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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2024

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: 001-36296

Carisma Therapeutics Inc.

(Exact Name of Registrant as Specified in its Charter)

Delaware	**26-2025616**
(State or other jurisdiction of incorporation or organization)	(IRS Employer Identification No.)
3675 Market Street, Suite 401 Philadelphia, PA	**19104**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (267) 491-6422

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

Title of each class	Trading Symbol(s)	Name of exchange on which registered
Common Stock, $0.001 par value per share	**CARM**	**The Nasdaq Stock Market LLC**

Securities registered pursuant to Section 12(g) of the Act: **None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒.

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒.

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, a 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	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to § 240.10D-1(b). ☐

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates based on the closing sale price as reported on The Nasdaq Stock Market LLC, as of the last business day of the registrant's most recently completed second fiscal quarter, June 28, 2024, was $53,095,128.

The registrant had 41,788,096 shares of common stock, $0.001 par value per share, outstanding as of March 26, 2025.

The registrant intends to file a definitive proxy statement pursuant to Regulation 14A within 120 days of the end of the fiscal year ended December 31, 2024. Portions of such definitive proxy statement are incorporated by reference into Part III of this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K 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 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 Annual Report on Form 10-K may include, but are not limited to, statements about:

- our ability to identify, evaluate and execute a strategic transaction;
- our ability to preserve our existing cash resources so that we may pursue an orderly wind down of our operations;
- our ability to successfully execute a planned orderly wind down;
- our expectations regarding the value or recovery that may be available to our stockholders and other stakeholders in connection with a potential strategic transaction or as part of a wind down process;
- our ability to obtain additional financing;
- our ability to continue as a going concern;
- the potential benefits and advantages of our platform technology, CT-2401, our pre-clinical stage product candidate targeting liver fibrosis and CT-1119, our product candidate targeting mesothelin-positive solid tumors;
- our potential to receive future milestones and royalty payments under our collaboration with ModernaTX, Inc., or Moderna or to realize value from such collaboration;
- our ability to resume research and development activities if we were to execute a strategic transaction or obtain significant additional funding;
- if we were to resume research and development activities, our ability to conduct discovery and pre-clinical testing of product candidates, and initiate, enroll patients in and complete clinical trials of product candidates;
- our ability to replicate in any such later clinical trials positive results found in pre-clinical studies and early-stage clinical trials of our product candidates;
- our ability to enter into and realize the anticipated benefits of our research and development programs, strategic partnerships, research and licensing programs and academic and other collaborations;
- if we were to resume research and development activities, the timing of applying for and receiving, and our ability to maintain, marketing approvals from applicable regulatory authorities for our product candidates;
- our ability to obtain and maintain intellectual property protection and regulatory exclusivity for our product candidates;
- acceptance of product candidates, if approved, by patients, the medical community, and third-party payors;
- our expectations regarding our ability to fund our operating expenses and capital expenditure requirements with our cash and cash equivalents;
- our estimates regarding the potential market opportunity for our product candidates;
- the potential impact of public health epidemics or pandemics and of global economic developments on our business, operations, strategy and goals;
- our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
- our competitive position;
- our ability to maintain compliance with Nasdaq listing standards;
- the impact of government laws and regulations;
- political and economic developments; and
- such other matters as discussed on this Annual Report on Form 10-K, including Part I, Item 1A, "Risk Factors."

In some cases, forward-looking statements can be identified by terminology such as "aim," "anticipate," "believe," "estimate," "expect," "intend," "may," "might," "plan," "predict," "project," "target," "potential," "goals," "will," "would," "could," "should," "continue" or the negative of these terms or other comparable terminology, although not all forward-looking statements contain these words. These statements are only predictions. You should not place undue reliance on forward-looking statements because they involve known and unknown risks, uncertainties, and other factors, which are, in some cases, beyond our control and which could materially affect results. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under the section titled "Risk Factors" and

elsewhere in this Annual Report on Form 10-K. If one or more of these risks or uncertainties occur, or if our underlying assumptions prove to be incorrect, actual events or results may vary significantly from those expressed or implied by the forward-looking statements. No forward-looking statement is a promise or a guarantee of future performance.

You should read this Annual Report on Form 10-K and the documents that we have filed as exhibits to this Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements in this Annual Report on Form 10-K represent our views as of the date of this Annual Report on Form 10-K. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should therefore not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this Annual Report on Form 10-K.

In this Annual Report on Form 10-K, unless otherwise stated or the context otherwise requires, references to the "Company," "Carisma," "we," "us," and "our" refer to Carisma Therapeutics Inc. (formerly Sesen Bio, Inc.) and its consolidated subsidiaries.

References to "Legacy Carisma" refer to CTx Operations, Inc. (formerly CARISMA Therapeutics Inc.) and references to "Sesen Bio" refer to Sesen Bio, Inc. prior to completion of the business combination on March 7, 2023 in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of September 20, 2022, as amended, by and among the Company, Legacy Carisma and Seahawk Merger Sub, Inc., a wholly owned subsidiary of the Company, pursuant to which Seahawk Merger Sub, Inc. merged with and into Legacy Carisma, with Legacy Carisma continuing as a wholly owned subsidiary of the Company and the surviving corporation of the merger, or the Merger.

Pursuant to the Merger Agreement, we changed our name from "Sesen Bio, Inc." to "Carisma Therapeutics Inc." Following the completion of the Merger, the business conducted by us became primarily the business conducted by Legacy Carisma, which is a biotechnology company dedicated to developing a differentiated and proprietary platform focused on engineered macrophages and monocytes, cells that play a crucial role in both the innate and adaptive immune response.

Part I

Item 1. Business.

Overview

We are a biotechnology company focused on applying our industry leading expertise in macrophage engineering to develop transformative therapies to treat serious diseases including liver fibrosis and cancer. We have created a comprehensive set of platform technologies to enable the therapeutic use of engineered macrophages and monocytes, which belong to a subgroup of white blood cells called myeloid cells. We seek to apply our ability to engineer macrophages and monocytes, either *in vivo* or *ex vivo*, using approaches and delivery systems most appropriate to each specific indication, to meaningfully alter the course of the disease. Our proprietary CAR-M platform uses chimeric antigen receptors, or CARs, to redirect macrophages or monocytes against specific tumor associated antigens with the goal of targeted anti-tumor immunity.

On March 7, 2023, we completed a business combination in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of September 20, 2022, pursuant to which the Merger was consummated. Pursuant to the Merger Agreement, we changed our name from "Sesen Bio, Inc." to "Carisma Therapeutics Inc." Following the completion of the Merger, our business became primarily the business conducted by Legacy Carisma.

2024 Revised Operating Plan

In March 2024, following a strategic review of our operating plan for 2024 and future periods, we approved a revised operating plan intended to balance value creation and expense management with our available cash resources. The objective of our revised operating plan was to focus our clinical development efforts on high potential value programs with meaningful near-term milestones and eliminate non-essential expenses and headcount to extend our cash runway. Under that plan, we intended to focus our *ex vivo* oncology clinical development efforts on our follow-on product candidate CT-0525, a CAR-Monocyte intended to treat solid tumors that over-express human epidermal growth factor receptor 2, or HER2 and cease development of CT-0508, our macrophage-based product candidate, and initial lead product candidate. In addition, at that time, we decided to continue to focus on our *in vivo* mRNA/lipid nanoparticle, or LNP, CAR-M programs in partnership with Moderna and pause development of CT-1119, amesothelin-targeted CAR-Monocyte, pending additional financing, reduce our workforce and decrease spending on other non-essential activities. All clinical activities of CT-0508 have ceased.

In December 2024, following a strategic review of our operating plan for 2025 and our future pipeline, we approved another revised operating plan intended to reduce monthly operating expenses, conserve cash, and refocus our efforts on strategic priorities. First, we decided to cease development of our HER2 directed autologous cell therapy platform including CT-0525. Our decision was based on an assessment of the competitive landscape in anti-HER2 treatments, including the impact of recently approved anti-HER2 therapies on HER2 antigen loss/downregulation, and the effects on the future development strategy of any anti-HER2 product. We dosed the last patient in our Phase 1 clinical trial of CT-0525 in November 2024 and all clinical activity ended in January 2025.

Further pursuant to the December 2024 revised operating plan, we pivoted our focus to developing product candidates targeting two indications – liver fibrosis and solid tumor oncology, while retaining the potential to receive milestones and royalties from our collaboration with Moderna.

Recent Developments - 2025 Cash Preservation Plan

As part of a further revised plan approved by our board of directors on March 25, 2025 to preserve our existing cash resources following our reduction in workforce, or our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction. We currently have no intention of resuming research and development activities. Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. As

part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations.

We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to work with this advisor on identifying and evaluating potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

Our Product Candidates and Pipeline

Our liver fibrosis program is based upon the discovery of a key efferocytosis defect in the macrophages that reside within the livers of patients with fibrosis. Using a novel mRNA LNP approach, our product candidate aims to reverse fibrotic disease and improve the outcomes of patients with advanced liver fibrosis. In the second quarter of 2024, we achieved pre-clinical proof of concept in our liver fibrosis program, demonstrating the anti-fibrotic potential of engineered macrophages in two liver fibrosis models. Prior to pausing our research and development activities, we planned to continue to conduct pre-clinical development of our product candidate, CT-2401, sufficient to enable a regulatory submission to initiate a clinical trial.

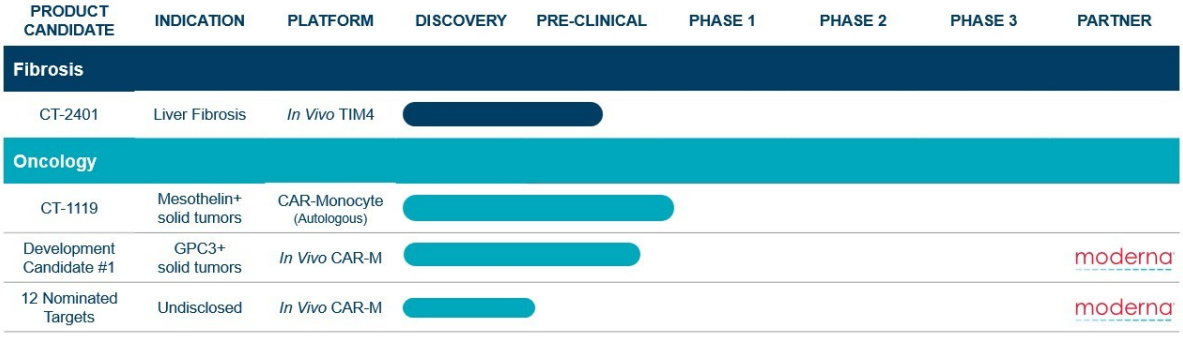
Our oncology program leverages our considerable expertise and experience in *ex vivo* cell therapy. CT-1119 is designed to treat patients with advanced mesothelin-positive solid tumors, including pancreatic cancer, ovarian cancer, lung cancer, mesothelioma, and others. Prior to pausing our research and development activities, we planned to initiate a Phase 1 clinical trial of CT-1119, a mesothelin-targeted CAR-Monocyte, in combination with tislelizumab, an anti-PD-1 antibody, in adult patients with mesothelin-positive solid tumors in China.

Our collaboration with Moderna utilizes Moderna's mRNA/LNP technology, together with our CAR-M platform technology, to create novel *in vivo* oncology off-the-shelf gene therapy product candidates. In June 2024, we announced that Moderna nominated the first development candidate under the collaboration and paid us a $2.0 million milestone. This development candidate targets Glypican-3, or GPC3, and is designed to treat solid tumors, including hepatocellular carcinoma. In November 2024, we announced new pre-clinical data on our anti-GPC3 *in vivo* CAR-M therapy for treating hepatocellular carcinoma. These pre-clinical data demonstrated robust anti-tumor activity. In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration for which we have the potential to receive future milestones and royalty payments. We will not be conduct any additional research activities under the collaboration agreement and we will not be receiving any further research funding from Moderna under the collaboration agreement. Moderna also agreed to terminate the *in-vivo* oncology field exclusivity, which would allow us to pursue *in vivo* CAR-M programs, outside of the 12 nominated oncology targets and product polypeptides.

Our Product Candidates and Discovery Programs

Using our industry leading expertise and proprietary technology in macrophage and monocyte engineering, we have developed a pipeline of product candidates, with a focus on liver fibrosis and solid tumor oncology. Our fibrosis and *ex*

vivo oncology programs are wholly owned while the *in vivo* CAR-M therapies are being developed by Moderna under our collaboration agreement . Our current pipeline is summarized below:



Liver Fibrosis

Our product candidate for liver fibrosis, CT-2401, is based upon the discovery of a key defect in the macrophages that reside within the livers of patients with fibrosis. Working in collaboration with researchers at Columbia University, we have identified that the macrophages that normally reside in the liver (Kupfer cells) become defective in patients with metabolic associated liver disease, or MASH. Specifically, they lose the ability to perform a normal, maintenance function called efferocytosis. Efferocytosis is the clearance of dead and dying cells by macrophages and is a critical normal function in the body, including within the liver. In MASH, the accumulation of fat in liver cells (hepatocytes) leads to a fatty liver (steatohepatitis). This accumulation of fat in hepatocytes ultimately leads to dead and dying cells. Efferocytosis should clear these cells in a manner that does not cause inflammation or additional disease. However, as efferocytosis is defective in MASH, these dead and dying cells accumulate and cause inflammation and ultimately liver fibrosis.

This defect in efferocytosis can be ascribed to the loss of a single receptor on the cell surfaces of Kupffer cells called TIM4. Although multiple factors are involved in efferocytosis, pre-clinical studies suggest that TIM4 is the major efferocytosis receptor that is lost in MASH and is responsible for the defective efferocytosis seen in the disease. Samples of liver tissue from patients with MASH demonstrated a loss of TIM4. In pre-clinical studies conducted in the laboratory of Dr. Ira Tabas at Columbia University (published in Biorxiv), deleting TIM4 in Kupffer cells was observed to cause liver fibrosis. Restoring TIM4 expression caused a significant reduction of the fibrosis seen in these models.

Pre-clinical data have consistently demonstrated that TIM4 replacement with TIM4 engineered macrophage cell therapy or with TIM4 mRNA/LNP lead to robust anti-fibrotic activity as evaluated by liver biopsy. TIM4 replacement therapy has demonstrated significant reduction of multiple independent biomarkers of MASH liver fibrosis, including overall liver collagen content, hepatic Collagen-1a1, hepatic osteopontin (a liver-specific fibrotic biomarker), and hepatic alpha-smooth muscle actin (a hepatic stellate cell activation marker associated with MASH) in mild and advanced MASH animal models.

CT-2401 is intended to be developed as an off-the-shelf, *in vivo* mRNA/LNP, approach designed to deliver mRNA encoding for TIM4 via LNPs that efficiently transfect Kupffer cells.

The proposed indication for CT-2401 is patients with MASH and later stage liver fibrosis (F3 and F4 compensated cirrhosis on a 4-point scale). By directly targeting a key driver of liver fibrosis in these later stage patients, we aim to show more robust benefit on fibrosis than the current types of metabolic directed agents on the market or in development. These agents generally show efficacy on steatosis, but only a small fraction of patients achieve reduction or reversal of fibrosis.

Prior to pausing research and development activities, we planned to continue to conduct pre-clinical development of CT-2401 sufficient to enable a regulatory submission to initiate a clinical trial.

Ex Vivo Oncology

CT-1119 is a mesothelin-targeted CAR-Monocyte that is designed to treat patients with advanced mesothelin-positive solid tumors, including pancreatic cancer, ovarian cancer, lung cancer, mesothelioma, and others. CT-1119 incorporates two key enhancements as compared to CT-0508 and CT-0525: (1) a next-generation CAR that, in pre-clinical studies, led to a significant increase in tumor killing and cytokine release when compared to our first generation construct, and (2) the

incorporation of a signal-regulatory protein alpha, or SIRPα, knockdown to overcome the cluster of differentiation, or CD47 immune checkpoint.

Prior to pausing our research and development activities, we planned to initiate a Phase 1 clinical trial of CT-1119, a mesothelin-targeted CAR-Monocyte, in combination with tislelizumab, an anti-PD-1 antibody, in adult patients with mesothelin-positive solid tumors, in China.

In addition to utilizing an enhanced CAR construct and SIRPα knockdown technology, the Phase 1 clinical trial design built on observations from our prior Phase 1 clinical trials. For example, the dosing schedule was based on the previously presented data from our HER2 program, in which we observed reductions in circulating tumor (ct) DNA. ctDNA is a marker of overall tumor burden and decreases can be viewed as evidence of reductions in tumor. The reductions observed in some patients after receiving CT-0508 had a nadir approximately three weeks after infusion and then rebounded. Based on this observation, repeat dosing is intended to keep therapeutic pressure on tumors and potentially provide meaningful clinical benefit. Additionally, pre-clinical data suggests a potential for synergy between CAR-M approaches and check point inhibitors, particularly PD-1. Data from the clinical trials of CT-0508 showed markers of T-cell exhaustion as having correlation with limited efficacy from HER2 CAR-M therapy. Based on the initial data from Phase 1 clinical trial of CT-0508, co-administration of a PD-1 checkpoint inhibitor and CT-0508 was generally well-tolerated in cancer patients. Therefore, the CT-1119 trial was designed to incorporate the addition of the PD-1 checkpoint inhibitor tislelizumab to the repeat administration of CT-1119.

In Vivo Oncology

To advance our *in vivo* CAR-M therapeutics, we established a strategic collaboration with Moderna, which utilizes Moderna's mRNA/LNP technology, together with our CAR-M platform technology, to create novel *in vivo* oncology off-the-shelf gene therapy product candidates. Since entering into the agreement, we have made significant progress advancing this program. In the fourth quarter of 2023, we presented pre-clinical data from this collaboration demonstrating that CAR-M can be directly produced *in vivo*, successfully redirecting endogenous myeloid cells against tumor-associated antigens using mRNA/LNP. Additionally, the pre-clinical data demonstrated feasibility, tolerability, and early efficacy of *in vivo* CAR-M against metastatic solid tumors. In December 2023, we announced the nomination of the collaboration's first lead candidate. In June 2024, we announced the achievement of the first development candidate under the collaboration with Moderna, triggering a $2.0 million milestone payment from Moderna. This development candidate targets GPC3 and is designed to treat solid tumors, including hepatocellular carcinoma. In November 2024, we presented pre-clinical data characterizing the efficacy of the development candidate targeting GPC3 for hepatocellular carcinoma. These pre-clinical data demonstrated robust anti-tumor activity. In February 2025, Moderna nominated 10 additional oncology targets, four of which replaced two oncology research targets and two autoimmune targets, which Moderna concurrently ceased developing. As of February 2025, all 12 oncology targets under the collaboration agreement were nominated by Moderna for which we have the potential to receive future milestones and royalty payments. We will not conduct any additional research activities under the collaboration agreement and we will not be receiving any further payments from Moderna for research and development services under the collaboration agreement. Moderna also agreed to terminate the *in vivo* oncology field exclusivity, which would allow us to pursue *in vivo* CAR-M programs, outside of the 12 nominated oncology targets, and to product polypeptides.

Background

Limitations of Current CAR-T or CAR-NK Therapies

Cellular immunotherapy is a type of immuno-oncology approach whereby human immune cells are utilized to recognize and destroy cancer cells in a targeted manner.

Despite the incredible promise shown by cell therapies for hematologic malignancies, the success has not been replicated in the solid tumor setting. There are numerous challenges impacting T and NK cell immunotherapy in patients with solid tumors, such as the inability of cells to appropriately access the tumor microenvironment, or TME, overcome immunosuppression in the TME, and overcome target antigen heterogeneity. Importantly, there have been challenges in targeting solid tumors with CAR-T cells without inducing toxicities against normal tissues or inducing severe systemic cytokine release syndrome, or CRS. To date, no CAR therapies for the treatment of solid tumors have received marketing approval.

The Opportunity for Engineered Macrophages in Treating Cancer and Liver Fibrosis

We believe that macrophage and monocyte cell therapies hold promise in addressing the limitations of other cell types and transforming the cell therapy treatment paradigm for solid tumors and fibrotic diseases. The inherent biology of macrophages and monocytes offers several potential advantages that directly apply to current barriers for cell therapy efficacy in the solid tumor context. Macrophages and monocytes are actively recruited into solid tumors, while other immune cells, such as T cells, are often actively excluded. Macrophages are professional phagocytic cells capable of directly killing tumor cells through this unique mechanism. In addition to direct killing, macrophages can secrete pro-inflammatory factors that convert the immunosuppressive TME into an environment that promotes immunity. Importantly, macrophages and monocytes are professional antigen presenting cells, meaning they can directly present tumor-derived antigens to T cells leading to anti-tumor T cell responses, a phenomenon known as epitope spreading. Epitope spreading enables activity against tumor cells which either lack or lose expression of the initial antigen targeted by the CAR — a key challenge for cell therapies — and ultimately enables macrophages and monocytes to overcome target antigen heterogeneity within the patient's cancer.

In addition to acting as a first line of defense in the innate immune system, macrophages and monocytes are found in all tissues in the body where they serve key regulatory functions such as wound healing, termination of immune responses and tissue regeneration. The prevalence and diversity of function of macrophages and monocytes make them an attractive potential therapeutic delivery cell.

Additionally, our liver fibrosis product candidate is designed with the goal of correcting acquired macrophage deficiencies, such as the loss of efferocytosis in MASH via the downregulation of the receptor TIM4. By aiming to restore TIM4 expression in hepatic macrophages (Kupffer cells), liver fibrosis as a result of MASH or other chronic liver injury may be significantly reduced.

CAR-M Pre-clinical data

CAR-M have the potential to address the key challenges involved in treating solid tumors. Pre-clinical studies with CAR-M have demonstrated the ability to infiltrate solid tumors, phagocytose and destroy tumor cells directly, and present tumor-derived antigens leading to activation of the adaptive immune system. CAR-M mount anti-tumor immunity in numerous ways. First, CAR-M leverage the natural tumor-homing ability of macrophages and monocytes, the naturally most abundant immune cells in the TME, to traffic to both primary tumors and metastases, enabling engineered macrophages to act as a "Trojan horse," tricking the tumor into recruiting engineered, anti-tumor CAR-M as if they were normal monocytes or macrophages. Once within the tumor, CAR-M directly kill antigen-expressing tumor cells through phagocytosis and secretion of cytotoxic factors. CAR-M secrete inflammatory cytokines and chemokines that promote a pro-inflammatory environment and lead to the recruitment of T cells and other leukocytes. Finally, CAR-M serve as professional antigen presenting cells for T cells, inducing epitope spreading, systemic anti-tumor immunity, and immune memory against tumor antigens, expanding anti-tumor immunity to target negative tumor cells and potentially preventing antigen negative relapse.

Pipeline of Product Candidates and Discovery Programs

Using our industry leading expertise and proprietary technology in macrophage and monocyte engineering, we have developed a broad pipeline of product candidates, with a focus on liver fibrosis and solid tumor oncology.

Lead oncology product candidate CT-1119 (Next generation Anti-Mesothelin CAR-Monocyte)

CT-1119 is a mesothelin-targeted CAR-Monocyte developed for study in patients with advanced mesothelin-positive solid tumors, including lung cancer, mesothelioma, pancreatic cancer, ovarian cancer, and others. CT-1119 incorporates two key enhancements: (i) a next-generation CAR that, as demonstrated in pre-clinical studies, lead to a significant increase in tumor killing and cytokine release, and (ii) the incorporation of SIRPα knockdown to overcome the CD47 immune checkpoint.

Mesothelin is a well validated tumor associated antigen. Mesothelin has been shown to be aberrantly expressed on the surface of tumor cells and plays an important role in promoting cancer invasion and proliferation. Mesothelin has been demonstrated to be expressed at high levels in mesothelioma, lung cancer, ovarian cancer, pancreatic cancer, and other

solid tumors with limited expression in normal tissue. Mesothelin positive solid tumors represent a significant unmet medical need.

CT-1119 Next-Gen CAR Design

We developed additional next generation CAR-M improvements utilizing enhanced CAR constructs to increase potency and functionality of the engineered cells. This includes optimization of each element of the CAR itself — the binder (which gives the CAR specificity to a target antigen), the hinge (which connects the binder to the transmembrane domain and gives the CAR length and flexibility), the transmembrane domain (which spans the cell membrane), and the intracellular signaling domains (which are responsible for activation of immune cell function). These changes can lead to increased proinflammatory cytokine release and more potent *in vitro* and *in vivo* killing relative to the first-generation CAR construct. A next generation CAR incorporating an optimized hinge, transmembrane, and signaling domain is incorporated into CT-1119.

CT-1119 SIRPα Knockdown

We have also developed gene editing technologies for enhancing anti-tumor CAR-M functions. Macrophages naturally express the inhibitory receptor SIRPα, which suppresses phagocytosis after stimulation with CD47. Solid tumors can over-express CD47 to evade phagocytosis by macrophages. We have previously demonstrated using CRISPR/Cas9 that SIRPα knockout, or KO, can enhance CAR-M killing and phagocytosis of tumor cells.

We have now developed a proprietary single-vector system to simultaneously deliver CAR and targeted gene knockdown. A novel vector was designed to introduce custom shRNA into a synthetic CAR intron under a shared promoter. Expression of this vector concomitantly produces CAR mRNA and SIRPα-targeting shRNA.

We demonstrated that the intronic shRNA vector could deliver HER2-targeting CAR, reduce SIRPα expression, and enhance anti-tumor functions of primary human CAR-M. Importantly, the one-step vector design was as proficient as transduction followed by CRISPR/Cas9 editing. We also demonstrated that the intronic shRNA vector improved tumor clearance *in vivo*, as compared to unedited CAR-M.

The intronic shRNA design is a generalizable technology that is valuable for additional CAR designs, target tumor antigens, and gene knockdown targets. The modular adenoviral vector introduces gene editing capabilities while remaining compatible with pre-existing manufacturing strategies. We have incorporated our proprietary intronic shRNA vector into the CT-1119 platform to enhance anti-tumor functions and overcome the CD47 checkpoint.

SIRPα knockdown is incorporated into CT-1119 utilizing intronic shRNA.

Synergistic Potential of CAR-M Therapy with T Cell Checkpoint Inhibitors

Blocking the immune checkpoint molecule PD-1 checkpoint inhibitor, has revolutionized cancer treatment for patients with a multitude of solid tumor indications. Pembrolizumab is a potent humanized immunoglobulin G4, or IgG4, mAb, with high specificity of binding to the PD-1 checkpoint inhibitor receptor, inhibiting its interaction with programmed cell death ligand 1, or PD-L1, and programmed cell death ligand 2, or PD-L2. While pembrolizumab is currently indicated for the treatment of patients across several solid tumor indications, the majority of patients have either primary or secondary resistance to immune checkpoint blockade and may benefit from combinatorial therapy that could overcome immune cell exclusion, poor antigen presentation, low T cell infiltration, high tumor-associated macrophages, or TAM, infiltration, a lack of productive co-stimulation, low mutational burden, intra-tumoral, or IT, immunosuppression, and a low frequency of tumor reactive T cell clones. Multiple additional PD-1 checkpoints, including tislelizumab, have also been approved for multiple oncology indications.

Based on the data generated during pre-clinical development, CT-0508 was able to specifically recognize cancer cells through the binding of the CAR to HER2 expressed on the surface of the cancer cells. This interaction triggered activation of the CAR-M and resulted in direct anti-tumor effect by killing and phagocytosis of the tumor cells. In addition, CT-0508 recruited T cells, activated the TME, and as professional antigen presenting cells, processed and presented tumor associated antigen and/or neoantigens expressed by the tumor cells, leading to T cell immunity against these specific antigens. However, this indirect anti-tumor effect involves the engagement of T cells that may be actively suppressed, or exhausted, within the TME by a variety of factors including secreted immune-modulatory factors and inhibitory ligands expressed on

both immune and tumor cells. Additionally, several studies have demonstrated that patients with low mutational burden, low major histocompatibility complex expression, defective antigen presentation, low CD8+ T cell infiltration, or minimal Type 1 T helper, or Th1, cytokine signatures tend to be unresponsive to PD-1 checkpoint inhibitor blockade. Therefore, based on the mechanism of action of CAR-M and the limitations of PD-1 checkpoint inhibitor blockade, the combination of CAR-M therapy with PD-1 checkpoint inhibitor blockade therapy may be beneficial as CAR-M will drive TME remodeling and enhance antigen presentation (innate immunity) to initiate an anti-tumor T cell response (adaptive immunity) which will be strengthened by inhibiting the PD-1 checkpoint inhibitor pathway. Pre-clinical data demonstrating the synergy between CAR-M and PD-1 checkpoint blockade were published in Nature Communications in 2025 (Pierini S, et al. Nature Communications. 2025). These data lay the groundwork for exploration of combination therapies consisting of CAR-M therapies (such as CT-1119) and T cell checkpoint inhibitors (such as anti-PD1).

mRNA/LNP Platform

In collaboration with Moderna, we have developed an mRNA based *in vivo* CAR-M platform for oncology. This approach is highly differentiated in the cell therapy space — not only because it relies on myeloid cells as the engineered effectors, but also because it utilizes direct *in vivo* reprogramming of patients' own cells with a well-validated mRNA/LNP platform. By engineering patients' own cells directly within their body, *ex vivo* autologous or allogeneic cell manufacturing is entirely bypassed. Importantly, while this approach enables an off-the-shelf therapy, the engineered cells are autologous, as it is the patients' own cells being engineered into CAR-M *in vivo*, or directly within their body. .

Studies with the LNP have shown mRNA delivery leads to CAR expression on myeloid cells (monocytes, macrophages, and dendritic cells). Preliminary data have demonstrated that the LNP is efficient in transfecting myeloid cells *in vitro* and *in vivo*. In addition, preliminary data confirms high CAR expression, viability, and CAR-M function. In the fourth quarter of 2023, we presented pre-clinical data from this collaboration demonstrating that CAR-M can be directly produced *in vivo*, successfully redirecting endogenous myeloid cells against tumor-associated antigens using mRNA/LNP. Additionally, the data demonstrated feasibility and early efficacy of *in vivo* CAR-M against metastatic solid tumors. In 2024, we announced nomination of the collaboration's first development candidate, which will target the GPC3 antigen present on hepatocellular carcinoma, an indication with significant unmet medical need. In November 2024, we announced new pre-clinical data on our anti-GPC3 *in vivo* CAR-M therapy for treating hepatocellular carcinoma. These pre-clinical data demonstrated robust anti-tumor activity.

In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration for which we have the potential to receive future milestones and royalty payments. We will not conduct any additional research activities under the collaboration agreement and we will not be receiving any further research funding from Moderna under the collaboration agreement.

Liver Fibrosis

We have a research program designed for liver fibrosis caused by advanced MASH. CT-2401 is designed to address defective efferocytosis, a novel pathway believed to drive the accumulation of dead hepatocytes in the liver of MASH patients leading to collagen deposition and chronic inflammation, resulting in liver fibrosis and MASH progression. Pre-clinical data identified TIM4 as a key downregulated/lost efferocytosis receptor in MASH. CT-2401, aims to restore TIM4 expression using mRNA/LNP technology. Pre-clinical proof of concept has been established.

***Ex Vivo* Oncology**

Past Product Candidate: CT-0508 (anti-HER2 CAR-Macrophage)

CT-0508 is a cell product comprised of autologous, peripheral blood monocyte-derived, pro inflammatory macrophages, transduced with a chimeric adenoviral vector, Ad5f35, containing an anti-HER2 CAR. HER2 is a protein on the cell surface that promotes the growth of cancer cells. The anti-HER2 CAR is a first-generation CAR composed of a fully human single-chain variable fragment, or scFv, derived from the monoclonal antibody, or mAb, trastuzumab, which is specific for human HER2. The anti-HER2 scFv is fused to a CAR backbone containing a CD8 hinge, CD8 transmembrane domain, and a CD3ζ intracellular domain. The CAR is cloned into an adenoviral vector backbone and transduced into monocyte-derived macrophages. Based on the pre-clinical data generated to date, CT-0508 CAR-Macrophages are able to

specifically recognize HER2 over-expressing tumor cells, which triggers both direct killing of tumor cells and phagocytosis. Additionally, CAR engagement to HER2 on tumor cells results in the secretion of a broad array of pro-inflammatory cytokines and chemokines, which contribute to the recruitment and activation of additional immune cells to the TME, including effector T cells and other antigen presenting cells. CT-0508 CAR-Macrophages are antigen presenting cells, and after phagocytosing tumor cells they process tumor-derived antigens and present them to T cells, leading to T cell immunity against tumor antigens. This additional activation of the adaptive immune system amplifies anti-tumor immune response and can lead to long term immune memory not only against HER2, the primary target, but other tumor specific neoantigens as well.

CT-0508 was studied in a multi-center open label Phase 1 clinical trial in the United States. A total of 20 patients received infusions of CT-0508 during either the primary portion of the trial (n=14) or during the expansion cohort in combination with pembrolizumab (n=6). The primary endpoints of safety and feasibility were met while the best overall response observed in any subject was stable disease (SD). The trial was closed to enrollment in April 2024 and closed in its entirety in August 2024. The final presentation of data from this trial was made in the third quarter of 2024 and results from the monotherapy portion of the trial were published in Nature Medicine in 2025 (Reiss KA, et al. Nature Medicine, 2025).

Past Product Candidate: CT-0525

CT-0525 is a cell product comprised of autologous, peripheral blood derived CD14+ monocytes transduced with a chimeric adenoviral vector, Ad5f35, containing an anti-HER2 CAR. Unlike CT-0508, CT-0525 is a non-differentiated monocyte that is not fully matured during an *ex vivo* cell culture process. Based on pre-clinical studies, CT-0525 is expected to differentiate into a CAR-Macrophage directly *in vivo*, subsequently carrying out the same mechanism of action as described above for CT-0508. CT-0525 enables potentially higher dosing, improved trafficking, and enhanced persistence.

CT-0525 was evaluated in a multi-center open label Phase 1 clinical trial in the United States. The Phase 1 clinical trial for CT-0525 was a single-arm, open-label study of systemic intravenous administration of CT-0525 intended to evaluate safety, tolerability, and the manufacturing feasibility of CT-0525. Secondary endpoints included cellular kinetics, overall response rate and duration of response. This trial enrolled participants with locally advanced (unresectable) or metastatic solid tumors over-expressing HER2 whose disease has progressed on standard approved therapies. The study consisted of two cohorts: Cohort 1 received IV administration of three billion CAR-positive cells, while Cohort 2 received IV administration of up to 10 billion CAR-positive cells. The first patient was dosed in May 2024. Three subjects were treated in Cohort 1 and two were treated in Cohort 2. The last patient was dosed in November 2024 and all clinical activity ended in January 2025 due to the decision to cease development of CT-0525.

Manufacturing and Delivery

We do not own or operate, and currently have no plans to establish, our own manufacturing facilities. We have relied on, and if we resume research and development activities, expect to rely on third-party contract manufacturing organizations for manufacturing of our product candidates.

We have established, and if we resume research and development activities, will continue to establish arrangements with contract manufacturers to supply clinical materials and manufacturing capabilities for our clinical trials.

If we resume research and development activities and scale to commercialization, we expect to increase our capacity with our current, or yet to be identified, suppliers and evaluate other options to secure commercial scale capacity.

Intellectual Property

We strive to protect and enhance our proprietary technology, inventions and improvements that we believe are commercially important to the development of our business, including through seeking, maintaining and defending patent rights, whether developed internally or licensed from third parties. We also intend to rely on trade secrets related to our proprietary technology platform and our know-how, continuing technological innovation and in-licensing opportunities to develop, strengthen and maintain our proprietary position in the fields of cancer and other indications including those related to fibrosis and other immunologic and inflammatory diseases, which may be important for the development of our

business. We also may rely on regulatory protection afforded through data exclusivity, market exclusivity and patent term extensions, where available.

Our success may depend, in part, on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, defend, and enforce our patents, preserve the confidentiality of our trade secrets and operate without infringing the valid enforceable patents and proprietary rights of third parties. Our ability to stop third parties from making, using, selling, offering to sell or importing our products may depend on the extent to which we have rights under valid and enforceable licenses, patents or trade secrets that cover these activities. With respect to both our owned and licensed intellectual property, we cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications we file in the future, nor can we be sure that any of our existing patents or any patents that may be granted us in the future will be commercially useful in protecting our commercial products and methods of manufacturing such products, as well as being held valid if challenged.

We currently control over 40 granted patents, which are expected to expire at various times between 2033 and 2042, and over 100 patent applications pending in several jurisdictions, including the United States, Europe, Australia, Brazil, Canada, China, Israel, Japan, Korea, Mexico, New Zealand, and Singapore. Intellectual property is a critical component of our business plan for maximizing return on our investments. We are actively developing intellectual property and will continue to maintain and defend United States and international patent rights for our products, technology, and development and improvement of our discovery platforms.

To maintain our competitive position in the market, we have spent considerable effort and resources securing intellectual property rights, including several patent rights related to our proprietary CAR technology and myeloid cell engineering technology.

Exclusively Licensed Intellectual Property — Penn

We have exclusive rights to four patent families, and non-exclusive rights to related know-how by virtue of a license agreement with the Trustees of the University of Pennsylvania, or Penn. These patent families are directed to, among other things, methods of efficiently expressing CARs in myeloid cells, including monocytes, macrophages, and dendritic cells and enhancing effector activity, as well as the modified cells and compositions including such modified cells for use in several indications including various oncology targets. The applications will have an expiration date of no earlier than 2034. This licensed patent portfolio includes:

- A patent family that includes nine issued U.S. patents and three pending U.S. patent applications relating to modified macrophages, monocytes and dendritic cells comprising CARs. These U.S. patents are expected to expire in 2036, absent any term adjustments or extensions. Corresponding foreign patents and pending applications include one issued patent in Australia, one issued patent in Brazil, one issued patent in China, two issued patents in Israel, two issued patents in Japan, one issued patent in Mexico, one issued patent in Russia, one issued patent in Singapore, and pending applications in Australia, Brazil, Canada, China, Europe, Israel, India, Japan, Korea, Mexico, New Zealand, Russia, Singapore, Thailand and South Africa.
- A patent family that includes one pending U.S. patent application relating to modified macrophages, monocytes and dendric cells in protein aggregate-associated disorders. Patent applications in this family are expected to expire in 2039, absent any term adjustments or extensions. Corresponding foreign patents and pending applications include one issued patent in Australia, one issued patent in Japan, and pending applications in Canada, China, Europe, Israel, Korea, New Zealand, and Singapore.
- A patent family that includes one pending U.S. patent application relating to activation of antigen presenting cells. Patent applications in this family are expected to expire in 2040, absent any term adjustments or extensions.
- A patent family that includes one issued U.S. patent and one pending U.S. patent application relating to CARs comprising human anti-mesothelin binding domains. Patent applications in this family are expected to expire in 2034, absent any adjustments or extensions. Corresponding foreign patents and pending applications include three issued patents in Australia, one issued patent in China, one issued patent in Colombia, one issued patent in Germany, two issued patents in Europe, one issued patent in Spain, one issued patent in France, one issued patent in the United Kingdom, one issued patent in Italy, two issued patents in Japan, one issued patent in Russia, and pending applications in Australia, Canada, China, Europe, and Japan.

Exclusively Licensed Intellectual Property — NYU

We have exclusive rights to one patent family, and non-exclusive rights to related know-how by virtue of a license agreement with New York University, or NYU. The rights granted under the NYU license are to all indications for human use. This licensed patent portfolio includes:

- A patent family that includes one U.S. patent relating to a chimeric human immunodeficiency virus type 1, or HIV-1, vector with a simian immunodeficiency virus, or SIV, minimal Vpx packaging domain and method of making virions with enhanced infectivity for macrophages and dendritic cells. The U.S. patent is expected to expire in 2033, absent any term adjustments or extensions.

Carisma Owned Intellectual Property

We currently own ten U.S. patent families. This owned patent portfolio includes:

- A patent family that includes two issued U.S. patent and one pending U.S. patent applications relating to macrophages, monocytes and dendritic cells comprising novel CAR constructs. Patent applications in this family are expected to expire in 2041, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, Brazil, Canada, China, Europe, Israel, Japan, Korea, Mexico, New Zealand, Singapore, and South Africa.
- A patent family that includes one pending U.S. application relating to mRNA transfection of macrophages, monocytes and dendritic cells comprising CARs. Patent applications in this family are expected to expire in 2041, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, China, Eurasia, Europe, Israel, India, Japan, Korea, Mexico, New Zealand, Singapore, and South Africa.
- A patent family that includes one pending U.S. application relating to modified immune cells for fibrosis and inflammation. Patent applications in this family are expected to expire in 2041, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, China, Eurasia, Europe, Israel, India, Japan, Korea, Mexico, New Zealand, Singapore, and South Africa.
- A patent family that includes one pending U.S. application relating to self-polarizing immune cells. Patent applications in this family are expected to expire in 2042, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, Brazil, Canada, China, Eurasia, Europe, Israel, India, Japan, Korea, Mexico, New Zealand, Singapore, and South Africa.
- A patent family that includes one pending U.S. application relating to *in vivo* delivery of, among other things, CARs to macrophages, monocytes, and dendritic cells. Patent applications in this family are expected to expire in 2042, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, Europe, and Japan.
- A patent family that includes one pending U.S. application relating to methods and constructs for modifying the response of certain cells to environmental and other stimuli. Patent applications in this family are expected to expire in 2043, absent any term adjustments or extensions. Corresponding foreign patent applications have been filed and are pending in Australia, Europe, and Japan.
- A patent family that includes one pending PCT application relating to modified macrophages, monocytes, and dendritic cells including anti-mesothelin CARs. Patent applications in this family are expected to expire in 2043, absent any term adjustments or extensions.
- A patent family that includes one pending PCT application relating to modified constructs including JAK/STAT binding domains. Patent applications in this family are expected to expire in 2043, absent any term adjustments or extensions.
- A patent family that includes one pending PCT application relating to modified constructs including DAP10 and/or DAP12 domains. Patent applications in this family are expected to expire in 2044, absent any term adjustments or extensions.
- A patent family that includes one pending PCT application relating to modified constructs including cassettes engineered to produce one or more inhibitory RNAs and a CAR. Patent applications in this family are expected to expire in 2044, absent any term adjustments or extensions.

We will also seek to generate additional intellectual property that covers enhancements to all aspects of the platform, including novel CARs, combinations, gene editing and manufacturing improvements. Where appropriate, we will also look to in-license relevant technology from third parties.

Patent Term and Patent Term Extensions

The term of individual patents depends upon the legal term for patents in the countries in which they are obtained. In most countries, including the United States, the patent term is 20 years from the earliest filing date of a non-provisional patent application. In the United States, a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the U.S. Patent and Trademark Office, or USPTO, in examining and granting a patent or may be shortened if a patent is terminally disclaimed over an earlier filed patent. The term of a patent that covers a drug, biological product or medical device approved pursuant to a pre- market approval may also be eligible for patent term extension when FDA approval is granted, provided statutory and regulatory requirements are met. The length of the patent term extension is related to the length of time the drug is under regulatory review while the patent is in force. The Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-Waxman Act, permits a patent term extension of up to five years beyond the expiration date set for the patent. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent applicable to each regulatory review period may be granted an extension and only those claims regarding the approved drug are extended. Similar provisions are available in Europe and other foreign jurisdictions to extend the term of a patent that covers an approved drug.

Trademarks

Our trademark portfolio currently includes registered U.S. trademarks for Carisma in the United States, Europe, Great Britain and Japan. All of our trademarks are renewed on an ongoing basis. In order to supplement the protection of our brand, we also have a registered internet domain name. Going forward, we will consider additional trademarks to enhance our brand and support our products.

Trade Secrets

We rely, in some circumstances, on trade secrets to protect our unpatented technology. However, trade secrets can be difficult to protect in certain circumstances. We seek to protect our trade secrets and proprietary technology and processes, including through confidentiality agreements with our employees, consultants, scientific advisors and contractors. 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. We may not have adequate remedies for any breach and could lose our trade secrets through such a breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our consultants, contractors or collaborators use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting trade secrets, know-how and inventions.

Moderna Collaboration and License Agreement

In collaboration with Moderna, we have established an approach that uses Moderna's mRNA/LNP technology, together with our CAR-M platform technology, to create novel *in vivo* oncology gene therapies. We believe this approach has the potential to enable a series of off-the-shelf product candidates to target a patient's own myeloid cells against cancer cells directly within their body.

In January 2022, Legacy Carisma and Moderna established this collaboration by entering into a Collaboration and License Agreement, or the Moderna License Agreement, which provides for a broad strategic collaboration to discover, develop and commercialize *in vivo* engineered CAR-M therapeutics. Under the Moderna License Agreement, the parties initiate research programs during a research term, focused on the discovery and research of products directed to biological targets. Moderna's mRNA platform builds on continuous advances in basic and applied mRNA science, delivery technology and manufacturing, and has allowed the development of therapeutics and vaccines for infectious diseases, immuno-oncology, rare diseases, cardiovascular diseases and auto-immune diseases. In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the Moderna License Agreement for which we have the potential to receive future milestones and royalty payments. We will not conduct any additional research activities under the Moderna License Agreement and we will not

be receiving any further research funding from Moderna under the Moderna License Agreement. We received the final research and development payment of $2.9 million from Moderna in January 2025.

Moderna has the right to designate up to 12 research targets as development targets during a specified development target nomination period upon payment of a development target designation milestone payment. To date, Moderna has designated one research target as a development target. This development candidate targets GPC3 and is designed to treat solid tumors, including hepatocellular carcinoma. Moderna can replace development targets with research targets during a specified period of time. If Moderna exercises its right to designate a development target, Moderna will have a worldwide, exclusive license under patents and know-how controlled by us to develop and commercialize products directed to the applicable development target, subject to certain diligence obligations.

Commencing a specified time after the effective date of the Moderna License Agreement, Moderna will have the right to nominate targets relating to diseases outside the field of oncology for inclusion in research programs in specified circumstances. Such right is subject to the same exclusions as Moderna's right to nominate other targets for inclusion in research programs.

During the term of the Moderna License Agreement, we and our affiliates are subject to various exclusivity obligations under which we are not permitted to research, develop or commercialize particular products outside of the collaboration, including products directed to any target included in the collaboration, or products containing a polypeptide provided by us to Moderna in connection with a research program that are directed to any development target. Moderna agreed to terminate the *in vivo* oncology field exclusivity, which would allow us to pursue *in vivo* CAR-M programs outside of the 12 nominated oncology targets and product polypeptides.

Under the terms of the Moderna License Agreement, we received a $45.0 million up-front cash payment. Assuming Moderna develops and commercializes 12 products, each directed to a different development target, we are also eligible to receive up to between $247.0 million and $253.0 million per product in development target designation, development, regulatory and commercial milestone payments. In addition, we are eligible to receive tiered mid-to-high single digit royalties on net product sales, subject to adjustment. Moderna has also agreed to cover the cost of certain milestone payments and royalties we owe as a licensor under one of our intellectual property in-license agreements with Penn that we are sublicensing to Moderna under the Moderna License Agreement, which royalties Moderna may deduct in part from any royalties owed to us.

Unless earlier terminated, the Moderna License Agreement will expire upon the expiration of all royalty obligations thereunder. The royalty period for each product developed under the Moderna License Agreement will expire on a country-by-country basis upon the later of (i) the expiration of the last-to-expire valid patent claim of specified patents, (ii) the expiration of regulatory-based exclusivity for such product in such country or (iii) ten years after the first commercial sale with respect to such product in such country. Moderna has the right to terminate the Moderna License Agreement for convenience in its entirety or with respect to a specific product or target on ninety days' prior notice. Either we or Moderna may terminate the Moderna License Agreement in its entirety if the other party is in material breach and such breach is not cured within the specified cure period, except in the case of Moderna's breach of its diligence obligations, termination by us is limited to the applicable target and product. In addition, either we or Moderna may terminate the Moderna License Agreement in the event of specified insolvency events involving the other party. As an alternative to termination in the event of our uncured material breach of certain sections of the agreement, Moderna has the option to continue the collaboration under the agreement with reduced payment obligations.

Penn License Agreement

In November 2017, Legacy Carisma entered into a license agreement, or the Penn License Agreement, with Penn, which was amended in February 2018, January 2019, March 2020 and June 2021. Pursuant to the Penn License Agreement, Penn granted us (i) an exclusive, worldwide license, with specified rights to sublicense, under Penn's interest in specified patents related to CAR macrophages, monocytes or dendritic cells, (ii) an exclusive, worldwide license, with specified rights to sublicense, under Penn's interest in specified patents related to CAR-M directed to mesothelin, and (iii) a nonexclusive, worldwide license under Penn's interest in specified know-how related to CAR-M, with limited rights to sublicense only in combination with specified products or patents. These licensed patents and know-how arose primarily from research conducted by Dr. Saar Gill and Dr. Michael Klichinsky at the University of Pennsylvania, co-founders of Carisma. The foregoing licenses are subject to rights retained by Penn for specified non-commercial uses and rights retained by the U.S. government. Under the Penn License Agreement, we are obligated to use commercially reasonable efforts to pursue development and commercialization of at least one CAR-M product in oncology and non-oncology fields.

We are responsible for paying Penn an annual license maintenance fee in the low tens of thousands of dollars, payable until our first payment of a royalty. We are required to pay Penn up to $10.9 million per product in development and regulatory milestone payments, up to $30.0 million per product in commercial milestone payments, and up to an additional $1.7 million in development and regulatory milestone payments for the first CAR-M product directed to mesothelin. While the agreement remains in effect, we are required to pay Penn low to mid-single digit percentage tiered royalties on annual net sales of licensed products, which may be subject to reductions. Penn is guaranteed a minimum royalty payment amount in the low hundreds of thousands of dollars for each year after the first commercial sale of a licensed product. We must also pay Penn a percentage in the mid-single digits to low double digits of certain types of income we receive from sublicensees. In addition, we are required to pay Penn an annual alliance management fee in the low tens of thousands of dollars, ending after several years, unless we provide funding to Penn for research and development activities that extend beyond a specified date, in which case we will continue to owe the alliance management fee for each year in which we continue to fund such activities. We also paid Penn an upfront fee in the low hundreds of thousands of dollars for the license to the patents related to the mesothelin binder that is incorporated into the CAR design for our mesothelin product candidate. We are responsible for a pro rata share of costs relating to the prosecution and maintenance of the licensed patents.

The royalty period for each licensed product will expire on a product-by-product basis upon the later of (i) the expiration of the last-to-expire valid patent claim of the licensed patents covering such product in the country of sale or in the country of manufacture, or (ii) the expiration of regulatory-based exclusivity for such product in the country of sale. The license agreement remains in effect until the later of (i) expiration or abandonment of the last licensed patent or (ii) loss of regulatory exclusivity. We may terminate the agreement for convenience upon thirty days' prior notice. Penn may terminate the agreement for our material breach, subject to a specified cure period, except for certain breaches for which Penn may terminate immediately. Penn may also terminate if we become the subject of a specified insolvency event.

NYU License Agreement

In July 2020, Legacy Carisma entered into a license agreement with NYU, or the NYU License Agreement. Pursuant to the NYU License Agreement, NYU granted us (i) an exclusive, worldwide license, with specified rights to sublicense, under NYU's interest in specified patents related to the Vpx-LV and (ii) a nonexclusive, worldwide license, with specified rights to sublicense, under NYU's interest in specified know-how related to the Vpx-LV, in each case to develop, manufacture, use and sell products developed using the Vpx-LV, or Licensed Products. The foregoing licenses are subject to rights retained by NYU to use, and to permit other non-commercial entities to use, the licensed patents and licensed know-how for educational and research purposes, as well as rights retained by the U.S. government. Under the NYU License Agreement, we are obligated to use reasonable diligence to carry out a specified development plan and to obtain regulatory approval for Licensed Products in the United States and each of the other countries in which we or our sublicensees intend to produce, use, and/or sell Licensed Products, as well as to begin the regular commercial production, use, and sale of the Licensed Products in good faith in accordance with the development plan and to continue diligently thereafter to commercialize the Licensed Products.

We are required to pay NYU an annual license maintenance fee in the mid tens of thousands of dollars; up to $1,685,000 per Licensed Product in development and regulatory milestone payments; and low single digit percentage tiered royalties on annual net sales of Licensed Products on a country-by-country basis until the later of (i) 12 years after first commercial sale of a Licensed Product in such country or (ii) expiration of the last to expire licensed patent. We must also pay NYU a percentage in the low single digits to low double digits of certain types of income we receive from sublicensees or assignees of the agreement. We are also responsible for all costs relating to the prosecution, maintenance, and defense of the licensed patents.

The NYU License Agreement remains in effect until the expiration of all royalty terms in all countries. Either party may terminate the NYU License Agreement for the other party's uncured material breach or insolvency or bankruptcy.

Competition

The biopharmaceutical industry, and in particular the cell therapy field and liver fibrosis field, is characterized by intense investment and competition aimed at rapidly advancing new technologies, intense competition, and a strong emphasis on intellectual property and proprietary products. Our platform and therapeutic product candidates are expected to face substantial competition from multiple technologies, marketed products, and numerous other therapies being developed by other biopharmaceutical companies, academic research institutions, governmental agencies, and public and private research institutions. Many of our potential competitors have substantially greater financial, technical, and other resources, such as

larger research and development staff, established manufacturing capabilities and facilities, and experienced marketing organizations with well-established sales forces, and any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future. In addition, there is substantial patent infringement litigation in the biopharmaceutical industry, and, in the future, we may bring or defend such litigation against our competitors.

The key competitive factors affecting the success of our product candidates, if approved, are likely to be their efficacy, safety, convenience and price, the level of competition, and the availability of coverage and adequate reimbursement from third-party payors.

Unlike other cell therapy approaches, our CAR-M platform is based on engineering macrophages and monocytes with proprietary vectors, constructs, and processes, enabling a differentiated platform from other cell therapy competitors that primarily focus on T or natural killer cells, or NK cells. While we believe that our scientific expertise, novel technology, and intellectual property position offer competitive advantages, we face competition from multiple other cell therapy technologies and companies. Other companies developing engineered myeloid cell therapies include, among others, Myeloid Therapeutics, Shoreline Biosciences, Inceptor Bio, Thunder Bio, Resolution Therapeutics, CellOrigin, Deverra, BobcatBio, and others.

Due to the broad promise of cell therapies, and the potential of myeloid cell-based approaches to expand cell therapy efficacy into solid tumors and liver fibrosis, we expect increasing competition from new and existing companies across several fronts, which include, among others:

- ***Myeloid cell therapies:*** CellOrigin, Deverra, Inceptor Bio, Myeloid Therapeutics, Resolution Therapeutics, Shoreline Biosciences, Thunder Bio, among others
- ***Autologous* T cell *therapies:*** 2seventy, Adaptimmune, Autolus, Bristol Myers Squibb, Cabaletta, Gracell, Kite/Gilead, Novartis, Poseida, TScan, Vor, among others
- ***Allogeneic* T cell *therapies:*** Allogene, Atara, Caribou, Century, Cellectis, Celyad, CRISPR, Fate, Gracell, Kite/ Gilead, Legend, Poseida, Precision Bio, Sana, TScan, Vor, among others
- ***NK and other cell therapies:*** Adicet, Artiva, Celularity, Century, Editas, Fate, Fortress, Gamida Cell, ImmunityBio, Nkarta, NKGen, Takeda, among others
- ***Direct in vivo reprogrammed cell therapies:*** BioNTech, Ensoma, Interius, Sanofi, Umoja, Orna Therapeutics, among others
- ***Liver fibrosis therapies:*** Madrigal, Akero, 89Bio, Resolution Therapeutics, among others and major pharmaceutical companies developing incretin therapies such as Eli Lilly, NovoNordisk, and others.

In addition to competition from other cell therapy companies, any products that we develop may also face competition from other types of therapies. Other companies developing non-cell therapies, including gene therapies, in relevant therapeutic areas include Gilead, ALX Oncology, Five-Prime, Immune-Onc, Pionyr, Infinity, NextCure, OncoResponse, Curis, Faron, Apexigen, Pfizer, Dren, and multiple biotechnology and pharmaceutical companies developing other directly competitive technologies such as small molecules, immune agonists, antibodies, bi/tri specific antibodies, antibody drug conjugates, and other solid tumor therapeutics.

We also have competed, and if we resume research and development activities will continue to compete with third parties for retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. If we were to resume research and development activities, we may pursue the in-license or acquisition of rights to complementary technologies and product candidates on an opportunistic basis. The acquisition and licensing of technologies and product candidates is a competitive area, and a number of more established companies also have similar strategies to in-license or acquire technologies and product candidates that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to in-license or acquire the relevant technology or product candidate on terms that would allow it to make an appropriate return on our investment.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, including as result of our decision to pause research and development

activities, which could result in our competitors establishing a strong market position before it is able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products.

Government Regulation

Government authorities in the United States, at the federal, state and local level, and in other countries and jurisdictions, including the European Union, or EU, extensively regulate, among other things, the research, development, testing, manufacture, pricing, reimbursement, sales, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, and import and export of pharmaceutical products, including biological products. The processes for obtaining marketing approvals in the United States and in foreign countries and jurisdictions, along with subsequent compliance with applicable statutes and regulations and other regulatory authorities, require the expenditure of substantial time and financial resources and may have a substantial impact on our business.

Licensure and Regulation of Biologics in the United States

In the United States, our product candidates are regulated as biological products, or biologics, under the Public Health Service Act, or the PHSA, and the Food, Drug and Cosmetic Act, or FDCA, and its implementing regulations and guidance. A company, institution, or organization which takes responsibility for the initiation and management of a clinical development program for such products, and for their regulatory approval, is typically referred to as a sponsor. The failure of a sponsor to comply with the applicable U.S. requirements at any time during the product development process, including pre-clinical testing, clinical testing, the approval process, or post-approval process, may subject a sponsor to delays in the conduct of the study, regulatory review, and approval, and/or administrative or judicial sanctions.

A sponsor seeking approval to market and distribute a new biologic in the United States generally must satisfactorily complete each of the following steps:

- pre-clinical laboratory tests, animal studies, and formulation studies all performed in accordance with the FDA's good laboratory practice, or GLP, regulations and standards and other applicable regulations;
- completion of the manufacture, under current good manufacturing practice, or cGMP, conditions, of the drug substance and drug product that the sponsor intends to use in human clinical trials along with required analytical and stability testing;
- design of a clinical protocol and submission to the FDA of an IND for human clinical testing, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, representing each clinical site before each clinical trial may be initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety, potency, and purity of the product candidate for each proposed indication, in accordance with current IND and good clinical practice, or GCP;
- preparation and submission to the FDA of a Biologic License Application, or BLA, for a biologic product requesting marketing for one or more proposed indications, including submission of detailed information on the chemistry, manufacturing and controls, or CMC, for the product in clinical development and proposed labeling;
- review of the product by an FDA advisory committee, where appropriate or if applicable;
- satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities, including those of third parties, at which the product, or components thereof, are produced to assess compliance with cGMP requirements and to assure that the facilities, methods, and controls are adequate to preserve the product's identity, strength, quality, and purity;
- satisfactory completion of any FDA audits of the pre-clinical studies and clinical trial sites to assure compliance with GLP, as applicable, and GCP, and the integrity of clinical data in support of the BLA;
- payment of substantial application and program fees under the Prescription Drug User Fee Act, or PDUFA;
- FDA review and approval of the BLA authorizing the licensure and marketing of the new biologic product for particular indications in the United States; and
- compliance with any post-approval requirements, including the potential requirement to implement a risk evaluation and mitigation strategy, or REMS, and any post-approval studies or other post-marketing commitments required by the FDA.

Pre-clinical Studies

Before testing any biologic product candidate in humans, the product candidate must undergo pre-clinical testing. Pre-clinical tests include laboratory evaluations of product chemistry, formulation and stability, as well as studies to evaluate the potential for efficacy and toxicity in animal studies. These studies are often referred to as IND-enabling studies. The conduct of the pre-clinical tests and formulation of the compounds for testing must comply with federal regulations and requirements, including GLP regulations and standards and the U.S. Department of Agriculture's Animal Welfare Act, if applicable. The results of the pre-clinical tests, together with manufacturing information and analytical data, are submitted to the FDA as part of an IND application. With passage of the FDA's Modernization Act 2.0 in December 2022, Congress eliminated provisions in both the FDCA and PHSA, that required animal testing in support of a BLA. While animal testing may still be conducted, the FDA was authorized to rely on alternative non-clinical tests, including cell-based assays, micro-physiological systems or bio-printed or computer models.

Investigational New Drug Application

An IND is an exemption from the FDCA that allows an unapproved product candidate to be shipped in interstate commerce for use in an investigational clinical trial and a request for FDA authorization to administer such investigational product to humans. The IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions about the product or conduct of the proposed clinical trial, including concerns that human research subjects will be exposed to unreasonable health risks or any issues surrounding CMC for the proposed product. In that case, the IND sponsor and the FDA must resolve any outstanding FDA concerns before the clinical trials can begin or recommence. As a result, submission of the IND may result in the FDA not allowing the trials to commence or allowing the trial to commence on the terms originally specified by the sponsor in the IND.

If the FDA raises concerns or questions either during this initial 30-day period, or at any time following allowance of an IND, it may choose to impose a partial or complete clinical hold. Clinical holds are imposed by the FDA whenever there is concern for patient safety and may be a result of new data, findings, or developments in preclinical and/or clinical trials, and/or CMC. This order issued by the FDA would delay either a proposed clinical trial or cause suspension of an ongoing trial, until all outstanding concerns have been adequately addressed and the FDA has notified the company that investigations may proceed. This could cause significant delays or difficulties in completing a planned clinical trial or future clinical trials in a timely manner.

Following the issuance of a clinical hold or partial clinical hold, a clinical investigation may only resume once the FDA has notified the sponsor that the investigation may proceed. The FDA will base that determination on information provided by the sponsor correcting the deficiencies previously cited or otherwise satisfying the FDA that the investigation can proceed or recommence.

Expanded Access to an Investigational Drug for Treatment Use

Expanded access, sometimes called "compassionate use," is the use of investigational products outside of clinical trials to treat patients with serious or immediately life-threatening diseases or conditions when there are no comparable or satisfactory alternative treatment options. The rules and regulations related to expanded access are intended to improve access to investigational products for patients who may benefit from investigational therapies. FDA regulations allow access to investigational products under an IND by the company or the treating physician for treatment purposes on a case-by-case basis for: individual patients (single-patient IND applications for treatment in emergency settings and non-emergency settings); intermediate-size patient populations; and larger populations for use of the investigational product under a treatment protocol or treatment IND application.

When considering an IND application for expanded access to an investigational product with the purpose of treating a patient or a group of patients, the sponsor and treating physicians or investigators will determine suitability when all of the following criteria apply: patient(s) have a serious or immediately life-threatening disease or condition, and there is no comparable or satisfactory alternative therapy to diagnose, monitor, or treat the disease or condition; the potential patient benefit justifies the potential risks of the treatment and the potential risks are not unreasonable in the context or condition to be treated; and the expanded use of the investigational drug for the requested treatment will not interfere with initiation, conduct, or completion of clinical investigations that could support marketing approval of the product or otherwise compromise the potential development of the product.

There is no obligation for a sponsor to make its drug products available for expanded access; however, as required by the 21st Century Cures Act, or Cures Act, passed in 2016, if a sponsor has a policy regarding how it evaluates and responds to expanded access requests, sponsors are required to make such policies publicly available upon the earlier of initiation of a Phase 2 or Phase 3 clinical trial, or 15 days after the investigational drug or biologic receives designation as a breakthrough therapy, fast track product, or regenerative medicine advanced therapy.

In addition to and separate from expanded access, the Right to Try Act, among other things, provides a federal framework for certain patients to access certain investigational 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 manufacturer to make its investigational products available to eligible patients as a result of the Right to Try Act.

Human Clinical Trials in Support of a BLA

Clinical trials involve the administration of the investigational product candidate to healthy volunteers or patients with the disease or condition to be treated under the supervision of a qualified principal investigator in accordance with GCP requirements. Clinical trials are conducted under protocols detailing, among other things, the objectives of the trial, inclusion and exclusion criteria, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND.

Further, each clinical trial must be reviewed and approved by an IRB either centrally or individually at each institution at which the clinical trial will be conducted. The IRB will consider, among other things, clinical trial design, patient informed consent, ethical factors, the safety of human subjects, and the possible liability of the institution. An IRB must operate in compliance with FDA regulations. The FDA, IRB, or the clinical trial sponsor may suspend or discontinue a clinical trial at any time for various reasons, including a finding that the clinical trial is not being conducted in accordance with FDA requirements or that the participants are being exposed to an unacceptable health risk. Clinical testing also must satisfy extensive GCP rules and the requirements for informed consent.

Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data monitoring committee, or DMC. A DMC may recommend continuation of the trial as planned, changes in trial conduct, or cessation of the trial at designated check points based on access that only the group maintains to available data from the study. Suspension or termination of development during any phase of clinical trials can occur if it is determined that the participants or patients are being exposed to an unacceptable health risk on the basis of data and information to which only the DMC has access.

Clinical trials typically are conducted in three sequential phases, but the phases may overlap or be combined. Additional studies may be required after approval.

- *Phase 1* clinical trials are initially conducted in a limited population to test the product candidate for safety, including adverse effects, dose tolerance, absorption, metabolism, distribution, excretion, and pharmacodynamics in healthy humans or, on occasion, in patients, such as cancer patients.
- *Phase 2* clinical trials are generally conducted in a limited patient population to identify possible adverse effects and safety risks, evaluate the potency and purity of the product candidate for specific targeted indications and determine dose tolerance and optimal dosage. Multiple Phase 2 clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more costly Phase 3 clinical trials.
- *Phase 3* clinical trials proceed if the Phase 2 clinical trials demonstrate that a dose range of the product candidate is potentially effective and has an acceptable safety profile. Phase 3 clinical trials are undertaken within an expanded patient population to further evaluate dosage, provide substantial evidence of clinical efficacy, and further test for safety in an expanded and diverse patient population at multiple, geographically dispersed clinical trial sites. A well-controlled, statistically robust Phase 3 trial may be designed to deliver the data that regulatory authorities will use to decide whether or not to approve, and, if approved, how to appropriately label a biologic; such Phase 3 studies are referred to as “pivotal.”

In some cases, the FDA may approve a BLA for a product but require the sponsor to conduct additional clinical trials to further assess the product’s safety, potency and purity after approval. Such trials are typically referred to as post approval or post marketing clinical trials. These studies are used to gain additional experience from the treatment of patients in the

intended therapeutic indication and to document a clinical benefit in the case of biologics approved under accelerated approval regulations. If the FDA approves a product while a company has ongoing clinical trials that were not necessary for approval, a company may be able to use the data from these clinical trials to meet all or part of any post marketing clinical trial requirement or to request a change in the product labeling. The failure to exercise due diligence with regard to conducting post approval clinical trials could result in withdrawal of approval for products.

A clinical trial may combine the elements of more than one phase and the FDA often requires more than one Phase 3 trial to support marketing approval of a product candidate. A company's designation of a clinical trial as being of a particular phase is not necessarily indicative that the study will be sufficient to satisfy the FDA requirements of that phase because this determination cannot be made until the protocol and data have been submitted to and reviewed by the FDA. Generally, pivotal trials are Phase 3 trials, but they may be Phase 2 trials if the design provides a well-controlled and reliable assessment of clinical benefit, particularly in an area of unmet medical need.

In December 2022, with the passage of the Food and Drug Omnibus Reform Act, or FDORA, Congress required sponsors to develop and submit a diversity action plan for each phase 3 clinical trial or any other "pivotal study" of a new drug or biological product. These plans are meant to encourage the enrollment of more diverse patient populations in late-stage clinical trials of FDA-regulated products. Specifically, action plans must include the sponsor's goals for enrollment, the underlying rationale for those goals, and an explanation of how the sponsor intends to meet them. In addition to these requirements, the legislation directs the FDA to issue new guidance on diversity action plans. In June 2024, as mandated by FDORA, the FDA issued draft guidance outlining the general requirements for diversity action plans. Unlike most guidance documents issued by the FDA, the diversity action plan guidance when finalized will have the force of law because FDORA specifically dictates that the form and manner for submission of diversity action plans are specified in FDA guidance.

In June 2023, the FDA issued draft guidance with updated recommendations for GCPs aimed at modernizing the design and conduct of clinical trials. The updates are intended to help pave the way for more efficient clinical trials to facilitate the development of medical products. The draft guidance is adopted from the International Council for Harmonisation's recently updated E6(R3) draft guideline that was developed to enable the incorporation of rapidly developing technological and methodological innovations into the clinical trial enterprise. That guideline was finalized by the International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use on January 6, 2025. In addition, the FDA issued draft guidance outlining recommendations for the implementation of decentralized clinical trials.

Finally, sponsors of clinical trials are required to register and disclose certain clinical trial information on a public registry, clinicaltrials.gov, maintained by the U.S. National Institutes of Health, or NIH. In particular, information related to the product, patient population, phase of investigation, study sites and investigators and other aspects of the clinical trial is made public as part of the registration of the clinical trial. Although sponsors are also obligated to disclose the results of their clinical trials after completion, disclosure of the results can be delayed in some cases for up to two years after the date of completion of the trial. The NIH's final rule on registration and reporting requirements for clinical trials became effective in 2017. The PHSA grants the Secretary of the U.S. Department of Health and Human Services, or HHS, the authority to issue a notice of noncompliance to a responsible party to failure to submit clinical trial information as required. The responsible party, however, is allowed 30 days to correct the noncompliance and submit the required information. As of December 19, 2024, the FDA has issued six notices of non-compliance, signaling the government's willingness to enforce these requirements against non-compliant clinical trial sponsors. While these notices of non-compliance did not result in civil monetary penalties, the failure to submit clinical trial information to clinicaltrials.gov, as required, is a prohibited act under the FDCA with violations subject to potential civil monetary penalties of up to $10,000 for each day the violation continues.

Clinical Studies Outside the United States in Support of FDA Approval

In connection with a clinical development program, a sponsor may conduct trials at sites outside the United States. When a foreign clinical study is conducted under an IND, all IND requirements must be met unless waived. When a foreign clinical study is not conducted under an IND, the sponsor must ensure that the study complies with certain regulatory requirements of the FDA in order to use the study as support for an IND or application for marketing approval. Specifically, the studies must be conducted in accordance with GCP, including undergoing review and receiving approval by an independent ethics committee, or IEC, and seeking and receiving informed consent from subjects. GCP requirements encompass both ethical and data integrity standards for clinical studies. The FDA's regulations are intended to help ensure the protection of human subjects enrolled in non-IND foreign clinical studies, as well as the quality and integrity of the resulting data. They further help ensure that non-IND foreign studies are conducted in a manner comparable to that required for IND studies.

The acceptance by the FDA of study data from clinical trials conducted outside the United States in support of U.S. approval may be subject to certain conditions or may not be accepted at all. In cases where data from foreign clinical trials are intended to serve as the sole basis for marketing approval in the United States., the FDA will generally not approve the application on the basis of foreign data alone unless (i) the data are applicable to the U.S. population and U.S. medical practice; (ii) the trials were performed by clinical investigators of recognized competence and pursuant to GCP regulations; and (iii) the data may be considered valid without the need for an on-site inspection by the FDA, or if the FDA considers such inspection to be necessary, the FDA is able to validate the data through an on-site inspection or other appropriate means.

In addition, even where the foreign study data are not intended to serve as the sole basis for approval, the FDA will not accept the data as support for an application for marketing approval unless the study is well-designed and well-conducted in accordance with GCP requirements and the FDA is able to validate the data from the study through an onsite inspection if deemed necessary. Many foreign regulatory authorities have similar approval requirements. In addition, such foreign trials are subject to the applicable local laws of the foreign jurisdictions where the trials are conducted.

Interactions with FDA During the Clinical Development Program

Following the clearance of an IND and the commencement of clinical trials, the sponsor will continue to have interactions with the FDA. A development safety update report detailing the results of clinical trials must be submitted annually within 60 days of the anniversary dates that the IND went into effect. In addition, IND safety reports must be submitted to the FDA for any of the following: serious and unexpected suspected adverse reactions; findings from other trials or animal or *in vitro* testing that suggest a significant risk in humans exposed to the product; and any clinically important increase in the occurrence of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. The FDA will typically inspect one or more clinical sites to assure compliance with GCP and the integrity of the clinical data submitted.

In addition, sponsors are given opportunities to meet with the FDA at certain points in the clinical development program. Specifically, there are five types of meetings that occur between sponsors and the FDA. Type A meetings are those that are necessary for an otherwise stalled product development program to proceed or to address an important safety issue. Type B meetings include pre-IND and pre-BLA meetings, as well as end of phase meetings such as End of Phase 2 meetings. A Type C meeting is any meeting other than a Type A or Type B meeting regarding the development and review of a product. A Type D meeting is focused on a narrow set of issues, which should be limited to no more than two focused topics, and should not require input from more than three disciplines or divisions. Finally, INitial Targeted Engagement for Regulatory Advice on CBER/CDER ProducTs, or INTERACT, meetings are intended for novel products and development programs that present unique challenges in the early development of an investigational product.

These meetings provide an opportunity for the sponsor to share information about the data gathered to date with the FDA and for the FDA to provide advice on the next phase of development. At the conclusion of these meetings, the FDA will typically provide its responses to questions posed by the sponsor regarding the clinical development program. The FDA will not indicate whether a BLA will be approved, but it will provide guidance to the sponsor on various questions, including whether an application should be submitted in the first place on the basis of the studies and data proposed by the sponsor. The FDA has indicated that its responses, as conveyed in meeting minutes and advice letters, only constitute mere recommendations and/or advice made to a sponsor and, as such, sponsors are not bound by such recommendations and/or advice. Nonetheless, from a practical perspective, a sponsor's failure to follow the FDA's recommendations for design of a clinical program may put the program at significant risk of failure.

Special Regulations and Guidance Governing Gene Therapy Products

The FDA has defined a gene therapy product as one that mediates its effects by transcription and/or translation of transferred genetic material and/or by integrating into the host genome and which is administered as nucleic acids, viruses, or genetically engineered microorganisms. The products may be used to modify cells *in vivo* or transferred to cells *ex vivo* prior to administration to the recipient.

Within the FDA, the Center for Biologics Evaluation and Research, or CBER, regulates gene therapy products. Within CBER, the FDA has established the Office of Tissues and Advanced Therapies, or the OTAT, to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER in its review. In September 2022, the FDA announced renaming of the OTAT to the Office of Therapeutic

Products, or the OTP, and elevation of the OTP to a "Super Office" to meet its growing cell and gene therapy workload and new commitments under the PDUFA for fiscal years 2023 to 2027.

The FDA has issued various guidance documents regarding gene therapies, including a November 2024 draft guidance to address frequently asked questions surrounding the development of cellular and gene therapy products and final guidance documents released in January 2020 relating to CMC information for gene therapy INDs, gene therapies for rare diseases and gene therapies for retinal disorders, as well as draft guidance in January 2021 for Human Gene Therapy for Neurodegenerative Diseases. Although the FDA has indicated that these and other guidance documents it previously issued are not legally binding, we believes that our compliance with them is likely necessary to gain approval for any gene therapy product candidate we may develop. The guidance documents provide additional factors that the FDA will consider at each of the above stages of development and relate to, among other things, the proper pre-clinical assessment of gene therapies; the chemistry, manufacturing, and control information that should be included in an IND application; the proper design of tests to measure product potency in support of an IND or BLA application; and measures to observe delayed adverse effects in subjects who have been exposed to investigational gene therapies when the risk of such effects is high. Further, the FDA usually recommends that sponsors observe subjects for potential gene therapy-related delayed adverse events for a 15-year period, including a minimum of five years of annual examinations followed by 10 years of annual queries, either in person or by questionnaire.

Finally, for a gene therapy product, the FDA also will not approve the product if the manufacturer is not in compliance with good tissue practices, or GTP. These standards are found in FDA regulations and guidance that govern the methods used in, and the facilities and controls used for, the manufacture of human cells, tissues, and cellular and tissue-based products, or HCT/Ps, which are human cells or tissue intended for implantation, transplant, infusion, or transfer into a human recipient. The primary intent of the GTP requirements is to ensure that T cell and tissue-based products are manufactured in a manner designed to prevent the introduction, transmission, and spread of communicable disease. FDA regulations also require tissue establishments to register and list their HCT/Ps with the FDA and, when applicable, to evaluate donors through screening and testing.

Pediatric Studies

Under the Pediatric Research Equity Act of 2003, or PREA, a BLA or supplement thereto must contain data that are adequate to assess the safety, potency and purity of the product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. Sponsors must also submit pediatric study plans prior to the assessment data. Those plans must contain an outline of the proposed pediatric study or studies the sponsor plans to conduct, including study objectives and design, any deferral or waiver requests, and other information required by regulation. The sponsor, the FDA, and the FDA's internal review committee must then review the information submitted, consult with each other, and agree upon a final plan. The FDA or the sponsor may request an amendment to the plan at any time. In May 2023, the FDA issued new draft guidance that further describes the pediatric study requirements under PREA.

The FDA may, on its own initiative or at the request of the sponsor, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements. A deferral may be granted for several reasons, including a finding that the product or therapeutic candidate is ready for approval for use in adults before pediatric trials are completed. The FDA is required to send a PREA Non-Compliance letter to sponsors who have failed to submit their pediatric assessments under PREA, have failed to seek or obtain a deferral or deferral extension or have failed to request approval for a required pediatric formulation. Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan designation, although the FDA has recently taken steps to limit what it considers abuse of this statutory exemption in PREA. The FDA also maintains a list of diseases that are exempt from PREA requirements due to low prevalence of disease in the pediatric population.

Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan designation, although the FDA has taken steps to limit what it considers abuse of this statutory exemption in PREA. Further, Section 505B of the FDCA, as amended by the FDA Reauthorization Act of 2017, or FDARA, requires that any original NDA or BLA submitted on or after August 18, 2020, for a new active ingredient, must contain reports on the molecularly targeted pediatric cancer investigation, unless the requirement is waived or deferred, if the drug that is the subject of the application is: (i) intended for the treatment of an adult cancer, and (ii) directed at a molecular target that the Secretary determines to be substantially relevant to the growth or progression of a pediatric cancer in accordance with FDA guidance. The FDA also maintains a list of diseases that are exempt from PREA requirements due to low prevalence of disease in the pediatric population.

Compliance with cGMP Requirements

Concurrent with clinical trials, sponsors usually complete additional animal safety studies, develop additional information about the chemistry and physical characteristics of the product candidate and finalize a process for manufacturing commercial quantities of the product candidate in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other criteria, the sponsor must develop methods for testing the identity, strength, quality, and purity of the finished product. Additionally, appropriate packaging must be selected and tested, and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

Specifically, the FDA's regulations require that pharmaceutical products be manufactured in specific approved facilities and in accordance with cGMPs. The cGMP regulations include requirements relating to organization of personnel, buildings and facilities, equipment, control of components and product containers and closures, production and process controls, packaging and labeling controls, holding and distribution, laboratory controls, records and reports and returned or salvaged products. Manufacturers and other entities involved in the manufacture and distribution of approved pharmaceuticals are required to register their establishments with the FDA and some state agencies, and they are subject to periodic unannounced inspections by the FDA for compliance with cGMPs and other requirements. The Prepare for and Respond to Existing Viruses, Emerging New Threats, and Pandemics Act, or PREVENT Pandemics Act, which was enacted in December 2022, clarifies that foreign drug manufacturing establishments are subject to registration and listing requirements even if a drug or biologic undergoes further manufacture, preparation, propagation, compounding, or processing at a separate establishment outside the United States prior to being imported or offered for import into the United States.

Manufacturers and others involved in the manufacture and distribution of products must also register their establishments with the FDA and certain state agencies. Both domestic and foreign manufacturing establishments must register and provide additional information to the FDA upon their initial participation in the manufacturing process. Any product manufactured by or imported from a facility that has not registered, whether foreign or domestic, is deemed misbranded under the FDCA. Establishments may be subject to periodic unannounced inspections by government authorities to ensure compliance with cGMPs and other laws. Inspections must follow a "risk-based schedule" that may result in certain establishments being inspected more frequently. Manufacturers may also have to provide, on request, electronic or physical records regarding their establishments. Delaying, denying, limiting, or refusing inspection by the FDA may lead to a product being deemed to be adulterated.

Submission and Review of a BLA

The results of product candidate development, pre-clinical testing, and clinical trials, including negative or ambiguous results as well as positive findings, are submitted to the FDA as part of a BLA requesting license to market the product. The BLA must contain extensive manufacturing information and detailed information on the composition of the product and proposed labeling as well as payment of a user fee. Under federal law, the submission of most BLAs is subject to an application user fee, which for federal fiscal year 2025 is $4,310,002 for an application requiring clinical data. The sponsor of a licensed BLA is also subject to an annual program fee, which for federal fiscal year 2025 is $403,889. Certain exceptions and waivers are available for some of these fees, such as an exception from the application fee for products with orphan designation and a waiver for certain small businesses.

Following submission of a BLA, the FDA has 60 days to conduct a preliminary review of the application and it must inform the sponsor within that period of time whether the BLA is sufficiently complete to permit substantive review. In the event that the FDA determines that an application does not satisfy this standard, it will issue a Refuse to File, or RTF, determination to the sponsor. The FDA may request additional information and studies, and the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing.

Once the submission has been accepted for filing, the FDA begins an in-depth review of the application. Under the goals and policies agreed to by the FDA under the PDUFA, the FDA has ten months in which to complete its initial review of a standard application and respond to the sponsor, and six months for a priority review of the application. The FDA does not always meet its PDUFA goal dates for standard and priority BLAs. The review process may often be significantly extended by the FDA requests for additional information or clarification. The review process and the PDUFA goal date may be extended by three months if the FDA requests or if the sponsor otherwise provides additional information or clarification regarding information already provided in the submission within the last three months before the PDUFA goal date.

The FDA seeks to meet these timelines for review of an application but its ability to do so may be affected by a variety of factors. While the costs associated with review of an application are typically covered by the PDUFA user fee program, other activities, including government budget and funding levels, the ability to hire and retain key personnel and statutory, regulatory and policy changes, may impact the FDA's review and approval of marketing applications. Average review times at the FDA have fluctuated in recent years as a result. For example, during the past decade, the U.S. government has shut down several times and certain regulatory agencies, including the FDA, has had to furlough critical employees and stop critical activities. Further, there is substantial uncertainty as to how measures being implemented by the new Trump administration across the government will impact the FDA and other federal agencies with jurisdiction over biologics. For example, the potential loss of FDA personnel could lead to further disruptions and delays in the FDA's operations and activities.

In connection with its review of a BLA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in full compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The PHSA emphasizes the importance of manufacturing control for products like biologics whose attributes cannot be precisely defined.

The FDA also may inspect the sponsor and one or more clinical trial sites to assure compliance with IND and GCP requirements and the integrity of the clinical data submitted to the FDA. With passage of the FDORA, Congress clarified the FDA's authority to conduct inspections by expressly permitting inspections of facilities involved in the preparation, conduct, or analysis of clinical and non-clinical studies submitted to the FDA as well as other persons holding study records or involved in the study process.

The FDA may also refer the application to an advisory committee for review, evaluation, and recommendation as to whether the application should be approved. In particular, the FDA may refer applications for novel biologic products or biologic products that present difficult questions of safety, potency or purity to an advisory committee. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates, and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions on approval. Data from clinical trials are not always conclusive, and the FDA or its advisory committee may interpret data differently than the sponsor interprets the same data. The FDA may also re-analyze the clinical trial data, which could result in extensive discussions between the FDA and the sponsor during the review process.

Moreover, the FDA will review a sponsor's financial relationship with the principal investigators who conducted the clinical trials in support of the BLA. That is because, under certain circumstances, principal investigators at a clinical trial site may also serve as scientific advisors or consultants to a sponsor and receive compensation in connection with such services. Depending on the level of that compensation and any other financial interest a principal investigator may have in a sponsor, the sponsor may be required to report these relationships to the FDA. The FDA will then evaluate that financial relationship and determine whether it creates a conflict of interest or otherwise affects the interpretation of the trial or the integrity of the data generated at the principal investigator's clinical trial site. If so, the FDA may exclude data from the clinical trial site in connection with its determination of safety, potency and purity of the investigational product.

The FDA also may require submission of a REMS if it determines that a REMS is necessary to ensure that the benefits of the product outweigh its risks and to assure the safe use of the product. The REMS could include medication guides, physician communication plans, assessment plans and/or elements to assure safe use, or ETASU, such as restricted distribution methods, patient registries or other risk minimization tools. The FDA determines the requirement for a REMS, as well as the specific REMS provisions, on a case-by-case basis. If the FDA concludes a REMS is needed, the sponsor of the application must submit a proposed REMS and the FDA will not approve the application without a REMS.

The FDA's Decision on a BLA

Under the PHSA the FDA may approve a BLA if it determines that the product is safe, pure, and potent, and the facility where the product will be manufactured meets standards designed to ensure that it continues to be safe, pure, and potent. Specifically, the FDA must determine that the expected benefits of the proposed product outweigh its potential risks to patients. This "benefit- risk" assessment is informed by the extensive body of evidence about the proposed product in the BLA. On the basis of the FDA's evaluation of the application and accompanying information, including the results of the

inspection of the manufacturing facilities and any FDA audits of pre-clinical and clinical trial sites to assure compliance with GCPs, the FDA may issue a complete response letter, or CRL, or an approval letter.

If the application is not approved, the FDA will issue a CRL, which will contain the conditions that must be met in order to secure final approval of the application and will outline recommended actions the sponsor might take to obtain approval of the application. Sponsors that receive a CRL may submit to the FDA information that represents a complete response to the issues identified by the FDA, withdraw the application or request a hearing. The FDA will not approve an application until issues identified in the CRL have been addressed. If a CRL is issued, the sponsor will have one year to respond to the deficiencies identified by the FDA, at which time the FDA can deem the application withdrawn or, in its discretion, grant the sponsor an additional six-month extension to respond.

An approval letter, on the other hand, authorizes commercial marketing of the product with specific prescribing information for specific indications. The FDA may limit the approved indication(s) for use of the product. It may also require that contraindications, warnings, or precautions be included in the product labeling. In addition, the FDA may call for post -approval studies, including Phase 4 clinical trials, to further assess the product's efficacy and/or safety after approval. The agency may also require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, including REMS, to help ensure that the benefits of the product outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals, and ETASU. ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patent registries. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, many types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval.

Expedited Review Programs

The FDA is authorized to expedite the review of applications in several ways. None of these expedited programs changes the standards for approval but each may help expedite the development or approval process governing product candidates.

- *Fast Track designation*. The sponsor of a product candidate may request the FDA to designate the product for a specific indication as a Fast Track product concurrent with or after the filing of the IND. Candidate products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation applies to the combination of the product candidate and the specific indication for which it is being studied. In addition to other benefits, such as the ability to have greater interactions with the FDA, the FDA may initiate review of sections of a Fast Track application before the application is complete, a process known as rolling review.
- *Breakthrough therapy designation*. To qualify for the breakthrough therapy program, product candidates must be intended to treat a serious or life-threatening disease or condition and preliminary clinical evidence must indicate that such product candidates may demonstrate substantial improvement on one or more clinically significant endpoints over existing therapies. The FDA will seek to ensure the sponsor of a breakthrough therapy product candidate receives intensive guidance on an efficient drug development program, intensive involvement of senior managers and experienced staff on a proactive, collaborative and cross-disciplinary review and rolling review.
- *Priority review*. A product candidate is eligible for priority review if it treats a serious condition and, if approved, it would be a significant improvement in the safety or effectiveness of the treatment, diagnosis or prevention compared to marketed products. The FDA determines, on a case-by-case basis, whether the proposed product represents a significant improvement when compared with other available therapies. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting product reaction, documented enhancement of patient compliance that may lead to improvement in serious outcomes, and evidence of safety, potency and purity in a new subpopulation. The FDA aims to complete its review of priority review applications within six months as opposed to 10 months for standard review.
- *Accelerated approval*. Drug or biologic products studied for their safety, potency and purity in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval. Accelerated approval means that a product candidate may be approved on the basis of adequate and well controlled clinical trials establishing that the product candidate has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity and prevalence of the condition and the availability or lack of alternative treatments. As a condition of

approval, the FDA may require that a sponsor of a drug or biologic product candidate receiving accelerated approval perform adequate and well controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials.

- With the passage of FDORA in December 2022, Congress modified certain provisions governing accelerated approval of drug and biologic products. Specifically, the new legislation authorized the FDA to require a sponsor to have its confirmatory clinical trial underway before accelerated approval is awarded and require a sponsor of a product granted accelerated approval to submit progress reports on its post-approval studies to the FDA every six months (until the study is completed). Moreover, FDORA established expedited procedures authorizing the FDA to withdraw an accelerated approval if certain conditions are met, including where a required confirmatory study fails to verify and describe the predicted clinical benefit or where evidence demonstrates the product is not shown to be safe or effective under the conditions of use. The FDA may also use such procedures to withdraw an accelerated approval if a sponsor fails to conduct any required post-approval study of the product with due diligence, including with respect to "conditions specified by the Secretary." The new procedures include the provision of due notice and an explanation for a proposed withdrawal, and opportunities for a meeting with the FDA Commissioner or the Commissioner's designee and a written appeal, among other things.
- In March 2023, the FDA issued draft guidance that outlines its current thinking and approach to accelerated approval. The agency indicated that the accelerated approval pathway is commonly used for approval of oncology drugs due to the serious and life-threatening nature of cancer. Although single-arm trials have been commonly used to support accelerated approval, a randomized controlled trial is the preferred approach as it provides a more robust efficacy and safety assessment and allows for direct comparisons to an available therapy. To that end, the FDA outlined considerations for designing, conducting, and analyzing data for trials intended to support accelerated approvals of oncology therapeutics. Subsequently, in December 2024 and January 2025, the FDA issued additional draft guidance relating to accelerated approval. This guidance describes the FDA's latest thinking on what it means to conduct a confirmatory trial with due diligence and how the agency plans to interpret whether such a study needs to be underway at the time of approval. While this guidance is currently only in draft form and will ultimately not be legally binding even when finalized, sponsors typically observe the FDA's guidance closely to ensure that their investigational products qualify for accelerated approval.
- *Regenerative advanced therapy*. With passage of the Cures Act, Congress authorized the FDA to accelerate review and approval of products designated as regenerative advanced therapies. A product is eligible for this designation if it is a regenerative medicine therapy that is intended to treat, modify, reverse or cure a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product candidate has the potential to address unmet medical needs for such disease or condition. The benefits of a regenerative advanced therapy designation include early interactions with the FDA to expedite development and review, benefits available to breakthrough therapies, potential eligibility for priority review and accelerated approval based on surrogate or intermediate endpoints.

Post-Approval Regulation

If regulatory approval for marketing of a product or new indication for an existing product is obtained, the sponsor will be required to comply with all regular post-approval regulatory requirements as well as any post-approval requirements that the FDA have imposed as part of the approval process. The sponsor will be required to report certain adverse reactions and production problems to the FDA, provide updated safety, potency and purity information and comply with requirements concerning advertising and promotional labeling requirements. Manufacturers and certain of their subcontractors are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with ongoing regulatory requirements, including cGMP regulations, which impose certain procedural and documentation requirements upon manufacturers. Accordingly, the sponsor and its third-party manufacturers must continue to expend time, money, and effort in the areas of production and quality control to maintain compliance with cGMP regulations and other regulatory requirements.

A product may also be subject to official lot release, meaning that the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official lot release, the manufacturer must submit samples of each lot, together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot, to the FDA. The FDA may in addition perform certain confirmatory tests on lots of some products before releasing the lots for distribution. Finally, the FDA will conduct laboratory research related to the safety, purity, potency, and effectiveness of pharmaceutical products.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with 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 trials to assess new safety risks; or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. In September 2021, the FDA published final regulations which describe the types of evidence that the agency will consider in determining the intended use of a biologic product. Products may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

If a company is found to have promoted off-label uses, it may become subject to adverse public relations and administrative and judicial enforcement by the FDA, the Department of Justice, or the Office of the Inspector General of the HHS as well as state authorities. This could subject a company to a range of penalties that could have a significant commercial impact, including civil and criminal fines and agreements that materially restrict the manner in which a company promotes or distributes drug products. The federal government has levied large civil and criminal fines against companies for alleged improper promotion, and has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed.

It may be permissible, under very specific, narrow conditions, for a manufacturer to engage in non-promotional, non-misleading communication regarding off-label information, such as distributing scientific or medical journal information. Moreover, with passage of the Pre-Approval Information Exchange Act, or PIE Act, in December 2022, sponsors of products that have not been approved may proactively communicate to payors certain information about products in development to help expedite patient access upon product approval. Previously, such communications were permitted under FDA guidance but the new legislation explicitly provides protection to sponsors who convey certain information about products in development to payors, including unapproved uses of approved products.

In addition, in January 2025, the FDA published final guidance outlining its policies governing the distribution of scientific information to healthcare providers about unapproved uses of approved products. The final guidance calls for such communications to be truthful, non-misleading and scientifically sound and to include all information necessary for healthcare providers to interpret the strengths and weaknesses and validity and utility of the information about the unapproved use of the approved product.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, and its implementing regulations, as well as the Drug Supply Chain Security Act, or DSCSA, which regulate the distribution and tracing of prescription drug samples at the federal level, and set minimum standards for the regulation of distributors by the states. The PDMA, its implementing regulations and state laws limit the distribution of prescription pharmaceutical product samples, and the DSCSA imposes requirements to ensure accountability in distribution and to identify and remove counterfeit and other illegitimate products from the market. Manufacturers were required by November 2023 to have such systems and processes in place to comply with the DSCSA, but, so as not to disrupt supply chains, the FDA has granted certain exemptions from enhanced drug distribution security requirements for eligible trading partners for particular periods of time.

Orphan Drug Designation and Exclusivity

Orphan drug designation in the United States is designed to encourage sponsors to develop products intended for rare diseases or conditions. In the United States, a rare disease or condition is statutorily defined as a condition that affects fewer than 200,000 individuals in the United States or that affects more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of developing and making available the biologic for the disease or condition will be recovered from sales of the product in the United States.

Orphan drug designation qualifies a company for tax credits and market exclusivity for seven years following the date of the product's marketing approval if granted by the FDA. An application for designation as an orphan product can be made

any time prior to the filing of an application for approval to market the product. A product becomes an orphan when it receives orphan drug designation from the Office of Orphan Products Development at the FDA based on acceptable confidential requests made under the regulatory provisions. The product must then go through the review and approval process like any other product.

A sponsor may request orphan drug designation of a previously unapproved product or new orphan indication for an already marketed product. In addition, a sponsor of a product that is otherwise the same product as an already approved orphan drug may seek and obtain orphan drug designation for the subsequent product for the same rare disease or condition if it can present a plausible hypothesis that its product may be clinically superior to the first drug. More than one sponsor may receive orphan drug designation for the same product for the same rare disease or condition, but each sponsor seeking orphan drug designation must file a complete request for designation.

If a product with orphan designation receives the first FDA approval for the disease or condition for which it has such designation or for a select indication or use within the rare disease or condition for which it was designated, the product generally will receive orphan drug exclusivity. Orphan drug exclusivity means that the FDA may not approve another sponsor's marketing application for the same product for the same indication for seven years, except in certain limited circumstances. If a product designated as an orphan drug ultimately receives marketing approval for an indication broader than what was designated in its orphan drug application, it may not be entitled to exclusivity.

The period of exclusivity begins on the date that the marketing application is approved by the FDA. Orphan drug exclusivity will not bar approval of another product under certain circumstances, including if a subsequent product with the same drug for the same condition is shown to be clinically superior to the approved product on the basis of greater efficacy or safety, or providing a major contribution to patient care, or if the company with orphan drug exclusivity is not able to meet market demand. Under Omnibus legislation enacted in December 2020, the requirement for a product to show clinical superiority applies to drugs and biologics that received orphan drug designation before enactment of FDARA in 2017, but have not yet been approved or licensed by the FDA. In addition, the FDA may approve a second application for the same product for a different use or a second application for a clinically superior version of the product for the same use.

The FDA and Congress may further reevaluate the Orphan Drug Act and its regulations and policies. This may be particularly true in light of a decision from the Court of Appeals for the 11th Circuit in September 2021 finding that, for the purpose of determining the scope of exclusivity, the term "same disease or condition" means the designated "rare disease or condition" and could not be interpreted by the FDA to mean the "indication or use." On January 23, 2023, the FDA announced that, in matters beyond the scope of that court order, the FDA will continue to apply its existing regulations tying orphan-drug exclusivity to the uses or indications for which the orphan drug was approved. However, on February 14, 2025, a federal district court in Washington, D.C. fully embraced the reasoning of the court decision in another decision challenging the scope of orphan drug exclusivity. The implications of this decision, and its impact on the FDA's implementation of the Orphan Drug Act, are unclear at this point.

Pediatric Exclusivity

Pediatric exclusivity is another type of non-patent exclusivity in the United States and for biologics, if granted, provides for the attachment of an additional six months of regulatory exclusivity to the term of any existing regulatory exclusivity, including orphan exclusivity. This six-month exclusivity may be granted if a BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity that cover the product are extended by six months.

Biosimilars and Exclusivity

The 2010 Patient Protection and Affordable Care Act, or ACA, which was signed into law in March 2010, included a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA. The BPCIA established a regulatory scheme authorizing the FDA to approve biosimilars and interchangeable biosimilars. A biosimilar is a biological product that is highly similar to an existing FDA-licensed "reference product." The FDA has approved a number of biosimilar products and interchangeable biosimilar products.

Under the BPCIA, a manufacturer may submit an application for licensure of a biologic product that is "biosimilar to" or "interchangeable with" a previously approved biological product or "reference product." In order for the FDA to approve a

biosimilar product, it must find that there are no clinically meaningful differences between the reference product and proposed biosimilar product in terms of safety, purity, and potency. For the FDA to approve a biosimilar product as interchangeable with a reference product, the agency must find that the biosimilar product can be expected to produce the same clinical results as the reference product, and (for products administered multiple times) that the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

An application for a biosimilar product may not be submitted to the FDA until four years following the date of approval of the reference product. The FDA may not approve a biosimilar product until 12 years from the date on which the reference product was approved. Even if a product is considered to be a reference product eligible for exclusivity, another company could market a competing version of that product if the FDA approves a full BLA for such product containing the sponsor's own pre-clinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity, and potency of their product.

The BPCIA also includes provisions to protect reference products that have patent protection. The biosimilar product sponsor and reference product sponsor may exchange certain patent and product information for the purpose of determining whether there should be a legal patent challenge. Based on the outcome of negotiations surrounding the exchanged information, the reference product sponsor may bring a patent infringement suit and injunction proceedings against the biosimilar product sponsor. The biosimilar applicant may also be able to bring an action for declaratory judgment concerning the patent.

The FDA maintains a publicly-available online database of licensed biological products, which is commonly referred to as the "Purple Book." The Purple Book lists product names, dates of licensure, and applicable periods of exclusivity. Further, the reference product sponsor must provide patent information and patent expiry dates to FDA following the exchange of patent information between biosimilar and reference product sponsors. This information is then published in the Purple Book.

In an effort to increase competition in the drug and biologic product marketplace, Congress, the executive branch, and the FDA have taken certain legislative and regulatory steps. For example, the 2020 Further Consolidated Appropriations Act included provisions requiring that sponsors of approved drug and biologic products, including those subject to REMS, provide samples of the approved products to persons developing biosimilar products within specified timeframes, in sufficient quantities, and on commercially reasonable market-based terms. Failure to do so can subject the approved product sponsor to civil actions, penalties, and responsibility for attorney's fees and costs of the civil action. There have been recent government proposals to reduce the 12-year reference product exclusivity period, but none has been enacted to date. At the same time, since passage of the BPCIA, many states have passed laws or amendments to laws, which address pharmacy practices involving biosimilar products.

Federal and State Data Privacy and Security Laws

There are multiple privacy and data security laws that may impact our business activities, in the United States and in other countries where we conduct trials or where we may do business in the future. These laws are evolving and may increase both our obligations and our regulatory risks in the future. In the health care industry generally, under the Health Insurance Portability and Accountability Act, or HIPAA, the HHS, has issued regulations to protect the privacy and security of protected health information, or PHI, used or disclosed by covered entities including certain healthcare providers, health plans, and healthcare clearinghouses. HIPAA also regulates standardization of data content, codes and formats used in healthcare transactions and standardization of identifiers for health plans and providers. HIPAA also imposes certain obligations on the business associates of covered entities that obtain protected health information in providing services to or on behalf of covered entities. HIPAA may apply to us in certain circumstances and may also apply to our business partners in ways that may impact our relationships with them. Our clinical trials are regulated by the Common Rule, which also includes specific privacy-related provisions. In addition to federal privacy regulations, there are a number of state laws governing confidentiality and security of health information that may be applicable to our business. In addition to possible federal civil and criminal penalties for HIPAA violations, state attorneys general are authorized to file civil actions for damages or injunctions in federal courts to enforce HIPAA and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, state attorneys general (along with private plaintiffs) have brought civil actions seeking injunctions and damages resulting from alleged violations of HIPAA's privacy and security rules. State attorneys general also have authority to enforce state privacy and security laws. New laws and regulations governing privacy and security may be adopted in the future as well.

States are also active in creating specific rules relating to the processing of personal information. In 2018 California passed into law the California Consumer Privacy Act, or the CCPA, which took effect on January 1, 2020, and imposed many requirements on businesses that process the personal information of California residents. Many of the CCPA's requirements are similar to those found in the General Data Protection Regulation, or the GDPR, including requiring businesses to provide notice to data subjects regarding the information collected about them and how such information is used and shared, and providing data subjects the right to request access to such personal information and, in certain cases, request the erasure of such personal information. The CCPA also affords California residents the right to opt-out of "sales" of their personal information. The CCPA contains significant penalties for companies that violate its requirements. In November 2020, California voters passed a ballot initiative for the California Privacy Rights Act, or the CPRA, which went into effect on January 1, 2023, and significantly expanded the CCPA to incorporate additional GDPR-like provisions including requiring that the use, retention, and sharing of personal information of California residents be reasonably necessary and proportionate to the purposes of collection or processing, granting additional protections for sensitive personal information, and requiring greater disclosures related to notice to residents regarding retention of information. The CPRA also created a new enforcement agency—the California Privacy Protection Agency—whose sole responsibility is to enforce the CPRA, which will further increase compliance risk. The provisions in the CPRA may apply to some of our business activities.

In addition to California, a number of other states have passed comprehensive privacy laws similar to the CCPA and CPRA. These laws are either in effect or will go into effect sometime over the next several years. Like the CCPA and CPRA, these laws create obligations related to the processing of personal information, as well as special obligations for the processing of "sensitive" data, which includes health data in some cases. Some of the provisions of these laws may apply to our business activities. There are also states that are strongly considering or have already passed comprehensive privacy laws that will go into effect in 2025 and beyond. Other states will be considering similar laws in the future, and Congress has also been debating passing a federal privacy law. There are also states that are specifically regulating health information that may affect our business. For example, the State of Washington passed the My Health My Data Act in 2023 which specifically regulates the collecting and sharing of health information that is not otherwise regulated by the HIPAA rules, and the law also has a private right of action, which further increases the relevant compliance risk. Connecticut and Nevada have also passed similar laws regulating consumer health data, and more states are considering such legislation in 2025. These laws may impact our business activities, including our identification of research subjects, relationships with business partners and ultimately the marketing and distribution of our product candidates, if approved.

Plaintiffs' lawyers are also increasingly using privacy-related statutes at both the state and federal level to bring lawsuits against companies for their data-related practices. In particular, there have been a significant number of cases filed against companies for their use of pixels and other web trackers. These cases often allege violations of the California Invasion of Privacy Act and other state laws regulating wiretapping, as well as the federal Video Privacy Protection Act.

Patent Term Restoration and Extension

In the United States, a patent claiming a new biologic product, its method of use or its method of manufacture may be eligible for a limited patent term extension under the Hatch-Waxman Act, which permits a patent extension of up to five years for patent term lost during product development and FDA regulatory review. Assuming grant of the patent for which the extension is sought, the restoration period for a patent covering a product is typically one-half the time between the effective date of the IND clearing clinical studies and the submission date of the BLA, plus the time between the submission date of the BLA and the ultimate approval date. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product's approval date in the United States. Only one patent applicable to an approved product is eligible for the extension, and the application for the extension must be submitted prior to the expiration of the patent for which extension is sought. A patent that covers multiple products for which approval is sought can only be extended in connection with one of the approvals. The USPTO reviews and approves the application for any patent term extension in consultation with the FDA.

FDA Approval of Companion Diagnostics

In August 2014, the FDA issued final guidance clarifying the requirements that will apply to approval of therapeutic products and *in vitro* companion diagnostics. According to the guidance, for novel drugs, a companion diagnostic device and its corresponding therapeutic should be approved or cleared contemporaneously by the FDA for the use indicated in the therapeutic product's labeling. Approval or clearance of the companion diagnostic device will ensure that the device has been adequately evaluated and has adequate performance characteristics in the intended population. In July 2016, the FDA issued a draft guidance intended to assist sponsors of the drug therapeutic and *in vitro* companion diagnostic device

on issues related to co-development of the products. The 2014 guidance also explains that a companion diagnostic device used to make treatment decisions in clinical trials of a biologic product candidate generally will be considered an investigational device, unless it is employed for an intended use for which the device is already approved or cleared. If used to make critical treatment decisions, such as patient selection, the diagnostic device generally will be considered a significant risk device under the FDA's Investigational Device Exemption, or IDE, regulations. Thus, the sponsor of the diagnostic device will be required to comply with the IDE regulations. According to the guidance, if a diagnostic device and a product are to be studied together to support their respective approvals, both products can be studied in the same investigational study, if the study meets both the requirements of the IDE regulations and the IND regulations. The guidance provides that depending on the details of the study plan and subjects, a sponsor may seek to submit an IND alone, or both an IND and an IDE.

In April 2020, the FDA issued additional guidance which describes considerations for the development and labeling of companion diagnostic devices to support the indicated uses of multiple biological oncology products, when appropriate. The 2020 guidance expands on the policy statement in the 2014 guidance by recommending that companion diagnostic developers consider a number of factors when determining whether their test could be developed, or the labeling for approved companion diagnostics could be revised through a supplement, to support a broader labeling claim such as use with a specific group of oncology therapeutic products (rather than listing an individual therapeutic product(s)).

Under the FDCA, *in vitro* diagnostics, including companion diagnostics, are regulated as medical devices. In the United States, the FDCA and its implementing regulations, and other federal and state statutes and regulations govern, among other things, medical device design and development, pre-clinical and clinical testing, premarket clearance or approval, registration and listing, manufacturing, labeling, storage, advertising and promotion, sales and distribution, export and import, and post market surveillance. Unless an exemption applies, diagnostic tests require marketing clearance or approval from the FDA prior to commercial distribution.

The FDA previously has required *in vitro* companion diagnostics intended to select the patients who will respond to the product candidate to obtain pre-market approval, or PMA, simultaneously with approval of the therapeutic product candidate. The PMA process, including the gathering of clinical and pre-clinical data and the submission to and review by the FDA, can take several years or longer. It involves a rigorous premarket review during which the sponsor must prepare and provide the FDA with reasonable assurance of the device's safety, potency and purity and information about the device and its components regarding, among other things, device design, manufacturing and labeling. PMA applications are subject to an application fee. For federal fiscal year 2025, the standard fee is $540,783 and the small business fee is $135,196.

It is possible that an *in vitro* companion diagnostic device could be subject to FDA enforcement discretion from compliance with the FDCA if it meets the definition of a Laboratory Developed Test, or LDT. However, FDA issued a final rule in April 2024 to end enforcement discretion for LDTs and actively regulate such products as medical devices. Under this final rule, LDTs are required to come into compliance with the FDA's medical device regulatory requirements in a staged approach over the course of four years. The implementation of this LDT final rule could potentially be affected by the Executive Order, *Regulatory Freeze Pending Review*, issued by President Trump on January 20, 2025 and/or the anticipated change in leadership at the FDA under the new administration. Further, while the final regulation is set to take effect on May 6, 2025, a number of parties have challenged the legality of the LDT regulation in a federal district court. That court held a hearing on this matter on February 19, 2025, and is expected to issue a ruling shortly thereafter.

Coverage, Pricing, and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we may seek regulatory approval by the FDA or other government authorities. In the United States and markets in other countries, patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Patients are unlikely to use any product candidates a sponsor may develop unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of such product candidates. Even if any product candidates a sponsor may develop are approved, sales of such product candidates will depend, in part, on the extent to which third-party payors, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers, and managed care organizations, provide coverage, and establish adequate reimbursement levels for, such product candidates. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors are increasingly challenging the prices charged, examining the medical necessity, and reviewing the cost-effectiveness of medical products and services and

imposing controls to manage costs. Third-party payors may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable marketing approvals. Nonetheless, product candidates may not be considered medically necessary or cost effective. A decision by a third-party payor not to cover any product candidates a sponsor may develop could reduce physician utilization of such product candidates once approved and have a material adverse effect on a sponsor's sales, results of operations and financial condition. Additionally, a payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage and reimbursement for the product, and the level of coverage and reimbursement can differ significantly from payor to payor. Third-party reimbursement and coverage may not be available to enable a sponsor to maintain price levels sufficient to realize an appropriate return on a sponsor's investment in product development. In addition, any companion diagnostic tests require coverage and reimbursement separate and apart from the coverage and reimbursement for their companion pharmaceutical or biological products. Similar challenges to obtaining coverage and reimbursement, applicable to pharmaceutical or biological products, will apply to any companion diagnostics.

The containment of healthcare costs also has become a priority of federal, state and foreign governments and the prices of pharmaceuticals have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement, and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company's revenue generated from the sale of any approved products. 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 a company or its collaborators receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Outside the United States, ensuring adequate coverage and payment for any product candidates a sponsor may develop will face challenges. Pricing of prescription pharmaceuticals is subject to governmental control in many countries. Pricing negotiations with governmental authorities can extend well beyond the receipt of regulatory marketing approval for a product and may require a sponsor to conduct a clinical trial that compares the cost effectiveness of any product candidates a sponsor may develop to other available therapies. The conduct of such a clinical trial could be expensive and result in delays in a sponsor's commercialization efforts.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies (so called health technology assessments) in order to obtain reimbursement or pricing approval. For example, the European Union provides options for its member states to restrict the range of products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. EU member states may approve a specific price for a product or they may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other member states allow companies to fix their own prices for products but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. Recently, many countries in the European Union have increased the amount of discounts required on pharmaceuticals and these efforts could continue as countries attempt to manage healthcare expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the European Union. The downward pressure on healthcare costs in general, particularly prescription products, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. Political, economic, and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various EU member states, and parallel trade (arbitrage between low-priced and high-priced member states), can further reduce prices. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of a sponsor's products, if approved in those countries.

Healthcare Law and Regulation

Healthcare providers and third-party payors play a primary role in the recommendation and prescription of pharmaceutical products that are granted marketing approval. Arrangements with providers, consultants, third-party payors, and customers

are subject to broadly applicable fraud and abuse, anti-kickback, false claims laws, reporting of payments to physicians and teaching physicians and patient privacy laws and regulations and other healthcare laws and regulations that may constrain a sponsor's business and/or financial arrangements. Restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, receiving, or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid;
- the federal civil and criminal false claims laws, including the civil False Claims Act, and civil monetary penalties laws, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false, fictitious, or fraudulent or knowingly making, using, or causing to made or used a false record or statement to avoid, decrease, or conceal an obligation to pay money to the federal government;
- the Foreign Corrupt Practices Act, or the FCPA, which prohibits companies and their intermediaries from making, or offering or promising to make improper payments to non-U.S. officials for the purpose of obtaining or retaining business or otherwise seeking favorable treatment; and
- the federal transparency requirements under the ACA, which require certain manufacturers of drugs, devices, biologics and medical supplies to report annually to the Centers for Medicare & Medicaid Services, or the CMS, within the HHS, information related to payments and other transfers of value made by that entity to physicians, other healthcare providers, and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members.

Some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring pharmaceutical manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures. In addition, certain state and local laws require drug manufacturers to register pharmaceutical sales representatives in the jurisdiction. State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

If a sponsor's operations are found to be in violation of any of these laws or any other governmental regulations that may apply to a sponsor, a sponsor may be subject to significant civil, criminal, and administrative penalties, damages, fines, disgorgement, exclusion from government funded healthcare programs, such as Medicare and Medicaid, integrity oversight and reporting obligations, and the curtailment or restructuring of a sponsor's operations.

Healthcare Reform

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. There have been a number of federal and state proposals during the last few years regarding the pricing of pharmaceutical and biopharmaceutical products, limiting coverage and reimbursement for drugs and other medical products, government control and other changes to the healthcare system in the United States.

In March 2010, the U.S. Congress enacted the ACA, which, among other things, includes changes to the coverage and payment for products under government healthcare programs. Other legislative changes have been proposed and adopted in the United States since the ACA was enacted. For example, in August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2012 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of up to 2% per fiscal year, which will remain in effect through 2031 pursuant to the Coronavirus Aid, Relief and Economic Security Act, or the CARES Act.

The American Taxpayer Relief Act of 2012, which was enacted in January 2013, among other things, further reduced Medicare payments to several providers, including hospitals, imaging centers, and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Further, with passage of the Inflation Reduction Act in August 2022, or IRA, Congress extended the expansion of ACA premium tax credits through 2025. Those subsidies were originally extended through 2022 under the American Rescue Plan Act of

2021. These laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices a sponsor may obtain for any of a sponsor's product candidates for which a sponsor may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used.

Since enactment of the ACA, there have been, and continue to be, numerous legal challenges and Congressional actions to repeal and replace provisions of the law. For example, with enactment of the Tax Cuts and Jobs Act of 2017, or the TCJA, which was signed by President Trump on December 22, 2017, Congress repealed the "individual mandate." The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective in 2019 Further, on June 17, 2021, the U.S. Supreme Court dismissed a lawsuit after finding that the plaintiffs do not have standing to challenge the constitutionality of the ACA. Shortly after taking office in January 2025, President Trump revoked numerous executive orders issued by President Biden, including at least two executive orders (e.g., EO 14009, Strengthening Medicaid and the Affordable Care Act, and EO 14070, Continuing to Strengthen Americans' Access to Affordable, Quality Health Coverage) which were designed to further implement the ACA. We anticipate similar efforts to undermine the ACA, and litigation and legislation over the ACA are likely to continue, with unpredictable and uncertain results.

Pharmaceutical Prices

The prices of prescription pharmaceuticals have also been the subject of considerable discussion in the United States. There have been U.S. congressional inquiries, as well as proposed and enacted state and federal legislation designed to, among other things, bring more transparency to pharmaceutical pricing, review the relationship between pricing and manufacturer patient programs, and reduce the costs of pharmaceuticals under Medicare and Medicaid.

In addition, in October 2020, the HHS and the FDA published a final rule allowing states and other entities to develop a Section 804 Importation Program, or SIP, to import certain prescription drugs from Canada into the United States. That regulation was challenged in a lawsuit by the Pharmaceutical Research and Manufacturers of America, or PhRMA, but the case was dismissed by a federal district court in February 2023 after the court found that PhRMA did not have standing to sue the HHS. Several states have passed legislation establishing workgroups to examine the impact of a state importation program. Several states have also passed laws allowing for the importation of drugs from Canada. Certain of these states have submitted Section 804 Importation Program proposals and are awaiting FDA approval. On January 5, 2024, the FDA approved Florida's plan for Canadian drug importation. Florida now has authority to import certain products from Canada for a period of two years once certain conditions are met. Florida will first need to submit a pre-import request for each product selected for importation, which must be approved by the FDA. Florida will also need to relabel the products and perform quality testing of the products to meet FDA standards.

Further, on November 20, 2020, the HHS finalized 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. The IRA, further delayed implementation of this rule to January 1, 2032.

The IRA has implications for Medicare Part D, which is a program available to individuals who are entitled to Medicare Part A or enrolled in Medicare Part B to give them the option of paying a monthly premium for outpatient prescription drug coverage. Among other things, the IRA requires manufacturers of certain drugs to engage in price negotiations with Medicare beginning in 2026, with prices that can be negotiated subject to a cap; and it replaces the Part D coverage gap discount program with a new discounting program beginning in 2025. In addition, the IRA established inflation rebate programs under Medicare Part B and Part D. These programs require manufacturers to pay rebates to Medicare if they raise their prices for certain Part B and Part D drugs faster than the rate of inflation. On December 9, 2024, with issuance of its 2025 Physician Fee Schedule final regulation, CMS finalized its rules governing the IRA inflation rebate programs. Further, the legislation subjects drug manufacturers to civil monetary penalties and a potential excise tax for failing to comply with the legislation by offering a price that is not equal to or less than the negotiated "maximum fair price" under the law or for taking price increases that exceed inflation. The IRA permits the Secretary of HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years.

Specifically, with respect to price negotiations, Congress authorized Medicare to negotiate lower prices for certain costly single-source drug and biologic products that do not have competing generics or biosimilars and are reimbursed under Medicare Part B and Part D. The CMS may negotiate prices for ten high-cost drugs paid for by Medicare Part D starting in 2026, followed by 15 additional Part D drugs in 2027, 15 additional Part B or Part D drugs in 2028, and 20 additional Part

B or Part D drugs in 2029 and beyond. This provision applies to drug products that have been approved for at least nine years and biologics that have been licensed for 13 years.

The IRA includes a provision exempting orphan drugs from Medicare price negotiations but this exclusion has been interpreted by CMS in final guidance issued in July 2023 to apply only to those orphan drugs with an approved indication (or indications) for a single rare disease or condition. Thus, a biologic that is designated for more than one rare disease or condition will not qualify for the orphan drug exclusion, even if it is not approved for any indications for the additional diseases or conditions. The final guidance clarifies that CMS will consider only active designations/approvals when evaluating a drug for the exclusion, such that designations/indications withdrawn before the selected drug publication date will not be considered. CMS also clarified that, if a drug loses its orphan drug exclusion status, the agency will use the earliest date of approval/licensure to determine whether the product is a qualifying single source drug subject to price negotiations.

The first cycle of negotiations for the Medicare Drug Price Negotiation Program commenced in the summer of 2023. On August 15, 2024, the HHS published the results of the first Medicare drug price negotiations for ten selected drugs that treat a range of conditions, including diabetes, chronic kidney disease, and rheumatoid arthritis. The prices of these ten drugs will become effective January 1, 2026. On January 17, 2025, shortly before the new administration took office, CMS announced its selection of 15 additional drugs covered by Part D for the second cycle of negotiations. There has been uncertainty about the extent to which the new administration would support the price negotiation program. Following the change in administrations, CMS issued a public statement on January 29, 2025, declaring that lowering the cost of prescription drugs is a top priority of the new administration and CMS is committed to considering opportunities to bring greater transparency in the negotiation program. The second cycle of negotiations with participating drug companies will occur during 2025, and any negotiated prices for this second set of drugs will be effective starting January 1, 2027.

On June 6, 2023, Merck & Co. filed a lawsuit against the HHS and the CMS asserting that, among other things, the IRA's Drug Price Negotiation Program for Medicare constitutes an uncompensated taking in violation of the Fifth Amendment of the Constitution. Subsequently, a number of other parties, including the U.S. Chamber of Commerce and pharmaceutical companies, also filed lawsuits in various courts with similar constitutional claims against the HHS and the CMS. HHS has generally won the substantive disputes in these cases, and various federal district court judges have expressed skepticism regarding the merits of the legal arguments being pursued by the pharmaceutical industry. Certain of these cases are now on appeal and, on October 30, 2024, the Court of Appeals for the Third Circuit heard oral argument in three of these cases. We expect that litigation involving these and other provisions of the IRA will continue, with unpredictable and uncertain results.

At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. A number of states, for example, require pharmaceutical manufacturers and other entities in the supply chain, including health carriers, pharmacy benefit managers, wholesale distributors, to disclose information about pricing of pharmaceuticals. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other healthcare programs. These measures could reduce the ultimate demand for a sponsor's products, once approved, or put pressure on a sponsor's product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures. This is increasingly true with respect to products approved pursuant to the accelerated approval pathway. State Medicaid programs and other payers are developing strategies and implementing significant coverage barriers, or refusing to cover these products outright, arguing that accelerated approval drugs have insufficient or limited evidence despite meeting the FDA's standards for accelerated approval.

Human Capital

Employee Matters

As of December 31, 2024, we had 46 full-time employees, including a total of 22 employees with M.D. or Ph.D. degrees, all of whom are located in the United States. Of these full-time employees, 40 were engaged in research and development activities. On March 31, 2025, in connection with our cash preservation plan, we reduced our employee base to 6 employees, each of whom we believe is necessary to evaluate our strategic alternatives and execute an orderly wind down

of our operations. None of our employees are represented by labor unions or covered by collective bargaining agreements. We consider our relationship with our existing employees to be good.

As a result of the wind down process, our human capital objectives are focused on retaining and incentivizing our management team and other employees as we continue to evaluate our strategic alternatives and prepare for wind down of our operations.

Cost Reduction Measures

In March 2024, our board of directors approved a reduction in force of 39 full-time employees (representing approximately 37% of our total workforce), including certain employees engaged in research and development activities and certain finance and corporate employees. In December 2024, our board of directors approved a further reduction in force of 23 full-time employees (representing approximately 34% of our total workforce) including certain employees engaged in research and development and manufacturing activities and certain finance and corporate employees. In March 2025, in connection with approving our cash preservation plan, our board of directors approved a further reduction in force of 42 full-time employees (representing approximately 95% of our total workforce at that time including certain employees engaged in research and development and manufacturing activities and certain finance and corporate employees).

Our Corporate Information

Our principal executive offices are located at 3675 Market Street, Suite 401, Philadelphia, PA, and our telephone number is (267) 491-6422. Our website address is *httpp://www.carismatx.com*. The information contained on, or that can be accessed through, our website is not a part of this Annual Report on Form 10-K. We have included our website address in this Annual Report on Form 10-K solely as an inactive textual reference.

We own or have rights to, or have applied for, trademarks, service marks and trade names that we use in connection with the operation of our business, including our corporate name, logos and website names. Other trademarks, service marks and trade names appearing in this Annual Report on Form 10-K are the property of their respective owners. Solely for convenience, some of the trademarks, service marks and trade names referred to in this Annual Report on Form 10-K are listed without the ® and ™ symbols.

Available Information

We make available, through our website *httpp://www.carismatx.com*, our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended as soon as reasonably practicable after we electronically file such material with the Securities and Exchange Commission, or the SEC. We have included our website address in this Annual Report on Form 10-K solely as an inactive textual reference.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. You should carefully consider the risk factors set forth below, as well as the other information in this Annual Report on Form 10-K, including our financial statements and the related notes and the section of this Annual Report on Form 10-K titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" before deciding whether to purchase our securities. The risks and uncertainties we describe below and in the documents mentioned above are not the only ones we face. Although we currently have no intention of resuming research and development activities, certain risks and uncertainties we describe below relate to our prior operations and historical activities. Additional risks and uncertainties not presently known to us could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our securities, and the occurrence of any of these risks might cause you to lose all or part of your investment.

Summary of Risk Factors
Risks Related to Our Evaluation of Strategic Alternatives and Wind Down

- Our exploration and pursuit of strategic alternatives may not be successful.
- If we do not successfully identify a strategic alternative or, if such a strategic alternative is identified, consummate such a transaction, it is highly unlikely that there will be cash available for distribution to our stockholders.

- Even if we do consummate a strategic alternative, the amount of cash available for distribution to our stockholders, if any, will depend heavily on the proceeds derived from the strategic transaction, the timing of any distribution to stockholders, whether as a dividend or through a liquidation and dissolution of our business, as well as the amount of cash that will need to be reserved for commitments and contingent liabilities.
- We may elect to commence bankruptcy or liquidation and dissolution proceedings, and such proceedings may delay our wind down timeframe, increase our costs, and decrease the cash, if any, that may be available for stockholders.
- We may experience difficulties, delays or unexpected costs and not achieve anticipated benefits and savings from our cash preservation plan, and our wind down activities may adversely affect our ability to consummate a strategic transaction that enhances stockholder value.
- We will be substantially dependent on our remaining employees and consultants, along with any other advisors and consultants we may engage, to facilitate the consummation of a strategic transaction and orderly wind down process.

Risks Related to Our Financial Position and Need for Additional Capital

- Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. Significant additional financing may not be available to us on acceptable terms, or at all.
- We have incurred significant losses since our inception. We expect to continue to incur losses while we explore strategic alternatives and carry out the orderly wind down of our operations and may never achieve or maintain profitability.
- Our independent registered public accounting firm has included an explanatory paragraph relating to our ability to continue as a going concern in its report on our audited consolidated financial statements included in this Annual Report on Form 10-K.
- We have never generated revenue from product sales and may never achieve or maintain profitability.
- Our limited operating history and our cash preservation plan may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

Risks Related to Our Historical Discovery Programs and Research and Development of Our Product Candidates

- Cell therapy is a rapidly evolving area of science, and the approach we have taken to discover and develop product candidates by utilizing genetically modified macrophages is novel and may never lead to approved or marketable products.
- We are early in our development efforts. If we are unable to commercialize our product candidates or experiences significant delays in doing so, our business will be materially harmed.
- If we experience delays or difficulties in the enrollment of patients in clinical trials our product candidates, our receipt of necessary marketing approvals could be delayed or prevented.
- We may conduct clinical trials at sites outside the United States. The FDA may not accept data from trials conducted in such locations, and the conduct of trials outside the United States could subject us to additional delays and expense.
- We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Risks Related to the Commercialization of Our Product Candidates

- Even if any of our product candidates receives marketing approval, we may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success, and the market opportunity for any of our product candidates, if approved, may be smaller than we estimate.
- We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do, thus rendering our products non-competitive, obsolete or reducing the size of the market for our product candidates

Risks Related to Our Dependence on Third Parties

- We currently rely, and may in the future rely, on single-source suppliers for certain materials and components used in the manufacturing of our product candidates. Any disruption in supply from these single-source suppliers could lead to supply delays or interruptions which would materially adversely affect our business, financial condition and results of operations.
- We expect to depend on collaborations with third parties for the research, development and commercialization of certain of our product candidates, including our collaboration agreement with Moderna. We cannot be certain Moderna will take the steps to achieve any of the milestones under the collaboration agreement, all of which are outside of our control, and as such, we may not be entitled to receive any remaining milestone payments or any royalty payments. If our collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates and our business could be adversely affected.

Risks Related to Our Intellectual Property

- If we are unable to obtain, maintain and enforce patent protection for our technology and product candidates or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and any ability to successfully develop and commercialize our technology and product candidates and to compete effectively may be adversely affected.

Risks Related to our Common Stock

- The market price of our common stock is volatile, and the market price of our common stock may drop in the future.
- We do not currently meet the requirements for continued listing on the Nasdaq Global Market. If we fail to meet the requirements for continued listing on the Nasdaq Global Market, our common stock could be delisted from trading, which would have a negative effect on the price of our common stock and our ability to raise additional capital.
- We incur and will continue to incur additional costs and increased demands upon management as a result of complying with the laws and regulations affecting public companies.
- If at some point we are no longer a "smaller reporting company" or otherwise no longer qualify for applicable exemptions, we will be subject to additional laws and regulations affecting public companies that will increase our costs and the demands on management and could harm our operating results.

Risks Related to Our Evaluation of Strategic Alternatives and Wind Down

Our exploration and pursuit of strategic alternatives may not be successful.

As part of a further revised plan approved by our board of directors on March 25, 2025 to preserve our existing cash resources following reduction in workforce, or our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Our cash preservation plan prioritizes payments necessary and appropriate for those reduced operations and those that will help to evaluate our strategic alternatives. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction.

We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to work with the financial advisor on identifying and evaluating potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

Although we believe that our current cash and cash equivalents are sufficient to sustain our operating expenses and capital expenditure requirements into the second half of 2025, we do not expect that our cash and cash equivalents will support our operations for more than one year following the date of this Annual Report on Form 10-K. As such, we only have a short period of time to identify and explore a range of strategic alternatives before we deplete our resources. The process may not result in any definitive offer to consummate such a transaction, or, if we receive such a definitive offer, the terms may not be as favorable as anticipated or may not result in the execution or approval of a definitive agreement. Even if we enter into

a definitive agreement, we may not be successful in completing a transaction or, if we complete such a transaction, it may not enhance stockholder value or deliver expected benefits.

Any strategic alternatives may involve or may be pursued through legal proceedings including bankruptcy or liquidation and dissolution proceedings, and such proceedings may also be necessary or appropriate in the absence of any strategic alternatives. In the event that our board of directors determines that a liquidation and dissolution of our business approved by stockholders is desirable or the best method to maximize value, we would prepare proxy materials and schedule a special meeting of our stockholders to seek approval of such a plan. For a discussion of the actions we have taken to date in connection with our cash preservation Plan, please see "Business – Recent Developments – 2025 Cash Preservation Plan."

If we do not successfully identify a strategic alternative or, if such a strategic alternative is identified, consummate such a transaction, it is highly unlikely that there will be cash available for distribution to our stockholders.

Our available cash resources continue to decrease in connection with our wind down activities as we evaluate our strategic alternatives. There can be no assurance that the process to identify a strategic alternative for our business will result in a successfully consummated transaction. If we do not successfully identify a strategic alternative or, if such a strategic alternative is identified, it is highly unlikely that there will be cash available for distribution to our stockholders. Accordingly, holders of our common stock and other securities would lose all of their investment in the company.

Even if we do consummate a strategic alternative, the amount of cash available for distribution to our stockholders, if any, will depend heavily on the proceeds derived from the strategic transaction, the timing of any distribution to stockholders, whether as a dividend or through a liquidation and dissolution of our business, as well as the amount of cash that will need to be reserved for commitments and contingent liabilities.

Even if we do consummate a strategic alternative, the amount of cash available for distribution to our stockholders, if any, will depend heavily on the proceeds derived from the strategic transaction, the timing of any distribution to stockholders, whether as a dividend or through a liquidation and dissolution of our business, as well as the amount of cash that will need to be reserved for commitments and contingent liabilities. Our available cash resources continue to decrease in connection with our wind down activities as we evaluate our strategic alternatives. We cannot assure our stockholders of any recovery, or any specific level of recovery, on their claims and interests if we were to determine to pay a dividend or seek a liquidation or dissolution in connection with a strategic transaction. Our estimates of these amounts may be inaccurate. Accordingly, holders of our common stock and other securities could lose all or a significant portion of their investment in the company.

We may elect to commence bankruptcy or liquidation and dissolution proceedings, and such proceedings may delay our wind down timeframe, increase our costs, and decrease the cash, if any, that may be available for stockholders.

Any strategic alternatives may involve or may be pursued through legal proceedings including bankruptcy or liquidation and dissolution proceedings, and such proceedings may also be necessary or appropriate in the absence of any strategic alternatives. In the event that our board of directors determines that a liquidation and dissolution of our business approved by stockholders is desirable or the best method to maximize value, we would prepare proxy materials and schedule a special meeting of our stockholders to seek approval of such a plan. Any such proceedings may increase the timeframe for executing strategic alternative transactions or otherwise winding down the company, may increase the costs of those actions, and may decrease the cash, if any, that may be available for stockholders.

We may experience difficulties, delays or unexpected costs and not achieve anticipated benefits and savings from our cash preservation plan, and our wind down activities may adversely affect our ability to consummate a strategic transaction that enhances stockholder value.

As part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. The reduction in workforce was effective on March 31, 2025. The reduction in workforce includes 37 of our full-time employees (representing approximately 84% of our total workforce), including certain employees engaged in research and development, manufacturing and corporate activities. We expect to incur approximately $3.8 million in connection with the reduction in workforce, which primarily represents one-time employee termination benefits directly associated with the workforce reduction. We also expect to pay the majority of related reduction in workforce amounts by the end of this year. We may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated with, this reduction in workforce.

While we have retained employees we deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations, the reduction in workforce resulted in the loss of a number of long-term employees, the loss of institutional knowledge and expertise, and the reallocation of certain job responsibilities, all of which could negatively

affect operational efficiencies and increase our operating expenses such that we may not fully realize anticipated savings from the wind down and complete a potential strategic transaction on terms that are favorable to us, or at all.

Further, if we were to resume research and development activities, this reduction in workforce could also make it difficult for us to pursue, or prevent us from pursuing, new opportunities and initiatives due to insufficient personnel, or require us to incur additional and unanticipated costs to hire new personnel to pursue such opportunities or initiatives. If we are unable to realize the anticipated benefits from the reduction in force, or if we experience significant adverse consequences from the reduction in force, our business, financial condition and results of operations may be materially adversely affected.

We will be substantially dependent on our remaining employees and consultants, along with any other advisors and consultants we may engage, to facilitate the consummation of a strategic transaction.

In connection with our cash preservation plan, we have terminated all but seven of our employees as of March 31, 2025. Our ability to successfully identify, evaluate and pursue a strategic alternative and any consummation of such a transaction depends in large part on our ability to retain our remaining employees and consultants along with any other advisors and consultants we may engage. One or more may terminate their engagement with us on short notice. It is also possible that we will determine to undertake future reductions in workforce. The loss of the services of any of these individuals could potentially harm our ability to identify, evaluate and pursue strategic alternatives, as well as engage in orderly wind down activities fulfill our continuing reporting obligations as a public company.

We may become involved in securities class action litigation that could divert management's attention and harm our business, and insurance coverage may not be sufficient to cover all costs and damages.

In the past, securities class action litigation has often followed certain significant business transactions, such as the sale of a company or announcement of any other strategic transaction, or the announcement of negative events, such as negative regulatory decisions or a determination to wind down operations. These events may also result in investigations by the Securities and Exchange Commission. We may be exposed to such litigation or investigation even if no wrongdoing occurred. Litigation and investigations are usually expensive and divert management's attention and resources, which could adversely affect our cash resources and our ability to consummate a potential strategic transaction.

Risks Related to Our Financial Position and Need for Additional Capital

Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. Significant additional financing may not be available to us on acceptable terms, or at all.

While we currently have no intention of resuming research and development activities, any future resumption of such activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. Our exploration of strategic alternatives may not result in the consummation of any transaction that provides additional funding to our company. Significant additional financing may not be available to us on acceptable terms, or at all, and may be impacted by the economic climate and market conditions.

To the extent that we are able to raise additional capital through the public or private sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of those securities may include liquidation or other preferences that adversely affect your rights as a holder of our common stock. Debt financing and preferred equity financing, if available, would increase our fixed payment obligations and may involve agreements that include covenants limiting or restricting our operations and ability to take specific actions, such as incurring additional debt, making acquisitions, engaging in acquisition, merger or collaboration transactions, selling or licensing our assets, making capital expenditures, redeeming our stock, making certain investments, declaring dividends or other operating restrictions that could adversely impact our ability to conduct business.

If we are able to raise funds through a strategic collaboration or partnership with one or more parties, we may have to relinquish valuable rights to our intellectual property, future revenue streams, discovery programs or product candidates, grant licenses on terms that may not be favorable to us or grant rights to develop and market product candidates that we would otherwise prefer to develop and market on our own, any of which may have a material adverse effect on our business, operating results and prospects.

If we were to resume research and development activities, our future capital requirements will depend on many factors, including:

- the progress, costs and results of pre-clinical testing of our product candidates;
- the progress, costs and results of clinical trials of our product candidates;
- the number of and development requirements for additional indications for our product candidates;
- the success of our collaborations with Moderna or others;
- our ability to scale up our manufacturing processes and capabilities to support clinical trials of the product candidates we are developing and may develop in the future;
- the costs, timing and outcome of regulatory review of our product candidates;
- potential changes in the regulatory environment and enforcement rules;
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of such arrangements;
- the payment of license fees and other costs of our technology license arrangements;
- the costs and timing of future commercialization activities, including product manufacturing, sales, marketing and distribution, for our product candidates;
- our ability to obtain and maintain acceptance of any approved products by patients, the medical community and third-party payors;
- the amount and timing of revenue, if any, received from commercial sales of any of our product candidates for which we receive marketing approval;
- potential changes in pharmaceutical pricing and reimbursement infrastructure;
- the availability of raw materials for use in production of our product candidates;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property and proprietary rights and defending any intellectual property-related claims; and
- the extent to which we in-license or acquire additional technologies or product candidates.

We have incurred significant losses since our inception. We have very limited cash resources remaining and a very short operating runway before we deplete our cash resources. We expect to continue to incur significant expenses and operating losses while we explore strategic alternatives and carry out the orderly wind down of our operations.

Since inception, we have incurred significant operating losses. Our net losses were $60.5 million and $86.9 million for the years ended December 31, 2024 and 2023, respectively. We expect to continue to incur significant expenses and operating losses while we explore strategic alternatives and carry out the orderly wind down of our operations, including the payment one-time employee termination benefits to terminated employees. We may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated with, our reduction in workforce.

As of December 31, 2024, we had cash and cash equivalents of $17.9 million. Although we believe that our current cash and cash equivalents are sufficient to sustain our operating expenses and capital expenditures requirements into the second half of 2025, we do not expect that our cash and cash equivalents will support our operations for more than one year following the date of this Annual Report on Form 10-K. As a result of these conditions, substantial doubt exists about our ability to continue as a going concern. We have based this estimate on assumptions that may prove to be wrong. In addition, changing circumstances could cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more than currently expected because of circumstances beyond our control. As a result, we could deplete our capital resources sooner than we currently expect, including before we are able to consummate a strategic alternative. Our exploration of strategic alternatives may not result in the consummation of any transaction that provides additional funding to our company.

To date, we have not yet commercialized any products or generated any revenue from product sales and have financed our operations primarily with proceeds from sales of our preferred stock, proceeds from our collaboration with Moderna, research tax credits, convertible debt financing and completion of the Merger and related financing. Because Moderna nominated all 12 oncology research targets under the collaboration agreement as of February 2025, we will no longer be conducting any additional research activities under the collaboration agreement and we will not be receiving any further payments from Moderna for research and development services under the collaboration agreement. Significant additional financing may not be available to us on acceptable terms, or at all, and may be impacted by the economic climate and market conditions.

We have historically devoted substantially all of our financial resources and efforts to pursuing discovery, research and early clinical development of our product candidates. As part of our cash preservation plan, we determined to pause all of

our research and development activities. Although we currently have no intention of resuming research and development activities, any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding.

If we were to resume research and development activities, we anticipate that our expenses will increase substantially if and as we:

- enhance the capabilities of our CAR-M platform;
- conduct discovery and pre-clinical testing of our product candidates;
- submit investigational new drug, or IND, applications in order to commence clinical trials;
- initiate, enroll patients in and conduct clinical trials;
- conduct discovery and pre-clinical testing of our autologous cell therapy pipeline to gather information to apply to the development of off-the-shelf engineered macrophage therapeutics;
- develop iPSC-derived CAR-M, and other macrophage therapies;
- develop *in vivo* reprogrammed mRNA/LNP CAR-M therapies for cancer;
- develop viral vectors to effectively engineer human monocytes and macrophages, including the Vpx lentiviral vector and our Ad5f35 vector;
- seek marketing approval for our product candidates if we successfully complete clinical trials;
- scale up our external manufacturing capabilities and capabilities to support clinical trials of our product candidates and for commercialization of any product candidate for which we may obtain marketing approval;
- establish a sales, marketing and distribution infrastructure to commercialize any product candidate for which we may obtain marketing approval;
- in-license or acquire additional technologies or product candidates;
- make any payments under our existing or future strategic collaboration agreements, global exclusive rights licensing agreements or sponsored research agreements, including with Moderna;
- maintain, expand, enforce and protect our intellectual property portfolio;
- hire additional clinical, regulatory, manufacturing, quality control, development and scientific personnel; and
- add operational, financial and management information systems and personnel, including personnel to support our discovery, product development and planned future commercialization efforts and our operations as a public company.

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 or maintain profitability. If we were to resume our research and development activities, our expenses could increase beyond our expectations if, among other things:

- we are required by regulatory authorities in the United States, Europe, or other jurisdictions to perform trials or studies in addition to, or different than, those that we currently expect;
- there are any delays in establishing appropriate manufacturing arrangements for or completing the development of any of our product candidates; or
- there are any third-party challenges to our intellectual property or our needs to defend against any intellectual property-related claim.

Even if we obtain marketing approval for and are successful in commercializing one or more of our product candidates, we expect to incur substantial additional discovery and product development and other expenditures to develop and market additional product candidates or to expand the approved indications of any marketed product. We may encounter unforeseen expenses, difficulties, complications, delays and other known or 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 independent registered public accounting firm has included an explanatory paragraph relating to our ability to continue as a going concern in its report on our audited consolidated financial statements included in this Annual Report on Form 10-K.

The report from our independent registered public accounting firm for the year ended December 31, 2024 includes an explanatory paragraph stating that our recurring losses raise substantial doubt about our ability to continue as a going concern. In connection with our cash preservation plan, we expect to continue to incur significant expenses and operating losses while we explore strategic alternatives and carry out the orderly wind down of our operations. Our exploration of

strategic alternatives may not result in the consummation of any transaction that provides additional funding to our company.

We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to identify and evaluate potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

If we are unable to continue as a going concern, we may have to liquidate our assets and may receive less than the value at which those assets are carried on our audited financial statements, and it is likely that investors will lose all or a part of their investment.

We have never generated revenue from product sales and may never achieve or maintain profitability.

Prior to pausing research and development activities, we were in the early stages of development of our product candidates. If we were to resume research and development activities, we expect that it will be a number of years, if ever, before we have a product candidate ready for commercialization. To become and remain profitable, we must succeed in completing development of, obtaining marketing approval for and eventually commercializing, one or more products that generate significant revenue. The ability to achieve this success would require us to be effective in a range of challenging activities, including completing pre-clinical testing and clinical development, timely filing and receiving acceptance of our IND applications in order to commence clinical trials, initiating, enrolling patients in and completing clinical development of our product candidates, scaling up our manufacturing processes and capabilities to support clinical trials, obtaining marketing approval for our product candidates, manufacturing, marketing and selling any products for which we may obtain marketing approval and maintaining a continued acceptable safety profile of our products following approval. We may never succeed in these activities and, even if we do, we may never generate revenues that are significant enough to achieve profitability.

Even if we were to achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, maintain our discovery and product development efforts, diversify our pipeline of product candidates or even continue our operations.

Our limited operating history and our cash preservation plan may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We were formed as Carma Therapeutics LLC, a Pennsylvania limited liability company, in April 2016 and converted to a Delaware corporation in May 2017 under the name CARISMA Therapeutics Inc. In connection with the Merger consummated in March 2023, CARISMA Therapeutics Inc. merged with and into a wholly-owned subsidiary of Sesen Bio and was renamed “CTx Operations, Inc.” Sesen Bio's name was changed to “Carisma Therapeutics Inc.” Following the completion of the Merger, the business conducted by the public company became primarily the business conducted by us. We are a biotechnology company with a limited operating history. Cell therapy product development is a highly speculative undertaking and involves a substantial degree of risk. Our operations historically have been limited to organizing and staffing our company, business planning, capital raising, establishing and maintaining our intellectual property portfolio, building our pipeline of product candidates, conducting drug discovery activities, undertaking pre-clinical studies, manufacturing process development studies, conducting early-stage clinical trials, and providing general and administrative support for these operations.

In connection with our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction. We currently have no intention of resuming research and development activities. Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. As part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations.

Our prospects must be considered in light the foregoing and in light of the uncertainties, risks, expenses and difficulties frequently encountered by companies in their early stages of operations. Prior to pausing our research and development

activities, we had not yet demonstrated our ability to successfully develop any product candidate, obtain marketing approvals, manufacture a commercial scale product or arrange for a third party to do so on our behalf, or conduct sales, marketing and distribution activities necessary for successful product commercialization. We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to identify and evaluate potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. Our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders. Consequently, any predictions you make about our future success or viability may not be as accurate.

In addition we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown obstacles. If resume research and clinical activities, we will need to transition at some point from a company with a discovery and pre-clinical focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

We expect our financial condition and operating results to fluctuate significantly from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. Accordingly, you should not rely upon the results of any quarterly or annual periods as indications of future operating performance.

Changes in tax law may adversely affect us or our investors.

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. It cannot be predicted whether, when, in what form or with what effective dates tax laws, regulations and rulings may be enacted, promulgated or issued, which could result in an increase in our or our stockholders' tax liability or require changes in the manner in which we operate in order to minimize or mitigate any adverse effects of changes in tax law. Prospective investors should consult their tax advisors regarding the potential consequences of changes in tax law on our business and on the ownership and disposition of our common stock.

Our ability to use our net operating losses and research and development tax credit carryforwards to offset future taxable income may be subject to certain limitations.

Prior to the Merger, we had a history of cumulative losses and anticipate that we will continue to incur significant losses in the foreseeable future. As a result, we do not know whether or when we will generate taxable income necessary to utilize our net operating losses, or NOLs, or research and development tax credit carryforwards.

In general, under Section 382 of the Code and corresponding provisions of state law, a corporation that undergoes an "ownership change," generally defined as a greater than 50 percentage point change (by value) in our equity ownership by certain stockholders over a three-year period, is subject to limitations on our ability to utilize our pre-change NOLs and research and development tax credit carryforwards to offset future taxable income. We have not conducted a study to assess whether any such ownership changes have occurred. We may have experienced such ownership changes in the past and may experience such ownership changes in the future (which may be outside our control). As a result, if and to the extent we earn net taxable income, our ability to use our pre-change NOLs and research and development tax credit carryforwards to offset such taxable income may be subject to limitations.

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We currently have no intention of resuming research and development activities independently or as a standalone company, and the following are risks primarily relating to our prior operations and historical activities, unless otherwise noted.

Risks Related to Our Historical Discovery Programs and Research and Development of Our Product Candidates

Cell therapy is a rapidly evolving area of science, and the approach we have taken to discover and develop product candidates by utilizing genetically modified macrophages and monocytes is novel and may never lead to approved or marketable products.

Cell therapy has yet to be broadly applied to solid tumors, inflammatory disease, fibrotic disease or neurodegeneration. The discovery, research and development of engineered macrophages and monocytes to treat disease is an emerging field and our CAR-M platform, which is the first CAR-M to be evaluated in a human clinical trial, is a relatively new technology. Our future success depends on the successful development of this novel therapeutic approach. The scientific evidence to support the feasibility of developing product candidates based on these discoveries is both preliminary and limited. As such, there may be adverse effects or limited favorable results from treatment with any of our product candidates that we cannot predict at this time.

Our success also depends on our successful application of our proprietary macrophage engineering platform in the combination setting and to other indications by reprogramming the target specificity of our CAR-M cell product and developing product candidates against a plethora of tumor associated antigens, including in therapeutic areas beyond oncology. However, our macrophage engineering platform may not allow us to generate new INDs to expand our pipeline on our anticipated timeline or in a cost-efficient manner or at all, which could cause the potential value of our business to decline and materially harm our business prospects.

As a result of these factors, it is more difficult for us to predict the time and cost of product candidate development, and we cannot predict whether the application of macrophage engineering platform will result in the development and marketing approval of any products. Any development problems we experience in the future related to our macrophage engineering platform or any of our discovery programs may cause significant delays or unanticipated costs or may prevent the development of a commercially viable product. Any of these factors may prevent us from completing our clinical trials or pre-clinical studies or commercializing any product candidates we may develop on a timely or profitable basis, if at all.

We are early in our development efforts. If we are unable to commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.

We are early in our development efforts. Prior to pausing research and development activities as part of our cash preservation plan, we were focusing our development efforts on CT-2401, our product candidate in development for liver fibrosis, and CT-1119, our product candidate in development for mesothelin-positive solid tumors. We have not initiated clinical development of either CT-2401 or CT-1119. We had planned to conduct pre-clinical development of CT-2401 sufficient to enable a regulatory submission to initiate a clinical trial. We had also planned to initiate a Phase 1 clinical trial of CT-1119, a mesothelin-targeted CAR-Monocyte, in combination with tislelizumab, an anti-PD-1 antibody, in adult patients with mesothelin-positive solid tumors.

Our ability to generate revenues from product sales, which we do not expect will occur for a number of years, if ever, will depend heavily on the successful development, marketing approval and eventual commercialization of our product candidates, which may never occur. The success of our product candidates will depend on many factors, including the following:

- successfully completing pre-clinical studies;
- timely filing and receiving clearance of IND applications to commence clinical trials;
- successfully initiating, enrolling patients in and completing clinical trials;
- scaling up manufacturing processes and capabilities to support clinical trials;
- applying for and receiving marketing approvals from applicable regulatory authorities;
- obtaining and maintaining intellectual property protection and regulatory exclusivity for our product candidates;
- making arrangements with third-party manufacturers, or establishing commercial manufacturing capabilities, for both clinical and commercial supplies of our product candidates;
- establishing sales, marketing and distribution capabilities and launching commercial sales of our products, 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;
- obtaining and maintaining coverage, adequate pricing and adequate reimbursement from third-party payors, including government payors;
- maintaining, enforcing, defending and protecting our rights in our intellectual property portfolio;
- not infringing, misappropriating or otherwise violating others' intellectual property or proprietary rights; and
- maintaining a continued acceptable safety profile of our products following receipt of any marketing approvals.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully develop and commercialize our product candidates, which would materially harm our business. As a company, we have limited experience in clinical development. Any predictions about the future success or viability of our product candidates we are developing or may develop in the future may not be as accurate as they could be if we had a longer history of conducting clinical trials.

Drug development involves a lengthy and expensive process, with an uncertain outcome. The results of pre-clinical studies and early clinical trials may not be predictive of future results. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

The risk of failure for our product candidates is high. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive marketing approval. Before obtaining marketing approval from regulatory authorities for the sale of a product candidate, we must complete pre-clinical development and then conduct extensive clinical trials to demonstrate the safety and efficacy of such product candidate in humans. Clinical trials may fail to demonstrate that our product candidates are safe for humans and effective for indicated uses. Even if the clinical trials are successful, changes in marketing approval policies during the development period, changes in or the enactment or promulgation of additional statutes, regulations or guidance or changes in regulatory review for each submitted product application may cause delays in the approval or rejection of an application.

Before we can commence clinical trials for a product candidate, we must complete extensive pre-clinical testing and studies, manufacturing process development studies, and analytical development studies that support our planned INDs and other applications to regulatory authorities in the United States or similar applications in other jurisdictions. We cannot be certain of the timely completion or outcome of our pre-clinical testing and studies and cannot predict if the outcome of our pre-clinical testing and studies will ultimately support the further development of our product candidates or whether regulatory authorities will accept our proposed clinical programs. As a result, we may not be able to submit applications to initiate clinical development of product candidates on the timelines we expect, if at all, and the submission of these applications may not result in regulatory authorities allowing clinical trials to begin. Furthermore, product candidates are subject to continued pre-clinical safety studies, which may be conducted concurrently with our clinical testing. The outcomes of these safety studies may delay the launch of or enrollment in future clinical trials and could impact our ability to continue to conduct our clinical trials.

Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to the outcome. We cannot guarantee that any of our clinical trials will be conducted as planned or completed on schedule, or at all. A failure of one or more clinical trials can occur at any stage of testing, which may result from a multitude of factors, including, among other things, flaws in study design, dose selection issues, placebo effects, patient enrollment criteria and failure to demonstrate favorable safety or efficacy traits.

Moreover, pre-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in pre-clinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. Furthermore, the failure of any of our product candidates to demonstrate safety and efficacy in any clinical trial could negatively impact the perception of our other product candidates or cause regulatory authorities to require additional testing before approving any of our product candidates.

We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or commercialize any product candidates, including:

- regulators or institutional review boards, or IRBs, may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site or at all;

- we may experience delays in reaching, or fail to reach, agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- regulators may determine that the planned design of our clinical trials is flawed or inadequate;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- we may be unable to establish clinical endpoints that applicable regulatory authorities consider clinically meaningful, or, if we seek accelerated approval, biomarker efficacy endpoints that applicable regulatory authorities consider likely to predict clinical benefit;
- pre-clinical testing may produce results based on which we may decide, or regulators may require us, to conduct additional pre-clinical studies before we proceed with certain clinical trials, limit the scope of our clinical trials, halt clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate (including because of a decrease in the pool of available patients) or participants may drop out of these clinical trials at a higher rate than we anticipate;
- third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may decide, or regulators or IRBs may require us, to suspend or terminate clinical trials of our product candidates for various reasons, including noncompliance with regulatory requirements or a finding that the participants are being exposed to unacceptable health risks;
- regulators or IRBs may require us to perform additional or unanticipated clinical trials to obtain approval or we may be subject to additional post-marketing testing requirements to maintain marketing approval;
- regulators may revise the requirements for approving our product candidates, or such requirements may not be as we anticipate;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate;
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our clinical investigators, regulators or IRBs to suspend or terminate the trials;
- regulators may withdraw their approval of a product or impose restrictions on its distribution; and
- business interruptions resulting from any health epidemics, pandemics or other contagious outbreaks may result in adverse effects on our business and operations.

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, if there are safety concerns or if we determine that the observed safety or efficacy profile would not be competitive in the marketplace, we may:

- incur unplanned costs;
- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain marketing approval in some countries and not in others;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in pre-clinical studies or clinical trials or in obtaining marketing or other regulatory approvals. We do not know whether any of our pre-clinical studies or clinical trials will begin timely, will need to be restructured or will be completed on schedule, or at all. We may also determine to change the design or protocol of one or more of our clinical trials, including to add additional patients or arms, which could result in increased costs and expenses or delays. Significant pre-clinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

In addition, the FDA's and other regulatory authorities' policies with respect to clinical trials may change and additional government regulations may be enacted. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies governing clinical trials, our development plans may be impacted. For example, in December 2022, with the passage of the Food and Drug Omnibus Reform Act of 2022, or FDORA, Congress required

sponsors to develop and submit a diversity action plan, or DAP, for each phase 3 clinical trial or any other "pivotal study" of a new drug or biological product. These plans are meant to encourage the enrollment of more diverse patient populations in late-stage clinical trials of FDA-regulated products. Specifically, DAPs must include the sponsor's goals for enrollment, the underlying rationale for those goals, and an explanation of how the sponsor intends to meet them. In June 2024, as mandated by FDORA, the FDA issued draft guidance outlining the general requirements for DAPs. Unlike most guidance documents issued by the FDA, the DAP guidance when finalized will have the force of law because FDORA specifically dictates that the form and manner for submission of DAPs are specified in FDA guidance.

Similarly, the regulatory landscape related to clinical trials in the European Union recently evolved. The EU Clinical Trials Regulation, or the EU-CTR, which was adopted in April 2014 and repeals the EU Clinical Trials Directive, became applicable on January 31, 2022. While the Clinical Trials Directive required a separate Clinical Trial Application, or CTA, to be submitted in each member state, to both the competent national health authority and an independent ethics committee, the EU-CTR introduces a centralized process and only requires the submission of a single application to all member states concerned. The EU-CTR allows sponsors to make a single submission to both the competent authority and an ethics committee in each member state, leading to a single decision per member state. The assessment procedure of the CTA has been harmonized as well, including a joint assessment by all member states concerned, and a separate assessment by each member state with respect to specific requirements related to its own territory, including ethics rules. Each member state's decision is communicated to the sponsor via the centralized EU portal. Once the CTA is approved, clinical study development may proceed. If we are not able to adapt to these and other changes in existing requirements or the adoption of new requirements or policies governing clinical trials, our development plans may be impacted.

Further, cancer therapies are sometimes characterized as first-line, second-line, or third-line, and the FDA often approves new therapies initially only for second-line or third-line use. When cancer is detected early enough, first-line therapy, usually hormone therapy, surgery, radiation therapy, chemotherapy or a combination of these, is sometimes adequate to cure the cancer or prolong life without a cure. Second- and third-line therapies are administered to patients when prior therapy is not effective. For any of our products that prove to be sufficiently beneficial, we would expect to seek approval potentially as a first-line therapy, but any product candidates we develop, even if approved, may not be approved for first-line therapy, and, prior to any such approvals, we may have to conduct additional clinical trials.

We may conduct clinical trials at sites outside the United States. The FDA may not accept data from trials conducted in such locations, and the conduct of trials outside the United States could subject us to additional delays and expense.

We may conduct one or more clinical trials with one or more trial sites that are located outside the United States. The acceptance by the FDA or other regulatory authorities of study data from clinical trials conducted outside their jurisdiction may be subject to certain conditions or may not be accepted at all. In cases where data from foreign clinical trials are intended to serve as the sole basis for marketing approval in the U.S., the FDA will generally not approve the application on the basis of foreign data alone unless (i) the data are applicable to the U.S. population and U.S. medical practice; (ii) the trials were performed by clinical investigators of recognized competence and pursuant good clinical practices, or to GCP, regulations; and (iii) the data may be considered valid without the need for an on-site inspection by the FDA, or if the FDA considers such inspection to be necessary, the FDA is able to validate the data through an on-site inspection or other appropriate means.

In addition, even where the foreign study data are not intended to serve as the sole basis for approval, the FDA will not accept the data as support for an application for marketing approval unless the study is well-designed and well-conducted in accordance with GCP requirements and the FDA is able to validate the data from the study through an onsite inspection if deemed necessary. Many foreign regulatory authorities have similar approval requirements. In addition, such foreign trials would be subject to the applicable local laws of the foreign jurisdictions where the trials are conducted. There can be no assurance that the FDA or any comparable foreign regulatory authority will accept data from trials conducted outside of the U.S. or the applicable jurisdiction. If the FDA or any comparable foreign regulatory authority does not accept such data, it would result in the need for additional trials, which could be costly and time-consuming, and which may result in current or future product candidates that we may develop not receiving approval for commercialization in the applicable jurisdiction.

Conducting clinical trials outside the U.S. also exposes us to additional risks, including risks associated with:

- additional foreign regulatory requirements;
- foreign exchange fluctuations;
- compliance with foreign manufacturing, customs, shipment and storage requirements;

- cultural differences in medical practice and clinical research;
- diminished protection of intellectual property in some countries; and
- interruptions or delays in our trials resulting from geopolitical events, such as war or terrorism.

The results of early-stage clinical trials and pre-clinical studies may not be predictive of future results. Initial success in clinical trials may not be indicative of results obtained when these trials are completed or in later stage trials.

The outcome of pre-clinical testing and early clinical trials may not be predictive of the success of later clinical trials, and preliminary or interim results of a clinical trial do not necessarily predict final results. In addition, initial success in clinical trials may not be indicative of results obtained when such trials are completed. In particular, the small number of patients in our early clinical trials may make the results of these trials less predictive of the outcome of later clinical trials. Our product candidates may also fail to show the desired safety and efficacy in clinical development despite positive results in pre-clinical studies or having successfully advanced through initial clinical trials.

Moreover, pre-clinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in pre-clinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. Our clinical trials may not ultimately be successful or support further clinical development of any of our product candidates and we cannot assure you that any clinical trials that we may conduct will demonstrate consistent or adequate efficacy and safety to support marketing approval. There is a high failure rate for product candidates proceeding through clinical trials. Many companies in the biopharmaceutical industry have suffered significant setbacks in late-stage clinical trials even after achieving promising results in pre-clinical testing and earlier-stage clinical trials, and we cannot be certain that we will not face similar setbacks. Any such setbacks in our clinical development could materially harm our business and results of operations.

Interim and preliminary results from our clinical trials that we announce or publish from time to time may change as more participant data become available and are subject to audit and verification procedures, which could result in material changes in the final data.

From time to time, we may announce or publish interim or preliminary results from our clinical trials. Interim results from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as participant enrollment continues and more participant data become available. 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 evaluate all data. Preliminary or interim results 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, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could be material and could significantly harm our reputation and business prospects and may cause the trading price of our common stock to fluctuate significantly.

If we experience delays or difficulties in the enrollment of patients in our clinical trials for any of our product candidates, our receipt of necessary marketing approvals could be delayed or prevented.

Identifying and qualifying patients to participate in our clinical trials of any of our product candidates in the future is critical to our success. Successful and timely completion of clinical trials will require that we enroll a sufficient number of patients who remain in the trial until its conclusion. We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside of the United States. In addition, some of our competitors have ongoing clinical trials for product candidates that treat the same indications as our product candidates, and patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' product candidates. We cannot predict how successful we will be at enrolling subjects in future clinical trials. Patient enrollment is affected by a variety of other factors, including:

- the prevalence and severity of the disease under investigation;
- the eligibility criteria for the trial in question;
- the perceived risks and benefits of the product candidate under trial;
- the requirements of the trial protocols;
- the availability of existing treatments for the indications for which we are conducting clinical trials;
- the ability to recruit clinical trial investigators with the appropriate competencies and experience;
- the efforts to facilitate timely enrollment in clinical trials;

- the ability to identify specific patient populations based on specific genetic mutations or other factors;
- 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 proximity and availability of clinical trial sites for prospective patients;
- the conduct of clinical trials by competitors for product candidates that treat the same indications or address the same patient populations as our product candidates;
- the cost to, or lack of adequate compensation for, prospective patients; and
- the impact of any health epidemics, pandemics or other contagious outbreaks.

Our inability to locate and enroll a sufficient number of patients for our clinical trials would result in significant delays, could require us to abandon one or more clinical trials altogether and could delay or prevent our receipt of necessary marketing approvals. Enrollment delays in our clinical trials may result in increased development costs for our product candidates, which could cause the value of our business to decline and limit our ability to obtain additional financing.

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 abandon or limit our further clinical development of those product candidates.

If any of our product candidate are associated with serious adverse events or undesirable side effects in clinical trials or have characteristics that are unexpected in clinical trials or pre-clinical testing, we may need to abandon development of such product candidate or limit development to more narrow uses or subpopulations in which the serious adverse events, undesirable side effects or unexpected characteristics are less prevalent, less severe or more acceptable from a risk-benefit perspective. In pharmaceutical development, many compounds that initially show promise in early-stage or clinical testing are later found to cause side effects that delay or prevent further development of the compound or decrease the size of the patient population for whom the compound could ultimately be prescribed.

Additionally, if results of our clinical trials reveal undesirable side effects, we, regulatory authorities or the IRBs at the institutions in which our studies are conducted could suspend or terminate our clinical trials, regulatory authorities could order us to cease clinical trials or deny approval of our product candidates for any or all targeted indications or we could be forced to materially modify the design of our clinical trials. Treatment-related side effects could also affect patient recruitment or the ability of enrolled patients to complete any of our clinical trials or result in potential liability claims. In addition, these side effects may not be appropriately recognized or managed by the treating medical staff.

If we elect or are forced to suspend or terminate any clinical trial of our product candidates, the commercial prospects of such product candidate will be harmed, and our ability to generate revenues from sales of such product candidate will be delayed or eliminated. Any of these occurrences could materially harm our business.

If any of our product candidates receives marketing approval and we, or others, later discover that the drug is less effective than previously believed or causes undesirable side effects that were not previously identified, our ability to market the drug could be compromised.

Clinical trials will be conducted in carefully defined subsets of patients who have agreed to enter into clinical trials. Consequently, it is possible that our clinical trials may indicate an apparent positive effect of a product candidate that is greater than the actual positive effect, if any, or alternatively fail to identify undesirable side effects. If one or more of our product candidates receives marketing approval, and we, or others, later discover that they are less effective than previously believed, or cause undesirable side effects, a number of potentially significant negative consequences could result, including:

- withdrawal or limitation by regulatory authorities of approvals of such product;
- seizure of the product by regulatory authorities;
- recall of the product;
- restrictions on the marketing of the product or the manufacturing process for any component thereof;
- requirement by regulatory authorities of additional warnings on the label;
- requirement that we implement a risk evaluation and mitigation strategy or create a medication guide outlining the risks of such side effects for distribution to patients;
- commitment to expensive post-marketing studies as a prerequisite of approval by regulatory authorities of such product;
- the product may become less competitive;

- initiation of regulatory investigations and government enforcement actions;
- initiation of legal action against us to hold us liable for harm caused to patients; and
- harm to our reputation and resulting harm to physician or patient acceptance of our products.

Any of these events could prevent us from achieving or maintaining market acceptance of a particular product candidate, if approved, and could significantly harm our business, financial condition, and results of operations.

We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we have historically focused on discovery programs and product candidates that we identify for specific indications. As a result, we have and may in the future forego or delay the pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. For example, in 2024, we determined to cease further development of CT-0525 and CT-0508 to refocus our efforts on other strategic priorities at the time. In the future we may further curtail, pause, delay or cease development of other product candidates at any stage of pre-clinical or clinical development based on a variety of factors, including our judgments regarding costs or timing of further development, probability of success of pre-clinical and clinical development, regulatory requirements, competitive landscapes, commercial potential, relative benefits and costs compared to other product candidates in our portfolio, and our overall strategy.

Our resource allocation decisions in the future may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Spending on discovery and product development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. Failure to allocate resources or capitalize on strategies in a successful manner will have an adverse impact on our business.

As part of our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. We plan to work on identifying and evaluating potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

We may evaluate certain of our product candidates in combination with other drugs. If the FDA or similar regulatory authorities outside of the United States do not approve these other drugs, revoke their approval of such drugs, or if safety, efficacy, manufacturing or supply issues arise with the drugs we choose to evaluate in combination with our product candidates, we may be unable to obtain approval of our product candidates.

We may evaluate certain of our product candidates in combination with other drugs. For example, prior to pausing research and development activities, we planned to initiate a Phase 1 clinical trial of CT-1119, in combination with tislelizumab, in adult patients with mesothelin-positive solid tumors.

We have not developed or obtained marketing approval for, nor have we manufactured or sold, any approved drug that we may study in combination with our product candidates. If the FDA or similar regulatory authorities outside of the United States revokes their approval of any drug or drugs in combination with which we determine to develop any of our product candidates, we will not be able to market such product candidates in combination with such revoked drugs.

If safety or efficacy issues arise with any of these drugs, we could experience significant regulatory delays, and the FDA or similar regulatory authorities outside of the United States may require us to redesign or terminate the applicable clinical trials. If the drugs we use are replaced as the standard of care for the indications we choose for our product candidates, the FDA or similar regulatory authorities outside of the United States may require us to conduct additional clinical trials. In addition, if manufacturing or other issues result in a shortage of supply of the drugs with which we determine to combine with any of our product candidates, we may not be able to initiate or complete clinical development of such product candidates on a desired timeline or at all.

Even if any of our product candidates were to receive marketing approval or be commercialized for use in combination with other existing drugs, we would continue to be subject to the risks that the FDA or similar regulatory authorities

outside of the United States could revoke approval of the drugs used in combination with our product candidates or that safety, efficacy, manufacturing or supply issues could arise with these existing drugs. Combination therapies are commonly used for the treatment of cancer, and we would be subject to similar risks if we develop any of our other product candidates for use in combination with other drugs for cancer or for indications other than cancer. This could result in our own products being removed from the market or being less successful commercially.

We may not be successful in our efforts to identify or discover additional potential product candidates.

A key element of our strategy is to apply our macrophage engineering platform to address a broad array of indications and targets to generate next-generation therapeutics, including programs for indications outside of liver fibrosis and oncology. The discovery efforts that we are conducting may not be successful in identifying product candidates that are useful in treating cancer or other diseases. Our discovery engine may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for a number of reasons, including:

- potential product candidates may, on further study, be shown to have harmful side effects or other characteristics that indicate that they are unlikely to be drugs that will receive marketing approval or achieve market acceptance; or
- potential product candidates may not be effective in treating their targeted diseases.

Discovery programs to identify new product candidates require substantial technical, financial and human resources. We may choose to focus our efforts and resources on a potential product candidate that ultimately proves to be unsuccessful. If we are unable to identify additional suitable product candidates for pre-clinical and clinical development, it will limit our potential to obtain revenues from sale of products in future periods, which likely would result in significant harm to our financial position and adversely impact our stock price.

Adverse public perception of genetic medicine, and gene therapy in particular, may negatively impact regulatory approval of, or demand for, our potential products.

The clinical and commercial success of our potential products will depend in part on public acceptance of the use of gene therapy for the prevention or treatment of human diseases. Public attitudes may be influenced by claims that gene therapy is unsafe, unethical, or immoral, and, consequently, our products may not gain the acceptance of the public or the medical community. Adverse public attitudes may adversely impact our ability to enroll clinical trials. Moreover, our success will depend upon physicians prescribing, and their patients being willing to receive, treatments that involve the use of product candidates that we may develop in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available.

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We currently have no intention of resuming research and development activities independently or as a standalone company, and the following are risks primarily relating to our prior operations and historical activities, unless otherwise noted.

Risks Related to the Commercialization of Our Product Candidates

Even if any of our product candidates receives marketing approval, we may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success, and the market opportunity for any of our product candidates, if approved, may be smaller than we estimate.

If any of our product candidates receives marketing approval, we may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. For example, current cancer treatments, such as chemotherapy and radiation therapy, are well established in the medical community and doctors may continue to rely on these and similar treatments. Efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may not be successful. If our product candidates do not achieve an adequate level of acceptance, we may not generate significant revenues from product sales and we may not become

profitable. The degree of market acceptance of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and potential advantages of our product candidates compared to the advantages and relative risks of alternative treatments;
- the effectiveness of sales and marketing efforts;
- our ability to offer our products, if approved, for sale at competitive prices;
- the clinical indications for which the product is approved;
- the cost of treatment in relation to alternative treatments;
- the convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing and distribution support;
- the timing of market introduction of competitive products;
- the availability of third-party coverage and adequate reimbursement, and patients' willingness to pay out of pocket for required co-payments or in the absence of third-party coverage or adequate reimbursement;
- product labeling or product insert requirements of the FDA, the European Medical Agency, or the EMA, or other regulatory authorities, including any limitations or warnings contained in a product's approved labeling;
- the prevalence and severity of any side effects;
- support from patient advocacy groups; and
- any restrictions on the use of our products, if approved, together with other medications.

Our assessment of the potential market opportunity for our product candidates is based on industry and market data that we obtained from industry publications, research, surveys and studies conducted by third parties and our analysis of these data, research, surveys and studies. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. While we believe these industry publications and third-party research, surveys and studies are reliable, we have not independently verified such data. Our estimates of the potential market opportunities for our product candidates include a number of key assumptions based on our industry knowledge, industry publications and third-party research, surveys and studies, which may be based on a small sample size and fail to accurately reflect market opportunities. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions. If any of our assumptions or estimates, or these publications, research, surveys or studies prove to be inaccurate, then the actual market for any of our product candidates may be smaller than we expect, and as a result our revenues from product sales may be limited and it may be more difficult for us to achieve or maintain profitability.

If we are unable to establish sales, marketing and distribution capabilities or enter into sales, marketing and distribution agreements with third parties, we may not be successful in commercializing our product candidates if and when they are approved.

We do not have a sales or marketing infrastructure and have no experience as a company in the sale, marketing or distribution of biopharmaceutical products. To achieve commercial success for any product for which we may obtain marketing approval, we will need to establish a sales, marketing and distribution organization, either ourselves or through collaborations or other arrangements with third parties.

We currently expect that we would build our own focused, specialized sales and marketing organization to support the commercialization in the United States of product candidates for which we receive marketing approval and that can be commercialized with such capabilities. There are risks involved with us establishing our own sales, marketing and distribution capabilities. For example, recruiting and training a sales force is expensive and time-consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. These efforts may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel. In general, the cost of establishing and maintaining a sales and marketing organization may exceed the cost-effectiveness of doing so.

Factors that may inhibit our efforts to commercialize our products on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales, marketing, market access, distribution, customer service, medical affairs and other support personnel;
- our inability to equip sales personnel with effective materials;

- our inability to effectively manage a geographically dispersed sales and marketing team;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future products;
- the inability of reimbursement professionals to negotiate arrangements for formulary access, reimbursement and other acceptance by payors;
- the inability to price our products at a sufficient price point to ensure an adequate and attractive level of profitability;
- restricted or closed distribution channels that make it difficult to distribute our products to segments of the patient population;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent commercialization organization.

If we are unable to establish our own sales, marketing and distribution capabilities and we enter into arrangements with third parties to perform these services, our revenues from product sales and our profitability, if any, are likely to be lower than if we were to market, sell and distribute any products that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute our product candidates or may be unable to do so on terms that are acceptable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively. If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

We face substantial competition, which may result in others discovering, developing or commercializing products before or more successfully than we do, thus rendering our products non-competitive, obsolete or reducing the size of the market for our products.

The biopharmaceutical industry, and in particular the cell therapy field and the liver fibrosis fields, is characterized by intense investment and competition aimed at rapidly advancing new technologies. Our platform and therapeutic product candidates are expected to face substantial competition from multiple technologies, marketed products and numerous other therapies being developed by third parties that use protein degradation, antibody therapy, inhibitory nucleic acid, gene editing or gene therapy development platforms and from companies focused on more traditional therapeutic modalities, such as small molecule inhibitors. The competition is likely to come from multiple sources, including biopharmaceutical companies, academic research institutions, governmental agencies and private research institutions that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization. The competition is likely to come from multiple sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions, government agencies and public and private research institutions.

We are aware of a number of companies generally pursuing the development of myeloid cell therapies, including, among others Myeloid Therapeutics, Shoreline Biosciences, Inceptor Bio, Thunder Bio, Resolution Therapeutics, CellOrigin, and others. We are also facing competition from companies pursuing autologous T cell therapies, allogeneic T cell therapies, NK and other cell therapies, direct *in vivo* reprogrammed cell therapies, liver fibrosis therapies and other macrophage-targeted oncology therapeutics.
Additionally, we are aware of a number of companies either marketing or pursuing the development of liver fibrosis/MASH therapies, including Madrigal, Akero, 89bio, Resolution Therapeutics, and major pharmaceutical companies developing incretin therapies such as Eli Lilly, NovoNordisk, and others.

Many of the companies against which we are competing or against which we may compete in the future have significantly greater financial resources and expertise in research and development, manufacturing, pre-clinical testing, conducting clinical trials, obtaining marketing approvals and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our development programs. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other marketing approval for their products more rapidly than we may obtain approval for our products, including as a result of our decision to pause research and development activities, which could result in our competitors establishing a strong market position before we

are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products. There are generic products currently on the market for certain of the indications that we are pursuing, and additional products are expected to become available on a generic basis over the coming years. If our product candidates are approved, we expect that they will be priced at a significant premium over competitive generic products.

Technology in the biopharmaceutical industry has undergone rapid and significant change, and we expect that it will continue to do so. Any products or processes that we develop may become obsolete or uneconomical before we recover any expenses incurred in connection with their development.

Mergers and acquisitions in the biopharmaceutical industry may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

We have pursued and, if we were to resume research and development activities, may in the future pursue the in-license or acquisition of rights to complementary technologies and product candidates on an opportunistic basis. However, we may be unable to in-license or acquire any additional technologies or product candidates from third parties. The acquisition and licensing of technologies and product candidates is a competitive area, and a number of more established companies also have similar strategies to in-license or acquire technologies and product candidates that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to in-license or acquire the relevant technology or product candidate on terms that would allow us to make an appropriate return on our investment.

Even if we are able to commercialize any product candidates, the products may become subject to unfavorable pricing regulations, third-party coverage or reimbursement practices or healthcare reform initiatives, which could harm our business.

The regulations that govern marketing approvals, pricing, coverage and reimbursement for new drug products vary widely from country to country. Current and future legislation may significantly change the approval requirements in ways that could involve additional costs and cause delays in obtaining approvals. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost effectiveness of our product candidate to other available therapies. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we may obtain marketing approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product, possibly for lengthy time periods, and negatively impact the revenues, if any, we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain marketing approval.

Our ability to commercialize any product candidates successfully also will depend in part on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. The availability of coverage and adequacy of reimbursement by governmental healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors are essential for most patients to be able to afford medical services and pharmaceutical products, including our product candidates. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, government authorities and third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Coverage and reimbursement may not be available for any product that we commercialize and, even if these are available, the level of reimbursement may not be satisfactory. Reimbursement may affect the demand for, or the price of, any product candidate for which we obtain marketing approval. Obtaining and maintaining adequate reimbursement for our products may be difficult. We may be required to conduct expensive pharmacoeconomic studies to justify coverage and reimbursement or the level of reimbursement relative to other therapies. If coverage and adequate reimbursement are not available or

reimbursement is available only to limited levels, we may not be able to successfully commercialize any product candidate for which we obtain marketing approval.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or similar regulatory authorities outside of the United States. Moreover, eligibility for coverage and reimbursement does not imply that a drug will be paid for in all cases or at a rate that covers its costs, including research, development, intellectual property, manufacture, sale and distribution expenses. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. In the United States, third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for any approved products that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

No uniform policy for coverage and reimbursement for products exists among third-party payors in the United States. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our product candidates to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Furthermore, rules and regulations regarding reimbursement change frequently, in some cases on short notice, and we believe that changes in these rules and regulations are likely.

There can be no assurance that our product candidates, even if they are approved for sale in the United States, in the European Union or in other countries, will be considered medically reasonable and necessary for a specific indication or cost-effective by third-party payors, or that coverage and an adequate level of reimbursement will be available or that third-party payors' reimbursement policies will not adversely affect our ability to sell our product candidates profitably.

Clinical trial and product liability lawsuits against us could divert our resources and could cause us to incur substantial liabilities and to limit commercialization of any products that we may develop.

We face an inherent risk of clinical trial and product liability exposure related to the testing of our product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. While we currently have no products that have been approved for commercial sale, the use of product candidates by us in clinical trials, and the sale of any approved products in the future, may expose us to liability claims. These claims might be made by patients that use the product, healthcare providers, pharmaceutical companies or others selling such products. On occasion, large judgments have been awarded in class action lawsuits based on products that had unanticipated adverse effects. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- termination of clinical trials;
- withdrawal of marketing approval, recall, restriction on the approval or a "black box" warning or contraindication for an approved drug;
- withdrawal of clinical trial participants;
- significant costs to defend any related litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue;
- injury to our reputation and significant negative media attention;
- reduced resources of our management to pursue our business strategy;
- distraction of management's attention from our primary business; and
- the inability to commercialize any products that we may develop.

We currently hold $10.0 million in product liability insurance coverage in the aggregate, with a per incident limit of $10.0 million, which may not be adequate to cover all liabilities that we may incur. We may need to increase our insurance

coverage if we initiate and expand our clinical trials or commence commercialization of our product candidates. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise. If a successful clinical trial or product liability claim or series of claims is brought against us for uninsured liabilities or in excess of insured liabilities, our assets may not be sufficient to cover such claims and our business operations could be impaired.

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We currently have no intention of resuming research and development activities independently or as a standalone company. The following are risks primarily relating to our prior operations and historical activities, expect for the risks relating to our ongoing collaboration with Moderna or as other otherwise noted below.

Risks Related to Our Dependence on Third Parties

We have relied, and if we resume research and development activities expect to continue to rely, on third parties to conduct our clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such trials, which may prevent or delay our ability to seek or obtain marketing approval for or commercialize our product candidates or otherwise harm our business. If we are not able to maintain these third-party relationships or if these arrangements are terminated, we may have to alter our development and commercialization plans and our business could be adversely affected.

We historically relied on, and if we resume research and development activities expect to continue to rely on third-party clinical research organizations, in addition to other third parties such as research collaboratives, clinical data management organizations, medical institutions and clinical investigators, to conduct our clinical trials. We currently have no plans to independently conduct any clinical trials of our product candidates. These contract research organizations, or CROs, and other third parties play a significant role in the conduct and timing of these trials and subsequent collection and analysis of data. These third-party arrangements might terminate for a variety of reasons, including a failure to perform by the third parties. If we need to enter into alternative arrangements, our product development activities might be delayed.

Our reliance on these third parties for discovery and product development activities reduces our control over these activities but does not relieve us of our responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. Moreover, the FDA requires us to comply with standards, commonly referred to as GCPs for conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of trial participants are protected. Regulatory authorities in Europe and other jurisdictions have similar requirements. Regulatory authorities enforce these GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of our CROs or trial sites fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable, and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. We are also required to register ongoing clinical trials and post the results of completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within specified timeframes. Failure to do so can result in fines, adverse publicity and civil and criminal sanctions.

If these third parties 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, we will not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully develop and commercialize our product candidates. Furthermore, these third parties may also have relationships with other entities, some of which may be our competitors. In addition, principal investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and may receive cash or equity compensation in connection with such services. If these relationships and any related compensation result in perceived or actual conflicts of interest, or the FDA concludes that the financial relationship may have affected the interpretation of the trial, the integrity of the data generated at the applicable clinical trial site may be questioned, and the utility of the clinical trial itself may be jeopardized, which could result in the delay or rejection of any marketing application we submit to the FDA. Any such delay or rejection could prevent us from commercializing our product candidates.

If any of our relationships with these third parties terminate, we may not be able to enter into arrangements with alternative third parties or do so on commercially reasonable terms. Switching or adding more CROs, investigators and other third parties involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new CRO commences work. As a result, delays can occur, which could materially impact our ability to meet our

desired clinical development timelines. Although we plan to carefully manage our relationships with our CROs, investigators and other third parties, we may nonetheless encounter challenges or delays in the future, which could have a material and adverse impact on our business, financial condition and prospects.

We have relied on, and if we resume research and development activities expect to continue to rely on third-party CMOs for the manufacture of both drug substance and finished drug product of our product candidates for pre-clinical and clinical testing and expect to continue to do so for commercialization. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We have relied on, and if we resume research and development activities, expect to continue to rely, on third-party CMOs for both drug substance and finished drug product, as well as for commercial manufacture if any of our product candidates receive marketing approval. We have relied on these third parties for the manufacture of plasmid and viral vectors, patient leukapheresis material logistics, as well as packaging, labeling, sterilization, storage, distribution and other production logistics. We continue to rely on these third parties for storage, distribution and other logistics of manufactured plasmid and viral vectors. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts. We may be unable to establish any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- the potential failure to manufacture our product candidate or product according to our specifications;
- the potential failure to manufacture our product candidate or product according to our schedule or at all;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

We or our third-party manufacturers may encounter shortages in the raw materials or active pharmaceutical ingredients necessary to produce our product candidates in the quantities needed for our clinical trials or, if our product candidates are approved, in sufficient quantities for commercialization or to meet an increase in demand, as a result of capacity constraints or delays or disruptions in the market for the raw materials or active pharmaceutical ingredients, including shortages caused by the purchase of such raw materials or active pharmaceutical ingredients by our competitors or others. Our or our third-party manufacturers' failure to obtain the raw materials or active pharmaceutical ingredients necessary to manufacture sufficient quantities of our product candidates may have a material adverse effect on our business.

Our third-party manufacturers are subject to inspection and approval by regulatory authorities before we can commence the manufacture and sale of any of our product candidates, and thereafter subject to ongoing inspection from time to time. Third-party manufacturers may not be able to comply with current good manufacturing practices, or cGMP, regulations or similar regulatory requirements outside of the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Our product candidates and any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. As a result, we may not obtain access to these facilities on a priority basis or at all. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us. Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply or a second source for bulk drug substance. If any of our contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. Although we believe that there are several potential alternative manufacturers who could manufacture our product candidates, we may incur added costs and delays in identifying and qualifying any such replacement or be unable to reach agreement with an alternative manufacturer.

Our future dependence upon others for the manufacture of our product candidates or products may adversely affect our future profit margins and our ability to commercialize any products that receive marketing approval on a timely and competitive basis.

We currently, and may in the future, rely on single-source suppliers for certain materials and components used in the manufacturing of our product candidates.

We have relied, and may in the future, rely on single-source suppliers for certain materials and components used in the manufacturing of our product candidates. There are, for certain of these materials and components, few, if any, alternative sources of supply and there is limited need for multiple suppliers at this stage of our business. We cannot ensure that these suppliers will remain in business, have sufficient capacity or supply to meet our needs, be able to supply materials to us at costs that are acceptable to us, or that they will not be purchased by one of our competitors or another company that is not interested in continuing to work with us. Our use of single-source suppliers of certain materials and components exposes us to several risks, including disruptions in supply, price increases or late deliveries. This supplier may be unable or unwilling to meet our future demands for our clinical trials. Establishing additional or replacement suppliers for these materials and components could take a substantial amount of time and it may be difficult to establish replacement suppliers who meet regulatory requirements. Any disruption in supply from these single-source suppliers could lead to supply delays or interruptions which would materially adversely affect our business, financial condition and results of operations.

We expect to depend on collaborations with third parties for the research, development and commercialization of certain of our product candidates, including our collaboration agreement with Moderna. If our collaborations are not successful, we may not be able to capitalize on the market potential of these product candidates and our business could be adversely affected.

We may depend on collaborations with third parties for the research, development and commercialization of certain of our product candidates. For example, we entered into a strategic collaboration with Moderna in January 2022 focused on the development of *in vivo* CAR-M therapeutics. In collaboration with Moderna, we have established a mRNA/LNP *in vivo* CAR-M platform for research targets, which enables an off-the-shelf approach wherein the patient's own myeloid cells are engineered directly within their body via the administration of a LNP encapsulating macrophage reprogramming mRNA CAR constructs, removing the requirement for *ex vivo* cell manufacturing entirely. In June 2024, we announced the nomination of the first development candidate under the collaboration with Moderna. The development candidate targets GPC3. In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration for which we have the potential to receive future milestones and royalties. We will not conduct any additional research activities under the collaboration agreement and we will not be receiving any further payments from Moderna for research and development services under the collaboration agreement.

Under the terms of the Moderna collaboration agreement, assuming Moderna develops and commercializes 12 products, each directed to a different development target, we are eligible to receive up to between $247.0 million and $253.0 million per product in development target designation, development, regulatory and commercial milestone payments. We are also eligible to receive tiered mid-to-high single digit royalties of net sales of any products that are commercialized under the agreement, which may be, subject to reductions. We cannot be certain that Moderna will take the steps to achieve any of these development, regulatory and commercial milestones, all of which are outside of our control. Therefore, we may not be entitled to receive from Moderna any remaining milestone payments or any royalty payments.

As part of our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, a strategic collaboration or partnership with one or more parties. If we were to resume research and development activities, we may also seek third-party collaborators for the research, development and commercialization of certain of our product candidates.

Collaborators for collaboration arrangements may include large and mid-size pharmaceutical companies and biotechnology companies, among others. We cannot provide any commitment that we will enter into any collaboration. Any such arrangements with third parties will likely limit our control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of our product candidates we may seek to develop with them. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities and efforts to successfully perform the functions assigned to them in these arrangements. We cannot predict the success of any collaboration that we enter into and we cannot be certain that they provide any value for our company or our stockholders.

Collaborations involving our discovery programs or any product candidates we may develop, including our collaboration with Moderna pose the following risks to us:

- collaborators have significant discretion in determining the amount and timing of efforts and resources that they will apply to these collaborations; for example, our collaboration with Moderna is managed by a JSC, which is comprised of representatives from the Company and Moderna, with Moderna having final decision-making authority, subject to specified limitations;
- collaborators may not perform their obligations as expected;
- collaborators may not pursue development of our product candidates or may elect not to continue or renew development programs based on results of clinical trials or other studies, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition or business combination, that divert resources or create competing priorities;
- collaborators may not pursue development and commercialization of any product candidates that achieve marketing approval or may elect not to continue or renew commercialization programs based on results of clinical trials or other studies, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition or business combination, that may divert resources or create competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- we may not have access to, or may be restricted from disclosing, certain information regarding product candidates being developed or commercialized under a collaboration and, consequently, may have limited ability to inform our stockholders about the status of such product candidates on a discretionary basis; for example, data, results and know-how generated in the performance of the Moderna collaboration is deemed the confidential information of Moderna, which we may not disclose except under limited circumstances;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates and products if the collaborators believe that the competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products, which may cause collaborators to cease to devote resources to the commercialization of our product candidates;
- a collaborator may fail to comply with applicable regulatory requirements regarding the development, manufacture, distribution or marketing of a product candidate or product;
- a collaborator may seek to renegotiate or terminate their relationship with us due to unsatisfactory clinical results, manufacturing issues, a change in business strategy, a change of control or other reasons;
- a collaborator with marketing and distribution rights to one or more of our product candidates that achieve marketing approval may not commit sufficient resources to the marketing and distribution of such product or products;
- disagreements with collaborators, including disagreements over intellectual property or proprietary rights, contract interpretation or the preferred course of development, might cause delays or terminations of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;
- we may lose certain valuable rights under circumstances identified in our collaborations, including if we undergo a change of control;
- collaborators may not properly obtain, maintain, enforce, defend or protect our intellectual property or proprietary rights or may use our proprietary information in such a way as to potentially lead to disputes or legal proceedings that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation; for example, Moderna has the first right to prosecute, enforce or defend certain patent rights under its agreement with us, and although we may have the right to assume the prosecution, enforcement or defense of such patent rights if Moderna does not, our ability to do so may be compromised by Moderna's actions;
- disputes may arise with respect to the ownership of intellectual property developed pursuant to our collaborations;
- collaborators may infringe, misappropriate or otherwise violate the intellectual property or proprietary rights of third parties, which may expose us to litigation and potential liability;
- collaborations may be terminated, and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product candidates; for example, Moderna has the right to terminate its agreement with us for convenience in its entirety or with respect to a specific product or

target on ninety days' prior notice, in connection with a material breach of the agreement by us that remains uncured for a specified period of time or in the event of specified insolvency events involving us; and

- collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner, or at all. If a present or future collaborator of ours was to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program under such collaboration could be delayed, diminished or terminated.

If any collaborations that we enter into do not result in the successful development and commercialization of products or if one of our collaborators terminates its agreement with us, we may not receive any future research funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, or receive it in the timeframe in which we expect to receive it, the development of our product candidates could be delayed, and we may need additional resources to develop our product candidates. All of the risks relating to product development, marketing approval and commercialization described herein also apply to the activities of our collaborators.

We may in the future decide to collaborate with biopharmaceutical companies for the development and potential commercialization of any product candidates we may develop. These relationships, or those like them, 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 could face significant competition in seeking appropriate collaborators, and the negotiation process is time-consuming and complex. Our ability to reach a definitive collaboration agreement will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration, and the proposed collaborator's evaluation of several factors. If we license rights to any product candidates we or our collaborators may develop, 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.

If we are not able to establish or maintain additional collaborations, on commercially reasonable terms, we may have to alter our development and commercialization plans, and our business could be adversely affected.

We face significant competition in attracting appropriate collaborators, and a number of more established companies may also be pursuing strategies to license or acquire third-party intellectual property rights that we consider attractive. These established companies may have a competitive advantage over us due to their size, financial resources and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA or other regulatory authorities, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge, the terms of any existing collaboration agreements, and industry and market conditions generally. The collaborator may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such a collaboration could be more attractive than the one with us for our product candidate. We may also be restricted under future license agreements from entering into agreements on certain terms with potential collaborators. Collaborations are complex and time-consuming to negotiate, document and execute. In addition, there have been a significant number of recent business combinations among large biopharmaceutical companies that have resulted in a reduced number of potential future collaborators. Any collaboration we may enter into may limit our ability to enter into future agreements on particular terms or covering similar target indications with other potential collaborators.

If we are unable to reach agreements with suitable collaborators on a timely basis, on acceptable terms or at all, we may have to curtail the development of a product candidate, reduce or delay our development program or one or more of our other development programs, delay our potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to fund and undertake development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we fail to enter into collaborations and do not have sufficient funds or expertise to undertake the necessary development and commercialization activities, we may not be able to further develop our product candidates or bring them to market and generate revenue from product sales, which could have an adverse effect on our business, prospects, financial condition and results of operations.

We have a number of academic collaborations to supplement our internal discovery and product development programs. If any such collaborator decides to discontinue or devote less resources to such research, our discovery programs could be diminished.

Our discovery engine is supplemented by academic collaborations to expand our platform, which we rely upon to advance our development and commercialization plans for our product candidates. For example, in August 2020, we entered into a scientific research and licensing agreement with Nathaniel R. Landau, Ph.D. and NYU Langone Health through which we obtained exclusive rights to develop their Vpx lentiviral vector globally for all indications. In addition, we, from time to time, may enter into academic research collaborations to explore the development of new technologies and indications.

While these academic institutions have contractual obligations to us, they are independent entities and are not under our control or the control of our officers or directors. Our research and licensing agreements with academic collaborators generally provide academic collaborators with license maintenance fees, development and regulatory milestone payments, royalties on net sales of products and a portion of sublicense income that we receive. Upon the scheduled expiration of any academic collaboration, we may not be able to renew the related agreement, or any renewal could be on terms less favorable to us than those contained in the existing agreement. Furthermore, either we or the academic institution generally may terminate the sponsored research agreement for convenience following a specified notice period. If any of these academic institutions decides to not renew or to terminate the related agreement or decides to devote fewer resources to such activities, our discovery efforts would be diminished, while our royalty obligations, if any, would continue unmodified.

Any acquisitions or in-license transactions that we complete could disrupt our business, cause dilution to our stockholders or reduce our financial resources.

We have licensed four patent families from Penn and one patent family from NYU and may enter into transactions to in-license or acquire other businesses, intellectual property, technologies, product candidates or products. If we determine to pursue a particular transaction, we may not be able to complete the transaction on favorable terms, or at all. Any in-licenses or acquisitions we complete may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an in-license or acquisition or issue our common stock or other equity securities to the stockholders of the target company, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities that are not covered by the indemnification we may obtain from the seller. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and nondisruptive manner. In-license and acquisition transactions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. We cannot predict the number, timing or size of additional future in-licenses or acquisitions or the effect that any such transactions might have on our operating results.

The FDA, EMA, or other comparable foreign regulatory authorities could require the clearance or approval of a companion diagnostic device as a condition of approval for any product candidate that requires or would commercially benefit from such tests. Failure to successfully validate, develop and obtain regulatory clearance or approval for companion diagnostics on a timely basis or at all could harm our product development strategy and we may not realize the commercial potential of any such product candidate.

If safe and effective use of any of our other product candidates depends on an *in vitro* diagnostic, then the FDA generally will require approval or clearance of that diagnostic, known as a companion diagnostic, at the same time that the FDA approves our product candidates. The process of obtaining or creating such diagnostic is time consuming and costly. Companion diagnostics, which provide information that is essential for the safe and effective use of a corresponding therapeutic product, are subject to regulation by the FDA, EMA and other comparable foreign regulatory authorities as medical devices and require separate regulatory approval from therapeutic approval prior to commercialization. The FDA previously has required *in vitro* companion diagnostics intended to select the patients who will respond to a product candidate to obtain pre-market approval, or PMA, simultaneously with approval of the therapeutic candidate. The PMA process, including the gathering of pre-clinical and clinical data and the submission and review by the FDA, can take several years or longer. It involves a rigorous pre-market review during which the sponsor must prepare and provide the FDA with reasonable assurance of the device's safety and effectiveness and information about the device and its components regarding, among other things, device design, manufacturing, and labeling. After a device is placed on the market, it remains subject to significant regulatory requirements, including requirements governing development, testing, manufacturing, distribution, marketing, promotion, labeling, import, export, record-keeping, and adverse event reporting.

Given our limited experience in developing and commercializing diagnostics, we do not plan to develop companion diagnostics internally and thus will be dependent on the sustained cooperation and effort of third-party collaborators in developing and obtaining approval for these companion diagnostics. We may not be able to enter into arrangements with a provider to develop a companion diagnostic for use in connection with a registrational trial for our product candidates or for commercialization of our product candidates, or do so on commercially reasonable terms, which could adversely affect and/or delay the development or commercialization of our product candidates. We and our future collaborators may encounter difficulties in developing and obtaining approval for the companion diagnostics, including issues relating to selectivity/specificity, analytical validation, reproducibility, or clinical validation. Any delay or failure by our collaborators to develop or obtain regulatory approval of the companion diagnostics could delay or prevent approval of our product candidates. In addition, we, our collaborators or third parties may encounter production difficulties that could constrain the supply of the companion diagnostics, and both they and we may have difficulties gaining acceptance of the use of the companion diagnostics by physicians.

Any companion diagnostic collaborator or third party with whom we contract may decide not to commercialize or to discontinue selling or manufacturing the companion diagnostic that we anticipate using in connection with development and commercialization of our product candidates, or our relationship with such collaborator or third party may otherwise terminate. We may not be able to enter into arrangements with another provider to obtain supplies of an alternative diagnostic test for use in connection with the development and commercialization of our product candidates or do so on commercially reasonable terms, which could adversely affect and/or delay the development or commercialization of our product candidates.

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We currently have no intention of resuming research and development activities independently or as a standalone company, and the following are risks primarily relating to our prior operations and historical activities, unless otherwise noted.

Risks Related to Our Intellectual Property

If we are unable to obtain, maintain and enforce patent protection for our technology and product candidates or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully develop and commercialize our technology and product candidates may be adversely affected and we may not be able to compete effectively in our market.

Our success depends in part on our ability to obtain, maintain and enforce protection of the intellectual property we may own solely and jointly with others or may license from others, particularly patents, in the United States and other countries with respect to any proprietary technology and product candidates. We seek to protect our proprietary position by filing patent applications in the United States and abroad related to our technologies and product candidates that are important to our business and by in-licensing intellectual property related to such technologies and product candidates. If we are unable to obtain, maintain or enforce patent protection with respect to any proprietary technology or product candidate, our business, financial condition, results of operations and prospects could be materially harmed. Any disclosure to or misappropriation by third parties of our confidential proprietary information could enable competitors to quickly duplicate or surpass our technological achievements, thus eroding our competitive position in our market. Moreover, the patent applications we own, co-own or license may fail to result in issued patents in the United States or in other foreign countries.

The patent prosecution process is expensive, time-consuming and complex, and we may not be able to file, prosecute, maintain, defend or license all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Moreover, in some circumstances, we do not have the right to control the preparation, filing and prosecution of patent applications, or to maintain, enforce and defend the patents, covering technology that we license from third parties. Therefore, these in-licensed patents and applications may not be prepared, filed, prosecuted, maintained, defended and enforced in a manner consistent with the best interests of our business.

The patent position of biopharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. In addition, the scope of patent protection outside of the United States is uncertain and laws of foreign countries may not protect our rights to the same extent as the laws of the United States or vice versa. For example, European patent law restricts the patentability of methods of treatment of the

human body more than U.S. law does. With respect to both owned and in-licensed patent rights, we cannot predict whether the patent applications we and our licensors are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient protection from competitors. Further, we may not be aware of all third-party intellectual property rights potentially relating to our product candidates. In addition, 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 published at all. Therefore, neither we nor our licensors can know with certainty whether either we or our licensors were the first to make the inventions claimed in the patents and patent applications we own or in-license now or in the future, or that either we or our licensors were the first to file for patent protection of such inventions. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Moreover, our owned or in-licensed pending and future patent applications may not result in patents being issued which protect our technology and product candidates, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents and our ability to obtain, protect, maintain, defend and enforce our patent rights, narrow the scope of our patent protection and, more generally, could affect the value or narrow the scope of our patent rights.

Moreover, we or our licensors may be subject to a third-party preissuance submission of prior art to the United States Patent and Trademark Office, or USPTO, or become involved in opposition, derivation, revocation, reexamination, *inter partes* review, post-grant review or interference proceedings challenging our patent rights or the patent rights of others. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or product candidates and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. If the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

Our owned or licensed patent estate includes patent applications, many of which are at an early-stage of prosecution. The coverage claimed in a patent application can be significantly reduced before the patent is issued, and its scope can be reinterpreted after issuance. Even if our owned or in-licensed patent applications 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. The issuance of a patent is not conclusive as to our inventorship, scope, validity or enforceability, and our owned and in-licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate 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. Such proceedings also may result in substantial costs and require significant time from our management and employees, even if the eventual outcome is favorable to us. 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. Furthermore, our competitors may be able to circumvent our owned or in-licensed patents by developing similar or alternative technologies or products in a non-infringing manner. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing technology and products similar or identical to any of our technology and product candidates.

Patent terms may be inadequate to protect our competitive position with respect to our current or future product candidates for an adequate amount of time.

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions may be available, but there is no assurance that any such extensions will be obtained, and the life of a patent, and the protection it affords, is limited. Even if patents covering our current or future product candidates are obtained, once the patent life has expired, we may be open to competition from competitive products, including generics or biosimilars. 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. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

In the United States, patent term can also be adjusted due to delays that occur during examination of patent applications, which may extend the term of a patent beyond 20 years. There is a risk that we may take action that reduces any accrued patent term adjustment.

It is necessary to pay certain maintenance fees, also referred to as annuities or renewal fees in some countries, throughout the lifetime of a patent at regular intervals. Failure to pay these fees can cause a granted patent to prematurely expire, without an opportunity for revival. There is a risk that we may be unable to maintain patent protection for certain patents in all markets due to finite availability of resources.

If we are unable to obtain licenses from third parties on commercially reasonable terms or fail to comply with our obligations under such agreements, our business could be harmed.

It may be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties. If we are unable to license such technology, or if we are forced to license such technology on unfavorable terms, our business could be materially harmed. If we are unable to obtain a necessary license, we may be unable to develop or commercialize the affected product candidate(s), which could materially harm our business and the third parties owning such intellectual property rights could seek either an injunction prohibiting our sales or an obligation on our part to pay royalties and/or other forms of compensation. Even if we are able to obtain a license, we may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us.

If we are unable to obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may be required to expend significant time and resources to redesign our technology, product candidates, or the methods for manufacturing them or to develop or license replacement technology, all of which may not be feasible on a technical or commercial basis. If we are unable to do so, we may be unable to develop or commercialize the affected technology and product candidates, which could harm our business, financial condition, results of operations and prospects significantly.

Additionally, if we fail to comply with our obligations under any license agreements, our counterparties may have the right to terminate these agreements, in which event we might not be able to develop, manufacture or market, or may be forced to cease developing, manufacturing or marketing, any product that is covered by these agreements or may face other penalties under such agreements. Such an occurrence could materially adversely affect the value of the product candidate being developed under any such agreement.

Termination of these agreements or reduction or elimination of our rights under these agreements, or restrictions on our ability to freely assign or sublicense our rights under such agreements when it is in the interest of our business to do so, may result in us having to negotiate new or restated agreements with less favorable terms, cause us to lose our rights under these agreements, including our rights to important intellectual property or technology or impede, or delay or prohibit the further development or commercialization of one or more product candidates that rely on such agreements.

If we do not obtain patent term extension for any product candidates we may develop, our business may be materially harmed.

In the United States, the term of a patent that covers an FDA-approved drug may, in certain cases, be eligible for a patent term extension under the Hatch-Waxman Act, as compensation for the loss of a patent term during the FDA regulatory review process for a drug product subject to the provisions of the Hatch-Waxman Act. The Hatch-Waxman Act permits a patent term extension of up to five years, but patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval. Only one patent among those eligible for an extension and only those claims covering the approved drug, a method for using it, or a method for manufacturing it may be extended. Similar provisions are available in Europe and certain other non-United States jurisdictions to extend the term of a patent that covers an approved drug. While, in the future, if and when our product candidates receive FDA approval, we expect to apply for patent term extensions on patents covering those product candidates. There is no guarantee that the applicable authorities, including the FDA, will agree with our assessment of whether such extensions should be granted, and even if granted, the length of such extensions could be for a shorter period than we anticipate. We may not be granted patent term extension either in the United States or in any foreign country because of, for example, failing to exercise due diligence during the testing phase or regulatory review process, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the term of extension, as well as the scope of patent protection during any such extension, afforded by the governmental authority could be less than we request. If we are unable to obtain any patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following the expiration of our patent rights, and our business, financial condition, results of operations and prospects could be materially harmed.

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

Changes in either the patent laws or interpretation of patent laws in the United States could increase the uncertainties and costs surrounding the prosecution of our owned or in-licensed patent applications and the maintenance, enforcement or defense of our owned or in-licensed issued patents.

In addition, the patent positions of companies in the development and commercialization of pharmaceuticals are particularly uncertain. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. This combination of events has created uncertainty with respect to the validity and enforceability of patents once obtained. Depending on future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could have a material adverse effect on our patent rights and our ability to protect, defend and enforce our patent rights in the future. Similarly, changes in patent law and regulations in other countries or jurisdictions, changes in the governmental bodies that enforce them or changes in how the relevant governmental authority enforces patent laws or regulations may weaken our ability to obtain new patents or to enforce patents that we own or have licensed or that we may obtain in the future.

The federal government retains certain rights in inventions created using its financial assistance under the Bayh-Dole Act. The federal government retains a "nonexclusive, nontransferable, irrevocable, paid-up license" for its own benefit. The Bayh-Dole Act also provides federal agencies with "march-in rights". March-in rights allow the government, in specified circumstances, to require the contractor or successors in title to the patent to grant a "nonexclusive, partially exclusive, or exclusive license" to a "responsible applicant or applicants." If the patent owner refuses to do so, the government may grant the license itself. We collaborate with a number of universities with respect to certain of our research and development. We cannot be sure that any co-developed intellectual property will be free from government rights pursuant to the Bayh-Dole Act. If, in the future, we co-own or in-license technology which is critical to our business that is developed in whole or in part with federal funds subject to the Bayh-Dole Act, our ability to enforce or otherwise exploit patents covering such technology may be adversely affected.

Although we or our licensors are not currently involved in any intellectual property litigation, we may become involved in lawsuits to protect or enforce our patents, the patents of our licensors or other intellectual property rights, which could be expensive, time-consuming and unsuccessful.

Competitors and other third parties may infringe, misappropriate or otherwise violate our or our licensor's issued patents, the patents of our licensors or other intellectual property. It may be difficult to detect infringers who do not advertise the components that are used in their products. Moreover, it may be difficult or impossible to obtain evidence of infringement in a competitor's product. To counter infringement or misappropriation, we or our licensors may need to file infringement, misappropriation or other intellectual property related claims, which can be expensive and time-consuming and can distract our management and scientific personnel. There can be no assurance that we will have sufficient financial or other resources to file and pursue such infringement claims, which typically last for years before they are concluded. Any claims we assert against perceived infringers could provoke such parties to assert counterclaims against us, alleging that we infringe, misappropriate or otherwise violate their intellectual property.

In addition, in a patent infringement proceeding, such parties could counterclaim that the patents we or our licensors have asserted are invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including novelty, non-obviousness, enablement, or written description. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. Third parties may institute such claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post-grant review, *inter partes* review, interference proceedings, derivation proceedings, and equivalent proceedings in foreign jurisdictions, such as opposition proceedings. The outcome following legal assertions of invalidity and unenforceability is unpredictable. Similarly, if we or our licensors assert trademark infringement claims, a court may determine that the marks we or our licensors have asserted are invalid or unenforceable, or that the party against whom we or our licensors have asserted trademark infringement has superior rights to the marks in question. In this case, we could ultimately be forced to cease use of such trademarks, which could materially harm our business and negatively affect our position in the marketplace.

An adverse result in any such proceeding could put one or more of our owned or in-licensed patents at risk of being invalidated, held unenforceable or interpreted narrowly, could put any of our owned or in-licensed patent applications at risk of not yielding an issued patent, and could limit our or our licensor's ability to assert those patents against those parties, or other competitors, and curtail or preclude our ability to exclude third parties from developing and commercializing similar or competitive products. A court may also refuse to stop the third party from using the technology at issue in a proceeding on the grounds that our owned or in-licensed patents do not cover such technology. Even if we establish infringement, a court may not order the third party to stop using the technology at issue and instead award only monetary damages to us, which 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 or trade secrets could be compromised by disclosure during this type of 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 common stock. Any of the foregoing could allow such third parties to develop and commercialize competing technologies and products and have a material adverse impact on our business, financial condition, results of operations and prospects.

Interference or derivation proceedings provoked by third parties or brought by us or declared by the USPTO may be necessary to determine the priority of inventions with respect to our patents or patent applications. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to us from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms or at all, or if a non-exclusive license is offered and our competitors gain access to the same technology. Our defense of litigation or interference or derivation proceedings may fail and, even if successful, may result in substantial costs and distract our management, technical personnel and other employees. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to continue our clinical trials, continue our research programs, license necessary technology from third parties, or enter into development partnerships that would help us bring our product candidates to market.

Any such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities.

We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources in one or more aspects, or for other reasons. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could compromise our ability to compete in the marketplace.

We may need to license intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.

A third party may hold intellectual property, including patent rights, that are important or necessary to the development of our products. It may be necessary for us to use the patented or proprietary technology of a third party to commercialize our own technology or products, in which case we would be required to obtain a license from such third party. A license to such intellectual property may not be available or may not be available on commercially reasonable terms, which could have a material adverse effect on our business and financial condition.

The licensing and acquisition of third-party intellectual property rights is a competitive practice, and companies that may be more established, or have greater resources than us, may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider necessary or attractive in order to commercialize our product candidates. More established companies may have a competitive advantage over us due to their larger size and cash resources or greater clinical development and commercialization capabilities. We may not be able to successfully complete such negotiations and ultimately acquire the rights to the intellectual property surrounding the additional product candidates that we may seek to acquire.

Third parties may initiate legal proceedings alleging that we are infringing, misappropriating or otherwise violating their intellectual property rights, the outcome of which would be uncertain and could have a material adverse effect on the success of our business.

Our commercial success depends upon our ability and the ability of our collaborators to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing, misappropriating or otherwise violating the intellectual property and proprietary rights of third parties. There is considerable patent and other intellectual property

litigation in the biopharmaceutical industry. We may become party to, or threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our technology and product candidates, including interference proceedings, post grant review, *inter partes* review, and derivation proceedings before the USPTO and similar proceedings in foreign jurisdictions, such as opposition proceedings before the European Patent Office. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are pursuing development candidates. As the biopharmaceutical industry expands and more patents are issued, the risk increases that our technologies or product candidates that we may identify may be subject to claims of infringement of the patent rights of third parties.

The legal threshold for initiating litigation or contested proceedings is low, so even lawsuits or proceedings with a low probability of success might be initiated and require significant resources to defend. Litigation and contested proceedings can also be expensive and time-consuming, and our adversaries in these proceedings may have the ability to dedicate substantially greater resources to prosecuting these legal actions than we can. The risks of being involved in such litigation and proceedings may increase if and as our product candidates near commercialization and as we gain the greater visibility associated with being a public company. Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future, regardless of merit. Even if we diligently search third-party patents for potential infringement by our products or product candidates, we may not successfully find patents our products or product candidates may infringe. We may not be aware of all such intellectual property rights potentially relating to our technology and product candidates and their uses, or we may incorrectly conclude that third-party intellectual property is invalid or that our activities and product candidates do not infringe such intellectual property. Thus, we do not know with certainty that our technology and product candidates, or our development and commercialization thereof, do not and will not infringe, misappropriate or otherwise violate any third party's intellectual property.

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations or methods, such as methods of manufacture or methods for treatment, related to the discovery, use or manufacture of the product candidates that we may identify or related to our technologies. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that the product candidates that we may identify may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. Moreover, as noted above, there may be existing patents that we are not aware of or that we have incorrectly concluded are invalid or not infringed by our activities. If any third-party patents were held by a court of competent jurisdiction to cover, for example, the manufacturing process of the product candidates that we may identify, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to commercialize such product candidate unless we obtained a license under the applicable patents, or until such patents expire.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize the product candidates that we may identify. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

We may choose to take a license or, if we are found to infringe, misappropriate or otherwise violate a third party's intellectual property rights, we could also be required to obtain a license from such third party to continue developing, manufacturing and marketing our technology and product candidates. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we are able to obtain a license, we could be non-exclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us and could require us to make substantial licensing and royalty payments. We could be forced, including by court order, to cease developing, manufacturing and commercializing the infringing technology or product. In addition, we could be found liable for significant monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent or other intellectual property right, we could be forced to indemnify our customers or collaborators. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. In addition, we may be forced to redesign our product candidates, seek new regulatory approvals and indemnify third parties pursuant to contractual agreements. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar material adverse effect on our business, financial condition, results of operations and prospects.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

While we seek to protect the trademarks and trade names we use in the United States and in other countries, we may be unsuccessful in obtaining registrations or otherwise protecting these trademarks and trade names, which we need to build name recognition in our markets of interest and among potential partners or customers. We rely on both registration and common law protection for our trademarks. Our registered or unregistered trademarks or trade names may be challenged, infringed, diluted or declared generic, or determined to be infringing on other marks. At times, competitors may adopt trademarks and trade names similar to ours, or our collaborators may fail to use our trade names or trademarks, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trademark infringement claims brought by owners of other registered trademarks or trademarks that incorporate variations of our registered or unregistered trademarks. If we are unable to protect our rights to trademarks and trade names, we may be prevented from using such marks and names unless we enter into appropriate royalty, license or coexistence agreements, which may not be available or may not be available on commercially reasonable terms.

During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. Effective trademark protection may not be available or may not be sought in every country in which our products are made available. Any name we propose to use for our products in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed product names, we may be required to expend significant additional resources in an effort to identify a usable substitute name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively, and our business may be adversely affected.

We may license our trademarks and trade names to third parties, such as distributors and collaborators. Though these license agreements may provide guidelines for how our trademarks and trade names may be used, a breach of these agreements or misuse of or failure to use our trademarks and trade names by our licensees may jeopardize our rights in or diminish the goodwill associated with our trademarks and trade names. Our efforts to enforce or protect our proprietary rights related to trademarks, trade names, trade secrets, know-how, domain names, copyrights or other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely affect our business, financial condition, results of operations and prospects.

Intellectual property litigation or other legal proceedings relating to intellectual property could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and may also have an advantage in such proceedings due to their more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of intellectual property litigation or other proceedings could compromise our ability to compete in the marketplace.

Obtaining and maintaining patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance, renewal and annuity fees and various other government fees on any issued patent and pending patent application must be paid to the USPTO and foreign patent agencies in several stages or annually over the lifetime of our

patents and patent applications. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. In certain circumstances, we rely on our licensing partners to pay these fees to, or comply with the procedural and documentary rules of, the relevant patent agency. With respect to our patents, we rely on an annuity service, outside firms and outside counsel to remind us of the due dates and to make payment after we instruct them to do so. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In such an event, potential competitors might be able to enter the market with similar or identical products or technology. If we or our licensors fail to maintain the patents and patent applications covering our product candidates, it would have a material adverse effect on our business, financial condition, results of operations and prospects.

If we fail to comply with our obligations in our current and future intellectual property licenses and funding arrangements with third parties, or otherwise experience disruptions to our business relationships with our licensors, we could lose intellectual property rights that are important to our business.

We are party to a number of license and research agreements. Some of these agreements provide us with the intellectual property rights required for the development of our product candidates, including the license agreement with Penn. These licenses and research agreements and similar agreements in the future may impose diligence, development and commercialization timelines, and milestone payment, royalty, insurance and other obligations on us. If we fail to comply with such obligations, the parties to these agreements may decide to terminate the agreements or require us to grant them certain rights, in which we may not be able to develop, manufacture, or market any products without the rights granted to us by these agreements and may face other penalties. Any such occurrences could adversely affect the value of any product candidate being developed.

For a variety of purposes, we will likely enter into additional licensing and funding arrangements with third parties that may impose similar obligations on us. Termination of these agreements or reduction or elimination of our rights under these agreements may result in us having to negotiate new or restated agreements with less favorable terms, or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology, which would have a material adverse effect on our business, financial condition, results of operations and prospects. While we still face all of the risks described herein with respect to such agreements, we cannot prevent third parties from also accessing those technologies. In addition, our licenses may place restrictions on our future business opportunities.

In addition to the above risks, intellectual property rights that our licenses in the future may include sublicenses under intellectual property owned by third parties, in some cases through multiple tiers. The actions of our licensors may therefore affect our rights to use our sublicensed intellectual property, even if we are in compliance with all of the obligations under our license agreements. Should our licensors or any of the upstream licensors fail to comply with their obligations under the agreements pursuant to which they obtain the rights that are sublicensed to us, or should such agreements be terminated or amended, our ability to develop and commercialize our product candidates may be materially harmed.

Disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the license agreement and other interpretation related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the payment obligations with respect to licensed technology.

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of

operations and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected technology and product candidates, which could have a material adverse effect on our business, financial conditions, results of operations and prospects.

Further, licensors could retain the right to prosecute and defend the intellectual property rights licensed to us, in which case we would depend on our licensors to control the prosecution, maintenance and enforcement of all of our licensed and sublicensed intellectual property, and even when we do have such rights, we may require the cooperation of our licensors and upstream licensors, which may not be forthcoming. Licensors may determine not to pursue litigation against other companies or may pursue such litigation less aggressively than we would. Our business could be adversely affected if we or our licensors are unable to prosecute, maintain and enforce our licensed and sublicensed intellectual property effectively.

Our current or future licensors may have relied on third-party consultants or collaborators or on funds from third parties such that our licensors are not the sole and exclusive owners of the patents and patent applications of our in-licenses. If other third parties have ownership rights to patents or patent applications of our in-licenses, they may be able to license such patents to our competitors, and our competitors could market competing products and technology. This could have a material adverse effect on our competitive position, business, financial conditions, results of operations and prospects.

In spite of our best efforts, our licensors might conclude that we have materially breached our license agreements and might therefore terminate the license agreements, thereby removing our ability to develop and commercialize product candidates and technology covered by these license agreements. If these in-licenses are terminated, or if the underlying intellectual property fails to provide the intended exclusivity, competitors would have the freedom to seek regulatory approval of, and to market, products and technologies identical to ours. This could have a material adverse effect on our competitive position, business, financial condition, results of operations and prospects.

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

Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive. 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, and even where such protection is nominally available, judicial and governmental enforcement of such intellectual property rights may be lacking. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, 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 have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection or licenses, but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents 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 our patents or marketing of competing products in violation of our intellectual property and proprietary rights generally. In addition, certain jurisdictions do not protect to the same extent or at all inventions that constitute new methods of treatment.

Proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated, held unenforceable or interpreted narrowly, could put our patent applications 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 and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors are forced to grant a license to third parties with respect to any patents relevant to

our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.

We or our licensors may be subject to claims that former employees, collaborators or other third parties have an interest in our owned or in-licensed patents, trade secrets or other intellectual property as an inventor or co-inventor. For example, we or our licensors may have inventorship disputes arise from conflicting obligations of employees, consultants or others who are involved in developing our product candidates. Although it is our policy to require our employees and contractors who may be involved in the conception or 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, conceives or develops intellectual property that we regard as our own, and we cannot be certain that our agreements with such parties will be upheld in the face of a potential challenge, or that they will not be breached, for which we may not have an adequate remedy. The assignment of intellectual property rights may not be self-executing or the assignment agreements may be breached, and litigation may be necessary to defend against these and other claims challenging inventorship or our or our licensors' ownership of our owned or in-licensed patents, trade secrets or other intellectual property. If we or our licensors fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property that is important to our product candidates. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to our management and other employees. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations and prospects.

We may be subject to claims by third parties asserting that our employees, consultants or contractors have wrongfully used or disclosed confidential information of third parties, including of their current or former employers or claims asserting we have misappropriated their intellectual property, or is claiming ownership of what we regard as our own intellectual property.

Many of our employees, consultants and contractors have been previously employed at universities or other biopharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and contractors 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 prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could have a material adverse effect on our competitive business position and prospects. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to commercialize our technology or products, which license may not be available on commercially reasonable terms, or at all, or such license may be non-exclusive. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our management and employees.

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

In addition to seeking patents for some of our technology and product candidates, we also rely on trade secrets and confidentiality agreements to protect our unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect our trade secrets and other proprietary technology, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, CROs, contract manufacturers, consultants, advisors and other third parties. We may have also entered into confidentiality and invention or patent assignment agreements with our employees and consultants, but 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. To the extent we become involved in litigation that may require discovery of our trade secrets, know-how and other proprietary technology, we will seek to secure protective orders from the court that bind the parties with access to the discovered information. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Detecting the disclosure or misappropriation of a trade secret and enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the

outcome is unpredictable. In addition, some courts inside and outside of the United States are less willing or unwilling to protect trade secrets. In addition, we cannot be certain that proprietary technical information and related confidential documents that we have shared with our collaborators and/or submitted to governmental agencies, including regulatory agencies for evaluation and supervision of pharmaceutical products, will be kept confidential. 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 any of our trade secrets were to be disclosed to or independently developed by a competitor or other third party, our competitive position would be materially and adversely harmed.

Intellectual property rights do not necessarily address all potential threats to us.

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 product candidates that are similar to ours but that are not covered by the claims of the patents that we own or license;
- we, or our license partners or current or future collaborators, might not have been the first to make the inventions covered by the issued patent or pending patent applications that we license or may own in the future;
- we, or our license partners or current or future collaborators, might not have been the first to file patent applications covering our inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our owned or in-licensed intellectual property rights;
- it is possible that our owned or in-licensed pending patent applications or those we may own or in-license in the future will not lead to issued patents;
- claims of issued patents that we hold rights to may be held invalid or unenforceable, including as a result of legal challenges by our competitors;
- our competitors might conduct research, development, testing or commercialization 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 cannot ensure that any of our patents, or any of our pending patent applications, if issued, or those of our licensors, will include claims having a scope sufficient to protect our product candidates;
- we cannot ensure that any patents issued to us or our licensors will provide a basis for an exclusive market for our commercially viable product candidates or will provide us with any competitive advantages;
- the U.S. Supreme Court, other federal courts, Congress, the USPTO or similar foreign authorities may change the standards of patentability and any such changes could narrow or invalidate, or change the scope of, our or our licensors' patents;
- patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time;
- we cannot ensure that our commercial activities or product candidates will not infringe upon the patents of others;
- we cannot ensure that we will be able to successfully commercialize our product candidates on a substantial scale, if approved, before the relevant patents that we own or license expire;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may harm our business; and
- we may choose not to file a patent in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property.

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

If approved, our product candidates that are licensed and regulated as biologics may face competition from biosimilars approved through an abbreviated regulatory pathway.

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 Affordability 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 an approved biologic.

Under the BPCIA, a reference biological product is granted 12 years of data exclusivity from the time of first licensure of the product, and the FDA will not accept an application for a biosimilar or interchangeable product based on the reference biological product until four years after the date of first licensure of the reference product In addition, the licensure of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still develop and receive approval of a competing biologic, so long as its biologics license application, or BLA, does not reply on the reference product, sponsor's data or submit the application as a biosimilar application.

We believe that any of the product candidates we develop 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 biosimilar competition sooner than anticipated. Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of the reference products in a way that is similar to traditional generic substitution for non-biological products will depend on a number of marketplace and regulatory factors that are still developing. Nonetheless, the approval of a biosimilar to our product candidates would have a material adverse impact on our business due to increased competition and pricing pressure.

In addition, foreign regulatory authorities may change their approval policies and new regulations may be enacted. For instance, the EU pharmaceutical legislation is currently undergoing a complete review process, in the context of the Pharmaceutical Strategy for Europe initiative, launched by the European Commission in November 2020. The European Commission's proposal for revision of several legislative instruments related to medicinal products (potentially reducing the duration of regulatory data protection, revising the eligibility for expedited pathways, etc.) was published on April 26, 2023. On April 10, 2024, the European Parliament adopted a position on the proposal requesting several amendments to the package. The proposed revisions remain to be agreed and adopted by the European Parliament and European Council and the proposals may therefore be substantially revised before adoption, which is not anticipated before early 2026. The revisions may, however, have a significant impact on the pharmaceutical industry and our business in the long term.

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We currently have no intention of resuming research and development activities independently or as a standalone company, and the following are risks primarily relating to our prior operations and historical activities, unless otherwise noted.

Risks Related to Regulatory Approval and Other Legal Compliance Matters

The regulatory approval process of the FDA is lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain marketing approval for our product candidates, our business will be substantially harmed.

The time required to obtain approval by the FDA is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We have not obtained marketing approval for any product candidate, and it is possible that none of our existing product candidates, or any product candidates we may seek to develop in the future will ever obtain marketing approval.

Our product candidates could fail to receive marketing 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 product candidate is safe and effective for our proposed indication;
- 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 pre-clinical studies or clinical trials;
- data collected from clinical trials of our product candidates may not be sufficient to support the submission of biologics licensing application, or BLA to the FDA or other submission or to obtain marketing approval in the United States;
- the FDA may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we 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.

This lengthy approval process as well as the unpredictability of future clinical trial results may result in us failing to obtain marketing approval to market any of our product candidates, which would significantly harm our business, results of operations and prospects. The FDA has substantial discretion in the approval process and determining when or whether marketing approval will be obtained for any of our product candidates. Even if we believe the data collected from clinical trials of our product candidates are promising, such data may not be sufficient to support approval by the FDA. Risks similar to those outlined above exist with regard to regulatory authorities outside the United States.

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, 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.

Even if we complete the necessary pre-clinical studies and clinical trials, the marketing approval process is expensive, time-consuming and uncertain and may prevent us from obtaining approvals for the commercialization of some or all of our product candidates. If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, 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 and distribution, export and import are subject to comprehensive regulation by the FDA and other regulatory authorities in the United States and by the EMA and other regulatory authorities outside of the United States. Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate. We have not submitted an application for or received marketing approval for any of our product candidates in the United States or in any other jurisdiction.

We have only limited experience in filing and supporting the applications necessary to gain marketing approvals and expect to rely on third-party clinical research organizations or other third-party consultants or vendors to assist us in this process. Securing marketing approval requires the submission of extensive pre-clinical and clinical data and supporting information, including manufacturing information, to the various regulatory authorities for each therapeutic indication to establish the product candidate's safety and efficacy. 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 us from obtaining marketing approval or prevent or limit commercial use. New cancer drugs frequently are indicated only for patient populations that have not responded to an existing therapy or have relapsed.

The process of obtaining marketing approvals, both in the United States and abroad, 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 product application, may cause delays in the approval or rejection of an application. Regulatory authorities have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional pre-clinical, clinical or other studies. In addition, varying interpretations of the data obtained from pre-clinical and clinical testing could delay, limit or prevent marketing approval of a product candidate. Any marketing approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

Further, under the Pediatric Research Equity Act of 2003, or PREA, a BLA or supplement to a BLA for certain biological products must contain data to assess the safety and effectiveness of the biological product in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective, unless the sponsor receives a deferral or waiver from the FDA. A deferral may be granted for several reasons, including a finding that the product or therapeutic candidate is ready for approval for use in adults before pediatric trials are complete or that additional safety or effectiveness data needs to be collected before the pediatric trials begin. The applicable legislation in the European Union also requires sponsors to either conduct clinical trials in a pediatric population in accordance with a Pediatric Investigation Plan approved by the Pediatric Committee of the EMA or to obtain a waiver or deferral from the conduct of these studies by this Committee. For any of our product candidates for which we are seeking

regulatory approval in the United States or the European Union, we cannot guarantee that we will be able to obtain a waiver or alternatively complete any required studies and other requirements in a timely manner, or at all, which could result in associated reputational harm and subject us to enforcement action, invalidation of the marketing application, and/or financial penalties. Our collaborators are also subject to similar requirements outside of the United States and the European Union and thus the attendant risks and uncertainties.

In addition, we could be adversely affected by several significant administrative law cases decided by the U.S. Supreme Court in 2024. In *Loper Bright Enterprises v. Raimondo*, for example, the court overruled *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc*., which for 40 years required federal courts to defer to permissible agency interpretations of statutes that are silent or ambiguous on a particular topic. The U.S. Supreme Court stripped federal agencies of this presumptive deference and held that courts must exercise their independent judgment when deciding whether an agency such as the FDA acted within its statutory authority under the Administrative Procedure Act, or the APA. Additionally, in *Corner Post, Inc. v. Board of Governors of the Federal Reserve System*, the court held that actions to challenge a federal regulation under the APA can be initiated within six years of the date of injury to the plaintiff, rather than the date the rule is finalized. The decision appears to give prospective plaintiffs a personal statute of limitations to challenge longstanding agency regulations. Another decision, *Securities and Exchange Commission v. Jarkesy,* overturned regulatory agencies' ability to impose civil penalties in administrative proceedings. These decisions could introduce additional uncertainty into the regulatory process and may result in additional legal challenges to actions taken by federal regulatory agencies, including the FDA and CMS, that we rely on. In addition to potential changes to regulations as a result of legal challenges, these decisions may result in increased regulatory uncertainty and delays and other impacts, any of which could adversely impact our business and operations.

Finally, our ability to develop and market new drug products may be impacted if litigation challenging the FDA's approval of another company's drug continues. In April 2023, the U.S. District Court for the Northern District of Texas invalidated the approval by the FDA of mifepristone, a drug product which was originally approved in 2000 and whose distribution is governed by various measures adopted under a REMS. The Court of Appeals for the Fifth Circuit declined to order the removal of mifepristone from the market but did hold that plaintiffs were likely to prevail in their claim that changes allowing for expanded access of mifepristone, which the FDA authorized in 2016 and 2021, were arbitrary and capricious. In June 2024, the Supreme Court reversed and remanded that decision after unanimously finding that the plaintiffs did not have standing to bring this legal action against the FDA. In October 2024, the Attorneys General of three states filed an amended complaint in the district court in Texas challenging FDA's actions. In January 2025, the district court agreed to allow these states to file an amended complaint and continue to pursue this challenge. Depending on the outcome of this litigation, if it continues, our ability to develop new drug product candidates and to maintain approval of existing drug products is at risk and could be delayed, undermined or subject to protracted litigation.

Failure to obtain marketing approval in foreign jurisdictions would prevent our product candidates from being marketed in such jurisdictions, which, in turn, would materially impair our ability to generate revenue.

In order to market and sell our products in the European Union and many other foreign jurisdictions, we and our collaborators must obtain separate marketing approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The marketing approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be approved for sale in that country. We or these third parties may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. The failure to obtain approval in one jurisdiction may negatively impact our ability to obtain approval elsewhere. We may not be able to file for marketing approvals and may not receive necessary approvals to commercialize our products in any jurisdiction, which would materially impair our ability to generate revenue.

Additionally, we could face heightened risks with respect to obtaining marketing authorization in the United Kingdom as a result of the withdrawal of the United Kingdom from the European Union, commonly referred to as Brexit. The United Kingdom is no longer part of the European Single Market and EU Customs Union. As of January 1, 2025, the Medicines and Healthcare products Regulatory Agency, or MHRA, is responsible for approving all medicinal products destined for the United Kingdom market (i.e., Great Britian and Northern Ireland). At the same time, a new international recognition procedure, or IRP, will apply, which intends to facilitate approval of pharmaceutical products in the UK. The IRP is open to applicants that have already received an authorization for the same product from one of the MHRA's specified Reference Regulators, or RRs. The RRs notably include EMA and regulators in the EU/European Economic Area, or EEA, member states for approvals in the EU centralized procedure and mutual recognition procedure as well as the FDA (for

product approvals granted in the U.S. However, the concrete functioning of the IRP is currently unclear. Any delay in obtaining, or an inability to obtain, any marketing authorizations may force us to restrict or delay efforts to seek regulatory approval in the United Kingdom for our product candidates, which could significantly and materially harm our business.

We expect that we will be subject to additional risks in commercializing any of our product candidates that receive marketing approval outside the United States, including tariffs, trade barriers and regulatory requirements; economic weakness, including inflation, or political instability in particular foreign economies and markets; compliance with tax, employment, immigration and labor laws for employees living or traveling abroad; foreign currency fluctuations, which could result in increased operating expenses and reduced revenue, and other obligations incident to doing business in another country; and workforce uncertainty in countries where labor unrest is more common than in the United States.

Inadequate funding for the FDA, the SEC and other government agencies, including from government shutdowns, funding shortages, personnel losses, regulatory reform or other disruptions to these agencies' operations, 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 FDA have fluctuated in recent years as a result. Disruptions at the FDA and other agencies may also slow the time necessary for new product candidates to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. 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.

In addition, disruptions may result from events similar to the COVID-19 pandemic. During the COVID-19 pandemic, a number of companies announced receipt of complete response letters due to the FDA's inability to complete required inspections for their applications. In the event of a similar public health emergency in the future, the FDA may not be able to continue its current pace and review timelines could be extended. Regulatory authorities outside the United States facing similar circumstances may adopt similar restrictions or other policy measures in response to a similar public health emergency and may also experience delays in their regulatory activities.

There is also substantial uncertainty as to how measures being implemented by the new Trump Administration across the government will impact the FDA, CMS and other federal agencies with jurisdiction over our activities. For example, since taking office, President Trump has issued a number of executive orders, which could have a significant impact on the manner in which the FDA conducts its operations and engages in regulatory and oversight activities. Further, while the FDA's review of BLAs and other applications is funded through the user fee program established under PDUFA, the Trump Administration has indicated that it will be reviewing that program and its implementation. If these or other orders or executive actions impose constraints on FDA's ability to engage in oversight and implementation activities in the normal course, our business may be negatively impacted. In addition, the loss of FDA personnel could lead to further disruptions and delays in FDA review and oversight of our product candidates.

Accordingly, if a prolonged government shutdown or other disruption 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. Future shutdowns or other disruptions could also affect other government agencies such as the SEC, which may also impact our business by delaying review of our public filings, to the extent such review is necessary, and our ability to access the public markets.

Regulatory requirements governing gene therapy products are periodically updated and may continue to change in the future.

The FDA has established the Office of Tissues and Advanced Therapies, or the OTAT, within the Center for Biologics Evaluation and Research, or the CBER, to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER in its review. In September 2022, the FDA announced retitling of the OTAT to the Office of Therapeutic Products, or the OTP, and elevation of the OTP to a "Super Office" to meet its growing cell and gene therapy workload and new commitments under the Prescription Drug User Fee Act agreement for fiscal years 2023 to 2027.

Gene therapy clinical trials conducted at institutions that receive funding for recombinant DNA research from the NIH also are potentially subject to review by the Office of Biotechnology Activities' Recombinant DNA Advisory Committee, or the RDAC; however, the NIH announced that the RDAC will only publicly review clinical trials if the trials cannot be evaluated by standard oversight bodies and pose unusual risks. Although the FDA decides whether individual gene therapy protocols may proceed, the RDAC public review process, if undertaken, can delay the initiation of a clinical trial, even if the FDA has reviewed the trial design and details and approved its initiation. Conversely, the FDA can put an IND on a clinical hold even if the RDAC has provided a favorable review or an exemption from in-depth, public review. If we were to engage an NIH-funded institution to conduct a clinical trial, that institution's Institutional Biosafety Committee, or IBC, as well as our IRB would need to review the proposed clinical trial to assess the safety of the trial. In addition, adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of our product candidates.

The FDA has issued various guidance documents regarding gene therapies, including a draft guidance from November 2024 addressing various questions and final guidance documents released in January 2020 relating to CMC information for gene therapy INDs, gene therapies for rare diseases and gene therapies for retinal disorders. Although the FDA has indicated that these and other guidance documents it previously issued are not legally binding, we believe that our compliance with them is likely necessary to gain approval for any gene therapy product candidate that we may develop. The guidance documents provide additional factors that the FDA will consider at each of the above stages of development and relate to, among other things, the proper pre-clinical assessment of gene therapies; the chemistry, manufacturing, and control information that should be included in an IND; the proper design of tests to measure product potency in support of an IND or BLA; and measures to observe delayed adverse effects in subjects who have been exposed to investigational gene therapies when the risk of such effects is high. Further, the FDA usually recommends that sponsors observe subjects for potential gene therapy-related delayed adverse events for a 15-year period, including a minimum of five years of annual examinations followed by 10 years of annual queries, either in person or by questionnaire.

Further, for a gene therapy product, the FDA also will not approve the product if the manufacturer is not in compliance with good tissue practices, or GTP. These standards are found in FDA regulations and guidance that govern the methods used in, and the facilities and controls used for, the manufacture of human cells, tissues, and cellular and tissue-based products, or HCT/Ps, which are human cells or tissue intended for implantation, transplant, infusion, or transfer into a human recipient. The primary intent of the GTP requirements is to ensure that cell and tissue-based products are manufactured in a manner designed to prevent the introduction, transmission, and spread of communicable disease. FDA regulations also require tissue establishments to register and list their HCT/Ps with the FDA and, when applicable, to evaluate donors through screening and testing.

Finally, ethical, social and legal concerns about gene therapy, genetic testing and genetic research could result in additional regulations or prohibiting the processes that we may use. Federal and state agencies, congressional committees and foreign governments have expressed their intentions to further regulate biotechnology. More restrictive regulations or claims that our product candidates are unsafe or pose a hazard could prevent us from commercializing any products. New government requirements may be established that could delay or prevent regulatory approval of our product candidates under development. It is impossible to predict whether legislative changes will be enacted, regulations, policies or guidance changed, or interpretations by agencies or courts changed, or what the impact of such changes, if any, may be.

As we advance our product candidates through clinical development, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. These regulatory review committees and advisory groups and any new guidelines they promulgate 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. 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.

Any product for which we obtain marketing approval in the future could be subject to post-marketing restrictions or withdrawal from the market and we may be subject to substantial penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with any such product following approval.

Any product for which we obtain marketing approval, as well as the manufacturing processes, post-approval studies and measures, labeling, advertising and promotional activities for such product, among other things, will be subject to ongoing requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, requirements relating to

manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. Even if marketing approval of a product is granted, the approval may be subject to limitations on the indicated uses for which the product may be marketed or to the conditions of approval, including the requirement to implement a Risk Evaluation and Mitigation Strategy, or REMS.

The FDA may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of a product. The FDA and other agencies, including the Department of Justice, closely regulate and monitor the post-approval marketing and promotion of products to ensure that they are manufactured, marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers' communications regarding off-label use and if we market any product for an indication that is not approved, we may be subject to warnings or enforcement action for off-label marketing. Violation of the Federal Food, Drug, and Cosmetic Act, or FDCA, and other statutes, including the False Claims Act, relating to the promotion and advertising of prescription drugs may lead to investigations or allegations of violations of federal and state health care fraud and abuse laws and state consumer protection laws.

In addition, later discovery of previously unknown adverse events or other problems with any product for which we may obtain marketing approval and its manufacturers or manufacturing processes or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on such product, manufacturers or manufacturing processes;
- restrictions on the labeling or marketing of the product;
- restrictions on product distribution or use;
- requirements to conduct post-marketing studies or clinical trials;
- warning letters or untitled letters;
- withdrawal of the product from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of the product;
- restrictions on coverage by third-party payors;
- fines, restitution or disgorgement of profits or revenues;
- suspension or withdrawal of marketing approvals;
- refusal to permit the import or export of the product;
- product seizure; or
- injunctions or the imposition of civil or criminal penalties.

Similar restrictions apply to the approval of our products in the EU. The holder of a marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion and sale of medicinal products. These include: compliance with the EU's stringent pharmacovigilance or safety reporting rules, which can impose post-authorization studies and additional monitoring obligations; the manufacturing of authorized medicinal products, for which a separate manufacturer's license is mandatory; and the marketing and promotion of authorized drugs, which are strictly regulated in the European Union and are also subject to EU Member State laws. The failure to comply with these and other EU requirements can also lead to significant penalties and sanctions.

Any regulatory approval to market our products will be limited by indication. If we fail to comply or are found to be in violation of FDA regulations restricting the promotion of our products for unapproved uses, we could be subject to criminal penalties, substantial fines or other sanctions and damage awards.

The regulations relating to the promotion of products for unapproved uses are complex and subject to substantial interpretation by the FDA, EMA, MHRA and other government agencies. In September 2021, the FDA published final regulations which describe the types of evidence that the agency will consider in determining the intended use of a drug product. Physicians may nevertheless prescribe our products off-label to their patients in a manner that is inconsistent with the approved label. We intend to implement compliance and training programs designed to ensure that our sales and marketing practices comply with applicable regulations. Notwithstanding these programs, the FDA or other government agencies may allege or find that our practices constitute prohibited promotion of our products for unapproved uses. We also cannot be sure that our employees will comply with company policies and applicable regulations regarding the promotion of products for unapproved uses.

Notwithstanding the regulatory restrictions on off-label promotion, the FDA and other regulatory authorities allow companies to engage in truthful, non-misleading, and non-promotional scientific communications concerning their products in certain circumstances.

We will also need to carefully navigate the FDA's various regulations, guidance and policies, along with recently enacted legislation, to ensure compliance with restrictions governing promotion of our products. In September 2021, the FDA published final regulations which describe the types of evidence that the Agency will consider in determining the intended use of a drug or biologic. Moreover, with passage of the Pre-Approval Information Exchange Act in December 2022, sponsors of products that have not been approved may proactively communicate to payors certain information about products in development to help expedite patient access upon product approval. In addition, in January 2025, the FDA published final guidance outlining its policies governing the distribution of scientific information to healthcare providers about unapproved uses of approved products. The final guidance calls for such communications to be truthful, non-misleading and scientifically sound and to include all information necessary for healthcare providers to interpret the strengths and weaknesses and validity and utility of the information about the unapproved use of the approved product. If a company engages in such communications consistent with the guidance's recommendations, the FDA indicated that it will not treat such communications as evidence of unlawful promotion of a new intended use for the approved product.

In recent years, a significant number of pharmaceutical and biotechnology companies have been the target of inquiries and investigations by various federal and state regulatory, investigative, prosecutorial and administrative entities in connection with the promotion of products for unapproved uses and other sales practices, including the Department of Justice and various U.S. Attorneys' Offices, the Office of Inspector General of the HHS, the FDA, the Federal Trade Commission, or the FTC, and various state Attorneys General offices. These investigations have alleged violations of various federal and state laws and regulations, including claims asserting antitrust violations, violations of the FDCA, the False Claims Act, the Prescription Drug Marketing Act and anti-kickback laws and other alleged violations in connection with the promotion of products for unapproved uses, pricing and Medicare and/or Medicaid reimbursement. Many of these investigations originate as "*qui tam*" actions under the False Claims Act. Under the False Claims Act, any individual can bring a claim on behalf of the government alleging that a person or entity has presented a false claim or caused a false claim to be submitted to the government for payment. The person bringing a *qui tam* suit is entitled to a share of any recovery or settlement. *Qui tam* suits, also commonly referred to as "whistleblower suits," are often brought by current or former employees. In a *qui tam* suit, the government must decide whether to intervene and prosecute the case. If it declines, the individual may pursue the case alone.

If the FDA or any other governmental agency initiates an enforcement action against us or if we are the subject of a *qui tam* suit and it is determined that we violated prohibitions relating to the promotion of products for unapproved uses, we could be subject to substantial civil or criminal fines or damage awards and other sanctions such as consent decrees and corporate integrity agreements pursuant to which our activities would be subject to ongoing scrutiny and monitoring to ensure compliance with applicable laws and regulations. Any such fines, awards or other sanctions would have an adverse effect on our revenue, business, financial prospects and reputation.

We may seek certain designations for our product candidates, including Breakthrough Therapy, Fast Track and Priority Review designations in the United States, but we might not receive such designations, and even if we do, such designations may not lead to a faster development or regulatory review or approval process.

We may seek certain designations for one or more of our product candidates that could expedite review and approval by the FDA. A Breakthrough Therapy product is defined as a product that is intended, alone or in combination with one or more other products, to treat a serious condition, and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For products that have been designated as Breakthrough Therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens.

The FDA may also designate a product for Fast Track review if it is intended, whether alone or in combination with one or more other products, for the treatment of a serious or life-threatening disease or condition, and it demonstrates the potential to address unmet medical needs for such a disease or condition. For Fast Track products, sponsors may have greater interactions with the FDA and the FDA may initiate review of sections of a Fast Track product's application before the application is complete. This rolling review may be available if the FDA determines, after preliminary evaluation of clinical data submitted by the sponsor, that a Fast Track product may be effective.

We may also seek a priority review designation for one or more of our product candidates. If the FDA determines that a product candidate offers major advances in treatment or provides a treatment where no adequate therapy exists, the FDA

may designate the product candidate for priority review. A priority review designation means that the goal for the FDA to review an application is six months, rather than the standard review period of ten months.

These designations are within the discretion of the FDA. Accordingly, even if we believe that one of our product candidates meets the criteria for these designations, the FDA may disagree and instead determine not to make such designation. Further, even if we receive a designation, the receipt of such designation for a product candidate may not result in a faster development or regulatory review or approval process compared to products considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualifies for these designations, the FDA may later decide that the product candidates no longer meet the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

We may seek PRIME Designation in the European Union for our product candidates, but we might not receive such designations, and even if we do, such designations may not lead to a faster development or regulatory review or approval process.

In the EU, we may seek PRIME designation for some of our product candidates in the future. PRIME is a voluntary program aimed at enhancing the EMA's role to reinforce scientific and regulatory support in order to optimize development and enable accelerated assessment of new medicines that are of major public health interest with the potential to address unmet medical needs. The program focuses on medicines that target conditions for which there exists no satisfactory method of treatment in the European Union or even if such a method exists, it may offer a major therapeutic advantage over existing treatments. PRIME is limited to medicines under development and not authorized in the European Union and where the sponsor intends to apply for an initial marketing authorization application through the centralized procedure. To be accepted for PRIME, a product candidate must meet the eligibility criteria in respect of its major public health interest and therapeutic innovation based on information that is capable of substantiating the claims. The benefits of a PRIME designation include the appointment of a rapporteur under the EMA's Committee for Human Medicinal Products to provide continued support and help to build knowledge ahead of a marketing authorization application, early dialogue and scientific advice at key development milestones, and the potential to qualify products for accelerated review, meaning reduction in the review time for an opinion on approvability to be issued earlier in the application process. PRIME enables a sponsor to request parallel EMA scientific advice and health technology assessment advice to facilitate timely market access. Even if we receive PRIME designation for any of our product candidates, the designation may not result in a materially faster development process, review or approval compared to conventional EMA procedures. Further, obtaining PRIME designation does not assure or increase the likelihood of EMA's grant of a marketing authorization.

We, or our collaborators, may seek approval from the FDA or comparable foreign regulatory authorities to use accelerated development pathways for our product candidates. If we, or our collaborators, are not able to use such pathways, we, or they, may be required to conduct additional clinical trials beyond those that are contemplated, which would increase the expense of obtaining, and delay the receipt of, necessary marketing approvals, if we, or they, receive them at all. In addition, even if an accelerated approval pathway is available to us, or our collaborators, it may not lead to expedited approval of our product candidates, or approval at all.

Under the FDCA and implementing regulations, the FDA may grant accelerated approval to a product candidate to treat a serious or life-threatening condition that provides meaningful therapeutic benefit over available therapies, upon a determination that the product has an effect on a surrogate endpoint or intermediate clinical endpoint that is reasonably likely to predict clinical benefit. The FDA considers a clinical benefit to be a positive therapeutic effect that is clinically meaningful in the context of a given disease, such as irreversible morbidity or mortality. For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign, or other measure that is thought to predict clinical benefit but is not itself a measure of clinical benefit. An intermediate clinical endpoint is a clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit measurement of a therapeutic effect that is considered reasonably likely to predict the clinical benefit of a drug. The accelerated approval pathway may be used in cases in which the advantage of a new drug over available therapy may not be a direct therapeutic advantage but is a clinically important improvement from a patient and public health perspective. Prior to seeking such accelerated approval, we, or our collaborators, will continue to seek feedback from the FDA or comparable foreign regulatory agencies and otherwise evaluate our, or their, ability to seek and receive such accelerated approval.

There can be no assurance that we will satisfy all FDA requirements, including new provisions that govern accelerated approval. For example, with passage of the FDORA in December 2022, Congress modified certain provisions governing accelerated approval of drug and biologic products. Specifically, the new legislation authorized the FDA to: require a sponsor to have its confirmatory clinical trial underway before accelerated approval is awarded, require a sponsor of a

product granted accelerated approval to submit progress reports on its post-approval studies to the FDA every six months (until the study is completed; and use expedited procedures to withdraw accelerated approval of an BLA if certain conditions are met, including where a required confirmatory study fails to verify and describe the predicted clinical benefit or where evidence demonstrates the product is not shown to be safe or effective under the conditions of use. The FDA may also use such procedures to withdraw an accelerated approval if a sponsor fails to conduct any required post-approval study of the product with due diligence, including with respect to "conditions specified by the Secretary." The new procedures include the provision of due notice and an explanation for a proposed withdrawal, and opportunities for a meeting with the Commissioner or the Commissioner's designee and a written appeal, among other things. We will need to fully comply with these and other requirements in connection with the development and approval of any product candidate that qualifies for accelerated approval.

In March 2023, the FDA issued draft guidance that outlines its current thinking and approach to accelerated approval. The FDA indicated that the accelerated approval pathway is commonly used for approval of oncology drugs due to the serious and life-threatening nature of cancer. Although single-arm trials have been commonly used to support accelerated approval, a randomized controlled trial is the preferred approach as it provides a more robust efficacy and safety assessment and allows for direct comparisons to an available therapy. To that end, the FDA outlined considerations for designing, conducting, and analyzing data for trials intended to support accelerated approvals of oncology therapeutics. Subsequently, in December 2024 and January 2025, the FDA issued additional draft guidance relating to accelerated approval. These guidances describe FDA's views on what it means to conduct a confirmatory trial with due diligence and how the agency plans to interpret whether such a study needs to be underway at the time of approval. While these guidances are currently only in draft form and will ultimately not be legally binding even when finalized, sponsors typically observe the FDA's guidance closely to seek accelerated approval for any product candidates.

In the European Union, a "conditional" marketing authorization may be granted in cases where all the required safety and efficacy data are not yet available. A conditional marketing authorization is subject to conditions to be fulfilled for generating missing data or ensuring increased safety measures. A conditional marketing authorization is valid for one year and has to be renewed annually until fulfillment of all relevant conditions. Once the applicable pending studies are provided, a conditional marketing authorization can become a "standard" marketing authorization. However, if the conditions are not fulfilled within the timeframe set by the EMA, the marketing authorization will cease to be renewed.

There can be no assurance that the FDA or comparable foreign regulatory agencies will agree with our, or our collaborators', surrogate endpoints or intermediate clinical endpoints in any of our, or their, clinical trials, or that we, or our collaborators, will decide to pursue or submit any additional application for accelerated approval or any other form of expedited development, review or approval. Similarly, there can be no assurance that, after feedback from the FDA or comparable foreign regulatory agencies, we, or our collaborators, will continue to pursue or apply for accelerated approval or any other form of expedited development, review or approval. Furthermore, for any submission of an application for accelerated approval or application under another expedited regulatory designation, there can be no assurance that such submission or application will be accepted for filing or that any expedited development, review or approval will be granted on a timely basis, or at all.

A failure to obtain accelerated approval or any other form of expedited development, review or approval for our product candidates, or withdrawal of a product candidate, would result in a longer time period until commercialization of such product candidate, could increase the cost of development of such product candidate and could harm our competitive position in the marketplace.

We may not be able to obtain orphan drug exclusivity for any product candidates we may develop, and even if we do, that exclusivity may not prevent the FDA or the EMA from approving other competing products.

Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug or biologic intended to treat a rare disease or condition. A similar regulatory scheme governs approval of orphan products by the EMA in the European Union. Generally, if a product candidate with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the product is entitled to a period of marketing exclusivity, which precludes the FDA or the EMA from approving another marketing application for the same product for the same therapeutic indication for that time period. The applicable period is seven years in the United States and ten years in the European Union. The exclusivity period in the European Union can be reduced to six years if a product no longer meets the criteria for orphan drug designation, in particular if the product is sufficiently profitable so that market exclusivity is no longer justified.

In order for the FDA to grant orphan drug exclusivity to one of our products, the FDA must find that the product is indicated for the treatment of a condition or disease with a patient population of fewer than 200,000 individuals in the

United States. The FDA may conclude that the condition or disease for which we seek orphan drug exclusivity does not meet this standard. Even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different products can be approved for the same condition. In addition, even after an orphan drug is approved, the FDA and comparable foreign regulatory authorities such as the EMA can subsequently approve the same product for the same condition if the FDA or such other authorities conclude that the later product is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. Orphan drug exclusivity may also be lost if the FDA or EMA determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the product to meet the needs of the patients with the rare disease or condition.

In 2017, the Congress passed the FDA Reauthorization Act, or FDARA. The FDARA, among other things, codified the FDA's pre-existing regulatory interpretation, to require that a drug sponsor demonstrate the clinical superiority of an orphan drug that is otherwise the same as a previously approved drug for the same rare disease in order to receive orphan drug exclusivity. Under omnibus legislation signed by former President Trump in December 2020, the requirement for a product to show clinical superiority applies to drugs and biologics that received orphan drug designation before enactment of the FDARA in 2017, but have not yet been approved or licensed by the FDA.
The FDA and Congress may further reevaluate the Orphan Drug Act and its regulations and policies. This may be particularly true in light of a decision from the Court of Appeals for the 11th Circuit in September 2021 finding that, for the purpose of determining the scope of exclusivity, the term "same disease or condition" means the designated "rare disease or condition" and could not be interpreted by the FDA to mean the "indication or use." Thus, the court concluded, orphan drug exclusivity applies to the entire designated disease or condition rather than the "indication or use." Although there have been legislative proposals to overrule this decision, they have not been enacted into law. On January 23, 2023, the FDA announced that, in matters beyond the scope of that court order, the FDA will continue to apply its existing regulations tying orphan-drug exclusivity to the uses or indications for which the orphan drug was approved. However, on February 14, 2025, a federal district court in Washington, D.C. fully embraced the reasoning of the court decision in another decision challenging the scope of orphan drug exclusivity. The implications of this decision, and its impact on the FDA's implementation of the Orphan Drug Act, are unclear at this point.

We do not know if, when, or how the FDA or Congress 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.

In addition, to obtain orphan drug designation in the EU, we would need to demonstrate that there exists no satisfactory method of diagnosis, prevention or treatment of the condition in question that has been authorized in the EU or, if such method exists, the medicinal product will be of significant benefit to those affected by that condition. There is no assurance that we would be able to meet that standard for any of our product candidates. Further, if we do obtain orphan drug designation for a product candidate in the EU, we will not be able to maintain that designation if we are not able to show, to the satisfaction of the EU regulatory authorities, that the product candidate is of significant benefit to patients over available commercial products for the indication in the European Union and any additional products that are ahead of our product candidate in clinical development for the indication.

If we are required by the FDA, EMA or comparable regulatory authority to obtain clearance or approval of a companion diagnostic test in connection with approval of any of our product candidates or a group of therapeutic products, and we do not obtain or we face delays in obtaining clearance or approval of a diagnostic test, we may not be able to commercialize the product candidate and our ability to generate revenue may be materially impaired.

If we are required by the FDA, EMA or a comparable regulatory authority to obtain clearance or approval of a companion diagnostic test in connection with approval of any of our product candidates, such companion diagnostic test would be used during our more advanced phase clinical trials as well as in connection with the commercialization of our product candidates. To be successful in developing and commercializing product candidates in combination with these companion diagnostics, we or our collaborators will need to address a number of scientific, technical, regulatory and logistical challenges. According to FDA guidance, if the FDA determines that a companion diagnostic device is essential to ensuring the safe and effective use of a novel therapeutic product or new indication, the FDA generally will not approve the therapeutic product or new therapeutic product indication if the companion diagnostic is not also approved or cleared. In certain circumstances (for example, when a therapeutic product is intended to treat a serious or life-threatening condition for which no satisfactory available therapy exists or when the labelling of an approved product needs to be revised to address a serious safety issue), however, the FDA may approve a therapeutic product without the prior or contemporaneous

marketing authorization of a companion diagnostic. In this case, approval of a companion diagnostic may be a post-marketing requirement or commitment.

Co-development of companion diagnostics and therapeutic products is critical to the advancement of precision medicine. Whether initiated at the outset of development or at a later point, co-development should generally be conducted in a way that will facilitate obtaining contemporaneous marketing authorizations for the therapeutic product and the associated companion diagnostic. If a companion diagnostic is required to identify patients who are most likely to benefit from receiving the product, to be at increased risk for serious adverse events as a result of treatment with a particular therapeutic product, or to monitor response to treatment with a particular therapeutic product for the purpose of adjusting treatment to achieve improved safety or effectiveness, then the FDA has required marketing approval of all companion diagnostic tests essential for the safe and effective use of a therapeutic product for cancer therapies. Various foreign regulatory authorities also regulate in vitro companion diagnostics as medical devices and, under those regulatory frameworks, will likely require the conduct of clinical trials to demonstrate the safety and effectiveness of any future diagnostics we may develop, which we expect will require separate regulatory clearance or approval prior to commercialization in those countries.

The approval of a companion diagnostic as part of the therapeutic product's labeling limits the use of the therapeutic product to only those patients who express the specific genomic alteration or mutation alteration that the companion diagnostic was developed to detect. If the FDA, EMA or a comparable regulatory authority requires clearance or approval of a companion diagnostic for any of our product candidates, whether before, concurrently with approval, or post-approval of the product candidate, we, and/or future collaborators, may encounter difficulties in developing and obtaining clearance or approval for these companion diagnostics. The process of obtaining or creating such companion diagnostics is time consuming and costly. The FDA previously has required in vitro companion diagnostics intended to select the patients who will respond to a product candidate to obtain PMA, simultaneously with approval of the therapeutic candidate. The PMA process, including the gathering of pre-clinical and clinical data and the submission and review by the FDA, can take several years or longer. It involves a rigorous pre-market review during which the sponsor must prepare and provide FDA with reasonable assurance of the device's safety and effectiveness and information about the device and its components regarding, among other things, device design, manufacturing, and labeling. After a device is placed on the market, it remains subject to significant regulatory requirements, including requirements governing development, testing, manufacturing, distribution, marketing, promotion, labeling, import, export, record-keeping, and adverse event reporting.

It is possible that an in vitro companion diagnostic device could be subject to FDA enforcement discretion from compliance with the FDCA if it meets the definition of a Laboratory Developed Test, or LDT. However, FDA issued a final rule in April 2024 to end enforcement discretion for LDTs and actively regulate such products as medical devices. Under this final rule, LDTs are required to come into compliance with FDA's medical device regulatory requirements in a staged approach over the course of four years. The implementation of this LDT final rule could potentially be affected by the Executive Order, Regulatory Freeze Pending Review, issued by President Trump on January 20, 2025 and/or the anticipated change in leadership at FDA under the new administration. Further, while the final regulation is set to take effect on May 6, 2025, a number of parties have challenged the legality of the LDT regulation in a federal district court. That court held a hearing on this matter on February 19, 2025, and is expected to issue a ruling soon.

Any delay or failure by us or third-party collaborators to develop or obtain regulatory clearance or approval of a companion diagnostic could delay or prevent approval or continued marketing of our related product candidates. Further, in April 2020, the FDA issued new guidance on developing and labeling companion diagnostics for a specific group of oncology therapeutic products, including recommendations to support a broader labeling claim rather than individual therapeutic products. We will continue to evaluate the impact of this guidance on our companion diagnostic development and strategy. This guidance and future issuances from the FDA, EMA and other regulatory authorities may impact our development of a companion diagnostic for our product candidates and could result in delays in regulatory clearance or approval or a change in the determination for whether or not a companion diagnostic is still required for our product candidates. We may be required to conduct additional studies to support a broader claim or more narrowed claim for a subset population. Also, to the extent other approved diagnostics are able to broaden their labeling claims to include any of our future approved product candidates covered indications, we may no longer need to continue our companion diagnostic development plans or we may need to alter those companion diagnostic development strategies, which could adversely impact our ability to generate revenue from the sale of our companion diagnostic test.

Additionally, we may rely on third parties for the design, development and manufacture of companion diagnostic tests for our product candidates. If we enter into such collaborative agreements, we will be dependent on the sustained cooperation and effort of our future collaborators in developing and obtaining clearance or approval for these companion diagnostics. It may be necessary to resolve issues such as selectivity/specificity, analytical validation, reproducibility, or clinical

validation of companion diagnostics during the development and regulatory clearance or approval processes. Moreover, even if data from pre-clinical studies and early clinical trials appear to support development of a companion diagnostic for a product candidate, data generated in later clinical trials may fail to support the analytical and clinical validation of the companion diagnostic. We and our future collaborators may encounter difficulties in developing, obtaining regulatory clearance or approval for, manufacturing and commercializing companion diagnostics similar to those we face with respect to our product candidates themselves, including issues with achieving regulatory clearance or approval, production of sufficient quantities at commercial scale and with appropriate quality standards, and in gaining market acceptance.

If we are unable to successfully develop companion diagnostics for our product candidates, or experience delays in doing so, the development of our product candidates may be adversely affected, our product candidates may not obtain marketing approval, and we may not realize the full commercial potential of any of our product candidates that obtain marketing approval. As a result, our business, results of operations and financial condition could be materially harmed. In addition, a diagnostic company with whom we contract may decide to discontinue selling or manufacturing the companion diagnostic test that we anticipate using in connection with development and commercialization of product candidates or our relationship with such diagnostic company may otherwise terminate. We may not be able to enter into arrangements with another diagnostic company to obtain supplies of an alternative diagnostic test for use in connection with the development and commercialization of our product candidates or do so on commercially reasonable terms, which could adversely affect and/or delay the co-development or commercialization of our companion diagnostic and therapeutic product candidates.

Our relationships with healthcare providers, physicians and third-party payors will be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to civil, criminal and administrative sanctions, contractual damages, reputational harm and diminished future profits and earnings.

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any drugs for which we obtain marketing approval. Our future arrangements with third-party payors, healthcare providers and physicians may expose us to broadly applicable state and federal fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute any drugs for which we obtain marketing approval. These include the following:

- *Anti-Kickback Statute* - prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, or receiving remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchasing, ordering, leasing, arranging for, or recommending the purchasing, ordering, or leasing of, any good or service for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare or Medicaid;
- *False Claims Act* - the federal civil and criminal false claims laws, including the civil False Claims Act, and Civil Monetary Penalties Law, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, false or fraudulent claims for payment or knowingly making, using or causing to made or used a false record or statement material to a false or fraudulent claim or to avoid, decrease or conceal an obligation to pay money to the federal government, or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government;
- *Health Insurance Portability and Accountability Act, or HIPAA* - the federal HIPAA, which created additional federal criminal statutes that prohibit, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters, and apply regardless of the payor (e.g., public or private);
- *HIPAA and HITECH* - HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, which impose obligations on HIPAA covered entities and their business associates, including mandatory contractual terms and required implementation of administrative, physical and technical safeguards to maintain the privacy and security of individually identifiable health information;
- *Transparency Requirements* - the federal physician transparency requirements known as the Physician Payments Sunshine Act, under the ACA, as amended by the Health Care Education Reconciliation Act, which requires manufacturers of drugs, medical devices, biological and medical supplies covered by Medicare, Medicaid, or State Children's Health Insurance Program to report annually to the CMS, within the HHS information related to payments and other transfers of value made by that entity to physicians, other healthcare providers and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members; and
- *Analogous State, Local and Foreign Laws* - analogous state, local and foreign fraud and abuse laws and regulations, such as state anti-kickback and false claims laws, which may be broader than similar federal laws, can

apply to claims involving healthcare items or services regardless of payor, and are enforced by many different federal and state agencies as well as through private actions.

Some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government and require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures. State and foreign laws also govern the privacy and security of health information in some circumstances, as well as tracking and reporting of transfers of value by pharmaceutical manufacturers to physicians and healthcare organizations, many of which differ from each other in significant ways and often are not pre-empted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and/or administrative penalties, damages, fines, individual imprisonment, disgorgement, exclusion from government funded healthcare programs, such as Medicare and Medicaid, contractual damages, reputational harm, administrative burdens, diminished profits and future earnings, additional reporting obligations and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws and the curtailment or restructuring of our operations. If any of the physicians or other healthcare providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

The provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is also prohibited in the European Union. The provision of benefits or advantages to physicians is governed by the national anti-bribery laws of EU Member States.

Current and future legislation may increase the difficulty and cost for us and any of our collaborators to obtain marketing approval of and commercialize product candidates and affect the prices we, or any of our collaborators, may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could, among other things, prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities, impact pricing and reimbursement and affect our ability, or the ability of any of our collaborators, to profitably sell or commercialize any product candidates for which we, or any of our collaborators, obtain marketing approval. The pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by legislative initiatives. In particular, there have been and continue to be a number of initiatives at the U.S. federal and state levels that seek to reduce healthcare costs and improve the quality of healthcare. Current laws, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we, or any of our collaborators, may receive for any FDA approved products.

In the United States, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or the MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for prescription drugs purchased through a pharmacy by the elderly and disabled and introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. In addition, this statute provides authority for limiting the number of drugs that will be covered in any therapeutic class, subject to certain exceptions. Cost reduction initiatives and other provisions of this statute could decrease the coverage and price that we receive for any approved products. While the MMA applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

In March 2010, then-President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act, or collectively the ACA. In addition, other legislative changes have been proposed and adopted since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to

reach required goals, thereby triggering the legislation's automatic reduction to several government programs. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and will remain in effect through 2031 under the CARES Act.

The American Taxpayer Relief Act of 2012, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Under current legislation, the actual reductions in Medicare payments may vary up to 4%.

The Consolidated Appropriations Act, or the Appropriations Act, which was signed into law by President Biden in December 2022, made several changes to sequestration of the Medicare program. Section 1001 of the Appropriations Act delays the 4% Statutory Pay-As-You-Go Act of 2010 sequester for two years, through the end of calendar year 2024. Triggered by enactment of the American Rescue Plan Act of 2021, the 4% cut to the Medicare program would have taken effect in January 2023. The Appropriation Act's health care offset title includes Section 4163, which extends the 2% Budget Control Act of 2011 Medicare sequester for six months into fiscal year 2032 and lowers the payment reduction percentages in fiscal years 2030 and 2031.

Further, with passage of the Inflation Reduction Act, or the IRA, Congress extended the expansion of the Patient Protection and Affordable Care Act premium tax credits through 2025. Those subsidies were originally extended through 2022 under the American Rescue Plan Act of 2021. These laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used.

Since enactment of the ACA, there have been and continue to be, numerous legal challenges and Congressional actions to repeal and replace provisions of the law. For example, with enactment of the Tax Cuts and Jobs Act of 2017, Congress repealed the "individual mandate." The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective in 2019. Further, in June 2021, the U.S. Supreme Court dismissed a lawsuit challenging the constitutionality of the ACA after finding that the plaintiffs do not have standing to bring the litigation. Shortly after taking office in January 2025, President Trump revoked numerous executive orders issued by President Biden, including at least two executive orders which where were designed to further implement the ACA. We anticipate similar efforts to undermine the ACA, and the accompanying uncertainty, for the foreseeable future.

Further, the recent election of President Trump, coupled with a consolidation of party control of both chambers of the U.S. Congress, has led to new legislative and regulatory initiatives in the United States and the roll-back of many initiatives of the previous presidential administration, which may impact our business in unpredictable ways. Market uncertainty and volatility have been magnified and may intensify due to the statements and actions of the new U.S. presidential administration and resulting uncertainties regarding actual and potential shifts in U.S. and foreign, trade, economic and other policies, including with respect to treaties and tariffs.

In the EU, on December 13, 2021, Regulation No 2021/2282 on Health Technology Assessment, or HTA, amending Directive 2011/24/EU, was adopted. While the Regulation entered into force in January 2022, it will only begin to apply from January 2025 onwards, with preparatory and implementation-related steps to take place in the interim. Once applicable, it will have a phased implementation depending on the products concerned. The Regulation intends to boost cooperation among EU member states in assessing health technologies, including new medicinal products as well as certain high-risk medical devices, and provide the basis for cooperation at the EU level for joint clinical assessments in these areas. It will permit EU member states to use common HTA tools, methodologies, and procedures across the EU, working together in four main areas, including joint clinical assessment of the innovative health technologies with the highest potential impact for patients, joint scientific consultations whereby developers can seek advice from HTA authorities, identification of emerging health technologies to identify promising technologies early, and continuing voluntary cooperation in other areas. Individual EU member states will continue to be responsible for assessing non-clinical (e.g., economic, social, ethical) aspects of health technology, and making decisions on pricing and reimbursement.

We expect that these healthcare reforms, 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 additional downward pressure on the price that we receive for any approved product and/or the level of reimbursement physicians receive for administering any approved product we might bring to market. Reductions in reimbursement levels may negatively impact the prices we receive or the frequency with which our products are prescribed or administered. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. Accordingly, such reforms, if enacted, could have an adverse effect on

anticipated revenue from product candidates that we may successfully develop and for which we may obtain marketing approval and may affect our overall financial condition and ability to develop or commercialize product candidates.

The prices of prescription pharmaceuticals in the United States and foreign jurisdictions are subject to scrutiny and considerable legislative and executive actions that could impact the prices we obtain for our drug products, if and when approved.

The prices of prescription pharmaceuticals have also been the subject of considerable discussion in the United States and foreign jurisdictions. There have been several U.S. congressional inquiries, as well as proposed and enacted state and federal legislation designed to, among other things, bring more transparency to pharmaceutical pricing, review the relationship between pricing and manufacturer patient programs, and reduce the costs of pharmaceuticals under Medicare and Medicaid.

In addition, in October 2020, the HHS and the FDA published a final rule allowing states and other entities to develop a Section 804 Importation Program, or SIP, to import certain prescription drugs from Canada into the United States. That regulation was challenged in a lawsuit by the Pharmaceutical Research and Manufacturers of America, or PhRMA, but the case was dismissed by a federal district court in February 2023 after the court found that PhRMA did not have standing to sue the HHS. Several states have passed laws allowing for the importation of drugs from Canada and a few states have passed legislation establishing workgroups to examine the impact of the state importation program. Several states have submitted Section 804 Importation Program proposals to the FDA. On January 5, 2024, the FDA approved Florida's plan for Canadian drug importation. That state now has authority to import certain drugs from Canada for a period of two years once certain conditions are met. Florida will first need to submit a pre-import request for each drug selected for importation, which must be approved by the FDA. Florida will also need to relabel the drugs and perform quality testing of the products to meet FDA standards.

Further, on November 20, 2020, the HHS finalized 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. The IRA further delayed implementation of this rule to January 1, 2032.

The IRA has implications for Medicare Part D, which is a program available to individuals who are entitled to Medicare Part A or enrolled in Medicare Part B to give them the option of paying a monthly premium for outpatient prescription drug coverage. Among other things, the IRA requires manufacturers of certain drugs to engage in price negotiations with Medicare beginning in 2026, with prices that can be negotiated subject to a cap; imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation; and replaces the Part D coverage gap discount program with a new discounting program beginning in 2025. The IRA permits the Secretary of the HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years.

Specifically, with respect to price negotiations, Congress authorized Medicare to negotiate lower prices for certain costly single-source drug and biologic products that do not have competing generics or biosimilars and are reimbursed under Medicare Part B and Part D. CMS may negotiate prices for ten high-cost drugs paid for by Medicare Part D starting in 2026, followed by 15 Part D drugs in 2027, 15 Part B or Part D drugs in 2028, and 20 Part B or Part D drugs in 2029 and beyond. This provision applies to drug products that have been approved for at least 9 years and biologics that have been licensed for 13 years, but it does not apply to drugs and biologics that have been approved for a single rare disease or condition. Nonetheless, since CMS may establish a maximum price for these products in price negotiations, we would be fully at risk of government action if our products are the subject of Medicare price negotiations. Moreover, given the risk that could be the case, these provisions of the IRA may also further heighten the risk that we would not be able to achieve the expected return on our drug products or full value of our patents protecting our products if prices are set after such products have been on the market for nine years.

The first cycle of negotiations for the Medicare Drug Price Negotiation Program commenced in the summer of 2023. On August 15, 2024, HHS published the results of the first Medicare drug price negotiations for ten selected drugs that treat a range of conditions. The prices of these ten drugs will become effective January 1, 2026. In January 2025, CMS announced the selection of up to 15 additional drugs covered by Part D for the second cycle of negotiations. This second cycle of negotiations with participating drug companies will occur during 2025, and any negotiated prices for this second set of drugs will be effective starting January 1, 2027. CMS issued a public statement on January 29, 2025, declaring that

lowering the cost of prescription drugs is a top priority of the new administration and CMS is committed to considering opportunities to bring greater transparency in the negotiation program.

Further, the legislation subjects drug manufacturers to civil monetary penalties and a potential excise tax for failing to comply with the legislation by offering a price that is not equal to or less than the negotiated "maximum fair price" under the law or for taking price increases that exceed inflation. In addition, the IRA established inflation rebate programs under Medicare Part B and Part D. The legislation also requires manufacturers to pay rebates for drugs in Medicare Part D whose price increases exceed inflation. On December 9, 2024, with issuance of its 2025 Physician Fee Schedule final regulation, CMS finalized its rules governing the IRA inflation rebate programs. The new law also caps Medicare out-of-pocket drug costs at an estimated $24,000 a year beginning in 2025. In addition, the IRA potentially raises legal risks with respect to individuals participating in a Medicare Part D prescription drug plan who may experience a gap in coverage if they required coverage above their initial annual coverage limit before they reached the higher threshold, or "catastrophic period" of the plan. Individuals requiring services exceeding the initial annual coverage limit and below the catastrophic period, must pay 100% of the cost of their prescriptions until they reach the catastrophic period. Among other things, the IRA contains many provisions aimed at reducing this financial burden on individuals by reducing the co-insurance and co-payment costs, expanding eligibility for lower income subsidy plans, and price caps on annual out-of-pocket expenses, each of which could have potential pricing and reporting implications.

On June 6, 2023, Merck & Co. filed a lawsuit against the HHS and CMS asserting that, among other things, the IRA's Drug Price Negotiation Program for Medicare constitutes an uncompensated taking in violation of the Fifth Amendment of the Constitution. Subsequently, a number of other parties, including the U.S. Chamber of Commerce and certain, also filed lawsuits in various courts with similar constitutional claims against the HHS and CMS. HHS has generally won the substantive disputes in these cases, and various federal district court judges have expressed skepticism regarding the merits of the legal arguments being pursued by the pharmaceutical industry. Certain of these cases are now on appeal and, on October 30, 2024, the Court of Appeals for the Third Circuit heard oral argument in three of these cases. We expect that litigation involving these and other provisions of the IRA will continue, with unpredictable and uncertain results.

Accordingly, while it is currently unclear how the IRA will be effectuated, we cannot predict with certainty what impact any federal or state health reforms will have on us, but such changes could impose new or more stringent regulatory requirements on our activities or result in reduced reimbursement for our products, any of which could adversely affect our business, results of operations and financial condition.
At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, health care organizations and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures. This is increasingly true with respect to products approved pursuant to the accelerated approval pathway. State Medicaid programs and other payers are developing strategies and implementing significant coverage barriers, or refusing to cover these products outright, arguing that accelerated approval drugs have insufficient or limited evidence despite meeting the FDA's standards for accelerated approval.

In other countries, particularly the countries of the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a drug. To obtain reimbursement or pricing approval in some countries, we, or our collaborators, may be required to conduct a clinical trial that compares the cost-effectiveness of our drug to other available therapies. If reimbursement of our drugs is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be materially harmed.

We are subject to anti-corruption laws, as well as export control laws, customs laws, sanctions laws and other laws governing our operations. If we fail to comply with these laws, we could be subject to civil or criminal penalties, other remedial measures and legal expenses, which could adversely affect our business, results of operations and financial condition.

Our operations are subject to anti-corruption laws, including the Foreign Corrupt Practices Act, or the FCPA, the Bribery Act, and other anti-corruption laws that apply in countries where we do business and may do business in the future. The

FCPA, the Bribery Act, and these other laws generally prohibit us, our officers and our employees and intermediaries from bribing, being bribed or making other prohibited payments to government officials or other persons to obtain or retain business or gain some other business advantage. We may in the future operate in jurisdictions that pose a high risk of potential FCPA or Bribery Act violations, and we may participate in collaborations and relationships with third parties whose actions could potentially subject us to liability under the FCPA, the Bribery Act, or local anti-corruption laws. In addition, we cannot predict the nature, scope or effect of future regulatory requirements to which our international operations might be subject or the manner in which existing laws might be administered or interpreted.

We are also subject to other laws and regulations governing our international operations, including regulations administered by the governments of the United States, United Kingdom, and authorities in the European Union, including applicable export control regulations, economic sanctions on countries and persons, customs requirements and currency exchange regulations, which is collectively referred to as Trade Control Laws.

There is no assurance that we will be completely effective in ensuring our compliance with all applicable anti-corruption laws, including the FCPA, the Bribery Act, or other legal requirements, including Trade Control Laws. If we are not in compliance with the FCPA, the Bribery Act, and other anti-corruption laws or Trade Control Laws, we may be subject to criminal and civil penalties, disgorgement and other sanctions and remedial measures, and legal expenses, which could have a material adverse impact on our business, financial condition, results of operations and liquidity. The SEC also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the FCPA's accounting provisions. Likewise, any investigation of any potential violations of the FCPA, the Bribery Act, other anti-corruption laws or Trade Control Laws by the United States, the United Kingdom or other authorities could also have an adverse impact on our reputation, business, results of operations and financial condition.
On February 10, 2025, President Trump issued an executive order directing the Attorney General to review the guidelines and policies governing FCPA investigations and enforcement actions. Per the executive order, this review will result in new DOJ FCPA guidelines intended to enhance American economic competitiveness and to safeguard national security interests. During the 180-day review period, any new FCPA investigations and enforcement actions are to be suspended absent authorization from the Attorney General, and all existing FCPA investigations and enforcement actions will be reviewed. Additionally, after the Attorney General issues revised guidelines, the executive order directs the Attorney General to assess whether "remedial measures" related to past FCPA actions are warranted. We will need to carefully monitor the implementation of this order.

We are subject to stringent privacy laws, information security laws, regulations, policies and contractual obligations related to data privacy and security and changes in such laws, regulations, policies, contractual obligations and failure to comply with such requirements could subject us to significant fines and penalties, which may have a material adverse effect on our business, financial condition or results of operations.

We are subject to data privacy and protection laws and regulations that apply to the collection, transmission, storage and use of personally-identifying information, which among other things, impose certain requirements relating to the privacy, security and transmission of personal information, including comprehensive regulatory systems in the United States, the European Union and the United Kingdom. The legislative and regulatory landscape for privacy and data protection continues to evolve in jurisdictions worldwide, and there has been an increasing focus on privacy and data protection issues with the potential to affect our business. Failure to comply with any of these laws and regulations could result in an enforcement action against us, including fines, imprisonment of company officials and public censure, claims for damages by affected individuals, damage to our reputation and loss of goodwill, any of which could have a material adverse effect on our business, financial condition, results of operations or prospects.

There are numerous U.S. federal and state laws and regulations related to the privacy and security of personal information. In particular, regulations promulgated pursuant to HIPAA establish privacy and security standards that limit the use and disclosure of individually identifiable health information, or protected health information, and require the implementation of administrative, physical and technological safeguards to protect the privacy of protected health information and ensure the confidentiality, integrity and availability of electronic protected health information. Determining whether protected health information has been handled in compliance with applicable privacy standards and our contractual obligations can be complex and may be subject to changing interpretation. These obligations may be applicable to some or all of our business activities now or in the future. In recent months, the Office of Civil Rights at HHS, or OCR, has been especially active in enforcing the HIPAA rules. Additionally, OCR is looking to amend the HIPAA Security Rule, which (if and when finalized) could create additional compliance obligations and risk for our business.

If we are unable to properly protect the privacy and security of protected health information, we could be found to have breached our contracts. Further, if we fail to comply with applicable privacy laws, including applicable HIPAA privacy and security standards, we could face civil and criminal penalties. The HHS enforcement activity can result in financial liability and reputational harm, and responses to such enforcement activity can consume significant internal resources. In addition, state attorneys general are authorized to bring civil actions seeking either injunctions or damages in response to violations that threaten the privacy of state residents. We cannot be sure how these regulations will be interpreted, enforced or applied to our operations. In addition to the risks associated with enforcement activities and potential contractual liabilities, our ongoing efforts to comply with evolving laws and regulations at the federal and state level may be costly and require ongoing modifications to our policies, procedures and systems.
In addition to potential enforcement by the HHS, we are also potentially subject to privacy enforcement from the FTC. The FTC has been particularly focused on the unpermitted processing of health and genetic data through its recent enforcement actions and is expanding the types of privacy violations that it interprets to be "unfair" under Section 5 of the FTC Act, as well as the types of activities it views to trigger the Health Breach Notification Rule (which the FTC also has the authority to enforce). The agency is also in the process of developing rules related to commercial surveillance and data security that may impact our business. We will need to account for the FTC's evolving rules and guidance for proper privacy and data security practices in order to mitigate our risk for a potential enforcement action, which may be costly. If we are subject to a potential FTC enforcement action, we may be subject to a settlement order that requires us to adhere to very specific privacy and data security practices, which may impact our business. We may also be required to pay fines as part of a settlement (depending on the nature of the alleged violations). If we violate any consent order that we reach with the FTC, we may be subject to additional fines and compliance requirements. Finally, both the FTC and HHS's enforcement priorities (as well as those of other federal regulators) may be impacted by the change in administration and new leadership. These shifts in enforcement priorities may also impact our business.

There are also increased restrictions at the federal level relating to transferring sensitive data outside of the United States to certain foreign countries. For example, in 2024, Congress passed H.B. 815, which included the Protecting Americans' Data from Foreign Adversaries Act of 2024. This law creates certain restrictions for entities that disclose sensitive data (including potential health data) to countries such as China. Failure to comply with these rules can lead to a potential FTC enforcement action. Additionally, the DOJ recently finalized a rule implementing Executive Order 14117, which creates similar restrictions related to the transfer of sensitive U.S. data to countries such as China. These data transfer restrictions (and others that may pass in the future) may create operational challenges and legal risks for our business.

States are also active in creating specific rules relating to the processing of personal information. In 2018, California passed into law the CCPA which took effect on January 1, 2020 and imposed many requirements on businesses that process the personal information of California residents. Many of the CCPA's requirements are similar to those found in the General Data Protection Regulation, or the GDPR, including requiring businesses to provide notice to data subjects regarding the information collected about them and how such information is used and shared, and providing data subjects the right to request access to such personal information and, in certain cases, request the erasure of such personal information. The CCPA also affords California residents the right to opt-out of "sales" of their personal information. The CCPA contains significant penalties for companies that violate its requirements. In November 2020, California voters passed a ballot initiative for the CPRA, which will significantly expand the CCPA to incorporate additional GDPR-like provisions including requiring that the use, retention, and sharing of personal information of California residents be reasonably necessary and proportionate to the purposes of collection or processing, granting additional protections for sensitive personal information, and requiring greater disclosures related to notice to residents regarding retention of information. Most CPRA provisions took effect on January 1, 2023, though the obligations apply to any personal information collected after January 1, 2022. These provisions may apply to some of our business activities.

In addition to California, a number of states have passed comprehensive privacy laws similar to the CCPA and CPRA. These laws are either in effect or will go into effect sometime over the next few years. Like the CCPA and CPRA, these laws create obligations related to the processing of personal information, as well as special obligations for the processing of "sensitive" data, which includes health data in some cases. Some of the provisions of these laws may apply to our business activities. There are also states that are strongly considering or have already passed comprehensive privacy laws during the 2025 legislative sessions. Other states will be considering similar laws in the future, and Congress has also been debating passing a federal privacy law. There are also states that are specifically regulating health information that may affect our business. For example, the State of Washington passed the My Health My Data Act in 2023 which specifically regulated health information that is not otherwise regulated by the HIPAA rules, and the law also has a private right of action, which further increases the relevant compliance risk. Connecticut and Nevada have also passed similar laws regulating consumer health data, and more states are considering such legislation in 2025. These laws may impact our business activities,

including our identification of research subjects, relationships with business partners and ultimately the marketing and distribution of our products, if approved.

Plaintiffs' lawyers in the United States are also increasingly using privacy-related statutes at both the state and federal level to bring lawsuits against companies for their data-related practices. In particular, there have been a significant number of cases filed against companies for their use of pixels and other web trackers. These cases often allege violations of the California Invasion of Privacy Act and other state laws regulating wiretapping, as well as the federal Video Privacy Protection Act. The rise in these types of lawsuits creates potential risk for our business.

Additionally, laws in all 50 states require businesses to provide notice to customers whose personal information has been disclosed as a result of a data breach. These laws are not consistent, and compliance in the event of a widespread data breach is difficult and may be costly. Moreover, states have been frequently amending existing laws, requiring attention to changing regulatory requirements. We also may be contractually required to notify affected individuals or other counterparties of a security breach, incident, or compromise. Although we may have contractual protections with our vendors, any actual or perceived security breach, incident, or compromise could harm our reputation and brand, expose us to potential liability or require us to expend significant resources on data security and in responding to any such actual or perceived breach, incident, or compromise. Any contractual protections we may have from our vendors may not be sufficient to adequately protect us from any such liabilities and losses, and we may be unable to enforce any such contractual protections. In addition to government regulation, privacy advocates and industry groups have and may in the future propose self-regulatory standards from time to time. These and other industry standards may legally or contractually apply to us, or we may elect to comply.

Similar to the laws in the United States, there are significant privacy and data security laws that apply in Europe and other countries. The collection, use, disclosure, transfer, or other processing of personal data, including personal health data, regarding individuals who are located in the European Economic Area, or the EEA, and the processing of personal data that takes place in the EEA, is regulated by the GDPR, which went into effect in May 2018 and which imposes obligations on companies that operate in our industry with respect to the processing of personal data and the cross-border transfer of such data. The GDPR imposes onerous accountability obligations requiring data controllers and processors to maintain a record of their data processing and policies. If our or our partners' or service providers' privacy or data security measures fail to comply with the GDPR requirements, we may be subject to litigation, regulatory investigations, enforcement notices requiring us to change the way we use personal data and/or fines of up to 20.0 million Euros or up to 4% of the total worldwide annual turnover of the preceding financial year, whichever is higher, as well as compensation claims by affected individuals, negative publicity, reputational harm and a potential loss of business and goodwill.

The GDPR places restrictions on the cross-border transfer of personal data from the European Union to countries that have not been found by the European Commission to offer adequate data protection legislation, such as the United States. There are ongoing concerns about the ability of companies to transfer personal data from the European Union to other countries. In July 2020, the Court of Justice of the EU, or the CJEU, invalidated the European Union-United States Privacy Shield, or Privacy Shield, one of the mechanisms used to legitimize the transfer of personal data from the EEA to the United States. The CJEU decision also drew into question the long-term viability of an alternative means of data transfer, the standard contractual clauses, for transfers of personal data from the EEA to the United States. While we are not self-certified under the Privacy Shield, this CJEU decision may lead to increased scrutiny on data transfers from the EEA to the United States, generally, and increase our costs of compliance with data privacy legislation as well as our costs of negotiating appropriate privacy and security agreements with our vendors and business partners.

Following the CJEU decision, in October 2022, President Biden signed an executive order to implement the EU-U.S. Data Privacy Framework, which would serve as a replacement to the EU-U.S. Privacy Shield. The European Union initiated the process to adopt an adequacy decision for the EU-U.S. Data Privacy Framework in December 2022, and the European Commission adopted the adequacy decision in July 2023. The adequacy decision permits U.S. companies who self-certify to the EU-U.S. Data Privacy Framework to rely on it as a valid data transfer mechanism for data transfers from the European Union to the United States. However, some privacy advocacy groups have already suggested that they will be challenging the EU-U.S. Data Privacy Framework. If these challenges are successful, they may not only impact the EU-U.S. Data Privacy Framework, but also further limit the viability of the standard contractual clauses and other data transfer mechanisms. The uncertainty around this issue has the potential to impact our business.

On June 23, 2016, the electorate in the United Kingdom. voted in favor of leaving the European Union, commonly referred to as Brexit. As with other issues related to Brexit, there are open questions about how personal data will be protected in the United Kingdom. and whether personal information can transfer from the European Union to the United Kingdom. Following the withdrawal of the United Kingdom from the European Union, the UK Data Protection Act 2018 applies to

the processing of personal data that takes place in the United Kingdom and includes parallel obligations to those set forth by GDPR. While the Data Protection Act of 2018 in the United Kingdom that "implements" and complements the GDPR has achieved Royal Assent on May 23, 2018 and is now effective in the United Kingdom, it is unclear whether transfer of data from the EEA to the United Kingdom will remain lawful under the GDPR, although these transfers currently are permitted by an adequacy decision from the European Commission. The United Kingdom government has already determined that it considers all European Union 27 and EEA member states to be adequate for the purposes of data protection, ensuring that data flows from the United Kingdom. to the EU/EEA remain unaffected. In addition, a recent decision from the European Commission appears to deem the United Kingdom. as being "essentially adequate" for purposes of data transfer from the European Union to the United Kingdom., although this decision may be re-evaluated in the future. The United Kingdom. and the United States. have also agreed to a U.S.-UK "Data Bridge," which functions similarly to the EU-U.S. Data Privacy Framework and provides an additional legal mechanism for companies to transfer data from the United Kingdom to the United States. In addition to the United Kingdom., Switzerland is also in the process of approving an adequacy decision in relation to the Swiss-U.S. Data Privacy Framework (which would function similarly to the EU-U.S. Data Privacy Framework and the U.S.-UK Data Bridge in relation to data transfers from Switzerland to the United States). Any changes or updates to these developments have the potential to impact our business.

Beyond GDPR, there are privacy and data security laws in a growing number of countries around the world. While many loosely follow GDPR as a model, other laws contain different or conflicting provisions. These laws will impact our ability to conduct our business activities, including both our clinical trials and any eventual sale and distribution of commercial products, through increased compliance costs, costs associated with contracting and potential enforcement actions.

While we continue to address the implications of the recent changes to data privacy regulations, data privacy remains an evolving landscape at both the domestic and international level, with new regulations coming into effect and continued legal challenges, and our efforts to comply with the evolving data protection rules may be unsuccessful. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices. We must devote significant resources to understanding and complying with this changing landscape. Failure to comply with laws regarding data protection would expose us to risk of enforcement actions taken by data protection authorities in the EEA and elsewhere and carries with it the potential for significant penalties if we are found to be non-compliant. Similarly, failure to comply with federal and state laws in the United States regarding privacy and security of personal information could expose us to penalties under such laws. Any such failure to comply with data protection and privacy laws could result in government-imposed fines or orders requiring that we change our practices, claims for damages or other liabilities, regulatory investigations and enforcement action, litigation and significant costs for remediation, any of which could adversely affect our business. Even if we are not determined to have violated these laws, government investigations into these issues typically require the expenditure of significant resources and generate negative publicity, which could harm our business, financial condition, results of operations or prospects.

If our employees, independent contractors, consultants, collaborators and vendors engage in misconduct or other improper activities, including non-compliance with regulatory standards and/or requirements and insider trading, we could sustain significant liability and harm to our reputation.

We are exposed to the risk of fraud or other misconduct by our employees, independent contractors, consultants, collaborators and vendors. Misconduct by these partners could include intentional failures to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, provide accurate information to the FDA or comparable foreign regulatory authorities, comply with manufacturing standards, comply with federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, report financial information or data accurately or disclose unauthorized activities to us. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. This could include violations of HIPAA, other U.S. federal and state laws, and requirements of foreign jurisdictions, including the GDPR. We are also exposed to risks in connection with any insider trading violations by employees or others affiliated with us. It is not always possible to identify and deter employee or third-party misconduct, and the precautions that we take to detect and prevent these activities 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, standards, regulations, guidance or codes of conduct. 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 and results of operations, including the imposition of significant fines or other sanctions.

If we or any third-party manufacturer we engage now or in the future fails to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs or liabilities that could significantly harm our business.

We and third-party manufacturers we engage now are, and any third-party manufacturer we may engage in the future will be, 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. From time to time and in the future, our operations may involve the use of hazardous and flammable materials, including chemicals and biological materials, and may also produce hazardous waste products. Although we contract with third parties for the disposal of these materials and waste products, we cannot completely eliminate the risk of contamination or injury resulting from these materials. In the event of contamination or injury resulting from the use or disposal of our hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties for failure to comply with such laws and regulations.

We maintain general liability insurance as well as workers' compensation insurance to cover costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, but this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. Current or future environmental laws and regulations may impair our research, development or production efforts, which could adversely affect our business, financial condition, results of operations or prospects. In addition, failure to comply with these laws and regulations may result in substantial fines, penalties or other sanctions.

Risks Related to Employee Matters

Our internal computer systems, or those of our collaborators, vendors, suppliers, contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs.

Our internal computer systems and those of any of our collaborators, vendors, suppliers, contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Such systems are also vulnerable to service interruptions or to security breaches from inadvertent or intentional actions by our employees, third-party vendors and/or business partners, or from cyber-attacks by malicious third parties. Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, unauthorized access to or deletion of files, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. Cyber-attacks also could include phishing attempts or email fraud to cause payments or information to be transmitted to an unintended recipient.

If we experience any material system failure, accident, cyber-attack or security that causes interruptions in our operations, it could result in a material disruption of our development programs and our business operations, whether due to a loss of our trade secrets or other proprietary information or other similar disruptions. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our marketing 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, our competitive position could be harmed, and the further development and commercialization of our product candidates could be delayed.

Our employees, independent contractors, including principal investigators, consultants and vendors and any third parties we may engage in connection with discovery programs, research, development, regulatory, manufacturing, quality assurance and other pharmaceutical functions and commercialization may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading, which could cause significant liability for us and harm our reputation.

We are exposed to the risk of fraud or other misconduct by our employees, independent contractors, including principal investigators, consultants and vendors and any other third parties we engage. Misconduct by these parties could include intentional, reckless or negligent conduct or unauthorized activities that include failures to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, provide complete and accurate information to the FDA or comparable foreign regulatory authorities, comply with manufacturing standards, comply with federal and state data

privacy, security, fraud and other healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, report complete financial information or data accurately or disclose unauthorized activities to us. Misconduct by employees and other third parties could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. This could include violations of HIPAA, other U.S. federal and state law, and requirements of non-U.S. jurisdictions, including the EU Data Protection Directive. We are also exposed to risks in connection with any insider trading violations by employees or others affiliated with us. It is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity 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, standards, regulations, guidance or codes of conduct. Additionally, we are subject to the risk that a person could allege such fraud or other misconduct, even if none occurred. 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 and results of operations, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgements, possible exclusion from participation in Medicare, Medicaid, other U.S. federal healthcare programs or healthcare programs in other jurisdictions, integrity oversight and reporting obligations to resolve allegations of non-compliance, individual imprisonment, other sanctions, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations.

Risks Related to the Ownership of Our Common Stock

The market price of our common stock is volatile, and the market price of our common stock may drop in the future.

The market price of our common stock has been and could be subject to significant fluctuations. Some of the factors that may cause the market price of our common stock to fluctuate include:

- our ability to successfully implement our cash preservation plan
- our determination to pause research and development activities;
- our ability to identify, evaluate, pursue and consummate a strategic alternative;
- failure to conduct an orderly wind down of our operations;
- if we were to resume research and development activities, results of clinical trials and pre-clinical studies of our product candidates, or those of our collaborators;
- results of clinical trials and pre-clinical studies of our competitors;
- failure to meet or exceed financial and development projections we may provide to the public;
- failure to meet or exceed the financial and development projections of the investment community;
- announcements of significant acquisitions, strategic collaborations, joint ventures or capital commitments by our competitors;
- actions taken by regulatory agencies with respect to our product candidates, clinical studies, manufacturing process or sales and marketing terms;
- disputes or other developments relating to proprietary rights, including patents, litigation matters, and our ability to obtain patent protection for our technologies;
- additions or departures of qualified scientific and management personnel;
- significant lawsuits, including patent or stockholder litigation;
- if securities or industry analysts do not publish research or reports about our business, or if they issue adverse or misleading opinions regarding our business and stock;
- changes in the market valuations of similar companies;
- general market or macroeconomic conditions or market conditions in the biopharmaceutical sector;
- sales of securities by us or our stockholders in the future;
- if we fail to raise an adequate amount of capital to fund our operations and continued development of our product candidates;
- trading volume of our common stock;
- announcements with respect to compliance with the Nasdaq listing requirements;
- announcements by competitors of new commercial products, clinical progress or lack thereof, significant contracts, commercial relationships or capital commitments;
- adverse publicity relating to product candidates, including with respect to other products in such markets;
- the introduction of technological innovations or new therapies that compete with our products and services; and
- period-to-period fluctuations in our financial results.

The price of our shares of common stock may experience increased volatility as we provide updates regarding our cash preservation plan and the wind down of our operations. For additional discussion of the risks related to our evaluation of strategic alternatives and the wind down of our operations, see "Risk Factors - Risks Related to Our Evaluation of Strategic Alternatives and Wind Down."

Moreover, the stock markets in general have experienced substantial volatility that has often been unrelated to the operating performance of individual companies. These broad market fluctuations may also adversely affect the trading price of our common stock. In addition, a recession, depression or other sustained adverse market event could materially and adversely affect our business and the value of our common stock. In the past, following periods of volatility in the market price of a company's securities, stockholders have often instituted class action securities litigation against such companies. Furthermore, market volatility may lead to increased stockholder activism if we experience a market valuation that activists believe is not reflective of its intrinsic value. Activist campaigns that contest or conflict with our strategic direction or seek changes in the composition of our board of directors could have an adverse effect on our operating results and financial condition.

We incur additional costs and increased demands upon management as a result of complying with the laws and regulations affecting public companies.

We incur significant legal, accounting and other expenses as a public company that we did not incur as a private company, including costs associated with public company reporting obligations under the Exchange Act. Some of our management team has not previously managed and operated a public company. These executive officers and other personnel will need to devote substantial time to gaining expertise related to public company reporting requirements and compliance with applicable laws and regulations to ensure that we comply with all of these requirements. Any changes we make to comply with these obligations may not be sufficient to allow us to satisfy our obligations as a public company on a timely basis, or at all. These reporting requirements, rules and regulations, coupled with the increase in potential litigation exposure associated with being a public company, could also make it more difficult for us to attract and retain qualified persons to serve on the board of directors or on board committees or to serve as executive officers, or to obtain certain types of insurance, including directors' and officers' insurance, on acceptable terms.

We do not currently meet the requirements for continued listing on The Nasdaq Global Market. If we fail to meet the requirements for continued listing on The Nasdaq Global Market, trading in our common stock could be suspended and our common stock delisted from Nasdaq, which would have a negative effect on the price of our common stock and our ability to raise additional capital.

Our common stock is currently listed on The Nasdaq Global Market. We are required to meet specified requirements to maintain our listing on The Nasdaq Global Market, including, among others, a minimum market value of listed securities , or MVLS, of $50,000,000 under Nasdaq Listing Rule 5450(b)(2)(A), or the MVLS Requirement and a minimum bid price of $1.00 per share under Nasdaq Listing Rule 5450(a)(1), or the Bid Price Rule.

On October 10, 2024, we received written notice from the Listing Qualifications Department, or the Staff, of The Nasdaq Stock Market LLC, or Nasdaq, notifying us that our common stock was not in compliance with the MVLS Requirements for the previous 30 consecutive business days. In accordance with the Nasdaq Listing Rules, we were granted 180 calendar days, or until April 8, 2025, to regain compliance with the MVLS Requirement. If we do not regain compliance with the MVLS Requirement by April 8, 2025, which we do not expect to, we will receive written notification from the Staff on our about April 9, 2025, that our securities are subject to delisting. At that time, we may request a hearing before the Nasdaq Hearnings Panel (the "Panel") pursuant to the procedures set forth in the 5800 Series of the Nasdaq Listing Rules. Our request for a hearing before the Panel would stay any further action by the Staff to delist our common stock from Nasdaq at least pending the hearing and the expiration of any extension the Panel may grant to us following the hearing.

On January 6, 2025, we received separate written notice from the Staff notifying us that, based upon the closing bid price of our common stock for the prior 38 consecutive business days, we were not in compliance with the Bid Price Rule, and were granted 180 calendar days, or until July 7, 2025, to regain compliance with the Bid Price Rule. If, at any time the closing bid price of our common stock is at least $1.00 per share for a minimum of ten, through generally not more than 20, consecutive days, the Staff will provide written notification to us that we have regained compliance with the Bid Price Rule. If we do not regain compliance with the Bid Price Rule by July 7, 2025, we may be eligible for an additional 180 calendar day period to regain compliance. To qualify for a second grace period, we would need to transfer the listing of our common stock to The Nasdaq Capital Market, evidence compliance with the initial listing criteria for The Nasdaq Capital Market, namely the $50 million MVLS rule or the $5 million stockholders' equity rule for initial listing on The Nasdaq Capital Market, with the exception of the $15 million market value of publicly held shares requirement, and provide written

notice to the Staff of our intention to cure the bid price deficiency during the second compliance period by effecting a reverse stock split, if necessary. If we do not regain compliance with the Bid Price Rule or are not eligible to transfer the listing of our common stock to The Nasdaq Capital Market by July 7, 2025, the Staff will provide separate written notification that our securities are subject to delisting, which we would address with the Panel.

The delisting of our common stock from Nasdaq could materially reduce the liquidity of our common stock and result in a corresponding material reduction in the price of our common stock. In addition, delisting could harm our ability to raise capital through alternative financing sources on terms acceptable to us, or at all, and would also make it more difficult for our stockholders to sell or purchase our common stock when they wish to do so. If delisted, we will likely trade on the OTC Markets system, which could make it more difficult to dispose of, or obtain accurate quotations for the price of, our common stock, and may lead to a reduction in coverage by securities analysts and the news media, which could cause the price of our common stock to decline further.

If a significant portion of our total outstanding shares are sold into the market, the market price of our common stock could drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. Certain of our stockholders have rights, subject to specified conditions, under our resale registration statement on Form S-3 registering 3,730,608 shares of our common stock under which they may sell their shares of common stock in the public market, so long as the resale registration statement on Form S-3 remains effective. We have also filed registrations statement registering all shares of common stock that we may issue under our equity compensation plans.

Moreover, we are also party to the Sale Agreement with Jefferies, as sales agent, pursuant to which we may offer and sell shares of our common stock having an aggregate offering price of up to $100.0 million from time to time through Jefferies under an “at-the-market offering” program, or ATM. The number of shares that are sold by Jefferies after we request that sales be made will fluctuate based on the market price of our common stock during the sales period and limits we set with Jefferies. Therefore, it is not possible to predict the number of shares that will ultimately be issued by us, if any, pursuant to the sales agreement. As of December 31, 2024, we have sold 1,362,917 shares of our common stock under the ATM for net proceeds of $3.0 million.

If at some point we are no longer a “smaller reporting company” or otherwise no longer qualify for applicable exemptions, we will be subject to additional laws and regulations affecting public companies that will increase our costs and the demands on management and could harm our operating results.

We will be subject to the reporting requirements of the Exchange Act, which requires, among other things, that we file with the SEC annual, quarterly and current reports with respect to our business and financial condition as well as other disclosure and corporate governance requirements. However, as a “smaller reporting company,” as defined in Item 10(f)(1) of Regulation S-K, we may take advantage of certain exemptions from disclosure requirements, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2022 and reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. If at some point we are no longer qualified as a smaller reporting company or otherwise no longer qualify for these exemptions, we will be required to comply with these additional legal and regulatory requirements applicable to public companies and will incur significant legal, accounting and other expenses to do so. If we are not able to comply with the requirements in a timely manner or at all, our financial condition or the market price of our common stock may be harmed. For example, if we or our independent auditor identify deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, then we could face additional costs to remedy those deficiencies, the market price of our stock could decline or we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources.

Our executive officers, directors and principal stockholders may have the ability to significantly influence all matters submitted to our stockholders for approval.

As of December 31, 2024, our executive officers, directors and principal stockholders, in the aggregate, beneficially owned 45.3% of our outstanding shares of common stock. As a result, if these stockholders were to choose to act together, they would be able to significantly influence all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would significantly influence the election of

directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of voting power could delay or prevent an acquisition of the Company on terms that other stockholders may desire.

We have broad discretion in the use of our cash and cash equivalents and may invest or spend the proceeds in ways with which you do not agree and in ways that may not increase the value of your investment.

We have broad discretion over the use of our cash and cash equivalents and have adopted a cash preservation plan. You may not agree with our decisions, and our use of the proceeds may not yield any return on your investment. Our failure to apply these resources effectively could compromise our ability to pursue our growth strategy and we may not be able to yield a significant return, if any, on our investment of these net proceeds. You do not have the opportunity to influence our decisions on how to use our cash resources.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 1C. Cybersecurity

Cybersecurity Risk Management and Strategy

We have established processes for assessing, identifying and managing cybersecurity risks, which are built into our overall risk management program and are designed to help protect our information assets and operations from internal and external cyber threats, protect employee and patient information from unauthorized access or attack, as well as secure our networks and systems. Such processes include physical, procedural and technical safeguards. We engage certain third parties to enhance and assist with our cybersecurity oversight, including a 24/7 Security Operation Center, or SOC, that monitors network devices and computer systems in real time. We include confidentiality and data protection provisions in certain contracts with third-party service providers to help protect us and our patients from any related vulnerabilities.

We do not believe that there are currently any known risks from cybersecurity threats that have or are reasonably likely to materially affect us or our business strategy, results of operations or financial condition. However, despite our efforts, we cannot eliminate all risks from cybersecurity threats, or provide assurances that we have not experienced undetected cybersecurity incidents. For more information on the most pertinent risks we may experience from cybersecurity threats, please refer to Part I, Item 1A, "Risk Factors" – "*Our internal computer systems, or those of our collaborators, vendors, suppliers, contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs*."

Cybersecurity Governance and Oversight

The audit committee of our board of directors provides oversight over cybersecurity risk and updates the full board of directors periodically regarding such oversight. The audit committee reviews and discusses with management the Company's major risk exposures, including cybersecurity matters, and is notified between such updates regarding significant new cybersecurity threats or incidents, if any.

Our Chief Executive Officer, or CEO, leads the operational oversight of company-wide cybersecurity strategy, policy, standards and processes and works across relevant departments to assess and help prepare us and our employees to address cybersecurity risks. The consultant that operates our SOC updates the CEO regarding the detection of cybersecurity risk exposure and provides advice on the prevention, mitigation and remediation of such risks. The CEO keeps the senior executive leadership team apprised, including our Vice President of Finance, on assessments of risk exposure to ensure that the highest levels of management are kept abreast of potential risks we are facing. The CEO has significant prior business experience in compliance and risk management and coordinates directly with the third party who operates our SOC on issues involving particular cybersecurity expertise.

In an effort to help deter and detect cyber threats, we regularly provide all employees, including part-time and temporary employees, with data protection cybersecurity and incident prevention training throughout the year, which covers timely and relevant topics, including social engineering, phishing, password protection, confidential data protection, asset use and mobile security, and educates employees on the importance of reporting all incidents immediately. We also use technology-based tools to mitigate cybersecurity risks and to bolster our employee-based cybersecurity programs.

Item 2. Properties

Our principal facilities consist of office and laboratory space in Philadelphia, Pennsylvania. We occupy approximately 4,369 square feet of office space under a lease that is expected to expire in October 2029 and laboratory space leases which expire in June 2025. We believe that our facilities are sufficient to meet our current needs.

Item 3. Legal Proceedings

We are currently not a party to any material legal proceedings.

Item 4. Mine Safety Disclosures

Not applicable.

Part II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Holders of Our Common Stock

Our common stock is currently listed on the Nasdaq Global Market under the symbol “CARM.” The number of stockholders of record of our common stock as of March 26, 2025 was 28. This number does not include stockholders for whom shares are held in “nominee” or “street” name.

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings to fund the development and expansion of our business. We do not anticipate paying any cash dividends for the foreseeable future, and future debt financing arrangements may contain terms prohibiting or limiting the amount of dividends that may be declared or paid on our common stock. Any future determination to declare and pay dividends will be made at the discretion of our board of directors and will depend on then-existing conditions including our results of operations, financial condition, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

Recent Sales of Unregistered Securities

We did not issue any securities that were not registered under the Securities Act of 1933, as amended, or the Securities Act, during the twelve months ended December 31, 2024, other than pursuant to transactions previously disclosed in our Current Reports on Form 8-K.

Purchases of Equity Securities

We did not purchase any of our registered equity securities during the period covered by this Annual Report on Form 10-K.

Item 6. [Reserved]

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read together with our consolidated financial statements and the related notes appearing elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements that involve risks and uncertainties. As a result of many factors, such as those set forth in the section titled "Risk Factors" and elsewhere in this Annual Report on Form 10-K, our actual results may differ materially from those anticipated by these forward-looking statements.

Overview

We are a biotechnology company focused on applying our industry leading expertise in macrophage engineering to develop transformative therapies to treat serious diseases including liver fibrosis and cancer. We have created a comprehensive set of platform technologies to enable the therapeutic use of engineered macrophages and monocytes, which belong to a subgroup of white blood cells called myeloid cells. We seek to apply our ability to engineer macrophages and monocytes, either *in vivo* or *ex vivo*, using approaches and delivery systems most appropriate to each specific indication, to meaningfully alter the course of the disease. Our proprietary CAR-M platform uses chimeric antigen receptors, or CARs, to redirect macrophages or monocytes against specific tumor associated antigens with the goal of targeted anti-tumor immunity.

2024 Revised Operating Plans

In late March 2024, following a strategic review of our operating plan for 2024 and future periods, we approved a revised operating plan intended to balance value creation and expense management with our available cash resources. The objective of our revised operating plan was to focus our clinical development efforts on high potential value programs with meaningful near-term milestones and eliminate non-essential expenses and headcount to extend our cash runway. Under that plan, we intended to focus our *ex vivo* oncology clinical development efforts on our follow-on product candidate CT-0525, a CAR-Monocyte intended to treat solid tumors that over-express human epidermal growth factor receptor 2, or HER2 and cease development of CT-0508, our macrophage-based product candidate, and initial lead product candidate. In addition, at that time, we decided to continue to focus on our *in vivo* mRNA/lipid nanoparticle, or LNP, CAR-M programs in partnership with Moderna and pause development of CT-1119, amesothelin-targeted CAR-Monocyte, pending additional financing, reduce our workforce and decrease spending on other non-essential activities. All clinical activities of CT-0508 have ceased.

In December 2024, following another strategic review of our operating plan for 2025 and our future pipeline, we approved another revised operating plan intended to reduce monthly operating expenses, conserve cash, and refocus our efforts on strategic priorities. First, we decided to cease development of our HER2 directed autologous cell therapy platform including CT-0525. Our decision was based on an assessment of the competitive landscape in anti-HER2 treatments, including the impact of recently approved anti-HER2 therapies on HER2 antigen loss/downregulation, and the effects on the future development strategy of any anti-HER2 product. We dosed the last patient in our Phase 1 clinical trial of CT-0525, in November 2024 and all clinical activity ended in January 2025.

Further pursuant to the December 2024 revised operating plan, we pivoted our focus to developing product candidates targeting two indications – liver fibrosis and solid tumor oncology, while retaining the potential to receive milestones and royalties from our collaboration with Moderna.

As part of our cost-reduction initiatives in 2024, we implemented workforce reductions resulting in the termination of 62 full-time employees (representing approximately 58% of our total workforce), across research and development and general and administrative functions. The workforce reductions resulted in $4.1 million of severance related costs. As of December 31, 2024, we accrued for $2.7 million in severance costs from our workforce reduction, $2.3 million of which was paid in January 2025. We may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated with, the 2024 reduction in workforce.

On June 26, 2024, we notified Novartis Pharmaceuticals Corporation, or Novartis, of our termination of the Manufacturing and Supply Agreement, dated March 1, 2023, relating to the manufacture of our first product candidate to enter clinical development, CT-0508, or the Manufacturing Agreement. The termination was effective July 31, 2024. As a result of the termination of the Manufacturing Agreement, we incurred a termination fee of $4.0 million, or the Termination Fee, which we paid in the third quarter of 2024. We separately agreed with Novartis that if we enter into an agreement for the tech transfer of another product, or a Substitute Product, to Novartis on or before December 31, 2024, then the Termination Fee

shall be credited in full or in part against any amounts due to Novartis under such agreement relating to the Substitute Product. We did not enter into an agreement relating to the Substitute Product with Novartis and we expensed the $4.0 million prepaid asset in the fourth quarter of 2024 to research and development in the consolidated statements of operations and comprehensive loss.

Recent Developments – 2025 Cash Preservation Plan

As part of a further revised plan approved by our board of directors on March 25, 2025 to preserve our existing cash resources following our reduction in workforce, or our cash preservation plan, we have reduced our operations to those necessary to identify and explore, a range of strategic alternatives to maximize value and prepare to wind down our business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction. We currently have no intention of resuming research and development activities. Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. As part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. Our cash preservation plan prioritizes payments necessary and appropriate for those reduced operations and those that will help us to evaluate our strategic alternatives.

We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to work with a financial advisor on identifying and evaluating potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

Our Product Candidates and Pipeline

Our liver fibrosis program is based upon the discovery of a key efferocytosis defect in the macrophages that reside within the livers of patients with fibrosis. Using a novel mRNA LNP approach, our product candidate aims to reverse fibrotic disease and improve the outcomes of patients with advanced liver fibrosis. In the second quarter of 2024, we achieved pre-clinical proof of concept in our liver fibrosis program, demonstrating the anti-fibrotic potential of engineered macrophages in two liver fibrosis models. Prior to pausing our research and development activities, we planned to continue to conduct pre-clinical development of our product candidate, CT-2401, sufficient to enable a regulatory submission to initiate a clinical trial.

Our oncology program leverages our considerable expertise and experience in *ex vivo* cell therapy. CT-1119 is designed to treat patients with advanced mesothelin-positive solid tumors, including pancreatic cancer, ovarian cancer, lung cancer, mesothelioma, and others. Prior to pausing our research and development activities, we planned to initiate a Phase 1 clinical trial of CT-1119, a mesothelin-targeted CAR-Monocyte, in combination with tislelizumab, an anti-PD-1 antibody, in adult patients with mesothelin-positive solid tumors, in China.

Our collaboration with Moderna utilizes Moderna's mRNA/LNP technology, together with our CAR-M platform technology, to create novel *in vivo* oncology off-the-shelf gene therapy product candidates. In June 2024, we announced that Moderna nominated the first development candidate under the collaboration and paid us a $2.0 million milestone. This development candidate targets Glypican-3, or GPC3, and is designed to treat solid tumors, including hepatocellular carcinoma. In November 2024, we announced new pre-clinical data on our anti-GPC3 *in vivo* CAR-M therapy for treating hepatocellular carcinoma. These pre-clinical data demonstrated robust anti-tumor activity. In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration for which we have the potential to receive future milestones and royalty payments. As such, we will not be conducting any additional research activities under the collaboration agreement and we will not be receiving any further research funding from Moderna under the collaboration agreement. Moderna also agreed to terminate the *in-vivo* oncology field exclusivity, which would allow us to pursue *in vivo* CAR-M programs outside of the 12 nominated targets and product polypeptides.

To date, we have not yet commercialized any products or generated any revenue from product sales and have financed our operations primarily with proceeds from sales of our preferred stock, proceeds from our collaboration with Moderna, research tax credits, convertible debt financing, and completion of the Merger and related financing. Our operations have

historically been limited to organizing and staffing the Company, business planning, capital raising, establishing and maintaining our intellectual property portfolio, building our pipeline of product candidates, conducting drug discovery activities, undertaking pre-clinical studies, manufacturing process development studies, conducting early-stage clinical trials, and providing general and administrative support for these operations. We have historically devoted substantially all of our financial resources and efforts to pursuing discovery, research and development of our product candidates.

Financial Operations

Our net losses were $60.5 million and $86.9 million for the years ended December 31, 2024 and 2023, respectively. As of December 31, 2024, we had $17.9 million in cash and cash equivalents and an accumulated deficit of $305.6 million. We expect to continue to incur significant expenses and operating losses while we explore strategic alternatives and carry out the orderly wind down of our operations. Although we believe our current cash and cash equivalents are sufficient to sustain our operating expenses and capital expenditure requirements into the second half of 2025, we do not expect that our cash and cash equivalents will support our operations for more than one year following the date of this Annual Report on Form 10-K. As a result of these conditions, substantial doubt exists about our ability to continue as a going concern. We have based this estimate on assumptions that may prove to be wrong. In addition, changing circumstances could cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more than currently expected because of circumstances beyond our control. As a result, we could deplete our capital resources sooner than we currently expect. Our exploration of strategic alternatives may not result in the consummation of any transaction that provides additional funding to our company.

Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders and there can be no assurance that we would be able to generate funds on terms acceptable to us, on a timely basis, or at all.

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 or maintain profitability. We may never succeed in these activities and, even if we do, may never generate revenues that are significant enough to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand business, maintain discovery and product development efforts, diversify our pipeline of product candidates or even continue operations.

Nasdaq Compliance

On October 10, 2024, we received written notice from the Listing Qualifications Department of The Nasdaq Stock Market LLC notifying us that our common stock was not in compliance with Nasdaq Listing Rule 5450(b)(2)(A), or the Minimum MVLS Requirement, which requires us to maintain a minimum market value of listed securities of $50,000,000. We have 180 calendar days, or until April 8, 2025, to regain compliance with the Minimum MVLS Requirement. On January 6, 2025, we received written notice from the Listing Qualifications Department of The Nasdaq Stock Market LLC notifying us that, based upon the closing bid price of our common stock for the last 38 consecutive business days, we were not in compliance with Nasdaq Listing Rule 5450(a)(1), or the Bid Price Rule, which requires us to maintain a minimum bid price of $1.00 per share. We have 180 calendar days, or until July 7, 2025, to regain compliance with the Bid Price Rule. We intend to continue to monitor our MLVS and bid price and consider available options to regain compliance with Nasdaq listing rules. For more information about our Nasdaq listing deficiencies, see the following risk factor in Item 1A, Risk Factors "*We do not currently meet the requirements for continued listing on the Nasdaq Global Market. If we fail to meet the requirements for continued listing on the Nasdaq Global Market, our common stock could be delisted from trading, which would have a negative effect on the price of our common stock and our ability to raise additional capital*.".

Financial Operations Overview

Collaboration Revenues

To date, we have not generated any revenue from product sales and do not expect to generate any revenue from the sale of products for the foreseeable future. Our revenues to date have been generated from the Moderna collaboration agreement. Moderna reimburses us for all costs incurred by it in connection with its research and development activities under the

Moderna collaboration agreement plus a reasonable margin for the respective services performed. As of February 2025, Moderna has nominated all 12 oncology research targets under the Moderna License Agreement. As such, we will not be conducting any additional research activities under the collaboration agreement and we will not be receiving any further research funding from Moderna under the collaboration agreement. We are eligible to receive potential milestone and royalty payments from Moderna in the future. To date, we have received $2.0 million in milestone payments and we have not received any royalties under the Moderna collaboration agreement.

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for our research activities, including discovery efforts and the development of product candidates, and include:

- expenses incurred to conduct the necessary pre-clinical studies and clinical trials required to obtain regulatory approval;
- salaries, benefits and other related costs, including stock-based compensation expense, for personnel engaged in research and development functions;
- costs of funding research performed by third parties, including pursuant to agreements with contract research organizations, or CROs, as well as investigative sites and consultants that conduct our pre-clinical studies and clinical trials;
- expenses incurred under agreements with contract manufacturing organizations, or CMOs, including manufacturing scale-up expenses and the cost of acquiring and manufacturing pre-clinical study and clinical trial materials;
- costs of outside consultants, including their fees, stock-based compensation and related travel expenses;
- the costs of laboratory supplies and acquiring materials for pre-clinical studies;
- facility-related expenses, which include direct depreciation costs of equipment and expenses for rent and maintenance of facilities and other operating costs; and
- third-party licensing fees.

Research and development activities are central to our business model. Product candidates in later stages of clinical development will generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect our research and development expenses to significantly decrease in 2025 as a result of our decision to pause our research and development activities as part of our cash preservation plan. If we were to resume research and development activities, our research and development expenses would increase; however, any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding.

The successful development of our current or future product candidates is highly uncertain. At this time, we cannot reasonably estimate or know the nature, timing and costs of the efforts that would be necessary to complete the development of any product candidates. If we were to resume research and development activities, the success of any of our product candidates will depend on several factors, including the following:

- successfully completing pre-clinical studies;
- timely filing and receiving clearance of investigational new drug applications to commence clinical trials;
- successfully initiating, enrolling patients in and completing clinical trials;
- scaling up manufacturing processes and capabilities to support clinical trials of any of our product candidates;
- applying for and receiving marketing approvals from applicable regulatory authorities;
- obtaining and maintaining intellectual property protection and regulatory exclusivity for any product candidates;
- making arrangements with third-party manufacturers, or establishing commercial manufacturing capabilities, for both clinical and commercial supplies of our product candidates;
- establishing sales, marketing and distribution capabilities and launching commercial sales of our products, if and when approved, whether alone or in collaboration with others;
- acceptance of any of our product candidates, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- obtaining and maintaining coverage, adequate pricing and adequate reimbursement from third-party payors, including government payors;
- maintaining, enforcing, defending and protecting our rights in our intellectual property portfolio;
- not infringing, misappropriating or otherwise violating others' intellectual property or proprietary rights; and
- maintaining a continued acceptable safety profile of our products following receipt of any marketing approvals.

A change in the outcome of any of these variables with respect to the development, manufacture or commercialization activities of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate. For example, 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, if there are safety concerns or if we determine that the observed safety or efficacy profile would not be competitive in the marketplace, we could be required to expend significant additional financial resources and time on the completion of clinical development. Product commercialization will take several years, and we expect to spend a significant amount in development costs.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel expenses, including salaries, benefits and stock-based compensation expense for employees in executive, finance, accounting, business development and human resource functions. General and administrative expense also includes corporate facility costs, including rent, utilities, depreciation and maintenance, and costs not otherwise included in research and development expenses, legal fees related to intellectual property and corporate matters as well as fees for accounting and consulting services.

We expect that our general and administrative expenses will decrease in 2025, as we have terminated all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. If we were to identify and pursue a strategic alternative, we expect our general and administrative expenses to increase.

Interest Income, net

Interest income, net consists of interest earned on our excess cash, net of interest expense. Interest expense consisted of interest on our finance leases and our convertible promissory note that was converted into common stock upon the closing of the Merger in 2023.

Change in Fair Value of Derivative Liability

Change in fair value of the derivative liability for the redemption feature of our convertible promissory note reflected the non-cash charge for changes in the fair value of the derivative liability that was subject to re-measurement at each balance sheet date through the settlement of the convertible promissory note upon the closing of the Merger at which time the redemption feature was derecognized.

Income Taxes

Since inception, we have incurred significant net losses. As of December 31, 2024, we had net operating loss carryforwards, or NOLs, for federal income tax purposes of $374.7 million. We have provided a valuation allowance against the full amount of our deferred tax assets since, in our opinion, based upon our historical and anticipated future losses, it is more likely than not that the benefits will not be realized. As of December 31, 2024, we remained in a full valuation allowance position.

The utilization of our NOLs may be subject to a substantial annual limitation in the event of certain cumulative changes in the ownership interest of significant stockholders over a three-year period in excess of 50 percent, as defined under Sections 382 and 383 of the Internal Revenue Code of 1986, or the Code, respectively, as well as similar state provisions. We have recorded a valuation allowance on all of our deferred tax assets, including deferred tax assets related to NOLs.

Results of Operations

Comparison of the Years Ended December 31, 2024 and 2023 (in thousands)

	Years Ended December 31,	
	2024	2023
Collaboration revenues	$ 19,632	$ 14,919
Operating expenses:		
Research and development	59,673	74,125
General and administrative	22,138	29,525
Total operating expenses	81,811	103,650
Operating loss	(62,179)	(88,731)
Change in fair value of derivative liability	—	(84)
Interest income, net	1,702	1,936
Net loss	$ (60,477)	$ (86,879)

Collaboration Revenues

Collaboration revenues were $19.6 million and $14.9 million for the years ended December 31, 2024 and 2023, respectively. The increase was primarily related to Moderna's development candidate nomination which resulted in $5.8 million of collaboration revenue consisting of $3.8 million of deferred option rights revenue recognition and $2.0 million of milestone revenue.

Research and Development Expenses

We track outsourced development, outsourced personnel costs and other external research and development costs of our CT-0508, CT-0525, and CT-1119 programs. We do not track internal research and development costs on a program-by-program basis. The following table summarizes our research and development expenses (in thousands). Certain amounts related to prior period results were reclassified to conform to current period presentation. These reclassifications have not changed total research and development expenses.

	Years Ended December 31,		
	2024	2023	Change
CT-0508 (1)	$ 9,652	$ 12,354	$ (2,702)
CT-0525 (1)	8,757	8,440	317
CT-1119 (1)	575	928	(353)
Personnel costs, including stock-based compensation (2)	18,724	19,249	(525)
Other clinical and pre-clinical development expenses	8,635	15,308	(6,673)
Facilities and other expenses	13,330	17,846	(4,516)
Total research and development expenses	$ 59,673	$ 74,125	$ (14,452)

(1) The revised operating plans that were implemented in 2024, adjusted our research and development focus. For the Phase 1 clinical trial of CT-0525, the last patient was dosed in November 2024 and all clinical activity ended in January 2025. All clinical activities related to CT-0508 also ceased in 2024. In connection with our 2024 revised operating plans, we had also elected to pause further development of CT-1119, a mesothelin-targeted CAR-Monocyte, pending additional financing.

(2) Our revised operating plans, which were implemented in 2024, included reductions in workforce which resulted in severance costs.

The decrease in research and development expenses was primarily attributable to a decrease in our clinical and pre-clinical development expenses and facility costs due to less laboratory supplies and laboratory space needs in connection with our revised operating plans.

General and Administrative Expenses

The following table summarizes our general and administrative expenses (in thousands). Certain amounts related to prior period results were reclassified to conform to current period presentation. These reclassifications have not changed total general and administrative expenses.

	Years Ended December 31,		
	2024	2023	Change
Personnel costs, including stock-based compensation (1)	$ 9,748	$ 10,671	$ (923)
Professional fees	8,058	12,821	(4,763)
Facilities and supplies	1,684	1,406	278
Insurance, taxes, and fees	1,351	2,890	(1,539)
Other expenses	1,297	1,737	(440)
Total general and administrative expenses	$ 22,138	$ 29,525	$ (7,387)

(1) Our revised operating plans, which were implemented in 2024, included reductions in workforce which resulted in severance costs.

The decrease in general and administrative expenses was primarily attributable to a decrease in our professional fees as a result of non-recurring legal costs associated with the Merger and a decrease in director and officer insurance costs.

Interest Income, net

We recognized $1.7 million in interest income, net for the year ended December 31, 2024, which was primarily attributable to interest earned on excess cash, partially offset by interest on our finance leases.

We recognized $1.9 million in interest income, net for the year ended December 31, 2023, which was primarily attributable to interest earned on excess cash, partially offset by interest expense on the convertible promissory note issued to Moderna, including non-cash interest expense associated with the amortization of the debt discount.

Change in Fair Value of Derivative Liability

We recognized a $0.1 million non-cash charge for the year ended December 31, 2023, for the increase in fair value of the derivative liability associated with the redemption feature of the convertible promissory note with Moderna, which was attributable to the timing in which we expected the accrued settlement event to occur. There was no change in fair value of derivative liability during the year ended December 31, 2024 because the derivative was redeemed in 2023.

Liquidity and Capital Resources

Sources of Liquidity

As of December 31, 2024, we had $17.9 million in cash and cash equivalents and an accumulated deficit of $305.6 million. To date, we have not yet commercialized any products or generated any revenue from product sales and have financed operations primarily with proceeds from sales of preferred stock, proceeds from our collaboration with Moderna, research tax credits, convertible debt financing, and completion of the Merger and related financing. Through December 31, 2024, we have generated $44.4 million of collaboration revenues related to research and development services, deferred option rights, and milestones.

As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration. As such, we will not be conducting any additional research activities under the collaboration agreement and we will not be receiving any further research funding from Moderna under the collaboration agreement. We received the final research and development payment of $2.9 million from Moderna in January 2025. Under the terms of the Moderna collaboration agreement, assuming Moderna develops and commercializes 12 products, each directed to a different development target, we are eligible to receive up to between $247.0 million and $253.0 million per product in development target designation, development, regulatory and commercial milestone payments. We are also eligible to receive tiered mid-to-high single

digit royalties of net sales of any products that are commercialized under the agreement, which may be, subject to reductions.

On April 17, 2023, we filed a universal shelf registration statement on Form S-3, which was declared effective on May 2, 2023, or the Registration Statement. Under the Registration Statement, we may offer and sell up to $300.0 million of a variety of securities, including debt securities, common stock, preferred stock, depository shares, subscription rights, warrants and units from time to time in one or more offerings at prices and on terms to be determined at the time of the offering. On May 12, 2023, we entered into an Amended and Restated Open Market Sale Agreement[SM], or the Sale Agreement, with Jefferies LLC, as sales agent, pursuant to which we may offer and sell shares of our common stock with an aggregate offering price of up to $100.0 million under an “at-the-market" offering program. As of December 31, 2024, we have sold 1,362,917 shares of our common stock for net proceeds of $3.0 million.

Cash Flows

The following table shows a summary of our cash flows (in thousands):

	Years Ended December 31,	
	2024	2023
Cash (used in) provided by:		
Operating activities	$ (59,917)	$ (81,177)
Investing activities	(123)	72,408
Financing activities	344	62,180
Net change in cash and cash equivalents	$ (59,696)	$ 53,411

Cash Flows from Operating Activities

During the year ended December 31, 2024, we used $59.9 million of net cash in operating activities. Cash used in operating activities reflected our net loss of $60.5 million and a $12.0 million net change in our operating assets and liabilities attributable to the timing in which we pay our vendors for research and development activities that was offset by $12.5 million of non-cash charges primarily related to depreciation and amortization expense, stock-based compensation and reductions in the operating right of use, or ROU assets.

During the year ended December 31, 2023, we used $81.2 million of net cash in operating activities. Cash used in operating activities reflected our net loss of $86.9 million and a $5.4 million net change in our operating assets and liabilities attributable to the timing in which we pay our vendors for research and development activities that was offset by $11.1 million of non-cash charges related to depreciation and amortization expense, stock-based compensation, reductions in the operating ROU assets, amortization of the debt discount on the convertible promissory note, change in fair value of the derivative liability, accretion on marketable securities, and non-cash interest on the finance lease liability.

Cash Flows from Investing Activities

During the year ended December 31, 2024, we used $0.1 million of net cash in investing activities which reflected purchases of property and equipment.

During the year ended December 31, 2023, we received $72.4 million of net cash from investing activities. Cash provided by investing activities reflected $108.0 million of proceeds from the sale of marketable securities, partially offset by purchases of marketable securities of $34.5 million and the purchase of property and equipment of $1.1 million.

Cash Flows from Financing Activities

During the year ended December 31, 2024, we received $0.3 million of net cash from financing activities, primarily attributable to $2.4 million from the sale of common stock in connection with the Sale Agreement, net of issuance costs, and $0.7 million in proceeds from failed-sale leaseback arrangements, partially offset by $1.4 million in payments of principal related to finance lease liabilities, and $1.3 million in payments to our finance liability from failed-sale leaseback arrangements.

During the year ended December 31, 2023, we received $62.2 million of net cash from financing activities, primarily attributable to the $37.9 million in the cash and cash equivalents acquired in connection with the Merger, $30.6 million in

proceeds from the issuance of common stock in pre-closing financing, $1.2 million in proceeds from failed-sale leaseback arrangements, $0.6 million from the sale of common stock in connection with the Sale Agreement, partially offset by $5.8 million in payments of financing costs, $1.3 million in payments of principal related to finance lease liabilities, and $1.1 million in payments to our finance liability from failed sale-leaseback arrangements.

Funding Requirements

As of December 31, 2024, we had cash and cash equivalents of $17.9 million. We expect to continue to incur significant expenses and operating losses while we explore strategic alternatives and carry out the orderly wind down of our operations. Although we believe our current cash and cash equivalents are sufficient to sustain our operating expenses and capital expenditure requirements into the second half of 2025, we do not expect that our cash and cash equivalents will support our operations for more than one year following the date of this Annual Report on Form 10-K. As a result of these conditions, substantial doubt exists about our ability to continue as a going concern. We have based this estimate on assumptions that may prove to be wrong. In addition, changing circumstances could cause us to consume capital significantly faster than we currently anticipate, and we may need to spend more than currently expected because of circumstances beyond our control. As a result, we could deplete our capital resources sooner than we currently expect. Our exploration of strategic alternatives may not result in the consummation of any transaction that provides additional funding to our company.

As part of our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction. As part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. Our cash preservation plan prioritizes payments necessary and appropriate for those reduced operations and those that will help us to evaluate our strategic alternatives.

We may retain a financial advisor to advise on our exploration of a range of strategic alternatives. We plan to work with the advisor on identifying and evaluating potential strategic alternatives with the goal of maximizing the value of our assets, including CT-2401, CT-1119, our macrophage and monocyte engineering platform and our CAR-M platform and realizing value for the potential milestone and royalty payments under the Moderna collaboration. However, our exploration of strategic alternatives may not result in the consummation of any transaction or the realization of any value for our company or our stockholders.

Any strategic alternatives may involve or may be pursued through legal proceedings including bankruptcy or liquidation and dissolution proceedings, and such proceedings may also be necessary or appropriate in the absence of any strategic alternatives. In the event that our board of directors determines that a liquidation and dissolution of our business approved by stockholders is desirable or the best method to maximize value, we would prepare proxy materials and schedule a special meeting of our stockholders to seek approval of such a plan.

We currently have no intention of resuming research and development activities. Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding. Significant additional financing may not be available to us on acceptable terms, or at all, and may be impacted by the economic climate and market conditions.

To the extent that we are able to raise additional capital through the public or private sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of those securities may include liquidation or other preferences that adversely affect your rights as a holder of our common stock. Debt financing and preferred equity financing, if available, would increase our fixed payment obligations and may involve agreements that include covenants limiting or restricting our operations and ability to take specific actions, such as incurring additional debt, making acquisitions, engaging in acquisition, merger or collaboration transactions, selling or licensing our assets, making capital expenditures, redeeming our stock, making certain investments, declaring dividends or other operating restrictions that could adversely impact our ability to conduct business.

If we are able to raise funds through a strategic collaboration or partnership with one or more parties, we may have to relinquish valuable rights to our intellectual property, future revenue streams, discovery programs or product candidates, grant licenses on terms that may not be favorable to us or grant rights to develop and market product candidates that we

would otherwise prefer to develop and market on our own, any of which may have a material adverse effect on our business, operating results and prospects.

If we were to resume research and development activities, our expenses would increase and our future capital requirements would depend on many factors, including:

- the progress, costs and results of pre-clinical testing of our product candidates;
- the progress, costs and results of clinical trials of our product candidates;
- the number of and development requirements for additional indications for our product candidates;
- the success of our collaborations with Moderna or others;
- our ability to scale up our manufacturing processes and capabilities to support clinical trials of the product candidates we are developing and may develop in the future;
- the costs, timing and outcome of regulatory review of our product candidates;
- potential changes in the regulatory environment and enforcement rules;
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of such arrangements;
- the payment of license fees and other costs of our technology license arrangements;
- the costs and timing of future commercialization activities, including product manufacturing, sales, marketing and distribution, for the product candidates we are developing and may develop in the future for which we may receive marketing approval;
- our ability to obtain and maintain acceptance of any approved products by patients, the medical community and third-party payors;
- the amount and timing of revenue, if any, received from commercial sales of the product candidates we are developing or develop in the future for which we receive marketing approval;
- potential changes in pharmaceutical pricing and reimbursement infrastructure;
- the availability of raw materials for use in production of our product candidates;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property and proprietary rights and defending any intellectual property-related claims; and
- the extent to which we in-license or acquire additional technologies or product candidates.

Identifying potential product candidates and conducting pre-clinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. We will not generate commercial revenues unless and until we can achieve sales of products, which we do not anticipate for a number of years, if at all.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations and commitments at December 31, 2024 (in thousands):

	Total	Less than 1 Year	1 to 3 Years	4 to 5 Years	More than 5 Years
Contractual obligations:					
Operating lease commitments[(1)]	$ 1,809	$ 927	$ 698	$ 184	$ —
Finance lease commitments	963	942	21	—	—
Total contractual obligations	$ 2,772	$ 1,869	$ 719	$ 184	$ —

(1) Reflects obligations pursuant to our office and laboratory leases in Philadelphia, Pennsylvania.

The commitment amounts in the table above are associated with contracts that are enforceable and legally binding and that specify all significant terms, including fixed or minimum services to be used, fixed, minimum or variable price provisions, and the approximate timing of the actions under the contracts. Our contracts with CMOs, CROs and other third parties for the manufacture of our product candidates and to support pre-clinical research studies and clinical testing are generally cancelable by us upon prior notice and do not contain any minimum purchase commitments. Payments due upon cancellation consisting only of payments for services provided or expenses incurred, including noncancelable obligations

of our service providers, up to the date of cancellation are not included in the table above as the amount and timing of such payments are not known.

The table above does not include any potential milestone or royalty payments that we may be required to make under our license agreement with Penn and under licensing agreements with other third parties not considered material. We excluded these milestone and royalty payments given that the timing and likelihood of any such payments cannot be reasonably estimated at this time. For further information about our lease arrangements, our license agreement with Penn and our other licensing agreements, see Note 8 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

In connection with the 2025 cash preservation plan, we expect to incur approximately $3.8 million, which primarily represents one-time employee termination benefits directly associated with the workforce reduction. We also expect to pay the majority of related reduction in workforce amounts by the end of 2025.

Critical Accounting Policies and Estimates

Our management's discussion and analysis of financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles. The preparation of our consolidated financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. We base our estimates on our limited historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in Note 3 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K, we believe the following accounting policies are the most critical to the judgments and estimates used in the preparation of our consolidated financial statements for the year ended December 31, 2024.

Revenues from Contracts

We account for our revenue in accordance with Accounting Standards Codification, or ASC, 606, *Revenue from Contracts with Customers*, or ASC 606. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five steps at inception of the agreement or upon material modification of the agreement: (i) identifies the contract(s) with a customer; (ii) identifies the performance obligations in the contract; (iii) determines the transaction price, including variable consideration, if any; (iv) allocates the transaction price to the performance obligations in the contract; and (v) recognizes revenue when (or as) the entity satisfies a performance obligation.

We consider the pattern of satisfaction of the performance obligations under step (v) above to be a critical accounting estimate. More specifically, the determination of the level of achievement of research and development service performance obligations, whose pattern of satisfaction is measured using costs incurred to date as compared to total costs incurred and expected to be incurred in the future is driven by a critical accounting estimate.

In estimating the costs expected to be incurred in the future, we use our most recent budget and long-range plan, adjusted for any pertinent information. While this is our best estimate as of the reporting period, costs expected to be incurred in the future require managements judgment as the scope and timing of research and development activities may change significantly over time. We may adjust the scope of our research and development activities based on several factors, such as additional work needed to support advancement of product candidate or change in the number of patients in trials. Further, research and development services may no longer be within the scope of a collaboration agreement, as has been the case with certain of our programs. The timing of when research and development costs are expected to be incurred may change as a result of external factors, such as delays caused by manufacturing or supply chain, or difficulty in enrolling patients; or internal factors, such as prioritization of programs. Our estimate of the scope and timing of research and development services performed relative to the actual scope and timing may have a significant impact on revenue recognition.

Research and Development Accruals

Research and development expenses consist primarily of costs incurred in connection with the development of our product candidates. We expense research and development costs as incurred.

We accrue expenses for pre-clinical studies and activities performed by third parties based upon estimates of the proportion of work completed over the term of the individual trial and patient enrollment rates in accordance with agreements with third parties. We determine the estimates by reviewing contracts, vendor agreements and purchase orders, and through discussions with our internal clinical personnel and external service providers as to the progress or stage of completion of activities or services and the agreed-upon fee to be paid for such services. However, actual costs and timing of clinical trials are highly uncertain, subject to risks and may change depending upon a number of factors, including our clinical development plan.

We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known at that time. If the actual timing of the performance of services or the level of effort varies from the estimate, we will adjust the accrual accordingly. Non-refundable advance payments for goods and services, including fees for process development or manufacturing and distribution of pre-clinical supplies that will be used in future research and development activities, are deferred and recognized as expense in the period that the related goods are consumed or services are performed.

Milestone payments within our licensing and collaboration arrangements are recognized when achievement of the milestone is deemed probable to occur. To the extent products are commercialized and future economic benefit has been established, commercial milestones that become probable are capitalized and amortized over the estimated remaining useful life of the intellectual property. In addition, we accrue royalty expense and sublicense non-royalty payments, as applicable, for the amount we are obligated to pay, with adjustments as sales are made.

Stock-Based Compensation

We measure compensation expense for all stock-based awards based on the estimated fair value of the award on the grant date. We use the Black-Scholes option pricing model to value our stock option awards. We recognize compensation expense on a straight-line basis over the requisite service period, which is generally the vesting period of the award. We have not issued awards where vesting is subject to a market or performance condition.

The Black-Scholes option pricing model requires the use of subjective assumptions that include the expected stock price volatility and prior to the Merger, the fair value of the underlying common stock on the date of grant. See Note 9 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for information concerning certain of the specific assumptions we used in applying the Black-Scholes option pricing model to determine the estimated fair value of our stock options granted during the years ended December 31, 2024 and 2023.

Recent Accounting Pronouncements

See Note 3 to our consolidated financial statements found in this Annual Report on Form 10-K for a description of recent accounting pronouncements applicable to our financial statements.

Off-Balance Sheet Arrangements

We do not have any relationships with unconsolidated entities or financial partnerships, including entities sometimes referred to as structured finance or special purpose entities that were established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. We do not engage in off-balance sheet financing arrangements. In addition, we do not engage in trading activities involving non-exchange traded contracts. We therefore believe that we are not materially exposed to any financing, liquidity, market or credit risk that could arise if we had engaged in these relationships.

Item 7A. 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. Our interest-earning assets consist of cash and cash equivalents for the year ended December 31, 2024 and cash, cash equivalents and marketable securities for the year ended December 31, 2023. Interest income earned on these assets was $2.1 million and $3.7 million for the years ended December 31, 2024 and 2023, respectively. Our interest income is sensitive to changes in the general level of interest rates, primarily U.S. interest rates.

We are not currently exposed to significant market risk related to changes in foreign currency exchange rates; however, we have contracts with foreign vendors. As such, our operations may be subject to fluctuations in foreign currency exchange rates in the future.

Inflation generally affects us by increasing our cost of labor and clinical trial costs. We do not believe that inflation had a material effect on our business, financial condition or results of operations during the years ended December 31, 2024 and 2023.

Item 8. Financial Statements and Supplementary Data.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Carisma Therapeutics Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Carisma Therapeutics Inc. and subsidiaries (the Company) as of December 31, 2024 and 2023, the related consolidated statements of operations and comprehensive loss, convertible preferred stock and stockholders' (deficit) equity, and cash flows for the years then ended, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2024, and 2023, and the results of its operations and its cash flows for the years then ended, in conformity with U.S. generally accepted accounting principles.

Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 of the consolidated financial statements, the Company has incurred losses and negative cash flows from operations since inception that raise substantial doubt about its ability to continue as a going concern. Management's plans in regard to these matters are also described in Note 2. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ KPMG LLP

We have served as the Company's auditor since 2018.

Philadelphia, Pennsylvania
March 31, 2025

CARISMA THERAPEUTICS INC.
Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31,	
	2024	2023
Assets		
Current assets:		
Cash and cash equivalents	$ 17,909	$ 77,605
Prepaid expenses and other assets	5,916	2,866
Total current assets	23,825	80,471
Property and equipment, net	4,385	6,764
Right of use assets – operating leases	2,040	2,173
Deferred financing costs	208	146
Total assets	$ 30,458	$ 89,554
Liabilities and Stockholders' (Deficit) Equity		
Current liabilities:		
Accounts payable	$ 2,081	$ 3,933
Accrued expenses	7,448	7,662
Deferred revenue	3,729	1,413
Operating lease liabilities	832	1,391
Finance lease liabilities	905	544
Other current liabilities	1,060	965
Total current liabilities	16,055	15,908
Deferred revenue	41,250	45,000
Operating lease liabilities	724	860
Finance lease liabilities	20	328
Other long-term liabilities	318	926
Total liabilities	58,367	63,022
Commitments and contingencies (Note 8)		
Stockholders' (deficit) equity:		
Preferred stock $0.001 par value, 5,000,000 shares authorized, none issued or outstanding	—	—
Common stock $0.001 par value, 350,000,000 shares authorized, 41,750,109 and 40,609,915 shares issued and outstanding at December 31, 2024 and 2023, respectively	41	40
Additional paid-in capital	277,629	271,594
Accumulated deficit	(305,579)	(245,102)
Total stockholders' (deficit) equity	(27,909)	26,532
Total liabilities and stockholders' (deficit) equity	$ 30,458	$ 89,554

See accompanying notes to consolidated financial statements.

CARISMA THERAPEUTICS INC.
Consolidated Statements of Operations and Comprehensive Loss
(in thousands, except share and per share data)

	Years Ended December 31,	
	2024	2023
Collaboration revenues	$ 19,632	$ 14,919
Operating expenses:		
Research and development	59,673	74,125
General and administrative	22,138	29,525
Total operating expenses	81,811	103,650
Operating loss	(62,179)	(88,731)
Change in fair value of derivative liability	—	(84)
Interest income, net	1,702	1,936
Net loss	$ (60,477)	$ (86,879)
Share information:		
Net loss per share of common stock, basic and diluted	$ (1.46)	$ (2.59)
Weighted-average shares of common stock outstanding, basic and diluted	41,456,210	33,524,197
Comprehensive loss		
Net loss	$ (60,477)	$ (86,879)
Unrealized gain on marketable securities	—	440
Less: reclassification to net loss of previous unrealized gain on marketable securities	—	(399)
Comprehensive loss	$ (60,477)	$ (86,838)

See accompanying notes to consolidated financial statements.

CARISMA THERAPEUTICS INC.
Consolidated Statements of Convertible Preferred Stock and Stockholders' (Deficit) Equity
(in thousands, except share data)

	Convertible preferred stock		Stockholders' (Deficit) Equity						
			Common stock		Additional paid-in capital	Accumulated other comprehensive loss	Accumulated deficit	Noncontrolling interests	Total
	Shares	Amount	Shares	Amount					
Balance, December 31, 2022	8,700,885	$ 107,808	2,217,737	$ 2	$ 1,197	$ (41)	$ (158,223)	$ 14,395	$ (142,670)
Exercise of stock options	—	—	128,716	—	187	—	—	—	187
Stock-based compensation	—	—	—	—	2,316	—	—	—	2,316
Unrealized gain on marketable securities	—	—	—	—	—	440	—	—	440
Reclassification to net loss of previous unrealized gain on marketable securities	—	—	—	—	—	(399)	—	—	(399)
Issuance of common stock for cash in pre-closing financing	—	—	3,730,608	4	30,636	—	—	—	30,640
Issuance of common stock upon settlement of convertible promissory note, accrued interest, and related derivative liability	—	—	5,059,338	5	42,442	—	—	—	42,447
Issuance of common stock to Sesen Bio shareholders in reverse capitalization	—	—	10,374,272	10	72,034	—	—		72,044
Conversion of convertible preferred stock and non-controlling interests to common stock	(8,700,885)	(107,808)	18,872,711	19	122,185	—	—	(14,395)	107,809
Sale of common stock under Open Market Sales Agreement, net of issuance costs	—	—	226,533	—	597	—	—	—	597
Net loss	—	—	—	—	—	—	(86,879)	—	(86,879)
Balance, December 31, 2023	—	—	40,609,915	40	271,594	—	(245,102)	—	26,532
Exercise of stock options	—	—	3,810	—	4	—	—	—	4
Stock-based compensation	—	—	—	—	3,649	—	—	—	3,649
Sale of common stock under Open Market Sales Agreement, net of issuance costs	—	—	1,136,384	1	2,382	—	—	—	2,383
Net loss	—	—	—	—	—	—	(60,477)	—	(60,477)
Balance, December 31, 2024	—	$ —	41,750,109	$ 41	$ 277,629	$ —	$ (305,579)	$ —	$ (27,909)

See accompanying notes to consolidated financial statements.

CARISMA THERAPEUTICS INC.
Consolidated Statements of Cash Flows (in thousands)

	Years Ended December 31,	
	2024	**2023**
Cash flows from operating activities:		
Net loss	$ (60,477)	$ (86,879)
Adjustment to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization expense	3,354	2,837
Loss on disposal of property and equipment	—	159
Stock-based compensation expense	3,649	2,316
Reduction in the operating right of use assets	4,963	5,428
Amortization of debt discount	—	1,283
Change in fair value of derivative liability	—	84
Accretion on marketable securities	—	(709)
Write-off of property and equipment	362	—
Realized gain on marketable securities	—	(399)
Non-cash interest expense	217	139
Loss on sale of equipment	49	—
Gain on sale of sale-leaseback	(82)	—
Changes in operating assets and liabilities:		
Prepaid expenses and other assets	(3,120)	1,046
Accounts payable	(1,852)	2,191
Accrued expenses	(213)	(2,899)
Deferred revenue	(1,434)	(1,046)
Operating lease liabilities	(5,525)	(4,941)
Other long term liabilities	192	213
Net cash used in operating activities	(59,917)	(81,177)
Cash flows from investing activities:		
Purchase of marketable securities	—	(34,460)
Proceeds from the sale of marketable securities	—	108,000
Purchases of property and equipment	(123)	(1,132)
Net cash (used in) provided by investing activities	(123)	72,408
Cash flows from financing activities:		
Cash, cash equivalents and restricted cash acquired in connection with the reverse recapitalization	—	37,903
Payment of reverse recapitalization finance costs	—	(5,814)
Proceeds from the issuance of common stock in pre-closing financing	—	30,640
Payment of principal related to finance lease liabilities	(1,429)	(1,301)
Proceeds from failed sale-leaseback arrangement	686	1,183
Payment of finance liability from failed sale-leaseback arrangements	(1,309)	(1,069)
Payment of deferred financing costs	—	(146)
Proceeds from the exercise of stock options	4	187
Sale of common stock under Open Market Sales Agreement, net of issuance costs	2,392	597
Net cash provided by financing activities	344	62,180
Net (decrease) increase in cash and cash equivalents	(59,696)	53,411
Cash and cash equivalents at beginning of the year	77,605	24,194
Cash and cash equivalents at end of the year	$ 17,909	$ 77,605

See accompanying notes to consolidated financial statements.

CARISMA THERAPEUTICS INC.
Consolidated Statements of Cash Flows (in thousands)

Supplemental disclosures of cash flow information:		
Cash paid for interest	$ 192	$ 352
Supplemental disclosure of non-cash financing and investing activities:		
Conversion of convertible preferred stock and non-controlling interests upon Merger	$ —	$ 122,204
Conversion of convertible promissory note, accrued interest and derivative liability upon Merger	$ —	$ 42,447
Unrealized gain on marketable securities	$ —	$ 41
Reclassification of deferred financing costs to additional paid-in-capital	$ 9	$ —
Right-of-use assets obtained in exchange for new financing lease liabilities	$ 1,660	$ —
Right-of-use assets obtained in exchange for new operating lease liabilities	$ 6,411	$ 2,779
Modification of operating lease right-of-use asset and operating lease liabilities	$ (1,581)	$ —
Disposal of property and equipment in exchange for reduction in financing lease liability	$ 396	$ —

See accompanying notes to consolidated financial statements.

CARISMA THERAPEUTICS INC.
Notes to Consolidated Financial Statements

(1) Background

Overview

Carisma Therapeutics Inc., a Delaware corporation (collectively with its subsidiaries, the Company), biotechnology company focused on applying its industry leading expertise in macrophage engineering to develop transformative therapies to treat serious diseases including liver fibrosis and cancer.

In March and December 2024, the Company and its board of directors approved revised operating plans to reduce monthly operating expenses, conserve cash, and refocus its efforts on strategic priorities. As part of these plans, in March 2024 the Company elected to cease further development of its first lead product candidate, CT-0508. In December 2024 as part of the plan, the Company elected to cease further development of its then lead product candidate, CT-0525, following an assessment of the competitive landscape in anti-HER2 treatments and the impact of recently approved therapies on HER2 antigen loss/downregulation, and the effects on the future development strategy of any anti-HER2 product.

As part of its cost-reduction initiatives in 2024, the Company implemented workforce reductions during 2024, resulting in the termination of 62 full-time employees (representing approximately 58% of the Company's total workforce), across research and development and general and administrative functions. The workforce reduction resulted in $4.1 million of severance related costs, of which $2.0 million and $2.1 million are included within general and administrative and research and development expense, respectively, in the accompanying consolidated statement of operations and comprehensive loss. As of December 31, 2024, $2.7 million in severance costs were accrued in the accompanying consolidated balance sheets. The Company may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated with, the 2024 reduction in workforce.

On October 10, 2024, the Company received written notice from the Listing Qualifications Department of The Nasdaq Stock Market LLC (Nasdaq) notifying the Company that our common stock was not in compliance with Nasdaq Listing Rule 5450(b)(2)(A), or the MVLS Requirement, which requires the Company to maintain a minimum market value of listed securities of $50,000,000. The Company has 180 calendar days, or until April 8, 2025, to regain compliance with the MVLS Requirement.

On January 6, 2025, the Company received a separate written notice from Nasdaq notifying the Company that, based upon the closing bid price of its common stock for the last 38 consecutive business days, the Company was not in compliance with Nasdaq Listing Rule 5450(a)(1) (the Bid Price Rule), which requires the Company to maintain a minimum bid price of $1.00 per share. The Company has 180 calendar days, or until July 7, 2025, to regain compliance with the Bid Price Rule.

(2) Development-Stage Risks and Liquidity

The Company has incurred losses and negative cash flows from operations since inception and has an accumulated deficit of $305.6 million as of December 31, 2024. The Company anticipates incurring additional losses until such time, if ever, that it can generate significant sales from its product candidates currently in development. As of December 31, 2024, the Company had cash and cash equivalents of $17.9 million. Based on current projections, the Company believes that it does not have sufficient cash and cash equivalents to support its operations for more than one year following the date that these financial statements are issued. As a result of these conditions, substantial doubt exists about the Company’s ability to continue as a going concern. In addition, changing circumstances could cause the Company to consume capital significantly faster than currently anticipated, and the Company may need to spend more than currently expected because of circumstances beyond its control. The Company's cash forecast contains estimates and assumptions, and management cannot predict the timing of all cash receipts and expenditures with certainty. The accompanying consolidated financial statements have been prepared on a going-concern basis, which contemplates the realization of assets and satisfaction of liabilities in the normal course of business. The consolidated financial statements do not include any adjustments related to

the recoverability and classification of recorded asset amounts or the amounts and classification of liability that might result from the outcome of this uncertainty.

Management is currently evaluating different strategies to maximize value and prepare to wind down the Company's business. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of the Company's assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of the Company. There is no assurance regarding when or if this strategic review process will result in any type of transaction.

The Company is subject to those risks associated with any specialty biotechnology company that has substantial expenditures for research and development. There can be no assurance that the Company's research and development projects will be successful, that products developed will obtain necessary regulatory approval, or that any approved product will be commercially viable. In addition, the Company operates in an environment of rapid technological change and is largely dependent on the services of its employees and consultants.

(3) Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles (GAAP). Any references in these notes to applicable guidance is meant to refer to GAAP as found in Accounting Standards Codification (ASC) and Accounting Standards Update (ASU) promulgated by the Financial Accounting Standards Board (FASB).

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated 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 at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from such estimates. Estimates and assumptions are periodically reviewed, and the effects of revisions are reflected in the consolidated financial statements in the period they are determined to be necessary.

Significant areas that require management's estimates include estimated research and development revenue, stock-based compensation assumptions, the estimated useful lives of property and equipment, and accrued research and development expenses.

Fair Value of Financial Instruments

Management believes that the carrying amounts of the Company's financial instruments, including cash equivalents and accounts payable, approximate fair value due to the short-term nature of those instruments.

Fair Value Measurements

The Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible. The Company determines fair value based on assumptions that market participants would use in pricing an asset or liability in the principal or most advantageous market. When considering market participant assumptions in fair value measurements, the following fair value hierarchy distinguishes between observable and unobservable inputs, which are categorized in one of the following levels:

- Level 1 Inputs: Unadjusted quoted prices in active markets for identical assets or liabilities accessible to the reporting entity at the measurement date.

- Level 2 Inputs: Other than quoted prices included in Level 1 inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the asset or liability.

- Level 3 Inputs: Unobservable inputs for the asset or liability used to measure fair value to the extent that observable inputs are not available, thereby allowing for situations in which there is little, if any, market activity for the asset or liability at the measurement date.

The following fair value hierarchy table presents information about the Company's assets measured at fair value on a recurring basis:

	Fair value measurement at reporting date using		
(in thousands)	(Level 1)	(Level 2)	(Level 3)
December 31, 2024			
Assets:			
Cash equivalents – money markets accounts	$ 14,887	$ —	$ —
December 31, 2023			
Assets:			
Cash equivalents – money markets accounts	$ 62,999	$ —	$ —

During the years ended December 31, 2024 and 2023, there were no transfers between Level 1, Level 2 and Level 3.

Revenue Recognition

The Company recognizes revenue in accordance with ASC Topic 606, *Revenue from Contracts with Customers* (ASC 606). This standard applies to all contracts with customers, except for contracts that are within the scope of other standards. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services.

The Company enters into collaboration and licensing agreements with strategic partners, which are within the scope of ASC 606, under which it may exclusively license rights to research, develop, manufacture, and commercialize its product candidates to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: (1) non-refundable, upfront license fees (2) reimbursement of certain costs; (3) customer option fees for additional goods or services; (4) development milestone payments, (5) regulatory and commercial milestone payments; and (6) royalties on net sales of licensed products.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligations under each of its agreements, the Company performs the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. As part of the accounting for these arrangements, the Company must use its judgment to determine: (a) the number of performance obligations based on the determination under step (i) above; (b) the transaction price under step (iii) above; (c) the stand-alone selling price for each performance obligation identified in the contract for the allocation of transaction price in step (iv) above; and (d) the contract term and pattern of satisfaction of the performance obligations under step (v) above. The Company uses judgment to determine whether milestones or other variable consideration, except for royalties, should be included in the transaction price as described further below. The transaction price is allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied.

Upfront license fees

If the license to the Company's intellectual property is determined to be distinct from the other promises or performance obligations identified in the arrangement, the Company recognizes revenue from non-refundable, upfront fees allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. In

assessing whether a promise or performance obligation is distinct from the other promises, the Company considers factors such as the research, manufacturing, and commercialization capabilities of the customer; the retention of any key rights by the Company; and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the customer can benefit from a promise for its intended purpose without the receipt of the remaining promises, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise and whether it is separately identifiable from the remaining promise. For licenses that are combined with other promises, the Company exercises judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Customer options

The Company evaluates the customer options for material rights or options to acquire additional goods or services for free or at a discount. If the customer options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. The Company allocates the transaction price to material rights based on the relative standalone selling price, which is determined based on the identified discount and the probability that the customer will exercise the option. Amounts allocated to a material right are not recognized as revenue until, at the earliest, the option is exercised. If an option is not exercised and the research and development target is terminated, the Company will accelerate and recognize all remaining revenue related to the material right performance obligation.

Research and development services

The promises under the Company's collaboration agreements may include research and development services to be performed by the Company for or on behalf of the customer. Payments or reimbursements resulting from the Company's research and development efforts are recognized as the services are performed and presented on a gross basis because the Company is the principal for such efforts. Reimbursements from and payments to the customer that are the result of a collaborative relationship with the customer, instead of a customer relationship, such as co-development activities, are recorded as a reduction to research and development expense.

Milestone payments

At the inception of each arrangement that includes development milestone payments, the Company evaluates whether the milestones are considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The Company evaluates factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant revenue reversal would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Concentration of credit risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash and cash equivalents. The Company maintains deposits in federally insured financial institutions in excess of federally insured limits. The Company has not experienced any losses in such accounts and believes it is not exposed to significant risk on its cash and cash equivalents.

Segment information

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Operating segments are defined as components of an enterprise about which separate discrete information is available for evaluation by the chief operating decision maker (CODM), or decision-making group, in deciding how to allocate resources in assessing performance. The Company has one operating segment. The Company's CODM is the chief executive officer. The Company's CODM manages the Company's operations on a consolidated basis for the purpose of allocating resources.

The accounting policies of its segment are the same as those described in the summary of significant accounting policies. The CODM assesses performance for its segment based on net loss, which is reported on the consolidated statements of operations and comprehensive loss. The measure of segment assets is reported on the balance sheet as total assets. The CODM uses cash forecast models in deciding how to invest into the segment. The CODM analyzes the Company's net loss and monitors budget versus actual results to assess the performance of the Company.

The table below summarizes the significant expense categories regularly reviewed by the CODM for the years ended December 31, 2024 and 2023:

	Years Ended December 31,	
	2024	2023
Collaboration revenues	$ 19,632	$ 14,919
Less:		
Research and development, excluding facilities, personnel, depreciation and amortization expenses	33,147	45,905
General and administrative, excluding facilities and personnel expenses, depreciation and amortization expenses	14,829	19,118
Facilities expense	5,917	7,671
Personnel expense	24,564	27,324
Depreciation, amortization and interest on finance and sale-leaseback lease liabilities	3,894	3,984
Other segment items(a)	(2,242)	(2,204)
Net loss	$ (60,477)	$ (86,879)

(a) Other segment items include changes in warrant liability and interest income.

Cash and Cash Equivalents

The Company considers all highly-liquid investments that have maturities of three months or less when acquired to be cash equivalents. As of December 31, 2024 and 2023, cash equivalents consisted of investments in a money market account.

Property and Equipment

Property and equipment are carried at cost less accumulated depreciation and amortization. Depreciation and amortization are calculated using the straight-line method over the estimated useful lives of the assets ranging from two to five years. Leasehold improvements are amortized over the shorter of the life of the lease or the estimated useful life of the assets. Lab equipment that are classified as finance leases are amortized over the lease term.

Long-lived Assets

Long-lived assets, such as property and equipment, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. When events indicate a triggering event occurred, the recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to estimated undiscounted future cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds its estimated undiscounted future cash flows, then an impairment charge is recognized by the amount by which the carrying amount of the asset exceeds the fair value of the asset. Considerable management judgment is necessary to estimate discounted future cash flows. Accordingly, actual results could vary significantly from such estimates.

The Company did not recognize any impairment of long-lived assets during the years ended December 31, 2024 or 2023.

Deferred Financing Costs

The Company capitalizes costs that are directly associated with in-process equity financings until such financings are consummated, at which time such costs are recorded against the gross proceeds from the applicable financing. If a financing is abandoned, deferred financing costs are expensed immediately.

Leases

The Company determines whether an arrangement is or contains a lease, its classification, and its term at the lease commencement date. Leases with a term greater than one year will be recognized on the balance sheet as right-of-use (ROU) assets, current lease liabilities, and if applicable, long-term lease liabilities. The Company includes renewal options to extend the lease term where it is reasonably certain that it will exercise these options. Lease liabilities and the corresponding ROU assets are recorded based on the present values of lease payments over the lease term. The interest rate implicit in lease contracts is typically not readily determinable. As such, the Company utilizes the appropriate incremental borrowing rates, which are the rates that would be incurred to borrow on a collateralized basis, over similar terms, amounts equal to the lease payments in a similar economic environment. Payments for non-lease components or that are variable in nature that do not depend on a rate or index are not included in the lease liability and are typically expensed as incurred. If significant events, changes in circumstances, or other events indicate that the lease term or other inputs have changed, the Company would reassess lease classification, remeasure the lease liability using revised inputs as of the reassessment date, and adjust the ROU assets. Lease expense is recognized on a straight-line basis over the expected lease term for operating classified leases.

Research and Development Costs

Research and development costs are charged to expense as incurred. Up-front and milestone payments made to third parties who perform research and development services on the Company's behalf are expensed as services are rendered.

Stock-Based Compensation

The Company measures stock-based awards, including stock options, at their grant-date fair value and records compensation expense over the requisite service period, which is the vesting period of the awards. The Company accounts for forfeitures as they occur.

Estimating the fair value of stock options requires the use of subjective assumptions, including the fair value of the Company's common stock prior to the Merger (as defined in Note 4), and, for stock options, the expected term of the option and expected stock price volatility. The Company uses the Black-Scholes option-pricing model to value its stock option awards. The assumptions used in calculating the fair value of stock options represent management's best estimates and involve inherent uncertainties and the application of management's judgment. As a result, if factors change and management uses different assumptions, stock-based compensation expense could be materially different for future awards.

Prior to the Merger (as defined in Note 4), the fair value of the Company's common stock was estimated by the Company's board of directors, with input by management considering the Company's most recently available third-party valuation of the Company's common stock. The expected term of stock options for employees is estimated using the simplified method, as the Company has limited historical information to develop reasonable expectations about future exercise patterns and post-vesting employment termination behavior for its stock option grants. The simplified method is the midpoint between the vesting date and the contractual term of the option. The contractual term is used as the expected term for stock options granted to nonemployees. For stock price volatility, the Company uses comparable public companies as a basis for the expected volatility to calculate the fair value of option grants. The risk-free rate is based on the U.S. Treasury yield curve commensurate with the expected term of the option. The expected dividend yield is zero given the Company does not expect to pay dividends for the foreseeable future.

Income taxes

Income taxes are accounted for under the asset and liability method. The Company recognizes deferred tax assets and liabilities for temporary differences between the financial reporting basis and the tax basis of the Company's assets and liabilities, and the expected benefits of net operating loss and income tax credit carryforwards. The impact of changes in

tax rates and laws on deferred taxes, if any, applied during the period in which temporary differences are expected to be settled, is reflected in the Company's consolidated financial statements in the period of enactment. The measurement of deferred tax assets is reduced, if necessary, if, based on weight of the evidence, it is more likely than not that some, or all, of the deferred tax assets will not be realized. As of December 31, 2024 and 2023, the Company has concluded that a full valuation allowance is necessary for all of its net deferred tax assets. The Company had no amounts recorded for uncertain tax positions, interest, or penalties in the accompanying consolidated financial statements. Although there are no unrecognized income tax benefits, when applicable, the Company's policy is to report interest and penalties related to unrecognized income tax benefits as a component of income tax expense.

Net loss per share

Basic net loss per share of common stock is computed by dividing net loss by the weighted-average number of shares of common stock outstanding during each period. Diluted net loss per share of common stock includes the effect, if any, from the potential exercise or conversion of securities, such as convertible preferred stock and stock options, which would result in the issuance of incremental shares of common stock. For diluted net loss per share, the weighted-average number of shares of common stock is the same for basic net loss per share due to the fact that when a net loss exists, potentially dilutive securities are not included in the calculation as their impact is anti-dilutive.

The following potentially dilutive securities have been excluded from the computation of diluted weighted-average shares of common stock outstanding, as they would be anti-dilutive:

	December 31,	
	2024	2023
Stock options	7,746,991	6,023,370

Recently adopted accounting pronouncements

In November 2023, the FASB issued ASU 2023-07, *Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures* (ASU 2023-07), which requires disclosure of incremental segment information on an annual and interim basis. This ASU is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024 on a retrospective basis. The Company incorporated the improved segment disclosures in the summary of significant accounting policies, herein.

Recently issued but not yet adopted accounting pronouncements

In December 2023, the FASB issued ASU 2023-09, *Income Taxes (Topic 740): Improvements to Income Tax Disclosures* (ASU 2023-09), which expands the disclosures required for income taxes. This ASU is effective for fiscal years beginning after December 15, 2024, with early adoption permitted. The amendment should be applied on a prospective basis while retrospective application is permitted. The Company is currently evaluating the effect of this pronouncement on its disclosures.

In November 2024, the FASB issued ASU 2024-03, *Income Statement—Reporting Comprehensive Income—Expense Disaggregation Disclosures (Subtopic 220-40): Disaggregation of Income Statement Expenses*, which is intended to provide more detailed information about specified categories of expenses (purchases of inventory, employee compensation, depreciation and amortization) included in certain expense captions presented on the consolidated statement of operations. The guidance in this ASU is effective for fiscal years beginning after December 15, 2026, and interim periods within fiscal years beginning after December 15, 2027. Early adoption is permitted. The amendments may be applied either (1) prospectively to financial statements issued for periods after the effective date of this ASU or (2) retrospectively to all prior periods presented in the consolidated financial statements. The Company is currently evaluating the impact that the adoption of ASU 2024-03 will have on its consolidated financial statements and disclosures.

(4) Merger with Sesen Bio

On March 7, 2023, the Company (formerly publicly-held Sesen Bio, Inc.) consummated a merger with CTx Operations, Inc. (formerly privately-held CARISMA Therapeutics Inc.) (Legacy Carisma) pursuant to an Agreement and Plan of Merger and Reorganization, as amended (the Merger Agreement), by and among the Company, Legacy Carisma and

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Seahawk Merger Sub, Inc. (Merger Sub), a Delaware corporation and wholly-owned subsidiary of the Company. The Merger Agreement provided for the merger of Merger Sub with and into Legacy Carisma, with Legacy Carisma continuing as a wholly-owned subsidiary of the Company and the surviving corporation of the merger (the Merger). The Merger was accounted for as a reverse recapitalization under GAAP because the primary assets of Sesen Bio were cash, cash equivalents and marketable securities. For financial reporting purposes Legacy Carisma was determined to be the accounting acquirer based upon the terms of the Merger and other factors, including: (i) Legacy Carisma stockholders own approximately 74.2% of the Combined Company, (ii) Legacy Carisma holds the majority (six of seven) of board seats of the Combined Company and (iii) Legacy Carisma management holds all key positions of management. Accordingly, the Merger was treated as the equivalent of Legacy Carisma issuing stock to acquire the net assets of Sesen Bio. As a result of the Merger, the net assets of Sesen Bio were recorded at their acquisition-date fair value in the consolidated financial statements and the reported operating results prior to the Merger are those of Legacy Carisma. Immediately after the Merger, there were 40,254,666 shares of the Company's common stock outstanding.

The following table shows the net assets acquired in the Merger (in thousands):

	March 7, 2023
Cash and cash equivalents	$ 37,873
Marketable securities	44,588
Prepaid expenses and other assets	1,316
Restricted cash	30
Accounts payable and accrued expenses	(3,499)
Total net assets acquired	80,308
Less: Transaction costs	(8,264)
Total net assets acquired less transaction costs	$ 72,044

Subsequent to March 7, 2023, the Company paid $4.6 million of severance and personnel costs related to Sesen Bio.

(5) Prepaid Expenses and Other Assets

Prepaid expenses and other assets consisted of the following (in thousands):

	December 31,	
	2024	2023
Research and development	$ 1,715	$ 278
Collaboration receivable	2,864	—
Insurance	340	402
Deposits	925	891
Other	72	1,295
	$ 5,916	$ 2,866

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(6) Property and Equipment, net

Property and equipment, net consisted of the following (in thousands):

	December 31,	
	2024	2023
Computer software	$ 508	$ 903
Lab equipment[1]	11,157	11,392
Office furniture	267	267
Leasehold improvements	340	340
Construction in progress	—	13
	12,272	12,915
Less: accumulated depreciation and amortization[2]	(7,887)	(6,151)
	$ 4,385	$ 6,764

(1) Lab equipment includes failed sale lease-back assets of $3.4 million as of December 31, 2024 and 2023. Lab equipment includes finance lease ROU assets of $3.2 million and $2.9 million, respectively, as of December 31, 2024 and 2023.

(2) The accumulated amortization balance includes $1.5 million and $0.9 million, respectively, related to failed sale-leaseback assets as of December 31, 2024 and 2023. The accumulated amortization balance includes $2.3 million and $1.7 million, respectively, related to finance lease ROU assets as of December 31, 2024 and 2023.

Depreciation and amortization expense was $3.4 million and $2.8 million for the years ended December 31, 2024 and 2023, respectively.

(7) Accrued Expenses

Accrued expenses consisted of the following (in thousands):

	December 31,	
	2024	2023
Research and development	$ 1,845	$ 3,131
Professional fees	537	1,366
Compensation and related expenses	4,879	3,100
Other	187	65
	$ 7,448	$ 7,662

(8) Commitments and Contingencies

Leases

The Company has operating leases for its laboratory and office space in Philadelphia, Pennsylvania. The Company's operating leases have term end dates ranging from 2025 to 2029. The Company also has obligations under an arrangement for the use of certain laboratory equipment that are classified as finance leases that commenced in 2022 and have end dates ranging from 2025 to 2026. Effective February 2024, the Company renewed an existing operating lease with an end date through 2026. In April 2024, in connection with the revised operating plan, the Company notified the lessor that it would terminate the lease effective August 2024. In July 2024, the Company entered into an amendment extending the

termination date of the lease to June 2025 with an option to extend to December 2025. The Company did not incur any penalties or fees in connection with the termination.

In September 2024, the Company modified existing finance leases and failed sale-leaseback arrangements by assigning the rights and obligations of certain underlying assets to an unrelated third party. The modifications resulted in a reduction of its finance lease ROU assets and related lease liability of $0.4 million. In addition, the Company recorded a reduction of its failed sale-leaseback liability and gain on the sale of the corresponding assets of $0.1 million.

The Company's operating and finance lease ROU assets and the related lease liabilities are initially measured at the present value of future lease payments over the lease term. The Company is responsible for payment of certain real estate taxes, insurance and other expenses on certain of its leases. These amounts are generally considered to be variable and are not included in the measurement of the ROU assets and lease liability. The Company accounts for non-lease components, such as maintenance, separately from lease components.

The Company carries laboratory equipment from failed sale-leasebacks, as property and equipment, net on the accompanying consolidated balance sheets. The ongoing lease payments are recorded as reductions to the finance liability and interest expense. As of December 31, 2024, the Company had a $1.4 million financing liability recorded in other current liabilities and other long-term liabilities on the consolidated balance sheets.

The elements of the lease costs were as follows (in thousands):

	Years Ended December 31,	
	2024	2023
Operating lease cost	$ 5,245	$ 5,774
Finance lease cost:		
Amortization of lease assets	1,584	1,187
Interest on lease liabilities	217	139
Total finance lease cost	1,801	1,326
Variable lease cost	1,071	1,733
Short term lease cost	671	—
Total lease cost	$ 8,788	$ 8,833

Lease term and discount rate information related to leases was as follows:

	December 31,	
	2024	2023
Weighted-average remaining lease term (in years)		
Operating leases	2.7	2.6
Finance leases	0.8	1.5
Weighted-average discount rate		
Operating leases	9.9 %	9.8 %
Finance leases	9.0 %	9.0 %

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Supplemental cash flow information was as follows (in thousands):

	Years Ended December 31,	
	2024	2023
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash used in operating leases	$ 5,807	$ 5,764
Operating cash used in finance leases	$ 217	$ 139
Financing cash used in finance leases	$ 1,429	$ 1,301

Future maturities of lease liabilities were as follows as of December 31, 2024 (in thousands):

	Operating Leases	Finance Leases
Fiscal year ending:		
2025	$ 927	$ 942
2026	225	21
2027	233	—
2028	240	—
2029	184	—
Thereafter	—	—
Total future minimum payments	1,809	963
Less imputed interest	(253)	(38)
Present value of lease liabilities	$ 1,556	$ 925

Licensing and Sponsored Research Agreements

Under a license agreement with The Trustees of the University of Pennsylvania (Penn), entered into in November 2017 (Penn License Agreement), the Company is required to make annual payments of $25,000. Penn is eligible to receive up to $10.9 million per product in development upon the achievement of certain clinical, regulatory and commercial milestone events. There are additional milestone payments required to be paid of up to $30.0 million per product in commercial milestones and up to an additional $1.7 million in development and regulatory milestone payments for the first CAR-M product directed to mesothelin. Additionally, the Company is obligated to pay Penn single-digit royalties based on its net sales.

In March 2023, the Company entered into a manufacturing and supply agreement with Novartis Pharmaceuticals Corporation (Novartis) for the manufacturing of the Company's CT-0508 product candidate (Novartis Agreement). The Novartis Agreement had a five year term. On June 26, 2024, in furtherance of its revised operating plan approved in late March 2024, the Company terminated the Novartis Agreement. Upon termination, the Company incurred a termination fee equal to $4.0 million, which was paid in the third quarter of 2024. A prepaid asset was recorded as the Company separately agreed with Novartis that if Novartis and the Company re-negotiate the agreement for a substitute product on or before December 31, 2024, then the $4.0 million termination fee would be credited in full or in part against any amounts due from the Company to Novartis under such agreement relating to the substitute product. The Company did not re-negotiate the agreement and expensed the $4.0 million prepaid asset in the fourth quarter of 2024 to research and development in the consolidated statements of operations and comprehensive loss.

Contingencies

Liabilities for loss contingencies, arising from claims, assessments, litigation, fines, penalties, and other sources are recorded when it is probable that a liability has been incurred and the amount of the assessment and/or remediation can be reasonably estimated. As of December 31, 2024, the Company was in negotiations with a vendor to determine the total costs owed for research and development services provided. While the negotiations are ongoing, the Company believes a

liability is probable. The Company has estimated the amount to be owed to be $1.2 million which is included within accrued expenses on the accompanying consolidated balance sheets. The final amount owed may differ from the estimate as negotiations progress. The Company will continue to evaluate the matter and will adjust the liability as necessary based on any new information or agreements reached with the vendor.

(9) Stockholders' (Deficit) Equity

On March 7, 2023, in connection with the closing of the Merger, the following is reflected on the consolidated statements of convertible preferred stock and stockholders' (deficit) equity for the year ended December 31, 2023: (i) the sale of 3,730,608 shares of common stock in a pre-closing funding at $8.21 per share for total proceeds of $30.6 million, (ii) the issuance of 5,059,338 shares of common stock upon the settlement of the Company's $35.0 million convertible promissory note, accrued interest and related derivative liability, (iii) the conversion of convertible preferred stock and exchangeable shares previously presented as noncontrolling interests into 18,872,711 shares of common stock, (iv) the issuance of 10,374,272 shares of common stock to Sesen Bio stockholders as consideration for the Merger.

On April 17, 2023, the Company filed a universal shelf registration statement on Form S-3, which was declared effective on May 2, 2023 (Registration Statement). Under the Registration Statement, the Company may offer and sell up to $300.0 million of a variety of securities, including debt securities, common stock, preferred stock, depositary shares, subscription rights, warrants and units from time to time in one or more offerings at prices and on terms to be determined at the time of the offering. On May 12, 2023, the Company entered into an Amended and Restated Open Market Sale Agreement℠ (Sale Agreement) with Jefferies LLC, as sales agent, pursuant to which the Company may offer and sell shares of common stock with an aggregate offering price of up to $100.0 million under an "at-the-market" offering program. During the years ended December 31, 2024 and 2023, the Company sold 1,136,384 and 226,533 shares of common stock, respectively, for gross proceeds of $2.4 million and $0.6 million, respectively.

On June 6, 2023, the Company's stockholders approved an amendment to the Company's Restated Certificate of Incorporation to increase the number of authorized shares of the Company's common stock, $0.001 par value, from 100,000,000 shares to 350,000,000 shares and authorized 5,000,000 shares of preferred stock, $0.001 par value.

(10) Stock-based Compensation

2017 Stock Incentive Plan

The Company adopted the CARISMA Therapeutics Inc. 2017 Stock Incentive Plan, as amended (the Legacy Carisma Plan), that provided for the grant of incentive stock options to employees, directors, and consultants. The maximum term of options granted under the Legacy Carisma Plan was ten years, and stock options typically vested over a four-year period. The Company's stock options vest based on the terms in the awards agreements and generally vest over four years. Upon completion of the Merger, the Company assumed the Legacy Carisma Plan and the outstanding and unexercised options issued thereunder, and ceased granting awards under the Legacy Carisma Plan.

2014 Stock Incentive Plan

The Amended and Restated 2014 Stock Incentive Plan, as amended, provides for the grant of incentive and non-qualified stock options, restricted stock awards and restricted stock units, stock appreciation rights and other stock-based awards to the Company's employees, officers, directors, consultants, and advisors, with amounts and terms of grants determined by the Company's board of directors at the time of grant. Stock options outstanding under the 2014 Amended and Restated Stock Incentive Plan (the 2014 Plan) generally vest over a four-year period and are exercisable for a period of ten years from the date of grant. As of December 31, 2024, approximately 4.8 million shares of common stock remained available for issuance.

2014 Employee Stock Purchase Plan

The Carisma Therapeutics Inc. 2014 Employee Stock Purchase Plan (the Carisma 2014 ESPP) provides employees with the opportunity to purchase shares of common stock at a 15% discount to the market price through payroll deductions or lump sum cash investments. The purpose of the Carisma 2014 ESPP is to enhance employee interest in the success and progress

of the Company by encouraging employee ownership of common stock. The Carisma 2014 ESPP had 0.2 million shares of common stock available for issuance as of December 31, 2024.

The following table summarizes stock option activity:

	Options	Weighted average exercise price	Weighted average remaining contractual term (years)	Aggregate Intrinsic Value (in thousands)
Outstanding as of December 31, 2023	6,023,370	$ 3.94		
Exercised	(3,810)	0.99		$ 4
Granted	3,805,465	1.76		
Forfeited	(2,078,034)	4.17		
Outstanding as of December 31, 2024	7,746,991	$ 2.81	7.5	$ 59
Exercisable as of December 31, 2024	4,414,750	$ 2.44	6.4	$ 59

The weighted-average grant-date per share fair values of options granted during the years ended December 31, 2024 and 2023 were $1.36 and $4.29, respectively. The fair values in the years ended December 31, 2024 and 2023 were estimated using the Black-Scholes option-pricing model based on the following assumptions:

	Years Ended December 31,	
	2024	2023
Risk-free interest rate	3.77% - 4.59%	2.92% - 4.76%
Expected term	6 years	6 years
Expected volatility	86.55% - 112.12%	57.77% - 103.00%
Expected dividend yield	—	—

Stock-Based Compensation Expense

The Company recorded stock-based compensation expense in the following expense categories in the accompanying consolidated statements of operations:

	Years Ended December 31,	
	2024	2023
Research and development	$ 1,116	$ 1,242
General and administrative	2,533	1,074
	$ 3,649	$ 2,316

In connection with the reductions in force, 1,898,297 options were forfeited during the year ended December 31, 2024. The Company recognized stock-based compensation expense of $0.2 million related to the modification of Sesen Bio options assumed in connection with the Merger during the year ended December 31, 2023. Compensation cost for awards not vested as of December 31, 2024 was $7.2 million and will be expensed over a weighted-average period of 2.5 years.

(11) Income Taxes

A reconciliation of income tax benefit at the statutory federal income tax rate and income taxes as reflected in the consolidated financial statements is as follows:

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	Years Ended December 31,	
	2024	2023
Federal tax benefit at statutory rate	(21.0) %	(21.0) %
State and local tax, net of federal benefit	(8.0)	(8.5)
State and local tax rate change	3.1	1.6
Permanent differences	0.1	0.4
Research and development	(5.8)	(0.9)
Change in valuation allowance	33.0	28.4
Other	(1.4)	—
Total provision	— %	— %

Deferred tax assets and liabilities are determined based on the differences between the financial statement carrying amounts and tax bases of assets and liabilities using enacted tax rates in effect for years in which differences are expected to reverse.

Significant components of the Company's deferred tax assets for federal income taxes consisted of the following (in thousands):

	December 31,	
	2024	2023
Deferred tax assets		
Net operating losses	$ 87,742	$ 72,689
Capitalized research and development costs, net of amortization	35,608	33,778
Research and development credits	13,269	9,746
Start-up costs	4,051	4,407
Deferred revenue	12,182	13,353
Lease liability	733	668
Accrued compensation	405	—
Amortizable assets and other	27	21
Equity compensation	1,115	87
Gross deferred tax assets	155,132	134,749
Valuation allowance	(153,855)	(133,580)
Deferred tax assets, net of valuation allowance	1,277	1,169
Deferred tax liabilities		
Right of use asset	(848)	(645)
Depreciation	(429)	(524)
Deferred tax liabilities	(1,277)	(1,169)
Net deferred tax assets and liabilities	$ —	$ —

As of December 31, 2024, the Company has net operating loss carryforwards (NOLs) for federal income tax purposes of $374.7 million, which are available to offset future federal taxable income. The pre-2018 federal NOLs of $120.0 million will begin to expire in 2031, if not utilized. The post-2017 federal NOLs of $254.7 million carry forward indefinitely. The Company also has NOLs for state and local income tax purposes of $280.3 million and $65.1 million, respectively that are available to offset future taxable income. The state NOLs will begin to expire in 2031 while the city of Philadelphia NOLs begin to expire in 2042. As of December 31, 2024, the Company also had federal and state research and development tax credit carryforwards of $12.6 million and $0.8 million that will begin to expire in 2029 and 2032, respectively, unless previously utilized.

In assessing the need for a valuation allowance, management must determine that there will be sufficient taxable income to allow for the realization of deferred tax assets. Based upon the historical and anticipated future losses, management has determined that the deferred tax assets do not meet the more-likely-than-not threshold for realizability. Accordingly, a full valuation allowance has been recorded against the Company's net deferred tax assets as of December 31, 2024. The valuation allowance increased by $20.3 million and $84.5 million during the years ended December 31, 2024 and 2023, respectively.

The NOLs and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. NOLs and tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant stockholders over a three-year period in excess of 50 percent, as defined under Sections 382 and 383 of the Internal Revenue Code, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future taxable income or tax liabilities. The amount of the annual limitation is determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has not done an analysis to determine whether or not ownership changes have occurred since inception. Certain state NOLs may also be limited, including Pennsylvania, which limits net operating loss utilization as a percentage of apportioned taxable income.

The Company will recognize interest and penalties related to uncertain tax positions as a component of income tax expense/(benefit). As of December 31, 2024, the Company had no accrued interest or penalties related to uncertain tax positions and no amounts have been recognized in the Company's financial statements. Tax years from 2021 and after remain subject to examination by all of the taxing jurisdictions. The NOLs and research credit carryforwards remain subject to review until utilized.

(12) Related-Party Transactions

The Company has a collaboration and license agreement with Moderna, a significant shareholder (Note 13).

(13) Moderna Collaboration and License Agreement

In January 2022, the Company entered into the Moderna License Agreement, which provides for a broad strategic collaboration to discover, develop and commercialize *in vivo* engineered CAR-M therapeutics in oncology. Moderna has the right to designate up to twelve research targets as development targets under this collaboration. While the collaboration was initially limited to oncology, in September 2024, the companies agreed to expand the collaboration to discover, develop and commercialize *in vivo* engineered CAR-M therapeutics in specific autoimmune diseases. As a result, Moderna nominated two autoimmune research targets. As of February 2025, in connection with Moderna's nomination of all 12 oncology research targets (Note 14), the Company will not be conducting any additional research activities under the collaboration agreement and will not be receiving any further payments from Moderna for research and development services under the collaboration agreement.

Subsequent to the nomination of a research target, Moderna may designate the research target as a development target. Upon Moderna’s designation of a development target (and payment of a related development target designation milestone) for commencement of pre-clinical development of a product candidate, the Company will grant Moderna an exclusive worldwide, sublicensable royalty bearing license to develop, manufacture and commercialize the product candidate.

Under the terms of the Moderna License Agreement, Moderna made an upfront non-refundable payment of $45.0 million to the Company. Assuming Moderna develops and commercializes 12 products, each directed to a different development target, the Company is eligible to receive up to between $247.0 million and $253.0 million per product in development target designation, development, regulatory and commercial milestone payments. Moderna also reimbursed the Company for all costs incurred by the Company in connection with its research and development activities under the Moderna License Agreement plus a reasonable margin for the respective services performed (with a minimum commitment to reimburse $10.0 million in research and development costs over the first three years from execution of the Moderna License Agreement). The Company is also eligible to receive tiered mid-to-high single digit royalties of net sales of any products that are commercialized under the agreement, which may be, subject to reductions. In addition, Moderna has agreed to cover the cost the Company incurs for certain milestone payments and royalties that the Company owes as a licensor under one of its intellectual property in-license agreements with Penn, which is sublicensed to Moderna under the Moderna License Agreement. Moderna may deduct these royalties in part from any royalties owed to the Company. The

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Moderna License Agreement terminates on a product-by-product basis upon the latest of expiration of the applicable product patents, expiration of regulatory exclusivity and the tenth anniversary of first commercial sale, unless terminated earlier by the Company or Moderna.

At commencement, the Company identified several potential performance obligations within the Moderna License Agreement, including research and development services on research targets, option rights held by Moderna, a non-exclusive royalty-free license to use the Company's intellectual property to conduct research and development activities and participation on the joint steering committee (JSC). The Company determined that there were 2 performance obligations comprised of (i) research and development services and (ii) option rights.

For the research and development services, the stand-alone selling price was determined considering the expected passthrough costs and cost of the research and development services and a reasonable margin for the respective services. The material rights from the option rights were valued based on the estimated discount at which the option is priced and the Company's estimated probability of the options' exercise as of the time of the agreement. The transaction price allocated to research and development services is recognized as collaboration revenues as the research and development services are provided to satisfy the underlying obligation related to the research and development target. The transfer of control occurs over this period and, in management's judgment, is the best measure of progress towards satisfying the performance obligation.

The transaction price of $45.0 million allocated to the options rights, which are considered material rights, will be recognized in the period that Moderna exercises or determines not to exercise its option right to license and commercialize the designated development target.

In June 2024, the Company received notice from Moderna that Moderna had designated the first development candidate, an *in vivo* CAR-macrophage targeting GPC3 that is designed to treat solid tumors, including hepatocellular carcinoma. Pursuant to the terms of the Moderna License Agreement, the designation triggered a $2.0 million milestone payment from Moderna to the Company. As a result, the Company recognized collaboration revenue of $2.0 million.

In addition, the Company reduced its $45.0 million deferred revenue liability associated with the option rights by recognizing $3.8 million in collaboration revenue, which represents a proportional reduction based on the 12 potential early-stage research targets. As of December 31, 2024, the Company recorded a collaboration receivable of $2.9 million related to the reimbursement of costs incurred in connection with the Company's research and development activities. The Company received the $2.9 million in January 2025.

The Company included the $45.0 million up-front and nonrefundable payment and $73.9 million of variable consideration for expected research and development services to be performed during the five-year contract term, inclusive of passthrough costs, in the transaction price as of the outset of the arrangement. During the years ended December 31, 2024 and 2023, the Company recognized $19.6 million and $14.9 million, respectively, of collaboration revenues. Collaboration revenues for the year ended December 31, 2024 include $3.8 million of deferred option rights revenue recognition and $2.0 million of milestones.

The Company recognized $38.7 million and $3.8 million, respectively, of research and development services and option right collaboration revenues since inception of the Moderna License Agreement through December 31, 2024. The following table includes estimated revenue expected to be recognized in the future related to performance obligations that are unsatisfied as of December 31, 2024 (in thousands):

	Transaction price unsatisfied
Performance obligations:	
Research and development	$ 35,301
Option rights	41,250
Total performance obligations	$ 76,551

Amounts due to the Company for satisfying the revenue recognition criteria or that are contractually due based upon the terms of the collaboration agreements are recorded as accounts receivable in the Company's consolidated balance sheets.

Contract liabilities consist of amounts received prior to satisfying the revenue recognition criteria, which are recorded as deferred revenue in the Company's consolidated balance sheets.

The following table summarizes the changes in deferred revenue (in thousands):

	Years Ended December 31,	
	2024	2023
Balance at the beginning of the period	$ 46,413	$ 47,459
Deferral of revenue	16,198	13,873
Recognition of unearned revenue	(17,632)	(14,919)
Balance at the end of the period	$ 44,979	$ 46,413

The current portion of deferred revenue represents advanced payments received from Moderna for costs expected to be incurred by the Company within the next twelve months. The noncurrent portion of deferred revenue represents the $41.3 million upfront, non-refundable and non-creditable payment allocated to customer option right which is not expected to be recognized within the next 12 months.

(14) Subsequent Events

The Company has evaluated subsequent events from the balance sheet date through March 31, 2025, the issuance date of these consolidated financial statements, and has identified the following matter requiring disclosure. *Moderna Collaboration and License Agreement*

In February 2025, Moderna nominated ten additional oncology research targets, four of which replaced two oncology research targets and two autoimmune research targets, which Moderna concurrently ceased developing. As of February 2025, Moderna has nominated all 12 oncology research targets under the collaboration for which the Company has the potential to receive future milestones and royalty payments. The Company will not conduct any additional research activities under the collaboration agreement and the Company will not be receiving any further research funding from Moderna under the collaboration agreement. Moderna also agreed to terminate the *in vivo* oncology field exclusivity, which would allow the Company to pursue *in vivo* CAR-M programs outside of the 12 nominated oncology targets and product polypeptides. The final research and development payment of $2.9 million was received in January 2025 which will be recognized as collaboration revenue for research and development services in the first quarter of 2025. The Company does not expect to recognize any additional unsatisfied research and development performance obligations.

2025 Cash Preservation Plan

As part of a further revised plan approved by the Company's board of directors, on March 25, 2025, to preserve the Company's existing cash resources following its reduction in workforce (the "cash preservation plan"), the Company reduced its operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down its business. The cash preservation plan prioritizes payments necessary and appropriate for those reduced operations and those that will help to evaluate our strategic alternatives. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of the Company's assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of the Company. Any future resumption of research and development activities would depend on completing a strategic transaction that would support the Company's prior operating plans or otherwise obtaining significant additional funding.

As part of the cash preservation plan, the board of directors determined to terminate all of its employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. Affected employees were informed of the reduction in workforce on March 25, 2025. The reduction in workforce was effective on March 31, 2025. The reduction in workforce includes 37 of the Company's full-time employees representing approximately 84% of our total workforce, including certain employees engaged in research and development, manufacturing and corporate activities. The Company expects to incur approximately $3.8 million in connection with the reduction in workforce, which primarily represents one-time employee termination benefits directly associated with the workforce reduction. The Company also expects to pay the majority of related reduction in workforce amounts by the end of 2025. The Company may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated

with, the reduction in workforce, including (but not limited to) impairment charges relating to the balances of property and equipment, net, prepaid research and development costs and right of use assets – operating lease.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and our principal financial officer has evaluated the effectiveness of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act, as of December 31, 2024. The term "disclosure controls and procedures," as defined in the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive officer and principal financial officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Based on the evaluation of our disclosure controls and procedures as of December 31, 2024, our principal executive officer and principal financial officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over our financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act as a process designed by, or under the supervision of, our principal executive officer and our principal financial officer, and effected by our board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of our financial statements for external purposes in accordance with generally accepted accounting principles, and includes those policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of assets;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with the authorizations of management and directors; and
- provide reasonable assurance regarding the prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on our financial statements.

Under the supervision and with the participation of our management, including our principal executive officer and our principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework provided in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting were effective as of December 31, 2024.

Changes in Internal Control over Financial Reporting

No changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) occurred during the three months ended December 31, 2024 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

(a) 2025 Cash Preservation Plan

As part of a further revised plan approved by our board of directors on March 25, 2025 to preserve our existing cash resources following our reduction in workforce, or our cash preservation plan, we have reduced our operations to those necessary to identify and explore a range of strategic alternatives to maximize value and prepare to wind down our business. Our cash preservation plan prioritizes payments necessary and appropriate for those reduced operations and those that help to evaluate our strategic alternatives. Potential strategic alternatives to be explored and evaluated may include, among other transactions, the sale, license, monetization or divestiture of one or more of our assets or technologies, a strategic collaboration or partnership with one or more parties or the merger or sale of our company. We cannot provide any commitment regarding when or if this strategic review process will result in any type of transaction. We currently have no intention of resuming research and development activities. Any future resumption of research and development activities would depend on completing a strategic transaction that would support our prior operating plans or otherwise obtaining significant additional funding.

As part of our cash preservation plan, our board of directors determined to terminate all of our employees not deemed necessary to pursue strategic alternatives and execute an orderly wind down of our operations. Affected employees were informed of the reduction in workforce on March 25, 2025. The reduction in workforce was effective on March 31, 2025. The reduction in workforce includes 37 of our full-time employees (representing approximately 84% of our total workforce), including certain employees engaged in research and development, manufacturing and corporate activities. We expect to incur approximately $3.8 million in connection with the reduction in workforce, which primarily represents one-time employee termination benefits directly associated with the workforce reduction. We also expect to pay the majority of related reduction in workforce amounts by the end of this 2025. We may also incur other charges or cash expenditures not currently contemplated due to events that may occur as a result of, or associated with, the reduction in workforce.

(b) Director and Officer Trading Arrangements

None of our directors or officers adopted or terminated a Rule 10b5-1 trading arrangement or a non-Rule 10b5-1 trading arrangement (as defined in Item 408(c) of Regulation S-K) during the fourth quarter of 2024.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

Part III

Item 10. Directors, Executive Officers and Corporate Governance.

Except to the extent provided below, the information required under this Item 10 is incorporated by reference to our definitive proxy statement for our 2025 Annual Meeting of Stockholders, which we intend to file with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2024.

We post our Code of Business Conduct and Ethics, which applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, in the “Governance Overview” sub-section of the “Governance” section on the "For Investors" page of our corporate website at *http://www.carismatx.com*. We intend to disclose on our website any amendments to, or waivers from, the Code of Business Conduct and Ethics that are required to be disclosed pursuant to the disclosure requirements of Item 5.05 of Form 8-K.

Item 11. Executive Compensation.

The information required under this Item 11 is incorporated by reference to our definitive proxy statement for our 2025 Annual Meeting of Stockholders, which proxy statement we intend to file with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2024.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required under this Item 12 is incorporated by reference to our definitive proxy statement for our 2025 Annual Meeting of Stockholders, which proxy statement we intend to file with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2024.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required under this Item 13 is incorporated by reference to our definitive proxy statement for our 2025 Annual Meeting of Stockholders, which proxy statement we intend to file with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2024.

Item 14. Principal Accountant Fees and Services.

The information required under this Item 14 is incorporated by reference to our definitive proxy statement for our 2025 Annual Meeting of Stockholders, which proxy statement will be filed with the Securities and Exchange Commission not later than 120 days after the close of the end of the fiscal year ended December 31, 2024.

Part IV

Item 15. Exhibits and Financial Statement Schedules.

1. **Financial Statements**

For a list of financial statements included herein, see Index to the Consolidated Financial Statements on page F-1 of this Annual Report on Form 10-K.

2. **Financial Statement Schedules**

All financial statement schedules have been omitted because they are not applicable, not required, or the information required is shown in the consolidated financial statements or the notes thereto.

3. **Exhibits**

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

EXHIBIT INDEX

Exhibit Number	Description
3.1*	Restated Certificate of Incorporation of Carisma Therapeutics Inc., dated March 7, 2023, as amended
3.2	Amended and Restated By-Laws of Carisma Therapeutics Inc., dated March 7, 2023 (incorporated by reference to Exhibit 3.2 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
4.1*	Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934
10.1#	Amendment and Restatement of Carisma Therapeutics Inc. Amended and Restated 2014 Stock Incentive Plan (incorporated by reference to Exhibit 99.1 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on June 9, 2023).
10.2†	Amended and Restated Open Market Sale Agreement℠, dated May 12, 2023 (incorporated by reference to Exhibit 1.1 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on May 12, 2023).
10.3†	Collaboration and License Agreement, dated January 7, 2022, by and between Carisma Therapeutics Inc. and ModernaTX, Inc. (incorporated by reference to Exhibit 10.32 to the registrant's Registration Statement on Form S-4/A (File No. 333-267891), filed on January 18, 2023).
10.4†	License Agreement, dated as of November 10, 2017, by and between Carisma Therapeutics Inc. and the Trustees of the University of Pennsylvania, as amended (incorporated by reference to Exhibit 10.33 to the registrant's Registration Statement on Form S-4 (File No. 333-267891), filed on October 14, 2022).
10.5†	License Agreement, dated as of July 24, 2020, by and between Carisma Therapeutics Inc. and New York University (incorporated by reference to Exhibit 10.34 to the registrant's Registration Statement on Form S-4 (File No. 333-267891), filed on October 14, 2022).
10.6	Registration Rights Agreement, dated March 7, 2023 (incorporated by reference to Exhibit 10.4 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.7	Contingent Value Rights Agreement, dated March 7, 2023 (incorporated by reference to Exhibit 10.5 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.8#	Form of Indemnification Agreement for Directors and Officers of Carisma Therapeutics Inc. (incorporated by reference to Exhibit 10.6 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.9#	Employment Agreement, dated March 7, 2023, by and between Carisma Therapeutics Inc. and Steven Kelly (incorporated by reference to Exhibit 10.7 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).

10.10#	Employment Agreement, dated March 7, 2023, by and between Carisma Therapeutics Inc. and Richard Morris (incorporated by reference to Exhibit 10.8 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.11#	Employment Agreement, dated March 7, 2023, by and between Carisma Therapeutics Inc. and Michael Klichinsky (incorporated by reference to Exhibit 10.9 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.12#	CARISMA Therapeutics Inc. 2017 Stock Incentive Plan (incorporated by reference to Exhibit 10.10 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.13#	Form of Nonstatutory Stock Option Agreement under the CARISMA Therapeutics Inc. 2017 Stock Incentive Plan (incorporated by reference to Exhibit 10.11 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.14#	Form of Incentive Stock Option Agreement under the CARISMA Therapeutics Inc. 2017 Stock Incentive Plan (incorporated by reference to Exhibit 10.12 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.15#	Carisma Therapeutics Inc. Amended and Restated 2014 Stock Incentive Plan (incorporated by reference to Exhibit 10.13 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.16#	2023 Form of Stock Option Agreement under the Carisma Therapeutics Inc. 2014 Amended and Restated Stock Incentive Plan (incorporated by reference to Exhibit 10.14 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.17	2024 Form of Stock Option Agreement under the Carisma Therapeutics Inc. 2014 Amended and Restated Stock Incentive Plan (incorporated by reference to Exhibit 10.17 to the registrant's Annual Report on Form 10-K (File No. 001-36296) filed on April 1, 2024).
10.18#	Form of Restricted Stock Unit Agreement under the Carisma Therapeutics Inc. 2014 Amended and Restated Stock Incentive Plan (incorporated by reference to Exhibit 10.15 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.19#	Carisma Therapeutics Inc. 2014 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.16 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on March 8, 2023).
10.20	Lease, dated April 22, 2019, by and between Wexford-SCEC 3675 Market Street, LLC and CARISMA Therapeutics Inc. (incorporated by reference to Exhibit 10.18 to the registrant's Quarterly Report on Form 10-Q (File No. 001-36296) filed on May 11, 2023).
10.21#	Master Services Agreement, dated December 24, 2024, by and between Carisma Therapeutics Inc. and Danforth Global, Inc. and Danforth Advisors, LLC (incorporated by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K (File No. 001-36296) filed on December 26, 2024).
19.1*	Insider Trading Policy
21.1*	Subsidiaries of the Registrant
23.1*	Consent of KPMG LLP, independent registered public accounting firm
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+	Certifications 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+	Certifications 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
97	Compensation Recovery Policy (incorporated by reference to Exhibit 97 to the registrant's Annual Report on Form 10-K (File No. 001-36296) filed on April 1, 2024).
101.INS*	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)

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* Filed herewith.

\+ Furnished herewith.

# Indicates a management contract or any compensatory plan, contract or arrangement.

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

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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.

Date: March 31, 2025

CARISMA THERAPEUTICS INC.

By: /s/ Steven Kelly
Name: Steven Kelly
Title: President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Steven Kelly Steven Kelly	President, Chief Executive Officer and Director (Principal Executive Officer)	March 31, 2025
/s/ Natalie McAndrew Natalie McAndrew	Vice President of Finance (Principal Financial Officer and Principal Accounting Officer)	March 31, 2025
/s/ Sanford Zweifach Sanford Zweifach	Director and Chair of the Board	March 31, 2025
/s/ Sohanya Cheng Sohanya Cheng	Director	March 31, 2025
/s/ John Hohneker, M.D. John Hohneker, M.D.	Director	March 31, 2025
/s/ Briggs Morrison, M.D. Briggs Morrison, M.D.	Director	March 31, 2025
/s/ David Scadden, M.D. David Scadden, M.D.	Director	March 31, 2025
/s/ Marella Thorell Marella Thorell	Director	March 31, 2025

Exhibit 3.1

RESTATED CERTIFICATE OF INCORPORATION
OF
SESEN BIO, INC.
(to be renamed Carisma Therapeutics Inc.)
(originally incorporated on February 25, 2008)

Sesen Bio, Inc. (the "Corporation"), a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the "General Corporation Law"), does hereby certify as follows:

A. The current name of the Corporation is Sesen Bio, Inc. The original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 25, 2008 under the name Newco LS14, Inc. The Certificate of Incorporation was mostly recently amended and restated on February 11, 2014 (as further amended, including most recently on March 7, 2023, the "Prior Certificate of Incorporation").

B. This Restated Certificate of Incorporation has been duly adopted by the Board of Directors of the Corporation pursuant to Sections 242 and 245 of the General Corporation Law of the State of Delaware to change the name of the Corporation to Carisma Therapeutics Inc. and to restate and integrate all amendments to the Prior Certificate of Incorporation and does not further amend (except as permitted under Sections 242(a)(1), 242(a)(7) and 242(b)(1) of the General Corporation Law of the State of Delaware) the provisions of the Prior Certificate of Incorporation as theretofore amended.

C. This Restated Certificate of Incorporation shall become effective as of 5:03 p.m. Eastern Standard Time on March 7, 2023 (the "Effective Time").

Accordingly, as of the Effective Time, the Prior Certificate of Incorporation of the Corporation, as theretofore amended, is hereby amended, integrated and restated in its entirety to read as follows:

First: The name of the Corporation is Carisma Therapeutics Inc.

Second: The address of the Corporation's registered office in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle, 19801. The name of its registered agent at that address is The Corporation Trust Company.

Third: The nature of the business or purposes to be conducted or promoted by the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware.

Fourth: The total number of shares of all classes of stock which the Corporation shall have authority to issue is 105,000,000 shares, consisting of (i) 100,000,000 shares of Common Stock, $0.001 par value per share ("Common Stock"), and (ii) 5,000,000 shares of Preferred Stock, $0.001 par value per share ("Preferred Stock").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK.

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights of the holders of the Preferred Stock of any series as may be designated by the Board of Directors upon any issuance of the Preferred Stock of any series.

2. Voting. The holders of the Common Stock shall have voting rights at all meetings of stockholders, each such holder being entitled to one vote for each share thereof held by such holder; provided, however, that, except as otherwise required by law, holders of Common Stock shall not be entitled to vote on any amendment to this Certificate of Incorporation (which, as used herein, shall mean the certificate of incorporation of the Corporation, as amended from time to time, including the terms of any certificate of designations of any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon pursuant to this Certificate of Incorporation. There shall be no cumulative voting.

The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

3. Dividends. Dividends may be declared and paid on the Common Stock from funds lawfully available therefor as and when determined by the Board of Directors and subject to any preferential dividend or other rights of any then outstanding Preferred Stock.

4. Liquidation. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential or other rights of any then outstanding Preferred Stock.

B. PREFERRED STOCK.

Preferred Stock may be issued from time to time in one or more series, each of such series to have such terms as stated or expressed herein and in the resolution or resolutions providing for the issue of such series adopted by the Board of Directors of the Corporation as hereinafter provided. Any shares of Preferred Stock which may be redeemed, purchased or acquired by the Corporation may be reissued except as otherwise provided by law.

Authority is hereby expressly granted to the Board of Directors from time to time to issue the Preferred Stock in one or more series, and in connection with the creation of any such series, by adopting a resolution or resolutions providing for the issuance of the shares thereof and by filing a certificate of designations relating thereto in accordance with the General Corporation Law of the State of Delaware, to determine and fix the number of shares of such series and such voting powers, full or limited, or no voting powers, and such designations, preferences and relative participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including without limitation thereof, dividend rights, conversion rights, redemption privileges and liquidation preferences, as shall be stated and expressed in such resolutions, all to the full extent now or hereafter permitted by the General Corporation Law of the State of Delaware. Without limiting the generality of the foregoing, the resolutions providing for issuance of any series of Preferred Stock may provide that such series shall be superior or rank equally or be junior to any other series of Preferred Stock to the extent permitted by law.

The number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares then outstanding) by the affirmative vote of the holders of a majority of the voting power of the capital stock of the Corporation entitled to vote thereon, voting as a single class, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of the State of Delaware.

Fifth: Except as otherwise provided herein, the Corporation reserves the right to amend, alter, change or repeal any provision contained in this Certificate of Incorporation, in the manner now or hereafter prescribed by statute and this Certificate of Incorporation, and all rights conferred upon stockholders herein are granted subject to this reservation.

Sixth: In furtherance and not in limitation of the powers conferred upon it by the General Corporation Law of the State of Delaware, and subject to the terms of any series of Preferred Stock, the Board of Directors shall have the power to adopt, amend, alter or repeal the By-laws of the Corporation by the affirmative vote of a majority of the directors present at any regular or special meeting of the Board of Directors at which a quorum is present. The stockholders may not adopt, amend, alter or repeal the By-laws of the Corporation, or adopt any provision inconsistent therewith, unless such action is approved, in addition to any other vote required by this Certificate of Incorporation, by the affirmative vote of the holders of at least seventy-five percent (75%) of the votes that all the stockholders would be entitled to cast in any annual election of directors or class of directors. Notwithstanding any other provisions of law, this Certificate of Incorporation or the By-laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors or class of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article SIXTH.

Seventh: Except to the extent that the General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty, no director of the Corporation shall be personally liable to the Corporation or its stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability. No amendment to or repeal of this provision shall apply to or have any effect on the liability or alleged liability of any director of the Corporation for or with respect to any acts or omissions of such director occurring prior to such amendment or repeal. If the General Corporation Law of the State of Delaware is amended to permit further elimination or limitation of the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law of the State of Delaware as so amended.

Eighth: The Corporation shall provide indemnification as follows:

1. Actions, Suits and Proceedings Other than by or in the Right of the Corporation. The Corporation shall indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation) by reason of the fact that he or she is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) (all such persons being referred to hereafter as an “Indemnitee”), or by reason of any action alleged to have been taken or omitted in such capacity, against all

expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974), and amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that his or her conduct was unlawful.

2. Actions or Suits by or in the Right of the Corporation. The Corporation shall indemnify any Indemnitee who was or is a party to or threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that Indemnitee is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with such action, suit or proceeding and any appeal therefrom, if Indemnitee acted in good faith and in a manner which Indemnitee reasonably believed to be in, or not opposed to, the best interests of the Corporation, except that no indemnification shall be made under this Section 2 in respect of any claim, issue or matter as to which Indemnitee shall have been adjudged to be liable to the Corporation, unless, and only to the extent, that the Court of Chancery of Delaware or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of such liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnity for such expenses (including attorneys' fees) which the Court of Chancery of Delaware or such other court shall deem proper.

3. Indemnification for Expenses of Successful Party. Notwithstanding any other provisions of this Article EIGHTH, to the extent that an Indemnitee has been successful, on the merits or otherwise, in defense of any action, suit or proceeding referred to in Sections 1 and 2 of this Article EIGHTH, or in defense of any claim, issue or matter therein, or on appeal from any such action, suit or proceeding, Indemnitee shall be indemnified against all expenses (including attorneys' fees) actually and reasonably incurred by or on behalf of Indemnitee in connection therewith. Without limiting the foregoing, if any action, suit or proceeding is disposed of, on the merits or otherwise (including a disposition without prejudice), without (i) the disposition being adverse to Indemnitee, (ii) an adjudication that Indemnitee was liable to the Corporation, (iii) a plea of guilty or nolo contendere by Indemnitee, (iv) an adjudication that Indemnitee did not act in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Corporation, and (v) with respect to any criminal proceeding, an adjudication that Indemnitee had reasonable cause to believe his or her conduct was unlawful, Indemnitee shall be considered for the purposes hereof to have been wholly successful with respect thereto.

4. Notification and Defense of Claim. As a condition precedent to an Indemnitee's right to be indemnified, such Indemnitee must notify the Corporation in writing as soon as practicable of any action, suit, proceeding or investigation involving such Indemnitee for which indemnity will or could be sought. With respect to any action, suit, proceeding or investigation of which the Corporation is so notified, the Corporation will be entitled to participate therein at its own expense and/or to assume the defense thereof at its own expense, with legal counsel reasonably acceptable to Indemnitee. After notice from the Corporation to Indemnitee of its election so to assume such defense, the Corporation shall not be liable to Indemnitee for any legal or other expenses subsequently incurred by Indemnitee in connection with such action, suit, proceeding or investigation, other than as provided below in this Section 4. Indemnitee shall have the right to employ his or her own counsel in connection with such action, suit, proceeding or investigation, but the fees and expenses of such counsel incurred after notice from the Corporation of its assumption of the defense thereof shall be at the expense of Indemnitee unless (i) the employment of counsel by Indemnitee has been authorized by the Corporation, (ii) counsel to Indemnitee shall have reasonably concluded that there may be a conflict of interest or position on any significant issue between the Corporation and Indemnitee in the conduct of the defense of such action, suit, proceeding or investigation or (iii) the Corporation shall not in fact have employed counsel to assume the defense of such action, suit, proceeding or investigation, in each of which cases the fees and expenses of counsel for Indemnitee shall be at the expense of the Corporation, except as otherwise expressly provided by this Article EIGHTH. The Corporation shall not be entitled, without the consent of Indemnitee, to assume the defense of any claim brought by or in the right of the Corporation or as to which counsel for Indemnitee shall have reasonably made the conclusion provided for in clause (ii) above. The Corporation shall not be required to indemnify Indemnitee under this Article EIGHTH for any amounts paid in settlement of any

action, suit, proceeding or investigation effected without its written consent. The Corporation shall not settle any action, suit, proceeding or investigation in any manner which would impose any penalty or limitation on Indemnitee without Indemnitee's written consent. Neither the Corporation nor Indemnitee will unreasonably withhold or delay its consent to any proposed settlement.

5. Advancement of Expenses. Subject to the provisions of Section 6 of this Article EIGHTH, in the event of any threatened or pending action, suit, proceeding or investigation of which the Corporation receives notice under this Article EIGHTH, any expenses (including attorneys' fees) incurred by or on behalf of Indemnitee in defending an action, suit, proceeding or investigation or any appeal therefrom shall be paid by the Corporation in advance of the final disposition of such matter; provided, however, that the payment of such expenses incurred by or on behalf of Indemnitee in advance of the final disposition of such matter shall be made only upon receipt of an undertaking by or on behalf of Indemnitee to repay all amounts so advanced in the event that it shall ultimately be determined by final judicial decision from which there is no further right to appeal that Indemnitee is not entitled to be indemnified by the Corporation as authorized in this Article EIGHTH; and provided further that no such advancement of expenses shall be made under this Article EIGHTH if it is determined (in the manner described in Section 6) that (i) Indemnitee did not act in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, or (ii) with respect to any criminal action or proceeding, Indemnitee had reasonable cause to believe his or her conduct was unlawful. Such undertaking shall be accepted without reference to the financial ability of Indemnitee to make such repayment.

6. Procedure for Indemnification and Advancement of Expenses. In order to obtain indemnification or advancement of expenses pursuant to Section 1, 2, 3 or 5 of this Article EIGHTH, an Indemnitee shall submit to the Corporation a written request. Any such advancement of expenses shall be made promptly, and in any event within 60 days after receipt by the Corporation of the written request of Indemnitee, unless (i) the Corporation has assumed the defense pursuant to Section 4 of this Article EIGHTH (and none of the circumstances described in Section 4 of this Article EIGHTH that would nonetheless entitle the Indemnitee to indemnification for the fees and expenses of separate counsel have occurred) or (ii) the Corporation determines within such 60-day period that Indemnitee did not meet the applicable standard of conduct set forth in Section 1, 2 or 5 of this Article EIGHTH, as the case may be. Any such indemnification, unless ordered by a court, shall be made with respect to requests under Section 1 or 2 only as authorized in the specific case upon a determination by the Corporation that the indemnification of Indemnitee is proper because Indemnitee has met the applicable standard of conduct set forth in Section 1 or 2, as the case may be. Such determination shall be made in each instance (a) by a majority vote of the directors of the Corporation consisting of persons who are not at that time parties to the action, suit or proceeding in question ("disinterested directors"), whether or not a quorum, (b) by a committee of disinterested directors designated by majority vote of disinterested directors, whether or not a quorum, (c) if there are no disinterested directors, or if the disinterested directors so direct, by independent legal counsel (who may, to the extent permitted by law, be regular legal counsel to the Corporation) in a written opinion, or (d) by the stockholders of the Corporation.

7. Remedies. The right to indemnification or advancement of expenses as granted by this Article EIGHTH shall be enforceable by Indemnitee in any court of competent jurisdiction. Neither the failure of the Corporation to have made a determination prior to the commencement of such action that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Corporation pursuant to Section 6 of this Article EIGHTH that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct. In any suit brought by Indemnitee to enforce a right to indemnification, or brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall have the burden of proving that Indemnitee is not entitled to be indemnified, or to such advancement of expenses, under this Article EIGHTH. Indemnitee's expenses (including attorneys' fees) reasonably incurred in connection with successfully establishing Indemnitee's right to indemnification, in whole or in part, in any such proceeding shall also be indemnified by the Corporation. Notwithstanding the foregoing, in any suit brought by Indemnitee to enforce a right to indemnification hereunder it shall be a defense that the Indemnitee has not met any applicable standard for indemnification set forth in the General Corporation Law of the State of Delaware.

8. Limitations. Notwithstanding anything to the contrary in this Article EIGHTH, except as set forth in Section 7 of this Article EIGHTH, the Corporation shall not indemnify an Indemnitee pursuant to this Article EIGHTH in connection with a proceeding (or part thereof) initiated by such Indemnitee unless the initiation thereof was approved by the Board of Directors of the Corporation. Notwithstanding anything to the contrary in this Article EIGHTH, the Corporation shall not indemnify an Indemnitee to the extent such Indemnitee is reimbursed from the proceeds of insurance, and in the event the Corporation makes any indemnification payments to an Indemnitee and such Indemnitee is subsequently reimbursed from the proceeds of insurance, such Indemnitee shall promptly refund indemnification payments to the Corporation to the extent of such insurance reimbursement.

9. Subsequent Amendment. No amendment, termination or repeal of this Article EIGHTH or of the relevant provisions of the General Corporation Law of the State of Delaware or any other applicable laws shall adversely affect or diminish in any way the rights of any Indemnitee to indemnification under the provisions hereof with respect to any action, suit, proceeding or investigation arising out of or relating to any actions, transactions or facts occurring prior to the final adoption of such amendment, termination or repeal.

10. Other Rights. The indemnification and advancement of expenses provided by this Article EIGHTH shall not be deemed exclusive of any other rights to which an Indemnitee seeking indemnification or advancement of expenses may be entitled under any law (common or statutory), agreement or vote of stockholders or disinterested directors or otherwise, both as to action in Indemnitee's official capacity and as to action in any other capacity while holding office for the Corporation, and shall continue as to an Indemnitee who has ceased to be a director or officer, and shall inure to the benefit of the estate, heirs, executors and administrators of Indemnitee. Nothing contained in this Article EIGHTH shall be deemed to prohibit, and the Corporation is specifically authorized to enter into, agreements with officers and directors providing indemnification rights and procedures different from those set forth in this Article EIGHTH. In addition, the Corporation may, to the extent authorized from time to time by its Board of Directors, grant indemnification rights to other employees or agents of the Corporation or other persons serving the Corporation and such rights may be equivalent to, or greater or less than, those set forth in this Article EIGHTH.

11. Partial Indemnification. If an Indemnitee is entitled under any provision of this Article EIGHTH to indemnification by the Corporation for some or a portion of the expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) or amounts paid in settlement actually and reasonably incurred by or on behalf of Indemnitee in connection with any action, suit, proceeding or investigation and any appeal therefrom but not, however, for the total amount thereof, the Corporation shall nevertheless indemnify Indemnitee for the portion of such expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) or amounts paid in settlement to which Indemnitee is entitled.

12. Insurance. The Corporation may purchase and maintain insurance, at its expense, to protect itself and any director, officer, employee or agent of the Corporation or another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) against any expense, liability or loss incurred by him or her in any such capacity, or arising out of his or her status as such, whether or not the Corporation would have the power to indemnify such person against such expense, liability or loss under the General Corporation Law of the State of Delaware.

13. Savings Clause. If this Article EIGHTH or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each Indemnitee as to any expenses (including attorneys' fees), liabilities, losses, judgments, fines (including excise taxes and penalties arising under the Employee Retirement Income Security Act of 1974) and amounts paid in settlement in connection with any action, suit, proceeding or investigation, whether civil, criminal or administrative, including an action by or in the right of the Corporation, to the fullest extent permitted by any applicable portion of this Article EIGHTH that shall not have been invalidated and to the fullest extent permitted by applicable law.

14. Definitions. Terms used herein and defined in Section 145(h) and Section 145(i) of the General Corporation Law of the State of Delaware shall have the respective meanings assigned to such terms in such Section 145(h) and Section 145(i).

Ninth: This Article NINTH is inserted for the management of the business and for the conduct of the affairs of the Corporation.

1. General Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors.

2. Number of Directors; Election of Directors. Subject to the rights of holders of any series of Preferred Stock to elect directors, the number of directors of the Corporation shall be established by the Board of Directors. Election of directors need not be by written ballot, except as and to the extent provided in the By-laws of the Corporation.

3. Classes of Directors. Subject to the rights of holders of any series of Preferred Stock to elect directors, the Board of Directors shall be and is divided into three classes, designated Class I, Class II and Class III. Each class shall consist, as nearly as may be possible, of one-third of the total number of directors constituting the entire Board of Directors. The Board of Directors is authorized to assign members of the Board of Directors already in office to Class I, Class II or Class III at the time such classification becomes effective.

4. Terms of Office. Subject to the rights of holders of any series of Preferred Stock to elect directors, each director shall serve for a term ending on the date of the third annual meeting of stockholders following the annual meeting of stockholders at which such director was elected; provided that the term of each director shall continue until the election and qualification of his or her successor and be subject to his or her earlier death, resignation or removal.

5. Quorum. The greater of (a) a majority of the directors at any time in office and (b) one-third of the number of directors fixed pursuant to Section 2 of this Article NINTH shall constitute a quorum of the Board of Directors. If at any meeting of the Board of Directors there shall be less than such a quorum, a majority of the directors present may adjourn the meeting from time to time without further notice other than announcement at the meeting, until a quorum shall be present.

6. Action at Meeting. Every act or decision done or made by a majority of the directors present at a meeting duly held at which a quorum is present shall be regarded as the act of the Board of Directors unless a greater number is required by law or by this Certificate of Incorporation.

7. Removal. Subject to the rights of holders of any series of Preferred Stock, directors of the Corporation may be removed only for cause and only by the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors or class of directors.

8. Vacancies. Subject to the rights of holders of any series of Preferred Stock, any vacancy or newly created directorship in the Board of Directors, however occurring, shall be filled only by vote of a majority of the directors then in office, although less than a quorum, or by a sole remaining director and shall not be filled by the stockholders. A director elected to fill a vacancy shall hold office until the next election of the class for which such director shall have been chosen, subject to the election and qualification of a successor and to such director's earlier death, resignation or removal.

9. Stockholder Nominations and Introduction of Business, Etc. Advance notice of stockholder nominations for election of directors and other business to be brought by stockholders before a meeting of stockholders shall be given in the manner provided by the By-laws of the Corporation.

10. Amendments to Article. Notwithstanding any other provisions of law, this Certificate of Incorporation or the By-laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors or class of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article NINTH.

Tenth: Stockholders of the Corporation may not take any action by written consent in lieu of a meeting. Notwithstanding any other provisions of law, this Certificate of Incorporation or the By-laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors or class of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article TENTH.

Eleventh: Special meetings of stockholders for any purpose or purposes may be called at any time by only the Board of Directors, the Chairman of the Board or the Chief Executive Officer, and may not be called by any other person or persons. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting. Notwithstanding any other provisions of law, this Certificate of Incorporation or the By-laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes which all the stockholders would be entitled to cast in any annual election of directors or class of directors shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article ELEVENTH.

* * *

IN WITNESS WHEREOF, this Restated Certificate of Incorporation has been executed by a duly authorized officer of the Corporation on this seventh day of March, 2023.

By:	/s/ Steven Kelly
Name:	Steven Kelly
Title:	President and Chief Executive Officer

Exhibit 4.1

DESCRIPTION OF SECURITIES REGISTERED UNDER SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

The following description of the securities of Carisma Therapeutics Inc. ("us," "our," "we" or the "Company") registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), is intended as a summary only and therefore is not a complete description. This description is based upon, and is qualified by reference to, our certificate of incorporation, our by-laws, and applicable provisions of the Delaware General Corporation Law (the "DGCL"). You should read our certificate of incorporation and by-laws, which are incorporated by reference as Exhibit 3.1 and Exhibit 3.2, respectively, to the Annual Report on Form 10-K of which this Exhibit 4.1 is a part, for the provisions that are important to you.

Authorized Capital Stock

Our authorized capital stock consists of 350,000,000 shares of common stock, par value $0.001 per share, and 5,000,000 shares of preferred stock, par value $0.001 per share, all of which is undesignated. Our common stock is registered under Section 12(b) of the Exchange Act.

Common Stock

Voting Rights. Each holder of common stock is entitled to one vote for each share held of record on all matters to be voted upon by stockholders, including the election of directors. Our certificate of incorporation and by-laws do not provide for cumulative voting rights. Except as otherwise provided by law, our certificate of incorporation and by-laws, all matters other than the election of directors, shall be decided by the vote of the holders of shares of stock having a majority in voting power of the votes cast by the holders of all of the shares of stock present or represented by proxy at the meeting at which a quorum is present and voting affirmatively or negatively on such matter. Directors shall be elected by a plurality of the shares present in person or represented by proxy at a meeting at which a quorum is present and entitled to vote on the election of directors.

Dividends. Subject to the rights, powers and preferences of any outstanding preferred stock, and except as provided by law or in our certificate of incorporation, dividends may be declared and paid or set aside for payment on the common stock out of legally available assets or funds when and as declared by the board of directors.

Liquidation or Dissolution. Subject to the rights, powers and preferences of any outstanding preferred stock, in the event of our liquidation or dissolution, our net assets will be distributed pro rata to the holders of our common stock.

Other Rights. Holders of the common stock have no right to convert the stock into any other security, have the stock redeemed, purchase additional stock, or maintain their proportionate ownership interest. Holders of shares of the common stock are not required to make additional capital contributions.

Preferred Stock

We are authorized to issue "blank check" preferred stock, which may be issued in one or more series upon authorization of our board of directors. Our board of directors is authorized to fix the designations, powers, preferences and the relative, participating, optional or other special rights and any qualifications, limitations and restrictions of the shares of each series of preferred stock. The authorized shares of our preferred stock are available for issuance without further action by our stockholders, unless such action is required by applicable law or the rules of any stock exchange on which our securities may be listed. If the approval of our stockholders is not required for the issuance of shares of our preferred stock, our board may determine not to seek stockholder approval.

Provisions of Our Certificate of Incorporation and By-Laws and Delaware Law That May Have Anti-Takeover Effects

No Cumulative Voting. The DGCL provides that stockholders are not entitled to the right to accumulate votes in the election of directors unless our certificate of incorporation provides otherwise. Our certificate of incorporation does not provide for cumulative voting.

Board of Directors. Our certificate of incorporation and by-laws provide for a board of directors divided as nearly equally as possible into three classes. Each class is elected to a term expiring at the annual meeting of stockholders held in the third year following the year of such election. The number of directors comprising our board of directors is fixed from time to time by the board of directors.

Removal of Directors by Stockholders. Our certificate of incorporation provides that members of our board of directors may only be removed for cause by the affirmative vote of the holders of at least seventy-five percent (75%) of the outstanding shares entitled to vote on the election of the directors.

Board Vacancies Filled Only by Majority of Directors Then in Office. Vacancies and newly created seats on our board may be filled only by a vote of a majority of our board of directors. Further, only our board of directors may determine the number of directors on our board. The inability of stockholders to determine the number of directors or to fill vacancies or newly created seats on the board makes it more difficult to change the composition of our board of directors.

Stockholder Nomination of Directors. Our by-laws provide that a stockholder must notify us in writing of any stockholder nomination of a director not earlier than the 120th day and not later than on the 90th day prior to the first anniversary of the preceding year's annual meeting; provided, that if the date of the annual meeting is advanced by more than 30 days or delayed by more than 60 days from such anniversary date, notice by the stockholder to be timely must be so delivered not earlier than the 120th day prior to the date of such annual meeting and not later than on the later of (x) the 90th day prior to the date of such annual meeting and (y) the 10th day following the day on which notice of the date of such annual meeting was given or public disclosure of the date of such annual meeting was made, whichever occurs first.

No Action By Written Consent. Our certificate of incorporation provides that our stockholders may not act by written consent and may only act at duly called meetings of stockholders.

Super-Majority Voting. The Delaware law provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our by-laws may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least seventy-five percent (75%) of the votes that all our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least seventy-five percent (75%) of the votes that all our stockholders would be entitled to cast in any annual election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above.

Delaware Business Combination Statute. We are subject to Section 203 of the DGCL ("Section 203"), which prohibits a Delaware corporation from engaging in business combinations with an interested stockholder. An interested stockholder is generally defined as an entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation or any entity or person affiliated with or controlling or controlled by such entity or person, or interested stockholder. Section 203 provides that an interested stockholder may not engage in business combinations with the corporation for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned (i) by persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or

- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines business combinations to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, transfer, pledge or other disposition of 10% or more of the assets of the corporation to or with the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loss, advances, guarantees, pledges or other financial benefits by or through the corporation.

Exhibit 10.17

Carisma Therapeutics Inc.
STOCK OPTION AGREEMENT

Carisma Therapeutics Inc. (the "Company") hereby grants the following stock option pursuant to its Amended and Restated 2014 Stock Incentive Plan. The terms and conditions attached hereto are also a part hereof.

Notice of Grant

Name of optionee (the "Participant"):	
Grant Date:	
Incentive Stock Option or Nonstatutory Stock Option:	
Number of shares of the Company's Common Stock subject to this option ("Shares"):	
Option exercise price per Share:[1]	
Vesting Start Date:	
Final Exercise Date: [2]	

Vesting Schedule:

Vesting Date:	Number of Options that Vest:
All vesting is dependent on the Participant remaining an Eligible Participant, as provided herein.	

This option satisfies in full all commitments that the Company has to the Participant with respect to the issuance of stock, stock options or other equity securities.

CARISMA THERAPEUTICS INC.

_____
Signature of Participant

_____
Street Address

_____
City/State/Zip Code

By:_____
Name of Officer
Title:

[1] This must be at least 100% of the Grant Date Fair Market Value (as defined in the Plan) of the Common Stock on the date of grant (110% in the case of a Participant that owns more than 10% of the total combined voting power of all classes of stock of the Company or its parent or subsidiary (a "10% Shareholder")) for the option to qualify as an incentive stock option (an "ISO") under Section 422 of the Internal Revenue Code.

[2] The Final Exercise Date must be no more than 10 years (5 years in the case of a 10% Shareholder) from the date of grant for the option to qualify as an ISO. The correct approach to calculate the final exercise date is to use the day immediately prior to the date ten years out from the date of the stock option award grant (5 years in the case of a 10% stockholder).

Carisma Therapeutics Inc.

Stock Option Agreement
Incorporated Terms and Conditions

1. Grant of Option.

This agreement evidences the grant by the Company, on the grant date (the "Grant Date") set forth in the Notice of Grant that forms part of this agreement (the "Notice of Grant"), to the Participant of an option to purchase, in whole or in part, on the terms provided herein and in the Company's Amended and Restated 2014 Stock Incentive Plan (the "Plan"), the number of Shares set forth in the Notice of Grant of common stock, $0.001 par value per share, of the Company ("Common Stock"), at the exercise price per Share set forth in the Notice of Grant. Unless earlier terminated, this option shall expire at 5:00 p.m., Eastern time, on the Final Exercise Date set forth in the Notice of Grant (the "Final Exercise Date").

The option evidenced by this agreement is intended to be an incentive stock option as defined in Section 422 of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the "Code") to the maximum extent permitted by law, solely to the extent designated as an incentive stock option in the Notice of Grant. To the extent not designated as an incentive stock option, or to the extent that the option does not qualify as an incentive stock option, the option shall be a nonstatutory stock option. Except as otherwise indicated by the context, the term "Participant", as used in this option, shall be deemed to include any person who acquires the right to exercise this option validly under its terms.

2. Vesting Schedule.

This option will become exercisable ("vest") in accordance with the vesting schedule set forth in the Notice of Grant. For a grant to a newly hired Participant, options will vest and become exercisable, subject to the Participant's continued service to the Company on each applicable vesting date, with respect to 25% of the shares of common stock subject to the Option on the first anniversary of the Participant's start date with the Company and 1/36 of the shares of common stock subject to the option each month thereafter until the option is fully vested on the fourth anniversary. For each subsequent annual grant to a Participant, options will vest and become exercisable, subject to the Participant's continued service to the Company, on each applicable vesting date, with respect to 1/48 of the shares of common stock subject to the Option each month following the grant date until the option is fully vested on the fourth anniversary.

The right of exercise shall be cumulative so that to the extent the option is not exercised in any period to the maximum extent permissible it shall continue to be exercisable, in whole or in part, with respect to all Shares for which it is vested until the earlier of the Final Exercise Date or the termination of this option under Section 3 hereof or the Plan.

3. Exercise of Option.

(a) Form of Exercise. Each election to exercise this option shall be in writing, in the form of the Stock Option Exercise Notice attached as Annex A, signed by the Participant, and received by the Company at its principal office, accompanied by this agreement, or in such other form (which may be electronic) as is approved by the Company, together with payment in full in the manner provided in the Plan. The Participant may purchase less than the number of shares covered hereby, provided that no partial exercise of this option may be for any fractional share.

(b) Continuous Relationship with the Company Required. Except as otherwise provided in this Section 3, this option may not be exercised unless the Participant, at the time he or she exercises this option, is, and has been at all times since the Grant Date, an employee,

director or officer of, or consultant or advisor to, the Company or any other entity the employees, officers, directors, consultants, or advisors of which are eligible to receive option grants under the Plan (an "Eligible Participant").

(c) Termination of Relationship with the Company. If the Participant ceases to be an Eligible Participant for any reason, including the Participant's death or disability (within the meaning of Section 22(e)(3) of the Code) prior to the Final Exercise Date, then, except as provided in paragraph (d) below, the right to exercise this option shall terminate twelve months after such cessation (but in no event after the Final Exercise Date), provided that this option shall be exercisable only to the extent that the Participant was entitled to exercise this option on the date of such cessation. Notwithstanding the foregoing, if the Participant, prior to the Final Exercise Date, violates the restrictive covenants (including, without limitation, the non-competition, non-solicitation, or confidentiality provisions) of any employment contract, any non-competition, non-solicitation, confidentiality or assignment agreement to which the Participant is a party, or any other agreement between the Participant and the Company, the right to exercise this option shall terminate immediately upon such violation.

(d) Termination for Cause. If, prior to the Final Exercise Date, the Participant's employment or other relationship with the Company is terminated by the Company for Cause (as defined below), the right to exercise this option shall terminate immediately upon the effective date of such termination of employment or other service relationship. If, prior to the Final Exercise Date, the Participant is given notice by the Company of the termination of his or her employment or other relationship by the Company for Cause, and the effective date of such employment or other termination is subsequent to the date of delivery of such notice, the right to exercise this option shall be suspended from the time of the delivery of such notice until the earlier of (i) such time as it is determined or otherwise agreed that the Participant's employment or other relationship shall not be terminated for Cause as provided in such notice or (ii) the effective date of such termination of employment or other relationship (in which case the right to exercise this option shall, pursuant to the preceding sentence, terminate immediately upon the effective date of such termination of employment or other relationship). If the Participant is subject to an individual employment or consulting agreement with the Company or eligible to participate in a Company severance plan or arrangement, in any case which agreement, plan or arrangement contains a definition of "cause" for termination of employment or other relationship, "Cause" shall have the meaning ascribed to such term in such agreement, plan or arrangement. Otherwise, "Cause" shall mean willful misconduct by the Participant or willful failure by the Participant to perform his or her responsibilities to the Company (including, without limitation, breach by the Participant of any provision of any employment, consulting, advisory, nondisclosure, non-competition or other similar agreement between the Participant and the Company), as determined by the Company, which determination shall be conclusive. The Participant's employment or other relationship shall be considered to have been terminated for Cause if the Company determines, within 30 days after the Participant's resignation, that termination for Cause was warranted.

4. Tax Matters.

(a) Withholding. No Shares will be issued pursuant to the exercise of this option unless and until the Participant pays to the Company, or makes provision satisfactory to the Company for payment of, any federal, state or local withholding taxes required by law to be withheld in respect of this option.

(b) Disqualifying Disposition. If this option is an incentive stock option and the Participant disposes of Shares acquired upon exercise of this option within two years from the Grant Date or one year after such Shares were acquired pursuant to exercise of this option, the Participant shall notify the Company in writing of such disposition.

5. Transfer Restrictions; Clawback.

(a) This option may not be sold, assigned, transferred, pledged, encumbered or otherwise disposed of by the Participant, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the lifetime of the Participant, this option shall be exercisable only by the Participant.

(b) In accepting this option, the Participant agrees to be bound by any clawback policy that the Company has in place or may adopt in the future.

6. Provisions of the Plan.

This option is subject to the provisions of the Plan (including the provisions relating to amendments to the Plan), a copy of which is furnished to the Participant with this option.

ANNEX A

Carisma Therapeutics

Stock Option Exercise Notice

Carisma Therapeutics Inc.
3675 Market Street, Suite 200
Philadelphia, PA 19104

Dear Sir or Madam:

I, _____(the "Participant"), hereby irrevocably exercise the right to purchase ____ shares of the Common Stock, $0.001 par value per share (the "Shares"), of Carisma Therapeutics Inc. (the "Company") at $___per share pursuant to the Company's Amended and Restated 2014 Stock Incentive Plan and a stock option agreement with the Company dated ____ (the "Option Agreement"). Enclosed herewith is a payment of $____, the aggregate purchase price for the Shares. The certificate for the Shares should be registered in my name as it appears below or, if so indicated below, jointly in my name and the name of the person designated below, with right of survivorship.

Dated: _____

_____
Signature
Print Name:

Address:
_____
_____

Name and address of persons in whose name the Shares are to be jointly registered (if applicable):

_____

Exhibit 19.1

CARISMA THERAPEUTICS INC.

INSIDER TRADING POLICY

1. Background and purpose

1.1 Why Have We Adopted This Policy?

The federal securities laws prohibit any member of the Board of Directors (a "Director"), officer (as defined in Rule 16a-1(f) under the Securities Exchange Act of 1934 (the "Exchange Act"), an "executive officer") or employee of Carisma Therapeutics Inc. (together with its subsidiaries, the "Company") from purchasing or selling Company securities on the basis of material nonpublic information concerning the Company, or from tipping material nonpublic information to others. These laws impose severe sanctions on individuals who violate them. In addition, the Securities and Exchange Commission (the "SEC") has the authority to impose large fines on the Company and on the Company's Directors, executive officers and controlling stockholders if the Company's employees engage in insider trading and the Company has failed to take appropriate steps to prevent it (so-called "controlling person" liability).

This insider trading policy is being adopted in light of these legal requirements, and with the goal of helping:

- prevent inadvertent violations of the insider trading laws;
- avoid embarrassing proxy disclosure of reporting violations by persons subject to Section 16 of the Exchange Act;
- promote compliance with the Company's obligation to publicly disclose information related to its insider trading policies and procedures and the use of certain trading arrangements by Company insiders;
- avoid the appearance of impropriety on the part of those employed by, or associated with, the Company;
- protect the Company from controlling person liability; and
- protect the reputation of the Company, its Directors and its employees.

As detailed below, this policy applies to family members and certain other persons and entities with whom Directors and employees have relationships. While the provisions in Sections 2 and 3 of this policy are not applicable to transactions by the Company itself, transactions by the Company will only be made in accordance with applicable U.S. federal securities laws, including those relating to insider trading.

1.2 What Type of Information is "Material"?

Information concerning the Company is considered material if there is a substantial likelihood that a reasonable shareholder would consider the information important in making an investment decision with respect to the Company's securities. Stated another way, there must be a substantial likelihood that a reasonable shareholder would view the information as having significantly altered the "total mix" of information available about the Company. Material information can include positive or negative information about the Company. Information

concerning any of the following subjects, or the Company's plans with respect to any of these subjects, would often be considered material:

- the Company's liquidity, cash burn rate, revenues or earnings;
- a significant merger or acquisition involving the Company;
- a significant licensing or collaboration agreement or serious discussions regarding such an agreement;
- a change in control of the Company;
- a significant change in the management or the Board of Directors of the Company;
- the public or private sale of a significant amount of securities of the Company;
- the Company's decision to commence or terminate the payment of cash dividends;
- the establishment of a program to repurchase securities of the Company;
- a stock split;
- a default on outstanding debt or preferred stock of the Company or a bankruptcy filing;
- a new product release or a significant development, invention or discovery;
- information concerning FDA actions or other significant regulatory developments, including a significant product recall;
- information concerning significant clinical trials or non-clinical studies, including the timing of and findings and data from such trials and studies;
- the loss, delay or gain of a significant contract, sale or order or other important development regarding customers, collaborators or suppliers;
- a significant operational issue or investigation of a potential such issue, including cybersecurity incidents and product defects;
- any litigation or disputes to which the Company may be a party;
- a conclusion by the Company or a notification from its independent auditor that any of the Company's previously issued financial statements should no longer be relied upon; or
- a change in or disagreement (within the meaning of Item 304 of Regulation S-K) with the Company's independent auditor.

This list is illustrative only and is not intended to provide a comprehensive list of circumstances that could give rise to material information.

1.3 When is Information "Nonpublic"?

Information concerning the Company is considered nonpublic if it has not been disseminated in a manner making it available to investors generally.

Information will generally be considered nonpublic unless (1) the information has been disclosed in a press release, in a public filing made with the SEC (such as a Report on Form 10-K, Form 10-Q or Form 8-K), or through a news wire service or daily newspaper of wide circulation, and (2) a sufficient amount of time has passed so that the information has had an opportunity to be digested by the marketplace.

2. PROHIBITIONS RELATING TO TRANSACTIONS IN THE COMPANY'S SECURITIES

2.1 Covered Persons. This Section 2 applies to the following individuals and entities (collectively, the "Covered Persons"):

- all Directors;
- all employees;

- all family members of Directors and employees who share the same address as, or are financially dependent on, the Director or employee and any other person who shares the same address as the Director or employee (other than (x) an employee or tenant of the Director or employee or (y) another unrelated person whom the Chief Executive Officer, the Principal Financial Officer or the General Counsel determines should not be covered by this policy); and
- all corporations, limited liability companies, partnerships, trusts or other entities controlled by any of the above Covered Persons, unless the entity has implemented policies or procedures designed to ensure that such Covered Person cannot influence transactions by the entity involving Company securities.

2.2 Prohibition on Trading While Aware of Material Nonpublic Information.

(a) Prohibited Activities. Except as provided in Section 2.2(b), no Covered Person may:

- purchase, sell or gift (which term, as used in this policy, includes charitable donations) any securities of the Company while such Covered Person is aware of any material nonpublic information concerning the Company or recommend doing so to someone else; or
- tip or otherwise disclose to someone else any material nonpublic information concerning the Company if the recipient may use that information to purchase, sell or gift Company securities or tip that information to others.

In addition, no Covered Person who, in the course of service to the Company, learns of material nonpublic information about another company (1) with which the Company does business, such as the Company's distributors, vendors, customers and suppliers, or (2) that is involved in a potential transaction or business relationship with Company, may engage in transactions in that other company's securities until the information becomes public or is no longer material.

(b) Exceptions. The prohibitions in Sections 2.2(a) and 2.3 on purchases, sales and gifts of Company securities do not apply to:

- exercises of stock options or other equity awards or the surrender of shares to the Company in payment of the exercise price or in satisfaction of any tax withholding obligations, in each case in a manner permitted by the applicable equity award agreement; provided, however, that the securities so acquired may not be sold (either outright or in connection with a "cashless" exercise transaction through a broker) while the Covered Person is aware of material nonpublic information or during an applicable blackout period (as defined in Section 2.3(b));
- acquisitions or dispositions of Company common stock under the Company's 401(k) or other individual account plan that are made pursuant to standing instructions, in a form approved by the Company, not entered into or modified while the Covered Person is aware of material nonpublic information or during an applicable blackout period;
- other purchases of securities from the Company (including purchases under the Company's employee stock purchase plan pursuant to standing instructions, in a form approved by the Company) or sales of securities to the Company; provided, however, that if the transaction involves the exercise of stock options or other equity awards, the transaction must be permitted by the first bullet above;

- bona fide gifts that are approved in advance by the Company;
- purchases, sales or gifts made pursuant to a binding contract, written plan or specific instruction which satisfies the applicable affirmative defense conditions of Rule 10b5-1(c), including as applicable the requirements applicable to an eligible sell-to-cover transaction as defined in Rule 10b5-1(c)(1)(ii)(D)(3) (a "trading plan"); provided such trading plan: (1) is in writing and (2) was submitted to the Company for review prior to its adoption; and
- purchases, sales or gifts made pursuant to a binding contract, written plan or specific instruction which satisfies the definition of a "non-Rule 10b5-1 trading arrangement" as such term is defined in Item 408(c) of Regulation S-K, provided such non-Rule 10b5-1 trading arrangement: (1) is in writing and (2) was submitted to the Company for review prior to its adoption.

(c)Application of Policy After Cessation of Service. If a person or entity ceases to be a Covered Person at a time when such person or entity is aware of material nonpublic information concerning the Company, the prohibitions on purchases, sales or gifts of securities in Section 2.2(a) shall continue to apply until that information has become public or is no longer material.

2.3 Blackout Periods.

(a) Regular Blackout Periods. Except as provided in Section 2.2(b), no Covered Person may purchase, sell or gift any securities of the Company during the period beginning three weeks prior to the scheduled release date of the Company's press release to announce results of the most recently ended fiscal quarter and ending upon the completion of the second full trading day after the periodic report for such fiscal quarter is filed (a "regular blackout period").

(b) Corporate News Blackout Periods. The Company may from time to time notify Directors, executive officers and other specified employees that an additional blackout period (a "corporate news blackout period") is in effect in view of significant events or developments involving the Company. In such event, except as provided in Section 2.2(b), no such individual who is notified of a corporate news blackout period may purchase, sell or gift any securities of the Company during such corporate news blackout period or inform anyone else that a corporate news blackout period is in effect. (In this policy, regular blackout periods and corporate news blackout periods are each referred to as a "blackout period.")

(c)Awareness of Material Non-Public Information when a Blackout Period is Not in Effect. Even if no blackout period is then in effect, if a Covered Person is aware of material nonpublic information the prohibitions contained in Section 2.2(a) apply.

2.4 Prohibition on Pledges. No Covered Person may purchase Company securities on margin, borrow against Company securities held in a margin account, or pledge Company securities as collateral for a loan. However, an exception may be granted in extraordinary situations where a Covered Person wishes to pledge Company securities as collateral for a loan (other than a margin loan) and clearly demonstrates the financial capacity to repay

the loan without resort to the pledged securities. Any Covered Person who wishes to pledge Company securities as collateral for a loan must submit a request for approval to the Principal Financial Officer or the General Counsel. In addition, any such request by a Director or executive officer of the Company must also be reviewed and approved by the Audit Committee of the Board of Directors.

2.5 Prohibition on Short Sales, Derivative Transactions and Hedging Transactions. No Covered Person may engage in any of the following types of transactions with respect to Company securities:

- short sales, including short sales "against the box"; or
- purchases or sales of puts, calls or other derivative securities; or
- purchases of financial instruments (including prepaid variable forward contracts, equity swaps, collars and exchange funds) or other transactions that hedge or offset, or are designed to hedge or offset, any decrease in the market value of Company securities.

2.6 Partnership Distributions. Nothing in this policy is intended to limit the ability of a venture capital partnership or other similar entity with which a Director is affiliated to distribute Company securities to its partners, members or other similar persons. It is the responsibility of each affected Director and the affiliated entity, in consultation with their own counsel (as appropriate), to determine the timing of any distributions, based on all relevant facts and circumstances and applicable securities laws.

2.7 Underwritten Public Offering. Nothing in this policy is intended to limit the ability of any Covered Person to sell Company securities as a selling stockholder in an underwritten public offering pursuant to an effective registration statement in accordance with applicable securities law.

3. ADDITIONAL PROHIBITIONS APPLICABLE TO DIRECTORS, EXECUTIVE OFFICERS AND DESIGNATED EMPLOYEES

3.1 Further Restricted Insiders. This Section 3 applies to the following Covered Persons, who are subject to certain additional restrictions as set forth herein (collectively, the "Further Restricted Insiders"):

- all Directors;
- all executive officers;
- such other employees as are designated from time to time by the Board of Directors, the Chief Executive Officer, the Principal Financial Officer or the General Counsel as being subject to this Section 3 (the "Designated Employees");
- all family members of Directors, executive officers and Designated Employees who share the same address as, or are financially dependent on, the Director, executive officer or Designated Employee and any other person who shares the same address as the Director, executive officer or Designated Employee (other than (x) an employee or tenant of the Director, executive officer or Designated Employee or (y) another unrelated person whom the Chief Executive Officer, the Principal Financial Officer or the General Counsel determines should not be covered by this policy); and

- all corporations, limited liability companies, partnerships, trusts or other entities controlled by any of the above Further Restricted Insiders, unless the entity has implemented policies or procedures designed to ensure that such Further Restricted Insider cannot influence transactions by the entity involving Company securities.

3.2 Notice and Pre-Clearance of Transactions.

(a) Pre-Transaction Clearance. No Further Restricted Insider may purchase, sell, gift, transfer or otherwise acquire or dispose of securities of the Company, either directly or indirectly, other than in a transaction permitted under Section 2.2(b), unless such Further Restricted Insider pre-clears the transaction with any of the Chief Executive Officer, the Principal Financial Officer or the General Counsel. A request for pre-clearance shall be made in accordance with the procedures established by the Chief Executive Officer, the Principal Financial Officer or the General Counsel. The Chief Executive Officer, the Principal Financial Officer and the General Counsel shall have sole discretion to decide whether to clear any contemplated transaction. The General Counsel and the Chief Executive Officer shall have sole discretion to decide whether to clear transactions by the Principal Financial Officer or by Further Restricted Insiders as a result of their relationship with the Principal Financial Officer, and the Principal Financial Officer shall have sole discretion to decide whether to clear transactions by the General Counsel or Further Restricted Insiders as a result of their relationship with the General Counsel. All transactions that are pre-cleared must be effected within three business days of receipt of the pre-clearance unless a longer or shorter period has been specified by the Chief Executive Officer, the Principal Financial Officer or the General Counsel. A pre-cleared transaction (or any portion of a pre-cleared transaction) that has not been effected during the three business day period must be pre-cleared again prior to execution. **Notwithstanding receipt of pre-clearance, if the Further Restricted Insider becomes aware of material non-public information or becomes subject to a blackout period before the transaction is effected, the transaction may not be completed.**

(b) Post-Transaction Notice. Each Further Restricted Insider who is subject to reporting obligations under Section 16 of the Exchange Act shall also notify the Principal Financial Officer or the General Counsel (or such person's designee) of the occurrence of any purchase, sale, gift, transfer, or other acquisition or disposition of securities of the Company as soon as possible following the transaction, but in any event within one business day after the transaction. Such notification may be oral or in writing (including by e-mail) and should include the identity of the Further Restricted Insider, the type of transaction, the date of the transaction, the number of shares involved, the purchase or sale price, and whether the transaction was effected pursuant to a contract, instruction or written plan that is intended either to satisfy the affirmative defense conditions of Rule 10b5-1(c) (and if so, the date of adoption of such contract, instruction or written plan) or to constitute a non-Rule 10b5-1 trading arrangement (as defined in Item 408(c) of Regulation S-K).

(c)Deemed Time of a Transaction. For purposes of this Section 3.2, a purchase, sale, gift, transfer, or other acquisition or disposition shall be deemed to occur at the time the person becomes irrevocably committed to it (for example, in the case of an open market purchase or sale, this occurs when the trade is executed, not when it settles).

4. REGULATION BTR

If the Company is required to impose a "pension fund blackout period" under Regulation BTR, each Director and executive officer shall not, directly or indirectly sell, purchase or otherwise transfer during such blackout period any equity securities of the Company acquired in connection with such person's service as a Director or officer of the Company, except as permitted by Regulation BTR.

5. PENALTIES FOR VIOLATION

Violation of any of the foregoing rules is grounds for disciplinary action by the Company, including termination of employment. In addition to any disciplinary actions the Company may take, insider trading can also result in administrative, civil or criminal proceedings which can result in significant fines and civil penalties, being barred from service as an officer or director of a public company, or imprisonment.

6. COMPANY ASSISTANCE AND EDUCATION

6.1 Education. The Company shall take reasonable steps designed to ensure that all Directors and employees of the Company are educated about, and periodically reminded of, the federal securities law restrictions and Company policies regarding insider trading.

6.2 Assistance. The Company shall provide reasonable assistance to all Directors and executive officers, as requested by such Directors and executive officers, in connection with the filing of Forms 3, 4 and 5 under Section 16 of the Exchange Act. However, the ultimate responsibility, and liability, for timely filing remains with the Directors and executive officers.

6.3 Limitation on Liability. None of the Company, the Chief Executive Officer, the Principal Financial Officer, the General Counsel or the Company's other employees will have any liability for any delay in reviewing, or refusal of, a trading plan submitted pursuant to Section 2.2(b), a request for pre-clearance submitted pursuant to Section 3.2(a) or a request to allow a pledge submitted pursuant to Section 2.4. Notwithstanding any review of a trading plan pursuant to Section 2.2(b) or pre-clearance of a transaction pursuant to Section 3.2(a), none of the Company, the Chief Executive Officer, the Principal Financial Officer, the General Counsel or the Company's other employees assumes any liability for the legality or consequences of such trading plan or transaction to the person engaging in or adopting such trading plan or transaction.

CARISMA THERAPEUTICS INC.

INSIDER TRADING POLICY
CERTIFICATION

I have received and read the Insider Trading Policy for Carisma Therapeutics Inc. regarding trading in the Company's securities and in other company's securities. I agree that it is my responsibility to adhere to the laws and requirements described in the policy. I further acknowledge that it is my responsibility to contact the Chief Executive Officer, the Principal Financial Officer or the General Counsel with any questions or issues.

_____

(Signature)

Name: _____

Date: _____

Exhibit 21.1

Subsidiaries of the Registrant

Name of Subsidiary	Jurisdiction of Incorporation
• CTx Operations, Inc.	• Delaware, U.S.
• CARISMA Therapeutics S.à r.l.	• Luxembourg

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the registration statements (Nos. 333-195170, 333-202677, 333-210523, 333-217686, 333-217687, 333-231644, 333-234697, 333-254264, 333-255941, 333-263070 and 333-271103) on Form S-8 and (Nos. 333-201176, 333-224682, 333-271295 and 333-271296) on Form S-3 of our report dated April 1, 2024, with respect to the consolidated financial statements of Carisma Therapeutics Inc.

/s/ KPMG LLP
Philadelphia, Pennsylvania
March 31, 2025

Exhibit 31.1

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 Kelly, certify that:

1. I have reviewed this Annual Report on Form 10-K of Carisma Therapeutics 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(s) 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: March 31, 2025

By: /s/ Steven Kelly

Steven Kelly
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

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, Natalie McAndrew, certify that:

1. I have reviewed this Annual Report on Form 10-K of Carisma Therapeutics 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(s) 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: March 31, 2025

By: /s/ Natalie McAndrew

Natalie McAndrew
Vice President of Finance
(Principal Financial Officer)

Exhibit 32.1

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 Annual Report of Carisma Therapeutics Inc. (the "Company") on Form 10-K for the year ended December 31, 2024 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, to my knowledge:

(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 results of operations of the Company.

Date: March 31, 2025

By: /s/ Steven Kelly

Steven Kelly
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

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 Annual Report of Carisma Therapeutics Inc. (the "Company") on Form 10-K for the year ended December 31, 2024 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, to my knowledge:

(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 results of operations of the Company.

Date: March 31, 2025

By: /s/ Natalie McAndrew

Natalie McAndrew
Vice President of Finance
(Principal Financial Officer)

Exhibit 97

CARISMA THERAPEUTICS INC.

Dodd-Frank Compensation Recovery Policy

This Compensation Recovery Policy (this "Policy") is adopted by Carisma Therapeutics Inc. (the "Company") in accordance with Nasdaq Listing Rule 5608 ("Rule 5608"), which implements Rule 10D-1 under the Securities Exchange Act of 1934, as amended (the "Exchange Act") (as promulgated pursuant to Section 954 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010). This Policy is effective as of October 2, 2023 (the "Effective Date").

1. Definitions

a. **"Accounting Restatement"** means a requirement that the Company prepare an accounting restatement due to the material noncompliance of the Company with any financial reporting requirement under the U.S. federal securities laws, including any required accounting restatement to correct an error in previously issued financial statements that is material to the previously issued financial statements, or that would result in a material misstatement if the error were corrected in the current period or left uncorrected in the current period. Changes to the Company's financial statements that do not represent error corrections are not an Accounting Restatement, including: (A) retrospective application of a change in accounting principle; (B) retrospective revision to reportable segment information due to a change in the structure of the Company's internal organization; (C) retrospective reclassification due to a discontinued operation; (D) retrospective application of a change in reporting entity, such as from a reorganization of entities under common control; and (E) retrospective revision for stock splits, reverse stock splits, stock dividends or other changes in capital structure.

b. **"Committee"** means the Compensation Committee of the Company's Board of Directors (the "Board").

c. **"Covered Person"** means a person who served as an Executive Officer at any time during the performance period for the applicable Incentive-Based Compensation.

d. **"Erroneously Awarded Compensation"** means the amount of Incentive-Based Compensation that was Received that exceeds the amount of Incentive-Based Compensation that otherwise would have been Received had the amount of Incentive-Based Compensation been determined based on the restated amounts, computed without regard to any taxes paid by the Covered Person or by the Company on the Covered Person's behalf. For Incentive-Based Compensation based on stock price or total shareholder return, where the amount of Erroneously Awarded Compensation is not subject to mathematical recalculation directly from the information in an Accounting Restatement, the amount of Erroneously Awarded Compensation will be based on a reasonable estimate by the Committee of the effect of the Accounting Restatement on the stock price or total shareholder return upon which the Incentive-Based Compensation was Received. The Company will maintain documentation of the determination of that reasonable estimate and provide such documentation to Nasdaq.

e. **"Executive Officer"** means the Company's officers as defined in Rule 16a-1(f) under the Exchange Act.

f. **"Financial Reporting Measures"** means (A) measures that are determined and presented in accordance with the accounting principles used in preparing the Company's financial statements, and any measures that are derived wholly or in part from such measures (whether or not such measures are presented within the Company's financial statements or included in a filing made with the U.S. Securities and Exchange Commission), (B) stock price and (C) total shareholder return.

g. **"Incentive-Based Compensation"** means any compensation that is granted, earned, or vested based wholly or in part upon the attainment of a Financial Reporting Measure.

h. Incentive-Based Compensation is deemed to be **"Received"** in the Company's fiscal period during which the Financial Reporting Measure specified in the applicable Incentive-Based Compensation award is attained, even if the payment or grant of the Incentive-Based Compensation occurs after the end of that period or is subject to additional time-based vesting requirements.

i. **"Recovery Period"** means the three completed fiscal years immediately preceding the earlier of: (A) the date the Board, a committee of the Board, or the officer or officers of the Company authorized to take such action if Board action is not required, concludes, or reasonably should have concluded, that the Company is required to prepare an Accounting Restatement; or (B) the date a court, regulator, or other legally authorized body directs the Company to

prepare an Accounting Restatement. In addition, if there is a change in the Company's fiscal year end, the Recovery Period will also include any transition period to the extent required by Rule 5608.

2. Recovery of Erroneously Awarded Compensation

Subject to the terms of this Policy and the requirements of Rule 5608, if the Company is required to prepare an Accounting Restatement, the Company will attempt to recover, reasonably promptly from each Covered Person, any Erroneously Awarded Compensation that was Received by such Covered Person during the Recovery Period pursuant to Incentive-Based Compensation that is subject to this Policy.

3. Interpretation and Administration

a. Role of the Committee. This Policy will be interpreted by the Committee in a manner that is consistent with Rule 5608 and any other applicable law and will otherwise be interpreted in the business judgment of the Committee. All decisions and interpretations of the Committee that are consistent with Rule 5608 will be final and binding.

b. Compensation Not Subject to this Policy. This Policy does not apply to Incentive-Based Compensation that was Received before the Effective Date. With respect to any Covered Person, this Policy does not apply to Incentive-Based Compensation that was Received by such Covered Person before beginning service as an Executive Officer.

c. Determination of Means of Recovery. Subject to the requirement that recovery be made reasonably promptly, the Committee will determine the appropriate means of recovery, which may vary between Covered Persons or based on the nature of the applicable Incentive-Based Compensation, and which may involve, without limitation, establishing a deferred repayment plan or setting off against current or future compensation otherwise payable to the Covered Person. Recovery of Erroneously Awarded Compensation will be made without regard to income taxes paid by the Covered Person or by the Company on the Covered Person's behalf in connection with such Erroneously Awarded Compensation.

d. Determination That Recovery is Impracticable. The Company is not required to recover Erroneously Awarded Compensation if a determination is made by the Committee that either (A) after the Company has made and documented a reasonable attempt to recover such Erroneously Awarded Compensation, the direct expense paid to a third party to assist in enforcing this Policy would exceed the amount to be recovered or (B) recovery of such Erroneously Awarded Compensation would likely cause an otherwise tax-qualified retirement plan, under which benefits are broadly available to employees of the Company, to fail to meet the requirements of Section 401(a)(13) or 411(a) of the Internal Revenue Code and regulations thereunder.

e. No Indemnification or Company-Paid Insurance. The Company will not indemnify any Covered Person against the loss of Erroneously Awarded Compensation and will not pay or reimburse any Covered Person for the purchase of a third-party insurance policy to fund potential recovery obligations.

f. Interaction with Other Clawback Provisions. The Company will be deemed to have recovered Erroneously Awarded Compensation in accordance with this Policy to the extent the Company actually receives such amounts pursuant to any other Company policy, program or agreement, pursuant to Section 304 of the Sarbanes-Oxley Act or otherwise.

g. No Limitation on Other Remedies. Nothing in this Policy will be deemed to limit the Company's right to terminate employment of any Covered Person, to seek recovery of other compensation paid to a Covered Person, or to pursue other rights or remedies available to the Company under applicable law.

Adopted by the Board on November 6, 2023.