden administration or other efforts, if any, to challenge, repeal or replace the ACA will impact our business. In addition, other legislative and regulatory changes have been proposed and adopted in the United States since the ACA was enacted:

- On August 2, 2011, the U.S. Budget Control Act of 2011, among other things, included aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022 due to the COVID-19 pandemic. Following the suspension, a 1% payment reduction began April 1, 2022 and continued through June 30, 2022, and the 2% payment reduction resumed on July 1, 2022.
- On January 2, 2013, the U.S. American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers.
- On April 13, 2017, CMS published a final rule that gives states greater flexibility in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the ACA for plans sold through such marketplaces.
- On May 30, 2018, the Right to Try Act, was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase 1 clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a pharmaceutical manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act.

- On May 23, 2019, CMS published a final rule to allow Medicare Advantage Plans the option of using step therapy for Part B drugs beginning January 1, 2020.
- On December 20, 2019, former President Trump signed into law the Further Consolidated Appropriations Act (H.R. 1865), which repealed the Cadillac tax, the health insurance provider tax, and the medical device excise tax. It is impossible to determine whether similar taxes could be instated in the future.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at containing or lowering the cost of healthcare. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our product. Such reforms could have an adverse effect on anticipated revenue from product candidates that we may successfully develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates.

Additionally, there has been increasing legislative and enforcement interest in the United States with respect to drug pricing practices. Specifically, there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several U.S. Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to drug pricing, reduce the cost of prescription drugs under Medicare, and review the relationship between pricing and manufacturer patient programs.

- At a federal level, President Biden signed an Executive Order on July 9, 2021 affirming the administration’s policy to (i) support legislative reforms that would lower the prices of prescription drug and biologics, including by allowing Medicare to negotiate drug prices, by imposing inflation caps, and, by supporting the development and market entry of lower-cost generic drugs and biosimilars; and (ii) support the enactment of a public health insurance option. Among other things, the Executive Order also directs HHS to provide a report on actions to combat excessive pricing of prescription drugs, enhance the domestic drug supply chain, reduce the price that the Federal government pays for drugs, and address price gouging in the industry; and directs the FDA to work with states and Indian Tribes that propose to develop section 804 Importation Programs in accordance with the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, and the FDA’s implementing regulations. FDA released such implementing regulations on September 24, 2020, which went into effect on November 30, 2020, providing guidance for states to build and submit importation plans for drugs from Canada. On September 25, 2020, CMS stated drugs imported by states under this rule will not be eligible for federal rebates under Section 1927 of the Social Security Act and manufacturers would not report these drugs for “best price” or Average Manufacturer Price purposes. Since these drugs are not considered covered outpatient drugs, CMS further stated it will not publish a National Average Drug Acquisition Cost for these drugs. If implemented, importation of drugs from Canada may materially and adversely affect the price we receive for any of our product candidates.

- Further, on November 20, 2020 CMS issued an Interim Final Rule implementing the Most Favored Nation, or MFN, Model under which Medicare Part B reimbursement rates would have been be calculated for certain drugs and biologics based on the lowest price drug manufacturers receive in Organization for Economic Cooperation and Development countries with a similar gross domestic product per capita. However, on December 29, 2021 CMS rescinded the Most Favored Nations rule.

- Additionally, on November 30, 2020, HHS published a regulation removing safe harbor protection for price reductions from pharmaceutical manufacturers to plan sponsors under Part D, either directly or through pharmacy benefit managers, unless the price reduction is required by law. The rule also creates a new safe harbor for price reductions reflected at the point-of-sale, as well as a safe harbor for certain fixed fee arrangements between pharmacy benefit managers and manufacturers. Pursuant to court order, the removal and addition of the aforementioned safe harbors were delayed and recent legislation imposed a moratorium on implementation of the rule until January 1, 2026.

- In August 2022, the Inflation Reduction Act of 2022 (the “IRA”) was signed into law. The IRA includes several provisions that will impact our business to varying degrees, including provisions that create a \$2,000 out-of-pocket cap for Medicare Part D beneficiaries, impose new manufacturer financial liability on all drugs in Medicare Part D, allow the U.S. government to negotiate Medicare Part B and Part D pricing for certain high-cost drugs and biologics without generic or biosimilar competition, require companies to pay rebates to Medicare for drug prices that increase faster than inflation, and delay the rebate rule that would require pass through of pharmacy benefit manager rebates to beneficiaries. The effect of IRA on our business and the healthcare industry in general is not yet known..

Although a number of these and other proposed measures may require authorization through additional legislation to become effective, and the Biden administration may reverse or otherwise change these measures, both the Biden administration and Congress have indicated that they will continue to seek new legislative measures to control drug costs.

We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our product candidates, if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our products, if licensed;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors, which may adversely affect our future profitability.

Our relationships with customers, healthcare providers, physicians, and third-party payors will be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, health information privacy and security laws, and other healthcare laws and regulations. If we or our employees, independent contractors, consultants, commercial partners and vendors violate these laws, we could face substantial penalties.

These laws may impact, among other things, our clinical research program, as well as our proposed and future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services is subject to extensive laws and regulations designed to prevent fraud, kickbacks, self-dealing and other abusive practices, including, without limitation, the federal Anti-Kickback Statute and the federal False Claims Act, which may constrain the business or financial arrangements and relationships through which such companies sell, market and distribute pharmaceutical products. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive and other business arrangements. We may also be subject to federal, state and foreign laws governing the privacy and security of individual identifiable health information and other personally identifiable information.

- the federal Anti-Kickback Statute, which prohibits, among other things, knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, either the referral of an individual, or the purchase, lease, order or recommendation of any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. A person or entity can be found guilty of violating the statute without actual knowledge of the statute or specific intent to violate it. In addition, a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act, or FCA. The Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers, and formulary managers on the other. There are a number of statutory exceptions and regulatory safe harbors protecting some common activities from prosecution;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the FCA, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, false or fraudulent claims for payment to, or approval by Medicare, Medicaid, or other federal healthcare programs, knowingly making, using or causing to be made or used a false record or statement material to a false or fraudulent claim or an obligation to pay or transmit money to the federal government, or knowingly concealing or knowingly and improperly avoiding or decreasing or concealing an obligation to pay money to the federal government. Manufacturers can be held liable under the FCA even when they do not submit claims directly to government payors if they are deemed to “cause” the submission of false or fraudulent claims. The FCA also permits a private individual acting as a “whistleblower” to bring actions on behalf of the federal government alleging violations of the FCA and to share in any monetary recovery;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created new federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (*e.g.*, public or private) and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters. Similar to the federal Anti-Kickback Statute, a person or entity can be found guilty of violating HIPAA without actual knowledge of the statute or specific intent to violate it;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, which impose, among other things, requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization. HITECH also created new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions;
- the federal Physician Payment Sunshine Act, created under the Patient Protection and Affordable Care Act, and its implementing regulations, which require manufacturers of drugs, devices, biologicals and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to the HHS information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members. Effective January 1, 2022, these reporting obligations extend to include transfers of value made to certain non-physician providers such as physician assistants and nurse practitioners;
- federal price reporting laws, which require manufacturers to calculate and report complex pricing metrics to government programs, where such reported prices may be used in the calculation of reimbursement and/or discounts on approved products;
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, and may be broader in scope than their federal equivalents; state and foreign laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers; state and foreign laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of individually identifiable health information and other personally identifiable information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

The distribution of pharmaceutical products is subject to additional requirements and regulations, including extensive record-keeping, licensing, storage and security requirements intended to prevent the unauthorized sale of pharmaceutical products.

The scope and enforcement of each of these laws is uncertain and subject to rapid change in the current environment of healthcare reform, especially in light of the lack of applicable precedent and regulations. Federal and state enforcement bodies have recently increased their scrutiny of interactions between healthcare companies and healthcare providers, which has led to a number of investigations, prosecutions, convictions and settlements in the healthcare industry. Ensuring business arrangements comply with applicable healthcare laws, as well as responding to possible investigations by government authorities, can be time- and resource-consuming and can divert a company's attention from the business.

The failure to comply with any of these laws or regulatory requirements subjects entities to possible legal or regulatory action. Depending on the circumstances, failure to meet applicable regulatory requirements can result in civil, criminal and administrative penalties, damages, fines, disgorgement, individual imprisonment, possible exclusion from participation in federal and state funded healthcare programs, contractual damages and the curtailment or restructuring of our operations, as well as additional reporting obligations and oversight if we become subject to a corporate integrity agreement or other agreement to resolve allegations of non-compliance with these laws. Any action for violation of these laws, even if successfully defended, could cause a pharmaceutical manufacturer to incur significant legal expenses and divert management's attention from the operation of the business. Prohibitions or restrictions on sales or withdrawal of future marketed products could materially affect business in an adverse way.

Because of the breadth of these laws and the narrowness of the statutory exceptions and regulatory safe harbors available, it is possible that some of our business activities, or our arrangements with physicians, some of whom receive stock options as compensation, could be subject to challenge under one or more of such laws. If we or our employees, independent contractors, consultants, commercial partners and vendors violate these laws, we may be subject to investigations, enforcement actions and/or significant penalties. We have adopted a code of business conduct and ethics, but it is not always possible to identify and deter employee misconduct or business noncompliance, and the precautions we take to detect and prevent inappropriate conduct may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. Efforts to ensure that our business arrangements will comply with applicable healthcare laws may involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, additional reporting requirements and/or oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, and curtailment of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

Risks Related to Data and Privacy

****Data collection is governed by restrictive regulations governing the use, processing, and cross-border transfer of personal information.***

We are subject to stringent privacy and data protection requirements and these requirements may become more complex as we grow our business and begin to operate in other jurisdictions. For example, the collection, use, storage, disclosure, transfer, or other processing of personal data, including health-related information, regarding individuals in the European Economic Area, or EEA, is governed by the European General Data Protection Regulation, or the GDPR, which became effective on May 25, 2018. The GDPR applies to any business, regardless of its location, that provides goods or services to residents in the EU or monitors the behavior of individuals within the European Union. The GDPR is wide ranging in scope and imposes stringent operational requirements for processors and controllers of personal data, including, for example, special protections for “sensitive information” which includes health and genetic information, expanded disclosures to individuals about how their personal data is to be used, limitations on retention of information, increased requirements pertaining to health data and pseudonymized (*i.e.*, key-coded) data, implementing safeguards to protect the security and confidentiality of personal data, mandatory data breach notification requirements and higher standards for controllers to demonstrate that they have obtained valid consent for certain data processing activities. The GDPR grants individuals the opportunity to object to the processing of their personal information, allows them to request deletion of personal information in certain circumstances, and provides the individual with an express right to seek legal remedies in the event the individual believes his or her rights have been violated.

The GDPR imposes strict rules on the transfer of personal data out of the European Union to the United States and other jurisdictions that have not been deemed to offer “adequate” privacy protections. The Privacy Shield program had been a valid mechanism for transfers of personal data to the United States. However, in July 2020, the Court of Justice of the EU, or the CJEU, in Case C-311/18 (Data Protection Commissioner v Facebook Ireland and Maximilian Schrems or Schrems II) invalidated the Privacy Shield Framework, or the Privacy Shield, as a means for legitimating the transfer of personal data from the EU to the U.S., on the grounds that the Privacy Shield failed to offer adequate protections to EU personal data transferred to the U.S. We have in the past relied on various transfer safeguards, including the Privacy Shield, to legitimize data transfers from the EU to the U.S. The CJEU, in the same decision, deemed that the Standard Contractual Clauses, or SCCs, remain valid. However, the CJEU ruled that transfers made pursuant to the SCCs need to be assessed on a case-by-case basis taking into account the legal regime applicable in the destination country, and required businesses to assess whether supplementary measures that provide privacy protections additional to those provided under SCCs need to be implemented to ensure an essentially equivalent level of data protection to that afforded in the EU. Subsequent guidance published by the European Data Protection Board, or EDPB, in June 2021 described what such supplementary measures must be, and stated that businesses should avoid or cease transfers of personal data if, in the absence of supplementary measures, equivalent protections cannot be afforded. In June 2021, the European Commission published new versions of the SCCs, which provide further details regarding the transfer assessments that the parties are required to conduct when implementing the new SCCs. The new SCCs must be used for relevant new data transfers from September 27, 2021; existing SCCs arrangements must be migrated to the new SCCs by December 27, 2022. Most recently, on March 25, 2022, EU Commission and the US White House announced that an agreement on Privacy Shield 2.0 has been reached and in October 2022, US President Joe Biden signed an Executive Order to implement the new framework. The new framework is designed to address the deficiencies that led to the invalidation of the original Privacy Shield. However, it is too soon to tell how the future of Privacy Shield 2.0 will evolve and what impact it will have on our cross-border activities.

In addition to the requirements of the GDPR, European Union Member States may make their own further laws and regulations in relation to the processing of genetic, biometric or health data, which could result in differences between Member States, limit our ability to use and share personal data or could cause our costs to increase, and harm our business and financial condition. EU member states have a broad right to impose additional conditions—including restrictions—on the processing of sensitive data. This is because the GDPR allows EU member states to derogate from the requirements of the GDPR mainly in regard to specific processing situations (including special category data and processing for scientific or statistical purposes). Our current activities cause us to be subject to the GDPR and the German federal data privacy law and we are subject to the regulatory authority of German data protection authorities. As the EU states continue to reframe their national legislation to harmonize with the GDPR, we will need to monitor compliance with all relevant EU member states' laws and regulations, including where permitted derogation from the GDPR are introduced.

Should we engage in a collaborative relationship or commence clinical trial activity within other member states of the European Union, such activity will be regulated by the GDPR as well as applicable member state laws. Compliance with the GDPR will be a rigorous and time-intensive process that may increase our cost of doing business or require us to change our business practices, and despite those efforts, there is a risk that we may be subject to fines and penalties, litigation, and reputational harm in connection with any future European activities. We could be adversely affected if we fail to comply fully with all of these requirements. Failure to comply with European Union data protection laws may result in fines (for example, of up to €20,000,000 or up to 4% of the total worldwide annual turnover of the preceding financial year (whichever is higher) under the GDPR) and other administrative penalties, which may be onerous and adversely affect our business, financial condition, results of operations and prospects.

In addition, further to the United Kingdom's (UK) exit from the EU on January 31, 2020, the GDPR ceased to apply in the UK at the end of the transition period on December 31, 2020. However, as of January 1, 2021, the UK's European Union (Withdrawal) Act 2018 incorporated the GDPR (as it existed on December 31, 2020 but subject to certain UK specific amendments) into UK law (referred to as the 'UK GDPR'). The UK GDPR and the UK Data Protection Act 2018 set out the UK's data protection regime, which is independent from but aligned to the EU's data protection regime. Non-compliance with the UK GDPR may result in monetary penalties of up to £17.5 million or 4% of worldwide revenue, whichever is higher. Although the UK is regarded as a third country under the EU's GDPR, the European Commission has now issued a decision recognizing the UK as providing adequate protection under the EU GDPR and, therefore, transfers of personal data originating in the EU to the UK remain unrestricted. Like the EU GDPR, the UK GDPR restricts personal data transfers outside the UK to countries not regarded by the UK as providing adequate protection. The UK government has confirmed that personal data transfers from the UK to the EEA remain free flowing. However, transfers of personal data to third countries that are not regarded by the U.K. as providing adequate protection, like the U.S. remain regulated. The Information Commissioner's Office, or ICO, has recently introduced new mechanisms for international transfers of personal data originating from the U.K. (an International Data Transfer Agreement, or IDTA, along with a separate addendum to the EU SCCs), which are in force as of March 21, 2022, to replace the old form EU SCCs for U.K. transfers. The new IDTA or the U.K. addendum must be used for any new contract entered into as of September 21, 2022 and implemented in existing contracts that incorporate the prior version of the SCCs by March 21, 2024. Implementing these new safeguards will require significant effort and cost. These and other future developments regarding the flow of data across borders could increase the cost and complexity of delivering our services in some markets and may lead to governmental enforcement actions, litigation, fines, and penalties or adverse publicity, which could adversely affect our business and financial position.

In the United States, there has been a flurry of activity at the state level. In California, the California Consumer Privacy Act, or CCPA, was enacted in June 2018, became effective on January 1, 2020, and became subject to enforcement by the California Attorney General's office on July 1, 2020. The CCPA broadly defines personal information, and creates new individual privacy rights and protections for California consumers (as defined in the law), places increased privacy and security obligations on entities handling personal data of consumers or households, and provides for civil penalties for violations and a private right of action for data breaches. The CCPA requires covered companies to provide certain disclosures to consumers about its data collection, use and sharing practices, and to provide affected California residents with ways to opt-out of certain sales or transfers of personal information. While there is an exception for protected health information that is subject to HIPAA and clinical trial regulations, the CCPA may impact our business activities if we become a "Business" regulated by the scope of the CCPA.

Additionally, a new California ballot initiative, the California Privacy Rights Act, or CPRA, was passed in November 2020. Effective on January 1, 2023, the CPRA imposes additional obligations on companies covered by the legislation and will significantly modify the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA. The effects of the CCPA and the CPRA are potentially significant and may require us to modify our data collection or processing practices and policies and to incur substantial costs and expenses in an effort to comply and increase our potential exposure to regulatory enforcement and/or litigation.

Certain other state laws impose similar privacy obligations and we also anticipate that more states will increasingly enact legislation similar to the CCPA. The CCPA has prompted a number of proposals for new federal and state-level privacy legislation and in some states efforts to pass comprehensive privacy laws have been successful. For example, on March 2, 2021, Virginia enacted the

Consumer Data Protection Act, or CDPA. The CDPA will become effective January 1, 2023. The CDPA will regulate how businesses (which the CDPA refers to as “controllers”) collect and share personal information. While the CDPA incorporates many similar concepts of the CCPA and CPRA, there are also several key differences in the scope, application, and enforcement of the law that will change the operational practices of controllers. The new law will impact how controllers collect and process personal sensitive data, conduct data protection assessments, transfer personal data to affiliates, and respond to consumer rights requests. Also, on July 8, 2021, Colorado’s governor signed the Colorado Privacy Act, or CPA, into law. The CPA is rather similar to Virginia’s CPDA but also contains additional requirements. The new measure applies to companies conducting business in Colorado or who produce or deliver commercial products or services intentionally targeted to residents of the state that either: (1) control or process the personal data of at least 100,000 consumers during a calendar year; or (2) derive revenue or receive a discount on the price of goods or services from the sale of personal data and process or control the personal data of at least 25,000 consumers.

Moreover, on March 24, 2022, Utah’s governor signed the Utah Consumer Privacy Act, or UCPA, which is largely based on Virginia’s CDPA, into law. The UCPA will take effect on December 31, 2023. Also, in May 2022, Connecticut Governor Lamont signed the Connecticut Data Privacy Act (CTDPA) into laws. The CTDPA draws heavily upon their predecessors in Virginia and Colorado. With the CTDPA, Connecticut became the fifth state to enact a comprehensive privacy law. New privacy and data security laws have been proposed in more than half of the states in the U.S. and in the U.S. Congress. With bills proposed in many other jurisdictions, it remains quite possible that other states will follow suit. The existence of comprehensive privacy laws in different states in the country, if enacted, will add additional complexity, variation in requirements, restrictions and potential legal risk, require additional investment of resources in compliance programs, impact strategies and the availability of previously useful data, and has resulted in and will result in increased compliance costs and/or changes in business practices and policies.

The effects of the CCPA, and other similar state or federal laws, are potentially significant and may require us to modify our data processing practices and policies and to incur substantial costs and potential liability in an effort to comply with such legislation.

Further, various jurisdictions around the world continue to propose new laws that regulate the privacy and/or security of certain types of personal data. Complying with these laws, if enacted, would require significant resources and leave us vulnerable to possible fines and penalties if we are unable to comply. The regulatory framework governing the collection, processing, storage, use and sharing of certain information is rapidly evolving and is likely to continue to be subject to uncertainty and varying interpretations. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our existing data management practices or the features of our services and platform capabilities. Any failure or perceived failure by us, or any third parties with which we do business, to comply with our posted privacy policies, evolving laws, rules and regulations, industry standards, or contractual obligations to which we or such third parties are or may become subject, may result in actions or other claims against us by governmental entities or private actors, the expenditure of substantial costs, time and other resources or the incurring of significant fines, penalties or other liabilities. In addition, any such action, particularly to the extent we were found to be guilty of violations or otherwise liable for damages, would damage our reputation and adversely affect our business, financial condition and results of operations.

If our security measures are breached or unauthorized access to individually identifiable health information or other personally identifiable information is otherwise obtained, our reputation may be harmed, and we may incur significant liabilities.

Unauthorized access to, or security breaches of, our systems and databases could result in unauthorized access to data and information and loss, compromise or corruption of such data and information. The systems of Penn, any CMOs that we may engage in the future, and present and future CROs, contractors and consultants also could experience breaches of security leading to the exposure of confidential and sensitive information. Cyber incidents have been increasing in sophistication and frequency and can include third parties gaining access to employee or customer data using stolen or inferred credentials, computer malware, viruses, spamming, phishing attacks, ransomware, card skimming code, and other deliberate attacks and attempts to gain unauthorized access. Because the techniques used by computer programmers who may attempt to penetrate and sabotage our network security or our website change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques.

It is also possible that unauthorized access to customer data may be obtained through inadequate use of security controls by customers, suppliers or other vendors. While we are not currently aware of any impact that the SolarWinds supply chain attack had on our business, this is a recent event, and the scope of the attack is yet unknown. Therefore, there is residual risk that we may experience a security breach arising from the SolarWinds supply chain attack.

In the event of a security breach, our company could suffer loss of business, severe reputational damage adversely affecting investor confidence, regulatory investigations and orders, litigation, indemnity obligations, damages for contract breach, penalties for violation of applicable laws or regulations, significant costs for remediation and other liabilities. For example, the loss of preclinical study or clinical trial data from completed or future preclinical studies or clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the further development and commercialization of our product candidates could be delayed.

We have incurred and expect to incur significant expenses to prevent security breaches, including costs related to deploying additional personnel and protection technologies, training employees, and engaging third-party solution providers and consultants. Although we expend significant resources to create security protections that shield our customer data against potential theft and security breaches, such measures cannot provide absolute security. Moreover, as we outsource more of our information systems to vendors and rely more on cloud-based information systems, the related security risks will increase, and we will need to expend additional resources to protect our technology and information systems.

We have in the past experienced security incidents, and we may in the future experience other data security incidents or breaches affecting personally identifiable information or other confidential business information. For example, in 2019, we believe a phishing incident led to certain employee email accounts being accessed by an unauthorized third party. We initiated an investigation to determine whether further action was required under applicable law. The incident did not have a material impact on our business or financial condition. While we believe we responded appropriately, including implementing remedial measures with the goal of preventing similar such events in the future, there can be no assurance that we will be successful in these remedial and preventative measures or in successfully mitigating the effects of potential future incidents or cyber-attacks. We remain at risk for future breaches, including, without limitation, breaches that may occur as a result of third-party action, or employee, vendor or contractor error or malfeasance and other causes. If, in the future, we experience a data breach or security incident, we would be likely to experience harm to our reputation, financial performance, and customer and vendor relationships, and the possibility of litigation or regulatory investigations or actions by state and federal governmental authorities and non-U.S. authorities. Additionally, actual, potential or anticipated attacks may cause us to incur increasing costs, including costs to deploy additional personnel and protection technologies, train employees, and engage third-party experts and consultants. Although we maintain cyber liability insurance, we cannot be certain that our coverage will be adequate for liabilities actually incurred or that insurance will continue to be available to us on economically reasonable terms, or at all.

Interruptions in the availability of server systems or communications with internet or cloud-based services, or failure to maintain the security, confidentiality, accessibility or integrity of data stored on such systems, could harm our business.

We rely upon a variety of internet service providers, third-party web hosting facilities and cloud computing platform providers to support our business. Failure to maintain the security, confidentiality, accessibility or integrity of data stored on such systems could result in interruptions in our operations, damage our reputation in the market, increase our service costs, cause us to incur substantial costs, subject us to liability for damages and/or fines, and divert our resources from other tasks, any one of which could materially adversely affect our business, financial condition, results of operations and prospects. If our security measures or those of our third-party data center hosting facilities, cloud computing platform providers, or third-party service partners, are breached, and unauthorized access is obtained to our data or our information technology systems, we may incur significant legal and financial exposure and liabilities.

We also do not have control over the operations of the facilities of our cloud service providers and our third-party web hosting providers, and they also may be vulnerable to damage or interruption from natural disasters, cybersecurity attacks, terrorist attacks, power outages and similar events or acts of misconduct. In addition, any changes in these providers' service levels may adversely affect our ability to meet our requirements and operate our business.

Risks Related to Ownership of Our Common Stock

Risks Related to Ownership Generally

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

As of September 30, 2022, our executive officers, directors, and 5% stockholders beneficially owned, in the aggregate, approximately 43% of our outstanding voting common stock, or 47% of our common stock, assuming all shares of non-voting common stock are converted into voting common stock in accordance with the terms of our Third Amended and Restated Certificate of Incorporation, or the amended and restated certificate of incorporation. Accordingly, these stockholders will have the ability to influence us through this ownership position and significantly affect the outcome of all matters requiring stockholder approval. For example, these stockholders may be able to significantly affect the outcome of elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets, or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may feel are in your best interest as one of our stockholders.

If we fail to establish and maintain proper and effective internal control over financial reporting, our operating results and our ability to operate our business could be harmed.

As a public company, we are required to maintain internal control over financial reporting and to report any material weaknesses in such internal controls. The Sarbanes-Oxley Act requires that we evaluate and determine the effectiveness of our internal control over financial reporting and, beginning with our second annual report following our initial public offering, provide a management report on internal control over financial reporting. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm.

Ensuring that we have adequate internal financial and accounting controls and procedures in place so that we can produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be re-evaluated frequently. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with generally accepted accounting principles. We have begun the process of documenting, reviewing, and improving our internal controls and procedures for compliance with Section 404 of the Sarbanes-Oxley Act. We have begun recruiting additional finance and accounting personnel with certain skill sets that we need as a public company.

Implementing any appropriate changes to our internal controls may distract our officers and employees, entail substantial costs to modify our existing processes, and take significant time to complete. These changes may not, however, be effective in maintaining the adequacy of our internal controls, and any failure to maintain that adequacy, or consequent inability to produce accurate financial statements on a timely basis, could increase our operating costs and harm our business. In addition, investors' perceptions that our internal controls are inadequate or that we are unable to produce accurate financial statements on a timely basis may harm our stock price and make it more difficult for us to effectively market and sell our service to new and existing customers.

The dual class structure of our common stock may limit your ability to influence corporate matters and may limit your visibility with respect to certain transactions.

The dual class structure of our common stock may limit your ability to influence corporate matters. Holders of our common stock are entitled to one vote per share, while holders of our non-voting common stock are not entitled to any votes. Nonetheless, each share of our non-voting common stock may be converted at any time into one share of our common stock at the option of its holder by providing written notice to us, subject to the limitations provided for in our amended and restated certificate of incorporation. Entities affiliated with or managed by Baker Brothers Life Sciences, L.P. and Adage Capital Partners, LP hold an aggregate of 2,068,500 shares of our non-voting common stock pursuant to our amended and restated certificate of incorporation. At any time, upon written notice, these entities could convert a portion of these shares of non-voting common stock into up to an aggregate of 7% of our shares of common stock. Upon 61 days' prior written notice, these entities could convert any or all of their respective shares of non-voting common stock into shares of common stock. Consequently, if holders of our non-voting common stock exercise their option to make this conversion, this will have the effect of increasing the relative voting power of those prior holders of our non-voting common stock, and correspondingly decreasing the voting power of the holders of our common stock, which may limit your ability to influence corporate matters. Additionally, stockholders who hold, in the aggregate, more than 10% of our common stock and non-voting common stock, but 10% or less of our common stock, and are not otherwise a company insider, may not be required to report changes in their ownership due to transactions in our non-voting common stock pursuant to Section 16(a) of the Exchange Act, and may not be subject to the short-swing profit provisions of Section 16(b) of the Exchange Act.

Sales of a substantial number of shares of our common stock by our existing stockholders in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. Certain holders of our common stock have rights, subject to conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act, except for shares held by affiliates, as defined in Rule 144 under the Securities Act. Any sales of securities by these stockholders could have a material adverse effect on the trading price of our common stock.

On November 10, 2020, we filed a registration statement on Form S-3 (File No. 333-250006) with the SEC, which was declared effective on November 18, 2020, or the Shelf Registration Statement, in relation to the registration of common stock, preferred stock, debt securities, warrants and/or units of any combination thereof for the purposes of selling, from time to time, our common stock, debt securities or other equity securities in one or more offerings. We also simultaneously entered into a Sales Agreement, or the Sales Agreement, with Cowen and Company, LLC, or the Sales Agent, to provide for the offering, issuance and sale of up to an aggregate amount of \$75.0 million of our common stock from time to time in "at-the-market" offerings under the Shelf Registration Statement

and subject to the limitations thereof. We will pay to the Sales Agent cash commissions of 3.0 percent of the aggregate gross proceeds of sales of common stock under the Sales Agreement. During the year ended December 31, 2021, we sold 4,792,562 shares pursuant to the ATM Program at an average price of \$10.38 per share for net proceeds of \$48.3 million, after deducting commissions of \$1.4 million. Sales of common stock, debt securities or other equity securities by us may represent a significant percentage of our common stock currently outstanding. If we sell, or the market perceives that we intend to sell, substantial amounts of our common stock under the Shelf Registration Statement or otherwise, the market price of our common stock could decline significantly.

We have also filed registration statements on Form S-8 to register shares issued or reserved for issuance under our equity compensation plans and will file additional registration statements on Form S-8 to register additional shares pursuant to the “evergreen” provisions under our equity compensation plans. Shares registered under these registration statements on Form S-8 can be freely sold in the public market upon issuance and once vested, subject to volume limitations applicable to affiliates and the lock-up agreements described above. If any of these additional shares are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline.

In addition, certain of our employees, executive officers, and directors may enter into Rule 10b5-1 trading plans providing for sales of shares of our common stock from time to time. Under a Rule 10b5-1 trading plan, a broker executes trades pursuant to parameters established by the employee, director, or officer when entering into the plan, without further direction from the employee, officer, or director. A Rule 10b5-1 trading plan may be amended or terminated in some circumstances. Our employees, executive officers, and directors also may buy or sell additional shares outside of a Rule 10b5-1 trading plan when they are not in possession of material, nonpublic information.

Risks Related to our Charter and Bylaws

Anti-takeover provisions under our charter documents and Delaware law could delay or prevent a change of control which could limit the market price of our common stock and may prevent or frustrate attempts by our stockholders to replace or remove our current management.

Our amended and restated certificate of incorporation and amended and restated bylaws, as amended, or the amended and restated bylaws, contain provisions that could delay or prevent a change of control of our company or changes in our board of directors that our stockholders might consider favorable. Some of these provisions include:

- a board of directors divided into three classes serving staggered three-year terms, such that not all members of the board will be elected at one time;
- a prohibition on stockholder action through written consent, which requires that all stockholder actions be taken at a meeting of our stockholders;
- a requirement that special meetings of stockholders be called only by the chairman of the board of directors, the chief executive officer, or by a majority of the total number of authorized directors;
- advance notice requirements for stockholder proposals and nominations for election to our board of directors;
- a requirement that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of the holders of not less than 75% of the votes that all our stockholders would be entitled to cast in an annual election of directors;
- a requirement of approval of not less than 75% of all outstanding shares of our voting stock to amend any bylaws by stockholder action or to amend specific provisions of our amended and restated certificate of incorporation; and
- the authority of the board of directors to issue preferred stock on terms determined by the board of directors without stockholder approval and which preferred stock may include rights superior to the rights of the holders of common stock.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, which may prohibit certain business combinations with stockholders owning 15% or more of our outstanding voting stock. These anti-takeover provisions and other provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make it more difficult for stockholders or potential acquirors to obtain control of our board of directors or initiate actions that are opposed by the then-current board of directors and could also delay or impede a merger, tender offer or proxy contest involving our company. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing or cause us to take other corporate actions you desire. Any delay or prevention of a change of control transaction or changes in our board of directors could cause the market price of our common stock to decline.

Our amended and restated bylaws designate certain courts as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Pursuant to our amended and restated bylaws, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is the sole and exclusive forum for state law claims for: (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, or other employees to us or our stockholders; (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law or our amended and restated certificate of incorporation or amended and restated bylaws (including the interpretation, application or validity thereof); or (iv) any action asserting a claim governed by the internal affairs doctrine (the Delaware Forum Provision). The Delaware Forum Provision will not apply to any causes of action arising under the Securities Act of 1933, as amended (the Securities Act) or the Securities Exchange Act of 1934. Our amended and restated bylaws further provide that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States of America are the sole and exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, or the rules and regulations promulgated thereunder (the Federal Forum Provision). In addition, our amended and restated bylaws provide that any person or entity purchasing or otherwise acquiring any interest in shares of our common stock is deemed to have notice of and consented to the foregoing Delaware Forum Provision and Federal Forum Provision; provided, however, that stockholders cannot and will not be deemed to have waived our compliance with the U.S. federal securities laws and the rules and regulations thereunder.

The Delaware Forum Provision and the Federal Forum Provision may impose additional litigation costs on stockholders in pursuing any such claims. Additionally, these forum selection clauses may limit our stockholders' ability to bring a claim in a judicial forum that they find favorable for disputes with us or our directors, officers or employees, which may discourage the filing of lawsuits against us and our directors, officers and employees even though an action, if successful, might benefit our stockholders. While the Delaware Supreme Court and other states have upheld the validity of federal forum selection provisions purporting to require claims under the Securities Act be brought in federal court, there is uncertainty as to whether other courts will enforce our Federal Forum Provision. If the Federal Forum Provision is found to be unenforceable, we may incur additional costs with resolving such matters. The Federal Forum Provision may also impose additional litigation costs on us and/or our stockholders who assert that the provision is invalid or unenforceable. The Court of Chancery of the State of Delaware or the federal district courts of the United States of America may also reach different judgments or results than would other courts, including courts where a stockholder considering an action may be located or would otherwise choose to bring the action, and such judgments may be more or less favorable to us than our stockholders.

Risks Related to Tax

Changes in tax laws could adversely affect our business and financial condition.

The rules dealing with U.S. federal, state, and local income taxation are constantly under review by persons involved in the legislative process and by the Internal Revenue Service and the U.S. Treasury Department. Changes to tax laws (which changes may have retroactive application) could adversely affect us or holders of our common stock. In recent years, many such changes have been made and changes are likely to continue to occur in the future. Future changes in tax laws could have a material adverse effect on our business, cash flow, financial condition or results of operations. Prospective investors in our common stock should consult with their legal and tax advisors with respect to potential changes in tax laws and the tax consequences of investing in or holding our common stock.

Our ability to utilize our net operating losses and certain other tax attributes to offset future taxable income may be subject to certain limitations.

As of December 31, 2021, we had U.S. federal, state and local net operating loss carryforwards of \$85.8 million, \$88.0 million and \$78.9 million, respectively. \$0.3 million of the federal amounts expire in 2037. The state net operating losses begin to expire in 2037 and the local net operating losses begin to expire in 2022. Approximately \$85.5 million of the federal net operating losses can be carried forward indefinitely. Certain net operating loss carryforwards could expire unused and be unavailable to offset future taxable income. In addition, in general, under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, or the Code, and corresponding provisions of state law, a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating loss carryforwards or tax credits, or NOLs or credits, to offset future taxable income or taxes. For these purposes, an ownership change generally occurs where the aggregate stock ownership of one or more stockholders or groups of stockholders who owns at least 5% of a corporation's stock increases its ownership by more than 50 percentage points over its lowest ownership percentage within a specified testing period. Our existing NOLs or credits may be subject to limitations arising from previous ownership changes, and if we undergo an ownership change, our ability to utilize NOLs or credits could be further limited by Sections 382 and 383 of the Code. In addition, future changes in our stock ownership, many of which are outside of our control, could result in an ownership change under Sections 382 and 383 of the Code. Our NOLs or credits may also be impaired under state law. Accordingly, we may not be able to utilize a material portion of our NOLs or credits. Furthermore, our ability to utilize our NOLs or credits is

conditioned upon our attaining profitability and generating U.S. federal and state taxable income. As described above under “—Risks Related to Our Financial Condition and Capital Requirements”, we have incurred significant net losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future; and therefore, we do not know whether or when we will generate the U.S. federal or state taxable income necessary to utilize our NOLs or credits. Under current law, U.S. federal net operating loss carryforwards generated in taxable years beginning after December 31, 2017 will not be subject to expiration. However, any such net operating loss carryforwards may only offset 80% of our annual taxable income in taxable years beginning after December 31, 2020.

General Risk Factors

The price of our stock may be volatile, and you could lose all or part of your investment.

The trading price of our common stock has been, and is likely to be in the future, highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including limited trading volume. In addition to the factors discussed in this “Risk Factors” section, these factors include:

- the commencement, enrollment or results of our planned preclinical studies or clinical trials of our product candidates or any preclinical studies or future clinical trials we may conduct, or changes in the development status of our product candidates;
- our decision to initiate a preclinical study or clinical trial, not to initiate a preclinical study or clinical trial or to terminate an existing preclinical study or clinical trial;
- adverse results or delays in preclinical studies or clinical trials of our product candidates;
- any delay in our regulatory filings for our product candidates and any adverse development or perceived adverse development with respect to the applicable regulatory authority’s review of such filings, including, without limitation, the FDA’s issuance of a “refusal to file” letter or a request for additional information;
- our failure to commercialize our product candidates;
- adverse regulatory decisions, including failure to receive regulatory approval of our product candidates;
- changes in laws or regulations applicable to our product candidates, including, but not limited to, clinical trial requirements for approvals;
- adverse developments concerning our manufacturers or suppliers;
- our inability to obtain adequate product supply for any licensed product or inability to do so at acceptable prices;
- our inability to establish collaborations, if needed;
- additions or departures of key scientific or management personnel;
- unanticipated serious safety concerns related to the use of our product candidates;
- introduction of new products or services offered by us or our competitors;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us or our competitors;
- our ability to effectively manage our growth;
- the size and growth of our initial target markets;
- our ability to successfully treat additional types of B cell-mediated autoimmune diseases;
- actual or anticipated variations in annual or quarterly operating results;
- our cash position;
- our failure to meet the estimates and projections of the investment community or that we may otherwise provide to the public;
- publication of research reports about us or our industry or positive or negative recommendations or withdrawal of research coverage by securities analysts;
- changes in the market valuations of similar companies;
- overall performance of the equity markets;
- sales of our common stock by us or our stockholders in the future;

- trading volume of our common stock;
- changes in accounting practices;
- ineffectiveness of our internal controls;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- significant lawsuits, including patent or stockholder litigation;
- general political and economic conditions, including inflation;
- global health concerns, such as the ongoing COVID-19 pandemic; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, and The Nasdaq Global Select Market and biopharmaceutical companies in particular, have experienced extreme price and volume fluctuations in recent years that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. Securities class action litigation has often been instituted against companies, particularly in the biopharmaceutical and life sciences industries, following periods of volatility in the market price of a company's securities. We have been subject to such a securities class action lawsuit filed in February 2022 and voluntarily dismissed by the plaintiff in October 2022, against certain of our officers and certain of our current and former directors, and may become subject to additional securities class action lawsuits in the future. See "Part II, Item 1. Legal Proceedings" for more information. This type of litigation could result in substantial costs and a diversion of management's attention and resources, which would harm our business, operating results or financial condition.

Our business is affected by macroeconomic conditions, including rising inflation, interest rates and supply chain constraints.

Various macroeconomic factors could adversely affect our business and the results of our operations and financial condition, including changes in inflation, interest rates and overall economic conditions and uncertainties such as those resulting from the current and future conditions in the global financial markets. Recent supply chain constraints have led to higher inflation, which if sustained could have a negative impact on our product development and operations. If inflation or other factors were to significantly increase our business costs, our ability to develop our current pipeline and new therapeutic products may be negatively affected. Interest rates, the liquidity of the credit markets and the volatility of the capital markets could also affect the operation of our business and our ability to raise capital on favorable terms, or at all, in order to fund our operations. Similarly, these macroeconomic factors could affect the ability of our third-party suppliers and manufacturers to manufacture clinical trial materials for our product candidates.

We do not intend to pay dividends on our common stock, so any returns will be limited to the value of our stock.

We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock.

We are an emerging growth company and a "smaller reporting company," and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies and smaller reporting companies will make our common stock less attractive to investors.

We are an emerging growth company, as defined in the Jumpstart Our Business Startups Act, or JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended, or the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years following the date of completion of our initial public offering, although circumstances could cause us to lose that status earlier. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of our initial public offering, (b) in which we have total annual gross revenue of at least \$1.235 billion or (c) in which we are deemed to be a large accelerated filer, which requires the market value of our common stock that is held by non-affiliates to exceed \$700 million as of the prior June 30th, and (2) the date on which we have issued more than \$1 billion in non-convertible debt during the prior three-year period.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, we are not subject to the same new or revised accounting standards as other public companies that are not emerging growth companies and our financial statements may not be comparable to other public companies that comply with new or revised accounting pronouncements as of public company effective dates.

We are also a “smaller reporting company,” as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended. We would cease to be a smaller reporting company if we have a public float in excess of \$250 million, or have annual revenues in excess of \$100 million and a public float in excess of \$700 million, determined on an annual basis. Consequently, even after we no longer qualify as an emerging growth company, we may still qualify as a “smaller reporting company” which would allow us to take advantage of many of the same exemptions from disclosure requirements including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

We may seek additional capital through a combination of public and private equity offerings, debt financings, strategic partnerships and alliances and licensing arrangements. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms may include liquidation or other preferences that adversely affect your rights as a stockholder. The incurrence of indebtedness would result in increased fixed payment obligations and could involve certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we raise additional funds through strategic partnerships and alliances and licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies or product candidates or grant licenses on terms unfavorable to us.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock depends in part on the research and reports that securities or industry analysts publish about us or our business. In the event that one or more of the analysts who covers us downgrades our stock or publishes inaccurate or unfavorable research about our business, our stock price may decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

Recent Sales of Unregistered Securities

None.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

The exhibits listed on the Exhibit Index immediately preceding such exhibits, which is incorporated herein by reference, are filed or furnished as part of this Quarterly Report on Form 10-Q.

Exhibit Number	Description
3.1	Third Amended and Restated Certificate of Incorporation of the Registrant, as currently in effect (incorporated by reference to Exhibit 3.1 to the Registrant's current report on Form 8-K (File No. 001-39103) filed with the SEC on October 30, 2019)
3.2	Amended and Restated Bylaws of the Registrant, as currently in effect (incorporated by reference to Exhibit 3.2 to the Registrant's current report on Form 8-K (File No. 001-39103) filed with the SEC on October 30, 2019)
3.3	Amendment No. 1 to the Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.3 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-39103) filed with the SEC on May 12, 2022)
10.1*	Exclusive License Agreement, dated October 7, 2022, by and between the Registrant and Nanjing IASO Biotherapeutics Co., LTD.
31.1**	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2**	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1**	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2**	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS*	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH*	Inline XBRL Taxonomy Extension Schema Document
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104*	Cover Page Interactive Data File (formatted as Inline XBRL with applicable taxonomy extension information contained in Exhibits 101*)

* Filed herewith.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to Item 601(b)(10) of Regulation S-K.

** This certification will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), or otherwise subject to the liability of that section. Such certification will not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act, except to the extent specifically incorporated by reference into such filing.

SIGNATURES

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

Cabaletta Bio, Inc.

Date: November 10, 2022

By:

/s/ Steven Nichtberger
Steven Nichtberger
Chief Executive Officer and President
(Principal Executive Officer)

Date: November 10, 2022

By:

/s/ Anup Marda
Anup Marda
Chief Financial Officer
(Principal Financial and Accounting Officer)

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT HAVE BEEN OMITTED AND REPLACED WITH “[*]”. SUCH IDENTIFIED INFORMATION HAS BEEN EXCLUDED FROM THIS EXHIBIT BECAUSE IT IS (I) NOT MATERIAL AND (II) THE TYPE OF INFORMATION THAT THE REGISTRANT TREATS AS PRIVATE OR CONFIDENTIAL.**

EXCLUSIVE LICENSE AGREEMENT

BY AND BETWEEN

CABALETTA BIO, INC.

AND

NANJING IASO BIOTHERAPEUTICS CO., LTD.

TABLE OF CONTENTS

- 1.DEFINITIONS AND INTERPRETATION
- 2.LICENSE
- 3.GOVERNANCE
- 4.DISCLOSURE OF LICENSED KNOW-HOW & COOPERATION
- 5.DEVELOPMENT AND REGULATORY
- 6.MANUFACTURING
- 7.COMMERCIALIZATION
- 8.FINANCIAL PROVISIONS
- 9.REPORTS AND PAYMENT TERMS
- 10.INTELLECTUAL PROPERTY RIGHTS
- 11.CONFIDENTIALITY
- 12.TERM AND TERMINATION
- 13.EFFECT OF TERMINATION
- 14.REPRESENTATIONS, WARRANTIES AND COVENANTS
- 15.INDEMNIFICATION; LIABILITY
- 16.PUBLICATIONS AND PUBLICITY
- 17.GENERAL PROVISIONS

EXHIBIT A – LICENSED PATENTS

EXHIBIT B – LICENSED SEQUENCE EXHIBIT C – IASO DOCUMENTS

EXHIBIT D – IASO CMC DATA

EXCLUSIVE LICENSE AGREEMENT

This EXCLUSIVE LICENSE AGREEMENT (this “**License Agreement**”) is made as of this 7th day of October, 2022 (“**Effective Date**”), by and between Cabaletta Bio, Inc., a Delaware corporation (“**Cabaletta**”) and Nanjing IASO Biotherapeutics Co., Ltd., a company registered in the People’s Republic of China (“**IASO**”). Cabaletta and IASO are each referred to individually as a “**Party**” and together as the “**Parties**.”

RECITALS

WHEREAS, IASO Controls the Licensed Patents and Licensed Know-How (each as defined below) relating to the Licensed Sequence (as defined below); and

WHEREAS, Cabaletta wishes to obtain, and IASO wishes to grant, the right to use the Licensed Sequence to Develop, Manufacture, Commercialize and otherwise Exploit Licensed Products on a worldwide basis in the Field (each as defined below), subject to the terms and conditions set out herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the Parties agree as follows.

1. DEFINITIONS AND INTERPRETATION

1.1 **Definitions**. Unless the context otherwise requires, the terms in this License Agreement with initial letters capitalized shall have the meanings set forth below, or the meaning as designated in the indicated places throughout this License Agreement.

“**Accounting Standards**” means United States Generally Accepted Accounting Principles (GAAP) or International Financial Reporting Standards (IFRS), or successor standards thereto, in each case, as generally and consistently applied for accounting and financial reporting purposes throughout the applicable Party’s organization.

“**Affiliate**” means, with respect to a Party, any Person that, directly or indirectly through one (1) or more intermediaries, controls, is controlled by or is under common control with a Party. For purposes of this definition, the term “control” (including, with correlative meanings, the terms “controlled by” and “under common control with”) as used with respect to a Person means: (a) direct or indirect ownership of more than fifty percent (50%) of the voting securities or other voting interest of any Person (including attribution from related parties); or (b) the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through ownership of voting securities, by contract, as a general partner, as a manager, or otherwise.

“**Alliance Manager**” shall have the meaning set forth in [Section 3.1](#).

“**APAC**” means China (including Hong Kong, Macau, and Taiwan), Japan, South Korea, Australia, and New Zealand.

“**Applicable Law**” means any law, statute, ordinance, written rule or regulation, order, injunction, judgment, decree, constitution or treaty enacted, promulgated, issued, enforced or entered by any Governmental Authority, including the United States Federal Food, Drug, and Cosmetic Act, as amended, cGCP, cGLP and cGMP, anti-bribery laws, such as the United States Anti-Kickback Statute, Foreign Corrupt Practices Act and UK Bribery Act, as well as all applicable data protection and privacy laws, rules and regulations applicable to the Parties and their respective obligations contemplated hereby, including the laws, rules and regulations governing the Development, Manufacture, or Commercialization of the Licensed Sequence or Licensed Product in the Field.

“**Auditor**” shall have the meaning set forth in [Section 9.4\(b\)](#).

“**Bankruptcy Code**” shall have the meaning set forth in [Section 12.2\(c\)](#).

“**Biosimilar Product**” means, with respect to a Licensed Product, a biologic product that: (a) contains therapeutically active ingredient that is “highly similar” (as such term is defined in 42 U.S.C. § 262(i)(2) or equivalent provision) to the therapeutically active ingredient in such Licensed Product; (b) has obtained Regulatory Approval in an expedited or abbreviated manner which relies in whole or in part on (i) a prior Regulatory Approval granted to such Licensed Product or (ii) safety and efficacy data generated by Cabaletta, its Affiliates or Sublicensees in support of a prior Regulatory Approval granted to such Licensed Product; (c) meets the criteria for constituting a “biosimilar” or “interchangeable” product pursuant to Section 351(k) of the Public Health Service Act (42 U.S.C. § 262(k)) or a “similar biological medicinal product” pursuant to Article 10(4) of the EU Directive 2001/83/EC or any successor thereto or any other equivalent provision that comes into effect during the term of this License Agreement, or is the subject of an analogous determination or has otherwise achieved analogous regulatory approval from another applicable Regulatory Authority; and (d) is not licensed, manufactured, marketed, or sold by Cabaletta, by its Affiliates or by its Sublicensees pursuant to a license or sublicense from Cabaletta.

“**BLA**” means (a) in the United States, a Biologics License Application, as defined in § 351(a) of the United States Public Health Service Act (42 U.S.C. §262), and applicable regulations promulgated thereunder by the FDA, or any equivalent application that replaces such application, (b) in the European Union, an MAA, as defined in applicable regulations of the EMA, and (c) in any other country or jurisdiction, the relevant equivalent to the foregoing.

“**Business Day**” means any day that is not a Saturday, Sunday or other day on which commercial banks are authorized or required to be closed, as the case may be, in Philadelphia, Pennsylvania or Beijing, China.

“**Cabaletta**” shall have the meaning set forth in the first paragraph of this License Agreement. “**Cabaletta Indemnitees**” shall have the meaning set forth in [Section 15.1](#).

“**Calendar Quarter**” means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

“**Calendar Year**” means a period of twelve (12) consecutive calendar months ending on December 31. “**CD19**” means B-lymphocyte antigen CD19 (cluster of differentiation 19).

“**CD22**” means B-lymphocyte antigen CD22 (cluster of differentiation 22).

“**Change of Control**” means, with respect to a Party, any of the following events: (a) any Third Party (or group of Third Parties acting in concert) becomes the beneficial owner, directly or indirectly, of more than fifty percent (50%) of the total voting power of the shares then outstanding of such Party normally entitled to vote in elections of directors (or equivalent body); (b) such Party consolidates with or merges into another corporation or entity, or any corporation or entity consolidates with or merges into such Party, in either event pursuant to a transaction in which more than fifty percent (50%) of the total voting power of the shares outstanding of the surviving entity normally entitled to vote in elections of directors (or equivalent body) is not held by the parties holding at least fifty percent (50%) of the outstanding shares of such Party preceding such consolidation or merger; or (c) such Party conveys, transfers or leases all or substantially all of its assets to any Third Party.

“**Claims**” means all Third Party demands, claims, actions and proceedings.

“**CMC**” means chemistry, manufacturing, and controls.

“**Combination Products**” means a commercial product comprising a Licensed Product in addition to another cell therapy or other therapeutically active ingredient, whether co-formulated or co-packaged.

“**Commercial Milestones**” means the milestone events relating to the Licensed Product(s) as set forth in [Section 8.2\(b\)](#).

“**Commercialize**” means to market, promote, distribute, import, export, offer to sell or sell a Licensed Product or conduct other commercialization activities, and “**Commercializing**” and “**Commercialization**” have the correlative meanings with respect to such activities. For clarity, “commercialize” and “commercialization” shall have the corresponding meanings with respect to any pharmaceutical product other than a Licensed Product.

“**Commercially Reasonable Efforts**” means, with respect to the efforts to be expended by a Party with respect to any objective under this License Agreement, reasonable, diligent, good-faith efforts to accomplish such objective as a similarly situated biotechnology or pharmaceutical company operating in similar markets would normally use to accomplish a similar objective under similar circumstances exercising reasonable business judgment, it being understood and agreed that, with respect to the Manufacture, Development, and Commercialization of a Licensed Product, such efforts shall be substantially equivalent to those efforts and resources commonly used by a similarly situated biotechnology or pharmaceutical company operating in similar markets would normally use for a product owned by it or to which it has rights, which product is being developed in an active and ongoing program, of similar market and economic potential as the Licensed Product(s), and at a similar stage in its Development or product life as the Licensed Product(s), taking into account efficacy, safety, approved labeling, the competitiveness of alternative products in the marketplace, the patent and other proprietary position of the product, the likelihood of regulatory approval given the regulatory structure involved, the profitability, and other relevant factors commonly considered in similar circumstances. Commercially Reasonable Efforts shall be determined on a Licensed Product-by-Licensed Product and country-by-country basis and it is anticipated that the level of effort will be different for different markets, and will change over time, reflecting changes in the status of the applicable Licensed Product and the market(s) involved.

“**Competing Program**” shall have the meaning set forth in [Section 2.3\(b\)](#).

“**Control**” or “**Controlled**” means, with respect to any Know-How, Patent Rights, other intellectual property rights, or any proprietary or trade secret information, the legal authority or right (whether by ownership, license or otherwise) of a Party to grant a license or a sublicense of or under such Know-How, Patent Rights, or intellectual property rights to another Person, or to otherwise disclose such proprietary or trade secret information to another Person, without breaching the terms of any agreement with a Third Party, or misappropriating the proprietary or trade secret information of a Third Party.

“**Cover**” means, as to any subject matter and with respect to a Patent Right, that a Valid Claim of such Patent Right would (absent a license or ownership thereof) be infringed (or, in the case of a claim of a Patent Right that has not yet issued, infringed if it were to issue without change) by the Exploitation of the subject matter. “**Covered**” and “**Covering**” shall have the correlative meanings.

“**Creating Party**” shall have the meaning set forth in [Section 10.1\(c\)](#).

“**Damages**” means all losses, liabilities, damages, taxes, costs and expenses of every kind and nature (including reasonable attorneys’ and experts’ fees).

“**Develop**” or “**Development**” means, with respect to a Licensed Product, all non-clinical and clinical research (including post-approval commitments to clinical research) and development activities, including discovery activities, toxicology, pharmacology and other research and pre-clinical efforts, statistical analysis, clinical studies, regulatory affairs, and the preparation, filing and prosecution of regulatory approval and clinical study regulatory activities, including all manufacturing activities directed to the production of a Licensed Product for development. For clarity, “develop” and “development” shall have the corresponding meanings with respect to any pharmaceutical product other than a Licensed Product.

“**Development Milestones**” means the milestone events relating to the Licensed Product(s) as set forth in Section 8.2(a).

“**Development Plan**” means the reasonably detailed development plan, as updated on a quarterly basis, setting forth the timeline and other material details of the clinical trials planned for a Licensed Product in the Field and in the Territory.

“**Diligence Milestones**” means the diligence milestone events relating to the Licensed Product(s) as set forth in Section 5.2.

“**Distributor**” means any Third Party appointed by Cabaletta or any of its Affiliates or its or their Sublicensees to distribute, market and sell a Licensed Product where: (a) such Third Party purchases Licensed Product from Cabaletta or its Affiliates or its or their Sublicensees but does not [***]; and (b) such Third Party does not [***].

“**Effective Date**” shall have the meaning set forth in the first paragraph of this License Agreement.

“**EMA**” means the European Medicines Agency or any successor entity thereto.

“**Encumbrance**” means any claim, charge, equitable interest, hypothecation, lien, mortgage, pledge, option, license, assignment, power of sale, retention of title, right of pre-emption, right of first refusal or security interest of any kind.

“**Europe**” means the European Union, the United Kingdom, Switzerland, Liechtenstein, Norway, and Iceland.

“**Existing Confidentiality Agreement**” means the Mutual Non-Disclosure Agreement dated [***] between IASO and Cabaletta.

“**Exploit**” or “**Exploiting**” means to make, have made, import, have imported, export, have exported, use, have used, sell, have sold, offer for sale or otherwise exploit, including to research, Develop, Commercialize, register, modify, enhance, improve, Manufacture, have Manufactured, hold, keep (whether for disposal or otherwise) or otherwise dispose of.

“**FDA**” means the United States Food and Drug Administration or any successor entity thereto.

“**Field**” means the diagnosis, prevention or treatment of any autoimmune and alloimmune Indications in humans.

“**First Commercial Sale**” means, on a Licensed Product-by-Licensed Product and country-by-country basis, the first sale of such Licensed Product in such country for use or consumption by the general public (following receipt of all Regulatory Approvals that are required in order to sell such Licensed Product in such country) and for which any of Cabaletta, its Affiliates or Sublicensees has invoiced sales of Licensed Products in such country; provided, that the following shall not constitute a First

Commercial Sale: (a) any sale of Licensed Product to an Affiliate or Sublicensee, unless the Affiliate or Sublicensee is the last Person in the distribution chain of the Licensed Product; (b) any use of Licensed Product in Development activities; or (c) any disposal or transfer of Licensed Product for a bona fide charitable purpose, compassionate use or samples.

“**Force Majeure**” shall have the meaning set forth in [Section 17.6](#).

“**FTE**” means a full time equivalent employee (i.e., one fully-committed or multiple partially-committed employees aggregating to one full-time employee) employed or contracted by a Party or its Affiliates and assigned to perform specified work hereunder, with such commitment of time and effort to constitute one employee performing such work on a full-time basis, which for purposes hereof shall be [***] hours per year; provided, that any such employee who devotes less than [***] hours per year shall be treated as an FTE on a pro rata basis based on the number of actual hours worked divided by [***]. For clarity, FTEs shall [***].

“**Governmental Authority**” means any: (a) federal, state, local, municipal, foreign or other government; (b) governmental or quasi-governmental authority of any nature, including any Regulatory Authority, governmental division, subdivision, department, agency, bureau, branch, office, commission, council, board, instrumentality, officer, official, representative, organization, unit, body or entity and any court or other tribunal; (c) multinational governmental organization or body; or (d) entity or body exercising, or entitled to exercise, any executive, legislative, judicial, administrative, regulatory, police, military or taxing authority or power of any nature.

“**IASO**” shall have the meaning set forth in the first paragraph of this License Agreement.

“**IASO Documents**” shall have the meaning set forth in [Section 5.3\(b\)](#).

“**IASO Indemnitees**” shall have the meaning set forth in [Section 15.2](#).

“[***]” shall have the meaning set forth in [Section \[***\]](#).

“**IND**” means an investigational new drug application (including any amendment or supplement thereto) submitted to the FDA pursuant to U.S. 21 C.F.R. Part 312, including any amendments thereto, and any comparable filing(s) outside the United States for the investigation of any product in humans in any other country or group of countries (such as an application for a clinical trial in the European Union).

“**Indemnification Claim Notice**” shall have the meaning set forth in [Section 15.3\(b\)](#).

“**Indemnified Party**” shall have the meaning set forth in [Section 15.3\(b\)](#).

“**Indemnifying Party**” shall have the meaning set forth in [Section 15.3\(b\)](#).

“**Indication**” means any disease, condition or syndrome, or sign or symptom of, or associated with, a disease or condition.

“**Information**” means all Know-How and other proprietary information and data of a financial, commercial or technical nature that the disclosing Party or any of its Affiliates has supplied or otherwise made available to the other Party or its Affiliates, whether made available orally, in writing or in electronic form, including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae in relation to this License Agreement.

“**Insolvency Event**” mean a Party makes a general assignment for the benefit of creditors, files a voluntary petition in bankruptcy, consents to an order for relief in connection with an involuntary

petition in bankruptcy filed against such Party (or an involuntary petition in bankruptcy filed against such Party remains un-dismissed or un-stayed for a period of more than [***]), petitions for or acquiesces in the appointment of any receiver, trustee or similar officer to liquidate or conserve its business or any substantial part of its assets, commences under the laws of any jurisdiction any proceeding involving its insolvency, bankruptcy, reorganization, adjustment of debt, dissolution, liquidation or any other similar proceeding for the release of financially distressed debtors, or becomes the subject of any proceeding or action of the type described above.

“**Joint Intellectual Property**” shall have the meaning set forth in Section 10.1(b).

“**Joint Research Committee**” or “**JRC**” means the committee established as set forth in Section 3.3.

“**Joint Steering Committee**” or “**JSC**” means the committee established as set forth in Section 3.2.

“**Know-How**” means all technical information, know-how and data, including inventions (whether patentable or not), discoveries, trade secrets, specifications, instructions, processes, formulae, materials, expertise and other technology applicable to compounds, formulations, compositions, products or to their manufacture, development, registration, use or commercialization or methods of assaying or testing them or processes for their manufacture, formulations containing them, compositions incorporating or comprising them and including all biological, chemical, pharmacological, biochemical, toxicological, pharmaceutical, physical and analytical, safety, quality control, manufacturing, preclinical and clinical data, instructions, processes, formulae, expertise and information, regulatory filings and copies thereof, relevant to the development, manufacture, use or commercialization of or which may be useful in studying, testing, development, production or formulation of products, or intermediates for the synthesis thereof.

“**Licensed Intellectual Property**” means the Licensed Patents and the Licensed Know-How. For clarity, Licensed Intellectual Property does not include any intellectual property of IASO that may Cover part of the Licensed Product, but does not Cover the Licensed Sequence.

“**Licensed Know-How**” means [***].

“**Licensed Patents**” means all patents and patent applications (including provisional patent applications) Controlled by IASO or its Affiliates that claim the Licensed Sequence. All Licensed Patents as of the Effective Date are identified in Exhibit A.

“**Licensed Product**” means any product that contains, comprises or is designed to modify T cells that (a) incorporates the Licensed Sequence as an antigen recognition domain, and (b) specifically binds to CD19 [***]. Notwithstanding the foregoing, “Licensed Products” [***].

“**Licensed Sequence**” means [***], the sequence of which is set forth on Exhibit B.

“**Licensed Sequence Improvement**” means any improvement to the DNA sequence of the Licensed Sequence made, conceived, reduced to practice, affixed or otherwise developed by or on behalf of Cabaletta during the term of this License Agreement in the exercise of the license granted to Cabaletta under Section 2.1; [***].

“**MAA**” means an application for the authorization to market the Licensed Product(s) in any country or group of countries outside the United States, as defined in the applicable laws and regulations and filed with the Regulatory Authority of a given country or group of countries, but not including any pricing or reimbursement approval.

“**Major European Markets**” means United Kingdom, France, Germany, Italy and Spain.

“**Major Market Country**” means U.S., United Kingdom, France Germany, Italy, Spain, Japan, mainland China, Canada and Australia.

“**Major Pharma**” means any international pharmaceutical company with an annual revenue that exceeds US\$[***] for the most recent financial year preceding the effective date of the proposed sublicense, or any direct or indirect subsidiary of such company.

“**Manufacture**” or “**Manufacturing**” means all activities related to the manufacturing of the Licensed Product(s) or the Licensed Sequence or, in either case, any component or ingredient thereof, including test method development and stability testing, formulation, process development, manufacturing scale-up whether before or after Regulatory Approval, manufacturing any Licensed Product or Licensed Sequence in bulk or finished form for Development or Commercialization (as applicable), including formulation, filling and finishing, packaging, labeling, shipping and holding, in-process and finished product testing, release of a Licensed Product or Licensed Sequence or, in either case, any component or ingredient thereof, quality assurance and quality control activities related to manufacturing and release of a Licensed Product or Licensed Sequence, and regulatory activities related to any of the foregoing. For clarity, “manufacture” and “manufacturing” shall have the corresponding meanings with respect to any pharmaceutical product other than the Licensed Product.

“**Material Transfer Agreement**” means the Material Transfer Agreement, dated [***], between IASO and Cabaletta.

“**Milestone Payments**” means the payments to be made by Cabaletta to IASO upon the achievement of the corresponding Milestones as set forth in Section 8.2.

“**Milestones**” means, collectively, the Development Milestones and the Commercial Milestones.

“**Net Sales**” means the [***]sales amounts invoiced by Cabaletta or any of its Affiliates or Sublicensees for the Licensed Product sold to Third Parties in the Territory in bona fide, arm’s length transactions, as determined in accordance with Accounting Standards less the following deductions booked on [***] basis by Cabaletta and its Affiliates or Sublicensees under the applicable Accounting Standards to calculate the recorded net sales from [***]:

- (i)normal and customary trade and cash discounts, actually allowed and properly taken, directly with respect to sales of the Licensed Product;
- (ii)amounts repaid or credited by reasons of defects, rejections, recalls or returns;
- (iii)rebates and chargebacks to customers and Third Parties (including Medicare, Medicaid, managed healthcare and similar types of rebates);
- (iv)amounts provided or credited to customers through coupons and other discount programs;
- (v)delayed ship order credits, discounts or payments related to the impact of price increases between purchase and shipping dates or retroactive price reductions;
- (vi)[***];
- (vii)taxes (including sales tax, excise tax and VAT, but not income taxes), tariffs and duties levied on the sales, transfer, transportation or delivery of the Licensed Product;
- (viii)[***]
- (ix)any invoiced amounts from a prior period which [***]; and
- (x)actual transportation cost for the delivery of the Licensed Product, to the extent added to the sale price and set forth separately as such in the total amount invoiced.

(a)In the case of any sale or other disposal of a Licensed Product between or among Cabaletta and its Affiliates or Sublicensees, for resale, Net Sales shall be calculated [***].

(b) In the case of any sale that is not invoiced or is delivered before invoice, Net Sales shall be calculated [***].

(c) In the case of any sale or other disposal for value, such as barter or counter-trade, of any Licensed Product, or part thereof, other than in an arm's length transaction exclusively for money, Net Sales shall be calculated [***].

(d) For the avoidance of doubt, sales between Cabaletta, and its Affiliates and Sublicensees shall not be considered Net Sales [***].

(e) [***].

“**Party**” or “**Parties**” shall have the meaning set forth in the first paragraph of this License Agreement. “**Patent Challenge**” shall have the meaning set forth in [Section 12.5](#).

“**Patent Prosecution**” shall have the meaning set forth in [Section 10.3\(a\)](#).

“**Patent Rights**” means all patents and patent applications (including provisional patent applications), including all divisionals, continuations, substitutions, continuations-in-part, re-examinations, reissues, additions, renewals, extensions, registrations, supplemental protection certificates, utility models, design patents and the like of any of the foregoing.

“**Person**” means any individual, partnership, limited liability company, firm, corporation, association, trust, unincorporated organization or other entity.

“**Phase 1 Clinical Trial**” means a human clinical trial which provides for the testing in humans of a new product, conducted in a small number of normal volunteers or patients to get information on product safety, tolerability, dosing regimens, immunogenicity, pharmacological activity, or pharmacokinetics, as more fully defined in 21 C.F.R. § 312.21(a) (or analogous regulations of an applicable Regulatory Authority outside the U.S.).

“**Phase 1/2 Clinical Trial**” means a Phase 1 Clinical Trial that (a) is also designed to satisfy the requirements of 21 C.F.R. 312.21(b) or corresponding foreign regulations; or (b) is subsequently optimized or expanded to satisfy the requirements of 21 C.F.R. 312.21(b) or corresponding foreign regulations.

“**Phase 3 Clinical Trial**” means a human clinical trial of any product on sufficient numbers of patients that is intended to demonstrate statistically, through a well-controlled design, that such product is safe and efficacious for its intended use, to evaluate the risk-benefit relationship of the product, and to define warnings, precautions and adverse reactions that are associated with such product in the dosage range to be prescribed, as described in 21 C.F.R. § 312.21(c) (or analogous regulations of an applicable Regulatory Authority outside the U.S.), and that is intended to support Regulatory Approval of such product.

“**Pivotal Trial**” means, with respect to a Licensed Product, a clinical study that at the time of initiation (or any later expansion of patient enrolment, if applicable) is expected to be the basis for final Regulatory Approval of such Licensed Product, including any Phase 3 Clinical Trial as described in U.S. 21 C.F.R. §312.21(c), as amended, or the foreign equivalent thereof.

“**Product Marks**” shall have the meaning set forth in [Section 10.5](#).

“**Qualified Sublicensee**” means [***].

“**Region**” means any of the following regions: (a) North America, (b) Europe, (c) APAC and (d) all countries outside of North America, Europe and APAC.

“**Regulatory Approval**” means all approvals, licenses and authorizations of the applicable Regulatory Authority necessary for the marketing and sale of a biological or pharmaceutical product for a particular Indication in a country in the world (including separate pricing or reimbursement approvals, as necessary), and including the approvals by the applicable Regulatory Authority of any expansion or modification of the label for such Indication.

“**Regulatory Authority**” means any Governmental Authority responsible for granting Regulatory Approvals for Licensed Products, including the FDA, EMA and any corresponding national or regional regulatory authorities.

“**Regulatory Exclusivity**” means any exclusive marketing rights or data exclusivity rights (other than Patent Rights) conferred by any Regulatory Authority with respect to a pharmaceutical or medical product, including orphan drug exclusivity, new chemical entity exclusivity, data exclusivity, pediatric exclusivity, rights conferred in the U.S. under the Hatch-Waxman Act or the FDA Modernization Act of 1997, in European Union member states under national implementations of Article 10 of Directive 2001/83/EC, and rights similar thereto in other country or jurisdiction.

“**Regulatory Filings**” means the regulatory registrations, applications, authorizations and approvals (including approvals of BLAs, supplements and amendments, pre- and post-approvals, pricing and Third Party reimbursement approvals, and labeling approvals), Regulatory Approvals or other submissions made to or with any Regulatory Authority necessary for the research, Development (including the conduct of clinical trials), Manufacture, or Commercialization of the Licensed Product(s) or the Licensed Sequence in a regulatory jurisdiction, together with all related correspondence to or from any Regulatory Authority and all documents referenced in the complete regulatory chronology for each BLA, including all Drug Master File(s) (if any), IND, Clinical Trial Application in the European Union, MAA and supplemental applications or foreign equivalents of any of the foregoing.

“**ROFN Territory**” means mainland China, Hong Kong, Macau and Taiwan.

“**ROW**” means outside of the United States and Europe.

“**Royalty Term**” means, on a Licensed Product-by-Licensed Product and country-by-country basis, the period starting on the date when Net Sales of such Licensed Product in such country is generated and ending on the last of: (a) the expiration of the last to expire Valid Claim included in the Licensed Intellectual Property Covering the Licensed Sequence contained in such Licensed Product in such country that, but for the licenses granted in this License Agreement, would be infringed by the sale of such Licensed Product in such country; (b) [***] from the date of the First Commercial Sale of such Licensed Product in such country; or (c) the expiration of all Regulatory Exclusivities for such Licensed Product in such country.

“**Sales, Royalty & Sublicensing Revenue Report**” means a written report or reports showing the calculation of each of: (a) the Net Sales of each Licensed Product in the Territory, on a country-by- country basis, during the reporting period by Cabaletta and its Affiliates and Sublicensees, including gross sales and an itemized calculation showing separately each type of deduction provided for in the definition of “**Net Sales**”; (b) the royalties payable, in United States Dollars, which shall have accrued hereunder with respect to such Net Sales, including any deductions taken pursuant to Sections 8.3(b), 8.3(c) and 8.4; and (c) Sublicensing Revenue (if any).

“**Senior Officers**” means, for Cabaletta, Chief Executive Officer, and for IASO, Chief Executive

Officer.

“**Sublicensee**” means any Person, other than an Affiliate or a Distributor, to which Cabaletta grants or transfers a sublicense or option rights under the Licensed Intellectual Property.

“**Sublicensing Revenue**” means [***].

“**Territory**” means worldwide.

“**Third Party**” means any Person other than a Party or an Affiliate of a Party.

“**Third Party Infringement**” shall have the meaning set forth in Section 10.4(a).

“**United States**” or “**U.S.**” means the United States of America, its territories and possessions. “**US\$**” means the lawful currency of the United States.

“**Valid Claim**” means: (a) a claim of an issued and unexpired patent included within the Licensed Intellectual Property that (i) has not been irrevocably or unappealably disclaimed or abandoned, or been held unenforceable, unpatentable or invalid by a decision of a court or other governmental agency of competent jurisdiction and (ii) has not been admitted to be invalid or unenforceable through reissue, disclaimer, or otherwise; or (b) a claim included in a patent application included within the Licensed Intellectual Property that (i) is being prosecuted in good faith and (ii) has not been irretrievably cancelled, withdrawn or abandoned, nor been pending for more than [***] from its priority date. If a claim included in a patent application ceased to be a Valid Claim under clause (b) of the preceding sentence only because of the passage of time under clause (b)(ii), and later issues as a part of a patent within clause (a) of the preceding sentence, then it shall again be considered a Valid Claim effective as of the issuance of such patent.

“**Withholding Tax Action**” shall have the meaning set forth in Section 9.3(c).

1.2**Interpretation.** In this License Agreement unless otherwise specified and unless the context otherwise requires:

- (a) “includes” and “including” shall mean respectively includes and including without limitation;
- (b) “or” shall mean and/or;
- (c) a Party includes its permitted assignees or the respective successors hereunder;
- (d) a statute or statutory instrument or any of their provisions is to be construed as a reference to that statute or statutory instrument or such provision as the same may have been or may from time to time hereafter be amended or re-enacted;
- (e) words denoting the singular shall include the plural and vice versa and words denoting any gender shall include all genders;
- (f) the Exhibits and other attachments form part of the operative provision of this License Agreement and references to this License Agreement shall include references to the Exhibits and attachments;
- (g) the headings in this License Agreement are for information only and shall not be considered in the interpretation of this License Agreement; and

(h) general words shall not be given a restrictive interpretation by reason of their being preceded or followed by words indicating a particular class of acts, matters or things.

2. LICENSE

2.1 License Grant. Subject to the terms and conditions of this License Agreement, IASO hereby grants to Cabaletta an exclusive (even as to IASO and its Affiliates), sublicensable (pursuant to Section 2.2) license, under the Licensed Intellectual Property to use the Licensed Sequence to Exploit the Licensed Product(s) in the Field in the Territory. For the avoidance of doubt, (a) the foregoing license is exclusive to Cabaletta and IASO has no retained rights (and will not attempt to license any rights, directly or indirectly, to any Third Party) with respect to the use of the Licensed Products or the Licensed Sequence in the Exploitation of the Licensed Products in the Field in the Territory, except for the right to conduct activities undertaken pursuant to the express terms of this License Agreement, (b) except for the Licensed Sequence, IASO does not grant to Cabaletta any right to use any component that is proprietary to IASO, whether or not known to Cabaletta as of the Effective Date, and (c) Cabaletta shall have the sole decision-making authority with respect to the Licensed Product(s) in the Field and in the Territory; provided, that [***].

2.2 Sublicense Rights. Cabaletta may sublicense through multiple tiers the rights granted to it by IASO under this License Agreement at any time and at its sole discretion; provided, that (a) any sublicense granted under this License Agreement shall be subject and subordinate to, and consistent with, the terms and conditions of this License Agreement, (b) Cabaletta shall promptly notify IASO (including whether such Sublicensee has an active Competing Program) and shall provide a copy of each such sublicense agreement to IASO within [***] after the execution thereof, which sublicense agreement may be reasonably redacted to the extent sufficient information remains unredacted to allow IASO to verify whether Cabaletta is in compliance with the requirements set forth in the foregoing clause (a), and (c) if such proposed Sublicensee qualifies as a Qualified Sublicensee and it has a Competing Program (as defined below) as of the date of the contemplated sublicense grant, Cabaletta shall obtain IASO's prior written consent prior to grant of such sublicense (provided, further, that, the Parties shall engage in good faith discussion prior to IASO making a decision of whether or not to consent to such proposed sublicense), and (d) if such proposed Sublicensee is not a Major Pharma and does not qualify as a Qualified Sublicensee, it shall not have an active Competing Program as of the date of the contemplated sublicense grant. Cabaletta may exercise its rights and perform its rights and obligations under this License Agreement itself or through any of its Affiliates. In addition, Cabaletta may subcontract to Third Parties the performance of tasks and obligations with respect to the Development, Manufacture and Commercialization of the Licensed Product(s) as Cabaletta deems appropriate. Cabaletta shall remain directly responsible for all of its obligations under this License Agreement that may have been delegated or sublicensed to any Affiliate, Sublicensee or subcontractor.

2.3 Non-Compete.

(a) During the term of this License Agreement, IASO shall not, shall cause its Affiliates not to, and shall not license, authorize, appoint or otherwise enable any Third Party to, directly or indirectly Exploit: (i) any mono-targeting therapy in autologous CAR-T therapy [***], or (ii) multi-targeting therapy in the Field; [***], except for [***].

(b) Cabaletta covenants and agrees that during the term of this License Agreement, Cabaletta shall not, shall cause its Affiliates and Sublicensees not to, and shall not license, authorize, appoint or otherwise knowingly enable any Third Party to directly or indirectly Exploit any dual-targeting therapy that targets both CD19 and CD22 in the Territory (a "**Competing Program**").

(c) [***].

(d)The Parties acknowledge and agree that the restrictions contained in this Section 2.3 are reasonable in scope and duration and are properly required for the adequate protection of each of IASO's and Cabaletta's rights hereunder and the value associated with the Licensed Sequence and the Licensed Product. The Parties further agree that if any portion of this Section 2.3 is determined by an arbitrator or a court of competent jurisdiction to be unenforceable, this Section 2.3 shall be interpreted to have the broadest application as shall be enforceable under Applicable Laws.

2.4 Right of First Negotiation. If Cabaletta desires to grant to any Third Party an exclusive license to the Develop, Manufacture, Commercialize or otherwise Exploit a Licensed Product in the ROFN Territory, then Cabaletta shall first provide IASO with written notice of its desire to do so. IASO shall have [***] after receipt of such written notice, access to such data room with such information about the Licensed Product that Cabaletta planned to provide to a Third Party bidder for such exclusive license, and an opportunity to request additional data, to notify Cabaletta, in writing, that it wishes to enter into negotiations with Cabaletta to obtain such rights to the Licensed Product in the ROFN Territory. If IASO notifies Cabaletta that it wishes to enter into such negotiations, then the Parties shall exclusively, in good faith and diligently negotiate an agreement on such terms and conditions within [***] of such notification by IASO. If the Parties are not able to reach an agreement upon the expiration of the foregoing [***] period, Cabaletta shall then be free to negotiate the grant of such rights to the Licensed Product in the ROFN Territory with Third Parties; provided, that, (a) Cabaletta shall not provide any material information regarding the Licensed Product to a Third Party bidder that was not previously provided to IASO and (b) if Cabaletta does not enter into a definitive agreement that grants such right to a Third Party within [***] from the end of the [***] negotiation period referenced above, then IASO's right of first negotiation shall again apply. For the sake of clarity, if IASO does not inform Cabaletta that it wishes to enter into negotiations with Cabaletta to obtain such rights to the Licensed Product in the ROFN Territory within said [***] period, then Cabaletta would then be free to negotiate the grant of such rights to the Licensed Product in the ROFN Territory to [***] Third Parties.

3. GOVERNANCE

3.1 Alliance Managers. Within [***] following the Effective Date, each Party will appoint (and notify the other Party of the identity of) a representative having a general understanding of pharmaceutical development and commercialization issues to act as its alliance manager under this License Agreement (each, an "Alliance Manager"). The Alliance Managers will serve as the contact point between the Parties for the purpose of: (a) exchanging information on the research, Development, Manufacturing and Commercialization activities of the Parties hereunder; (b) facilitating the flow of information and otherwise promoting communication, coordination and collaboration between the Parties; (c) providing single point communication for seeking consensus both internally within the respective Party's organization and together regarding key global strategy and planning issues, as appropriate, including facilitating review of external corporate communications; and (d) raising cross- Party or cross-functional disputes in a timely manner. Each Party may replace its Alliance Manager upon prior written notice to the other Party.

3.2 Joint Steering Committee.

(a)The Parties will establish a Joint Steering Committee, composed of up to [***] senior personnel of IASO and up to [***] senior personnel of Cabaletta ([***] of which will be the Party's Alliance Manager and which personnel for each Party, collectively, shall have a general understanding of drug manufacturing, development or commercialization issues), to oversee the Development and Commercialization of the Licensed Product(s) in the Territory, including new product planning and Commercialization activities. The JSC may also fulfill such other

responsibilities as may be allocated to the JSC by mutual written agreement of the Parties.

(b) Within [***] following the Effective Date, each Party will designate its initial members to serve on the JSC and notify the other Party of the dates of availability for the first meeting of the JSC. Each Party may replace its representatives on the JSC on written notice to the other Party.

(c) The JSC shall meet on a [***] basis and at such other times as the Parties may agree. The first meeting of the JSC shall be held as soon as reasonably practicable, but in no event later than [***] following the Effective Date. Meetings shall be held at such place or places as are mutually agreed or by teleconference or videoconference and, except with the prior consent of both Parties, will only be attended by the representatives of the JSC.

(d) Cabaletta shall appoint one of its representatives on the JSC to act as chairperson of the JSC. The JSC chairperson shall set agendas for JSC meetings (which shall include all relevant topics reasonably requested by any JSC member that fall within the jurisdiction of the JSC) and be responsible for recording, preparing and, within a reasonable time, issuing draft minutes of each JSC meeting, which draft minutes shall be subject to review and approval by all JSC members.

3.3 Joint Research Committee.

(a) The Parties will establish a Joint Research Committee, composed of up to [***] senior personnel of IASO and up to [***] senior personnel of Cabaletta ([***] of which will be the Party's Alliance Manager and which personnel for each Party, collectively, shall have a general understanding of drug manufacturing, development or commercialization issues), to discuss the Development Plan and review the Development activities with respect to the Licensed Product(s) in the Field in the Territory.

(b) Within [***] following the Effective Date, each Party will designate its initial members to serve on the JRC and notify the other Party of the dates of availability for the first meeting of the JRC. Each Party may replace its representatives on the JRC on written notice to the other Party.

(c) The JRC will discuss the Development Plan and review the Development activities with respect to the Licensed Product(s). Each Calendar Year, Cabaletta will prepare and present to the JRC an amendment to the Development Plan for the JRC's review and discussion.

(d) The JRC shall meet on a [***] basis and at such other times as the Parties may agree. The first meeting of the JRC shall be held as soon as reasonably practicable, but in no event later than [***] following the Effective Date. Meetings shall be held at such place or places as are mutually agreed or by teleconference or videoconference and, except with the prior consent of both Parties, will only be attended by the representatives of the JRC.

(e) Cabaletta shall appoint [***] of its representatives on the JRC to act as chairperson of the JRC. The JRC chairperson shall set agendas for JRC meetings (which shall include all relevant topics reasonably requested by any JSC member that fall within the jurisdiction of the JSC) and be responsible for recording, preparing and, within a reasonable time, issuing draft minutes of each JRC meeting, which draft minutes shall be subject to review and approval by all JRC members.

3.4 Costs of Governance. The Parties agree that the costs incurred by each Party in connection with its participation at any meetings under this [Article 3](#) shall be borne solely by such Party.

3.5 Decision-Making Authority. For the avoidance of doubt, subject to [Section 2.1](#), Cabaletta shall have the sole decision-making authority with respect to the Licensed Product(s) in the Field in the Territory.

4.DISCLOSURE OF LICENSED KNOW-HOW & COOPERATION

4.1 **Disclosure of Licensed Know-How.** Within [***] after the Effective Date, IASO, without additional consideration, shall disclose to Cabaletta or its designated Affiliate all of the Licensed Know-How in existence as of the Effective Date. Thereafter on a continuing basis during the term of this License Agreement, IASO, without additional consideration, shall promptly disclose to Cabaletta or its designated Affiliate all additional Licensed Know-How that comes in to existence from time to time.

4.2 **Cooperation.** IASO shall use Commercially Reasonable Efforts to provide assistance to Cabaletta or its designated Affiliate in connection with understanding and using the Licensed Know-How for purposes consistent with licenses and rights granted to Cabaletta hereunder, including by providing information to assist Cabaletta or its designated Affiliate in developing the Licensed Product(s) and its related activities.

5.DEVELOPMENT AND REGULATORY

5.1 **Development.** Cabaletta will be responsible for conducting, at its sole expense, such research and preclinical, clinical and other Development of the Licensed Product in the Field in the Territory as Cabaletta determines appropriate in its sole discretion. Such Development activities shall be conducted pursuant to a Development Plan prepared by, and amended from time to time by, Cabaletta in its sole discretion; [***].

5.2Development Diligence.

(a)Cabaletta shall, directly or through its Affiliates or Sublicensees, use Commercially Reasonable Efforts to Develop [***] Licensed Product in [***] Indication in the Field in (a) the United States and (b) [***] of the Major European Markets or, upon mutual written consent of the Parties (IASO’s consent not to be unreasonably withheld, delayed or conditioned), [***].

(b)Without limiting Cabaletta’s obligations under clause (a) above, Cabaletta shall satisfy the Diligence Milestones set forth in the table on or before the corresponding Diligence Milestone Date. Cabaletta may up to [***] unilaterally extend the corresponding date of a Diligence Milestone by a [***] period (for a maximum of [***] of extension to such date) for a one-time payment of US\$[***] for the [***] extension and US\$[***] for the [***] extension, in which case all subsequent dates listed in the below table would be extended accordingly. [***] any failure by Cabaletta to satisfy the Diligence Milestones obligations under this Section 5.2(b) [***] (for clarity, the foregoing shall not [***]).

	Diligence Milestone	Diligence Milestone Date
	[***]	[***]
[***]		[***]
	[***]	[***]

5.3Regulatory.

(a)Cabaletta will (i) determine the regulatory plans and strategies for the Licensed Product(s), (ii) (either directly or through its Affiliates or Sublicensees) make all Regulatory Filings with

respect to the Licensed Product(s) and (iii) will be responsible for obtaining and maintaining Regulatory Approvals for the Licensed Product(s), in each case in the Field throughout the Territory in the name of Cabaletta or its Affiliates or Sublicensees.

(b)IASO hereby grants to Cabaletta (i) an exclusive right of reference (including with regard to IASO and its Affiliates), with the right to grant further rights of reference through multiple tiers, under certain Regulatory Filings or (ii) access to certain other documents, materials and information relating to the Licensed Sequence within [***] after the Effective Date, in each case (of clauses (i) and (ii)) as set forth in **Exhibit C** and as such Regulatory Filings, documents, material and information exist as of the Effective Date (“**IASO Documents**”) solely for Cabaletta to use in the preparation and submission of Regulatory Filings in connection with the Development of the Licensed Product(s) in the Field in the Territory; provided, that, if Cabaletta, or any Person to which Cabaletta grants a further right of reference, references such IASO Documents (or any data or results contained therein) in any of its Regulatory Filings, Cabaletta shall (x) ensure that IASO’s ownership of such referenced IASO Documents and data or results contained therein is made clear in such Regulatory Filings, and (y) provide IASO a draft of such Regulatory Filings at least [***] prior to submission in order to provide IASO a reasonable opportunity to review and comment on such draft Regulatory Filings, and Cabaletta shall consider IASO’s comments in good faith. IASO may provide the IASO Documents to Cabaletta in their original language and shall have no obligation to translate them into English language. IASO may reasonably redact sensitive or irrelevant information in the IASO Documents. Cabaletta shall not use (or permit the use of) the IASO Documents or any data or results contained therein for any other purpose except as expressly permitted under this Section 5.3(b).

(c)Cabaletta shall have the right to disclose the existence of, and the results from, any clinical trials conducted under this License Agreement in accordance with its standard policies.

5.4 Compliance. Each Party agrees that in performing its obligations under this License Agreement (a) it shall comply with all Applicable Law, including applicable current international regulatory standards, including cGMP, cGLP, cGCP and other rules, regulations and requirements and (b) it will not employ or use any person that has been debarred under Section 306(a) or 306(b) of the United States Federal Food, Drug and Cosmetic Act, as amended.

6.MANUFACTURING

6.1 Manufacturing. Cabaletta or its designated Affiliates(s) and Sublicensee(s) will be solely responsible for the Manufacture of the Licensed Sequence and Licensed Products being Developed or Commercialized under this License Agreement.

6.2 CMC Assistance. Within [***] after IASO’s receipt of the upfront payment under Section 8.1, IASO shall provide written responses (as of the Effective Date) to the CMC related questions set forth in **Exhibit D** (such responses, the “**IASO CMC Data**”). During the term of this License Agreement, IASO shall provide Cabaletta up to an aggregate of [***] of assistance to answer additional technical questions from Cabaletta that relate to the Licensed Sequence free of charge; provided, that IASO shall not be obligated to disclose to Cabaletta any commercially sensitive information, as determined by IASO in good faith. After the exhaustion of the foregoing [***] of technical assistance for the additional technical questions from Cabaletta, only in the event a Regulatory Authority has issued to Cabaletta a request or question relating to the License Sequence which Cabaletta is unable to respond to without IASO’s assistance, the Parties shall discuss in good faith for IASO’s prompt provision of such requested additional assistance to Cabaletta.

7.COMMERCIALIZATION

7.1 Commercialization Responsibility; Diligence. Cabaletta or its designated Affiliate(s) and Sublicensee(s) will be solely responsible for all aspects of Commercialization of the Licensed Product(s) in the Territory, including planning and implementation, distribution, booking of sales, pricing and reimbursement. Cabaletta, directly or through its Affiliates or Sublicensees, shall be required to use Commercially Reasonable Efforts, at its expense, to Commercialize [***] Licensed Product in [***] Indication in the Field in (a) the United States and (b) [***] of the Major European Markets or, upon mutual written consent of the Parties (IASO's consent not to be unreasonably withheld, delayed or conditioned), [***].

7.2 Pharmacovigilance. Unless the Parties enter into a license agreement for the Licensed Product in the ROFN Territory pursuant to Section 2.4, Cabaletta shall be solely responsible for the reporting and handling of adverse events in accordance with Applicable Laws with regard to pharmacovigilance of the Licensed Product. If required to comply with regulatory requirements, following the Effective Date, and in time to ensure that all regulatory requirements are met, the Parties shall enter into a mutually- agreed written pharmacovigilance agreement to document exchange between the Parties of adverse event reports and safety information associated with the Licensed Sequence and the Licensed Product(s) and any IASO product that includes the Licensed Sequence.

8. FINANCIAL PROVISIONS

8.1 Upfront Payment. In consideration of the licenses and rights granted to Cabaletta hereunder, Cabaletta shall pay to IASO a one-time, non-refundable, non-creditable upfront payment of US\$2,500,000 within [***] of the Effective Date.

8.2 Milestone Payments. In further consideration of the licenses and rights granted to Cabaletta hereunder, upon achievement by Cabaletta, its Affiliates, or its Sublicensees of each of the following Milestones for the Licensed Product(s) set forth below, the corresponding Milestone Payments shall be payable by Cabaletta to IASO.

(a) **Development Milestones:** The Development Milestones shall be paid once for each of the [***] Licensed Products; provided, that in the event any Development Milestone set forth in the below table is achieved with respect to a [***] Licensed Product, the applicable Milestone Payment set forth below shall [***]. For clarity, with respect to a Licensed Product for which Regulatory Approval has been achieved for [***] (e.g. [***]), Regulatory Approval for the same Licensed Product [***] (e.g. [***]) shall [***].

Development Milestone Event

Development Milestone Payment (US\$)

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

For the purpose of this Section 8.2(a), [***].

With respect to the Development Milestones [***].

With respect to the Development Milestones [***].

(b)**Commercial Milestones:** The following one-time Commercial Milestone payments are based on the aggregate Net Sales of all of the Licensed Product(s) in the Territory during a Calendar Year.

Commercial Milestone Event

Milestone Payment (US\$)

[***]

[***]

[***]

[***]

[***]

[***]

[***]

[***]

For purposes of each Commercial Milestone event, Net Sales shall only include [***].

(c)**Notice of Milestone Achievement.** Cabaletta shall provide IASO with written notice of the achievement of each Milestone within [***] after such Milestone is achieved.

8.3 Royalty Payments.

(a) In consideration of the licenses and rights granted to Cabaletta hereunder, during the Royalty Term for a Licensed Product(s), Cabaletta will make royalty payments to IASO on Net Sales of such Licensed Product by Cabaletta, its Affiliates and Sublicensees at the applicable percentages set forth below.

Portion of Net Sales of all Licensed Product(s) in any Calendar Year during the Royalty Term	Royalty Percentage
[***]	[***]
[***]	[***]
[***]	[***]

The royalty percentage stated next to a given range of Net Sales will be used to calculate only royalties to be paid on Net Sales falling within that range. For example, if Net Sales of the Licensed Product(s) in a Calendar Year are US\$[***], the royalty on such Net Sales shall be equal to [***] of US\$[***] plus [***] of US\$[***].

(b) The royalty amounts payable under Section 8.3(a) with respect to Net Sales of Licensed Products in a particular country shall be reduced by [***] of the amounts otherwise payable, during any portion of the applicable Royalty Term in which there is not [***] Valid Claim of a Licensed Patent that Covers such Licensed Product in such country. [***].

(c) If, on a Licensed Product-by-Licensed Product and country-by-country basis, a Biosimilar Product with respect to any Licensed Product is introduced in such country, then the royalties payable under Section 8.3(a) with respect to Net Sales of such Licensed Product in such country shall be reduced by [***] solely for so long as sales of such Biosimilar Product represent more than [***] of the total market (by unit sales) for such Licensed Product and Biosimilar Product in such country as reported by IQVIA (or another credible source if IQVIA does not provide such information).

(d) Following expiration of the Royalty Term on a Licensed Product-by-Licensed Product and country-by-country basis, Cabaletta's licenses under Section 2.1 with respect to such Licensed Product in such country shall continue in effect, but become fully paid-up, royalty-free, transferable, perpetual and irrevocable.

8.4 Third Party Obligations.

(a) Notwithstanding the provisions of this Section 8.4, IASO shall remain responsible for the payment of royalty, milestone and other payment obligations, if any, due to Third Parties under

any Licensed Patents or Licensed Know-How that have been licensed to IASO and are sublicensed to Cabaletta under this License Agreement. All such payments shall be made promptly by IASO in accordance with the terms of its agreement with such Third Parties.

(b) In the event that Cabaletta reasonably determines that rights to any Patent Right Controlled by a Third Party that Covers the Licensed Sequence are required in order to Develop, Manufacture, use or Commercialize the Licensed Product (in addition to the Licensed Intellectual Property and outside the intellectual property falling under the scope of Section 8.4(a)), Cabaletta shall have the right to negotiate and acquire such rights through a license or otherwise (including pursuant to any settlement agreement) and to deduct from the royalty payments due to IASO during any Calendar Quarter [***] of the royalties paid by Cabaletta to such Third Party during such Calendar Quarter and Cabaletta shall use Commercially Reasonable Efforts to negotiate and minimize such royalties for such Third Party license.

8.5 Royalty Floor. On a Licensed Product-by-Licensed Product and country-by-country basis, in no event shall the royalty reductions described in Sections 8.3(b), 8.3(c) and 8.4, alone or together, reduce the royalties payable by Cabaletta for such Licensed Product and such country in a given Calendar Quarter pursuant to Section 8.3(a) by more than [***]; provided, however, that in each of the foregoing instances, any such reduction not fully taken as a result of the application of this Section 8.5 may be carried forward and applied against future royalties otherwise owed until the full amount that Cabaletta was entitled to apply to reduce such amounts has been applied.

8.6 Sublicensing Revenue. During the Royalty Term, Cabaletta will pay IASO [***] of Sublicensing Revenue actually received for the grant or transfer of any sublicenses or options rights to a Third Party of the Licensed Intellectual Property.

8.7 No Projections. IASO and Cabaletta acknowledge and agree that nothing in this License Agreement shall be construed as representing an estimate or projection of anticipated sales of any Licensed Product, and that the Milestones and Net Sales levels set forth above or elsewhere in this License Agreement or that have otherwise been discussed by the Parties are merely intended to define the Milestone Payments and royalty obligations to IASO in the event such Milestones or Net Sales levels are achieved. NEITHER CABALETTA NOR IASO MAKES ANY REPRESENTATION OR WARRANTY, EITHER EXPRESS OR IMPLIED, THAT CABALETTA WILL BE ABLE TO SUCCESSFULLY DEVELOP OR COMMERCIALIZE ANY LICENSED PRODUCT OR, IF COMMERCIALIZED, THAT ANY PARTICULAR NET SALES LEVEL OF SUCH LICENSED PRODUCT WILL BE ACHIEVED.

9. REPORTS AND PAYMENT TERMS

9.1 Payment Terms.

(a) Following achievement of a Milestone, Cabaletta shall make the applicable Milestone Payment(s) within [***] of Cabaletta's receipt of invoice from IASO.

(b) Within [***] after each Calendar Quarter during the term of this License Agreement following the start of the first Royalty Term or the first receipt of any Sublicense Revenue, Cabaletta will provide to IASO a Sales, Royalty & Sublicensing Revenue Report. IASO shall invoice Cabaletta for the applicable royalty amounts and Sublicensing Revenue (if any), and Cabaletta shall pay such undisputed amounts within [***] of Cabaletta's receipt of such invoice.

(c) All payments hereunder shall be made by wire transfer in U.S. Dollars to the credit of such bank account as may be designated by the recipient in writing. Any payment that falls due on a date that is not a Business Day in the location from which the payment will be made may be

made on the next succeeding Business Day in such location.

(d) If IASO does not receive payment of any sum due to it on or before the due date therefor, simple interest shall thereafter accrue on the sum due to IASO from the due date until the date of payment at a per-annum rate of prime (as reported in The Wall Street Journal (U.S., Eastern Edition)) plus [***] or the maximum rate allowable by Applicable Laws, whichever is less.

9.2 Currency. All payments under this License Agreement shall be payable in U.S. Dollars. When conversion of payments from any foreign currency is required to be undertaken by Cabaletta, the U.S. Dollar equivalent shall be calculated using Cabaletta's then-current standard exchange rate methodology as applied in its external reporting.

9.3 Taxes.

(a) Each Party shall be responsible for any tax obligations of its own due to this License Agreement, including but not limited to income tax and capital gains tax. Neither Party shall have any obligation towards the other Party in case that the other Party fails to fully comply with its tax obligations.

(b) Payments under this License Agreement are exclusive of any applicable VAT, GST, sales or similar taxes. Any other indirect tax, including transfer tax, duties, levies and customs, shall be borne by IASO.

(c) If any taxes are required by Applicable Law to be withheld by Cabaletta in respect of any amount payable to IASO under this License Agreement, prior to making any withholding, Cabaletta will: (i) timely provide a prior written notice to IASO of the amounts subject to deduction or withholding, and the legal basis therefor; (ii) provide IASO a reasonable opportunity to furnish such forms, certificates or other items that would reduce or eliminate such deduction or withholding; (iii) deduct such withholding taxes (adjusted for any such reduction or exemption) from the payment made to IASO; (iv) timely pay such taxes to the proper taxing authority; (v) promptly send proof of payment to IASO; and (vi) reasonably assist IASO in its efforts to obtain a credit or refund for such tax payment. Each Party agrees to reasonably assist the other Party in lawfully claiming exemptions from or minimizing such deductions or withholdings under double taxation laws or similar circumstances. Notwithstanding the foregoing, if Cabaletta is required by Applicable Law to withhold taxes in respect of any amount payable to IASO under this License Agreement, and if such withholding obligation arises or is increased as a result any action by Cabaletta or its Affiliates after the Effective Date that is not required by Applicable Law, including any assignment, sublicense, change in tax residency, change in the entity making payment, failure to comply with Applicable Laws or filing or record retention requirements (each, a "**Withholding Tax Action**"), then, notwithstanding anything to the contrary herein, any such amount payable to IASO under this License Agreement shall be increased to take into account such increased withholding taxes as may be necessary so that, after making all required withholdings, IASO receives an amount equal to the sum it would have received had no such Withholding Tax Action occurred.

(d) For all tax purposes, both Parties agree to report the transactions contemplated by this License Agreement in a manner consistent with its terms and to not take any position inconsistent therewith in any tax return, refund claim, litigation, or otherwise.

9.4 Records and Audit Rights.

(a) Cabaletta shall keep complete, true and accurate books and records in accordance with its

Accounting Standards in relation to this License Agreement, including, in relation to Net Sales, royalties and Sublicensing Revenue. Cabaletta will keep such books and records for at least [***] following the Calendar Quarter to which they pertain.

(b)IASO may, upon written notice to Cabaletta, appoint an internationally-recognized independent accounting firm (which is reasonably acceptable to Cabaletta) (the “**Auditor**”) to inspect the relevant reports, statements, records or books of accounts (as applicable) of Cabaletta to verify the accuracy of any financial statement or reports hereunder, including any Sales, Royalty & Sublicensing Revenue Report. Before beginning its audit, the Auditor shall execute an undertaking acceptable to Cabaletta by which the Auditor shall keep confidential all Information reviewed during such audit. The Auditor shall have the right to disclose to IASO its conclusions regarding any payments owed under this License Agreement.

(c)Cabaletta shall make its records available for inspection by such Auditor during regular business hours at such place or places where such records are customarily kept, upon receipt of reasonable advance notice from IASO. The records shall be reviewed solely to verify the accuracy of the relevant reports and payments. Such inspection right shall not be exercised more than once in any Calendar Year and not more frequently than once with respect to records covering any specific period of time. In addition, IASO shall only be entitled to audit the relevant books and records of Cabaletta for a period of [***] after receipt of the applicable report to which such books and records pertain. All Information received and all Information learned in the course of any audit or inspection shall constitute Information of Cabaletta hereunder subject to Article 11.

(d)The Auditor shall provide its audit report and basis for any determination to Cabaletta at the time such report is provided to IASO, before it is considered final. Cabaletta shall have the right to request a further determination by such Auditor as to matters that Cabaletta disputes within [***] following receipt of such report. Cabaletta will provide IASO and the Auditor with a reasonably detailed statement of the grounds upon which it disputes any findings in the audit report and the Auditor shall undertake to complete such further determination within [***] after the dispute notice is provided, which determination shall be limited to the disputed matters. Any matter that remains unresolved shall be resolved in accordance with the dispute resolution procedures contained in Section 17.5.

(e)In the event that the final result of the inspection reveals an undisputed underpayment or overpayment by either Party, the underpaid or overpaid amount shall be settled promptly (in the case of underpayment by Cabaletta under this License Agreement, plus interest from original due date as set forth in Section 9.1(d)).

(f)IASO shall pay for such audits, as well as its own expenses associated with enforcing its rights with respect to any payments hereunder, except that in the event there is any upward adjustment in aggregate amounts payable for any year shown by such audit of more than [***] of the amount paid, Cabaletta shall pay for such audit.

10.INTELLECTUAL PROPERTY RIGHTS

10.1 Ownership of Intellectual Property.

(a)Any intellectual property related to the Licensed Intellectual Property in the Field in the Territory that is solely conceived, developed, reduced to practice or otherwise made and reduced to practice by or on behalf of one Party or its Affiliates (and not by or on behalf of the other Party or its Affiliates) (the “**Creating Party**”), whether or not patented or patentable, shall be solely owned by the Creating Party.

(b)As between the Parties, the Parties shall each own an equal, undivided interest in any and all intellectual property related to the Licensed Intellectual Property in the Field in the Territory that is conceived, discovered, developed, reduced to practice or otherwise made jointly by or on behalf of IASO or its Affiliates, on the one hand, and Cabaletta or its Affiliates, on the other hand, whether or not patented or patentable (the “**Joint Intellectual Property**”). Each Party shall promptly disclose to the other Party in writing, and shall cause its Affiliates, licensees and Sublicensees to so disclose, the development, making, conception or reduction to practice of any Joint Intellectual Property. Each Party, as joint owners, shall be entitled to practice, license, assign and otherwise exploit its interest in the Joint Intellectual Property anywhere in the world without the duty of accounting or seeking consent from the other Party; provided, that (i) neither Party may practice, license, assign and otherwise exploit its interest in the Joint Intellectual Property in a manner inconsistent with its obligations set forth in Section 2.3 and (ii) IASO may not practice, license, assign and otherwise exploit its interest in the Joint Intellectual Property with respect to the conduct of any activity that, if conducted with respect to the Licensed Intellectual Property, would be inconsistent with the rights granted to Cabaletta under Section 2.1.

(c)If Cabaletta is the Creating Party with regard to any Licensed Sequence Improvement, Cabaletta shall (and hereby does) grant to IASO a sublicensable (through multiple tiers), non- exclusive, worldwide, perpetual (except in the case of termination by Cabaletta pursuant to Section 12.2), irrevocable (except in the case of termination by Cabaletta pursuant to Section 12.2), royalty free and fully paid license to such Licensed Sequence Improvement for use solely in connection with [***].

10.2 Ownership of Results and Data. All clinical data, results and other non-proprietary information arising from Cabaletta’s, its Affiliates and Sublicensee’s activities under this License Agreement shall be owned by Cabaletta.

10.3 Patent Prosecution.

(a)IASO will have the first right to file, prosecute and maintain the patents and patent applications under the Licensed Patents and the Joint Intellectual Property in the Territory at its own cost and expense. IASO will keep Cabaletta reasonably informed of the status of such Licensed Patents and the patents and patent applications under the Joint Intellectual Property in the Territory and, prior to making any material filings or submissions to any Governmental Authority with respect to Licensed Patents and the patents and patent applications under the Joint Intellectual Property in the Territory, shall provide a copy thereof to Cabaletta for its review and comment (such comments to be considered in good faith by IASO).

(b)IASO will notify Cabaletta of any decision not to file applications for, or to cease prosecution or maintenance of, or not to continue to pay the expenses of prosecution or maintenance of, any Licensed Patents and the patents and patent applications under the Joint Intellectual Property in the Territory. IASO will provide such notice at least [***] prior to any filing or payment due date, or any other due date that requires action, in connection with such Licensed Patents or the patents and patent applications under the Joint Intellectual Property. In such event, IASO shall permit Cabaletta, at its sole discretion and expense, to file or to continue prosecution or maintenance of such Licensed Patent or the patents and patent applications under the Joint Intellectual Property and Cabaletta shall have the right to deduct the amount of the documented out-of-pocket costs it incurred for doing so from future royalty payments to IASO under this License Agreement. Cabaletta’s prosecution or maintenance of such Licensed Patent or the patents and patent applications under the Joint Intellectual Property shall not change the Parties’ respective rights and obligations under this License Agreement with respect thereto other than

those expressly set forth in this [Section 10.3\(b\)](#).

10.4 Patent Enforcement and Defense.

(a) Each Party will promptly notify the other of any infringement by a Third Party of any of the Licensed Intellectual Property or the Joint Intellectual Property in the Field in the Territory of which it becomes aware, and of any request for declaratory judgment, opposition, nullity action, interference, inter-partes reexamination, inter-partes review, post-grant review, derivation proceeding, or similar action alleging the invalidity, unenforceability or non-infringement of any of the Licensed Patents (collectively “**Third Party Infringement**”).

(b) Cabaletta will have the first right to bring and control any legal action in connection with any Third Party Infringement relating to activities that would fall within the scope of Cabaletta’s exclusive license set forth in [Section 2.1](#), at its own expense as it reasonably determines appropriate, and IASO shall have the right (i) to review and comment on such activities (such comments to be considered in good faith by Cabaletta) and (ii) at IASO’s own expense, to be represented in any such action by counsel of its own choice. Cabaletta will notify IASO of any decision not to bring and control any legal action in connection with any Third Party Infringement relating to activities within the scope of Cabaletta’s exclusive license set forth in set forth in [Section 2.1](#). Cabaletta will provide such notice at least [***] prior to any filing or payment due date, or any other due date that requires action, in connection with such actions. In such event, Cabaletta shall permit IASO, at its sole discretion and expense, to bring and control any such enforcement relating to activities that would fall within the scope of Cabaletta’s exclusive license set forth in [Section 2.1](#).

(c) Each Party shall promptly, but in any event no later than [***] after receipt of notice of such application, notify the other Party if it becomes aware of any application for regulatory approval of a Biosimilar Product. Cabaletta shall take the lead and be responsible for preparing and filing any responses with any Regulatory Authority in the Territory and for negotiating any patent resolution in connection with any such application as set forth in paragraphs 2 through 6 of Section 351(l) of the United States Public Health Service Act (42 U.S.C. § 262(l)(2)-(6)), or any foreign equivalent thereof.

(d) At the reasonable request of a Party in connection with an enforcement action brought by such Party pursuant to [Section 10.4\(b\)](#) or in response to a Biosimilar Product application pursuant to [Section 10.4\(c\)](#), the other Party shall, at the enforcing Party’s cost and expense, provide reasonable assistance in connection therewith, including by executing reasonably appropriate documents, access to its premises and employees, cooperating reasonably in discovery and joining as a party to the action if required.

(e) In connection with any such proceeding, the enforcing Party shall not enter into any settlement admitting the invalidity of, or otherwise impairing the other Party’s rights in, the Licensed Patents or Joint Intellectual Property without the prior written consent of the other Party, which will not be unreasonably withheld, delayed or conditioned.

(f) Any recoveries resulting from such an action relating to a Claim of Third Party Infringement relating to activities that would fall within the scope of Cabaletta’s exclusive license set forth in [Section 2.1](#) shall be first applied against payment of each Party’s costs and expenses in connection therewith. Any remainder will be retained by (or if received by the non-enforcing Party, paid to) the enforcing Party; provided, however, that any such remainder retained by Cabaletta shall be subject to a royalty payment to IASO as if such remainder were Net Sales under this License Agreement.

(g)IASO will have the sole right to bring and control any legal action in connection with any Third Party Infringement relating to activities that would fall outside the scope of Cabaletta's exclusive license set forth in Section 2.1, at its own expense as it reasonably determines appropriate, and IASO shall have the right to retain all recoveries.

10.5 Trademarks. Cabaletta shall have the right to brand the Licensed Product(s) using Cabaletta related trademarks and any other trademarks and trade names it determines appropriate for the Licensed Product(s) in the Field in the Territory, which may vary by country or within a country ("**Product Marks**"). Cabaletta shall own all rights in Product Marks and register and maintain Product Marks in the countries and regions it determines reasonably necessary.

10.6 Patent Extensions.

(a)IASO shall in its sole discretion determine which, if any, Licensed Patents and for which product (which may or may not be a Licensed Product) it will apply to extend.

(b)If IASO determines to extend a Licensed Patent for a Licensed Product pursuant to the foregoing subsection (a), Cabaletta shall cooperate with IASO in obtaining patent term restoration (under but not limited to Drug Price Competition and Patent Term Restoration Act), supplemental protection certificates or their equivalents, and patent term extensions with respect to such Licensed Patents for such Licensed Products in any country or region where applicable as determined by IASO pursuant to the foregoing subsection (a). Cabaletta shall provide all reasonable assistance requested by IASO, including permitting IASO to proceed with applications for such in the name of Cabaletta, if deemed appropriate by IASO, and executing documents and providing any relevant information to IASO.

11. CONFIDENTIALITY

11.1 Duty of Confidence. Subject to the other provisions of this Article 11, all Information disclosed by a Party or its Affiliates under this License Agreement will be maintained in confidence and otherwise safeguarded by the recipient Party. The recipient Party may only use the Information for the purposes of this License Agreement and pursuant to the rights granted to the recipient Party under this License Agreement, which shall include, in the case of Cabaletta, the use and Development of the Licensed Product. Subject to the other provisions of this Article 11, each Party shall hold as confidential such Information of the other Party or its Affiliates in the same manner and with the same protection as such recipient Party maintains its own confidential information but no less than reasonable care. Subject to the other provisions of this Article 11, a recipient Party may only disclose Information of the other Party to employees, agents, contractors, consultants and advisers of the Party and its Affiliates and Sublicensees and to Third Parties to the extent reasonably necessary for the purposes of, and for those matters undertaken pursuant to, this License Agreement; provided, that such Persons are bound in writing to maintain the confidentiality of the Information in a manner consistent with the confidentiality provisions of this License Agreement.

11.2 Exceptions. The obligations under this Article 11 shall not apply to any information to the extent the recipient Party can demonstrate by competent evidence that such information:

(a)is (at the time of disclosure) or becomes (after the time of disclosure) known to the public or part of the public domain through no breach of this License Agreement by the recipient Party or its Affiliates;

(b)was known to, or was otherwise in the possession of, the recipient Party or its Affiliates prior to the time of disclosure by the disclosing Party or any of its Affiliates;

(c) is disclosed to the recipient Party or an Affiliate on a non-confidential basis by a Third Party who is entitled to disclose it without breaching any confidentiality obligation to the disclosing Party or any of its Affiliates; or

(d) is independently developed by or on behalf of the recipient Party or its Affiliates, as evidenced by its written records, without reference to the Information disclosed by the disclosing Party or its Affiliates under this License Agreement.

Specific aspects or details of Information shall not be deemed to be within the public domain or in the possession of the recipient Party merely because the Information is embraced by more general information in the public domain or in the possession of the recipient Party. Further, any combination of Information shall not be considered in the public domain or in the possession of the recipient Party merely because individual elements of such Information are in the public domain or in the possession of the recipient Party unless the combination and its principles are in the public domain or in the possession of the recipient Party.

11.3 Authorized Disclosures.

(a) In addition to disclosures allowed under Sections 11.1 and 11.2, each Party may disclose Information belonging to the other Party or its Affiliates to the extent such disclosure is necessary in the following instances: (i) filing or prosecuting Patent Rights as permitted by this License Agreement; (ii) in connection with Regulatory Filings for Licensed Products; (iii) prosecuting or defending litigation as permitted by this License Agreement; (iv) complying with applicable court orders or governmental regulations; (v) to the extent otherwise necessary or appropriate in connection with exercising the license and other rights granted to it hereunder; or (vi) as necessary in connection with any financing, merger, sublicensing or similar transaction, subject to confidentiality provisions substantially similar to those in this Article 11, or as necessary to obtain legal or financial advice from its attorneys, and financial advisors who have an obligation of confidentiality to the Party.

(b) In addition, Cabaletta and its Affiliates and Sublicensees may disclose Information of IASO to Third Parties as may be necessary or useful in connection with the Development, Manufacture or Commercialization of the Licensed Sequence or the Licensed Product(s) as contemplated by this License Agreement, including in connection with subcontracting transactions, subject to confidentiality provisions substantially similar to those in this Article 11.

(c) In the event the recipient Party is required to disclose Information of the disclosing Party by Applicable Law or in connection with bona fide legal process or pursuant to any regulations or rules of any stock exchange, such disclosure shall not be a breach of this License Agreement; provided, that the recipient Party (i) informs the disclosing Party as soon as reasonably practicable of the required disclosure; (ii) limits the disclosure to the required purpose; and (iii) at the disclosing Party's request and expense, assists in an attempt to object to or limit the required disclosure.

11.4 Ongoing Obligation for Confidentiality. Upon early termination of this License Agreement for any reason, each Party and its Affiliates shall immediately return to the other Party or destroy any Information disclosed by the other Party, except for one copy that may be retained in its confidential files for archive purposes.

11.5 Terms of this License Agreement. The terms of this License Agreement shall constitute Information disclosed by each Party to the other hereunder and shall be subject to the provisions of this Article 11.

12. TERM AND TERMINATION

12.1 **Term.** The term of this License Agreement will commence upon the Effective Date and continue on a country-by-country, Licensed Product-by-Licensed Product basis until the expiration of the Royalty Term, unless earlier terminated as permitted by this License Agreement.

12.2 Termination for Breach or Insolvency.

(a) If a Party is in material breach of any material obligation hereunder, the other Party may give written notice to the breaching Party specifying the claimed particulars of such breach, and in the event such material breach is not cured within [***] after such notice, the notifying Party shall have the right thereafter to terminate this License Agreement immediately by giving written notice to the breaching Party to such effect; provided, however, that if such breach is capable of being cured but cannot be cured within such [***] period and the breaching Party initiates actions to cure such breach within such period and thereafter diligently pursues such actions, the breaching Party shall have an additional period no longer than [***] to cure such breach. In the event that arbitration is commenced with respect to any alleged breach hereunder, no purported termination of this License Agreement pursuant to this Section 12.2(a) shall take effect until the resolution of such arbitration, and the period for cure of such alleged breach shall be tolled during the pendency of any dispute with respect to an alleged breach. Any termination by any Party under this Section 12.2(a) and the effects of termination provided herein shall be without prejudice to any Damages or other legal or equitable remedies to which it may be entitled.

(b) Either IASO or Cabaletta may terminate this License Agreement if an Insolvency Event occurs in relation to the other Party. In any event when a Party first becomes aware of the likely occurrence of any Insolvency Event in regard to that Party, it shall promptly so notify the other Party in sufficient time to give the other Party sufficient notice to protect its interests under this License Agreement, including Cabaletta's continued use and practice of the Licensed Intellectual Property.

(c) Cabaletta may terminate this License Agreement in its entirety or on a Licensed Product-by- Licensed Product or Region-by-Region basis in the event IASO rejects this License Agreement under Section 365 of the United States Bankruptcy Code, 11 U.S.C. §§ 101 et seq. (the "**Bankruptcy Code**") or under any similar laws in any other country in the Territory.

12.3 **Termination by Cabaletta At Will.** Cabaletta may terminate this License Agreement at will at any time after the Effective Date in its entirety or on a Licensed Product-by-Licensed Product or Region- by-Region basis at any time on [***] prior written notice.

12.4 **Termination by IASO for Cabaletta's Failure to Achieve Diligence Milestone.** IASO shall have the right to terminate this License Agreement by providing written notice to Cabaletta in the event that Cabaletta fails to achieve an applicable Diligence Milestone in Section 5.2 for a period of [***] following the applicable date of completion for such Diligence Milestone; provided, that all possible extensions, as outlined in Section 5.2, have expired or been waived by Cabaletta; provided, further, that such [***] period shall be extended to the extent any Force Majeure event, action by a Regulatory Authority or act or omission by IASO in breach of this License Agreement has delayed Cabaletta's ability to achieve the applicable Diligence Milestone.

12.5 **Termination by IASO for Cabaletta's Patent Challenge.** IASO shall have the right to terminate this License Agreement in its entirety upon written notice if Cabaletta (or any of its Affiliates or Sublicensees) commences any interference or opposition proceeding with respect to, challenges the

validity, scope or enforceability of or otherwise opposes any Licensed Patent other than as may be necessary or reasonably required to assert a cross-claim or a counter-claim or to respond to a court request or order or administrative law, request or order (“**Patent Challenge**”) and (a) in the case of a challenge brought by Cabaletta or its Affiliates, Cabaletta or its Affiliate does not withdraw such Patent Challenge within [***] after IASO provides written notice to Cabaletta indicating its intent to terminate this License Agreement if the Patent Challenge is not withdrawn or (b) in the case of a challenge brought by a Sublicensee of Cabaletta, Cabaletta does not take action to enforce the obligations of such Sublicensee under the applicable sublicense to cease such Patent Challenge, including where available, termination of such sublicense, within [***] after IASO provides written notice to Cabaletta indicating the intent to terminate this License Agreement if the Patent Challenge is not withdrawn and identifying the Sublicensee that brought forth such challenge. In the event that IASO is entitled to terminate this License Agreement in accordance with this [Section 12.5](#) but such termination is not permitted under Applicable Law, IASO may elect to not terminate this License Agreement and all outstanding amounts (e.g., any milestone payments or any royalties applicable to Net Sales of Licensed Product) to be paid by Cabaletta to IASO under this License Agreement shall be automatically increased by [***] going forward. For the avoidance of doubt, an action by Cabaletta in accordance with this License Agreement to amend claims within a pending patent application of IASO during the course of Cabaletta’s prosecution and maintenance of such pending patent application or in defense of a Third Party proceeding, or to make a negative determination of patentability of claims of a patent application of IASO or to abandon a patent application of IASO during the course of Cabaletta’s prosecution and maintenance of such pending patent application, shall not constitute a challenge under this [Section 12.5](#).

12.6 Rights in Bankruptcy.

(a) The Parties agree that this License Agreement constitutes an executory contract under Section 365 of the Bankruptcy Code for the license of “intellectual property” as defined under Section 101 of the Bankruptcy Code and constitutes a license of “intellectual property” for purposes of any similar laws in any other country in the Territory. The Parties further agree that Cabaletta, as licensee of such rights under this License Agreement, will retain and may fully exercise all of its protections, rights and elections under the Bankruptcy Code, including, but not limited to, Section 365(n) of the Bankruptcy Code, and any similar laws in any other country in the Territory. The Parties further agree that, in the event of the commencement of a bankruptcy proceeding by or against IASO under the Bankruptcy Code and any similar laws in any other country in the Territory, Cabaletta will be entitled to a complete duplicate of (or complete access to, as appropriate) Licensed Know-How, IASO CMC Data and IASO Documents and the same, if not already in its possession, will be promptly delivered to it (i) upon any such commencement of a bankruptcy proceeding upon its written request therefor, unless IASO elects to continue to perform all of its obligations under this License Agreement, or (ii) if not delivered under clause (i) above, following the rejection of this License Agreement by or on behalf of IASO upon written request therefor by Cabaletta.

(b) All rights, powers and remedies of Cabaletta provided for in this [Section 12.6](#) are in addition to and not in substitution for any and all other rights, powers and remedies now or hereafter existing at law or in equity (including under the Bankruptcy Code and any similar laws in any other country in the Territory). In the event of an Insolvency Event in relation to IASO, Cabaletta, in addition to the rights, power and remedies expressly provided herein, shall be entitled to exercise all other such rights and powers and resort to all other such remedies as may now or hereafter exist at law or in equity (including under the Bankruptcy Code). The Parties agree that they intend the following Cabaletta rights to extend to the maximum extent permitted by law, including for purposes of the Bankruptcy Code: the right of access to and the continued right to practice any Licensed Intellectual Property in the Development, Manufacture or Commercialization of the Licensed Product(s) in the Field in the Territory.

13.EFFECT OF TERMINATION

13.1 **Termination by Cabaletta for Cause.** Upon termination of this License Agreement by Cabaletta pursuant to Section 12.2:

- (a) the licenses and other rights granted by IASO to Cabaletta will terminate and revert to IASO;
- (b) the license granted by Cabaletta to IASO under Section 10.1(c) shall terminate and revert to Cabaletta, except that if IASO has already incorporated any Licensed Sequence Improvement into any product that has entered into clinical development before such termination, then IASO shall continue to have the right to use such Licensed Sequence Improvement in connection with such product (or any modification or improvement thereof) after such termination; and
- (c) Except as set forth in this Section 13.1 and in Section 13.4, the rights and obligations of the Parties hereunder shall terminate as of the date of such termination.

13.2 **Termination by IASO for Cause or Patent Challenge, or by Cabaletta At Will.** Upon termination of this License Agreement by IASO pursuant to Section 12.2 or Section 12.5, or by Cabaletta pursuant to Section 12.3:

- (a) any licenses and other rights granted by IASO to Cabaletta will terminate and revert to IASO;
- (b) the license granted by Cabaletta to IASO under Section 10.1(c) shall continue; and
- (c) Except as set forth in Section 13.4, the rights and obligations of the Parties hereunder shall terminate as of the date of such termination.

13.3 **[***] Breach.** If [***] has a right to terminate this License Agreement pursuant to Section 12.2(a) due to [***] uncured material breach of its obligations [***] may [***] the terms and conditions set forth herein, except that [***].

13.4 **Survival.** Expiration or termination of this License Agreement shall not relieve the Parties of any obligation accruing prior to such expiration or termination. Without limiting the foregoing, Article 1, Articles 9 (solely with respect to payment payable or accrued prior to expiration or termination), 10.1, 16.2, 13, 15 and 17 shall survive expiration or termination of this License Agreement, and Section 8.3(d) shall survive expiration (but not, for clarity, the earlier termination) of this License Agreement. The provisions of Article 11 shall survive the termination or expiration of this License Agreement for a period of [***].

13.5 **Termination Not Sole Remedy.** Termination is not the sole remedy under this License Agreement and, whether or not termination is affected and notwithstanding anything contained in this License Agreement to the contrary, all other remedies will remain available except as agreed to otherwise herein.

14.REPRESENTATIONS, WARRANTIES AND COVENANTS

14.1 **Representations and Warranties by Each Party.** Each Party represents and warrants to the other as of the Effective Date that:

- (a) it is a company duly organized, validly existing, and in good standing under the laws of its jurisdiction of formation;
- (b) it has full power and authority to execute, deliver, and perform this License Agreement, and has taken all action required by law and its organizational documents to authorize the execution

and delivery of this License Agreement and the consummation of the transactions contemplated by this License Agreement;

(c) this License Agreement constitutes a valid and binding agreement enforceable against it in accordance with its terms;

(d) all consents, approvals and authorizations from all Governmental Authorities or other Third Parties required to be obtained by such Party in connection with entering into this License Agreement have been obtained;

(e) the execution and delivery of this License Agreement and all other instruments and documents required to be executed pursuant to this License Agreement, and the consummation of the transactions contemplated hereby do not and shall not (i) conflict with or result in a breach of any provision of its organizational documents, (ii) result in a breach of any agreement to which it is a party; or (iii) violate any Applicable Law;

(f) (i) neither such Party nor, to the actual knowledge of such Party, any employee, agent or subcontractor of such Party involved or to be involved in the Development of the Licensed Sequence or the Licensed Product(s) has been debarred under Subsection (a) or (b) of Section 306 of the United States Federal Food, Drug and Cosmetic Act, as amended; (ii) no Person who is known by such Party to have been debarred under Subsection (a) or (b) of Section 306 of the United States Federal Food, Drug and Cosmetic Act, as amended, will be employed by such Party in the performance of any activities hereunder; and (iii) to the actual knowledge of such Party, no Person on any of the FDA clinical investigator enforcement lists (including, but not limited to, the (1) Disqualified/Totally Restricted List, (2) Restricted List and (3) Adequate Assurances List) will participate in the performance of any activities hereunder; and

(g) all of its employees, officers, and consultants have executed agreements or have existing obligations under Applicable Law requiring assignment to it of all inventions made during the course of and as the result of their association with it and obligating the individual to maintain as confidential its Information as well as confidential information of other parties (including the other Party and its Affiliates) that such individual may receive, to the extent required to support its obligations under this License Agreement.

14.2 Representations and Warranties by IASO. IASO represents and warrants to Cabaletta as of the Effective Date that:

(a) **Exhibit A** sets forth a complete and accurate list of all Licensed Patents in existence as of the Effective Date;

(b) IASO (or its Affiliates) is the sole and exclusive owner of all of the Licensed Patents free from Encumbrances and is listed in the records of the appropriate Governmental Authorities as the sole and exclusive owner of record for each registration, grant and application included in the Licensed Patents;

(c) IASO (or its Affiliates) has obtained from all individuals who participated in any respect in the invention or authorship of any Licensed Intellectual Property effective assignments of all ownership rights of such individuals in such Licensed Intellectual Property, either pursuant to written agreement or by operation of law;

(d) IASO has the right to grant to Cabaletta the licenses under the Licensed Patents and Licensed Know-How that it purports to grant hereunder;

(e)IASO has the right to disclose to Cabaletta, and to grant Cabaletta the right to use and disclose (in each case under appropriate conditions of confidentiality), the Licensed Know-How, IASO CMC Data, and IASO Documents, in each case, free from Encumbrances in accordance with the terms and conditions of this License Agreement;

(f)to the actual knowledge of IASO, there are no Claims, challenges, oppositions, nullity actions, interferences, inter-partes reexaminations, inter-partes reviews, post-grant reviews, derivation proceedings, or other proceedings regarding any Licensed Patent pending or threatened in writing against IASO, and IASO has filed and prosecuted patent applications within the Licensed Patents in good faith and complied with all duties of disclosure with respect thereto;

(g)to IASO's actual knowledge, IASO has not committed any act, or omitted to commit any act, that would reasonably be expected to cause the Licensed Patents to expire prematurely or be declared invalid or unenforceable;

(h)all application, registration, maintenance and renewal fees in respect of the Licensed Patents as of the Effective Date have been paid and all necessary documents and certificates required by Applicable Law have been filed with the relevant agencies for the purpose of maintaining the Licensed Patents;

(i)IASO has not granted to any Third Party, including any academic organization or agency, any rights to the Licensed Sequence that would otherwise conflict or be inconsistent with the license granted by IASO to Cabaletta hereunder;

(j)to IASO's actual knowledge, the use of the Licensed Sequence in accordance with this License Agreement itself does not infringe the Patent Rights or misappropriate the Know-How of any Third Party, nor has IASO received any written notice alleging such infringement or misappropriation;

(k)IASO has not initiated or been involved in any proceedings or other Claims in which it alleges that any Third Party is or was infringing or misappropriating any Licensed Intellectual Property, nor have any such proceedings been threatened by IASO;

(l)IASO has not entered into a government funding relationship that would result in rights to any Licensed Sequence or Licensed Product residing in the United States Government, National Institutes of Health, National Institute for Drug Abuse or other agency, and the licenses granted hereunder are not subject to overriding obligations to the United States Government as set forth in Public Law 96 517 (35 U.S.C. 200 204), as amended, or any similar obligations under the laws of any other country with respect to other Governmental Authorities; and

(m)IASO has not granted to any Third Party any rights under Licensed Intellectual Property that would otherwise conflict or be inconsistent with the license granted by IASO to Cabaletta hereunder, and there are no agreements or arrangements to which IASO or any of its Affiliates is a party relating to the Licensed Product(s), Licensed Sequence, Licensed Patents, Licensed Know-How, IASO CMC Data or IASO Documents, in each case, that would limit the rights granted to Cabaletta under this License Agreement.

14.3 Covenants of IASO. IASO covenants and agrees that:

(a)it will not grant any interest in the Licensed Patents or Licensed Know-How that is inconsistent with the terms and conditions of this License Agreement, nor shall IASO assign its right, title or interest in or to the Licensed Patents or Licensed Know-How to any Third Party in a manner that is inconsistent with the license granted to Cabaletta under this License Agreement; and

(b)if, at any time after execution of this License Agreement, it becomes aware that it or any employee, agent or subcontractor of IASO who participated, or is participating, in the performance of any activities hereunder is on, or is being added to the FDA Debarment List or any of the three (3) FDA Clinical Investigator Restriction Lists referenced in Section 14.1(f), it will provide written notice of this to Cabaletta within [***] of its becoming aware of this fact.

14.4Covenants of Cabaletta. Cabaletta covenants and agrees that:

(a)if, at any time after execution of this License Agreement, it becomes aware that it or any employee, agent or subcontractor of Cabaletta who participated, or is participating, in the performance of any activities hereunder is on, or is being added to the FDA Debarment List or any of the three (3) FDA Clinical Investigator Restriction Lists referenced in Section 14.1(f), it will provide written notice of this to IASO within [***] of its becoming aware of this fact.

14.5No Other Warranties. EXCEPT AS EXPRESSLY STATED IN THIS ARTICLE 14, (A) NO REPRESENTATION, CONDITION OR WARRANTY WHATSOEVER IS MADE OR GIVEN BY OR ON BEHALF OF CABALETTA OR IASO; AND (B) ALL OTHER CONDITIONS AND WARRANTIES WHETHER ARISING BY OPERATION OF LAW OR OTHERWISE ARE HEREBY EXPRESSLY EXCLUDED, INCLUDING ANY CONDITIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT.

15.INDEMNIFICATION; LIABILITY

15.1Indemnification by IASO. IASO shall indemnify, defend and hold Cabaletta, its Affiliates, its Sublicensees and their respective officers, directors, employees and agents (“**Cabaletta Indemnitees**”) harmless from and against Damages arising out of or resulting from any Claims of Third Parties against them to the extent arising or resulting from:

(a)the negligence or willful misconduct of IASO or any of its Affiliates; or

(b)the breach of any of the covenants, agreements, warranties or representations made by IASO to Cabaletta under this License Agreement;

provided, however, that IASO shall not be obliged to so indemnify, defend and hold harmless the Cabaletta Indemnitees for any Claims for which Cabaletta has an obligation to indemnify IASO Indemnitees pursuant to Section 15.2 or to the extent that such Claims arise from the breach, negligence or willful misconduct of Cabaletta or the Cabaletta Indemnitee.

15.2Indemnification by Cabaletta. Cabaletta shall indemnify, defend and hold IASO, its Affiliates, and their respective officers, directors, employees and agents (“**IASO Indemnitees**”) harmless from and against Damages arising out of or resulting from any Claims of Third Parties against them to the extent arising or resulting from:

(a)the Exploitation of the Licensed Sequence or any Licensed Product by or on behalf of Cabaletta or any of its Affiliates or Sublicensees;

(b)the negligence or willful misconduct of Cabaletta or any of its Affiliates; or

(c)the breach of any of the covenants, agreements, warranties or representations made by Cabaletta to IASO under this License Agreement;

provided, however, that Cabaletta shall not be obliged to so indemnify, defend and hold harmless the

IASO Indemnitees for any Claims for which IASO has an obligation to indemnify Cabaletta Indemnitees pursuant to Section 15.1 or to the extent that such Claims arise from the breach, negligence or willful misconduct of IASO or the IASO Indemnitee.

15.3 Indemnification Procedure.

(a) For the avoidance of doubt, all indemnification claims in respect of a Cabaletta Indemnitee or IASO Indemnitee shall be made solely by Cabaletta or IASO, respectively.

(b) A Party seeking indemnification hereunder (“**Indemnified Party**”) shall notify the other Party (“**Indemnifying Party**”) in writing reasonably promptly after the assertion against the Indemnified Party of any Claim or fact in respect of which the Indemnified Party intends to base a claim for indemnification hereunder (“**Indemnification Claim Notice**”), but the failure or delay to so notify the Indemnifying Party shall not relieve the Indemnifying Party of any obligation or liability that it may have to the Indemnified Party, except to the extent that the Indemnifying Party demonstrates that its ability to defend or resolve such Claim is adversely affected thereby. The Indemnification Claim Notice shall contain a description of the Claim and the nature and amount of the Claim (to the extent that the nature and amount of such Claim is known at such time). Upon the request of the Indemnifying Party, the Indemnified Party shall furnish promptly to the Indemnifying Party copies of all correspondence, communications and official documents (including court documents) received or sent in respect of such Claim.

(c) Subject to the provisions of Sections 15.3(d) and 15.3(e), the Indemnifying Party shall have the right, upon written notice given to the Indemnified Party within [***] after receipt of the Indemnification Claim Notice to assume the defense and handling of such Claim, at the Indemnifying Party’s sole expense, in which case the provisions of Section 15.3(d) shall govern. The assumption of the defense of a Claim by the Indemnifying Party shall not be construed as acknowledgement that the Indemnifying Party is liable to indemnify any Indemnified Party in respect of the Claim, nor shall it constitute a waiver by the Indemnifying Party of any defenses it may assert against any Indemnified Party’s claim for indemnification. In the event that it is ultimately decided that the Indemnifying Party is not obligated to indemnify or hold an Indemnified Party harmless from and against the Claim, the Indemnified Party shall reimburse the Indemnifying Party for any and all costs and expenses (including attorneys’ fees and costs of suit) and any losses incurred by the Indemnifying Party in its defense of the Claim. If the Indemnifying Party does not give written notice to the Indemnified Party, within [***] after receipt of the Indemnification Claim Notice, of the Indemnifying Party’s election to assume the defense and handling of such Claim, the provisions of Section 15.3(e) shall govern.

(d) Upon assumption of the defense of a Claim by the Indemnifying Party: (i) the Indemnifying Party shall have the right to and shall assume sole control and responsibility for dealing with the Claim; (ii) the Indemnifying Party may, at its own cost, appoint as counsel in connection with conducting the defense and handling of such Claim any law firm or counsel reasonably selected by the Indemnifying Party; (iii) the Indemnifying Party shall keep the Indemnified Party informed of the status of such Claim; and (iv) the Indemnifying Party shall have the right to settle the Claim on any terms the Indemnifying Party chooses; provided, however, that it shall not, without the prior written consent of the Indemnified Party, agree to a settlement of any Claim that could lead to liability or create any financial or other obligation on the part of the Indemnified Party for which the Indemnified Party is not entitled to indemnification hereunder or that admits any wrongdoing or responsibility for the Claim on behalf of the Indemnified Party. The Indemnified Party shall reasonably cooperate with the Indemnifying Party and shall be entitled to participate in, but not control, the defense of such Claim with its own counsel and at its own expense. In particular, the Indemnified Party shall furnish such

records, information and testimony, provide witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith. Such cooperation shall include access during normal business hours by the Indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Claim, and making the Indemnified Party, the Indemnified Parties and its and their employees and agents available on a mutually convenient basis to provide additional information and explanation of any records or information provided.

(e) If the Indemnifying Party does not give written notice to the Indemnified Party as set forth in Section 15.3(c) or fails to conduct the defense and handling of any Claim in good faith after having assumed such Claim, the Indemnified Party may, at the Indemnifying Party's expense, select counsel reasonably acceptable to the Indemnifying Party in connection with conducting the defense and handling of such Claim and defend or handle such Claim in such manner as it may deem appropriate. In such event, the Indemnified Party shall keep the Indemnifying Party timely apprised of the status of such Claim and shall not settle such Claim without the prior written consent of the Indemnifying Party, which consent shall not be unreasonably withheld. If the Indemnified Party defends or handles such Claim, the Indemnifying Party shall cooperate with the Indemnified Party, at the Indemnified Party's request but at no expense to the Indemnified Party, and shall be entitled to participate in the defense and handling of such Claim with its own counsel and at its own expense.

15.4 Mitigation of Loss. Each Indemnified Party will take all such reasonable steps and actions as are necessary or as the Indemnifying Party may reasonably require in order to mitigate any Claims (or potential Damages) under this Article 15. Nothing in this License Agreement shall or shall be deemed to relieve any Party of any common law or other duty to mitigate any losses incurred by it.

15.5 Limitation of Liability. NEITHER PARTY NOR ANY OF ITS AFFILIATES SHALL BE LIABLE IN CONTRACT, TORT, NEGLIGENCE BREACH OF STATUTORY DUTY OR OTHERWISE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OR FOR ANY ECONOMIC LOSS OR LOSS OF PROFITS SUFFERED BY THE OTHER PARTY. NOTHING IN THIS SECTION 15.5 IS INTENDED TO OR SHALL LIMIT OR RESTRICT (A) ANY SUCH DAMAGES REQUIRED TO BE PAID TO A THIRD PARTY AS PART OF A CLAIM FOR WHICH A PARTY PROVIDES INDEMNIFICATION UNDER THIS ARTICLE 15 OR (B) ANY DAMAGES AVAILABLE FOR A PARTY'S BREACH OF SECTION 2.3 (NON-COMPETE), OR ARTICLE 11 (CONFIDENTIALITY).

15.6 No Exclusion. Neither Party excludes any liability for death or personal injury caused by its negligence or that of its employees, agents or sub-contractors.

16. PUBLICATIONS AND PUBLICITY

16.1 Publications.

(a) Each Party may issue a press release after the Effective Date, subject to the consent of the other Party (not to be unreasonably withheld, delayed or conditioned). In all other cases, subject to this Article 16, IASO agrees not to, and agrees to cause its Affiliates not to, issue any press release or other public statement disclosing any information relating to this License Agreement, the activities hereunder, or the transactions contemplated hereby, unless such press release or other public statement is approved by Cabaletta in writing (not to be unreasonably withheld, delayed or conditioned) or the information relating to this License Agreement contained in such press release or other public statement has already been publicly disclosed; provided, that the foregoing shall not apply to any public disclosure required by law or governmental regulation or by the rules of any recognized stock exchange (in each case, as solely and to the extent

IASO's counsel determines such disclosure is required); provided, further, that in each such case, IASO will use reasonable efforts to afford Cabaletta a reasonable period of time to review any such disclosure and consider in good faith any comments made by Cabaletta.

(b)For the avoidance of doubt, Cabaletta or any of its Affiliates may, without any required consents from IASO (i) issue press releases and other public statements as it deems appropriate in connection with the research, Development, Manufacture and Commercialization of the Licensed Product(s) under this License Agreement; and (ii) publish or have published information about clinical trials related to the Licensed Product(s), including the results of such clinical trials; provided, that, in each case of (i) and (ii), such disclosure does not contain any Information of IASO.

16.2 Publicity.

(a)Except as otherwise expressly set forth herein, neither Party shall use the name, symbol, trademark, trade name or logo of the other Party or its Affiliates in any press release, publication or other form of public disclosure without the prior written consent of the other Party in each instance, except for those disclosures for which consent has already been obtained or as may be required by Applicable Law, including the rules of any securities exchange or market on which a Party's securities are listed or traded. Notwithstanding the foregoing, Cabaletta shall be entitled to use the name of IASO to identify IASO as its licensor of the Licensed Sequence to the extent necessary or useful in connection with the research, Development or Manufacture of the Licensed Product(s), including in connection with sublicensing and subcontracting transactions.

(b)Except as set forth in Section 16.1(a), each Party agrees not to issue any press release or other public statement, whether oral or written, disclosing the existence of this License Agreement, the terms hereof or any information relating to this License Agreement without the prior written consent of the other Party; provided, however, that Cabaletta may issue press releases and other public statements as it deems appropriate in connection with the Development, Manufacture and Commercialization of Licensed Products under this License Agreement; provided, that such press releases and other public statements do not contain any Information of IASO.

(c)Notwithstanding anything herein to the contrary, each Party may make any disclosures required of it to comply with any duty of disclosure it may have pursuant to Applicable Law or governmental regulation or pursuant to the rules of any recognized stock exchange. In the event of a disclosure required by Applicable Law, governmental regulation or the rules of any recognized stock exchange, the Parties shall coordinate with each other with respect to the timing, form and content of such required disclosure; provided, that, each Party shall consider any comments made by the other Party in good faith. If so requested by the other Party, the Party subject to such obligation shall use Commercially Reasonable Efforts to obtain an order protecting to the maximum extent possible the confidentiality of such provisions of this License Agreement as reasonably requested by the other Party. If the Parties are unable to agree on the form or content of any required disclosure, such disclosure shall be limited to the minimum required as determined by the disclosing Party in consultation with its legal counsel. Without limiting the foregoing, each Party shall consult with the other Party on the provisions of this License Agreement, together with exhibits or other attachments attached hereto, to be redacted in any filings made by IASO or Cabaletta with the U.S. Securities and Exchange Commission (or other regulatory body) or as otherwise required by law.

17. GENERAL PROVISIONS

17.1 **Assignment.** Neither Party may assign its rights and obligations under this License Agreement without

the other Party's prior written consent, except that each Party may (a) assign its rights and obligations under this License Agreement or any part hereof to one or more of its Affiliates; or (b) assign this License Agreement in its entirety to a successor to all or substantially all of its business or assets to which this License Agreement relates. Any permitted assignee will assume all obligations of its assignor under this License Agreement (or related to the assigned portion in case of a partial assignment). Any attempted assignment in contravention of the foregoing will be void. Subject to the terms of this License Agreement, this License Agreement will be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns.

17.2 Extension to Affiliates. Cabaletta shall have the right to extend the rights, immunities and obligations granted in this License Agreement to one or more of its Affiliates. All applicable terms and provisions of this License Agreement shall apply to any such Affiliate to which this License Agreement has been extended to the same extent as such terms and provisions apply to Cabaletta. Cabaletta shall remain primarily liable for any acts or omissions of its Affiliates.

17.3 Severability. Should one or more of the provisions of this License Agreement become void or unenforceable as a matter of law, then this License Agreement shall be construed as if such provision were not contained herein and the remainder of this License Agreement shall be in full force and effect, and the Parties will use their Commercially Reasonable Efforts to substitute for the invalid or unenforceable provision a valid and enforceable provision that conforms as nearly as possible with the original intent of the Parties.

17.4 Governing Law. This License Agreement shall be governed by and construed under the laws of the State of New York, without giving effect to the conflicts of laws provision thereof. The United Nations Convention on Contracts for the International Sale of Goods (1980) shall not apply to the interpretation of this License Agreement. Notwithstanding anything to the contrary herein, the interpretation and construction of any Patent Rights shall be governed in accordance with the laws of the jurisdiction in which such Patent Rights were filed or granted, as the case may be.

17.5 Dispute Resolution.

(a) In the event of a dispute under this License Agreement, the Parties will refer the dispute to the Alliance Managers for discussion and resolution. If the Alliance Managers are unable to resolve such a dispute within [***] of the dispute being referred to them, either Party may require that the Parties forward the matter to the Senior Officers (or designees with similar authority to resolve such dispute), who shall attempt in good faith to resolve such dispute. If the Senior Officers cannot resolve such dispute within [***] of the matter being referred to them, either Party shall be free to initiate the arbitration proceedings outlined in Section 17.5(b).

(b) All unresolved disputes arising out of or in connection with this License Agreement shall be finally settled under the Rules of Arbitration of [***]. The place of arbitration shall be [***], and the language of the proceedings shall be English. The arbitration will be conducted by a panel of three arbitrators appointed in accordance with [***] rules; provided, that each Party shall within [***] after the institution of the arbitration proceedings appoint an arbitrator, and such arbitrators shall together, within [***], select a third arbitrator as the chairman of the arbitration panel, each arbitrator shall have significant experience in the pharmaceutical business. If the two initial arbitrators are unable to select a third arbitrator within such [***] period, the third arbitrator shall be appointed in accordance with [***] rules. The arbitrators shall render their opinion within [***] of the final arbitration hearing. No arbitrator (nor the panel of arbitrators) shall have the power to award punitive damages under this License Agreement and such award is expressly prohibited. Decisions of the panel of arbitrators shall be final and binding on the Parties. Judgment on the award so rendered may be entered in any court of competent jurisdiction.

17.6**Force Majeure.** In the event that either Party is prevented from performing its obligations under this License Agreement as a result of any contingency beyond its reasonable control, including war, terrorism, hostilities between nations, civil commotions, riots, pandemic, fire, floods and acts of nature such as typhoons, hurricanes, earthquakes, or tsunamis (“**Force Majeure**”), the Party so affected shall not be responsible to the other Party for any delay or failure of performance of its obligations hereunder, for so long as Force Majeure prevents such performance. In the event of Force Majeure, the Party immediately affected thereby shall give prompt written notice to the other Party specifying the Force Majeure event complained of, and shall use Commercially Reasonable Efforts to resume performance of its obligations.

17.7**Waivers and Amendments.** The failure of a Party to assert a right hereunder or to insist upon compliance with any term or condition of this License Agreement shall not constitute a waiver of that right or excuse a similar subsequent failure to perform any such term or condition by the other Party. No waiver shall be effective unless it has been given in writing and signed by the Party giving such waiver. No provision of this License Agreement may be amended or modified other than by a written document signed by authorized representatives of each Party.

17.8**Relationship of the Parties.** Nothing contained in this License Agreement shall be deemed to constitute a partnership, joint venture, or legal entity of any type between IASO and Cabaletta, or to constitute one as the agent of the other. Moreover, each Party agrees not to construe this License Agreement, or any of the transactions contemplated hereby, as a partnership for any tax purposes. Each Party shall act solely as an independent contractor, and nothing in this License Agreement shall be construed to give any Party the power or authority to act for, bind, or commit the other.

17.9**Notices.** All notices, consents, waivers, and other communications under this License Agreement must be in writing and will be deemed to have been duly given when: (a) delivered by hand or by overnight courier with tracking capabilities, or (b) mailed postage prepaid by first class, registered, or certified mail, in each case with a courtesy copy (which shall not constitute notice) provided via email, addressed as set forth below (or to such other addresses as a Party may designate by notice):

If to IASO:

[***]

with a copy to (which shall not constitute notice):

[***]

If to Cabaletta:

[***]

with a copy to (which shall not constitute notice):

[***]

17.10**Further Assurances.** Cabaletta and IASO hereby covenant and agree without the necessity of any further consideration, to execute, acknowledge and deliver any and all such other documents and take any such other action as may be reasonably necessary to carry out the intent and purposes of this License Agreement.

17.11**Compliance with Law.** Each Party shall perform its obligations under this License Agreement in accordance with all Applicable Laws. No Party shall, or shall be required to, undertake any activity under or in connection with this License Agreement that violates, or that it believes, in good faith, may violate, any Applicable Law.

17.12**No Third Party Beneficiary Rights.** The provisions of this License Agreement are for the sole benefit of the Parties and their successors and permitted assigns, and they shall not be construed as conferring any rights to any Third Party (including any third party beneficiary rights).

17.13**English Language.** This License Agreement is written and executed in the English language. Any translation into any other language shall not be an official version of this License Agreement and in the event of any conflict in interpretation between the English version and such translation, the English version shall prevail.

17.14**Expenses.** Except as otherwise expressly provided in this License Agreement, each Party shall pay the fees and expenses of its respective lawyers and other experts and all other expenses and costs incurred by such Party incidental to the negotiation, preparation, execution, delivery and performance of this License Agreement.

17.15**Entire Agreement.** This License Agreement, together with its Exhibits, sets forth the entire agreement and understanding of the Parties as to the subject matter hereof and supersedes all agreements (including the Existing Confidentiality Agreement and Material Transfer Agreement), proposals, oral or written, and all other prior communications between the Parties with respect to such subject matter. In the event of any conflict between a substantive provision of this License Agreement and any Exhibit hereto, the substantive provisions of this License Agreement shall prevail.

17.16**Counterparts.** This License Agreement may be executed in separate counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Signature pages of this License Agreement may be exchanged by email/pdf or other electronic means without affecting the validity thereof. The Parties may use electronic signatures.

17.17**Cumulative Remedies.** No remedy referred to in this License Agreement is intended to be exclusive, but each shall be cumulative and in addition to any other remedy referred to in this License Agreement or otherwise available under law.

[Signature Page Follows]

IN WITNESS WHEREOF, the Parties intending to be bound have caused this Exclusive License Agreement to be executed by their duly authorized representatives.

Cabaletta Bio, Inc.

Nanjing IASO Biotherapeutics Co., Ltd.

By: /s/ Steven Nichtberger

By: /s/ Wen (Maxwell) Wang

Name: Steven Nichtberger, M.D.

Name: Wen (Maxwell) Wang

Title: Chairman and CEO

Title: CEO

[Signature Page to Exclusive License Agreement]

EXHIBIT A

LICENSED PATENTS

[*]**

EXHIBIT B

LICENSED SEQUENCE

[*]**

EXHIBIT C

IASO DOCUMENTS

[*]**

EXHIBIT D

IASO CMC DATA

[*]**

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Steven Nichtberger, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Cabaletta Bio, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 10, 2022

By:

/s/ Steven Nichtberger
Steven Nichtberger
Chief Executive Officer and President
(Principal Executive Officer)

**CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Anup Marda, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Cabaletta Bio, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 10, 2022

By:

/s/ Anup Marda
Anup Marda

**Chief Financial Officer
(Principal Financial and Accounting Officer)**

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report of Cabaletta Bio, Inc. (the "Company") on Form 10-Q for the fiscal quarter ended September 30, 2022, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

- (1)The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2)The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: November 10, 2022

By:

/s/ Steven Nichtberger
Steven Nichtberger
Chief Executive Officer and President
(Principal Executive Officer)

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report of Cabaletta Bio, Inc. (the "Company") on Form 10-Q for the fiscal quarter ended September 30, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1)The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2)The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

Date: November 10, 2022

By:

/s/Anup Marda
Anup Marda
Chief Financial Officer
(Principal Financial and Accounting Officer)
