Table of Contents

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

FORM 10-Q

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

For the quarterly period ended March 31, 2023

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: 001-39319

GENERATION BIO CO.
(Exact name of registrant as specified in its charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**81-4301284** **(I.R.S. Employer Identification Number)**
301 Binney Street **Cambridge, Massachusetts** **(Address of principal executive offices)**	**02142** **(Zip Code)**

(617) 655-7500
(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 Par Value	**GBIO**	**Nasdaq Global Select Market**

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

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

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

As of April 28, 2023 there were 65,674,928 shares of Common Stock, $0.0001 par value per share, outstanding.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q, or this Quarterly Report, of Generation Bio Co. contains forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act and Section 21E of the Securities Exchange Act of 1934, as amended, that involve substantial risks and uncertainties. All statements, other than statements of historical fact, contained in this Quarterly Report, including statements regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intend," "may," "might," "plan," "potential," "predict," "project," "should," "target," "will," "would," or the negative of these words or other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this Quarterly Report include, among other things, statements about:

- the initiation, timing, progress and results of our research and development programs and preclinical studies and clinical trials;
- our estimates regarding expenses, future revenue, capital requirements, need for additional financing and the period over which we believe that our existing cash, cash equivalents and marketable securities will be sufficient to fund our operating expenses and capital expenditure requirements;
- the potential achievement of milestones and receipt of payments under our collaboration with ModernaTX, Inc.;
- our ability to enter into additional collaborations with third parties or obtain additional funding;
- our ability to find one or more third parties to assume our lease or sublease the property in Waltham, MA;
- the potential advantages of our non-viral genetic medicine platform;
- our plans to develop and, if approved, subsequently commercialize any product candidates we may develop;
- the timing of and our ability to submit applications and obtain and maintain regulatory approvals for any product candidates we may develop;
- our estimates regarding the potential addressable patient populations for our programs;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our expectations regarding our ability to obtain and maintain intellectual property protection;
- our intellectual property position;
- our ability to identify additional products, product candidates or technologies with significant commercial potential that are consistent with our objectives;
- the residual impact of the COVID-19 pandemic and our response to the pandemic;
- the impact of government laws and regulations;
- our competitive position and our expectations regarding developments and projections relating to our competitors and any competing therapies that are or become available; and

- developments and expectations regarding developments and projections relating to our competitors and our industry.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and stockholders should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this Quarterly Report, particularly in the "Risk Factors" section in this Quarterly Report and our most recent Annual Report on Form 10-K filed with the Securities and Exchange Commission, or SEC, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Moreover, we operate in a competitive and rapidly changing environment. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, collaborations, joint ventures, or investments we may make or enter into.

Stockholders should read this Quarterly Report and the documents that we file with the SEC with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements contained in this Quarterly Report are made as of the date of this Quarterly Report, and we do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by applicable law.

Except where the context otherwise requires or where otherwise indicated, the terms "we," "us," "our," "our company," "the company," and "our business" in this Quarterly Report refer to Generation Bio Co. and its consolidated subsidiary.

Generation Bio Co.

INDEX

PART I—FINANCIAL INFORMATION

Item 1. Financial Statements (unaudited)

Generation Bio Co.
Condensed Consolidated Balance Sheets
(In thousands, except share and per share amounts)
(Unaudited)

	March 31, 2023	December 31, 2022
Assets		
Current assets:		
Cash and cash equivalents	$ 95,650	$ 93,171
Marketable securities	192,999	185,920
Collaboration receivable	47,500	—
Tenant receivable	1,814	395
Prepaid expenses and other current assets	6,770	7,530
Total current assets	344,733	287,016
Property and equipment, net	22,030	22,215
Operating lease right-of-use assets	57,945	59,208
Restricted cash	5,692	5,692
Deferred offering costs	434	434
Other long-term assets	583	1,699
Total assets	$ 431,417	$ 376,264
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 1,504	$ 662
Accrued expenses and other current liabilities	7,647	11,402
Deferred revenue	5,681	—
Operating lease liability	7,905	7,086
Total current liabilities	22,737	19,150
Deferred revenue, net of current portion	55,085	—
Operating lease liability, net of current portion	74,456	74,621
Total liabilities	152,278	93,771
Commitments and contingencies (Note 9)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 5,000,000 shares authorized and no shares issued or outstanding at March 31, 2023 and December 31, 2022	—	—
Common stock, $0.0001 par value; 150,000,000 shares authorized at March 31, 2023 and December 31, 2022; 65,535,663 and 59,505,437 shares issued and outstanding at March 31, 2023 and December 31, 2022, respectively	7	6
Additional paid-in capital	755,957	727,335
Accumulated other comprehensive income	34	(83)
Accumulated deficit	(476,859)	(444,765)
Total stockholders' equity	279,139	282,493
Total liabilities and stockholders' equity	$ 431,417	$ 376,264

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

Generation Bio Co.
Condensed Consolidated Statements of Operations and Comprehensive Loss
(In thousands, except share and per share amounts)
(Unaudited)

	Three Months Ended March 31,	
	2023	2022
Operating expenses:		
Research and development	$ 22,000	$ 25,554
General and administrative	12,866	9,790
Total operating expenses	34,866	35,344
Loss from operations	(34,866)	(35,344)
Other income:		
Other income and interest income, net	2,772	345
Net loss and net loss attributable to common stockholders	$ (32,094)	$ (34,999)
Net loss per share attributable to common stockholders, basic and diluted	$ (0.53)	$ (0.61)
Weighted average common shares outstanding, basic and diluted	60,230,077	56,996,495
Comprehensive loss:		
Net loss	$ (32,094)	$ (34,999)
Other comprehensive loss:		
Unrealized gains on marketable securities	117	—
Comprehensive loss	$ (31,977)	$ (34,999)

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

Generation Bio Co.
Condensed Consolidated Statements of Stockholders' Equity
(In thousands, except share amounts)
(Unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
	Three Months Ended March 31, 2023					
Balances at December 31, 2022	59,505,437	$ 6	$ 727,335	$ (83)	$ (444,765)	$ 282,493
Issuance of common stock in connection with the Moderna Agreement	5,859,375	1	22,555	—	—	22,556
Issuance of common stock upon exercise of stock options	—	—	—	—	—	—
Vesting of restricted common stock	170,851	—	(199)	—	—	(199)
Stock-based compensation expense	—	—	6,266	—	—	6,266
Unrealized gains on marketable securities	—	—	—	117	—	117
Net loss	—	—	—	—	(32,094)	(32,094)
Balances at March 31, 2023	65,535,663	$ 7	$ 755,957	$ 34	$ (476,859)	$ 279,139

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
	Three Months Ended March 31, 2022					
Balances at December 31, 2021	56,969,618	$ 6	$ 689,866	$ —	$ (308,126)	$ 381,746
Issuance of common stock upon exercise of stock options	21,787	—	102	—	—	102
Vesting of restricted common stock	12,723	—	—	—	—	—
Stock-based compensation expense	—	—	6,066	—	—	6,066
Unrealized losses on marketable securities	—	—	—	—	—	—
Net loss	—	—	—	—	(34,999)	(34,999)
Balances at March 31, 2022	57,004,128	$ 6	$ 696,034	$ —	$ (343,125)	$ 352,915

The accompanying notes are an integral part of these condensed consolidated financial statements

Generation Bio Co.
Condensed Consolidated Statements of Cash Flows
(In thousands)
(Unaudited)

	Three Months Ended March 31,	
	2023	2022
Cash flows from operating activities:		
Net loss	$ (32,094)	$ (34,999)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation expense	6,266	6,066
Depreciation and amortization expense	1,330	1,197
Amortization (accretion) of premium (discount) on marketable securities, net	(2,101)	—
Loss on sale of property and equipment	24	28
Changes in operating assets and liabilities:		
Collaboration receivable	(47,500)	—
Tenant receivable	(1,419)	—
Prepaid expenses and other current assets	761	(531)
Operating lease right-of-use assets	1,263	2,260
Other noncurrent assets	1,115	(5,176)
Accounts payable	816	(684)
Accrued expenses and other current liabilities	(4,292)	(3,407)
Deferred revenue	47,500	—
Operating lease liability	654	(189)
Net cash used in operating activities	(27,677)	(35,435)
Cash flows from investing activities:		
Purchases of property and equipment	(755)	(2,784)
Purchases of marketable securities	(87,861)	—
Maturities of marketable securities	83,000	—
Net cash used in investing activities	(5,616)	(2,784)
Cash flows from financing activities:		
Payment of share issuance costs	(29)	(50)
Proceeds from issuance of common stock in connection with the Moderna Agreement	36,000	—
Proceeds from exercise of stock options and other types of equity, net	—	102
Tax withholding payments related to net share settlements of restricted stock units	(199)	—
Net cash provided by financing activities	35,772	52
Net increase (decrease) in cash, cash equivalents and restricted cash	2,479	(38,167)
Cash, cash equivalents and restricted cash at beginning of period	98,863	380,837
Cash, cash equivalents and restricted cash at end of period	$ 101,342	$ 342,670
Supplemental disclosure of noncash investing and financing information:		
Purchases of property and equipment included in accounts payable and accrued expenses	$ 438	$ 1,928
Unrealized gains on marketable securities	$ 117	$ —
Issuance costs included in accrued expenses	$ 149	$ —

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

1. Nature of the Business and Basis of Presentation

Generation Bio Co., or Generation Bio, was incorporated on October 21, 2016 as Torus Therapeutics, Inc. and subsequently changed its name to Generation Bio Co. Generation Bio Co. and its consolidated subsidiary, or the company, we, our or us, are innovating genetic medicines to provide durable, redosable treatments for potentially hundreds of millions of patients living with rare and prevalent diseases. Our non-viral genetic medicines platform incorporates our high-capacity DNA construct called closed-ended DNA, or ceDNA; our cell-targeted lipid nanoparticle delivery system, or ctLNP; and our highly scalable capsid-free manufacturing process that uses our proprietary cell-free rapid enzymatic synthesis, or RES, to produce ceDNA. Using our approach, we are developing novel genetic medicines to provide targeted delivery of genetic payloads that include large and multiple genes to a range of cell types across a broad array of diseases. We are also engineering our genetic medicines to be redosable, which may enable individualized patient titration to reach the desired therapeutic expression and to maintain efficacy throughout a patient's life. We are headquartered in Cambridge, Massachusetts.

We are subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including, but not limited to, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations, the ability to establish clinical- and commercial-scale manufacturing processes and the ability to secure additional capital to fund operations. Programs currently under development will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization of a product. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if our development efforts are successful, it is uncertain when, if ever, we will realize significant revenue from product sales.

The accompanying condensed consolidated financial statements have been prepared on the basis of continuity of operations, realization of assets and the satisfaction of liabilities and commitments in the ordinary course of business. Since inception, we have funded our operations with proceeds from the sale of instruments convertible into convertible preferred stock (which converted into convertible preferred stock in 2017), sales of convertible preferred stock (which converted into common stock in 2020), and sales of common stock in underwritten public offerings, "at-the-market" offerings, and in a private placement, as well as payments pursuant to our collaboration with ModernaTX, Inc., or Moderna. We have incurred recurring losses, including net losses of $32.1 million for the three months ended March 31, 2023 and $35.0 million for the three months ended March 31, 2022. As of March 31, 2023, we had an accumulated deficit of $476.9 million. We expect to continue to generate operating losses in the foreseeable future. As of May 10, 2023, the issuance date of these condensed consolidated financial statements, we expect that our cash, cash equivalents and marketable securities will be sufficient to fund our operating expenses and capital expenditure requirements for at least 12 months.

We will need to obtain additional funding through public or private equity offerings, debt financings, collaborations, strategic alliances and/or licensing arrangements. We may not be able to obtain financing on acceptable terms, or at all, and we may not be able to enter into additional collaborative or strategic alliances or licensing arrangements. The terms of any financing may adversely affect the holdings or the rights of our stockholders. Arrangements with collaborators or others may require us to relinquish rights to certain of our technologies or programs. If we are unable to obtain funding, we could be forced to delay, reduce or eliminate some or all of our research and development programs, pipeline expansion or commercialization efforts, which could adversely affect our business prospects. Although management will continue to pursue these plans, there is no assurance that we will be successful in obtaining sufficient funding on terms acceptable to us to fund continuing operations when needed or at all.

The accompanying condensed consolidated financial statements reflect the operations of Generation Bio and our wholly owned subsidiary, Generation Bio Securities Corporation. Intercompany balances and transactions have been eliminated in consolidation. The accompanying condensed consolidated financial statements have been prepared in conformity with generally accepted accounting principles in the United States of America, or GAAP. Any reference in these notes to applicable guidance is meant to refer to the authoritative GAAP as found in the Accounting Standards Codification, or ASC, and Accounting Standards Update, or ASU, of the Financial Accounting Standards Board, or FASB.

2. Summary of Significant Accounting Policies

Use of estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting periods. Significant estimates and assumptions reflected in these condensed consolidated financial statements include, but are not limited to, the accrual of research and development expenses and stock-based compensation expense. We base our estimates on historical experience, known trends and other market-specific or other relevant factors that we believe to be reasonable under the circumstances. On an ongoing basis, management evaluates its estimates, as there are changes in circumstances, facts and experience. Changes in estimates are recorded in the period in which they become known. Actual results may differ from those estimates or assumptions.

Unaudited interim financial information

The condensed consolidated balance sheet as of December 31, 2022 was derived from audited financial statements but does not include all disclosures required by GAAP. The accompanying unaudited financial statements as of March 31, 2023 and for the three months ended March 31, 2023 and 2022 have been prepared by us pursuant to the rules and regulations of the Securities and Exchange Commission, or SEC, for interim financial statements. Certain information and footnote disclosures normally included in financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to such rules and regulations. These financial statements should be read in conjunction with our audited financial statements included in our Annual Report on Form 10-K that was most recently filed with the SEC. In the opinion of management, all adjustments, consisting only of normal recurring adjustments necessary for a fair presentation of our financial position as of March 31, 2023, the results of operations for the three months ended March 31, 2023 and 2022, and cash flows for the three months ended March 31, 2023 and 2022 have been made. The results of operations for the three months ended March 31, 2023 are not necessarily indicative of the results of operations that may be expected for the year ending December 31, 2023 or any other period.

Our significant accounting policies are described in Note 2 of the Notes to Consolidated Financial Statements included in our Annual Report on Form 10-K for the year ended December 31, 2022.

Concentrations of credit risk and of significant suppliers

Financial instruments that potentially expose us to concentrations of credit risk consist primarily of cash, cash equivalents, and marketable securities. We believe that we are not exposed to significant credit risk due to the financial strength of the national depository institutions in which our cash, cash equivalents, and marketable securities are held. We maintain our cash equivalents in money market funds that invest in U.S. treasury securities. We have adopted an investment policy that limits the amounts that we may invest in the securities of a single issuer with the exclusion of the U.S. government. We have not experienced any credit losses.

We are dependent on a small number of third-party suppliers for our drug substance and drug product. In particular, we rely, and expect to continue to rely, on third-party suppliers for certain materials and components required for the production of any product candidates we may develop for our programs. These programs could be adversely affected by a significant interruption in the supply process.

Revenue Recognition

We enter into collaboration agreements that are within the scope of ASC Topic 606, “Revenue from Contracts with Customers”, or ASC 606, under which we license rights to certain of our potential product candidates and perform research and development services. The terms of these contracts typically include payment of the following: non-refundable, upfront fees; reimbursement of research and development costs; development, regulatory, and commercial milestone payments; royalties on net sales of licensed products, and a premium or discount on the sale of our common stock.

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. To determine the appropriate amount of revenue to be recognized for contracts determined to be within the scope of ASC 606, we perform the following five 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, we satisfy each performance obligation. We only apply the five-step model to contracts when it is probable that we will collect consideration we are entitled to in exchange for the goods or services we transfer to the customer.

The promised goods or services in our arrangements typically consist of license rights to our intellectual property and research and development services. We provide options to additional items in the contract, which will be accounted for as separate contracts if and when the other party elects to exercise such options, unless the option provides a material right to such party. We evaluate the other party's options for material rights, or options to acquire additional goods or services for free or at a discount. If the other party's options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the contract. Performance obligations are promised goods or services in a contract to transfer a distinct good or service to the other party and are considered distinct when (i) the other party can benefit from the good or service on its own or together with other readily available resources and (ii) the promised good or service is separately identifiable from other promises in the contract. In assessing whether promised goods or services are distinct, we consider factors such as the stage of development of the underlying intellectual property, the capabilities of the other party to develop the intellectual property on its own or whether the required expertise is readily available and whether the goods or services are integral or dependent to other goods or services in the contract.

We estimate the transaction price based on the amount expected to be received for transferring the promised goods or services in the contract. The consideration may include fixed consideration or variable consideration. At the inception of each contract that includes variable consideration, we evaluate the number of potential payments and the likelihood that the payments will be received. We utilize either the most likely amount method or expected amount method to estimate the amount expected to be received based on which method best predicts the amount expected to be received. The amount of variable consideration that is included in the transaction price may be constrained and is included in the transaction price only to the extent that it is probable that a significant reversal in the amount of the cumulative revenue recognized will not occur in a future period.

Our contracts include development, regulatory, and commercial milestone payments that will be assessed under the most likely amount method and constrained if it is probable that a significant revenue reversal would occur. Milestone payments that are not within our control or the counterparty's control, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. At the end of each reporting period, we re-evaluate the probability of achievement of such development, regulatory, and commercial milestones and any related constraint, and if necessary, we adjust our estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect collaboration revenues in the period of adjustment. To date, we have not recognized any consideration related to the achievement of development, regulatory, or commercial milestone revenue resulting from our collaboration contracts.

For contracts that include sales-based royalties, including milestone payments based on the level of sales, and where the license is deemed to be the predominant item to which the royalties relate, we recognize revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, we have not recognized any consideration related to sales-based royalty revenue resulting from our collaboration contract.

We allocate the transaction price based on the estimated stand-alone selling price of each of the performance obligations. We must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. We utilize key assumptions to determine the stand-alone selling price for service obligations, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs. Additionally, in determining the standalone selling price for material rights, we utilize comparable transactions, clinical trial success probabilities, and estimates of option exercise likelihood. Variable consideration is

allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated are consistent with the amounts we would expect to receive for the satisfaction of each performance obligation.

The consideration allocated to each performance obligation is recognized as revenue when control is transferred for the related goods or services. For performance obligations that consist of licenses and other promises, we utilize 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. We evaluate the measure of progress each reporting period and, if necessary, adjust the measure of performance and related revenue recognition.

Upfront payments and fees are recorded as deferred revenue upon receipt or when due until we perform our obligations. Amounts are recorded as accounts receivable when our right to consideration is unconditional.

3. Marketable Securities and Fair Value Measurements

The following tables present our marketable securities by security type:

	As of March 31, 2023			
(in thousands)	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. treasury securities	$ 192,965	$ 38	$ (4)	$ 192,999

	As of December 31, 2022			
(in thousands)	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. treasury securities	$ 186,003	$ 13	$ (96)	$ 185,920

As of March 31, 2023 and December 31, 2022, our marketable securities consisted of investments that mature within one year.

The following tables present our assets that are measured at fair value on a recurring basis and indicate the level within the fair value hierarchy of the valuation techniques that we utilized to determine such fair value:

	Fair Value Measurements at March 31, 2023 Using:			
(in thousands)	Level 1	Level 2	Level 3	Total
Cash equivalents:				
Money market funds	$ 48,960	$ —	$ —	$ 48,960
Marketable securities:				
U.S. treasury securities	—	192,999	—	192,999
Totals	$ 48,960	$ 192,999	$ —	$ 241,959

	Fair Value Measurements at December 31, 2022 Using:			
(in thousands)	Level 1	Level 2	Level 3	Total
Cash equivalents:				
Money market funds	$ 77,010	$ —	$ —	$ 77,010
Marketable securities:				
U.S. treasury securities	—	185,920	—	185,920
Totals	$ 77,010	$ 185,920	$ —	$ 262,930

4. Collaboration and License Agreement

Moderna Collaboration and License Agreement

In March 2023, we entered into a Collaboration and License Agreement, or the Collaboration Agreement, with Moderna to collaborate on developing treatments for certain diseases by targeting delivery of nucleic acids to liver cells and certain cells outside of the liver.

Under the Collaboration Agreement, the parties have agreed to collaborate on preclinical research programs relating to lipid nanoparticle, or LNP, delivery systems and nucleic acid payloads, with each party obtaining certain rights to intellectual property used in and arising out of such research programs. Each party will be solely responsible for its own clinical development and commercialization of products under the Collaboration Agreement. Moderna will reimburse us for the internal and external costs incurred by us in conducting the research programs, to the extent consistent with such research plans and budgets.

Moderna has exclusive options, upon payment of option exercise fees, to obtain worldwide, exclusive, sublicensable licenses under specified company intellectual property to develop, manufacture and commercialize (a) products comprising LNP delivery systems and nucleic acid payloads that are directed to (i) up to two liver targets, (ii) up to two non-liver targets and (iii) a third liver or non-liver target and (b) “Exclusive Targets,” which are Independent Program Products (as defined below) that include messenger RNA, or mRNA ,that are directed to gene and protein targets in any of certain agreed-upon cell types, referred to as the Cell Target Types. Subject to the our exclusivity obligations described below, each party has granted to the other a worldwide, non-exclusive, sublicensable license under certain LNP-related intellectual property arising out of the non-liver ctLNP program, or the Joint Collaboration ctLNP Intellectual Property, to develop, manufacture and commercialize products comprising LNP delivery systems and nucleic acid payloads directed to gene and protein targets in any of the Cell Target Types, or Independent Program Products.

Each party is obligated to use commercially reasonable efforts to complete the activities assigned to it under the research plans, and Moderna is further obligated to use commercially reasonable efforts to develop, seek regulatory approval for and commercialize at least one product directed to each target for which Moderna exercises its exclusive license option in at least one indication in the United States and in specified European countries.

We have agreed not to, directly or indirectly, alone or with, for or through any third party, develop, manufacture, commercialize or exploit (a) products containing mRNA that are directed to any of the Cell Target Types, during an agreed-upon exclusivity period, which may be extended by payment of extension fees, (b) products directed to any liver target or non-liver target during the option periods for those targets, (c) products directed to any liver target or non-liver target for which Moderna has exercised its exclusive license option or (d) products containing mRNA that are directed to any Exclusive Target for which Moderna has exercised its exclusive license option.

Under the terms of the Collaboration Agreement, in April 2023, Moderna made an upfront payment to us of $40.0 million, as well as $7.5 million in prepaid research funding. In addition, we are eligible to receive up to $1.8 billion in milestone payments upon the achievement of specified development, regulatory, commercial, and sales milestone events, research term extension fees and exclusivity extension fees. Subject to reductions in specified circumstances, we will also be entitled to receive tiered royalties: (i) ranging from high-single-digits to low-double-digits on sales of licensed products that are directed to any liver target or non-liver target with respect to which Moderna has exercised its exclusive license option, and (ii) in the single digits on sales of Independent Program Products, including the exclusively licensed Independent Program Products directed to the Exclusive Targets. In consideration for the non-exclusive license granted by Moderna to us under the Joint Collaboration ctLNP Intellectual Property, we have agreed to pay Moderna tiered royalties in the single digits on sales of Independent Program Products that include mRNA, subject to reductions in specified circumstances. Royalties will be paid by each party, on a licensed product-by-licensed product and country-by-country basis, until the latest to occur of: (i) expiration of the last-to-expire of specified licensed patent rights; (ii) expiration of regulatory exclusivity; or (iii) ten (10) years after the first commercial sale of the applicable licensed product..

In addition, in connection with the execution of the Collaboration Agreement, we entered into a Share Purchase Agreement, or the Share Purchase Agreement, with Moderna, pursuant to which we issued and sold 5,859,375 shares of

our common stock to Moderna, at a price of $6.14 per share, for an aggregate purchase price of $36.0 million, which closed concurrently with the execution of the Collaboration Agreement. Under the Share Purchase Agreement, Moderna has the right, subject to certain terms and conditions, to purchase up to 3.06% of the outstanding shares of our common stock (on a post-closing basis) in connection with a future equity financing of at least $25.0 million by us.

Moderna Agreement Assessment

We assessed the promised goods and services under the Collaboration Agreement, in accordance with ASC 606. At inception, the Collaboration Agreement included one combined performance obligation, which includes the license to the ctLNP technology to target indications outside of the liver and the related research services to develop such technology, as the two items are not distinct in context of the contract. The Collaboration Agreement also provides Moderna with options to receive additional research services and options to receive exclusive licenses. The options to receive exclusive licenses allow Moderna to develop and commercialize product candidates that utilize our ctLNP and ceDNA technology for targets within the liver, as well as utilizing the ctLNP technology to be developed as part of the Collaboration Agreement and our ceDNA technology for targets outside the liver. These options are considered to be a priced at a discount to its standalone selling price and therefore are considered to be material rights.

The transaction price will initially include the $40.0 million upfront fee, the premium paid over the fair value of the common stock of $13.3 million in connection with shares issued and sold to Moderna under the Share Purchase Agreement, and the estimated revenue associated with the payment for research services, including $7.5 million in prepaid research services. We utilized the expected amount method to determine the amount of reimbursement for these activities. We utilized the most likely amount method to determine the amount of consideration to include in the transaction price related to any variable consideration related to exclusivity fees, and milestones, and the royalty payments are constrained based on the royalty constraint. No amounts are included in the transaction price related to these elements.

The transaction price was allocated to the performance obligation and material rights based on the relative estimated standalone selling prices of each element, over which management has applied significant judgment. We developed the estimated standalone selling price for combined performance obligation and each of the options to receive licenses primarily based on the probability-weighted present value of expected future cash flows associated with each license related to each specific program and an estimate of the costs to provide services including a reasonable return. In developing such estimate, we also considered applicable market conditions and relevant entity-specific factors, including those factors contemplated in negotiating the agreement, the probability of success and the time needed to commercialize a product candidate pursuant to the associated license.

We measure proportional performance of the combined performance obligation over time using an input method based on cost incurred relative to the total estimated costs on a quarterly basis by determining the proportion of effort incurred as a percentage of total effort we expect to expend. Any changes to these estimates will be recognized in the period in which they change as a cumulative catch up. All allocated consideration for the material rights is deferred until such time that Moderna exercises its options or the right to exercise the options expires. Upon exercise, we will determine the appropriate revenue recognition methodology and any other implications on the accounting treatment for the arrangement.

As of March 31, 2023, no services have been performed under the combined performance obligation and therefore no amounts have been recognized. As of March 31, 2023, we recorded $5.7 million and $55.1 million as deferred revenue and deferred revenue, net of current portion, respectively, on our condensed consolidated balance sheet.

5. Property and equipment, net

Property and equipment, net consisted of the following:

(in thousands)	March 31, 2023	December 31, 2022
Laboratory equipment	$ 13,595	$ 13,619
Computer equipment and software	1,262	1,189
Furniture and fixtures	1,146	1,146
Leasehold improvements	20,786	20,786
Construction in progress	1,068	13
	37,857	36,753
Less: Accumulated depreciation and amortization	(15,827)	(14,538)
Total	$ 22,030	$ 22,215

Depreciation and amortization expense for the three months ended March 31, 2023 and 2022 was $1.3 million and $1.2 million, respectively.

6. Accrued Expenses

Accrued expenses and other current liabilities consisted of the following:

(in thousands)	March 31, 2023	December 31, 2022
Accrued employee compensation and benefits	$ 3,015	$ 7,970
Accrued external research and development expenses	2,406	1,959
Accrued professional fees	1,253	1,047
Property and equipment	388	—
Other	585	426
Total	$ 7,647	$ 11,402

7. Equity

As of March 31, 2023, our amended and restated certificate of incorporation authorizes us to issue 150,000,000 shares of common stock, par value $0.0001 per share, and 5,000,000 shares of preferred stock, par value $0.0001 per share, all of which preferred stock is undesignated.

In August 2021, we entered into an “at-the-market” sales agreement pursuant to which we may, from time to time, sell shares of our common stock having an aggregate offering price of up to $250.0 million. As of May 10, 2023, the issuance date of these condensed consolidated financial statements, we have issued and sold 1,795,524 shares of our common stock pursuant to this sales agreement resulting in net proceeds of $12.3 million.

In March 2023, in connection with the Share Purchase Agreement with Moderna, we issued and sold 5,859,375 shares of our common stock to Moderna at a price of $6.14 per share for an aggregate purchase price of $36.0 million. For additional information, refer to Note 4, Collaboration and License Agreements.

Each share of common stock entitles the holder to one vote on all matters submitted to a vote of our stockholders. Holders of common stock are not entitled to receive dividends, unless declared by the board of directors.

8. Stock-Based Compensation

Stock incentive plans

Our 2017 Stock Incentive Plan, or the 2017 Plan, provided for us to grant incentive stock options or nonstatutory stock options, restricted stock, restricted stock units and other equity awards to employees, non-employees, and directors.

In May 2020, our board of directors adopted, and in June 2020, our stockholders approved, the 2020 Stock Incentive Plan, or the 2020 Plan, and, together with the 2017 Plan, the Plans, which became effective on June 11, 2020. The 2020 Plan provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock units and other stock-based awards. The number of shares of common stock reserved for issuance under the 2020 Plan is the sum of (1) 2,547,698 shares; plus (2) the number of shares (up to a maximum of 7,173,014 shares) as was equal to the sum of (x) the number of shares of common stock reserved for issuance under the 2017 Plan that remained available for grant under the 2017 Plan on June 11, 2020 and (y) the number of shares of common stock subject to outstanding awards granted under the 2017 Plan that expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right; plus (3) an annual increase, to be added on the first day of each fiscal year, beginning with the fiscal year ending December 31, 2021 and continuing until, and including, the fiscal year ending December 31, 2030, equal to the lesser of (i) 4% of the number of shares of common stock outstanding on such date, and (ii) an amount determined by the board of directors. In January 2021, 2022 and 2023, the number of shares of common stock authorized for issuance under the 2020 Plan was increased from 10,275,717 shares to 12,154,517 shares, from 12,154,517 shares to 14,433,745 shares, and from 14,433,745 shares to 16,813,962 shares, respectively. Upon the effectiveness of the 2020 Plan, we ceased granting additional awards under the 2017 Plan.

The Plans are administered by the board of directors or, at the discretion of the board of directors, by a committee of the board of directors. The exercise prices, vesting and other restrictions on any award under the Plans are determined at the discretion of the board of directors, or its committee if so delegated. Stock options granted under the Plans with service-based vesting conditions generally vest over four years and expire after ten years. The exercise price for stock options granted is not less than the fair value of common stock as of the date of grant. Prior to our IPO, fair value of common stock was determined by the board of directors. Subsequent to our IPO, fair value of common stock is based on quoted market prices.

As of March 31, 2023, 1,207,324 shares remained available for future issuance under the 2020 Plan. Shares subject to outstanding awards granted under the Plans that expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right will be available for future awards under the 2020 Plan.

Grant of stock options

During the three months ended March 31, 2023, we granted time-based options to certain employees for the purchase of an aggregate of 1,365,391 shares of common stock with a weighted average grant date fair value of $3.68 per share that vest over a weighted average period of approximately four years.

Restricted stock units

During the three months ended March 31, 2023, we issued 695,595 restricted stock units with a fair value of $3.3 million that vest over a weighted average period of approximately 3.9 years.

Employee stock purchase plan

In May 2020, our board of directors adopted, and in June 2020, our stockholders approved, the 2020 Employee Stock Purchase Plan, or the 2020 ESPP, which became effective June 11, 2020. The 2020 ESPP is administered by our board of directors or by a committee appointed by the board of directors. The number of shares of common stock authorized for issuance under the 2020 ESPP automatically increases on the first day of each fiscal year, beginning with the fiscal year

that commenced on January 1, 2021 and continuing for each fiscal year until, and including the fiscal year commencing on, January 1, 2030, in an amount equal to the lowest of (1) 1,302,157 shares of common stock, (2) 1% of the number of shares of common stock outstanding on such date, and (3) an amount determined by the board of directors. In January 2021, 2022, and 2023, the number of shares of common stock authorized for issuance under the 2020 ESPP was increased from 481,231 shares to 950,931 shares, from 950,931 shares to 1,520,738 shares, and from 1,520,738 shares to 2,115,792 shares, respectively. As of March 31, 2023, 1,933,830 shares remained available for issuance under the 2020 ESPP.

Stock-based compensation

Stock-based compensation expense was classified in the condensed consolidated statements of operations and comprehensive loss as follows:

	Three Months Ended March 31,	
(in thousands)	**2023**	**2022**
Research and development expenses	$ 2,855	$ 3,151
General and administrative expenses	3,411	2,915
Total	$ 6,266	$ 6,066

As of March 31, 2023, total unrecognized compensation cost related to unvested time-based stock options and restricted stock units was $42.6 million, with $35.8 million expected to be recognized over a weighted average period of 2.9 years and $6.8 million expected to be recognized over a weighted average period of 2.3 years, respectively. Additionally, as of March 31, 2023, we had unrecognized compensation cost related to unvested stock options with performance-based vesting conditions for which performance has not been deemed probable of $1.7 million.

9. Commitments and Contingencies

401(k) Plan

We have a defined-contribution plan under Section 401(k) of the Internal Revenue Code of 1986, as amended, or the 401(k) Plan. The 401(k) Plan covers all employees who meet defined minimum age and service requirements and allows participants to contribute a portion of their annual compensation on a pre-tax and/or after-tax basis. In September 2020, we adopted a match program, beginning on January 1, 2021, for employee contributions to the 401(k) Plan up to a maximum of four percent of the employee's salary, subject to the maximums established under the U.S. Internal Revenue Code of 1986, as amended.

Indemnification agreements

In the ordinary course of business, we may provide indemnification of varying scope and terms to vendors, lessors, contract research organizations, business partners and other parties with respect to certain matters including, but not limited to, losses arising out of breach of such agreements or from intellectual property infringement claims made by third parties. In addition, we have entered into indemnification agreements with members of our board of directors and our officers that will require us, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. The maximum potential amount of future payments we could be required to make under these indemnification agreements is, in many cases, unlimited. We have not incurred any material costs as a result of such indemnifications and are not currently aware of any indemnification claims.

Legal proceedings

We, from time to time, may be party to litigation arising in the ordinary course of business. We were not subject to any material legal proceedings during the three months ended March 31, 2023.

10. Net Loss per Share

We have generated a net loss in all periods presented, therefore the basic and diluted net loss per share attributable to common stockholders are the same as the inclusion of the potentially dilutive securities would be anti-dilutive. We excluded the following potential common shares, presented based on amounts outstanding at each period end, from the computation of diluted net loss per share attributable to common stockholders for the periods indicated:

	March 31,	
	2023	2022
Unvested restricted stock units	1,411,002	1,537,744
Stock options to purchase common stock	10,032,920	8,473,696
Total	11,443,922	10,011,440

11. Related Parties

In March 2023, we entered into the Collaboration Agreement with Moderna. In connection with the Share Purchase Agreement, we issued and sold 5,859,375 shares of our common stock to Moderna, which resulted in Moderna becoming the beneficial owner of 8.9% of our outstanding common stock and a related party.

Item 2. 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 is meant to provide material information relevant to an assessment of the financial condition and results of operations of our company, including an evaluation of the amounts and uncertainties of cash flows from operations and from outside resources, so as to allow investors to better view our company from management's perspective. It should be read in conjunction with our condensed consolidated financial statements and related notes appearing elsewhere in this Quarterly Report on Form 10-Q, or Quarterly Report, and our consolidated financial statements and related notes appearing in our most recently filed Annual Report on Form 10-K, or Annual Report, with the Securities and Exchange Commission, or SEC. Some of the information contained in this discussion and analysis or set forth elsewhere in this Quarterly Report, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this Quarterly Report, in our Annual Report and in the other documents filed with the SEC, our actual results could differ materially from the results described in, or implied by, the forward-looking statements contained in the following discussion and analysis.

Overview

We are innovating genetic medicines to provide durable, redosable treatments for potentially hundreds of millions of patients living with rare and prevalent diseases. Our non-viral genetic medicine platform incorporates our high-capacity DNA construct called closed-ended DNA, or ceDNA; our cell-targeted lipid nanoparticle delivery system, or ctLNP; and our highly scalable capsid-free manufacturing process that uses our proprietary cell-free rapid enzymatic synthesis, or RES, to produce ceDNA. Using our approach, we are developing novel genetic medicines to provide targeted delivery of genetic payloads that include large and multiple genes to a range of cell types across a broad array of diseases. We are also engineering our genetic medicines to be redosable, which may enable individualized patient titration to reach the desired level of therapeutic expression and to maintain efficacy throughout a patient's life.

We are advancing a broad portfolio of programs, including programs for rare and prevalent diseases of the liver. We are focused on diseases with significant unmet need for which our non-viral genetic medicine platform may substantially improve clinical efficacy relative to current gene therapy approaches. We are initially prioritizing rare monogenic diseases that result from mutations in a single gene , and which can be treated by delivering our ceDNA cargo to cells of the liver, called hepatocytes. We are focusing on indications like hemophilia A, which is our lead program, that have well-established biomarkers and clear clinical and regulatory pathways. We are at the preclinical research stage, and are currently optimizing our ctLNPs to improve hepatocyte delivery to treat hemophilia A and other rare monogenic diseases. The biodistribution of our ctLNPs is driven by biological targeting molecules called ligands, which we believe will enable selective delivery to hepatocytes and ultimately to other cell types and tissues. We plan to expand our portfolio to include programs based on cell-targeted delivery of ceDNA to immune cells, tumors, retina, skeletal muscle, and to the central nervous system, or CNS, by developing discrete ctLNPs specifically engineered to reach each of these cell types or tissues.

In addition, we believe that our non-viral genetic medicine platform may be used to develop therapies that deliver antibody genes to direct the liver to produce antibody therapies from patients' own cells for years at a time from a single dose in a process we refer to as endogenous therapeutic antibody production, or ETAP. We plan to advance ETAP programs across multiple therapeutic areas, including prevalent diseases.

We also believe that our platform may be used to develop other therapeutic modalities and are exploring ways to apply our platform technologies. For example, we are conducting early research into the development of potential ceDNA-based vaccines using our proprietary vaccine-optimized ctLNPs. We believe that, compared to currently approved messenger RNA, or mRNA, vaccines, ceDNA-ctLNP vaccines could enable improved immune responses, more durable protection, and could be stored at ambient temperatures, potentially allowing for greater shelf stability than currently approved mRNA-LNP vaccines, which currently must be stored at very low temperatures, limiting distribution.

In July 2021, we entered into a lease agreement to build out a current Good Manufacturing Practice-, or cGMP-, compliant manufacturing facility, or the Seyon Facility, in Waltham, Massachusetts in order to scale ceDNA manufacturing utilizing RES for clinical and initial commercial supply. Following additional process development of RES, we decided to transition from building out the cGMP-compliant manufacturing facility to utilizing an external cleanroom for manufacturing, and

consequently, we are seeking one or more third parties to assume our lease or sublease the property. We have entered into an agreement with an external cleanroom facility at which we expect to manufacture cGMP-compliant clinical and initial commercial supply of ceDNA using RES that will allow us to retain control over personnel, quality, infrastructure and process. Additionally, we may enter into agreements with contract manufacturing organizations, or CMOs, to provide further manufacturing capacity.

In March 2023, we entered into a Collaboration and License Agreement, or the Collaboration Agreement, with ModernaTX, Inc., or Moderna, to collaborate on developing treatments for certain diseases by targeting delivery of nucleic acids to liver cells and certain cells outside of the liver. Under the Collaboration Agreement, the parties have agreed to collaborate on preclinical research programs relating to lipid nanoparticle, or LNP, delivery systems and nucleic acid payloads, with each party obtaining certain rights to intellectual property used in and arising out of such research programs.

The research programs will be conducted pursuant to research plans and associated research budgets established by governance committees formed by the parties. Moderna will reimburse us for the internal and external costs we incur in conducting the research programs, to the extent consistent with such research plans and budgets. Each party will be solely responsible for its own clinical development and commercialization of products under the Collaboration Agreement.

In addition, Moderna has exclusive options, upon payment of option exercise fees, to obtain worldwide, exclusive, sublicensable licenses under certain of our specified intellectual property to develop, manufacture and commercialize (a) products comprising LNP delivery systems and nucleic acid payloads that are directed to (i) up to two liver targets, (ii) up to two agreed-upon non-liver targets and (iii) a third liver or non-liver target and (b) products comprising LNP delivery systems that include mRNA that are directed to gene and protein targets in any of the agreed-upon immune cell types, or Cell Targets Types.

Under the terms of the Collaboration Agreement, April 2023, Moderna made an upfront payment to us of $40.0 million, as well as $7.5 million in prepaid research funding. In addition, we are eligible to receive up to $1.8 billion in milestone payments upon the achievement of specified development, regulatory, commercial, and sales milestone events, research term extension fees and exclusivity extension fees. Subject to reduction in specified circumstances, we will also be entitled to receive tiered royalties: (i) ranging from high-single-digits to low-double-digits on sales of licensed products that are directed to the liver targets and non-liver targets with respect to which Moderna has exercised its exclusive license options, and (ii) in the single digits on sales of Independent Program Products, including the exclusively licensed Independent Program Products. In consideration for the non-exclusive license granted by Moderna to us under the LNP-related intellectual property arising out of the research program focused on the discovery and development of ctLNPs directed to agreed-upon immune cell types, we have agreed to pay Moderna tiered royalties ranging from low-single-digits to mid-single-digits on sales of Independent Program Products that include mRNA, subject to reductions in specified circumstances.

In connection with the execution of the Collaboration Agreement, we entered into a Share Purchase Agreement with Moderna, pursuant to which we issued and sold 5,859,375 shares of our common stock to Moderna, at a price of $6.14 per share, for an aggregate purchase price of $36.0 million, which closed concurrently with the execution of the Collaboration Agreement. In addition, under the Share Purchase Agreement, Moderna has the right, subject to certain terms and conditions, to purchase up to 3.06% of the outstanding shares of our common stock (on a post-closing basis) in connection with a future equity financing of at least $25.0 million by us. For additional information on our collaboration with Moderna and the accounting thereunder, refer to Note 4, Collaboration and License Agreements.

Since our inception in October 2016, we have focused substantially all of our resources on building our non-viral genetic medicine platform, establishing and protecting our intellectual property portfolio, conducting research and development activities, developing our manufacturing process, organizing and staffing our company, business planning, raising capital and providing general and administrative support for these operations. We do not have any products approved for sale and have not generated any revenue from product sales. We expect that any revenue recognized for the next several years will be derived primarily from our current collaboration with Moderna and any additional collaborations that we may enter into in the future. As of March 31, 2023, we recorded $5.7 million and $55.1 million as deferred revenue and deferred revenue, net of current portion, respectively, on our condensed consolidated balance sheet. Historically, we have funded our operations with proceeds from the sale of instruments convertible into convertible preferred stock (which converted

into convertible preferred stock in 2017), sales of convertible preferred stock (which converted into common stock in 2020), and sales of common stock in underwritten public offerings, "at-the-market" offerings, and in a private placement, as well as payments pursuant to our collaboration with Moderna. In June 2020, we completed our initial public offering, or IPO, pursuant to which we issued and sold 12,105,263 shares of our common stock, including 1,578,947 shares sold by us pursuant to the full exercise of the underwriters' option to purchase additional shares. We received net proceeds of $210.7 million, after deducting underwriting discounts and commissions and other offering expenses. In January 2021, we issued and sold 9,200,000 shares of our common stock, including 1,200,000 shares sold by us pursuant to the full exercise of the underwriters' option to purchase additional shares, in a follow-on public offering, resulting in net proceeds of $211.3 million after deducting underwriting discounts and commissions and other offering expenses. In August 2021, we entered into an "at-the-market" sales agreement pursuant to which we may, from time to time, sell shares of our common stock having an aggregate offering price of up to $250.0 million. As of May 10, 2023, we have issued and sold 1,795,524 shares of our common stock pursuant to this sales agreement resulting in net proceeds of $12.3 million. In March 2023, in connection with the Share Purchase Agreement entered into with Moderna, we issued and sold 5,859,375 shares of our common stock to Moderna at a price of $6.14 per share for an aggregate purchase price of $36.0 million.

Historically, we have incurred significant operating losses. Our ability to generate any product revenue or product revenue sufficient to achieve profitability will depend on the successful development and eventual commercialization of one or more product candidates we may develop. For the three months ended March 31, 2023 and 2022, we reported net losses of $32.1 million and $35.0 million, respectively. As of March 31, 2023, we had an accumulated deficit of $476.9 million. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. We expect that our expenses and capital requirements will increase substantially in connection with our ongoing activities, particularly if and as we:

- obtain, expand, maintain, defend and enforce our intellectual property portfolio;
- continue our current research programs and conduct additional research programs, including pursuant to our collaboration with Moderna;
- expand the capabilities of our proprietary non-viral genetic medicine platform;
- add operational, legal, compliance, financial and management information systems and personnel to support our research, product development, future commercialization efforts and operations as a public company;
- establish additional manufacturing sources and secure supply chain capacity sufficient to provide necessary quantities of any product candidates we may develop for clinical or commercial use;
- hire additional clinical, regulatory and scientific personnel;
- advance any product candidates we identify into preclinical and clinical development;
- seek marketing approvals for any product candidates that successfully complete clinical trials; and
- ultimately establish a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval.

We will not generate revenue from product sales unless and until we successfully complete clinical development and obtain regulatory approval for any product candidates we may develop. If we obtain regulatory approval for any product candidates we may develop, we expect to incur significant expenses related to developing our commercial capability to support product sales, marketing and distribution. Further, we expect to continue to incur additional costs associated with operating as a public company.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our

operations through a combination of equity offerings, debt financings, collaborations, strategic alliances and/or licensing arrangements, including our collaboration with Moderna. We may be unable to raise additional funds or enter into such other agreements or arrangements when needed on favorable terms, or at all. If we fail to raise capital or enter into such agreements when needed or on terms acceptable to us, we would be required to delay, limit, reduce or terminate our product development or future commercialization of one or more of our product candidates.

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. Even if we are able to generate product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

We believe that our existing cash, cash equivalents and marketable securities will enable us to fund our operating expenses and capital expenditures into 2025. We have based our estimates as to how long we expect we will be able to fund our operations on assumptions that may prove to be wrong. We could use our available capital resources sooner than we currently expect, in which case we would be required to obtain additional financing, which may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. See "—Liquidity and Capital Resources."

COVID-19

The COVID-19 pandemic has and will continue to present a public health and economic challenge around the world. The length of time and full extent to which the COVID-19 pandemic may directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain, subject to change and difficult to predict. We, our contract manufacturing organizations, or CMOs, and our contract research organizations, or CROs, continue to closely monitor the impact of the COVID-19 pandemic on our and their operations. Additionally, we have taken steps to monitor and strengthen our supply chain to maintain an uninterrupted supply of our critical products and services.

We also continue to closely monitor the ongoing impact and effects of the COVID-19 pandemic on our employees and our other business operations. In an effort to provide a safe work environment for our employees, we have maintained our increased cadence of sanitization of our office and lab facilities and a company policy requiring COVID-19 vaccinations for all employees, with certain limited exceptions.

We expect to continue to take actions as may be required or recommended by government authorities or as we determine are in the best interests of our employees and other business partners in light of the pandemic.

Components of Our Results of Operations

Operating expenses

Research and development expenses

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

- personnel-related costs, including salaries, benefits and stock-based compensation expense, for employees engaged in research and development functions;

- expenses incurred in connection with our research programs, including under agreements with third parties, such as consultants, contractors and CROs, and regulatory agency fees;

- the cost of developing and scaling our manufacturing process and capabilities and manufacturing drug substance and drug product for use in our research and preclinical studies, including under agreements with third parties, such as consultants, contractors and contract development organizations, or CDOs;

- laboratory supplies and research materials;

- facilities, depreciation and amortization and other expenses, which include direct and allocated expenses for rent and maintenance of facilities and insurance; and

- payments made under third-party licensing agreements.

We expense research and development costs as incurred. Advance payments that we make for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses. The prepaid amounts are expensed as the related goods are delivered or the services are performed.

Our external research and development expenses consist of costs that include fees and other costs paid to consultants, contractors, CDOs and CROs in connection with our research, preclinical and manufacturing activities. We do not allocate our research and development costs to specific programs because costs are deployed across multiple programs and our platform and, as such, are not separately classified. We expect that our research and development expenses will increase substantially as we advance our programs into clinical development and expand our discovery, research and preclinical activities in the near term and in the future. At this time, we cannot accurately estimate or know the nature, timing and costs of the efforts that will be necessary to complete the preclinical and clinical development of any product candidates we may develop. The successful development of any of our product candidates is highly uncertain. This is due to the numerous risks and uncertainties associated with product development, including the following:

- the timing and progress of preclinical studies, including investigational new drug, or IND , -enabling studies;

- the number and scope of preclinical and clinical programs we decide to pursue;

- raising additional funds necessary to complete preclinical and clinical development of our product candidates;

- the timing of the submission and acceptance of IND applications or comparable foreign applications that allow commencement of future clinical trials for our product candidates;

- the successful initiation, enrollment and completion of clinical trials, including under Good Clinical Practices;

- our ability to achieve positive results from our future clinical programs that support a finding of safety and effectiveness and an acceptable risk-benefit profile in the intended patient populations of any product candidates we may develop;

- our ability to scale RES to produce clinical and initial commercial supply;

- our ability to establish arrangements with third-party manufacturers for preclinical and clinical supply;

- the availability of specialty raw materials for use in production of our product candidates;

- our ability to establish new licensing or collaboration arrangements;

- the receipt and related terms of regulatory approvals from the U.S. Food and Drug Administration and other applicable regulatory authorities;

- our ability to establish, obtain, maintain, enforce and defend patent, trademark, trade secret protection and other intellectual property rights or regulatory exclusivity for any product candidates we may develop and our technology;

- our ability to maintain a continued acceptable safety, tolerability and efficacy profile of our product candidates following approval; and

- the terms and timing of any existing or future collaboration, license or other arrangement, including the terms and timing of any achievement of milestones and the receipt of payments thereunder.

A change in the outcome of any of these variables with respect to any product candidates we may develop could significantly change the costs and timing associated with the development of that product candidate. We may never succeed in obtaining regulatory approval for any product candidates we may develop.

General and administrative expenses

General and administrative expenses consist primarily of personnel-related costs, including salaries, benefits and stock-based compensation, for employees engaged in executive, legal, finance and accounting and other administrative functions. General and administrative expenses also include professional fees for legal, patent, consulting, investor and public relations and accounting and audit services as well as direct and allocated facility-related costs.

We anticipate that our general and administrative expenses will increase in the future as we increase our headcount to support our continued research activities and development of our programs and platform. We also anticipate that we will continue to incur substantial accounting, audit, legal, regulatory, compliance, director and officer insurance costs and investor and public relations expenses associated with operating as a public company.

Other income and interest income, net

Other income and interest income, net consists of interest income earned on our invested cash balances and other miscellaneous income unrelated to our core operations.

Results of Operations

Comparison of the three months ended March 31, 2023 and 2022

The following table summarizes our results of operations for the three months ended March 31, 2023 and 2022:

(in thousands)	Three Months Ended March 31, 2023	2022	Change 2023 vs 2022
Operating expenses:			
Research and development	$ 22,000	$ 25,554	$ (3,554)
General and administrative	12,866	9,790	3,076
Total operating expenses	34,866	35,344	(478)
Loss from operations	(34,866)	(35,344)	478
Other income:			
Other income and interest income, net	2,772	345	2,427
Net loss	$ (32,094)	$ (34,999)	$ 2,905

Research and development expenses

The following table summarizes our research and development expenses for the three months ended March 31, 2023 and 2022:

(in thousands)	Three Months Ended March 31, 2023	2022	Change 2023 vs 2022
Personnel-related	$ 7,277	$ 7,746	$ (469)
Preclinical and manufacturing	4,801	4,641	160
Facilities-related	3,359	5,339	(1,980)
Stock-based compensation	2,855	3,151	(296)
Lab supplies	824	1,479	(655)
Consulting and professional services	603	1,010	(407)
Other	2,281	2,188	93
Total research and development expenses	$ 22,000	$ 25,554	$ (3,554)

Research and development expenses were $22.0 million for the three months ended March 31, 2023, compared to $25.6 million for the three months ended March 31, 2022. The decrease in facilities-related costs of $2.0 million was primarily driven by our decision to transition from building out the Seyon Facility, to utilizing an external cleanroom facility for manufacturing cGMP-compliant clinical and initial commercial supply of ceDNA using RES after achieving increased scalability of the RES development process in the second half of 2022. The decrease in lab supplies of $0.7 million was driven primarily by the timing of supply purchases.

General and administrative expenses

The following table summarizes our general and administrative expenses for the three months ended March 31, 2023 and 2022:

(in thousands)	Three Months Ended March 31, 2023	2022	Change 2023 vs 2022
Personnel-related	$ 4,281	$ 4,057	$ 224
Stock-based compensation	3,411	2,915	496
Professional and consultant fees	2,125	2,049	76
Facilities-related	2,420	126	2,294
Other	629	643	(14)
Total general and administrative expenses	$ 12,866	$ 9,790	$ 3,076

General and administrative expenses were $12.9 million for the three months ended March 31, 2023, compared to $9.8 million for the three months ended March 31, 2022. The increase in facilities-related costs of $2.3 million was primarily driven by rent expense related to the Seyon Facility after our decision to transition from the Seyon Facility to utilizing an external cleanroom facility for manufacturing cGMP-compliant clinical and initial commercial supply of ceDNA using RES in the second half of 2022. The increases in stock-based compensation costs and personnel-related costs of $0.5 million and $0.2 million, respectively, were primarily a result of increases in equity award grants and increases employee compensation to support our general and administrative function.

Other income and interest income, net

Other income and interest income, net for the three months ended March 31, 2023 was $2.8 million, as compared to other income and interest income, net of $0.3 million for the three months ended March 31, 2022. The increase in other income and interest income, net during the three months ended March 31, 2023 was primarily due to an increase of interest earned on our invested cash balances.

Liquidity and Capital Resources

Since our inception, we have incurred significant operating losses. We expect to incur significant expenses and operating losses for the foreseeable future as we support our continued research activities and development of our programs and platform. We have not yet commercialized any product candidates and we do not expect to generate revenue from sales of any product candidates for several years, if at all. We expect that any revenue recognized for the next several years will be derived primarily from our current collaboration with Moderna and any additional collaborations that we may enter into in the future. To date, we have not received recognized any revenue under the Collaboration Agreement with Moderna. Historically, we have funded our operations with proceeds from the sale of instruments convertible into convertible preferred stock (which converted into convertible preferred stock in 2017), sales of convertible preferred stock (which converted into common stock in 2020), and sales of common stock in underwritten public offerings, “at-the-market” offerings, and in a private placement, as well as payments pursuant to our collaboration with Moderna. In June 2020, we completed our IPO, pursuant to which we issued and sold 12,105,263 shares of our common stock, including 1,578,947 shares sold by us pursuant to the full exercise of the underwriters’ option to purchase additional shares. We received net proceeds of $210.7 million, after deducting underwriting discounts and commissions and other expenses. In January 2021, we issued and sold 9,200,000 shares of our common stock, including 1,200,000 shares sold by us pursuant to the full exercise of the underwriters’ option to purchase additional shares, in a follow-on public offering, resulting in net proceeds of $211.3 million, after deducting underwriting discounts and commissions and other offering expenses. In August 2021, we entered into an “at-the-market” sales agreement pursuant to which we may, from time to time, sell shares of our common stock having an aggregate offering price of up to $250.0 million. As of May 10, 2023, the issuance date of the condensed consolidated financial statements, we have issued and sold 1,795,524 shares of our common stock pursuant to this sales agreement resulting in net proceeds of $12.3 million. In March 2023, in connection with the Share Purchase Agreement with Moderna, we issued and sold 5,859,375 shares of our common stock to Moderna at a price of $6.14 per share for an aggregate purchase price of $36.0 million. As of March 31, 2023, we had cash, cash equivalents and marketable securities of $288.6 million.

Cash flows

The following table summarizes our sources and uses of cash for each of the periods presented:

	Three Months Ended March 31,	
(in thousands)	**2023**	**2022**
Net cash used in operating activities	$ (27,677)	$ (35,435)
Net cash used in investing activities	(5,616)	(2,784)
Net cash provided by financing activities	35,772	52
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 2,479	$ (38,167)

Operating activities

During the three months ended March 31, 2023, operating activities used $27.7 million of cash, primarily resulting from our net loss of $32.1 million and cash used in the changes in our operating assets and liabilities of $1.1 million, offset by the net of non-cash charges of $5.5 million. Net cash used in changes in our operating assets and liabilities for the three months ended March 31, 2023 consisted of a $47.5 million increase of collaboration receivable, as offset by a $47.5 million increase of deferred revenue, a $1.1 million decrease of other noncurrent assets, a $1.3 million decrease in operating lease right-of-use assets, a $3.5 million decrease of accrued expense and other current liabilities and accounts payable, a $0.8 million decrease in prepaid expenses and other current assets, a $0.7 million increase in operating lease liability and a $1.4 million increase in tenant receivable.

During the three months ended March 31, 2022, operating activities used $35.4 million of cash, primarily resulting from our net loss of $35.0 million and cash used in the changes in our operating assets and liabilities of $7.7 million, offset by non-cash charges of $7.3 million. Net cash used by changes in our operating assets and liabilities for the three months ended March 31, 2022 consisted of a $5.2 million increase in other noncurrent assets, a $2.3 million decrease in operating lease right-of-use assets, a $4.1 million decrease of accrued expense and other current liabilities and accounts payable, a $0.2 million decrease in operating lease liability, and a $0.5 million increase in prepaid expenses and other current assets.

Changes in accounts payable, accrued expenses and other current liabilities, prepaid expenses, and other long-term assets in the periods were generally due to growth in our business and the timing of vendor invoicing and payments.

Investing activities

During the three months ended March 31, 2023, net cash used in investing activities was $5.6 million, primarily due to an increase in purchases of marketable securities of $87.9 million and property and equipment of $0.8 million during the period, offset by $83.0 million in maturities of marketable securities. During the three months ended March 31, 2022, net cash used in investing activities was $2.8 million, due to an increase in purchases of property and equipment during the period. Property and equipment purchases during the three months ended March 31, 2023 and 2022 were primarily related to leasehold improvements and lab equipment for our facility in Cambridge, Massachusetts.

Financing activities

During the three months ended March 31, 2023, net cash provided by financing activities was $35.8 million, consisting primarily of net proceeds from the sale and issuance of our common stock to Moderna, offset by payments for repurchase of common stock for employee tax withholdings. During the three months ended March 31, 2022, net cash provided by financing activities was $0.1 million, primarily consisting of proceeds from the exercise of common stock options during the period.

Funding requirements

We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we advance preclinical activities and initiate clinical trials for our product candidates in development. The timing and amount of our operating expenditures will depend largely on:

- the identification of additional research programs and product candidates;
- the scope, progress, costs and results of preclinical and clinical development for any product candidates we may develop;
- our research and development costs and the amounts we receive as reimbursement and milestone payments under our collaboration with Moderna;

- the costs, timing and outcome of regulatory review of any product candidates we may develop;
- the cost and timing of completion of commercial-scale manufacturing activities, including the costs and resources required to manufacture our drug substance and drug product using external cleanroom facilities and/or CMOs;
- the costs and timing of future commercialization activities, including product manufacturing, marketing, sales and distribution, for any product candidates we may develop for which we receive marketing approval;
- the costs and scope of the continued development of our non-viral genetic medicine platform;
- the costs of satisfying any post-marketing requirements;
- the revenue, if any, received from commercial sales of product candidates we may develop for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting applications for patents, obtaining, maintaining, defending and enforcing our intellectual property rights and defending against any intellectual property-related claims, including claims of infringement, misappropriation or other violation of third-party intellectual property;
- the costs of operational, financial and management information systems and associated personnel;
- the associated costs in connection with any acquisition of in-licensed products, intellectual property and technologies; and
- the costs of operating as a public company.

We believe that our existing cash, cash equivalents and marketable securities will enable us to fund our operating expenses and capital expenditures into 2025. We have based our estimates as to how long we expect we will be able to fund our operations on assumptions that may prove to be wrong. We could use our available capital resources sooner than we currently expect, in which case we would be required to obtain additional financing, which may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. Although we may receive potential future payments under our collaboration with Moderna, we do not have any committed external source of funds. Accordingly, we will be required to obtain further funding through public or private equity offerings, debt financings, collaborations and licensing arrangements or other sources. If we raise additional funds by issuing equity securities, our stockholders may experience dilution. Any future debt financing into which we enter would result in fixed payment obligations and may involve agreements that include grants of security interests on our assets and restrictive covenants that limit our ability to take specific actions, such as incurring additional debt, making capital expenditures, granting liens over our assets, redeeming stock or declaring dividends, that could adversely impact our ability to conduct our business. Any debt financing or additional equity that we raise may contain terms that could adversely affect the holdings or the rights of our common stockholders.

If we are unable to raise sufficient capital as and when needed, we may be required to significantly curtail, delay or discontinue one or more of our research or development programs or the commercialization of any product candidate we may develop, or be unable to expand our operations or otherwise capitalize on our business opportunities. If we raise additional funds through collaborations or licensing arrangements with third parties, we may have to relinquish valuable rights to future revenue streams or product candidates or grant licenses on terms that may not be favorable to us.

See the “Risk Factors” section of this Quarterly Report and in our Annual Report for additional risks associated with our substantial capital requirements.

Critical Accounting Policies and Significant Judgments and Estimates

Our condensed consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States of America, or GAAP. The preparation of our condensed consolidated financial statements and related disclosures requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, costs and expenses and related disclosures and the disclosure of contingent assets and liabilities in our condensed consolidated financial statements. We base our estimates on 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 significantly from these estimates under different assumptions or conditions.

We define our critical accounting policies as those accounting principles generally accepted in the United States that require us to make subjective estimates and judgments about matters that are uncertain and are likely to have a material impact on our financial condition and results of operations as well as the specific manner in which we apply those principles. Management has determined that our most critical accounting policies are those relating to accrued research and development expenses, stock-based compensation, and revenue recognition.

Except for the addition of Revenue Recognition, during three months ended March 31, 2023, there have been no material changes to our critical accounting policies and estimates from those disclosed in our financial statements and the related notes included in our Annual Report.

Revenue Recognition

We enter into collaboration agreements that are within the scope of ASC Topic 606, “Revenue from Contracts with Customers”, or ASC 606, under which we license rights to certain of our potential product candidates and perform research and development services.

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. To determine the appropriate amount of revenue to be recognized for contracts determined to be within the scope of ASC 606, we perform the following five 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, we satisfy each performance obligation. We only apply the five-step model to contracts when it is probable that we will collect consideration we are entitled to in exchange for the goods or services we transfer to the customer. For a further discussion, please see Note 2 – *Revenue Recognition*.

Item 3. Quantitative and Qualitative Disclosures about Market Risks.

Interest Rate Market Risk

We are exposed to market risk related to changes in interest rates. We had marketable securities of $193.0 million as of March 31, 2023. During the three months ended March 31, 2023, we recognized $2.8 million in interest earned on our invested cash balances and we did not record any impairment charges to our marketable securities. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because a majority of our investments are in short-term securities. Interest rate changes would result in a change in the net fair value of these financial instruments due to the difference between the current market interest rate and the market interest rate at the date of purchase of the financial instrument. We currently do not seek to hedge this exposure to fluctuations in interest rates. We have not been exposed to, nor do we anticipate being exposed to, material risks due to changes in interest rates.

Counterparty Credit Risk

Our investment portfolio is subject to counterparty credit risk due to potential changes in the credit ratings of the issuers. A downgrade in the credit rating of an issuer of a debt security or further deterioration of the credit markets could result in a decline in the fair value of the debt instruments. Our investment guidelines prohibit investment in auction rate securities and we do not believe we have any direct exposure to losses relating from mortgage-based securities or derivatives related thereto such as credit-default swaps.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, under the supervision and with the participation of our President and Chief Executive Officer and our Chief Financial Officer, our principal executive officer and principal financial and accounting officer, respectively, evaluated the effectiveness of our disclosure controls and procedures as of March 31, 2023. The term "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, 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 and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any disclosure 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 March 31, 2023, our President and Chief Executive Officer and our Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There were no other changes in our internal control over financial reporting (as defined in Rules 13a–15(f) and 15d–15(f) under the Exchange Act) during the three months ended March 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1A. Risk Factors.

The following information updates, and should be read in conjunction with, the risk factors discussed in Part I, Item 1A Risk Factors in our Annual Report, which could materially affect our business, financial condition, or future results.

We hold a portion of our cash and cash equivalents that we use to meet our working capital and operating expense needs in deposit accounts that could be adversely affected if the financial institutions holding such funds fail.

We hold a portion of cash and cash equivalents that we use to meet our working capital and operating expense needs in deposit accounts. The balance held in these accounts may exceed the Federal Deposit Insurance Corporation, or FDIC, standard deposit insurance limit of $250,000. If a financial institution in which we hold such funds fails or is subject to significant adverse conditions in the financial or credit markets, we could be subject to a risk of loss of all or a portion of such uninsured funds or be subject to a delay in accessing all or a portion of such uninsured funds. Any such loss or lack of access to these funds could adversely impact our short-term liquidity and ability to meet our operating expense obligations.

For example, on March 10, 2023, SVB and Signature Bank were closed by state regulators and the FDIC was appointed receiver for each bank. The FDIC created successor bridge banks and all deposits of SVB and Signature Bank were transferred to the bridge banks under a systemic risk exception approved by the United States Department of the Treasury, the Federal Reserve and the FDIC. While we believe that we are not exposed to significant credit risk due to the financial strength of the national depository institutions in which our cash, cash equivalents, and marketable securities are held, if the financial institutions in which we hold funds for working capital and operating expenses were to fail, we cannot provide any assurances that such governmental agencies would take action to protect our uninsured deposits in a similar manner.

We also maintain investment accounts in which we hold our investments and, if access to the funds we use for working capital and operating expenses is impaired, we may not be able to open new operating accounts or to sell investments or transfer funds from our investment accounts to new operating accounts on a timely basis sufficient to meet our operating expense obligations.

We have entered into, and we may continue to enter into, collaborations with third parties for the research, development and commercialization of certain of the product candidates we may develop. If any such collaborations are not successful, we may not be able to capitalize on the market potential of those product candidates.

In March 2023, we entered into the Collaboration Agreement with Moderna, to collaborate on developing treatments for certain diseases by targeting delivery of nucleic acids to liver cells and certain cells outside of the liver utilizing our ctLNP proprietary platform. We may seek in the future additional third-party collaborators for the research, development and commercialization of certain of the product candidates we may develop. However, we have agreed to certain exclusivity provisions that limit our ability to develop, manufacture, commercialize or exploit certain products we develop pursuant to the Collaboration Agreement or against certain targets set forth in the Collaboration Agreement and, as a result, could limit our ability to into additional third-party collaborations. We will likely have limited control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of any product candidates we may seek to develop with them. For example, while Moderna has agreed to use commercially reasonable efforts to complete the activities assigned to it under the research plans set forth in the Collaboration Agreement, we cannot control the amount or timing of resources that they dedicate to these activities. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. We cannot predict the success of our collaboration with Moderna or any other collaboration that we may enter into.

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

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not pursue development and commercialization of any product candidates we may develop or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborator's strategic focus or available funding or external factors such as an acquisition that diverts resources or creates competing priorities;
- collaborators may delay programs, preclinical studies or clinical trials, provide insufficient funding for programs, preclinical studies or clinical trials, stop a preclinical study or 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;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with any product candidates we may develop if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- collaborators may be acquired by a third party having competitive products or different priorities;

- collaborators with marketing and distribution rights to one or more medicines may not commit sufficient resources to the marketing and distribution of such medicine or medicines;

- collaborators may not properly obtain, maintain, enforce or defend our intellectual property or proprietary rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our proprietary information or expose us to potential litigation;

- disputes may arise between the collaborators and us that result in the delay or termination of the research, development, or commercialization of our medicines or any product candidates we may develop or that result in costly litigation or arbitration that diverts management attention and resources;

- we may lose certain valuable rights under certain circumstances, including if we undergo a change of control;

- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates we may develop; and

- collaboration agreements, including the Collaboration Agreement with Moderna, 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 were 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 our collaborations do not result in the successful development and commercialization of product candidates, 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, our development of product candidates could be delayed, and we may need additional resources to develop product candidates. In addition, if one of our collaborators terminates its agreement with us, we may find it more difficult to find a suitable replacement collaborator or attract new collaborators, and our development programs may be delayed or the perception of us in the business and financial communities could be adversely affected. All of the risks relating to product development, regulatory approval and commercialization described in the risk factors discussed in Part I, Item 1A in our Annual Report apply to the activities of our collaborators.

We may in the future decide to collaborate with pharmaceutical and biotechnology 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 with a future collaborator 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.

Our current collaboration with Moderna, future acquisitions or strategic alliances could disrupt our business and harm our financial condition and results of operations.

We may acquire additional businesses or drugs, form strategic alliances or collaborations, such as our current collaboration with Moderna, or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new drugs resulting from a strategic alliance, collaboration, including our current collaboration with Moderna, or acquisition that delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure our stockholders that, following any such

strategic alliance, acquisition or collaboration, we will achieve the expected synergies to justify the transaction. The risks we face in connection with acquisitions include:

- diversion of management time and focus from operating our business to addressing acquisition integration challenges;
- coordination of research and development efforts;
- retention of key employees from the acquired company;
- changes in relationships with strategic partners as a result of product acquisitions or strategic positioning resulting from the acquisition;
- cultural challenges associated with integrating employees from the acquired company into our organization;
- the need to implement or improve controls, procedures and policies at a business that prior to the acquisition may have lacked sufficiently effective controls, procedures and policies;
- liability for activities of the acquired company before the acquisition, including intellectual property infringement claims, violation of laws, commercial disputes, tax liabilities and other known liabilities;
- unanticipated write-offs or charges; and
- litigation or other claims in connection with the acquired company, including claims from terminated employees, customers, former stockholders or other third parties.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions or strategic alliances could cause us to fail to realize the anticipated benefits of these transactions, cause us to incur unanticipated liabilities and harm the business generally. There is also a risk that future acquisitions will result in the incurrence of debt, contingent liabilities, amortization expenses or incremental operating expenses, any of which could harm our financial condition or results of operations.

Item 6. Exhibits.

Exhibit Number	Description of Exhibit
10.1+*	Offer letter, dated March 17, 2023, by and between the registrant and Yalonda Howze, as amended.
10.2*†◇	Collaboration and License Agreement, dated March 23, 2023, by and between the registrant and ModernaTX, Inc.
10.3*◇	Share Purchase Agreement, dated March 23, 2023, by and between the registrant and ModernaTX, Inc.
31.1*	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1**	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2**	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.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 and contained in Exhibit 101)

* Filed herewith.

** Furnished herewith.

\+ Indicates management contract or compensatory plan.

† Certain schedules and exhibits have been omitted pursuant to Item 601 of Regulation S-K. A copy of any omitted schedule and/or exhibit will be furnished to the SEC upon request.

◇ Portions of this exhibit have been omitted pursuant to Item 601(b)(10)(iv) of Regulation S-K.

SIGNATURES

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

GENERATION BIO CO.

Date: May 10, 2023

By: /s/ Geoff McDonough
Geoff McDonough, M.D.
President and Chief Executive Officer
(Principal Executive Officer)

Date: May 10, 2023

By: /s/ Matthew Norkunas
Matthew Norkunas, M.D., M.B.A.
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 10.1

By Electronic Mail

March 17, 2023

Yalonda Howze
***
***

RE: Offer of Employment

Dear Yalonda:

We are very excited to offer you the position of Chief Legal Officer where you will play an essential role in building Generation Bio's foundation and long-term business and scientific success. Below are the terms of employment for your review and execution. If these terms are acceptable, please sign and return a copy to us within five business days.

1. **Position:** Your initial position with Generation Bio will be as Chief Legal Officer where you will be initially reporting to the Chief Executive Officer. This is a full-time position with a principal workplace at Generation Bio's headquarters in Cambridge, Massachusetts. The attached job description provides additional details about the position.

2. **Start Date:** Your employment will begin on April 5, 2023 (the "Start Date").

3. **Salary:** Generation Bio will pay you a Base Salary of $19,166.67 semimonthly ($460,000 on an annualized basis), payable in accordance with Generation Bio's standard payroll schedule and subject to applicable deductions and withholdings. This salary will be subject to periodic review and adjustments at Generation Bio's discretion. Because this is an exempt position, you will not be eligible for any overtime pay.

4. **Bonus:** During the term of your employment with Generation Bio, you will be eligible for an annual incentive bonus ("Bonus") for each fiscal year of your employment with Generation Bio. The amount, terms and conditions of such bonus are to be determined at the sole discretion of the Board of Directors of Generation Bio (the "Board"), and such terms and conditions may be changed at any time with or without notice to you. Your target annual Bonus shall be up to 40% of your annual salary. Your actual Bonus percentage is discretionary and will be subject to Generation Bio's assessment of your performance as well as the performance of Generation Bio during the applicable fiscal year. Any Bonus payable for the year in which you begin working for the Company shall be prorated based on your Start Date. Payment of the Bonus shall be contingent upon you being employed by Generation Bio as of the last day of the fiscal year in which it was earned. The annual Bonus, if any, shall be paid on or before March 15th of the calendar year following the fiscal year for which such Bonus is earned.

In addition, the Company will pay you a $65,000 one-time bonus within one month of your start date less appropriate payroll taxes. The bonus is deemed fully earned after twelve (12) months of active employment. Should you leave the company for any reason, voluntarily or involuntarily other than due to your termination by the Company without cause or your death, before you have completed twelve (12) months of active employment, 100% of the bonus is required to be repaid. Any repayment must be made on or before your final date of active employment and shall be by certified check to the Company or may be deducted from your final payroll.

5. **Incentive Equity Grant:** You will be eligible to participate in the Company's stock incentive program. Subject to the approval of the Board, you will be granted options to purchase 107,100 shares of Generation Bio's common stock (the "Options") and 53,550 Generation Bio restricted stock units (the "RSUs" and together with the Options, the "Equity Grant"). The Options and RSUs subject to the Equity Grant will vest and be subject to the terms and conditions of a written stock option and restricted stock unit agreement, as applicable, which you will be required to

sign, and/or the Company's written stock plan (the "Grant Documents"). The Options shall have an exercise price per share equal to the fair market value of the Company's common stock at the time of grant, as determined by the Board.

6. **Benefits:** You may participate in the benefit programs offered by the Company to its employees, provided that you are eligible under and subject to all provisions of the plan documents that govern those programs. Benefits are subject to change at any time in the Company's sole discretion. You will also be entitled to paid vacation and sick leave each year in accordance with the terms and conditions set forth in the Company's policies. You will also be entitled to receive reimbursement for all reasonable business expenses incurred by you in performing your services to the Company in keeping with Company policies. In addition, you may be eligible for other benefits offered by the Company as set forth in the Employee Guide, which can be accessed on the Company's intranet portal.

7. **Accrued Obligations:** If your employment terminates for any reason, including for Cause or as a result of Involuntary Termination, the Company will pay you the Accrued Obligations earned through your last day of employment (the "Separation Date") on or before the time required by law or applicable policy, except to the extent any such payments would accelerate compensation in a manner inconsistent with compliance with Section 409A of the Internal Revenue Code of 1986, as amended (the "Code").

8. **Severance Benefits:** If you are subject to an Involuntary Termination, in addition to the Accrued Obligations, you will be eligible to receive severance benefits as described under Sections 8(A) or (B) below, as applicable ("Severance Benefits"), provided you have: (i) returned all Company property in your possession on or prior to the Separation Date, (ii) resigned as a member of the Board of Directors of the Company (the "Board") or of any subsidiary of the Company, to the extent you are then a Director of the Company or of any such subsidiary, and (iii) entered into a separation agreement that has become enforceable and irrevocable and includes a general release of all claims you may have against the Company or persons affiliated with the Company and, at the Company's election, a non-competition covenant (the "Separation Agreement"). Notwithstanding the foregoing, except as set forth in Section 8(B)(iv), no term of this Agreement or the Separation Agreement shall impact or affect in any way your rights with respect to, and the Separation Agreement shall not include a waiver or release of any claims related to: (x) your status as a stockholder or equity holder of the Company or any rights you have under the terms of any equity award agreement between you and the Company, including any claims with respect to any options or other equity awards owned or held by you at the time your employment is terminated, or (y) any rights to indemnification from the Company, pursuant to any applicable governing documents of the Company or any applicable written agreement between you and the Company, rights under ERISA or rights which, as a matter of law, cannot be waived. The Separation Agreement, in a form to be provided to you by the Company, must be executed and become enforceable and irrevocable within 52 days following the Separation Date, or such shorter period of time prescribed by the Company (the date by which the Separation Agreement must become enforceable and irrevocable, the "Prescribed Deadline"). If the Separation Agreement is not executed or is executed but has not become enforceable and irrevocable by the Prescribed Deadline, you shall be entitled to the Accrued Obligations only and not to any Severance Benefits. Any Severance Benefits under either Section 8(A)(i) or 8(B)(i) shall be paid, either in a single lump sum, or begin to be paid in regular installments in each pay period, in the first regular payroll beginning after the Separation Agreement becomes enforceable and irrevocable, provided that if the foregoing 52-day period begins in the year in which your Separation Date occurs and ends in the following year, the Company will not make any payments before the first payroll date falling after the later of (A) January 1 of the year following the year in which your Separation Date occurs and (B) the date on which the Separation Agreement becomes enforceable and irrevocable (the date the Severance Benefits are paid or commence pursuant to this sentence, the "Payment Date"). For clarity, it is at the Company's option and sole discretion whether to make any such Severance Benefits payments in a single lump sum or through regular payroll payments. If the Company elects to make Severance Benefits payments in installments, then the first installment payroll shall include all amounts that would otherwise have been paid to you between the Separation Date and your receipt of the first payment.

A. Involuntary Termination Prior to or More than 12 months Following a Change in Control

In the event of your Involuntary Termination prior to or more than 12 months following a Change in Control, you are eligible to receive the following Severance Benefits:

i. Salary. The Company shall pay you an amount equal to nine (9) months of your base salary as in effect on the Separation Date either in a lump sum or in installments, as set forth in Section 8 above;

ii. Bonus Payment. The Company may pay you an amount determined by reference to your target annual incentive bonus for the year in which the Separation Date occurs, based on Company and individual performance for such year, as determined by the Board in its sole discretion for the Company as a whole, and pro- rated based on the number of days you were employed by the Company in such year, which payment (if any) will be paid to you in a single lump sum amount on the later of (1) the Payment Date or (2) the date on which bonuses are paid to other executives of the Company but no later than two and one-half (2.5) months following the end of the year in which the Separation Date occurs; and

iii. Health Insurance. If you are (i) participating in the Company's group health plan immediately prior to the Separation Date and (ii) you timely elect and pay the applicable premium for COBRA health, dental, and/or vision insurance continuation, as applicable, through the Company's COBRA administrator (currently Sentinel), then the Company will continue to pay to the relevant healthcare carriers for such COBRA coverage the share of the premium the Company would have paid to provide such health, dental, and/or vision coverage for you and your eligible dependents if you had remained employed by the Company for a period ending on the earlier of the date that is nine (9) months following the Separation Date or the date COBRA eligibility ends or the date on which you terminate such COBRA health, dental, and/or vision insurance continuation, as such premiums become due, provided that the Company's payment for COBRA coverage shall only apply if and while permitted under applicable tax or other laws as nondiscriminatory.

B. Involuntary Termination On or Within 12 Months Following a Change in Control

In the event of your Involuntary Termination on or within 12 months following a Change in Control (including the one-year anniversary thereof), you are eligible to receive the following Severance Benefits:

i. Salary. The Company shall pay you a lump sum amount on the Payment Date equal to eighteen (18) months of your base salary as in effect on the Separation Date;

ii. Bonus Payment. The Company shall pay you a lump sum amount on the Payment Date equal to the greater of (i) one and one-half (1.5) times your target annual incentive bonus amount for the year in which your Separation Date occurs or (ii) your pro-rated target annual incentive bonus amount for the year in which your Separation Date occurs based on the number of days you were employed by the Company in such year;

iii. Health Insurance. If you are (i) participating in the Company's group health plan immediately prior to the Separation Date and (ii) you timely elect and pay the applicable premium for COBRA health, dental, and/or vision insurance continuation, as applicable, through the Company's COBRA administrator (currently Sentinel), then the Company will continue to pay to the relevant healthcare carriers for such COBRA coverage the share of the premium the Company would have paid to provide such health, dental and/or vision coverage for you and your eligible dependents if you had remained employed by the Company for a period ending on the earlier of the date that is eighteen (18) months following the Separation Date or the date COBRA eligibility ends or the date on which you terminate such COBRA health, dental, and/or vision insurance continuation, as such premiums become due, provided that the Company's payment for COBRA coverage shall only apply if and while permitted under applicable tax or other laws as nondiscriminatory; and

iv. Equity. One hundred percent (100%) of the unvested portion of any then- outstanding Equity Grant shall vest and become fully exercisable or non-forfeitable as of the Separation Date, provided however, that:

a. no such acceleration shall be effective until the Separation Agreement has become enforceable and irrevocable; and

b. if the Separation Agreement does not become enforceable and irrevocable, the portions of the Equity Grants that would have vested as a result of this provision shall not vest and shall be treated in accordance with the terms and conditions of the applicable award agreement.

9. Representation Regarding Other Obligations. Your employment is contingent upon your signing the Company's Invention, Non-Disclosure, Non-Competition and Non-Solicitation Agreement (the "Non-Disclosure Agreement"), a copy of which is enclosed. Further, you hereby represent to the Company that you are not a party to any agreement of any type which may impact or limit your ability to become employed by or perform your job at the Company or which is in any way inconsistent with the terms of this offer letter. You represent and agree that you will not disclose to the Company, use, or induce the Company to use any confidential or proprietary information or material belonging to any current or previous employer or others. Further, you hereby represent that (i) your employment with the Company and this offer letter does not and will not violate or conflict with any obligations you may have to or any agreements you may have with any former employer and (ii) you have provided the Company with all written agreements that describe any continuing post-employment obligations to any former employer.

10. Taxes

A. Withholding.

All forms of compensation referred to in this letter are subject to reduction to reflect applicable withholding and payroll taxes and other deductions required by law. You hereby acknowledge that the Company does not have a duty to design its compensation policies in a manner that minimizes your tax liabilities and that you will not make any claim against the Company or the Board related to tax liabilities arising from your compensation.

B. Payments Subject to Section 409A.

Notwithstanding anything to the contrary in this Agreement, no severance payments that may become due under this Agreement may begin prior to the date of your Separation (determined as set forth below), which may occur on or after the termination of your employment. The following rules shall apply with respect to distribution of the severance payments, if any, to be provided to you under this Agreement, as applicable:

It is intended that each lump sum payment or installment payment (as the case may be) of the severance payments provided under this Agreement shall be treated as a separate "payment" for purposes of Section 409A of the Code ("Section 409A"). Neither the Company nor you shall have the right to accelerate or defer the delivery of any such payment(s) except to the extent specifically permitted or required by Section 409A.

If, as of the date of your Separation from the Company, you are not a "specified employee" (within the meaning of Section 409A), then each lump sum payment or installment payment of the severance payment(s) shall be made on the dates and terms set forth in this Agreement.

If, as of the date of your Separation from the Company, you are a "specified employee" (within the meaning of Section 409A), then:

1. Each lump sum payment or installment payment (as the case may be) of the severance payments due under this Agreement that, in accordance with the dates and terms set forth herein, will in all circumstances, regardless of when your Separation occurs, be paid within the short-term deferral period (as defined under Section 409A) shall be treated as a short-term deferral within the meaning of Treasury Regulation Section 1.409A-1(b)(4) to the maximum extent permissible under Section 409A and shall be paid on the dates and terms set forth this Agreement; and

2. Each lump sum payment or installment payment (as the case may be) of the severance payments due under this Agreement that is not described in this Section 10(B) and that would, absent this subsection,

be paid within the six-month period following your Separation from the Company shall not be paid until the date that is six months and one day after such Separation (or, if earlier, as soon as practicable following your death), with any such installments that are required to be delayed being accumulated during the six-month period and paid in a lump sum on the date that is six months and one day following your Separation and any subsequent installments, if any, being paid in accordance with the dates and terms set forth herein; provided, however, that the preceding provisions of this sentence shall not apply to any installment of payments if and to the maximum extent that that such installment is deemed to be paid under a separation pay plan that does not provide for a deferral of compensation by reason of the application of Treasury Regulation 1.409A-1(b)(9)(iii) (relating to separation pay upon an involuntary separation from service). Any installments that qualify for the exception under Treasury Regulation Section 1.409A-1(b)(9)(iii) must be paid no later than the last day of your second taxable year following the taxable year in which the Separation occurs.

The determination of whether and when your Separation from the Company has occurred shall be made in a manner consistent with, and based on the presumptions set forth in, Treasury Regulation Section 1.409A-1(h). Solely for purposes of this Section 10, "Company" shall include all persons with whom the Company would be considered a single employer under Section 414(b) and 414(c) of the Code.

All reimbursements and in-kind benefits provided under this Agreement shall be made or provided in accordance with the requirements of Section 409A to the extent that such reimbursements or in-kind benefits are subject to Section 409A, including, where applicable, the requirements that (i) any reimbursement is for expenses incurred during your lifetime (or during a shorter period of time specified in this letter agreement), (ii) the amount of expenses eligible for reimbursement during a calendar year may not affect the expenses eligible for reimbursement in any other calendar year, (iii) the reimbursement of an eligible expense will be made on or before the last day of the calendar year following the year in which the expense is incurred and (iv) the right to reimbursement is not subject to set off or liquidation or exchange for any other benefit.

The Company makes no representation or warranty and shall have no liability to you or to any other person if any of the provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A but that do not satisfy an exemption from, or the conditions of, that section.

11. **Interpretation, Amendment and Enforcement.** This offer letter, along with the Non-Disclosure Agreement and the Grant Documents, constitute the complete agreement between you and the Company, contain all the terms of your employment, and supersede any prior agreements, representations or understandings (whether written, oral or implied) between you and the Company. The terms of this offer letter and the resolution of any disputes as to the meaning, effect, performance or validity of this offer letter or arising out of, related to, or in any way connected with, this offer letter, your employment with the Company or any other relationship between you and the Company (the "Disputes") will be governed by Massachusetts law, excluding laws relating to conflicts or choice of law. You and the Company submit to the exclusive personal jurisdiction of the federal and state courts located in the Commonwealth of Massachusetts in connection with any Dispute or any claim related to any Dispute.

12. **Vaccination Requirement:** This offer is contingent on you being in compliance with Generation Bio's COVID-19 Vaccination Policy. Employees regularly working onsite at Generation Bio's facilities are required to be fully vaccinated against COVID-19. "Fully vaccinated" is currently defined as having received both doses of a two-dose vaccine (Pfizer or Moderna) or one dose of single dose vaccine (Johnson and Johnson) plus also having received a COVID-19 booster vaccination if five or more months have elapsed since the final dose of your primary vaccination series. Only vaccines that are FDA authorized or approved at the time of vaccination (including vaccinations authorized for emergency use by the FDA) will be accepted.

On your start date, you will be required to report your vaccination status and provide proof of vaccination (including booster shot(s)) to Generation Bio through the Generation Bio confidential PreworkScreen portal as part of your orientation. All vaccination and testing information will reside solely in the PreworkScreen portal separate from your personnel information and can only be accessed by select individuals in our HR department. If you are unable to be fully vaccinated prior to your start date for any reason or wish to discuss the possibility of a reasonable accommodation based on disability or religious beliefs, please contact us directly at covid@generationbio.com before your start date.

13. **Other Terms.** This offer letter shall not be construed as an agreement, either express or implied, to employ you for any stated term, and shall in no way alter the Company's policy of employment at-will, which means that you have the right to terminate your employment relationship with the Company at any time for any reason and the Company has the right to terminate its employment relationship with you at any time for any reason, with or without reason or notice. Similarly, nothing in this letter shall be construed as an agreement, either express or implied, to pay you any compensation or grant you any benefit beyond the end of your employment with the Company, except as may be required by, and subject to the conditions set forth in, Section 8. You have the right to consult with counsel before signing this offer letter. This offer is contingent on verification of your right to work in the United States, as demonstrated by your completion of the federal Form I-9 upon hire and your submission of acceptable documentation (as required by the Form I-9) verifying your identity and work authorization within three days of starting employment.

14. Definitions: The following terms have the meaning set forth below wherever they are used in this letter:

a. "Accrued Obligations" means: (i) any earned but unpaid base salary as of the Separation Date, (ii) any vested benefits you may have under any employee benefit plan of the Company as of the Separation Date in accordance with the terms of the applicable benefit plan, (iii) any unpaid expense reimbursements accrued prior to the Separation Date for which you have timely submitted appropriate documentation in accordance with Company policy, and (iv) any unpaid but earned bonus approved by the Board for a fiscal year preceding the year in which your employment is terminated.

b. "Cause" means (i) your material breach of the Non-Disclosure Agreement, (ii) your conviction of, or your plea of "guilty" or "no contest" to, a felony under the laws of the United States or any State, (iii) your gross negligence or willful misconduct in the performance of your duties, (iv) your continuing failure to perform assigned duties after receiving written notification of the failure from the Company, or (v) your failure to cooperate in good faith with a governmental or internal investigation of the Company or its directors, officers or employees, if the Company has requested your cooperation; provided, however, that "Cause" shall not be deemed to have occurred pursuant to subsection (iii), (iv), or (v) hereof unless you have first received written notice from the Company specifying in reasonable detail the particulars of such grounds and that the Company intends to terminate your employment hereunder for such grounds, and you have failed to cure such grounds to the Company's satisfaction within a period of thirty (30) days from the date of such notice.

c. "Change in Control" means the occurrence of any one or more of the following events, in each case only to the extent that such event also constitutes a "change in ownership" of the Company or a "change in the ownership of a substantial part of the Company's assets" for the purposes of Section 409A: (i) the consummation of a merger or consolidation of the Company with any other entity, other than a merger or consolidation in which voting securities of the Company outstanding immediately prior thereto continue to represent more than fifty percent (50%) percent of the total voting power entitled to vote generally in the election of directors: (A) the surviving or resulting corporation; or (B) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation immediately after such merger or consolidation; (ii) the acquisition by an individual, entity or group (within the meaning of Section 13(d)(3) or 14(d)(2) of the Exchange Act) (a "Person") of beneficial ownership of any capital stock of the Company if, after such acquisition, such Person beneficially owns (within the meaning of Rule 13d-3 under the Exchange Act) more than 50% of the total voting power of the then-outstanding securities of the Company entitled to vote generally in the election of directors; provided, however, that for purposes of this subsection (ii), the following acquisitions shall not constitute a Change in Control: (A) any acquisition directly from the Company or (B) any acquisition by any corporation pursuant to a merger or consolidation which falls within the exception provided in subsection (i) above; or (iii) the sale, transfer or exclusive license of all or substantially all of the assets of the Company.

d. "Involuntary Termination" means either (i) your Termination Without Cause, or (ii) your Resignation for Good Reason.

e. "Resignation for Good Reason" means a Separation as a result of your resignation within three (3) months after one of the following conditions has come into existence without your consent: (i) a reduction in your base salary

by more than 10% (unless such reduction is part of a broad-based salary reduction program at the Company); (ii) a material diminution of your authority, duties or responsibilities; or (iii) a relocation of your principal workplace by more than forty (40) miles.

A Resignation for Good Reason will not be deemed to have occurred unless you give the Company written notice of the condition within thirty (30) days after the condition comes into existence and the Company fails to remedy the condition within thirty (30) days after receiving your written notice.

f. “Separation” means a “separation from service,” as defined in the regulations under Section 409A.

g. "Termination Without Cause" means a Separation as a result of a termination of your employment by the Company without Cause, provided you are willing and able to continue performing services within the meaning of Treasury Regulation 1.409A-1(n)(1).

15. **General Provisions**

Severability. If any portion or provision of this Agreement shall to any extent be declared illegal or unenforceable by a court of competent jurisdiction, then the remainder of this Agreement shall remain be valid and enforceable to the fullest extent permitted under applicable law.

Jurisdiction. You and the Company hereby agree that the state and federal courts in the Commonwealth of Massachusetts shall have the exclusive jurisdiction to consider any matters related to this Agreement, including without limitation any claim of a violation of this Agreement. With respect to any such court action, you submit to the jurisdiction of such courts and you acknowledge that venue in such courts is proper.

Governing Law; Interpretation. This Agreement shall be interpreted and enforced under the laws of the Commonwealth of Massachusetts, without regard to conflict of law principles. In the event of any dispute, this Agreement is intended by the parties to be construed as a whole, to be interpreted in accordance with its fair meaning, and not to be construed strictly for or against either you or the Company or the “drafter” of all or any portion of this Agreement.

Entire Agreement. This Agreement shall be effective as of the date first set forth above. This Agreement constitutes the entire agreement between you and the Company with respect to the subject matter herein. This Agreement supersedes any previous agreements or understandings between you and the Company with respect to the subject matter herein, except for the Non-Disclosure Agreement, which remain in full force and effect.

We are excited about welcoming you to the Generation Bio team. We are eager to add your talent and energy to building a company capable of transforming patients’ lives around the world. This offer is valid for five business days from the date of this letter; we look forward to receiving a response from you acknowledging, by signing below, that you have accepted this offer of employment.

Very truly yours,

Generation Bio Co.
By: /s/Geoff McDonough
Name: Geoff McDonough
Title: Chief Executive Officer

I have read and accept this employment offer

By: /s/ Yalonda Howze

Name: Yalonda Howze
Dated: 3/17/2023

Exhibit 10.2

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential. Double asterisks denote omissions.

COLLABORATION AND LICENSE AGREEMENT

between

GENERATION BIO CO.

and

MODERNATX, INC.

dated

March 23, 2023

TABLE OF CONTENTS

Page

Page

COLLABORATION AND LICENSE AGREEMENT

This COLLABORATION AND LICENSE AGREEMENT (this "**Agreement**") is entered into as of March 23, 2023 (the "**Effective Date**") by and between:

GENERATION BIO CO., a Delaware corporation, having its principal place of business at 301 Binney St., Cambridge, MA 02142 (hereinafter referred to as "**GBIO**")

and

MODERNATX, INC., a Delaware corporation, having its principal place of business at 200 Technology Square, Cambridge, MA 02139 (hereinafter referred to as "**Moderna**").

GBIO and Moderna may sometimes individually be referred to hereafter as a "**Party**" or collectively as the "**Parties**."

WITNESSETH

WHEREAS, GBIO Controls (as defined below) certain intellectual property rights relating to a proprietary platform for non-viral delivery of DNA via cell-targeted lipid nanoparticles;

WHEREAS, Moderna Controls certain intellectual property rights relating to a proprietary platform for non-viral delivery of messenger RNA via lipid nanoparticles, and has substantial experience in the development and commercialization of messenger RNA therapeutics; and

WHEREAS, the Parties desire to collaborate on developing treatments for certain diseases by targeting delivery of nucleic acids to liver cells and certain cells outside of the liver.

NOW, THEREFORE, in consideration of the mutual covenants and obligations set forth herein, the Parties hereto, intending to be legally bound, agree as follows:

ARTICLE 1 - DEFINITIONS AND INTERPRETATION

1.1 **Definitions**. For the purposes of this Agreement the following words and phrases shall have the following meanings:

1.1.1 "**Accounting Standards**" means United States Generally Accepted Accounting Practices, consistently applied.

1.1.2 "**Acquirer**" has the meaning set forth in Section 1.1.29.

1.1.3 "**Acquirer Program**" has the meaning set forth in Section 2.9.3(b)(i).

1.1.4 "**[**]**" means [**] or any of its Affiliates (other than any Affiliate that becomes an Affiliate as a result, directly or indirectly, of Change of Control of [**], wherein the meaning of Change of Control shall apply *mutatis mutandis*).

1.1.5 "**[**] Agreement**" means the [**] Agreement by and between GBIO and [**], dated [**], as amended from time to time.

1.1.6 "**Additional Option Fee**" has the meaning set forth in Section 8.3.5.

1.1.7 "**Affiliate**" means, as to any Person, any other Person that, directly or indirectly, controls, is controlled by, or is under common control with such Person, as the case may be, for so long as such control exists. As used in this Section 1.1.7, "control" means: (a) to possess, directly or indirectly, the power to direct the management and policies of a Person, whether through ownership of voting securities or by contract relating to voting rights or corporate governance; or (b) direct or indirect beneficial ownership of at least fifty percent (50%) (or such lesser percentage that is the maximum allowed to be owned by a foreign Person in a particular jurisdiction and is sufficient to grant the holder of such voting stock or interest the power to direct the management and policies of such entity) of the voting stock or interest in a Person.

1.1.8 "**Agreement**" has the meaning set forth in the introduction to this Agreement.

1.1.9 "**Alliance Manager**" has the meaning set forth in Section 4.1.

1.1.10 "**Antitrust Clearance Date**" has the meaning set forth in Section 3.2.2.

1.1.11 "**Antitrust Counsel Only Material**" has the meaning set forth in Section 3.2.3.

1.1.12 "**Antitrust Law**" means the Hart-Scott-Rodino Antitrust Improvements Act of 1976 and the rules and regulations promulgated thereunder (the "**HSR Act**"), the Sherman Act, as amended, the Clayton Act, as amended, the Federal Trade Commission Act, as amended, and any other Applicable Laws related to merger control or designed to prohibit, restrict, or regulate actions having the purpose or effect of monopolization or restraint of trade, in the United States, all states and territories thereof, and any other jurisdiction in the Territory that Moderna or GBIO, in its good faith judgment, determines requires a pre-merger notification filing prior to consummation of any applicable transaction contemplated by this Agreement.

1.1.13 "**Applicable Law**" means any applicable law, statute, rule, regulation, ordinance, common law, or other pronouncement having the effect of law of any federal, national, multinational, state, provincial, county, city, or other political subdivision, as from time to time enacted, repealed, or amended, including Good Clinical Practices, Good Laboratory Practices, Good Manufacturing Practices, adverse event reporting requirements, guidance from the International Conference on Harmonization or other generally accepted conventions, the FD&C Act and similar laws and regulations in countries outside the United States, and all other rules, regulations, and requirements of the FDA or any other applicable Regulatory Authority.

1.1.14 "**Audited Party**" has the meaning set forth in Section 8.9.1.

1.1.15 "**Auditing Party**" has the meaning set forth in Section 8.9.1.

1.1.16 "**Backup Cell Target Type**" means the Cell Type [**].

1.1.17 "**Bankruptcy Code**" has the meaning set forth in Section 12.5.

1.1.18 "**Biosimilar Application**" means an application submitted to the FDA under subsection (k) of Section 351 of the PHSA, or any analogous application submitted to a Regulatory Authority in the United States or in another country in the world.

1.1.19 "**Biosimilar Competition**" means, on a Licensed Product-by-Licensed Product, country-by-country, and Calendar Quarter-by-Calendar Quarter basis, that (a) there are one (1) or more Biosimilar Products being sold in such country with respect to such Licensed Product in such Calendar Quarter and (b) such Biosimilar Product(s), by unit equivalent volume in such country in such Calendar Quarter, exceed a [**] percent ([**]%) share of the aggregate market in such country of such Licensed Product and all such Biosimilar Product(s) (based on the number of units of such Licensed Product and such Biosimilar Product(s) in the aggregate sold in such country, as reported by a Third Party reporting service agreed between the Parties acting reasonably (*e.g.*, [**])).

1.1.20 "**Biosimilar Product**" means, with respect to a Licensed Product in a country, any biological product that: (a) is marketed or sold in such country by a Third Party that (i) is not a Sublicensee (other than a Sublicensee who becomes a Sublicensee as a result of settlement of any litigation arising under the Biologics Price Competition and Innovation Act or any equivalent law in a jurisdiction outside the U.S.) and (ii) does not purchase such product in a chain of distribution that includes the applicable Party or any of its Affiliates or Sublicensees; and (b) has received all necessary approvals and licensures by the applicable Regulatory Authorities in such country to market and sell such product as (i) a "biosimilar" or "interchangeable biosimilar" of such Licensed Product, (ii) a "similar biological medicinal product" with respect to which such Licensed Product is the "reference medicinal product," or (iii) if not in the United States or European Union, as the foreign equivalent of a "biosimilar," "interchangeable," or "similar biological medicinal product" of such Licensed Product; in each case ((i)-(iii)), for use in such country pursuant to an abbreviated Regulatory Approval process governing approval of biosimilars based on the then-current standards for Regulatory Approval in such country (and where such Regulatory Approval was based in part upon findings by the Regulatory Authority(ies) of clinical safety and efficacy based on clinical data generated by the applicable Party or any of its Affiliates or Sublicensees with respect to such Licensed Product).

1.1.21 "**Breaching Party**" has the meaning set forth in Section 12.3.1.

1.1.22 "**Business Day**" means a day other than a Saturday or Sunday or any other day on which commercial banks in Boston, Massachusetts are authorized or required by Applicable Law to close.

1.1.23 "**Calendar Quarter**" means any of the three (3)-month periods beginning on January 1, April 1, July 1, or October 1 of any Calendar Year, except that the first Calendar Quarter of the Term shall commence on the Effective Date and end on March 31, 2023 and the last Calendar Quarter shall end on the last day of the Term.

1.1.24 "**Calendar Year**" means, (a) for the first Calendar Year, the period commencing on the Effective Date and ending on December 31, 2023, (b) for the last Calendar Year, the period commencing on January 1 of the last year of the Term, and ending on the last day of the Term, and (c) each interim period of twelve (12) months commencing on January 1 and ending on December 31.

1.1.25 "**ceDNA**" means a DNA molecule having [**].

1.1.26 "**Cell Type**" means any of the Cell Target Types or any other similarly defined human cell type.

1.1.27 "**Cell Target Type**" means [**] (a) T cells, [**].

1.1.28 "**Cell Target Type Success Criteria**" means, on a Cell Target Type-by-Cell Target Type basis:

(a) [**]; and

(b) [**].

1.1.29 "**Change of Control**" means, with respect to a Party, an event or transaction or series of events or transactions by which: (a) any Third Party (or group of Third Parties acting in concert) becomes the beneficial owner, directly or indirectly, of more than fifty percent (50%) of the outstanding securities of such Party or the total voting power of such securities normally entitled to vote in elections of directors for such Party; (b) any Third Party (or group of Third Parties acting in concert) holding less than fifty percent (50%) of the outstanding securities of such Party or the total voting power of such securities normally entitled to vote in elections of directors for such Party acquires, as a result of a reorganization, merger, or consolidation involving such Party, beneficial ownership, directly or indirectly, of more than fifty percent (50%) of the outstanding securities of the surviving entity or the total voting power of such securities normally entitled to vote in election of directors for the surviving entity immediately after such reorganization, consolidation, or merger; or (c) such Party conveys, transfers, or leases to a Third Party (i) all or substantially all of its assets or the control thereof or (ii) all or substantially all of its assets or business relating to this Agreement or the control thereof. The Third Party (or group of Third Parties acting in concert, as applicable) in any of clauses (a), (b), or (c) is referred to herein as the "**Acquirer**," and any of such Third Party's(ies') Affiliates (whether in existence as of or any time following the applicable transaction, but other than the Party subject to the Change of Control and its Affiliates as in existence prior to the applicable transaction or Persons that such Party or such Affiliates control (directly or indirectly) after the applicable transaction) are referred to collectively herein as the "**New Affiliates**."

1.1.30 "**Claim**" has the meaning set forth in Section 13.1.1.

1.1.31 "**Clinical Trial**" means any clinical study conducted on human subjects. Without limiting the foregoing, "Clinical Trial" includes any Phase I Clinical Trial, Phase II Clinical Trial, Phase III Clinical Trial, or Pivotal Clinical Trial, or any post-Regulatory Approval human clinical trial, as applicable, or any other similar test or study in human subjects.

1.1.32 "**Collaboration Affiliates**" means, with respect to a Change of Control of GBIO, all Persons that are GBIO's Affiliates (i) immediately prior to such Change of Control of GBIO or (ii) after such Change of Control of GBIO, other than the applicable Acquirer and any New Affiliates.

1.1.33 "**[**]**" has the meaning set forth in Section [**].

1.1.34 "**Collaborative Patent Rights**" has the meaning set forth in Section 10.2.3.

1.1.35 "**[**]**" means [**].

1.1.36 "**Combination Product**" has the meaning set forth in Section 1.1.168.

1.1.37 "**Combination Target**" means [**].

1.1.38 "**Commercialize**" or "**Commercializing**" means any activities directed to [**].

1.1.39 "**Commercially Reasonable Efforts**" means, with respect to the performing Party under this Agreement, the carrying out of obligations of such Party [**], with efforts that are consistent with the efforts [**].

1.1.40 "**Committee**" means each of the JSC, the JRC, the JPC, and any Subcommittee established by the JSC.

1.1.41 "**Confidential Information**" means all confidential or proprietary technology, Know-How, or other information (whether or not patentable) disclosed or made available by or on behalf of one Party (the "**Disclosing Party**") or any of its Affiliates to the other Party (the "**Receiving Party**") or any of its Affiliates prior to or after the Effective Date in connection with this Agreement or the Confidentiality Agreement, including information regarding a Party's technology, products, business information, or objectives; except that "Confidential Information" shall exclude any information that:

(a) was known by the Receiving Party or any of its Affiliates prior to its disclosure to the Receiving Party or any of its Affiliates by or on behalf of the Disclosing Party or any of its Affiliates, as established by written evidence; or

(b) is rightfully disclosed to the Receiving Party or any of its Affiliates, without any obligation of confidentiality, by a source, other than by or on behalf of the Disclosing Party or any of its Affiliates, rightfully in possession of the information; or

(c) is or becomes published or generally known to the public through no fault or omission on the part of the Receiving Party or any of its Affiliates or (sub)licensees; or

(d) is independently developed by or for the Receiving Party or any of its Affiliates without reference to or reliance upon any of the Disclosing Party's Confidential Information, as established by the Receiving Party's or its applicable Affiliate's contemporaneously-maintained written records. Notwithstanding anything to the contrary in the foregoing, (x) [**] shall be deemed Confidential Information of GBIO (and not Moderna), with GBIO deemed the Disclosing Party and Moderna deemed the Receiving Party with respect thereto, and Moderna may not rely on Section 1.1.41(d) with respect thereto, (y) [**] shall be deemed Confidential Information of Moderna (and not GBIO), with Moderna deemed the Disclosing Party and GBIO deemed the Receiving Party with respect thereto, and GBIO may not rely on Section 1.1.41(d) with respect thereto, and (z) [**].

1.1.42 "**Confidentiality Agreement**" means the Confidential Disclosure Agreement by and between the Parties, dated as of [**].

1.1.43 "**Control**" means, with respect to any Know-How, Patent Right, or other intellectual property right, the possession (whether by license (other than a license granted under this Agreement) or ownership) by a Party or, subject to Section 15.2, any of its Affiliates of the ability to grant to the other Party access or a license or sublicense to such Know-How, Patent Right, or other intellectual property right (as applicable), as provided herein, without violating the terms of any agreement with any Third Party. Notwithstanding anything to the contrary in this Agreement, if a Party or its Affiliate possesses (whether by license (other than a license granted under this Agreement) or ownership) the ability to grant to the other Party access or a license or sublicense to any Know-How, Patent Right, or other intellectual property right without violating the terms of any agreement with any Third Party, but such access, license, or sublicense would be narrower in scope or rights than the rights granted under the applicable terms of this Agreement, then such Party or its Affiliate will nonetheless be deemed to "Control" such Know-How, Patent Right, or other intellectual property right, provided that such access, license, or sublicense under this Agreement with respect to such Know-How, Patent Right, or other intellectual property right will be limited to the extent that such Party or its Affiliate has the ability to grant such access, license, or sublicense without violating the terms of the applicable Third Party agreement.

1.1.44 "**Controlled Improvements**" has the meaning set forth in Section 11.4.2(a).

1.1.45 "**Cover**" means, with respect to a product or technology and a Patent Right, that, but for ownership of or a license under such Patent Right, the Development, Manufacture, Commercialization, or other Exploitation of such product or practice of such technology by a Person would infringe a claim of such Patent Right or, with respect to a claim included in any patent application, would infringe such claim if such patent application were to issue as a patent.

1.1.46 "**ctLNP**" means an LNP that is Directed to a given Cell Type.

1.1.47 "**Cure Period**" has the meaning set forth in Section 12.3.1(a).

1.1.48 "**Deductible Third Party Payments**" means, [**]:

(a) [**];

(b) [**];

(c) [**];

(d) [**]; and

(e) [**].

[**].

1.1.49 "**Development**" means, with respect to a compound or product, all discovery and research and development activities (including clinical and non-clinical research and development activities) conducted for such compound or product, including toxicology, pharmacology test method development and stability testing, process development, formulation development, delivery system development, quality assurance and quality control development, statistical analysis, Clinical Trials, regulatory affairs, pharmacovigilance, Clinical Trial regulatory activities, and obtaining and maintaining Regulatory Approval. When used as a verb, "Develop" or "Developing" means to engage in Development.

1.1.50 "**Directed**" means:

(a) with respect to an LNP Therapy and a Target (to the extent applicable), that such LNP Therapy is intended to [**] such Target;

(b) with respect to an LNP Therapy and a Combination Target, [**];

(c) with respect to an LNP (including any ctLNP) and a Cell Type, that such LNP [**];

(d) with respect to an LNP Therapy and a Cell Type, that such LNP [**]; and

(e) with respect to an LNP Therapy and an Independent Program Target, [**].

For purposes of this Agreement, in order for a given LNP Therapy to be Directed (as defined in Section 1.1.50(a) or Section 1.1.50(b)) to a given Target or Combination Target, such LNP Therapy must not be Directed (as defined in Section 1.1.50(a) or Section 1.1.50(b)) to any other Target or Combination Target.

[**].

1.1.51 "**Directed Against**" means, [**].

1.1.52 "**Disclosing Party**" has the meaning set forth in Section 1.1.41.

1.1.53 "**Dispute**" has the meaning set forth in Section 18.3.

1.1.54 "**DNA**" means deoxyribonucleic acid.

1.1.55 "**DOJ**" has the meaning set forth in Section 3.2.2

1.1.56 "**Dollar**" means a U.S. dollar, and "**$**" is to be interpreted accordingly.

1.1.57 "**Drug Approval Application**" means any marketing authorization application (and any amendments thereto) filed with any applicable Regulatory Authority in a country or other regulatory jurisdiction, which application is required to obtain a Regulatory Approval.

1.1.58 "**Effective Date**" has the meaning set forth in the introduction to this Agreement.

1.1.59 "**EMA**" means the European Medicines Agency, and any successor agency thereto.

1.1.60 "**European Union**" means the economic, scientific, and political organization of member states of the European Union as it may be constituted from time to time.

1.1.61 "**Event of Force Majeure**" has the meaning set forth in ARTICLE 14.

1.1.62 "**Excess Costs**" has the meaning set forth in Section 8.4.2.

1.1.63 "**Exclusive Target**" means each Independent Program Target with respect to which Moderna timely exercises an Exclusive Target Option pursuant to Section 3.1.3(c); but excluding all Terminated Exclusive Targets.

1.1.64 "**Exclusive Target Exclusivity Term**" has the meaning set forth in Section 2.9.2(f).

1.1.65 "**Exclusive Target Option**" has the meaning set forth in Section 3.1.1(c).

1.1.66 "**Exclusive Target Option Exercise Date**" has the meaning set forth in Section 3.1.3(c).

1.1.67 "**Exclusive Target Option Exercise Fee**" has the meaning set forth in Section 8.3.8.

1.1.68 "**Executive Officers**" means the [**] of Moderna and the [**] of GBIO, or any other senior executive officer (including, for clarity, a senior vice president) designated by a Party who has the authority to resolve the applicable matter referred to the Executive Officers in accordance with this Agreement.

1.1.69 "**Existing In-License Agreement**" means each of (a) the [**] Agreement and (b) the [**] Agreement.

1.1.70 "**Exploit**" means to design, identify, make, use, offer to sell, sell, import, export, practice, research, develop, manufacture, commercialize, or otherwise exploit (including to research, Develop, Manufacture, and Commercialize), and have others do the same on one's behalf. "**Exploitation**" and "**Exploiting**" shall be construed accordingly.

1.1.71 "**Extensions**" has the meaning set forth in Section 10.2.7.

1.1.72 "**FD&C Act**" means the United States Federal Food, Drug, and Cosmetic Act, as amended, together with any rules, regulations, and requirements promulgated thereunder (including all additions, supplements, extensions, and modifications thereto).

1.1.73 "**FDA**" means the United States Food and Drug Administration, and any successor agency thereto.

1.1.74 "**Field**" means all diagnostic, prophylactic, and therapeutic human uses.

1.1.75 "**Firewall Event**" has the meaning set forth in Section 2.9.3(c).

1.1.76 "**Firewall Period**" means, with respect to an Acquirer Program, the period commencing on the applicable Firewall Event and ending on the earlier of: (a) [**]; and (b) [**].

1.1.77 "**Firewalls**" means, with respect to a given Acquirer that has (or that has a New Affiliate that has) an Acquirer Program, ensuring that the Development or Commercialization activities under this Agreement are conducted separately from any Development or Commercialization activities under such Acquirer Program, [**] (except that this requirement shall not apply to (i) [**]; or (ii) general and administrative personnel necessary for the normal operation of the Acquirer or the New Affiliate, provided such personnel do not access [**] except to the extent reasonably necessary to perform their duties).

1.1.78 "**First Commercial Sale**" means the first commercial sale of a Licensed Product by a Party or any of its Affiliates or Sublicensees in a country in an arm's-length transaction to a Third Party following receipt of applicable Regulatory Approval for such Licensed Product in such country.

1.1.79 "**[**]**" has the meaning set forth in Section [**].

1.1.80 "**[**]**" has the meaning set forth in Section [**].

1.1.81 "**[**]**" has the meaning set forth in Section [**].

1.1.82 "**[**]**" has the meaning set forth in Section [**].

1.1.83 "**[**] mRNA Field Exclusivity Period Extension Fee**" has the meaning set forth in Section 8.3.4.

1.1.84 "**FTC**" has the meaning set forth in Section 3.2.2

1.1.85 "**FTE**" means one qualified person working full time for a twelve (12) month period (consisting of [**] hours per twelve (12) month period) in a Development, Manufacturing, regulatory, or other relevant capacity employed or contracted by GBIO or any of its Affiliates and assigned to perform specified work. Any such employee or contractor who devotes fewer than [**] hours per year on the applicable activities shall be treated as an FTE on a pro-rata basis, calculated by dividing the actual number of hours worked by such employee on such activities by [**]. For clarity, no individual person can ever constitute more than a single FTE.

1.1.86 "**FTE Costs**" means, with respect to a given period, the amount calculated by multiplying the FTE Rate by the number of FTEs expended by GBIO or any of its Affiliates during such period.

1.1.87 "**FTE Rate**" means [**] U.S. Dollars ($[**]); except that such rate shall be adjusted annually, [**], based on [**].

1.1.88 "**GBIO**" has the meaning set forth in the introduction to this Agreement.

1.1.89 "**GBIO [**]**" means, collectively:

(a) "**[**]**," which means any [**]; and

(b) "**[**]**," which means any [**];

[**].

1.1.90 "**GBIO Background Intellectual Property**" means, subject to Section 5.2.4, collectively:

(a) "**GBIO Background Know-How**," which means any Know-How that is [**]; and

(b) "**GBIO Background Patent Rights**," which means any Patent Rights that [**];

[**].

1.1.91 "**GBIO [**]**" means, collectively:

(a) "**[**]**," which means [**]; and

(b) "**[**]**," which means [**];

[**].

1.1.92 "**GBIO [**]**" means, collectively:

(a) "**[**],**" which means any [**]; and

(b) "**[**],**" which means [**].

1.1.93 "**GBIO Intellectual Property**" means, collectively:

(a) "**GBIO Know-How**," which means [**]; and

(b) "**GBIO Patent Rights**," which means [**].

1.1.94 "**GBIO [**]**" means, subject to Section 5.2.4, with respect to a given Cell Target Type:

(a) [**] with respect to such Cell Target Type); and

(b) [**] with respect to such Cell Target Type (the "**[**]**") and (ii) [**];

(c) [**]; and

(d) [**].

Notwithstanding anything to the contrary in this Section 1.1.94, with respect to any Patent Rights or Know-How that (x) [**], (y) [**], and (z) [**] shall only include such [**] with respect to such Cell Target Type as set forth in the foregoing clauses (a)-(d) as if [**].

1.1.95 "**GBIO [**]**" means, subject to Section 5.2.4, and on an Optioned Liver Target-by-Optioned Liver Target basis:

(a) all GBIO Intellectual Property that is (i) [**] and (ii) [**];

(b) [**] that is (i) (A) [**] and (B) [**] such Optioned Liver Target [**] and (ii) [**];

(c) [**] such Optioned Liver Target; and

(d) [**] such Optioned Liver Target.

1.1.96 "**GBIO [**]**" means, collectively:

(a) "**GBIO [**]**," which means [**]; and

(b) "**GBIO [**]**," which means Patent Rights that solely Cover any [**].

1.1.97 "**GBIO [**]**" means, subject to Section 5.2.4, and on an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis:

(a) all GBIO Intellectual Property that is (i) [**] and (ii) [**];

(b) [**] (i) (A) [**] and (B) [**] such Optioned Non-Liver Target ([**] and (ii) [**];

(c) [**] such Optioned Non-Liver Target; and

(d) [**] such Optioned Non-Liver Target.

1.1.98 "**GBIO Research Licensed Technology**" has the meaning set forth in Section 5.1.1(a).

1.1.99 "**GBIO Sole-Prosecuted Patent Rights**" has the meaning set forth in Section 10.2.3.

1.1.100 "**GBIO Target**" means any Independent Program Target that GBIO designates as a GBIO Target pursuant to Section 2.10.

1.1.101 "**Gene**" means:

(a) a naturally Noccurring human gene (including the wild type and naturally occurring mutant and allelic variants), including all coding, non-coding, and regulatory regions thereof, as identified by the applicable transcript identifier (*i.e.*, NCBI Refseq transcript ID), gene identifier (*i.e.*, NCBI Refseq Gene ID), gene name and synonyms and nucleotide sequence coordinates, gene transcript, and nucleotide sequence, together with any variants of the wildtype of such human gene encoding the same Protein;

(b) any naturally occurring non-coding region of the human genome, including, but not limited to, transcriptional regulatory elements, non-protein coding RNA, and intergenic regions;

(c) a naturally occurring gene of a human pathogen (including the wild type and naturally occurring mutant and allelic variants) together with any variants of the wildtype of such gene encoding the same Protein or any naturally occurring non-coding region of a human pathogen genome, including, but not limited to, transcriptional regulatory elements, non-protein coding RNA, and intergenic regions; or

(d) any gene (including the wild type and naturally occurring mutant and allelic variants) which is not covered by subclauses (a), (b) or (c) above, together with any variants of the wildtype of such gene, encoding the same Protein.

1.1.102 "**Good Clinical Practices**" or "**GCP**" means the then-current ethical and scientific quality standards for designing, conducting, recording, and reporting trials that involve the participation of human subjects as are required by any applicable Regulatory Authority or Applicable Law in the relevant jurisdiction.

1.1.103 "**Good Laboratory Practices**" or "**GLP**" means the then-current good laboratory practice standards promulgated or endorsed by the FDA, as defined in U.S. 21 C.F.R. Part 58 (or such other comparable regulatory standards in jurisdictions outside the United States, as they may be updated from time to time).

1.1.104 "**Good Manufacturing Practices**," "**current Good Manufacturing Practices**," "**GMP**," or "**cGMP**" means all then-current applicable standards relating to manufacturing practices for fine chemicals, intermediates, bulk products, or finished biopharmaceutical products, including (a) all applicable requirements detailed in the FDA's current Good Manufacturing Practices regulations, U.S. 21 C.F.R. Parts 210 and 211 and "The Rules Governing Medicinal Products in the European Community, Volume IV, Good Manufacturing Practice for Medicinal Products", as each may be amended from time to time, and (b) all Applicable Laws promulgated by any Governmental Authority having jurisdiction over the Manufacture of any Licensed Product.

1.1.105 "**Governmental Authority**" means any: (a) nation, principality, state, commonwealth, province, territory, county, municipality, district, or other jurisdiction of any nature; (b) federal, state, local, municipal, foreign, or other government; (c) governmental or quasi-governmental authority of any nature (including any governmental division, subdivision, department, agency, bureau, branch, office, commission, council, board, instrumentality, officer, official, representative, organization, unit, body, or entity, and any court or other tribunal); (d) supranational or multinational organization or body; or (e) individual, entity, or body exercising, or entitled to exercise, any executive, legislative, judicial, administrative, regulatory, police, military, or taxing authority or power of any nature.

1.1.106 "**HSR/Antitrust Filing**" has the meaning set forth in Section 3.2.2

1.1.107 "**HSR Act**" has the meaning set forth in Section 1.1.12.

1.1.108 "**Improvement**" means, [**].

1.1.109 "**In-License Agreement**" means each Existing In-License Agreement, each New In-License Agreement, and any agreement [**] that is deemed an In-License Agreement pursuant to Section 5.2.5.

1.1.110 "**IND**" means (a) in the United States, an Investigational New Drug Application, as defined in the FD&C Act, filed with the FDA that is required to be filed with the FDA before conducting a Clinical Trial (including all supplements and amendments that may be filed with respect to the foregoing); and (b) any foreign counterpart of the foregoing.

1.1.111 "**IND Effectiveness**" means, with respect to given biopharmaceutical product, that an IND has been filed with the FDA or EMA (or any other foreign counterpart thereof) for such biopharmaceutical product and either (a) thirty (30) days have passed without the FDA, or sixty (60) days have passed without the EMA, or the applicable timeframe has passed in the applicable foreign jurisdiction without the foreign counterpart, each as applicable, placing a clinical hold on such IND or (b) the FDA or EMA or such foreign counterpart, as applicable, has provided notice that such IND has become effective.

1.1.112 "**Indemnitee**" has the meaning set forth in Section 13.2.1.

1.1.113 "**Indemnitor**" has the meaning set forth in Section 13.2.1.

1.1.114 "**Independent Program Target**" means, with respect to a given Cell Target Type, a specific Target or Combination Target.

1.1.115 "**Independent Program Target Option Exercise Period**" means, with respect to a given Independent Program Target, the period beginning on the Effective Date and ending on the earlier of (a) [**] or (b) [**].

1.1.116 "**Infringement**" has the meaning set forth in Section 10.3.1.

1.1.117 "**[**]**" has the meaning set forth in Section [**].

1.1.118 "**[**]**" has the meaning set forth in Section [**].

1.1.119 "**[**]**" has the meaning set forth in Section [**].

1.1.120 "**[**]**" has the meaning set forth in Section [**].

1.1.121 "**Insolvency Event**" has the meaning set forth in Section 12.3.2.

1.1.122 "**Joint Collaboration ctLNP Intellectual Property**" means, collectively:

(a) "**Joint Collaboration ctLNP Know-How**," which means [**]; and

(b) "**Joint Collaboration ctLNP Patent Rights**," which means [**];

[**].

1.1.123 "**Joint Collaboration Intellectual Property**" means, collectively:

(a) "**Joint Collaboration Know-How**," which means [**]; and

(b) "**Joint Collaboration Patent Rights**," which means [**];

but [**].

1.1.124 "**JCT**" has the meaning set forth in Section 4.8.1.

1.1.125 "**Joint Intellectual Property**" means, collectively, Joint Know-How and Joint Patent Rights.

1.1.126 "**Joint Know-How**" has the meaning set forth in Section 10.1.6.

1.1.127 "**Joint Patent Rights**" has the meaning set forth in Section 10.1.6.

1.1.128 "**JPC**" has the meaning set forth in Section 4.4.1.

1.1.129 "**JRC**" has the meaning set forth in Section 4.3.1.

1.1.130 "**JSC**" has the meaning set forth in Section 4.2.1.

1.1.131 "**Know-How**" means any tangible or intangible trade secrets, know-how, expertise, discoveries, inventions, information, data, or materials, including ideas, concepts, formulae, methods, procedures, designs, technologies, compositions, plans, applications, technical data, assays, manufacturing information or data, samples, and chemical and biological materials.

1.1.132 "**Liability**" has the meaning set forth in Section 13.1.1.

1.1.133 "**Licensed Independent Product**" means, with respect to a given Cell Target Type, [**]; but excluding all Licensed Non-Liver Products.

1.1.134 "**Licensed Liver Product**" means, with respect to a given Optioned Liver Target, any LNP Therapy that (a) is Directed to such Optioned Liver Target in the liver and (b) [**].

1.1.135 "**Licensed Liver Product Type**" has the meaning set forth in Section 8.5.2(a).

1.1.136 "**Licensed Non-Liver Product**" means, with respect to a given Optioned Non-Liver Target, any LNP Therapy that (a) is Directed to such Optioned Non-Liver Target outside of the liver and (b) [**].

1.1.137 "**Licensed Non-Liver Product Type**" has the meaning set forth in Section 8.5.3(a).

1.1.138 "**Licensed Product**" means, as applicable, (a) a Licensed Independent Product, (b) a Licensed Liver Product, or (c) a Licensed Non-Liver Product.

1.1.139 "**Liver Option**" has the meaning set forth in Section 3.1.1(a).

1.1.140 "**Liver Option Exercise Fee**" has the meaning set forth in Section 8.3.6.

1.1.141 "**Liver Option Exercise Date**" has the meaning set forth in Section 3.1.3(a).

1.1.142 "**Liver Option Exercise Period**" means, with respect to a given Liver Target, the period beginning on the Effective Date and ending on the earlier of (a) [**] following the end of the [**] or (b) [**] following the [**].

1.1.143 "**Liver Program**" means, on a Liver Target-by-Liver Target basis, the research program conducted with respect to such Liver Target pursuant to Section 2.2 during the Liver Research Term.

1.1.144 "**Liver Research Plan**" means, with respect to a given Liver Program, the plan for such Liver Program, as further described in Section 2.2.4.

1.1.145 "**Liver Research Plan Template**" has the meaning set forth in Section 2.2.4(b).

1.1.146 "**Liver Research Term**" has the meaning set forth in Section 2.2.2.

1.1.147 "**[**]**" has the meaning set forth in Section [**].

1.1.148 "**Liver Target**" means each of the Targets (a) phenylalanine hydroxylase gene ("PAH") / Phenylalanine Hydroxylase, (b) ATPase Copper Transporting Beta gene ("ATP7B") / ATPase7B, [**].

1.1.149 "**LNP**" means a lipid-based nanoparticle or a lipid nanoparticle.

1.1.150 "**LNP Know-How**" means any Know-How that pertains to the delivery of nucleic acids by use of LNPs, or to the Development, Manufacture, formulation, Commercialization, use, or other Exploitation of LNPs, including any Know-How that pertains to the use of targeting molecules to improve any LNP.

1.1.151 "**LNP Therapy**" means either of [**]."

1.1.152 "**Major Market**" means each of [**].

1.1.153 "**Manufacture**" or "**Manufacturing**" means to make, have made, produce, manufacture, process, fill, finish, package, label, perform quality assurance testing, release, ship, or store a compound or product or any intermediate or component thereof. When used as a noun, "**Manufacture**" or "**Manufacturing**" means activities involved in Manufacturing a compound or product or any intermediate or component thereof.

1.1.154 "**Materials**" has the meaning set forth in Section 2.7.1.

1.1.155 "**Moderna**" has the meaning set forth in the introduction to this Agreement.

1.1.156 "**Moderna Background Intellectual Property**" means, collectively:

(a) "**Moderna Background Know-How**," which means any Know-How that is [**]; and

(b) "**Moderna Background Patent Rights**," which means any Patent Rights that [**];

[**].

1.1.157 "**Moderna [**]**" means, collectively:

(a) "**[**]**," which means any LNP Know-How [**]; and

(b) "**[**]**," which means any Patent Rights that [**];

[**].

1.1.158 "**Moderna [**]**," means, collectively:

(a) "**[**]**," which means any Know-How that [**]; and

(b) "**[**]**," which means any Patent Rights that [**];

[**].

1.1.159 "**Moderna Intellectual Property**" means, collectively:

(a) "**Moderna Know-How**," which means Moderna [**]; and

(b) "**Moderna Patent Rights**," which means the Moderna [**].

1.1.160 "**Moderna [**]**" means, collectively:

(a) "**[**]**," which means any Know-How that is [**]; and

(b) "**[**]**," which means Patent Rights that [**].

1.1.161 "**Moderna [**]**" means, collectively:

(a) "**Moderna [**]**," which means any Know-How that is [**]; and

(b) "**Moderna [**]**," which means Patent Rights that [**].

1.1.162 "**Moderna Research Licensed Technology**" has the meaning set forth in Section 5.1.2(a).

1.1.163 "**Moderna Sole-Prosecuted Patent Rights**" has the meaning set forth in Section 10.2.2.

1.1.164 "**mRNA**" means messenger RNA or a single-stranded RNA construct (modified or unmodified) with a specific sequence for the expression of a Protein, including the sequence of such construct (which comprises an open reading frame and optionally comprises other elements, such as a cap, a 5' UTR, a 3'UTR, an IRES or cap-independent translation initiation sequence, modified 5' and/or 3' ends, and a poly A tail) and the chemistry of natural and non-natural nucleic acids contained in such construct and the other chemical elements contained in such construct; [**]).

1.1.165 "**mRNA Field**" means [**].

1.1.166 "**mRNA Field Exclusivity Period**" has the meaning set forth in Section 2.9.1.

1.1.167 "**[**]**" means [**].

1.1.168 "**Net Sales**" means, with respect to any Licensed Product, the gross amounts invoiced by or on behalf of a Party or any of its Affiliates or Sublicensees (each, a "**Selling Party**") to Third Parties that are not Selling Parties for sales or other commercial dispositions of such Licensed Product, less the following deductions actually incurred, allowed, paid, accrued, or specifically allocated in the applicable Selling Party's financial statements and calculated in accordance with Accounting Standards:

[**].

1.1.169 "**New Affiliate**" has the meaning set forth in Section 1.1.29.

1.1.170 "**New In-License Agreement**" means each agreement or arrangement (a) that is entered into by GBIO or any of its Affiliates following the Effective Date, (b) under which GBIO or any of its Affiliates acquires Control of any Patent Rights or Know-How that, subject to Section 5.2.4, would be licensed to Moderna hereunder, and (c) that is deemed a New In-License Agreement pursuant to Section 5.2.4.

1.1.171 "**[**] Agreement**" means that certain [**] Agreement [**] by and between [**] and GBIO, dated as of [**].

1.1.172 "**Non-Breaching Party**" has the meaning set forth in Section 12.3.1.

1.1.173 "**Non-Liver ctLNP**" means, on a Cell Target Type-by-Cell Target Type basis, a ctLNP that is Directed to such Cell Target Type.

1.1.174 "**Non-Liver ctLNP Program**" means the research program conducted pursuant to Section 2.1 during the Non-Liver ctLNP Research Term.

1.1.175 "**Non-Liver ctLNP Research Plan**" means, with respect to the Non-Liver ctLNP Program, the plan for the Non-Liver ctLNP Program, as further described in Section 2.1.3.

1.1.176 "**Non-Liver ctLNP Research Term**" has the meaning set forth in Section 2.1.2.

1.1.177 "**[**]**" has the meaning set forth in Section [**].

1.1.178 "**Non-Liver Option**" has the meaning set forth in Section 3.1.1(b).

1.1.179 "**Non-Liver Option Exercise Date**" has the meaning set forth in Section 3.1.3(b).

1.1.180 "**Non-Liver Option Exercise Fee**" has the meaning set forth in Section 8.3.7.

1.1.181 "**Non-Liver Option Exercise Period**" means, with respect to a given Non-Liver Target, the period beginning on the Effective Date and ending on the earlier of (a) [**] following the end of the [**] or (b) [**] following the [**].

1.1.182 "**Non-Liver Program**" means, on a Non-Liver Target-by-Non-Liver Target basis, the research program conducted with respect to such Non-Liver Target pursuant to Section 2.3 during the Non-Liver Research Term.

1.1.183 "**Non-Liver Research Plan**" means, with respect to a given Non-Liver Program, the plan for such Non-Liver Program, as further described in Section 2.3.4.

1.1.184 "**Non-Liver Research Plan Template**" has the meaning set forth in Section 2.3.4(b).

1.1.185 "**Non-Liver Research Term**" has the meaning set forth in Section 2.3.2.

1.1.186 "**[**]**" has the meaning set forth in Section [**].

1.1.187 "**Non-Liver Target**" means each of the Targets [**].

1.1.188 "**Non-mRNA Field**" means [**].

1.1.189 "**Option**" means, as applicable, (a) a Liver Option, (b) a Non-Liver Option, or (c) an Exclusive Target Option.

1.1.190 "**Optioned Liver Target**" means each Liver Target with respect to which Moderna timely exercises a Liver Option pursuant to Section 3.1.3(a); but excluding all Terminated Liver Targets.

1.1.191 "**Optioned Non-Liver Target**" means each Non-Liver Target with respect to which Moderna timely exercises a Non-Liver Option pursuant to Section 3.1.3(b); but excluding all Terminated Non-Liver Targets.

1.1.192 "**Other Product**" has the meaning set forth in Section 1.1.168.

1.1.193 "**Out-of-Pocket Expenses**" means the amounts paid by or on account of GBIO or any of its Affiliates to Third Party vendors or contractors for supplies and materials for use, or for services provided by them, directly in the performance of applicable activities under this Agreement. Out-of-Pocket Expenses do not include: (a) [**]; or (b) [**].

1.1.194 "**Party**" and "**Parties**" has the meaning set forth in the introduction to this Agreement.

1.1.195 "**Party Controlled Patent Rights**" has the meaning set forth in Section 10.2.1.

1.1.196 "**Patent Right**" means any national, regional, or international (a) issued patent or pending patent application (including any provisional patent application), (b) patent application filed either from any of the foregoing or from an application claiming priority to any of the foregoing, including any provisional application, converted provisional, substitution, continuation, continuation-in-part, division, renewal, or continued prosecution application, and any patent granted thereon, (c) patent-of-addition, revalidation, reissue, reexamination, or extension or restoration (including any supplementary protection certificate or the like) by any existing or future extension or restoration mechanism, including any patent term adjustment, patent term extension, supplementary protection certificate, or any equivalent thereof, (d) inventor's certificate, utility model, petty patent, innovation patent, or design patent, (e) any other form of government-issued rights comparable in scope to any of the foregoing, including any so-called pipeline protection or any importation, revalidation, confirmation, or introduction patent or registration patent or patent of addition to any of such foregoing, or (f) United States or foreign counterpart of any of the foregoing.

1.1.197 "**Payee**" has the meaning set forth in Section 8.10.2.

1.1.198 "**Payor**" has the meaning set forth in Section 8.10.2.

1.1.199 "**Person**" means any individual or any corporation, limited or general partnership, limited liability company, joint venture, trust, unincorporated association, governmental body, authority, bureau or agency, or other entity.

1.1.200 "**Phase I Clinical Trial**" means a Clinical Trial of a product, the principal purpose of which is a preliminary determination of safety, tolerability, and pharmacokinetics in study subjects where potential pharmacological activity may be determined, or a similar clinical study prescribed by any applicable Regulatory Authority, from time to time, pursuant to Applicable Law or otherwise, including the trials referred to in 21 C.F.R. § 312.21(a), as amended (or any non-United States equivalent thereof).

1.1.201 "**Phase II Clinical Trial**" means a Clinical Trial intended to explore a variety of doses, dose response, and duration of effect, and to generate evidence of clinical safety and effectiveness for a particular indication or indications in a target patient population, or a similar Clinical Trial prescribed by any applicable Regulatory Authority, from time to time, pursuant to Applicable Law or otherwise, including the trials referred to in 21 C.F.R. § 312.21(b), as amended (or any non-United States equivalent thereof).

1.1.202 "**Phase III Clinical Trial**" means a Clinical Trial of a product in any country that would satisfy the requirements of 21 C.F.R. § 312.21(c), as amended (or any non-United States equivalent thereof) and is intended to (a) establish that the product is safe and efficacious for its intended use, (b) define contraindications, warnings, precautions, and adverse reactions that are associated with the product in the dosage range to be prescribed, and (c) support Regulatory Approval for such product.

1.1.203 "**PHSA**" means the United States Public Health Service Act, as amended.

1.1.204 "**Pivotal Clinical Trial**" means, with respect to a given Licensed Product, any Clinical Trial of such Licensed Product in a given country that satisfies both of the following: (a) such Clinical Trial includes a sufficient number of subjects and is designed to establish that the Licensed Product has an acceptable safety and efficacy profile for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with the Licensed Product in the dosage range to be prescribed; and (b) such Clinical Trial is a registration-enabling Clinical Trial designed to be sufficient to support the filing of an Drug Approval Application for the Licensed Product in an applicable country or jurisdiction or some or all of an extra-national territory, as evidenced by guidance or minutes issued by an applicable Regulatory Authority for such Clinical Trial. For clarity, a Pivotal Clinical Trial need not be designated a "Phase III Clinical Trial".

1.1.205 "**Prepaid Research Funding**" has the meaning set forth in Section 8.4.1.

1.1.206 "**Prosecute and Maintain**" or "**Prosecution and Maintenance**" means, with respect to a particular Patent Right, all activities associated with the preparation, filing, prosecution, and maintenance of such Patent Right, together with the conduct of related interferences, re-issuance, re-examination, derivation proceedings, *inter partes* review, and post-grant review, the defense of oppositions and other similar proceedings with respect to such Patent Right, but not including any activities associated with claims, including as a counterclaim or declaratory judgment action, of unpatentability, invalidity, or unenforceability of such Patent Right that are brought by a Third Party in connection with an Infringement under Section 10.3 or otherwise.

1.1.207 "**Protein**" means:

(a) any naturally occurring protein encoded by a specific gene locus, as identified by the applicable transcript identifier (*i.e.*, NCBI Refseq transcript ID), gene identifier (*i.e.*, NCBI Refseq Gene ID), gene name and synonyms, and DNA sequence coordinates, together with all variants of such protein, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced, and species homologs and orthologs thereof, as long as any such variant possesses substantially similar mechanism of action and biological activity to the wild type; or

(b) any protein that is not covered by subclause (a) above, together with any variants, mutated versions, derivatives, or fragments of such protein, as long as such variant, mutated version, derivative or fragment possesses a substantially similar mechanism of action and biological activity as such protein.

1.1.208 "**Publication**" means any publication in any scientific journal, any scientific abstract to be presented to any audience, any presentation at any scientific conference, including slides and texts of oral or other public presentations, any other scientific presentation, or any other oral, written, or electronic scientific disclosure directed to any audience that specifically pertains to any data or results arising from any activity under this Agreement.

1.1.209 "**Publishing Notice**" has the meaning set forth in Section 9.4.1.

1.1.210 "**Receiving Party**" has the meaning set forth in Section 1.1.41.

1.1.211 "**Redacted Version**" has the meaning set forth in Section 9.3.3.

1.1.212 "**Regulatory Approval**" means all approvals of each applicable Regulatory Authority necessary for the commercial marketing and sale of a biopharmaceutical product in a country or region in the Territory; but excluding any pricing approval.

1.1.213 "**Regulatory Authority**" means, with respect to a country in the Territory, any national (*e.g.*, the FDA), supra-national (*e.g.*, the EMA), regional, state, or local regulatory agency, department, bureau, commission, council, or other Governmental Authority involved in the granting of a Regulatory Approval or a pricing approval, for biopharmaceutical products in such country.

1.1.214 "**Regulatory Documentation**" means all (a) applications (including all INDs and Drug Approval Applications), registrations, licenses, authorizations, and approvals (including all Regulatory Approvals and pricing approvals); (b) correspondence and reports submitted to or received from Regulatory Authorities (including minutes and official contact reports relating to any communications with any Regulatory Authority) and all supporting documents with respect thereto, including all adverse event files and complaint files; and (c) clinical and other data contained, referenced, or otherwise relied upon in any of the foregoing.

1.1.215 "**Regulatory Exclusivity**" means, with respect to any country or other jurisdiction in the Territory, any market protection, exclusive marketing rights, or data exclusivity rights, other than Patent Right protection, conferred by any Regulatory Authority in such country or other jurisdiction with respect to a Licensed Product that prevents (a) such Regulatory Authority from granting any Regulatory Approval of a Third Party product in such country or other jurisdiction that is a Biosimilar Product of such Licensed Product or (b) any Third Party from making a cross reference to data regarding such Licensed Product held by such Regulatory Authority, including, as applicable, orphan drug exclusivity, new chemical entity exclusivity, new use or indication exclusivity, new formulation exclusivity, data exclusivity, pediatric exclusivity, rights conferred in the United States under Section 351 of the Public Health Service Act, 42 U.S.C. §262, as amended, or the Drug Price Competition and Patent Term Restoration Act (21 U.S.C. §355), as amended, or in the European Union under Directive 2001/83/EC, as amended, and Regulation (EC) No. 1901/2006, as amended, or rights similar thereto in other countries or regulatory jurisdictions.

1.1.216 "**Research Budget**" has the meaning set forth in Section 8.4.2.

1.1.217 "**Research Costs**" means the (a) Out-of-Pocket Expenses and (b) FTE Costs, in each case ((a) and (b)), incurred or accrued by GBIO and its Affiliates in conducting the Development activities allocated to GBIO in any Research Plan, in each case ((a) and (b)), solely to the extent identified in and covered by the applicable Research Budget; but excluding overhead costs and capital expenditures to the extent not included in the FTE Rate. In addition, Research Costs shall include any other categories of expenses incurred in the performance of activities under a Research Plan, as specifically identified in the applicable Research Budget. Research Costs shall be recognized in accordance with the Accounting Standards as consistently applied by GBIO.

1.1.218 "**Research Licensed Technology**" means GBIO Research Licensed Technology or Moderna Research Licensed Technology, as applicable.

1.1.219 "**Research Plan**" means each Liver Research Plan, each Non-Liver Research Plan, and the Non-Liver ctLNP Research Plan.

1.1.220 "**Research Program**" means each Liver Program, each Non-Liver Program, and the Non-Liver ctLNP Program.

1.1.221 "**Research Term**" means, as applicable, (a) the Liver Research Term, (b) the Non-Liver Research Term, or (c) the Non-Liver ctLNP Research Term.

1.1.222 "**Reversion Product**" has the meaning set forth in Section 12.6.3.

1.1.223 "**Right of Reference or Use**" means a "Right of Reference or Use" as that term is defined in 21 C.F.R. §314.3(b), and any non-United States equivalents.

1.1.224 "**RNA**" means ribonucleic acid.

1.1.225 "**Royalty Bearing Patent Right**" means (a) with respect to royalties owed by Moderna on Net Sales of Licensed Liver Products pursuant to Section 8.6.1(a), [**], (b) with respect to royalties owed by Moderna on Net Sales of Licensed Non-Liver Products pursuant to Section 8.6.1(b), [**], (c) with respect to royalties owed by Moderna on Net Sales of Licensed Independent Products pursuant to Section 8.6.1(c), [**], and (d) with respect to royalties owed by GBIO on Net Sales of Licensed Independent Products pursuant to Section 8.6.2, [**].

1.1.226 "**Royalty Term**" has the meaning set forth in Section 8.6.3.

1.1.227 "**Rules**" has the meaning set forth in Section 18.3.2(a).

1.1.228 "**Safety Concern**" means a Serious Adverse Event reasonably related to or observed in connection with Development or Commercialization activities with respect to a Licensed Product.

1.1.229 "**[**]**" has the meaning set forth in Section [**].

1.1.230 "**[**] mRNA Field Exclusivity Period Extension Fee**" has the meaning set forth in Section 8.3.4.

1.1.231 "**[**]**" has the meaning set forth in Section [**].

1.1.232 "**Selling Party**" has the meaning set forth in Section 1.1.168.

1.1.233 "**Serious Adverse Event**" means a serious adverse drug experience or circumstance that results in any of the following outcomes (a) death, (b) life threatening condition, (c) inpatient hospitalization or a prolongation of existing hospitalization, (d) persistent or significant disability or incapacity or substantial disruption of the ability to conduct normal life functions, (e) a congenital anomaly/birth defect, (f) significant intervention required to prevent permanent impairment or damage, or (g) a medical event that may not result in death, be life threatening, or require hospitalization but, based on appropriate medical judgment, that may jeopardize the patient or subject and may require medical or surgical intervention to prevent one of the outcomes described in clauses (a) through (f).

1.1.234 "**Special Meeting**" has the meaning set forth in Section 4.2.3.

1.1.235 "**Specifically Identify**" has the meaning set forth in Section 10.2.2.

1.1.236 "**Subcommittee**" has the meaning set forth in Section 4.2.4.

1.1.237 "**Sublicensee**" means (a) with respect to Moderna as the sublicensor, any Third Party to whom Moderna or any of its Affiliates or any other Sublicensee grants a license or sublicense under any license granted by GBIO to Moderna pursuant to Section 5.1.1 and (b) with respect to GBIO as the sublicensor, any Third Party to whom GBIO or any of its Affiliates or any other Sublicensee grants a license or sublicense under any license granted by Moderna to GBIO pursuant to Section 5.1.2.

1.1.238 "**Target**" means:

(a) [**];

(b) [**];

(c) [**];

(d) [**]; or

(e) [**].

1.1.239 "**Tax/Taxes**" means (a) any national, federal, state, local, municipal, foreign or other tax, charge, fee, duty (including customs duty), levy or assessment, including any income, gross receipts, net proceeds, alternative, top-up, add-on minimum, corporation, ad valorem, turnover, real property, personal property (tangible or intangible), sales, use, franchise, excise, value added, stamp, leasing, lease, user, transfer, fuel, excess profits, profits, occupational, premium, interest equalization, windfall profits, severance, license, registration, payroll, environmental, escheat, unclaimed property, capital stock, capital duty, disability, estimated, gains, wealth, welfare, employee's income withholding, other withholding, unemployment or social security or any other tax of whatever kind (including any duty fee, assessment, impost or other charges in the nature of or in lieu of any tax) that is imposed by any Governmental Authority, including any interest, fines, penalties or additions resulting from, attributable to, or incurred in connection with any such items.

1.1.240 "**Tax Action**" has the meaning set forth in Section 8.10.2.

1.1.241 "**Term**" has the meaning set forth in Section 12.1.

1.1.242 "**Terminated Country**" has the meaning set forth in Section 12.2.

1.1.243 "**Terminated Exclusive Target**" means any Exclusive Target that is deemed a Terminated Exclusive Target pursuant to Section 6.2.2 or Section 12.2.

1.1.244 "**Terminated Liver Target**" means any Liver Target that is deemed a Terminated Liver Target pursuant to Section 2.2.3, Section 3.1.4, Section 6.2.2, or Section 12.2.

1.1.245 "**Terminated Non-Liver Target**" means any Non-Liver Target that is deemed a Terminated Non-Liver Target pursuant to Section 2.3.3, Section 3.1.4, Section 6.2.2, or Section 12.2.

1.1.246 "**Territory**" means all countries in the world.

1.1.247 "**Third Party**" means any Person other than Moderna, GBIO, and each of their respective Affiliates.

1.1.248 "**Third Party Action**" has the meaning set forth in Section 10.4.1(a).

1.1.249 "**Third Party Contractor**" has the meaning set forth in Section 5.4.

1.1.250 "**Third Party Patent Challenge**" has the meaning set forth in Section 10.4.2(a).

1.1.251 "**[**]**" means [**].

1.1.252 "**[**] Agreement**" means that certain [**] Agreement by and between [**] and GBIO, dated as of [**].

1.1.253 "**Unanimous Agreement**" means, with respect to a specified decision of a Committee, that both Parties' representatives on such Committee who are present (in person or by teleconference or videoconference) at the applicable meeting agree on such decision.

1.1.254 "**U.S.**" means the United States of America and its territories and possessions.

1.1.255 "**Valid Claim**" means (a) a claim of any issued, unexpired patent that has not been revoked or held unenforceable or invalid by a decision of a court or governmental agency of competent jurisdiction from which no appeal can be taken, or with respect to which an appeal is not taken within the time allowed for appeal, and that has not been disclaimed or admitted to be invalid or unenforceable through reissue, disclaimer, or otherwise, or (b) a claim of any patent application filed by a Person in good faith that has not been cancelled, withdrawn, or abandoned, nor been pending for more than [**] from the filing of the earliest patent application from which such claim derives priority.

1.1.256 "**VAT**" has the meaning set forth in Section 8.10.3.

1.2 **Certain Rules of Interpretation and Construction**. The captions to the several Articles and Sections of this Agreement are included only for convenience of reference and shall not in any way affect the construction of, or be taken into consideration in interpreting, this Agreement. In this Agreement, unless the context requires otherwise, (a) the words "including," "include," "includes," "such as" and "*e.g.*" shall be deemed to be followed by the phrase "without limitation" or like expression, whether or not followed by the same; (b) references to the singular shall include the plural and vice versa; (c) references to masculine, feminine, and neuter pronouns and expressions shall be interchangeable; (d) the words "herein" or "hereunder" relate to this Agreement; (e) the term "or" will be interpreted in the inclusive sense commonly associated with the term "and/or" unless used with other language indicating the subjects of the conjunction are, or are intended to be, mutually exclusive; (f) the word "will" shall be construed to have the same meaning and effect as the word "shall"; (g) all references to "dollars" or "$" herein shall mean U.S. Dollars; (h) the term "nucleic acids" will be interpreted to include all naturally or non-naturally occurring nucleic acids, all modified versions of any of the foregoing, and all forms of mimetics of any of the foregoing; (i) a capitalized term not defined herein but reflecting a different part of speech from that of a capitalized term which is defined herein shall be interpreted in a correlative manner; and (j) the phrases "to GBIO's knowledge" and the like mean the actual knowledge of GBIO's [**], in each case, as of the Effective Date after reasonable due inquiry by such Person(s). Each Party represents that it has been represented by legal counsel in connection with this Agreement and acknowledges that it has participated in the drafting hereof. In interpreting and applying the terms and provisions of this Agreement, the Parties agree that no presumption will apply against the Party which drafted such terms and provisions.

ARTICLE 2 - RESEARCH PROGRAMS; EXCLUSIVITY; GBIO TARGETS

2.1 **Non-Liver ctLNP Program**.

2.1.1 Objective and Conduct of the Non-Liver ctLNP Program. The Parties will conduct the Non-Liver ctLNP Program in accordance with the Non-Liver ctLNP Research Plan, the terms of this Agreement, and Applicable Law, and in good scientific manner. The purpose of the Non-Liver ctLNP Program will be to identify and Develop Non-Liver ctLNPs that meet the Cell Target Type Success Criteria.

2.1.2 Non-Liver ctLNP Research Term. The "**Non-Liver ctLNP Research Term**" will begin on the Effective Date and will end on the latest of (a) [**], (b) [**], or (c) [**].

2.1.3 Non-Liver ctLNP Research Plan.

(a) The Non-Liver ctLNP Research Plan shall set forth all of the Development activities to be conducted by the Parties under the Non-Liver ctLNP Program during the Non-Liver ctLNP Research Term, including a timeline for the conduct of such activities and the estimated Research Budget for the Non-Liver ctLNP Program. An initial proposed draft of the Non-Liver ctLNP Research Plan is attached hereto as Schedule 2.1.3.

(b) Within [**] following the Effective Date, the JRC will review and the JSC will approve (or amend and approve) the Non-Liver ctLNP Research Plan attached hereto as Schedule 2.1.3. Upon approval by the JSC of the Non-Liver ctLNP Research Plan, the Non-Liver ctLNP Program will commence. The Non-Liver ctLNP Research Plan requires approval of the JSC to be effective, and, notwithstanding anything to the contrary herein, neither Party shall be obligated to perform any activities under the Non-Liver ctLNP Research Plan until the Non-Liver ctLNP Research Plan has been approved by the JSC.

(c) The Non-Liver ctLNP Research Plan shall provide that (i) the Parties will only conduct Development activities with respect to [**] for the first [**] following approval of the initial Non-Liver ctLNP Research Plan by the JSC, (ii) [**] (iii) the Non-Liver ctLNP Program will focus on Development of LNPs Directed to the Cell Target Types, including by incorporation of targeting molecules, based on GBIO's LNPs as existing during the Non-Liver ctLNP Research Term, and, except as otherwise agreed by GBIO, will not include [**].

(d) Either Party may propose changes to the Non-Liver ctLNP Research Plan, which shall be subject to review and approval by the JRC or the JSC, as applicable, as provided in Section 4.2, Section 4.3, and Section 4.5.

2.1.4 **Cell Target Type Replacement Option**. On a Cell Target Type-by-Cell Target Type basis, during the Non-Liver ctLNP Research Term, if (a) either (i) [**]. From and after any such replacement, the original Cell Target Type shall be deemed to no longer be a Cell Target Type under this Agreement (and, for the avoidance of doubt, may not be a Backup Cell Target Type), and the Backup Cell Target Type identified by Moderna shall be deemed to be a Cell Target Type under this Agreement. [**]. During the Non-Liver ctLNP Research Term, GBIO (A) shall not [**] and (B) shall promptly notify Moderna upon receiving [**], in each case (A)-(B), with respect to the assignment, transfer, conveyance, or disposition of, license, or other grant of rights with respect to (including any option right), or any other encumbrance of, any Backup Cell Target Type in any manner that would conflict in any respect with Moderna's right to replace a Cell Target Type with such Backup Cell Target Type in accordance with this Section 2.1.4. [**] pursuant to this Section 2.1.4.

2.2 **Liver Programs**.

2.2.1 **Objective and Conduct of the Liver Programs**. The Parties will conduct one (1) or more Liver Programs, each in accordance with a Liver Research Plan, the terms of this Agreement, and Applicable Law, and in good scientific manner. The purpose of each Liver Program will be to identify, Develop, and evaluate candidate Licensed Liver Products Directed to the applicable Liver Target with the aim of advancing at least one (1) such candidate incorporating ceDNA to IND.

2.2.2 **Liver Research Term**. The "**Liver Research Term**" will begin on the Effective Date and will end on the latest of (a) [**], (b) [**], or (c) [**].

2.2.3 **Selection of Targets**. Moderna may select any Liver Target to be the subject of a Liver Program. However, (a) GBIO shall not have any obligation to conduct more than one (1) Liver Program during the first [**] following approval of the first Liver Research Plan by the JSC and (b) once GBIO has begun work on a given Liver Program, Moderna may instruct GBIO to stop work (or the Parties may agree that GBIO will stop work) on that Liver Program in order to start work on a different Liver Program, in which case, unless such Liver Target has become an Optioned Liver Target, such Liver Target shall be deemed a Terminated Liver Target and Section 12.6 shall apply to such Terminated Liver Target.

2.2.4 **Liver Research Plans**.

(a) Once Moderna has selected a Liver Target to be the subject of a Liver Program, the Parties will promptly meet to draft a Liver Research Plan for such Liver Program. The JRC will review and the JSC will approve (or amend and approve) such Liver Research Plan within [**] of Moderna selecting such Liver Target.

(b) Each Liver Research Plan shall set forth all of the Development activities to be conducted by the Parties under the applicable Liver Program during the Liver Research Term, including a [**] for the applicable Liver Program, and shall include all Development activities expected to be required to enable the filing of an IND for a Licensed Liver Product Directed to such Liver Target and shall be consistent with and substantially similar in scope (including [**] of the applicable Liver Program) to the high-level template attached as Schedule 2.2.4(b) (the "**Liver Research Plan Template**"). Upon approval by the JSC of a Liver Research Plan, the corresponding Liver Program will commence. Each Liver Research Plan requires approval of the JSC to be effective, and, notwithstanding anything to the contrary herein, neither Party shall be obligated to perform any activities under a given Liver Research Plan until such Liver Research Plan has been approved by the JSC.

(c) The Liver Research Plans shall, collectively, provide that [**].

(d) Either Party may propose changes to a Liver Research Plan, which shall be subject to review and approval by the JRC or the JSC, as applicable, as provided in Section 4.2, Section 4.3 and Section 4.5.

2.3 **Non-Liver Programs**.

2.3.1 Objective and Conduct of the Non-Liver Programs. The Parties will conduct one (1) or more Non-Liver Programs, each in accordance with a Non-Liver Research Plan, the terms of this Agreement, and Applicable Law, and in good scientific manner. The purpose of each Non-Liver Program will be to use Non-Liver ctLNPs Developed under the Non-Liver ctLNP Program to identify, Develop, and evaluate candidate Licensed Non-Liver Products Directed to the applicable Non-Liver Target with the aim of advancing at least one (1) such candidate incorporating ceDNA to IND.

2.3.2 Non-Liver Research Term. The "**Non-Liver Research Term**" will begin on the Effective Date and will end on the latest of (a) [**], (b) [**], or (c) [**].

2.3.3 Selection of Targets. Moderna may select any Non-Liver Target to be the subject of a Non-Liver Program. However, (a) GBIO shall not have any obligation to conduct more than one (1) Non-Liver Program during the first [**] following approval of the first Liver Research Plan by the JSC and (b) once GBIO has begun work on a given Non-Liver Program, Moderna may instruct GBIO to stop work (or the Parties may agree that GBIO will stop work) on that Non-Liver Program in order to start work on a different Non-Liver Program, in which case, unless such Non-Liver Target has become an Optioned Non-Liver Target, such Non-Liver Target shall be deemed a Terminated Non-Liver Target and Section 12.6 shall apply to such Terminated Non-Liver Target.

2.3.4 Non-Liver Research Plans.

(a) Once Moderna has selected a Non-Liver Target to be the subject of a Non-Liver Program, the Parties will promptly meet to draft a Non-Liver Research Plan for such Non-Liver Program. The JRC will review and the JSC will approve (or amend and approve) such Non-Liver Research Plan within [**] of Moderna selecting such Non-Liver Target.

(b) Each Non-Liver Research Plan shall set forth all of the Development activities to be conducted by the Parties under the applicable Non-Liver Program during the Non-Liver Research Term, including a [**] for the applicable Non-Liver Program, and shall include all Development activities expected to be required to enable the filing of an IND for a Licensed Non-Liver Product Directed to such Non-Liver Target and shall be consistent with and substantially similar in scope (including [**] of the applicable Research Program) to the high-level template attached as Schedule 2.3.4(b) (the "**Non-Liver Research Plan Template**"). Upon approval by the JSC of a Non-Liver Research Plan, the corresponding Non-Liver Program will commence. Each Non-Liver Research Plan requires approval of the JSC to be effective, and, notwithstanding anything to the contrary herein, neither Party shall be obligated to perform any activities under a given Non-Liver Research Plan until such Non-Liver Research Plan has been approved by the JSC.

(c) The Non-Liver Research Plans shall, collectively, provide that [**].

(d) Either Party may propose changes to a Non-Liver Research Plan, which shall be subject to review and approval by the JRC or the JSC, as applicable, as provided in Section 4.2, Section 4.3 and Section 4.5.

2.4 **Research Program Diligence**. Each Party will use Commercially Reasonable Efforts to perform all activities assigned to such Party in each Research Plan.

2.5 **Research Program Costs**. Moderna shall pay for GBIO's Research Costs for performing Development activities allocated to GBIO under each Research Plan in accordance with Section 8.4.

2.6 **Records; Reports; Tech Transfer**.

2.6.1 Records. Each Party shall maintain, and cause its Affiliates and Sublicensees and Third Party Contractors to maintain, in good scientific manner, complete and accurate books and records pertaining to its activities under each Research Program, in sufficient detail to verify compliance with its obligations under this Agreement, and shall ensure that such books and records (a) are appropriate for patent and regulatory purposes, (b) are kept and maintained in compliance with Applicable Law, and (c) properly reflect all work done and results achieved in the performance of activities under each Research Program. Such books and records shall be retained by each Party for at least [**] after the expiration or termination of this Agreement in its entirety or for such longer period as may be required by Applicable Law. Each Party shall have the right, during normal business hours and upon reasonable notice, to inspect and copy all such records of the other Party.

2.6.2 Reports. Each Party shall provide the JRC with periodic updates and reports (at least [**]) of its activities under each Research Program, including [**] during the period covered by such reports. GBIO shall provide Moderna with access to a GBIO electronic share site (or other electronic portal mutually agreed by the Parties) for the collaboration containing copies of the results and data summarized in GBIO's updates and reports, and other results and data (including raw data), findings, and analyses that are created or generated by or on behalf of GBIO through the performance of its activities under the applicable Research Program during the period covered by the applicable reports.

2.6.3 Research Technology Transfer. On a Research Program-by-Research Program basis:

(a) as soon as reasonably practicable, but in any event on or prior to initiation of such Research Program, each Party shall provide to the other Party copies of such Party's material Research Licensed Technology necessary or reasonably useful for the other Party to carry out its activities and perform its obligations under such Research Program and, in the case such Party is GBIO, copies of the material GBIO Background Intellectual Property that GBIO has used or intends to use in such Research Program, in each case to the extent the same is in such Party's or any of its Affiliates' possession and Control as of the date of such provision;

(b) from time to time during the Research Term with respect to such Research Program, each Party shall provide the other Party (i) with reasonable access ([**]) to the material Know-How arising out of such Party's Research Program activities to the extent that such Know-How could be assigned to the other Party, or practiced in accordance with the licenses granted or to be granted, under this Agreement, and (ii) regular (but no less frequently than [**]) and reasonably detailed summary updates describing material GBIO Intellectual Property (in the case such Party is GBIO) or Moderna Intellectual Property (in the case such Party is Moderna) necessary or reasonably useful for either Party to carry out its activities and perform its obligations under such Research Program; provided, in the event the providing Party is GBIO, [**], including a description [**] of such GBIO Intellectual Property (in the reasonable opinion of GBIO) (and, upon reasonable request by such other Party, such Party shall provide such other Party with any material Know-How within the summary updates that is reasonably determined by such other Party to be necessary for either Party to carry out its activities and perform its obligations under such Research Program, to the extent in such Party's or any of its Affiliates' possession and Control and not previously provided to such other Party); and

(c) during the Research Term with respect to such Research Program, each Party shall reasonably cooperate, and shall cause its applicable Affiliate(s) to reasonably cooperate, with the other Party to facilitate the technology transfer of such Party's Research Licensed Technology (as provided in Sections 2.6.3(a) and 2.6.3(b)) for such Research Program to the other Party, which cooperation shall include providing the other Party with reasonable access by teleconference or in-person at such Party's (or its applicable Affiliate's) facilities to appropriate personnel from such Party or its applicable Affiliate to provide the other Party with technical assistance and consultation in connection with the transfer of such Party's Research Licensed Technology for the applicable Research Program. The cooperation provided by GBIO or its Affiliates under this Section 2.6.3(c) will be at Moderna's expense and reflected in the applicable Research Budget.

2.7 **Exchanged Materials**.

2.7.1 Use Restrictions. Each Party may transfer to the other Party certain biological or chemical materials or sequences in connection with the performance of activities under a Research Program ("**Materials**"). The receiving Party shall use the Materials provided by the other Party in compliance with all Applicable Laws, and solely to perform activities permitted or assigned to the receiving Party under each applicable Research Program, and not for any other purpose. The receiving Party shall not transfer any Materials provided by the other Party to any Third Party without the providing Party's prior written consent. Other than as necessary for the performance of activities under each Research Plan, the receiving Party shall not, and shall cause any transferees to not, copy, reproduce, synthesize, disassemble, reverse engineer, or attempt to disassemble or reverse engineer (including via sequencing techniques), any Materials provided by the providing Party without the providing Party's prior written consent.

2.7.2 Disclaimer. EXCEPT AS EXPRESSLY SET FORTH IN THIS AGREEMENT, ALL MATERIALS PROVIDED BY EITHER PARTY TO THE OTHER PARTY ARE PROVIDED "AS IS," AND THE PROVIDING PARTY PROVIDES NO REPRESENTATIONS OR WARRANTIES FOR SUCH MATERIALS OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT, OR FITNESS FOR A PARTICULAR PURPOSE.

2.8 **No Guarantee**. The Parties acknowledge that the work conducted under each Research Program is initial research, and the results are uncertain, and neither Party makes any guarantee that any Non-Liver ctLNP, Licensed Liver Product, or Licensed Non-Liver Product will meet any specifications set forth in any Research Plan, any Cell Target Type Success Criteria, or any other criteria.

2.9 **Exclusivity**.

2.9.1 mRNA Field Exclusivity Period. On a Cell Target Type-by-Cell Target Type basis, the "**mRNA Field Exclusivity Period**" for such Cell Target Type will begin on the Effective Date and will end on the latest of (a) [**], (b) if Moderna pays GBIO a [**] mRNA Field Exclusivity Period Extension Fee pursuant to Section 8.3.4 prior to the end of the [**] mRNA Field Exclusivity Period, [**]after the end of the [**] mRNA Field Exclusivity Period [**], or (c) if Moderna (i) extends the mRNA Field Exclusivity Period for such Cell Target Type through the [**] mRNA Field Exclusivity Period pursuant to Section 2.9.1(b) and (ii) [**].

2.9.2 Exclusivity Obligations.

(a) On a Liver Target-by-Liver Target basis, during the Liver Option Exercise Period for such Liver Target, GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (i) Develop, Commercialize, or otherwise Exploit any LNP Therapy Directed to, or other product or compound Directed Against, such Liver Target or (ii) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (i). For the avoidance of doubt, this Section 2.9.2(a) shall not apply with respect to any Terminated Liver Target.

(b) On an Optioned Liver Target-by-Optioned Liver Target basis, [**], GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (A) Develop, Commercialize, or otherwise Exploit any LNP Therapy Directed to, or other product or compound Directed Against, such Optioned Liver Target or (B) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (A). For the avoidance of doubt, this Section 2.9.2(b) shall not apply with respect to any Terminated Liver Target.

(c) On a Non-Liver Target-by-Non-Liver Target basis, during the Non-Liver Option Exercise Period for such Non-Liver Target, GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (i) Develop, Commercialize, or otherwise Exploit any LNP Therapy Directed to, or other product or compound Directed Against, such Non-Liver Target or (ii) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (i). For the avoidance of doubt, this Section 2.9.2(c) shall not apply with respect to any Terminated Non-Liver Target.

(d) On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, [**], GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (A) Develop, Commercialize, or otherwise Exploit any LNP Therapy Directed to, or other product or compound Directed Against, such Optioned Non-Liver Target or (B) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (A). For the avoidance of doubt, this Section 2.9.2(d) shall not apply with respect to any Terminated Non-Liver Target.

(e) On a Cell Target Type-by-Cell Target Type basis, during the mRNA Field Exclusivity Period for such Cell Target Type, GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (i) Develop, Commercialize, or otherwise Exploit any LNP or LNP Therapy Directed to, or other product or compound Directed Against, such Cell Target Type in the mRNA Field or (ii) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (i). For the avoidance of doubt, this Section 2.9.2(e) shall not apply with respect to any GBIO Target in the Combination Field.

(f) On an Exclusive Target-by-Exclusive Target basis, during the period beginning on the Exclusive Target Option Exercise Date with respect to such Exclusive Target and ending on the earlier of (i) termination of Development and Commercialization of Licensed Independent Products Directed to such Exclusive Target or (ii) the expiration of all Royalty Terms with respect to marketed Licensed Independent Products Directed to such Exclusive Target (the "**Exclusive Target Exclusivity Term**" with respect to such Exclusive Target), GBIO covenants and agrees, solely on behalf of itself and its Affiliates, that GBIO and its Affiliates shall not (except in the conduct of activities pursuant to this Agreement), alone or with, for, or through any Third Party, (A) Develop, Commercialize, or otherwise Exploit any LNP Therapy Directed to, or other product or compound Directed Against, such Exclusive Target in the mRNA Field or (B) (sub)license (including granting any option, covenant not to sue, or other like right thereto), authorize, appoint, or otherwise seek to or enable, whether directly or indirectly, any Third Party to conduct any of the activities described in clause (A). For the avoidance of doubt, this Section 2.9.2(f) shall not apply with respect to any GBIO Target in the Combination Field or with respect to any Terminated Exclusive Target or any Independent Program Target that is not an Exclusive Target.

2.9.3 Exceptions.

(a) In General. The restrictions set forth in Section 2.9.2 shall not prevent GBIO or any of its Affiliates, alone or with, for, or through any Third Party, from fulfilling its obligations or exercising its rights under any agreement between GBIO (or any of its Affiliates), on the one hand, and Moderna (or any of its Affiliates), on the other hand.

(b) Orthogonal Research Activities. The restrictions set forth in Section 2.9.2 shall not [**] or (ii) [**] activities pursuant to this Agreement.

(c) Change of Control. If a Change of Control occurs with respect to GBIO, the Acquirer and its New Affiliates shall be permitted (x) to continue to conduct any ongoing activities and (y) to initiate new activities (whether planned before the occurrence of the Change of Control or thereafter) where any such activities would otherwise cause the Acquirer or the New Affiliates to violate Section 2.9.2 (an "**Acquirer Program**"), and such initiation or continuation will not constitute a violation of Section 2.9.2, as long as (A) GBIO and the Collaboration Affiliates implement and enforce and cause the Acquirer and applicable New Affiliates to implement and enforce as of the completion of such Change of Control (in the event of (x)) or the initiation of the Acquirer Program (in the event of (y)) (each, with respect to the Acquirer Program, the "**Firewall Event**") Firewalls with respect to such Acquirer Program for the duration of the Firewall Period, (B) no Moderna Intellectual Property or GBIO Intellectual Property (in each case other than Know-How that is in the public domain or independently generated by or on behalf of the Acquirer or any New Affiliates) is used in such Acquirer Program, and (C) no Confidential Information of Moderna is used in such Acquirer Program.

2.10 **GBIO Targets**. On a Cell Target Type-by-Cell Target Type basis, [**], GBIO will have the right to designate [**] Independent Program Targets for such Cell Target Type that are not, at such time, Exclusive Targets, as GBIO Targets by providing written notice of such designation to Moderna; except that, if [**], then such Independent Program Target will be an Exclusive Target and not a GBIO Target. Upon such designation with respect to a given Independent Program Target, such Independent Program Target shall be a GBIO Target for all purposes under this Agreement.

2.11 **Joint Collaboration ctLNP Intellectual Property Restrictions**. Neither Party may grant any Third Party any license or sublicense under any Joint Collaboration ctLNP Intellectual Property except as part of a *bona fide* collaboration with such Third Party, in which such Party or any of its Affiliates has material Development or Commercialization obligations, or as part of a license to Develop, Manufacture, or Commercialize an LNP Therapy with respect to which such Party or any of its Affiliates has, or has had, a *bona fide* Development or Commercialization program.

ARTICLE 3 - OPTIONS

3.1 **Options**.

3.1.1 Option Grants. Subject to the terms and conditions of this Agreement:

(a) with respect to up to two (2) (or, if Moderna elects to obtain an additional Liver Option pursuant to Section 3.1.2, three (3)) Liver Targets, GBIO hereby grants to Moderna an exclusive option to be granted the license in Section 5.1.1(b) with respect to such Liver Target (each such option, a "**Liver Option**"), each of which Liver Options Moderna may exercise during the applicable Liver Option Exercise Period pursuant to Section 3.1.3(a);

(b) with respect to up to two (2) (or, if Moderna elects to obtain an additional Non-Liver Option pursuant to Section 3.1.2, three (3)) Non-Liver Targets, GBIO hereby grants to Moderna an exclusive option to be granted the license in Section 5.1.1(c) with respect to such Non-Liver Target (each such option, a "**Non-Liver Option**"), each of which Non-Liver Options Moderna may exercise during the applicable Non-Liver Option Exercise Period pursuant to Section 3.1.3(b); and

(c) GBIO hereby grants to Moderna an exclusive option to designate any Independent Program Target as an Exclusive Target (each such option, an "**Exclusive Target Option**"), each of which Exclusive Target Options Moderna may exercise during the applicable Independent Program Target Option Exercise Period pursuant to Section 3.1.3(c).

3.1.2 Additional Option Election. Moderna may elect to obtain either one (1) additional Liver Option or one (1) additional Non-Liver Option (but not both) in accordance with this Section 3.1.2. If Moderna desires to obtain one (1) additional Liver Option, then Moderna may elect to obtain such additional Liver Option by notifying GBIO of such election and paying GBIO the Additional Option Fee pursuant to Section 8.3.5 [**]. If Moderna desires to obtain one (1) additional Non-Liver Option, then Moderna may elect to obtain such additional Non-Liver Option by notifying GBIO of such election and paying GBIO the Additional Option Fee pursuant to Section 8.3.5 [**].

3.1.3 Option Exercise.

(a) On a Liver Target-by-Liver Target basis, Moderna may exercise a Liver Option with respect to such Liver Target by, at any time during the Liver Option Exercise Period for such Liver Target, (i) providing GBIO with written notice of such exercise and (ii) paying GBIO a Liver Option Exercise Fee for such Liver Target in accordance with Section 8.3.6 (the date on which Moderna completes both (i) and (ii), a "**Liver Option Exercise Date**"). From and after such Liver Option Exercise Date (if any), such Liver Target shall be an Optioned Liver Target.

(b) On a Non-Liver Target-by-Non-Liver Target basis, Moderna may exercise a Non-Liver Option with respect to such Non-Liver Target by, at any time during the Non-Liver Option Exercise Period for such Non-Liver Target, (i) providing GBIO with written notice of such exercise and (ii) paying GBIO a Non-Liver Option Exercise Fee for such Non-Liver Target in accordance with Section 8.3.7 (the date on which Moderna completes both (i) and (ii), a "**Non-Liver Option Exercise Date**"). From and after such Non-Liver Option Exercise Date (if any), such Non-Liver Target shall be an Optioned Non-Liver Target.

(c) On an Independent Program Target-by-Independent Program Target basis, Moderna may exercise an Exclusive Target Option with respect to such Independent Program Target by, at any time during the Independent Program Target Option Exercise Period for such Independent Program Target, (i) providing GBIO with written notice of such exercise and (ii) if applicable, paying GBIO an Exclusive Target Option Exercise Fee for such Independent Program Target in accordance with Section 8.3.8 (the date on which Moderna completes both (i) and (ii), an "**Exclusive Target Option Exercise Date**"). From and after such Exclusive Target Option Exercise Date (if any), such Independent Program Target shall automatically be designated as an Exclusive Target.

3.1.4 Expiration of Option.

(a) If Moderna does not exercise a Liver Option with respect to a given Liver Target during the applicable Liver Option Exercise Period, then, effective as of the expiration of such Liver Option Exercise Period, such Liver Target shall be deemed a Terminated Liver Target and Section 12.6 shall apply to such Terminated Liver Target. In addition, if, at any time, Moderna is unable to exercise a Liver Option with respect to any additional Liver Targets (*i.e.*, because Moderna has already exercised a Liver Option with respect to three (3) Liver Targets or because Moderna has already exercised a Liver Option with respect to two (2) Liver Targets and has elected to obtain an additional Non-Liver Option pursuant to Section 3.1.2), then all Liver Targets that are not, at such time, Optioned Liver Targets, shall be deemed Terminated Liver Targets and Section 12.6 shall apply to such Terminated Liver Targets.

(b) If Moderna does not exercise a Non-Liver Option with respect to a given Non-Liver Target during the applicable Non-Liver Option Exercise Period, then, effective as of the expiration of such Non-Liver Option Exercise Period, such Non-Liver Target shall be deemed a Terminated Non-Liver Target and Section 12.6 shall apply to such Terminated Non-Liver Target. In addition, if, at any time, Moderna is unable to exercise a Non-Liver Option with respect to any additional Non-Liver Targets (*i.e.*, because Moderna has already exercised a Non-Liver Option with respect to three (3) Non-Liver Targets or because Moderna has already exercised a Non-Liver Option with respect to two (2) Non-Liver Targets and has elected to obtain an additional Liver Option pursuant to Section 3.1.2), then all Non-Liver Targets that are not, at such time, Optioned Non-Liver Targets, shall be deemed Terminated Non-Liver Targets and Section 12.6 shall apply to such Terminated Non-Liver Targets.

(c) If Moderna does not exercise an Exclusive Target Option with respect to a given Independent Program Target during the applicable Independent Program Target Option Exercise Period, then, effective as of the expiration of such Independent Program Target Option Exercise Period, such Independent Program Target may not thereafter be an Exclusive Target.

3.2 **HSR/Antitrust Filings**.

3.2.1 Efforts. Each of GBIO and Moderna will use its commercially reasonable good faith efforts, to the extent applicable with respect to the transactions contemplated by any Option exercise under this Agreement, to obtain the expiration or termination of the applicable waiting period under the HSR Act, and to obtain the termination or expiration of any other applicable waiting periods or any necessary approvals or consents under any other applicable Antitrust Law, at the earliest possible date of filing. Notwithstanding anything to the contrary in this Agreement, this Section 3.2 and the term "commercially reasonable good faith efforts" do not require that either Party (a) offer, negotiate, commit to or effect, by consent decree, hold separate order, trust or otherwise, the sale, divestiture, license or other disposition of any capital stock, assets, rights, products or businesses of GBIO, Moderna, or any of their respective Affiliates, (b) agree to any restrictions on the businesses of GBIO, Moderna, or any of their respective Affiliates, (c) agree to any other structural or behavioral remedy, or (d) pay any amount or take any other action to prevent, effect the dissolution of, vacate, or lift any decree, order, judgment, injunction, temporary restraining order, or other order in any suit or proceeding that would otherwise have the effect of preventing or delaying the transactions contemplated by any Option exercise under this Agreement.

3.2.2 HSR/Antitrust Filings. Concurrent with any notice by Moderna of its intent to exercise any Option, Moderna shall inform GBIO in writing whether Moderna has concluded that the fair market value of the licenses to be acquired pursuant to such Option exercise, determined in accordance with 16 C.F.R. § 801.10, crosses the applicable filing threshold of the HSR Act. Each of GBIO and Moderna will, within ten (10) Business Days after the notice of any intent to exercise any Option (or such later time as may be agreed to in writing by the Parties) file with the U.S. Federal Trade Commission ("**FTC**") and the Antitrust Division of the U.S. Department of Justice ("**DOJ**") any HSR/Antitrust Filing required of it under the HSR Act should the filing threshold be crossed and, as soon as practicable, file with the appropriate Governmental Authority any other HSR/Antitrust Filing required of it under any other Antitrust Law as determined in the reasonable opinion of either Party with respect to the transactions contemplated by such Option exercise. The Parties shall cooperate with one another to the extent necessary in the preparation of any such HSR/Antitrust Filing. The Parties shall equally share all fees (other than penalties that may be incurred as a result of actions or omissions on the part of a Party, which penalties shall be the sole financial responsibility of such Party), required to be paid to any Governmental Authority in connection with making any such HSR/Antitrust Filing. Each Party shall be responsible for all other costs, expenses, and filing fees incurred by such Party in connection with any HSR/Antitrust Filing. In the event that the Parties make an HSR/Antitrust Filing under this Section 3.2, the relevant Option exercise shall terminate (a) at the election of either Party, immediately upon notice to the other Party, in the event that the FTC, DOJ, or other Governmental Authority obtains a preliminary injunction or final order under Antitrust Law enjoining the transactions contemplated by such Option exercise, or (b) at the election of either Party, immediately upon notice to the other Party, in the event that the Antitrust Clearance Date shall not have occurred on or prior to one hundred twenty (120) days after the effective date of the last HSR/Antitrust Filing submitted to a Governmental Authority in relation to such Option exercise (or such later time as may be agreed to in writing by the Parties). Notwithstanding anything to the contrary contained herein, except for the terms and conditions of this Section 3.2, none of the terms and conditions resulting from any Option exercise shall be effective until the later of (i) the date of such Option exercise, (ii) if a determination is made pursuant to this Section 3.2 that an HSR/Antitrust Filing is not required to be made under any Antitrust Law for such Option exercise, the date of such determination, or (iii) if a determination is made pursuant to this Section 3.2 that an HSR/Antitrust Filing is required to be made under any Antitrust Law for such Option exercise, the applicable Antitrust Clearance Date. As used herein: (x) "**Antitrust Clearance Date**" means the earliest date on which the Parties have actual knowledge that all applicable waiting periods under the HSR Act and any comparable waiting periods, approvals or clearances, as applicable, as required under any other Antitrust Law, in each case, with respect to the transactions contemplated by the relevant Option exercise, have expired, have been terminated or have been obtained, as applicable; and (y) "**HSR/Antitrust Filing**" means (i) a filing by GBIO and Moderna with the FTC and the DOJ of a Notification and Report Form for Certain Mergers and Acquisitions, together with all required documentary attachments thereto or (ii) any comparable filing by GBIO or Moderna required under any other Antitrust Law, in each case ((i) and (ii)), with respect to the transactions contemplated by any applicable Option exercise.

3.2.3 **Information Exchange**. Each of GBIO and Moderna will, in connection with any HSR/Antitrust Filing, (a) reasonably cooperate with each other in connection with any communication, filing, or submission and in connection with any investigation or other inquiry, including any proceeding initiated by a private party; (b) keep the other Party or its counsel informed of any substantive communication received by such Party from, or given by such Party to, the FTC, the DOJ, or any other Governmental Authority and of any communication received or given in connection with any proceeding by a private party, in each case regarding the transactions contemplated by any Option exercise; (c) consult with each other in advance of any meeting or conference with the FTC, the DOJ, or any other Governmental Authority or, in connection with any proceeding by a private party, with any other Person, and to the extent permitted by the FTC, the DOJ, or such other Governmental Authority or other Person, give the Parties or their counsel the opportunity to attend and participate in such meetings and conferences; and (d) to the extent practicable, permit the other Party or its counsel to review in advance any submission, filing, or communication (and documents submitted therewith) intended to be given by it to the FTC, the DOJ, or any other Governmental Authority; except that such materials may be redacted to remove references concerning the valuation of the business of GBIO or other sensitive information and any substantive oral or written communications to the FTC, the DOJ, or any other Governmental Authority shall be approved in advance by the Parties. GBIO and Moderna, as each deems advisable and necessary, may reasonably designate any competitively sensitive material to be provided to the other under this Section 3.2 as "**Antitrust Counsel Only Material**." Such materials and the information contained therein shall be given only to the outside antitrust counsel of the recipient and will not be disclosed by such outside counsel to employees, officers or directors of the recipient unless express permission is obtained in advance from the source of the materials (GBIO or Moderna, as the case may be) or its legal counsel.

3.2.4 **No Further Obligations**. If any Option exercise is terminated pursuant to this Section 3.2, then, notwithstanding any provision in this Agreement to the contrary, (a) no Party shall have any further obligation to the other Party with respect to the subject matter of such Option exercise, (b) if such Option was a Liver Option, then it will be deemed as though Moderna had failed to exercise such Liver Option during the applicable Liver Option Exercise Period, (c) if such Option was a Non-Liver Option, then it will be deemed as though Moderna had failed to exercise such Non-Liver Option during the applicable Non-Liver Option Exercise Period, and (d) if such Option was an Exclusive Target Option, then it will be deemed as though Moderna had failed to exercise such Exclusive Target Option during the applicable Independent Program Target Option Exercise Period.

ARTICLE 4 - GOVERNANCE

4.1 **Alliance Managers**. Within [**] after the Effective Date, each Party shall appoint one (1) designated representative to serve as an alliance manager ("**Alliance Manager**") with responsibility for being the primary point of contact between the Parties with respect to activities under this Agreement. The Alliance Managers shall attend JSC meetings and may attend other Committee meetings, as necessary, in each case as non-voting observers. Nothing herein shall prohibit a Party from appointing its Alliance Manager as a member of any Committee. Each Party shall ensure that its Alliance Manager is under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9.

4.2 **JSC**.

4.2.1 Formation. Within [**] after the Effective Date, the Parties shall establish a Joint Steering Committee ("**JSC**") to oversee and coordinate all Development activities under this Agreement. The JSC shall have decision-making authority with respect to the matters within its purview to the extent expressly and as more specifically provided herein.

4.2.2 Composition. The JSC shall be composed of [**] representatives from each of GBIO and Moderna, each of which representatives shall be employees of such Party and of the seniority and experience appropriate for service on the JSC in light of the status of the Development activities under this Agreement. Each Party may replace any of its representatives on the JSC at any time with prior written notice to the other Party. Each Party shall appoint one of its representatives on the JSC to act as a co-chairperson of the JSC. Notwithstanding the foregoing, [**]. The responsibility for running each JSC meeting will alternate between the JSC co-chairpersons from meeting-to-meeting, with [**] co-chairperson running the first meeting of the JSC. The JSC co-chairpersons (or, at the election of the JSC co-chairpersons, the Alliance Managers) shall jointly prepare and circulate agendas to the JSC representatives at least [**] before each JSC meeting and shall direct the preparation of meeting minutes after each JSC meeting, which shall be approved by the JSC co-chairpersons and circulated to other JSC representatives within [**] after such meeting. Except as expressly set forth in this Section 4.2.2, no JSC co-chairperson shall have any rights or powers greater than those of any other JSC member. Each Party shall ensure that its JSC members are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9.

4.2.3 **Meetings**. The JSC shall hold an initial meeting within [**] after its establishment or as otherwise agreed by the Parties. Thereafter, the JSC shall meet at least [**], unless the JSC members otherwise agree. All JSC meetings may be conducted in person or by teleconference or videoconference; except that, unless otherwise determined by the JSC, at least [**] shall be held in person. Unless otherwise agreed by the Parties, all in-person JSC meetings shall be held on an alternating basis between GBIO's facilities in Cambridge, Massachusetts (or such future location as GBIO's facilities may move to) and Moderna's facilities in Cambridge, Massachusetts (or such future location as Moderna's facilities may move to). Each Party may call special meetings of the JSC or a Subcommittee of the JSC with at least [**] prior written notice, or a shorter time period in exigent circumstances, to resolve significant matters requested by such Party that are within the purview of the JSC or such Subcommittee (each such special meeting, with respect to a Committee or Subcommittee, a "**Special Meeting**") and which must be addressed before the next regularly scheduled meeting of the JSC or the Subcommittee. In the case of a Special Meeting of the JSC or a Subcommittee called by a Party, the proposed agenda items, including any decision to be made by the JSC or such Subcommittee at such Special Meeting, and appropriate information with respect to such proposed items shall be provided by the Party requesting such Special Meeting to the JSC or Subcommittee co-chairpersons no later than [**] before the Special Meeting. A reasonable number of other representatives of each Party may attend any JSC meeting as non-voting observers, as long as (a) the names and affiliation(s) of such additional representatives are disclosed in writing to the other Party at least [**] prior to the applicable JSC meeting (including any applicable Special Meeting), (b) such additional representatives are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9, and (c) reasonably in advance of the applicable JSC meeting, both Parties approve the list of non-voting observers to attend such meeting, which approval shall not be unreasonably withheld, conditioned, or delayed. Each Party shall be responsible for all of its own personnel and travel costs and expenses relating to participation in JSC meetings.

4.2.4 **Subcommittees**. From time to time, the JSC may establish subcommittees to oversee particular projects or activities, as it deems necessary or advisable (each, a "**Subcommittee**"). Each Subcommittee shall consist of such number of members as the JSC determines is appropriate from time to time. Such members shall be individuals with expertise and responsibilities in the relevant areas, as determined by the JSC. Except as otherwise determined by the JSC, each Subcommittee shall operate under the same principles as are set forth in this ARTICLE 4 for the JSC and JRC.

4.2.5 **Functions and Authority**. The JSC will be responsible for supervising and managing the Parties' Development activities under this Agreement. Its functions will be:

(a) managing the strategic direction of the Development activities under this Agreement;

(b) reviewing and monitoring progress of the Development activities under this Agreement and serving as a forum for exchanging information and facilitating discussions regarding the conduct of such activities;

(c) reviewing, amending, and approving each initial Research Plan (including, for clarity, the Research Budget included therein);

(d) approving [**] that (i) [**], provided that the foregoing shall not prejudice the JSC's right to determine what activities may be performed by a Third Party Contractor under any Research Program;

(e) reviewing and approving any proposed changes to any Research Budget, any proposed material changes to the timelines of any Research Program, and any and all other proposed amendments to any Research Plan proposed pursuant to Section 2.1.3(d), Section 2.2.4(d), or Section 2.3.4(d) that the JRC is not entitled to or cannot approve;

(f) establishing Subcommittees in accordance with Section 4.2.4;

(g) serving as a forum for dispute resolution in accordance with Section 4.5.1 with respect to matters that are not resolved at the JRC or any Subcommittee; and

(h) performing such other duties as are specifically assigned to the JSC under this Agreement.

4.3 **JRC**.

4.3.1 Formation. Within [**] after the Effective Date, the Parties shall establish a Joint Research Committee ("**JRC**") to oversee and coordinate the overall conduct of the Research Programs. The JRC shall have decision-making authority with respect to the matters within its purview to the extent expressly and as more specifically provided herein.

4.3.2 Composition. The JRC shall be composed of [**] representatives from each of GBIO and Moderna, each of which representatives shall be employees of such Party and of the seniority and experience appropriate for service on the JRC in light of the status of the Research Programs. Each Party may replace any of its representatives on the JRC at any time with prior written notice to the other Party. Each Party shall appoint one of its representatives on the JRC to act as a co-chairperson of the JRC. The responsibility for running each JRC meeting will alternate between the JRC co-chairpersons from meeting-to-meeting, with [**] co-chairperson running the first meeting of the JRC. The JRC co-chairpersons shall jointly prepare and circulate agendas to the JRC representatives at least [**] before each JRC meeting and shall direct the preparation of meeting minutes after each JRC meeting, which shall be approved by the JRC co-chairpersons and circulated to other JRC representatives within [**] after such meeting. Except as expressly set forth in this Section 4.3.2, no JRC co-chairperson shall have any rights or powers greater than those of any other JRC member. Each Party shall ensure that its JRC members are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9.

4.3.3 Meetings. The JRC shall hold an initial meeting within [**] after its establishment or as otherwise agreed by the Parties. Thereafter, the JRC shall meet as frequently as needed to timely approve each initial Research Plan, and, following approval of all initial Research Plans, shall meet at least [**], unless the JRC members otherwise agree. All JRC meetings may be conducted in person or by teleconference or videoconference; except that, unless otherwise determined by the JRC, at least [**] shall be held in person. Unless otherwise agreed by the Parties, all in-person JRC meetings shall be held on an alternating basis between GBIO's facilities in Cambridge, Massachusetts (or such future location as GBIO's facilities may move to) and Moderna's facilities in Cambridge, Massachusetts (or such future location as Moderna's facilities may move to). Each Party may call Special Meetings of the JRC with at least [**] prior written notice, or a shorter time period in exigent circumstances, to resolve significant matters requested by such Party that are within the purview of the JRC and which must be addressed before the next regularly scheduled meeting of the JRC. In the case of a Special Meeting of the JRC called by a Party, the proposed agenda items, including any decision to be made by the JRC at such Special Meeting, and appropriate information with respect to such proposed items shall be provided by the Party requesting such Special Meeting to the JRC co-chairpersons no later than [**] before the Special Meeting. A reasonable number of other representatives of each Party may attend any JRC meeting as non-voting observers, as long as (a) the names and affiliation(s) of such additional representatives are disclosed in writing to the other Party at least [**] prior to the applicable JRC meeting (including any applicable Special Meeting), (b) such additional representatives are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9, and (c) reasonably in advance of the applicable JRC meeting, both Parties approve the list of non-voting observers to attend such meeting, which approval shall not be unreasonably withheld, conditioned, or delayed. Each Party shall be responsible for all of its own personnel and travel costs and expenses relating to participation in JRC meetings.

4.3.4 **Functions and Authority**. The JRC will be responsible for supervising and managing each Research Program. Its functions will be:

(a) overseeing and coordinating the progress and results of each Research Program;

(b) reviewing and submitting to the JSC for approval each initial Research Plan (including the Research Budget included therein);

(c) reviewing and approving proposed amendments to each Research Plan proposed pursuant to Section 2.1.3(d), Section 2.2.4(d), or Section 2.3.4(d) (other than any changes to any Research Budget or any material changes to the timelines of any Research Program, each of which shall be reviewed by the JRC and submitted by the JRC to the JSC for review, amendment (as appropriate), and approval);

(d) determining the frequency and content of updates and reports to be provided by each Party regarding its activities under each Research Plan pursuant to Section 2.6.2, and reviewing such updates and reports;

(e) in collaboration with the JPC (and JCT once established), reviewing and discussing Publications in accordance with Section 9.4; and

(f) such other matters as are expressly set forth in this Agreement or as the Parties may mutually agree in writing.

4.4 **JPC**.

4.4.1 **Formation**. Within [**] after the Effective Date, the Parties shall establish a Joint Patent Committee ("**JPC**") to oversee and coordinate the filing, prosecution, defense, and enforcement of Joint Collaboration Patent Rights and to determine [**]. The JPC shall have decision-making authority with respect to the matters within its purview to the extent expressly and as more specifically provided herein. For clarity, the JPC shall not make any decision inconsistent with this Agreement.

4.4.2 **Composition**. The JPC shall be composed of [**] from each of GBIO and Moderna, each of which representatives shall be an employee or outside patent counsel of the appointing Party and have expertise and experience appropriate for service on the JPC. Each Party may replace its representative on the JPC at any time with prior written notice to the other Party. The JPC representatives shall jointly prepare agendas at least [**] before each JPC meeting and shall direct the preparation of meeting minutes after each JPC meeting. Each Party shall ensure that its JPC member is under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9.

4.4.3 **Meetings**. The JPC will meet in person or by teleconference or videoconference when and as reasonably requested by a representative on the JPC. Unless otherwise agreed by the Parties, all in-person JPC meetings shall be held on an alternating basis between GBIO's facilities in Cambridge, Massachusetts (or such future location as GBIO's facilities may move to) and Moderna's facilities in Cambridge, Massachusetts (or such future location as Moderna's facilities may move to). Each Party may call Special Meetings of the JPC with at least [**] prior written notice, or a shorter time period in exigent circumstances, to resolve significant matters requested by such Party that are within the purview of the JPC and which must be addressed before the next regularly scheduled meeting of the JPC. In the case of a Special Meeting of the JPC called by a Party, the proposed agenda items, including any decision to be made by the JPC at such Special Meeting, and appropriate information with respect to such proposed items shall be provided by the Party requesting such Special Meeting to the Parties' JPC representatives no later than [**] before the Special Meeting. A reasonable number of other representatives of any Party may attend any JPC meeting as non-voting observers, as long as (a) the names and affiliation(s) of such additional representatives are disclosed in writing to the other Party at least [**] prior to the applicable JPC meeting (including any applicable Special Meeting), (b) such additional representatives are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9, and (c) reasonably in advance of the applicable JPC meeting, both Parties approve the list of non-voting observers to attend such meeting, which approval shall not be unreasonably withheld, conditioned, or delayed. Each Party shall be responsible for all of its own personnel and travel costs and expenses relating to participation in JPC meetings.

4.4.4 **Functions and Authority**. The JPC will be responsible for only the following:

(a) reviewing any and all Know-How disclosed to it by either Party pursuant to Section 10.1.2 and determining whether any such given Know-How and Patent Rights Covering the same qualify as [**];

(b) determining the ownership of [**];

(c) coordinating with the Parties in accordance with Section 10.2.6 to reasonably avoid creating potential issues in prosecution of the patent applications included in each Party's Patent Rights;

(d) determining whether [**];

(e) in collaboration with the JRC (and JCT, once established), reviewing and discussing Publications in accordance with Section 9.4; and

(f) such other matters as are expressly set forth in this Agreement or as the Parties may mutually agree in writing.

4.5 **Decision-Making**.

4.5.1 Decisions; Referral to JSC and Executive Officers. Each Committee shall endeavor to make all decisions by Unanimous Agreement, with each Party's representatives collectively having one (1) vote, and shall be set forth in minutes approved by both Parties. Upon [**] prior written notice, any Party may convene a special meeting of any Committee for the purpose of resolving any failure to reach agreement on a matter within the scope of the authority and responsibility of such Committee. If a Committee other than the JSC is unable to reach agreement on any matter so referred to it for resolution by one or both Parties within [**] after the matter is so referred to it, such matter shall be referred to the JSC for resolution, provided that disputes at the JPC shall be referred to the Executive Officers for resolution and shall not be referred to the JSC. If the JSC is unable to reach agreement on any matter referred to it for resolution by one or both Parties within [**] after the matter is so referred to it, such matter shall be referred to the Executive Officers for resolution.

4.5.2 Decision-Making Authority. If a matter referred to the Executive Officers pursuant to Section 4.5.1 is not resolved by the Executive Officers within [**] after such referral, then, subject to Section 4.5.3, [**] shall have the right to decide such unresolved matter.

4.5.3 Limitations on Decision-Making Authority. Notwithstanding anything to the contrary in this Agreement, (x) no Committee will have any authority to (i) resolve any dispute involving the breach or alleged breach of this Agreement, (ii) resolve any dispute as to the manner of GBIO's performance of activities assigned to GBIO in any Research Plan, (iii) amend, modify, or waive the terms of this Agreement or any other agreement between the Parties, or (iv) alter, increase, decrease, expand, or waive compliance by a Party with a Party's obligations under this Agreement and (y) [**] will not have the right to finally resolve a matter pursuant to Section 4.5.2:

(a) [**];

(b) in a manner that would result in the inclusion in any Research Plan (including any amendment thereto) of (i) any activities that are not fully covered by the associated Research Budget, (ii) any activities to be performed in a particular timeframe without giving [**] reasonable time, based on [**] to perform such activities in such timeframe, (iii) where the Research Plan is a Liver Research Plan, [**], or (iv) [**];

(c) in a manner that requires [**]; provided, for clarity, that [**] has the right to finally resolve a matter pursuant to Section 4.5.2 in a manner that results in [**];

(d) in a manner that excuses [**] from any of its obligations specifically enumerated under this Agreement;

(e) to resolve any dispute involving the breach or alleged breach of this Agreement; or

(f) to determine whether or not a milestone event has been achieved under this Agreement.

4.6 **Scope of Governance**. Notwithstanding the creation of the Committees, each Party will retain the rights, powers, and discretion granted to it under this Agreement, and the Committees will not be delegated or vested with rights, powers, or discretion unless such delegation or vesting is expressly provided herein, or the Parties expressly so agree in writing. The Parties understand and agree that issues to be formally decided by a Committee in relation to this Agreement are only those specific issues that are expressly provided in this Agreement to be decided by such Committee.

4.7 **Duration**. Each Committee (other than the JPC) shall be in existence until the expiration of the last-to-expire Research Term, unless the Parties mutually agree to dissolve such Committee earlier. Upon the expiration of the last-to-expire Research Term, each Committee (other than the JPC) will disband and this ARTICLE 4 will no longer apply to the activities of the Parties under this Agreement other than activities overseen and coordinated by the JPC and the activities coordinated by the JCT. The JPC shall be in existence during the Term, unless the Parties mutually agree to dissolve the JPC earlier.

4.8 **JCT**.

4.8.1 Formation. Within [**] prior to the expiration of the last-to-expire Research Term, the Parties shall establish a Joint Coordination Team ("**JCT**") to coordinate the regulatory and publication activities of the Parties after the expiration of the last-to-expire Research Term and to facilitate information exchange between the Parties in connection therewith. The JCT shall not have any decision-making authority with respect to the matters within its purview.

4.8.2 Composition. The JCT shall be composed of [**] representatives from each of GBIO and Moderna, each of which representatives shall be employees of such Party and of the seniority and experience appropriate for service on the JCT in light of the regulatory status of the Licensed Products. Each Party may replace any of its representatives on the JCT at any time with prior written notice to the other Party. Each Party shall ensure that its JCT members are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9 .

4.8.3 Meetings. The JCT shall hold an initial meeting within [**] after its establishment or as otherwise agreed by the Parties. Thereafter, the JCT shall meet at least [**], unless the JCT members otherwise agree. A reasonable number of other representatives of each Party may attend any JCT meeting, as long as (a) the names and affiliation(s) of such additional representatives are disclosed in writing to the other Party at least [**] prior to the applicable JCT meeting, (b) such additional representatives are under obligations of confidentiality and non-use applicable to the Confidential Information of the other Party that are at least as protective as are those set forth in ARTICLE 9 and (c) reasonably in advance of the applicable JCT meeting, both Parties approve the list of such additional representatives to attend such meeting, which approval shall not be unreasonably withheld, conditioned, or delayed. Each Party shall be responsible for all of its own personnel and travel costs and expenses relating to participation in JCT meetings.

4.8.4 Functions and Authority. The JCT will be responsible for coordinating the regulatory and publication activities of the Parties after the expiration of the last-to-expire Research Term and for facilitating information exchange between the Parties in connection therewith. Its functions will be:

(a) providing a forum for the Parties to share information with respect to regulatory activities with respect to the Licensed Products; and

(b) in collaboration with the JPC, reviewing and discussing Publications in accordance with Section 9.4.

4.8.5 **Duration**. Once established, the JCT shall be in existence during the Term, unless the Parties mutually agree to dissolve the JCT earlier.

ARTICLE 5 - LICENSES

5.1 **License Grants**.

5.1.1 **Licenses Granted to Moderna**.

(a) Subject to the terms and conditions of this Agreement, GBIO agrees to grant and hereby grants to Moderna (i) on a Liver Target-by-Liver Target basis, during the Liver Research Term, a [**] right and license under the GBIO Intellectual Property solely to permit Moderna to perform its obligations under the Liver Program for such Liver Target, (ii) on a Non-Liver Target-by-Non-Liver Target basis, during the Non-Liver Research Term, a non-exclusive right and license under the GBIO Intellectual Property solely to permit Moderna to perform its obligations under the Non-Liver Program for such Non-Liver Target, and (iii) during the Non-Liver ctLNP Research Term, a non-exclusive right and license under the GBIO Intellectual Property solely to permit Moderna to perform its obligations under the Non-Liver ctLNP Research Program (such GBIO Intellectual Property in each of (i)-(iii), "**GBIO Research Licensed Technology**").

(b) Subject to the terms and conditions of this Agreement, on an Optioned Liver Target-by-Optioned Liver Target basis, commencing on the date that Moderna exercises a Liver Option with respect to such Optioned Liver Target, GBIO agrees to grant and hereby grants to Moderna an exclusive (even as to GBIO and its Affiliates) right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under GBIO's rights in the [**] to Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Liver Products Directed to such Optioned Liver Target in accordance with the terms of this Agreement.

(c) Subject to the terms and conditions of this Agreement, on an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, commencing on the date that Moderna exercises a Non-Liver Option with respect to such Optioned Non-Liver Target, GBIO agrees to grant and hereby grants to Moderna an exclusive (even as to GBIO and its Affiliates) right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under GBIO's rights in the [**] to Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Non-Liver Products Directed to such Optioned Non-Liver Target in accordance with the terms of this Agreement.

(d) Subject to the terms and conditions of this Agreement, on a Cell Target Type-by-Cell Target Type basis, GBIO agrees to grant and hereby grants to Moderna:

(i) during the mRNA Field Exclusivity Period for such Cell Target Type, an exclusive (even as to GBIO and its Affiliates, subject to GBIO's retained right to, itself or with or through any of its Affiliates or any Third Party, perform its obligations and exercise its rights under this Agreement, including to, itself or with or through any of its Affiliates or any Third Party, Develop, Manufacture, or Commercialize any LNP Therapy in the [**] Field Directed to any GBIO Target) right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under (A) the [**] with respect to such Cell Target Type and (B) [**], in each case ((A) and (B)) to Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Independent Products in the mRNA Field Directed to such Cell Target Type;

(ii) during the Exclusive Target Exclusivity Term for each Exclusive Target with respect to such Cell Target Type, an exclusive (even as to GBIO and its Affiliates, subject to GBIO retained right to, itself or with or through any of its Affiliates or any Third Party, perform its obligations and exercise its rights under this Agreement, including to, itself or with or through any of its Affiliates or any Third Party, Develop, Manufacture, or Commercialize any LNP Therapy in the [**] Field Directed to any GBIO Target) right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under (A) the [**] with respect to such Cell Target Type and (B) GBIO's rights in the [**], in each case ((A) and (B)) to Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Independent Products in the mRNA Field Directed to such Exclusive Target; and

(iii) a non-exclusive right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under (A) the [**] with respect to such Cell Target Type and (B) without prejudice to the license granted to Moderna under Section 10.1.5, GBIO's rights in the Joint Collaboration ctLNP Intellectual Property, in each case ((A) and (B)) to Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Independent Products Directed to such Cell Target Type.

(e) GBIO hereby grants to Moderna a worldwide, non-exclusive, perpetual, irrevocable, royalty-free, fully-paid, freely transferrable, freely sublicensable (through multiple tiers) license under (i) the [**] conceived, invented, discovered, developed, created, or otherwise generated by or on behalf of Moderna or any of Moderna's Affiliates and (ii) all [**] in this Section 5.1.1(e).

5.1.2 Licenses Granted to GBIO.

(a) Subject to the terms and conditions of this Agreement, Moderna agrees to grant and hereby grants to GBIO (i) on a Liver Target-by-Liver Target basis, during the Liver Research Term, a non-exclusive right and license under the Moderna Intellectual Property solely to permit GBIO to perform its obligations under the Liver Program for such Liver Target, (ii) on a Non-Liver Target-by-Non-Liver Target basis, during the Non-Liver Research Term, a non-exclusive right and license under the Moderna Intellectual Property solely to permit GBIO to perform its obligations under the Non-Liver Program for such Non-Liver Target, and (iii) during the Non-Liver ctLNP Research Term, a non-exclusive right and license under the Moderna Intellectual Property solely to permit GBIO to perform its obligations under the Non-Liver ctLNP Research Program (such Moderna Intellectual Property in each of (i)-(iii), "**Moderna Research Licensed Technology**").

(b) Subject to the terms and conditions of this Agreement, on a Cell Target Type-by-Cell Target Type basis, without prejudice to the license granted to GBIO under Section 10.1.5, Moderna hereby grants to GBIO a non-exclusive right and license in the Field in the Territory, with the right to grant sublicenses as set forth in Section 5.3, under Moderna's rights in the Joint Collaboration ctLNP Intellectual Property to (i) Develop, Manufacture, Commercialize, and otherwise Exploit Licensed Independent Products in the Non-mRNA Field Directed to such Cell Target Type, (ii) [**], and (iii) [**].

(c) Moderna hereby grants to GBIO a worldwide, non-exclusive, perpetual, irrevocable, royalty-free, fully-paid, freely transferrable, freely sublicensable (through multiple tiers) license under (i) the [**] conceived, invented, discovered, developed, created, or otherwise generated by or on behalf of GBIO or any of GBIO's Affiliates and (ii) all [**] in this Section 5.1.2(c).

5.2 **In-License Agreements**. Notwithstanding anything to the contrary in this Agreement, the Parties acknowledge and agree as follows:

5.2.1 Upstream Obligations. Moderna acknowledges and agrees that the rights, licenses, and sublicenses granted by GBIO to Moderna in this Agreement (including any right to sublicense) are subject to the terms of each applicable In-License Agreement, the scope of the licenses granted to GBIO under each such In-License Agreement, and the rights retained by each Third Party counterparty to each such In-License Agreement and any other Third Party (including Governmental Authorities) expressly set forth in each such In-License Agreement. Without limiting any of the foregoing in this Section 5.2.1, Moderna agrees to be bound by [**] of the [**] Agreement and [**] of the [**] Agreement, [**].

5.2.2 Assistance. Without limiting Section 5.2.1 in any way, at GBIO's request, Moderna shall use Commercially Reasonable Efforts to, and cause its Affiliates and all Sublicensees to use Commercially Reasonable Efforts to, take such reasonable actions as may be required to assist GBIO in complying with its obligations under the In-License Agreements, solely to the extent applicable to Moderna's rights or obligations under this Agreement.

5.2.3 Termination of Licenses. Moderna acknowledges and agrees that, if any of the licenses granted to GBIO under any of the In-License Agreements is terminated, in whole or in part, then, to the extent that any Patent Right or Know-How licensed under such terminated license is sublicensed to Moderna hereunder, Moderna's sublicense under such terminated license(s) shall automatically terminate, subject to any right of Moderna to receive a direct license [**].

5.2.4 New In-License Agreements.

(a) Notwithstanding anything in this Agreement to the contrary, in the event that GBIO or, subject to Section 15.2, any of its Affiliates enters into an agreement or arrangement following the Effective Date under which GBIO or any of its Affiliates acquires Control of any Patent Rights or Know-How that are necessary or reasonably useful for the Development, Manufacture, or Commercialization of any Licensed Product that is being Developed or Commercialized (or, based on the then-current Research Plans, that is reasonably likely to be Developed or Commercialized) by Moderna or any of its Affiliates or Sublicensees, which agreement or arrangement GBIO or its applicable Affiliate shall use reasonable efforts to negotiate to ensure that (i) such Patent Rights and Know-How are [**] (it being understood and agreed that so long as any of such Patent Rights and Know-How [**], GBIO or its applicable Affiliate shall ensure that such Patent Rights and Know-How are [**], (ii) the fees, royalties, milestones, or other amounts payable thereunder with respect to any rights that may be [**], and (iii) GBIO's (or its applicable Affiliate's) rights and obligations with respect to [**], then, to the extent permitted under any confidentiality obligations related to such agreement or arrangement, which GBIO or its applicable Affiliate shall use reasonable efforts to negotiate to permit the [**], GBIO shall, within [**] after the effective date of such agreement or arrangement, [**].

(b) Any such Patent Rights or Know-How in-licensed by GBIO or its Affiliates are hereby deemed not to be part of the GBIO Intellectual Property and not sublicensed to Moderna hereunder unless and until Moderna provides written notice to GBIO that Moderna agrees to [**].

(c) Within [**] after GBIO's receipt of Moderna's written notice designating a New In-License Agreement, [**].

5.2.5 [**] Technology. [**].

5.3 **Rights to Sublicense**.

5.3.1 Moderna. Subject to Section 5.3.3 and the terms of each applicable In-License Agreement, Moderna shall have the right to grant sublicenses within the scope of the licenses granted to Moderna under Sections 5.1.1(a)-(d) to any of its Affiliates or any Third Party.

5.3.2 GBIO. Subject to Section 5.3.3, GBIO shall have the right to grant sublicenses within the scope of the licenses granted to GBIO under Sections 5.1.2(a) and 5.1.2(b) to any of its Affiliates or any Third Party.

5.3.3 Sublicense Requirements. Any sublicense granted by a Party pursuant to Section 5.3.1 or Section 5.3.2 shall be subject to the following:

(a) each sublicense granted hereunder shall be consistent with the requirements of this Agreement;

(b) such Party shall be primarily liable for any failure by any of its Affiliates or Sublicensees to comply with all relevant restrictions, limitations, and obligations in this Agreement;

(c) each sublicense to any Third Party must be granted pursuant to a written sublicense agreement, and the sublicensing Party shall provide the other Party with a copy of any such sublicense agreement entered into under Section 5.3.1 or Section 5.3.2 within [**] after the execution of such sublicense agreement (which shall be the sublicensing Party's Confidential Information); except that any such copy may be reasonably redacted to remove any confidential, proprietary, or competitively sensitive information, but such copy shall not be redacted to the extent that it impairs the non-sublicensing Party's ability to ensure compliance with this Agreement;

(d) each Party shall require each Affiliate or Sublicensee to whom such Party discloses any of the other Party's Confidential Information to enter into a written agreement obligating such Affiliate or Sublicensee to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are no less restrictive than are the obligations set forth in ARTICLE 9, including requiring such Affiliate or Sublicensee to agree in writing not to issue any Publications except in compliance with the terms of this Agreement [**], and (iii) upon the request of the other Party, removes from such Publication any Confidential Information of such other Party); and

(e) neither Party may grant any sublicense to any Third Party under any Joint Collaboration ctLNP Intellectual Property except as permitted under Section 2.11.

5.4 **Third Party Contractors**. Moderna shall have the right, within the scope of the licenses granted to Moderna under Section 5.1.1, and GBIO shall have the right, within the scope of the licenses granted to GBIO under Section 5.1.2, to retain any Third Party for the purpose of engaging such Third Party as a contract research organization, contract manufacturer, contract sales force, consultant, academic researcher, or the like (each, a "**Third Party Contractor**") in connection with the performance of any Research Program (subject, in the case of Third Party Contractors not set forth on Schedule 5.4 [**]. Such retention of a Third Party Contractor is not a sublicense within the meaning of Section 5.3 but is considered an activity of Moderna under the licenses granted under Section 5.1.1, or GBIO under the licenses granted under Section 5.1.2, as applicable. Engagement of Third Party Contractors under this Section 5.4 is subject to the following (except as otherwise mutually agreed by the Parties):

5.4.1 each Party shall obligate each of its Third Party Contractors to agree in writing to assign to such Party ownership of, or grant to such Party a royalty-free, fully-paid, worldwide, perpetual, exclusive, and irrevocable license (with the right to grant sublicenses through multiple tiers) to, any Know-How and related intellectual property rights (including Patent Rights) arising under its agreement with such Third Party Contractor to the extent related to the Development, Manufacture, or Commercialization of any Non-Liver ctLNP or Licensed Product (which may be subject to reasonable and customary exceptions for a Third Party Contractor's own existing intellectual property rights and improvements thereto), and such Party shall structure such assignment or exclusive license so as to enable such Party to license or sublicense such Third Party Know-How and related intellectual property rights to the other Party pursuant to the applicable provisions of this Agreement (including permitting such other Party to grant further sublicenses);

5.4.2 at the written request of either Party, the other Party shall provide such Party with a copy of each agreement between such other Party and any Third Party Contractor, which copy may be redacted with respect to matters that do not relate to activities conducted under this Agreement; and

5.4.3 each Party shall require each Third Party Contractor to whom such Party discloses any of the other Party's Confidential Information to enter into a written agreement obligating such Third Party Contractor to be bound by obligations of confidentiality and restrictions on use of such Confidential Information that are no less restrictive than are the obligations set forth in ARTICLE 9, including requiring such Third Party Contractor to agree in writing not to issue any Publications except in compliance with the terms of this Agreement [**], and (c) upon the request of the other Party, removes from such Publication any Confidential Information of such other Party).

5.5 **No Implied Licenses**. Each Party acknowledges that the licenses granted under this Agreement are limited to the scope expressly granted, and all other rights to Patent Rights and Know-How licensed hereunder are expressly reserved to the Party granting the license to such Patent Rights or Know-How. Nothing in this Agreement will be interpreted to grant a Party any rights under any intellectual property rights owned or Controlled by the other Party that are not expressly granted herein, whether by implication, estoppel, or otherwise.

5.6 **Technology Transfers**.

5.6.1 Optioned Liver Targets. On an Optioned Liver Target-by-Optioned Liver Target basis, (a) to the extent not previously provided, as soon as reasonably practicable but in any event no more than [**] after the Liver Option Exercise Date for such Optioned Liver Target, GBIO will provide Moderna with (i) an electronic copy of all material [**] with respect to such Optioned Liver Target in existence as of such Liver Option Exercise Date; and (ii) to the extent reasonably requested by Moderna, [**] by or on behalf of GBIO or its Affiliates as of such Liver Option Exercise Date; and (b) following the Liver Option Exercise Date with respect to such Optioned Liver Target, no less frequently than [**] during the Liver Research Term and the [**] period immediately following the end of the Liver Research Term, GBIO shall provide to Moderna an electronic copy of [**] that comes into Control of GBIO or any of its Affiliates but was not previously provided to Moderna. Within [**] after the expiration of the [**] period immediately following the end of the Liver Research Term, GBIO shall provide to Moderna an electronic copy of [**] in existence as of the date of such expiration that was not previously provided to Moderna.

5.6.2 Optioned Non-Liver Targets. On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, (a) to the extent not previously provided, as soon as reasonably practicable but in any event no more than [**] after the Non-Liver Option Exercise Date for such Optioned Non-Liver Target, GBIO will provide Moderna with (i) an electronic copy of all material [**] with respect to such Optioned Non-Liver Target in existence as of such Non-Liver Option Exercise Date; and (ii) to the extent reasonably requested by Moderna, [**] by or on behalf of GBIO or its Affiliates as of such Non-Liver Option Exercise Date; and (b) following the Non-Liver Option Exercise Date with respect to such Optioned Non-Liver Target, no less frequently than [**] during the Non-Liver Research Term and the [**] period immediately following the end of the Non-Liver Research Term, GBIO shall provide to Moderna an electronic copy of all material [**] with respect to such Optioned Non-Liver Target that comes into Control of GBIO or any of its Affiliates but was not previously provided to Moderna. Within [**] after the expiration of the [**] period immediately following the end of the Non-Liver Research Term, GBIO shall provide to Moderna an electronic copy of all material [**] with respect to such Optioned Non-Liver Target in existence as of the date of such expiration that was not previously provided to Moderna.

5.6.3 Licensed Independent Products.

(a) On a Cell Target Type-by-Cell Target Type basis, (i) as soon as reasonably practicable but in any event no more than [**] after the achievement of the applicable Cell Target Type Success Criteria, GBIO will provide to Moderna, to the extent not previously provided, an electronic copy of all material (A) [**] and (B) Joint Collaboration ctLNP Intellectual Property, in each case ((A) and (B)) in existence as of the achievement of the applicable Cell Target Type Success Criteria that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products Directed to such Cell Target Type; and (ii) no less frequently than [**] during the mRNA Field Exclusivity Period for such Cell Target Type thereafter, GBIO shall provide to Moderna with an electronic copy of all material (A) [**] and (B) [**], in each case ((A) and (B)) that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products Directed to such Cell Target Type and that comes into Control of GBIO or its Affiliates but was not previously provided to Moderna. Within [**] after the expiration of the mRNA Field Exclusivity Period for such Cell Target Type, GBIO shall provide to Moderna an electronic copy of all material (A) [**] and (B) [**], in each case ((A) and (B)) that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products Directed to such Cell Target Type in existence as of the date of such expiration but was not previously provided to Moderna.

(b) Prior to the achievement of the applicable Cell Target Type Success Criteria, upon reasonable request by Moderna, GBIO shall provide to Moderna with an electronic copy of material (i) [**] and (ii) Joint Collaboration ctLNP Intellectual Property, in each case ((i) and (ii)) in existence at such time that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products Directed to such Cell Target Type but was not previously provided to Moderna.

(c) On an Exclusive Target-by-Exclusive Target basis, (i) as soon as reasonably practicable but in any event no more than [**] after the Exclusive Target Option Exercise Date for such Exclusive Target, GBIO will provide to Moderna, to the extent not previously provided, an electronic copy of all material (A) [**] and (B) Joint Collaboration ctLNP Intellectual Property, in each case ((A) and (B)) in existence as of such Exclusive Target Option Exercise Date that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products in the mRNA Field that are Directed to such Exclusive Target; and (ii) no less frequently than [**] during the applicable mRNA Field Exclusivity Period, GBIO shall provide to Moderna with an electronic copy of all material (A) [**] and (B) [**], in each case ((A) and (B)) that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products in the mRNA Field that are Directed to such Exclusive Target and that comes into Control of GBIO or its Affiliates but was not previously provided to Moderna. Within [**] after the expiration of the mRNA Field Exclusivity Period, GBIO shall provide to Moderna an electronic copy of all material (A) [**] and (B) [**], in each case ((A) and (B)) that is necessary or reasonably useful for the Development, Manufacture, Commercialization, or other Exploitation of Licensed Independent Products in the mRNA Field that are Directed to such Exclusive Target in existence as of the date of such expiration but was not previously provided to Moderna.

5.6.4 **Assistance**. At Moderna's reasonable request, GBIO shall reasonably cooperate with Moderna to facilitate the technology transfers described in this Section 5.6 and to enable the use of the transferred technology by Moderna or its applicable Affiliates or Sublicensees. Such cooperation shall include providing Moderna or its applicable Affiliates or Sublicensees with reasonable access by teleconference or in-person at GBIO's or its Affiliates' facilities to appropriate personnel from GBIO or its Affiliates to provide Moderna or its applicable Affiliates or Sublicensees with technical assistance and consultation in connection with such technology transfers or such use, and [**] consultation at Moderna's or its applicable Affiliates' or Sublicensees' facilities as reasonably requested by Moderna to facilitate the use of the transferred technology by Moderna or its applicable Affiliates or Sublicensees.

5.6.5 **Cost**. GBIO shall provide the technology transfer, technical assistance, and consultation described in this Section 5.6 free of charge for up to [**] person hours in aggregate across all such technology transfer, technical assistance, and consultation. Thereafter Moderna will be required to reimburse GBIO for all time in excess of [**] person hours for providing such technology transfer, technical assistance, and consultation at the FTE Rate *pro-rata* on an hourly basis.

ARTICLE 6 - DEVELOPMENT, MANUFACTURING, AND COMMERCIALIZATION

6.1 **General**.

6.1.1 **Optioned Liver Targets**. On an Optioned Liver Target-by-Optioned Liver Target basis, from and after the date that Moderna exercises a Liver Option with respect to such Optioned Liver Target, as between the Parties, Moderna shall be responsible, at its sole expense, for all aspects of the Development, Manufacturing, Commercialization, and other Exploitation of Licensed Liver Products Directed to such Optioned Liver Target conducted by or on behalf of Moderna or any of its Affiliates or Sublicensees, provided that the foregoing shall not reduce, diminish, or otherwise prejudice any obligation of either Party set forth in the applicable Research Plan with respect to such Optioned Liver Target during the remainder of the Liver Research Term.

6.1.2 **Optioned Non-Liver Targets**. On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, from and after the date that Moderna exercises a Non-Liver Option with respect to such Optioned Non-Liver Target, as between the Parties, Moderna shall be responsible, at its sole expense, for all aspects of the Development, Manufacturing, Commercialization, and other Exploitation of Licensed Non-Liver Products Directed to such Optioned Non-Liver Target conducted by or on behalf of Moderna or any of its Affiliates or Sublicensees, provided that the foregoing shall not reduce, diminish or otherwise prejudice any obligation of either Party set forth in the applicable Research Plan with respect to such Optioned Non-Liver Target during the remainder of the Non-Liver Research Term.

6.1.3 **Exclusive Targets**. On an Exclusive Target-by-Exclusive Target basis, from and after the Exclusive Target Option Exercise Date with respect to such Exclusive Target, as between the Parties, Moderna shall be responsible, at its sole expense, for all aspects of the Development, Manufacturing, Commercialization, and other Exploitation of Licensed Independent Products Directed to such Exclusive Target conducted by or on behalf of Moderna or any of its Affiliates or Sublicensees.

6.1.4 Independent Program Targets. Subject to the licenses granted hereunder, Moderna's payment obligations under Section 8.4, and GBIO's exclusivity obligations under Section 2.9.2, on an Independent Program Target-by-Independent Program Target basis, from and after the Effective Date, as between the Parties, each Party shall be responsible, at its sole expense, for all aspects of the Development, Manufacturing, Commercialization, and other Exploitation of Licensed Independent Products Directed to such Independent Program Target conducted by or on behalf of such Party or any of its Affiliates or Sublicensees.

6.2 **Diligence**.

6.2.1 General.

(a) On an Optioned Liver Target-by-Optioned Liver Target basis, from and after the date that Moderna exercises a Liver Option with respect to such Optioned Liver Target, Moderna shall use Commercially Reasonable Efforts to (i) Develop and obtain Regulatory Approval for at least one (1) Licensed Liver Product Directed to such Optioned Liver Target in each Major Market and (ii) Commercialize each such Licensed Liver Product in any country or jurisdiction in which Regulatory Approval is obtained for such Licensed Liver Product.

(b) On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, from and after the date that Moderna exercises a Non-Liver Option with respect to such Optioned Non-Liver Target, Moderna shall use Commercially Reasonable Efforts to (i) Develop and obtain Regulatory Approval for at least one (1) Licensed Non-Liver Product Directed to such Non-Liver Target in each Major Market and (ii) Commercialize each such Licensed Non-Liver Product in any country or jurisdiction in which Regulatory Approval is obtained for such Licensed Non-Liver Product.

(c) On an Exclusive Target-by-Exclusive Target basis, from and after the date that Moderna exercises an Exclusive Target Option with respect to such Exclusive Target, Moderna shall use Commercially Reasonable Efforts to (i) Develop and obtain Regulatory Approval for at least one (1) Licensed Independent Product Directed to such Exclusive Target in each Major Market and (ii) Commercialize each such Licensed Independent Product in any country or jurisdiction in which Regulatory Approval is obtained for such Licensed Independent Product.

6.2.2 Commercially Reasonable Shelving.

(a) On an Optioned Liver Target-by-Optioned Liver Target basis, if Moderna determines, consistent with its diligence obligations under Section 6.2.1(a), to cease Developing or Commercializing all Licensed Liver Products Directed to such Optioned Liver Target, then Moderna shall promptly notify GBIO of such determination, and such Optioned Liver Target shall thereafter be deemed a Terminated Liver Target, and Section 12.6 shall apply with respect to such Terminated Liver Target.

(b) On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, if Moderna determines, consistent with its diligence obligations under Section 6.2.1(b), to cease Developing or Commercializing all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target, then Moderna shall promptly notify GBIO of such determination, and such Optioned Non-Liver Target shall thereafter be deemed a Terminated Non-Liver Target, and Section 12.6 shall apply with respect to such Terminated Non-Liver Target.

(c) On an Exclusive Target-by-Exclusive Target basis, if Moderna determines, consistent with its diligence obligations under Section 6.2.1(c), to cease Developing or Commercializing all Licensed Independent Products Directed to such Exclusive Target, then Moderna shall promptly notify GBIO of such determination, and such Exclusive Target shall thereafter be deemed to be a Terminated Exclusive Target, and Section 12.6 shall apply with respect to such Terminated Exclusive Target.

6.3 **Compliance with Applicable Laws**. Moderna shall comply with all Applicable Laws (including Good Laboratory Practices, Good Clinical Practices, and Good Manufacturing Practices) in the Development, Manufacture, and Commercialization of Licensed Products, and shall require its Affiliates and Sublicensees to do the same.

6.4 **Progress Reports**.

6.4.1 Development Reports.

(a) Beginning upon the initiation of the first Clinical Trial of a Licensed Liver Product or Licensed Non-Liver Product, Moderna shall keep GBIO informed in a timely manner as to the progress of the Development of such Licensed Product by and on behalf of Moderna or any of its Affiliates and Sublicensees, including providing GBIO with a written report every [**] that provides (i) [**] and (ii) [**].

(b) Beginning upon the initiation of the first Clinical Trial of a Licensed Independent Product Directed to an Exclusive Target, Moderna shall keep GBIO informed in a timely manner as to the progress of the Development of such Licensed Product by and on behalf of Moderna or any of its Affiliates or Sublicensees, including providing GBIO with a written report every [**] that provides (i) [**] and (ii) [**].

(c) Each Party shall keep the other Party reasonably informed regarding the Development, by and on behalf of such Party or any of its Affiliates or Sublicensees, of Licensed Independent Products that are not Directed to Exclusive Targets.

6.4.2 Commercialization Reports.

(a) Beginning upon the submission of the first Drug Approval Application for a Licensed Liver Product, Licensed Non-Liver Product, or Licensed Independent Product Directed to an Exclusive Target and ending on GBIO's receipt of the first royalty report for such Licensed Liver Product, Licensed Non-Liver Product, or Licensed Independent Product, Moderna shall keep GBIO reasonably informed in a timely manner as to the progress of the Commercialization of such Licensed Liver Product, Licensed Non-Liver Product, or Licensed Independent Product.

(b) Beginning upon the submission of the first Drug Approval Application for a Licensed Independent Product that is not Directed to an Exclusive Target and ending on the other Party's receipt of the first royalty report for such Licensed Independent Product, each Party shall keep the other Party reasonably informed regarding the Commercialization, by and on behalf of such Party or any of its Affiliates or Sublicensees, of such Licensed Independent Product.

ARTICLE 7 - REGULATORY MATTERS

7.1 **Regulatory Interactions**. As between the Parties, each Party shall have the sole right to (a) prepare and submit all Regulatory Documentation (including all INDs and all applications for Regulatory Approval and pricing approval) with respect to all Licensed Products being Developed or Commercialized by such Party or any of its Affiliates or Sublicensees, (b) obtain and maintain all Regulatory Approvals and pricing approvals for all Licensed Products being Developed or Commercialized by such Party or any of its Affiliates or Sublicensees, and (c) conduct all correspondence and communications with Regulatory Authorities regarding the matters described in clauses (a) and (b).

7.2 **Regulatory Documentation**. All Regulatory Documentation (including all Regulatory Approvals and pricing approvals) with respect to any Licensed Product shall be owned by and shall be the sole property and held in the name of, the Party (or its applicable Affiliate, Sublicensee, or designee) that is Developing or Commercializing such Licensed Product.

7.3 **Coordination and Cooperation**. At Moderna's reasonable request and expense, GBIO shall use reasonable efforts to cooperate and coordinate with, and shall provide all reasonable assistance to, Moderna in connection with (a) preparation and submission of Regulatory Documentation (including INDs and all applications for Regulatory Approval and pricing approval) with respect to Licensed Products being Developed or Commercialized by Moderna or any of its Affiliates or Sublicensees, (b) obtaining and maintaining Regulatory Approvals and pricing approvals for Licensed Products being Developed or Commercialized by Moderna or any of its Affiliates or Sublicensees, and (c) the conduct of correspondence and communications with Regulatory Authorities regarding the matters described in clauses (a) and (b). Without limiting the generality of the foregoing, at Moderna's reasonable request and expense, GBIO shall (i) provide Moderna with material documents and information in GBIO's or its Affiliates' Control and possession that are necessary or reasonably useful for obtaining and maintaining Regulatory Approvals or pricing approvals for Licensed Products being Developed or Commercialized by Moderna or any of its Affiliates or Sublicensees, in each case to the extent not previously provide to Moderna, (ii) [**], and (iii) [**].

7.4 **Safety Concern**. Notwithstanding anything to the contrary herein, if, at any time during the Term, a Party reasonably believes that there is a Safety Concern with respect to a Licensed Product, then such Party will promptly provide written notice to the other Party of such Safety Concern.

ARTICLE 8 - FEES, MILESTONES, AND ROYALTIES

8.1 **Upfront Fee**. In partial consideration of the rights and licenses granted by GBIO to Moderna under this Agreement, within [**] after the Effective Date, Moderna shall pay to GBIO a one-time, non-refundable, non-creditable upfront amount equal to Forty Million U.S. Dollars ($40,000,000).

8.2 **Equity Purchase Agreement**. Moderna will purchase stock of GBIO on the terms and pursuant to the conditions of a Stock Purchase Agreement to be executed on or around the Effective Date.

8.3 **Extension and Option Fees**.

8.3.1 [**].

8.3.2 [**].

8.3.3 [**].

8.3.4 mRNA Field Exclusivity Period Extension Fee. If Moderna desires to extend the mRNA Field Exclusivity Period for a given Cell Target Type [**], then Moderna shall pay GBIO a one-time, non-refundable, non-creditable amount equal to [**] U.S. Dollars ($[**]) (a "**[**]mRNA Field Exclusivity Period Extension Fee**"). [**].

8.3.5 Additional Option Fee. If Moderna desires to obtain one (1) additional Liver Option or one (1) additional Non-Liver Option pursuant to Section 3.1.2, then Moderna shall pay GBIO a one-time, non-refundable, non-creditable amount equal to (a) if Moderna elects to obtain one (1) additional Liver Option, [**] U.S. Dollars ($[**]) or (b) if Moderna elects to obtain one (1) additional Non-Liver Option, [**] U.S. Dollars ($[**]) (the "**Additional Option Fee**").

8.3.6 Liver Option Exercise Fee. On a Liver Target-by-Liver Target basis, if Moderna desires to exercise a Liver Option for such Liver Target pursuant to Section 3.1.3(a), then Moderna shall pay to GBIO a one-time, non-refundable, non-creditable payment of [**] U.S. Dollars ($[**]) (the "**Liver Option Exercise Fee**").

8.3.7 Non-Liver Option Exercise Fee. On a Non-Liver Target-by-Non-Liver Target basis, if Moderna desires to exercise a Non-Liver Option for such Non-Liver Target pursuant to Section 3.1.3(b), then Moderna shall pay to GBIO a one-time, non-refundable, non-creditable payment of [**] U.S. Dollars ($[**]) (the "**Non-Liver Option Exercise Fee**").

8.3.8 Exclusive Target Option Exercise Fee. On an Independent Program Target-by-Independent Program Target basis, if Moderna desires to exercise an Exclusive Target Option for such Independent Program Target pursuant to Section 3.1.3(c), then Moderna shall pay to GBIO a one-time, non-refundable, non-creditable payment of (a) [**] U.S. Dollars ($[**]), (b) [**], and (c) [**] (each such payment, if any, an "**Exclusive Target Option Exercise Fee**").

8.4 **Research Costs**.

8.4.1 Prepaid Research Funding. Within [**] after the Effective Date, Moderna shall pay to GBIO an amount equal to [**] U.S. Dollars ($[**]) as prepayment of Research Costs that GBIO expects to incur or accrue in conducting the Research Programs (the "**Prepaid Research Funding**").

8.4.2 Ongoing Research Funding. GBIO's Research Costs incurred under each Research Plan shall first be offset against the Prepaid Research Funding. Upon fully consuming the Prepaid Research Funding with GBIO's Research Costs, Moderna shall pay GBIO, on a Research Plan-by-Research Plan basis, for GBIO's Research Costs incurred under the applicable Research Plan which are not covered by the Prepaid Research Funding (the "**Excess Costs**") so long as the aggregate Research Costs incurred by GBIO in the applicable Research Program do not exceed [**] percent ([**]%) of the aggregate budget for such Research Program as set forth in the applicable Research Plan (each, a "**Research Budget**"). Following the end of each Calendar Quarter in which GBIO incurs or accrues any Research Costs in the performance of any activities assigned to GBIO in any Research Plan, GBIO shall provide Moderna an invoice and report setting forth such Research Costs, along with reasonable supporting explanation and documentation for such invoiced amounts (including [**]). GBIO shall in such invoice indicate the portion, if any, of the invoice amount that constitute Excess Costs. GBIO may not invoice Research Costs more than [**] after such Research Costs became payable by GBIO. Moderna will pay GBIO all amounts set forth in any invoice submitted pursuant to this Section 8.4.2 (except for any invoiced amounts that Moderna disputes in good faith) within [**] after receipt of the applicable invoice by Moderna; except that Moderna may credit the Prepaid Research Funding against any Research Costs invoiced pursuant to this Section 8.4.2 until such amount has been fully credited, provided that payment of any Excess Costs with respect to a given Research Program that exceed [**] percent ([**]%) of the Research Budget for such Research Program shall be subject to approval by Moderna. Moderna may request, and GBIO shall provide, [**] to substantiate the invoiced costs and expenses. GBIO shall use the Prepaid Research Funding it receives from Moderna under this Agreement solely to carry out its activities in the Research Programs in accordance with the applicable Research Plans therefor and the terms and conditions of this Agreement and for no other purposes.

8.4.3 Research Forecast.

(a) With respect to each approved Research Plan and associated Research Budget, at least [**] before end of each Calendar Quarter in which such Research Plan and Research Budget are in existence, GBIO shall provide to Moderna, in a format to be mutually agreed by the Parties, a non-binding activity-based financial forecast containing the estimated amounts of anticipated Research Costs for such Research Plan for the current Calendar Quarter (or a good faith estimate of any portions thereof).

(b) With respect to each approved Research Plan and associated Research Budget, at least [**] before end of each Calendar Quarter in which such Research Plan and Research Budget are in existence, GBIO shall provide to Moderna, in a format to be mutually agreed by the Parties, a non-binding activity-based financial forecast containing the estimated amounts of anticipated Research Costs for such Research Plan for the next [**] Calendar Quarters (or a good faith estimate of any portions thereof).

8.5 **Milestone Payments**.

8.5.1 Liver Non-Human Primate Proof of Concept Milestone. If, during the Initial Liver Research Term, GBIO achieves the criteria set forth on Schedule 8.5.1, Moderna shall pay GBIO a one-time, non-refundable, non-creditable amount equal to [**] U.S. Dollars ($[**]).

8.5.2 Optioned Liver Target Milestones.

(a) For purposes of this Section 8.5.2, a "**Licensed Liver Product Type**" means, on an Optioned Liver Target-by-Optioned Liver Target basis, (i) [**] and (ii) [**]. By way of example and not limitation, [**].

(b) Subject to Section 8.5.2(b)(iv), on a Licensed Liver Product Type-by-Licensed Liver Product Type basis, upon the first achievement of each of the Development and regulatory milestone events set forth below with respect to such Licensed Liver Product Type, Moderna shall pay GBIO the corresponding one-time amounts set forth below.

Milestones (per Licensed Liver Product Type)	**Payment (in US Dollars)**
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]

(i) Each milestone payment under this Section 8.5.2(b) shall be made to GBIO within [**] after the achievement of the applicable milestone.

(ii) For clarity, Moderna shall only pay GBIO once for achievement of each of the milestone events set forth in the table above for each Licensed Liver Product Type. In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Licensed Liver Product Type under this Section 8.5.2(b).

(iii) The following provisions shall apply to milestone events that are not achieved before the achievement of subsequent milestone events:

(A) If a milestone event in row [**] of the table set forth above in this Section 8.5.2(b) is achieved with respect to a given Licensed Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(B) If a milestone event in row [**] of the table set forth above in this Section 8.5.2(b) is achieved with respect to a given Licensed Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(C) If a milestone event in row [**] of the table set forth above in this Section 8.5.2(b) is achieved with respect to a given Licensed Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(iv) [**].

In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Optioned Liver Target under this Section 8.5.2(b).

(c) On an Optioned Liver Target-by-Optioned Liver Target basis, Moderna shall pay GBIO each of the following one-time amounts within [**] following the end of the Calendar Quarter in which the corresponding sales milestone event set forth below is first achieved, in the aggregate, by all Licensed Liver Products Directed to such Optioned Liver Target.

Milestones (per Optioned Liver Target)	**Payment (in US Dollars)**
(1) First time the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target equal or exceed $[**]	$[**]
(2) First time the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target equal or exceed $[**]	$[**]
(3) First time the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target equal or exceed $[**]	$[**]
(4) First time the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target equal or exceed $[**]	$[**]

(i) If more than one of the milestone events under this Section 8.5.2(c) is achieved in the same Calendar Quarter, then all corresponding milestone payments under this Section 8.5.2(c) shall be paid within [**] following the end of such Calendar Quarter.

(ii) For clarity, Moderna shall only pay GBIO once for achievement of each of the sales milestone events set forth in the table above for each Optioned Liver Target. In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Optioned Liver Target under this Section 8.5.2(c).

8.5.3 Optioned Non-Liver Target Milestones.

(a) For purposes of this Section 8.5.3, a "**Licensed Non-Liver Product Type**" means, on an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, (i) [**] and (ii) [**]. By way of example and not limitation, [**].

(b) Subject to Section 8.5.3(b)(iv), on a Licensed Non-Liver Product Type-by-Licensed Non-Liver Product Type basis, upon the first achievement of each of the Development and regulatory milestone events set forth below with respect to such Licensed Non-Liver Product Type, Moderna shall pay GBIO the corresponding one-time amounts set forth below.

Milestones (per Licensed Non-Liver Product Type)	Payment (in US Dollars)
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]
[**]	$[**]

(i) Each milestone payment under this Section 8.5.3(b) shall be made to GBIO within [**] after the achievement of the applicable milestone.

(ii) For clarity, Moderna shall only pay GBIO once for achievement of each of the milestone events set forth in the table above for each Licensed Non-Liver Product Type. In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Licensed Non-Liver Product Type under this Section 8.5.3(b).

(iii) The following provisions shall apply to milestone events that are not achieved before the achievement of subsequent milestone events:

(A) If a milestone event in row [**] of the table set forth above in this Section 8.5.3(b) is achieved with respect to a given Licensed Non-Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Non-Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Non-Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Non-Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(B) If a milestone event in row [**] of the table set forth above in this Section 8.5.3(b) is achieved with respect to a given Licensed Non-Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Non-Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Non-Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Non-Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(C) If a milestone event in row [**] of the table set forth above in this Section 8.5.3(b) is achieved with respect to a given Licensed Non-Liver Product Type before achievement of the milestone event in row [**] of such table for such Licensed Non-Liver Product Type, then such skipped milestone will be deemed to have been achieved with respect to such Licensed Non-Liver Product Type upon the achievement of such subsequent milestone with respect to such Licensed Non-Liver Product Type, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

(iv) [**].

In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Optioned Non-Liver Target under this Section 8.5.3(b).

(c) On an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, Moderna shall pay GBIO each of the following one-time amounts within [**] following the end of the Calendar Quarter in which the corresponding sales milestone event set forth below is first achieved, in the aggregate, by all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target.

Milestones (per Optioned Non-Liver Target)	**Payment (in US Dollars)**
(1) First time the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target equal or exceed $[**]	$[**]
(2) First time the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target equal or exceed $[**]	$[**]
(3) First time the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target equal or exceed $[**]	$[**]
(4) First time the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target equal or exceed $[**]	$[**]

(i) If more than one of the milestone events under this Section 8.5.3(c) is achieved in the same Calendar Quarter, then all corresponding milestone payments under this Section 8.5.3(c) shall be paid within [**] following the end of such Calendar Quarter.

(ii) For clarity, Moderna shall only pay GBIO once for achievement of each of the sales milestone events set forth in the table above for each Optioned Non-Liver Target. In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Optioned Non-Liver Target under this Section 8.5.3(c).

8.5.4 Exclusive Target Milestones.

On an Exclusive Target-by-Exclusive Target basis, upon the first achievement of each of the Development and regulatory milestone events set forth below with respect to a Licensed Independent Product Directed to such Exclusive Target, Moderna shall pay GBIO the corresponding one-time amounts set forth below.

Milestones (per Exclusive Target)	Payment (in US Dollars)
[**]	$[**]
[**]	$[**]
[**]	$[**]

(a) Each milestone payment under this Section 8.5.4 shall be made to GBIO within [**] after the achievement of the applicable milestone.

(b) For clarity, Moderna shall only pay GBIO once for achievement of each of the milestone events set forth in the table above for each Exclusive Target. In no event would Moderna owe GBIO more than [**] U.S. Dollars ($[**]) in milestone payments per Exclusive Target under this Section 8.5.4.

(c) If a milestone event in row [**] of the table set forth above in this Section 8.5.4 is achieved with respect to a Licensed Independent Product Directed to a given Exclusive Target before achievement of the milestone event in row [**] of such table for such Exclusive Target, then such skipped milestone will be deemed to have been achieved with respect to such Exclusive Target upon the achievement of such subsequent milestone with respect to such Exclusive Target, and Moderna shall pay to GBIO the milestone payment corresponding to such skipped milestone within [**] after such achievement.

8.6 **Royalties**.

8.6.1 Royalty Rates Payable by Moderna.

(a) Subject to the remainder of this Section 8.6, on an Optioned Liver Target-by-Optioned Liver Target basis, Moderna shall pay to GBIO royalties on worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target as set forth below:

Calendar Year Net Sales	Royalty Rate
Portion of the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target, in the aggregate, up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Liver Products Directed to such Optioned Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]).	[**]%

Each royalty rate set forth in the table above will apply only to that portion of the worldwide Net Sales of all Licensed Liver Products Directed to the applicable Optioned Liver Target during a given Calendar Year that falls within the indicated portion. For example, if, in a given Calendar Year, worldwide Net Sales of all Licensed Liver Products Directed to a given Optioned Liver Target were $[**], then the royalties payable with respect to such Net Sales would be:

[**].

(b) Subject to the remainder of this Section 8.6, on an Optioned Non-Liver Target-by-Optioned Non-Liver Target basis, Moderna shall pay to GBIO royalties on worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target as set forth below:

Calendar Year Net Sales	**Royalty Rate**
Portion of the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target, in the aggregate, up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Non-Liver Products Directed to such Optioned Non-Liver Target, in the aggregate, greater than [**] U.S. Dollars ($[**]).	[**]%

Each royalty rate set forth in the table above will apply only to that portion of the worldwide Net Sales of all Licensed Non-Liver Products Directed to the applicable Optioned Non-Liver Target during a given Calendar Year that falls within the indicated portion. For example, if, in a given Calendar Year, worldwide Net Sales of all Licensed Non-Liver Products Directed to a given Optioned Non-Liver Target were $[**], then the royalties payable with respect to such Net Sales would be:

[**].

(c) **S**ubject to the remainder of this Section 8.6, on an Independent Program Target-by-Independent Program Target basis, Moderna shall pay to GBIO royalties on worldwide Calendar Year Net Sales of all Licensed Independent Products Directed to such Independent Program Target as set forth below:

Calendar Year Net Sales	**Royalty Rate**
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products Directed to such Independent Program Target, in the aggregate, up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]).	[**]%

Each royalty rate set forth in the table above will apply only to that portion of the worldwide Net Sales of all Licensed Independent Products Directed to the applicable Independent Program Target during a given Calendar Year that falls within the indicated portion. For example, if, in a given Calendar Year, worldwide Net Sales of all Licensed Independent Products Directed to a given Independent Program Target were $[**], then the royalties payable with respect to such Net Sales would be:

[**].

8.6.2 Royalty Rates Payable by GBIO.

(a) Subject to the remainder of this Section 8.6, on an Independent Program Target-by-Independent Program Target basis, GBIO shall pay to Moderna royalties on worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Field Directed to such Independent Program Target as set forth below:

Calendar Year Net Sales	Royalty Rate
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Field Directed to such Independent Program Target, in the aggregate, up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Field Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Field Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]).	[**]%

Each royalty rate set forth in the table above will apply only to that portion of the worldwide Net Sales of all Licensed Independent Products in the [**] Field Directed to the applicable Independent Program Target during a given Calendar Year that falls within the indicated portion. For example, if, in a given Calendar Year, worldwide Net Sales of all Licensed Independent Products in the [**] Field Directed to a given Independent Program Target were $[**], then the royalties payable with respect to such Net Sales would be:

[**].

(b) Subject to the remainder of this Section 8.6, on an Independent Program Target-by-Independent Program Target basis, GBIO shall pay to Moderna royalties on worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Directed to such Independent Program Target as set forth below:

Calendar Year Net Sales	Royalty Rate
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Directed to such Independent Program Target, in the aggregate, up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]) up to and including [**] U.S. Dollars ($[**]).	[**]%
Portion of the worldwide Calendar Year Net Sales of all Licensed Independent Products in the [**] Directed to such Independent Program Target, in the aggregate, greater than [**] U.S. Dollars ($[**]).	[**]%

Each royalty rate set forth in the table above will apply only to that portion of the worldwide Net Sales of all Licensed Independent Products in the [**] Directed to the applicable Independent Program Target during a given Calendar Year that falls within the indicated portion. For example, if, in a given Calendar Year, worldwide Net Sales of all Licensed Independent Products in the [**] Directed to a given Independent Program Target were $[**], then the royalties payable with respect to such Net Sales would be:

[**].

8.6.3 **Royalty Term**. Royalties payable under this Section 8.6 shall be paid by the applicable Party on a Licensed Product-by-Licensed Product and country-by-country basis from the First Commercial Sale of such Licensed Product in such country until the latest of (a) expiration of the last to expire Valid Claim in the Royalty Bearing Patent Rights Covering such Licensed Product in such country, (b) expiration of all Regulatory Exclusivity for such Licensed Product in such country, and (c) ten (10) years following the date of First Commercial Sale of such Licensed Product in such country (each such term with respect to a Licensed Product and a country, a "**Royalty Term**").

8.6.4 **Royalty Reduction**.

(a) On a Licensed Product-by-Licensed Product and country-by-country basis, subject to Section 8.6.4(d), during any period in which there is no Valid Claim in the Royalty Bearing Patent Rights Covering such Licensed Product in such country, the royalty rate with respect to such Licensed Product in such country will be reduced to [**] percent ([**]%) of the applicable rate set forth in Section 8.6.1 or Section 8.6.2, as applicable, provided that such reduction shall instead [**] percent ([**]%) so long as (i) Regulatory Exclusivity has been obtained for such Licensed Product in such country and is in force, and at the same time (ii) there is no Biosimilar Product on the market with respect to such Licensed Product in such country.

(b) If, on a Licensed Product-by-Licensed Product, country-by-country, and Calendar Quarter-by-Calendar Quarter basis, there is Biosimilar Competition with respect to such Licensed Product in such country in such Calendar Quarter, then, subject to Section 8.6.4(d), the royalty rate with respect to such Licensed Product in such country in such Calendar Quarter will be reduced to [**] percent ([**]%) of the applicable rate set forth in Section 8.6.1 or Section 8.6.2, as applicable.

(c) On a Licensed Product-by-Licensed Product, country-by-country, and Calendar Quarter-by-Calendar Quarter basis, subject to Section 8.6.4(d), a Party shall be entitled to credit against the royalties due to the other Party on Net Sales of such Licensed Product in such country in such Calendar Quarter pursuant to Section 8.6.1 or Section 8.6.2, as applicable, an amount equal to the Deductible Third Party Payments with respect to such Licensed Product in such country in such Calendar Quarter.

(d) In no event shall the royalty reductions described in Section 8.6.4(a), Section 8.6.4(b), and Section 8.6.4(c) alone or together, reduce the royalties payable by a Party for a given Licensed Product in a given country in any given Calendar Quarter to less than [**] percent ([**]%) of the amounts otherwise payable by the applicable Party for such Licensed Product in such country in such Calendar Quarter pursuant to Section 8.6.1 or Section 8.6.2, as applicable. Such Party may carry over and apply any such royalty reductions that are accrued in a Calendar Quarter and are not deducted in such Calendar Quarter due to the limitation set forth in the first sentence of this Section 8.6.4(d) to any subsequent Calendar Quarter(s) and shall begin applying such reductions to such royalties as soon as practicable and continue applying such reductions on a Calendar Quarter basis thereafter until fully deducted, in all cases subject to the limitation set forth in the first sentence of this Section 8.6.4(d).

8.6.5 **Expiration of Royalty Term**. Upon the expiration of the Royalty Term with respect to a Licensed Product in a country (but not earlier termination of this Agreement, in whole or in part), the license granted by the applicable Party to the other Party pursuant to Section 5.1.1 or 5.1.2, as applicable, shall be deemed to be fully paid-up, irrevocable, and perpetual with respect to such Licensed Product in such country, and sales of such Licensed Product in such country shall no longer be included in the calculation of Net Sales for purposes of calculating the applicable royalty rate under Section 8.6.1 or Section 8.6.2 or milestones under Section 8.5.2(c) or Section 8.5.3(c), as applicable, but such other Party shall be solely responsible for any amounts payable to Third Party licensors and shall be responsible for complying with the terms of any license agreements with such Third Party licensors, in each case, with respect to such other Party's exercise of such rights as to such Licensed Product in such country following the expiration of such Royalty Term.

8.6.6 **Royalty Reports; Payments**. Each Party shall, (a) within [**] following the end of each Calendar Quarter in which a royalty payment owed to the other Party accrues, provide to such other Party a good faith estimate of royalties that will be paid to such other Party under this Agreement for such Calendar Quarter, and (b) within [**] following the end of each Calendar Quarter in which a royalty payment accrues, (i) provide to such other Party a report for each country in which sales of any Licensed Product occurred in the Calendar Quarter, specifying for such Calendar Quarter: the number of Licensed Products sold; the applicable royalty rate under this Agreement; the royalties payable in each country's currency, including an accounting of deductions taken in the calculation of Net Sales in accordance with Accounting Standards; the applicable exchange rate to convert from each country's currency to U.S. Dollars under Section 8.12; and the royalty calculation and royalties payable in U.S. Dollars and (ii) make the royalty payments owed to such other Party hereunder in accordance with such royalty report in arrears.

8.7 **In-License Agreement Payments**. Moderna shall reimburse GBIO for any fees, royalties, milestones, and other amounts actually paid by GBIO or its applicable Affiliate under any New In-License Agreement, as allocated to Moderna pursuant to Section 5.2.4, or under any deemed In-License Agreement, as allocated to Moderna pursuant to Section 5.2.5, in each case within [**] after receipt of an invoice therefor.

8.8 **Financial Records**. Each Party shall keep, and shall require its Affiliates and Sublicensees to keep, complete and accurate books and records relating to the Development, Manufacture, and Commercialization of Licensed Products in accordance with Accounting Standards. Each Party shall keep, and shall require its Affiliates and Sublicensees to keep, such books and records for at least [**] following the end of the Calendar Year to which they pertain. Such books of accounts shall be kept at the principal place of business of the financial personnel with responsibility for preparing and maintaining such records. Such records shall be in sufficient detail to support, as applicable, (a) calculations of royalties and milestones owed under this Agreement and (b) calculations of Research Costs owed or paid by Moderna under this Agreement.

8.9 **Audits**.

8.9.1 **Audit Process**. Upon the written request of a Party (the "**Auditing Party**") and with at least [**] prior written notice, but not more than [**] during the Term and during the [**] following the expiration or termination of this Agreement, the other Party (the "**Audited Party**") shall permit an independent certified public accounting firm of internationally recognized standing in the field of audit selected by the Auditing Party and reasonably acceptable to the Audited Party, at the Auditing Party's sole cost and expense (except as set forth in this Section 8.9), to have access during normal business hours to such of the financial records and books of the Audited Party as are required to be maintained under this Agreement (a) in the case of Moderna as the Audited Party, to verify the accuracy of the royalty reports and calculation of Net Sales for payments due to GBIO hereunder and (b) in the case of GBIO as the Audited Party, to verify the accuracy of the Research Costs invoiced to Moderna hereunder or to verify the accuracy of the royalty reports and calculation of Net Sales for payments due to Moderna hereunder; provided that such independent accounting firm is subject to written obligations of confidentiality, non-disclosure, and non-use applicable to the Audited Party's confidential or proprietary information that are at least as stringent as those set forth in ARTICLE 9. Such accountants may audit such records for any Calendar Year ending not more than [**] prior to the date of such request. The report of the independent certified public accountant shall be shared with the Audited Party before distribution to the Auditing Party so that the Audited Party can provide the independent public accountant with justifying remarks for inclusion in the report before sharing the conclusions of such independent public audit with the Auditing Party. The final audit report will be shared with both Parties at the same time. The accounting firm shall disclose to the Auditing Party only the information relevant to support a statement as to whether (x) in the case of Moderna as the Audited Party, the royalty reports and royalty and milestone payments provided to GBIO were correct or not and (y) in the case of GBIO as the Audited Party, the Research Costs invoiced to Moderna, or the royalty reports and royalty and milestone payments provided to Moderna, were correct or not, and, in either case ((x) or (y)), shall not include any confidential information (to the extent not already disclosed by the Audited Party to the Auditing Party) disclosed to the auditor during the course of the audit. An audit of the records relating to a particular Calendar Year may be conducted not more than [**].

8.9.2 Payment.

(a) If such accounting firm concludes that any royalties, milestones, or Research Costs were owed but not paid to GBIO, Moderna shall pay the additional royalties, milestones, or Research Costs within [**] following the date GBIO delivers to Moderna an invoice therefor following the issuance of such accounting firm's written report so concluding. With respect to unpaid royalties and milestones, Moderna shall also pay GBIO interest at the rate set forth in Section 8.13. If such accounting firm concludes that the royalties, milestones, or Research Costs paid were more than what was owed during such period, Moderna may credit such overpayment against future payments owed to GBIO under this Agreement or, in the case of Research Costs, elect to have GBIO pay to Moderna such overpayment within [**] following the date GBIO receives an invoice therefor.

(b) If such accounting firm concludes that any royalties or milestones were owed but not paid to Moderna, GBIO shall pay the additional royalties or milestones, together with interest at the rate set forth in Section 8.13, within [**] following the date Moderna delivers to GBIO an invoice therefor following the issuance of such accounting firm's written report so concluding. If such accounting firm concludes that the royalties or milestones paid were more than what was owed during such period, GBIO may credit such overpayment against future payments owed to Moderna under this Agreement.

(c) If the Audited Party disagrees with the findings of the audit report, the Parties will first seek to resolve the matter between themselves, and, in the event that they fail to reach agreement, then the dispute resolution procedures set forth in Section 18.3 shall apply to such Dispute.

(d) The fees charged by the accounting firm shall be paid by the Auditing Party; except that, if the audit determines that (i) the royalties or milestones payable by the Audited Party for the audited period were understated by greater than [**] percent ([**]%) and the understated amount exceeds [**] Dollars ($[**]) or (ii) the Research Costs payable by Moderna for the audited period were overstated by greater than [**] percent ([**]%) and the overstated amount exceeds [**] Dollars ($[**]), then the Audited Party shall pay the reasonable fees and expenses charged by such accounting firm.

8.10 **Tax Matters**.

8.10.1 Taxes. The Parties acknowledge and agree that, unless expressly stated otherwise, the sole responsible party for all Taxes related to payments made under this Agreement shall be the Party legally obligated for such Taxes under Applicable Laws.

8.10.2 **Withholding Taxes**. If a Party (the "**Payor**") is required under any Applicable Laws to withhold any Taxes or other governmental charges on any amounts payable by the Payor to the other Party (the "**Payee**") under this Agreement, the Payor shall notify the Payee of such determination no less than [**] prior to making such payment. To the extent that Applicable Laws require that Taxes be withheld with respect to any payments to be made by the Payor to the Payee under this Agreement, the Payor shall: (a) deduct those Taxes from the remittable payment, (b) pay the Taxes to the proper taxing authority, and (c) promptly send evidence of the obligation together with proof of Tax payment, sufficient under Applicable Laws to enable the Payee to obtain a refund or credit of such paid amounts, to the Payee on a reasonable and timely basis following such Tax payment. The Payee shall provide such information and documentation to the Payor as are reasonably requested by the Payor, including any applicable requested Form W-9 or W-8 (as provided in Section 8.10.4), to determine if any withholding Taxes apply to any payments to be made by the Payor under this Agreement and to establish qualification for a reduced withholding rate or an exemption from such Tax to be withheld under the applicable bilateral income tax treaty or relevant statutory provision. The Payor agrees to cooperate with the Payee in claiming refunds, reductions, or exemptions from such deductions or withholdings under any Applicable Law, relevant agreement or treaty that is in effect. Notwithstanding anything to the contrary in this Agreement, in the event the Payor redomiciles or assigns its rights or obligations under this Agreement in accordance with Section 15.1 (each, a "**Tax Action**"), and, as a result of such Tax Action, the amount of Tax required to be withheld under this Section 8.10.2 in respect of a payment to the Payee is greater than the amount of such Tax that would have been required to have been withheld absent such Tax Action, then any such amount payable to the Payee shall be adjusted to take into account such withholding Taxes as may be necessary so that, after making all required withholdings or credits, the Payee receives an amount equal to the sum it would have received, taking into account applicable tax rates imposed on such income and any tax credits available as a result of the withholding or credits, had no such Tax Action occurred (but in no case shall any payment under this Agreement be an amount less than the remittable payment due without regard to this Section 8.10.2). The obligation to adjust payments pursuant to the preceding sentence shall not apply, however, to the extent such increased withholding of Tax (x) would not have been imposed but for a Tax Action taken by the Payee or (y) is attributable to the failure by the Payee to comply with the requirements of this Section 8.10.2. For purposes of this Section 8.10.2, a "redomiciliation" shall include a reincorporation or other action resulting in a change in tax residence of the applicable Party or its assignee.

8.10.3 **VAT**. Notwithstanding anything to the contrary in this Agreement (including anything to the contrary in this Section 8.10), this Section 8.10.3 shall apply with respect to value added tax or any similar tax ("**VAT**"). If, under Applicable Law, any VAT is required to be paid in respect of any supply of goods or services under this Agreement, the Party that is responsible under Applicable Law to account for VAT shall, as applicable, (a) issue an invoice for VAT at the applicable rate to the other Party and (b) if provided under applicable Law, pay directly to the relevant tax authorities.

8.10.4 **Forms**. Each Party has provided a properly completed and duly executed IRS Form W-9 or applicable Form W-8 to the other Party. Each Party shall provide to the other Party, at the time or times reasonably requested by such other Party or as required by Applicable Law, such properly completed and duly executed documentation (for example, IRS Forms W-8 or W-9) as will permit payments made under this Agreement to be made without, or at a reduced rate of, withholding for Taxes, and the applicable payment shall be made without (or at a reduced rate of) withholding to the extent permitted by such documentation, as reasonably determined by the paying Party.

8.11 **Foreign Derived Intangible Income Deduction**. Each Party shall use Commercially Reasonable Efforts to provide, and to cause its Affiliates and applicable Third Parties to provide, any information and documentation reasonably requested by the other Party to obtain the benefits of Section 250 of the Internal Revenue Code of 1986, as amended and the applicable Treasury Regulations, including information required to demonstrate the extent to which the Licensed Products will be sold, consumed, used, or manufactured outside the United States.

8.12 **Currency Exchange**. Unless otherwise expressly stated in this Agreement, all amounts specified in, and all payments made under, this Agreement shall be in United States Dollars. If any currency conversion shall be required in connection with the calculation of amounts payable under this Agreement, such conversion shall be performed in a manner consistent with the paying Party's normal practices used to prepare its audited financial statements for internal and external reporting purposes.

8.13 **Late Payments**. Any payments that are not paid on or before the date such payments are due under this Agreement shall bear interest at an annual rate equal to the lesser of (a) the "prime rate" as reported by The Wall Street Journal, Eastern Edition, plus [**] percent ([**]%), or (b) the highest rate permitted by Applicable Law; in each case calculated on the number of days such payment is delinquent, compounded monthly; except that, with respect to any disputed payments, no interest payment shall be due until such dispute is resolved and the interest which shall be payable thereon shall be based on the finally-resolved amount of such payment, calculated from the original date on which the disputed payment was due through the date on which payment is actually made.

8.14 **Blocked Payments**. In the event that, by reason of Applicable Law in any country, it becomes impossible or illegal for a Party (or any of its Affiliates or Sublicensees) to transfer, or have transferred on its behalf, payments owed to the other Party hereunder, the paying Party will promptly notify the other Party of the conditions preventing such transfer and such payments will be deposited in local currency in the relevant country to the credit of such other Party in a recognized banking institution designated by such other Party or, if none is designated by such other Party within a period of [**], in a recognized banking institution selected by the paying Party or its applicable Affiliate or Sublicensee, as the case may be, and identified in a written notice given to the other Party.

8.15 **Prohibitions on Payments**. When, in any country in the Territory, Applicable Law prohibits both the transmittal and the deposit of royalties on sales in such country, royalty payments due on Net Sales shall be suspended for as long as such prohibition is in effect and, as soon as such prohibition ceases to be in effect, all royalties that the paying Party would have been under an obligation to transmit or deposit but for the prohibition shall forthwith be deposited or transmitted, to the extent allowable. The Parties shall cooperate in good faith to overcome, to the extent reasonably possible, any prohibition described in this Section 8.15 within a reasonable period of time.

ARTICLE 9 - CONFIDENTIALITY

9.1 **General**. Each Receiving Party shall, and shall ensure that its Affiliates shall, (a) maintain in confidence the Confidential Information of the Disclosing Party using not less than the efforts such Receiving Party uses to maintain in confidence its own proprietary information of similar kind and value, but in no event less than a reasonable degree of effort, (b) not disclose such Confidential Information to any of its Affiliates or any Third Party without the prior written consent of the Disclosing Party, except for disclosures expressly permitted below, and (c) not use such Confidential Information for any purpose except to perform the Receiving Party's obligations, or exercise the Receiving Party's rights, under this Agreement.

9.2 **Permitted Disclosure**. The Receiving Party and its Affiliates may provide the Disclosing Party's Confidential Information:

9.2.1 to the Receiving Party or its Affiliates, and its and their respective employees, directors, officers, consultants, subcontractors, and advisors (including attorneys and accountants), who have a need to know such Confidential Information in order to perform the Receiving Party's obligations, or exercise the Receiving Party's rights, under this Agreement and have an obligation to treat such information and materials as confidential under obligations of confidentiality and non-use no less protective than are those set forth in this ARTICLE 9;

9.2.2 to Regulatory Authorities in order to seek or obtain approval to conduct Clinical Trials, or to gain Regulatory Approval, with respect to any Licensed Product, as contemplated by this Agreement, but such disclosure may be made only following reasonable notice to the Disclosing Party and only to the extent reasonably necessary to seek or obtain such approvals;

9.2.3 solely with the Disclosing Party's prior written consent (which may be withheld in the Disclosing Party's sole discretion), to patent offices in order to seek or obtain Patent Rights as contemplated by this Agreement;

9.2.4 to any of the Receiving Party's or any of its Affiliates' actual or potential *bona fide* investors, merger partners, acquirers, or licensees, and their respective attorneys, consultants, and advisors, as may be necessary or useful in connection with their evaluation of such actual or potential investment, merger, acquisition, or license, as long as, in each case, such Third Party agrees to be bound by obligations of confidentiality and non-use with respect to such Confidential Information no less stringent than the obligations in this Agreement; and

9.2.5 if such disclosure is required by judicial order or Applicable Law (including the rules and regulations of the SEC or any securities exchange on which securities issued by the Receiving Party or any of the Receiving Party's Affiliates are traded) or to defend or prosecute litigation or arbitration, as long as, prior to such disclosure, to the extent permitted by Applicable Law, the Receiving Party promptly notifies the Disclosing Party of such requirement, cooperates with the Disclosing Party to take whatever action the Disclosing Party may deem appropriate to protect the confidentiality of the information, and furnishes only that portion of the Disclosing Party's Confidential Information that the Receiving Party or its applicable Affiliate is legally required to furnish.

9.3 **Publicity; Terms of this Agreement; Non-Use of Names**.

9.3.1 Initial Press Release. Within [**] after the Effective Date at a time mutually agreed by the Parties, the Parties shall issue the joint press release attached as Schedule 9.3.1.

9.3.2 Voluntary Public Announcements. Except as required by judicial order or Applicable Law (in which case, Section 9.3.3 must be complied with) or as explicitly permitted by this ARTICLE 9, neither Party shall make any public announcement concerning this Agreement without the prior written consent of the other Party, which consent shall not be unreasonably withheld, conditioned, or delayed. The Party preparing any such public announcement shall provide the other Party with a draft thereof at least [**] prior to the date on which such Party would like to make the public announcement. Any Party may issue a press release or public announcement or make such other disclosure relating to this Agreement if the contents of such press release, public announcement, or disclosure (a) (i) do not consist of nonpublic financial information and have previously been made public other than through a breach of this Agreement by the issuing Party or any of its Affiliates, (ii) are contained in the issuing Party's financial statements prepared in accordance with Accounting Standards and have previously been made public other than through a breach of this Agreement by the issuing Party or any of its Affiliates, or (iii) if applicable as provided in Section 9.3.3, are contained in the Redacted Version of this Agreement, and (b) are material to the event or purpose for which the new press release or public announcement is made.

9.3.3 Public Announcements Required by Law. Notwithstanding the terms of this ARTICLE 9, either Party shall be permitted to disclose the existence and terms of this Agreement to the extent required, in the reasonable opinion of such Party's legal counsel, to comply with Applicable Laws, including the rules and regulations promulgated by the SEC or any other Governmental Authority or securities exchange on which securities issued by such Party or any of such Party's Affiliate are traded. Notwithstanding the foregoing, before disclosing this Agreement or any of the terms hereof pursuant to this Section 9.3.3 (except with respect to disclosures covered by clause (a)(i) of Section 9.3.2 that remain accurate at the time of disclosure), the Parties shall coordinate in advance with each other in connection with any filings disclosing the existence and terms of this Agreement with the SEC, NYSE, NASDAQ, or any other securities exchange on which securities issued by a Party or a Party's Affiliate are traded, and the redaction of certain provisions of this Agreement (together with all exhibits and schedules) (the "**Redacted Version**"), and each Party shall use Commercially Reasonable Efforts to seek confidential treatment for such terms as may be reasonably requested by the other Party, and the Parties shall use Commercially Reasonable Efforts to file redacted versions with applicable governing bodies that are consistent with the Redacted Version.

9.3.4 Other Disclosures. Moderna may disclose the fact that certain Cell Types are Cell Target Types under this Agreement and the fact that certain Targets are Liver Targets, Optioned Liver Targets, Non-Liver Targets, Optioned Non-Liver Targets, or Exclusive Targets under this Agreement, in each case consistent with Moderna's standard business practices of making its Development programs information public upon reaching Development candidate stage, provided that Moderna shall provide GBIO with prior written notice of such disclosure. Either Party may disclose the terms of this Agreement, in each case under written obligations of confidentiality, non-disclosure, and non-use at least as protective as are those set forth in this ARTICLE 9:

(a) to any *bona fide* actual or potential acquirer, assignee, licensee, licensor, investment banker, institutional investor, lender, or other financial partner, but such disclosure shall solely be of the Redacted Version, it being understood and agreed that, in connection with a proposed Change of Control with respect to such Party, only after negotiations with the proposed Third Party acquirer have progressed so that such Party reasonably and in good faith believes it is in the final round of negotiations with such Third Party regarding execution of a definitive agreement with such Third Party with respect to the proposed transaction may such Party provide an unredacted version of this Agreement to such Third Party; or

(b) to Third Party attorneys, professional accountants, and auditors who are engaged by any licensor, licensee, acquiror, or lender for the purpose of confirming such Party's compliance with the terms of its applicable agreement(s) with such licensor, licensee, acquiror, or lender.

9.4 **Publications**. The Parties agree that neither Party nor any of either Party's Affiliates shall have the right to make any Publication except as provided herein. If either Party or any of either Party's Affiliates desires to make a Publication, such Party or Affiliate (as applicable) must comply with the following procedure:

9.4.1 Review by the Non-Publishing Party. The publishing Party shall provide the JPC, JRC, and JCT (each, if in existence) with an advance copy of the proposed Publication for review and discussion, at least [**] (or [**] in the case of a manuscript, or [**] in the case of an abstract or oral presentation) prior to submission for publication, and the non-publishing Party's representatives shall then have [**] (or [**] in the case of a manuscript, or [**] in the case of an abstract or oral presentation) prior to submission for publication in which to review and provide comments on such proposed Publication. If the non-publishing Party's representatives notify the publishing Party in writing (a "**Publishing Notice**"), within the applicable timeframes set forth in the immediately preceding sentence after receiving a copy of the proposed Publication, that such proposed Publication in their reasonable judgment (i) contains an invention, solely or jointly conceived or reduced to practice by the non-publishing Party, for which the non-publishing Party reasonably desires to obtain patent protection or (ii) contains any Confidential Information of the non-publishing Party or of both Parties that the non-publishing Party does not wish to be included in the proposed Publication, then the publishing Party shall (A) in the case of clause (i) above, delay such Publication for a mutually agreeable period of time or (B) in the case of clause (ii) above, remove such Confidential Information specifically identified by the non-publishing Party's representatives in the Publishing Notice prior to any publication, so long as the non-publishing Party's representatives' request to remove such Confidential Information from the proposed Publication is reasonable. In the case of clause (A) above, a delay shall be for a period reasonably sufficient to permit the timely preparation and filing of a patent application(s) claiming the applicable invention, and in no event less than [**] from the date of the Publishing Notice. If the non-publishing Party does not provide a Publishing Notice with respect to a given proposed Publication within the applicable timeframes set forth above, then the Publishing Party may publish such proposed Publication without modification. Notwithstanding the foregoing, a Party's obligation to submit any proposed Publication to the JPC, JRC, or JCT for review and discussion shall not apply to any Publication that does not contain the other Party's Confidential Information or disclose any non-public information included in the other Party's intellectual property.

9.4.2 Scientific Conferences. Each Party shall have the right to present its Publications approved pursuant to this Section 9.4 at scientific conferences, including at any conferences in any country in the world, subject to any reasonable conditions imposed by the non-publishing Party in its comments.

9.5 **Term**. All obligations under Section 9.1, Section 9.2, Section 9.3, and Section 9.6 shall survive termination or expiration of this Agreement and shall expire [**] following termination or expiration of this Agreement; provided that, with respect to any Confidential Information that is the subject of trade secret protection under Applicable Law, such obligations shall survive for as long as such Confidential Information remains subject to trade secret protection under Applicable Law.

9.6 **Destruction of Confidential Information**.

9.6.1 Obligations to Destroy. Subject to the remainder of this Section 9.6, upon the expiration or termination of this Agreement, the Receiving Party shall, upon written request by Disclosing Party, destroy all Confidential Information received by the Receiving Party or any of its Affiliates from the Disclosing Party or any of its Affiliates (and all copies and reproductions thereof) except to the extent required to be maintained by Regulatory Authorities or an administrative or court order (but any such retained copies may only be used or disclosed as required by such Regulatory Authorities or administrative or court order). In addition, the Receiving Party shall destroy:

(a) any notes, reports, or other documents prepared by the Receiving Party or any of its Affiliates that contain Confidential Information of the Disclosing Party or any of its Affiliates; and **(b)** any Confidential Information of the Disclosing Party or any of its Affiliates (and all copies and reproductions thereof) that is in electronic form or cannot otherwise be returned to the Disclosing Party.

9.6.2 Electronic Back-Up Media. Nothing in this Section 9.6 shall require the deletion, alteration, transfer, or destruction of any electronic backup tapes or other electronic backup media made in the ordinary course of business during automatic system back-up procedures pursuant to the Receiving Party's and its Affiliates' electronic record retention and destruction practices that apply to its or their own general electronic files and information so long as such backup tapes or other backup media are (a) maintained only on centralized storage servers (and not on personal computers or devices), (b) not accessible by any of the Receiving Party's or its Affiliates' personnel (other than its or their information technology specialists), and (c) not otherwise accessed subsequently except with the written consent of the Disclosing Party or as required by Applicable Law.

9.6.3 Retained Copies. Notwithstanding the foregoing in this Section 9.6:

(a) the Receiving Party's legal counsel may retain one copy of the Disclosing Party's Confidential Information solely for the purpose of determining the Receiving Party's continuing obligations under this ARTICLE 9; and

(b) the Receiving Party may retain the Disclosing Party's Confidential Information and its own notes, reports, and other documents to the extent reasonably required (i) to exercise the rights and licenses of the Receiving Party expressly surviving expiration or termination of this Agreement; or (ii) to perform the obligations of the Receiving Party expressly surviving expiration or termination of this Agreement

Notwithstanding the return or destruction of the Disclosing Party's Confidential Information, the Receiving Party shall continue to be bound by its obligations of confidentiality and other obligations under this ARTICLE 9 .

9.7 **Vicarious Responsibility**. The Receiving Party shall be responsible for any action or omission by a disclosee of the Receiving Party or its Affiliates that would breach this ARTICLE 9 as if such action or omission were undertaken or not undertaken by the Receiving Party.

9.8 **Non-Use of Name**. Neither Party shall use the name, symbol, trademark, trade name, or logo of the other Party or any of its Affiliates in any press release, publication, or other form of public disclosure without the prior written consent of the other Party, except for those disclosures for which consent has already been obtained.

ARTICLE 10 - INTELLECTUAL PROPERTY

10.1 **Ownership of Intellectual Property**.

10.1.1 Background Intellectual Property. As between the Parties, Moderna will retain all right, title, and interest in and to all Moderna Background Intellectual Property and GBIO will retain all right, title, and interest in and to all GBIO Background Intellectual Property, except, in each case, to the extent that any such rights are expressly licensed by one Party to the other Party under this Agreement.

10.1.2 Invention Disclosures. During the Term, (a) GBIO will disclose to Moderna, through the JPC, all material Know-How conceived, invented, discovered, developed, created, or otherwise generated by or on behalf of GBIO or any of its Affiliates under this Agreement that, in GBIO's reasonable opinion, constitutes [**], Joint Collaboration Know-How (including Joint Collaboration ctLNP Know-How), or Joint Know-How, and (b) Moderna will disclose to GBIO, through the JPC, all material Know-How conceived, invented, discovered, developed, created, or otherwise generated by or on behalf of Moderna or any of its Affiliates under this Agreement that, in Moderna's reasonable opinion, constitutes [**], Joint Collaboration Know-How (including Joint Collaboration ctLNP Know-How), or Joint Know-How. Such disclosure shall (x) be made promptly and in any event reasonably prior to the filing of any patent application with respect to such Know-How and (y) include all invention disclosures or other similar documents submitted to such Party by its or its Affiliates' employees, agents, or independent contractors relating thereto.

10.1.3 [**] Intellectual Property and [**] Intellectual Property. As between the Parties, GBIO will solely own all right, title, and interest in and to all [**] and [**]. Moderna shall, and hereby does (and shall cause its Affiliates to), assign to GBIO all of its right, title, and interest in and to all such [**] and [**]. Moderna shall, at GBIO's request and expense, assist GBIO in recording and perfecting GBIO's rights in and to such [**] and [**], including executing assignments of all applicable inventions to the extent necessary to effectuate the assignment to GBIO of such [**] and [**], all in forms reasonably acceptable to GBIO.

10.1.4 [**] Intellectual Property and [**] Intellectual Property. As between the Parties, Moderna will solely own all right, title, and interest in and to all [**] and [**]. GBIO shall, and hereby does (and shall cause its Affiliates to), assign to Moderna all of its right, title, and interest in and to all such [**] and [**]. GBIO shall, at Moderna's request and expense, assist Moderna in recording and perfecting Moderna's rights in and to such [**] and [**], including executing assignments of all applicable inventions to the extent necessary to effectuate the assignment to Moderna of such [**] and [**], all in forms reasonably acceptable to Moderna.

10.1.5 Joint Collaboration Intellectual Property. The ownership of any and all Joint Collaboration Intellectual Property shall be determined by [**] acting reasonably and in good faith in accordance with Section 4.4.4(b). Each Party shall, and hereby does (and shall cause its Affiliates to), assign to the other Party all of its (and their) right, title, and interest in and to all Joint Collaboration Intellectual Property, [**]. Subject to (a) any exclusivity obligations under this Agreement, (b) any other licenses granted by one Party to the other Party under this Agreement, and (c) Section 2.11, each Party hereby grants to the other Party a perpetual, irrevocable, non-exclusive, royalty-free, fully-paid, worldwide license, with the right to grant sublicenses (through multiple tiers), to practice the Joint Collaboration Intellectual Property owned by such Party for any and all purposes, with the right to enforce the Joint Collaboration Patent Rights under Section 10.3.5 on an equivalent basis to the granting Party (and the owning Party shall take all reasonable steps requested by the licensee Party that are necessary to enable the licensee Party to enforce any Joint Collaboration Patent Rights under Applicable Law, [**]).

10.1.6 **Joint Intellectual Property**. Other than [**], and [**], as between the Parties, (i) each Party shall own any Know-How that is conceived, invented, discovered, developed, created, or otherwise generated under this Agreement after the Effective Date but outside the performance of any Research Program by or on behalf of such Party or any of such Party's Affiliates, either solely or jointly with any Third Party (but not the other Party or any of the other Party's Affiliates), and all Patent Rights that Cover any such Know-How, and (ii) the ownership of any and all Know-How that is conceived, invented, discovered, developed, created, or otherwise generated under this Agreement after the Effective Date but outside the performance of any Research Program by or on behalf of either Party or any of such Party's Affiliates jointly with the other Party or any of the other Party's Affiliates, whether or not jointly with any Third Party ("**Joint Know-How**"), and [**].

10.1.7 **Determination of Ownership**. The Parties shall endeavor in good faith to determine, through [**].

10.1.8 **Further Assurances**. Each Party agrees to execute, acknowledge and deliver such further instruments and to do all such other acts as may be necessary or appropriate to effect the allocation of ownership set forth this Section 10.1.

10.2 **Patent Prosecution and Maintenance**. Subject to any applicable terms in any applicable In-License Agreement:

10.2.1 **Generally**. Subject to the remainder of this Section 10.2, each Party shall control the Prosecution and Maintenance of Patent Rights that such Party Controls, other than Control obtained pursuant to a grant of licensed rights under this Agreement (such Party's "**Party Controlled Patent Rights**").

10.2.2 **Moderna Sole-Prosecuted Patent Rights**. As between the Parties, Moderna shall have the first right and authority, but not the obligation, to Prosecute and Maintain all Patent Rights exclusively licensed to Moderna hereunder (from and after the date on which such exclusive license becomes effective until such exclusive license expires or is terminated) that (a) [**] (i) [**], or (ii) [**], collectively (a) and (b), the "**Moderna Sole-Prosecuted Patent Rights**") on a worldwide basis, in each case, at Moderna's sole expense. [**].

10.2.3 **GBIO Sole-Prosecuted Patent Rights**. As between the Parties, GBIO shall have the first right and authority, but not the obligation, to Prosecute and Maintain any and all Patent Rights licensed to Moderna hereunder other than Moderna Sole-Prosecuted Patent Rights (such Patent Rights, the "**GBIO Sole-Prosecuted Patent Rights**") on a worldwide basis, in each case, at GBIO's sole expense. [**].

10.2.4 **Separation of Patent Claims and Transfer of Prosecution and Maintenance**. [**]. In addition, (a) [**] and (b) [**].

10.2.5 **Joint Collaboration Patent Rights and Joint Patent Rights**. Subject to Sections 10.2.2 and 10.2.3, as between the Parties, [**], as applicable; provided that, (i) [**]; and (ii) [**], as applicable.

10.2.6 **Cooperation**. The Parties shall, at all times, fully cooperate with each other, [**], in order to [**] of this Section 10.2. Such cooperation may include [**] such coordination should not [**]. For the avoidance of doubt, (a) [**] and (b) [**].

10.2.7 Patent Term Extension and Supplementary Protection Certificate. As between the Parties, each Party shall have the sole right to make decisions regarding, and to apply for, patent term extensions in the Territory, including in the United States with respect to extensions pursuant to 35 U.S.C. §156 et. seq. and in other jurisdictions pursuant to supplementary protection certificates, and in all jurisdictions with respect to any other extensions that are now or become available in the future, wherever applicable (collectively, the "**Extensions**"), with respect to any Licensed Product that is being Developed or Commercialized by such Party or any of its Affiliates or Sublicensees; except that (i) GBIO's prior written consent (which GBIO may withhold in its sole discretion) shall be required to apply for Extensions for the GBIO Patent Rights and the Joint Collaboration Patent Rights and Joint Patent Rights owned by GBIO, and (ii) Moderna's prior written consent (which Moderna may withhold in its sole discretion) shall be required to apply for Extensions for the Moderna Patent Rights and the Joint Collaboration Patent Rights and Joint Patent Rights owned by Moderna. Notwithstanding the foregoing provisions of this Section 10.2.7, Moderna shall have the sole right to make decisions regarding, and to apply for, Extensions for any and all Moderna Sole-Prosecuted Patent Rights with respect to any Licensed Product. At either Party's request, the other Party shall provide prompt and reasonable assistance with respect to any Extensions permitted under this Section 10.2.7, including by taking such action as patent holder as is required under any Applicable Law to obtain such extension or supplementary protection certificate.

10.2.8 Unitary Patent System. The Party Prosecuting and Maintaining a Patent Right in Europe will have the exclusive right to opt-in or opt-out of the Europe Unitary Patent System for such Patent Right. [**]. Without limiting the generality of the foregoing, unless the applicable prosecuting Party or its Affiliate has expressly opted in to the Europe Unitary Patent System with respect to a given Patent Right, the other Party will not initiate any action with respect to such Patent Right under the Europe Unitary Patent System without such Party's prior written approval, such approval to be granted or withheld in such Party's sole discretion.

10.3 **Enforcement of Patent Rights**. Subject to any applicable terms in any applicable In-License Agreement:

10.3.1 Notice. Each Party shall notify the other Party within [**] of becoming aware of any alleged or threatened infringement by a Third Party of any GBIO Patent Right or Moderna Patent Right, which infringing activity involves the using, making, importing, offering for sale, or selling of (a) any Licensed Product, (b) any other product that is, or could reasonably be expected to be, competitive with any Licensed Product, or (c) any other LNP Therapy Directed to any Liver Target, any Non-Liver Target, or any Independent Program Target, in each case ((a) through (c)) in the Field in the Territory, and any declaratory judgment, opposition or similar action alleging the invalidity, unenforceability or non-infringement of any such Patent Rights in connection with any such alleged or threatened infringement (collectively, "**Infringement**"); provided that, (i) with respect to [**], such notification obligation will only apply if [**], and (ii) the foregoing notification obligation shall [**].

10.3.2 Generally. Subject to the remainder of this Sections 10.3, each Party shall have the sole right to bring and control any legal action in connection with any Infringement of such Party's Party Controlled Patent Rights.

10.3.3 Patent Right Enforcement by Moderna. As between the Parties, Moderna shall have the first right, at its sole expense, but not the obligation, to determine the appropriate course of action to enforce (a) the Moderna Sole-Prosecuted Patent Rights against any Infringement thereof, or (b) any Collaborative Patent Rights against any Infringement thereof (other than with respect to any Licensed Independent Product being Developed or Commercialized by or on behalf of GBIO or any of its Affiliates or Sublicensees), and, in each case (a)-(b), to take (or refrain from taking) appropriate action to enforce such Patent Rights against such Infringement, to control any litigation or other enforcement action and to enter into, or permit, the settlement of any such litigation or other enforcement action with respect to such Infringement. Moderna shall keep GBIO reasonably informed of the status of such enforcement efforts for such Patent Rights. GBIO may, at its own expense, be represented in any such action by counsel of its own choice with respect to any such enforcement of any Moderna Sole-Prosecuted Patent Rights. If Moderna does not bring any legal action with respect to such Infringement with respect to any Moderna Sole-Prosecuted Patent Rights within a commercially reasonable period of time (but not longer than [**]) after the notice provided pursuant to Section 10.3.1, [**] with respect to the enforcement of such Patent Rights.

10.3.4 Patent Right Enforcement by GBIO. Except as set forth in Section 10.3.3, as between the Parties, GBIO shall have the sole (or, solely as expressly set forth in this Section 10.3.4, first) right, at its sole expense, but not the obligation, to determine the appropriate course of action to enforce the GBIO Patent Rights (other than Joint Collaboration Patent Rights or Joint Patent Rights) against any Infringement thereof, to take (or refrain from taking) appropriate action to enforce such Patent Rights against such Infringement, to control any litigation or other enforcement action and to enter into, or permit, the settlement of any such litigation or other enforcement action with respect to such Infringement, provided that GBIO shall not bring such legal action in the absence of Moderna's prior written consent in the event Moderna has brought or plans to bring any legal action asserting any Moderna Sole-Prosecuted Patent Right or GBIO Sole-Prosecuted Patent Right against the same Infringement, in each case under Section 10.3.3. With respect to enforcement of Collaborative Patent Rights against Infringements other than those competitive with GBIO's Licensed Independent Products, (a) GBIO shall keep Moderna reasonably informed of the status of such enforcement efforts, (b) Moderna may, at its own expense, be represented in any such action by counsel of its own choice with respect to any such enforcement, and (c) if GBIO does not bring any legal action with respect to such Infringement with respect to any Collaborative Patent Rights within a commercially reasonable period of time (but not longer than [**]) after the notice provided pursuant to Section 10.3.1, [**] with respect to the continued enforcement thereof.

10.3.5 Enforcement of Joint Collaboration Patent Rights and Joint Patent Rights. Except as set forth in Sections 10.3.3 and 10.3.4, as between the Parties, each Party shall have the right, at its sole expense, but not the obligation, to determine the appropriate course of action to enforce any Joint Collaboration Patent Right or Joint Patent Right against any infringement thereof, to take (or refrain from taking) appropriate action to enforce such Patent Rights against such infringement, to control any litigation or other enforcement action and to enter into, or permit, the settlement of any such litigation or other enforcement action with respect to such infringement. Such Party shall keep the other Party reasonably informed of the status of such enforcement efforts for such Patent Rights. The other Party may, at its own expense, be represented in any such action by counsel of its own choice with respect to the enforcement of any such Patent Rights.

10.3.6 Biosimilar Applications. Notwithstanding the foregoing provisions of this Section 10.3, if either Party or any of its Affiliates receives a copy of a Biosimilar Application naming a Licensed Product being Developed or Commercialized by or on behalf of Moderna or any of its Affiliates or Sublicensees as a reference product or otherwise becomes aware that such a Biosimilar Application has been filed (such as in an instance described in Section 351(1)(9)(C) of the PHSA), such Party shall promptly notify the other Party. If either Party receives any equivalent or similar certification or notice in the United States or any other jurisdiction, such Party shall, promptly, notify and provide the other Party copies of such communication.

(a) For all such Licensed Products, Moderna, shall designate pursuant to Section 351(l)(1)(B)(ii) of the PHSA the outside counsel and in-house counsel who shall receive confidential access to the Biosimilar Application.

(b) Moderna shall have the right, after consulting with GBIO, to list any Moderna Sole-Prosecuted Patents, insofar as they meet the statutory requirements pursuant to Section 351(l)(1)(3)(A), Section 351(l)(5)(b)(i)(II), or Section 351(l)(7) of the PHSA, to respond to any communications with respect to such lists from the filer of the Biosimilar Application, and to negotiate with the filer of the Biosimilar Application as to whether to utilize a different mechanism for information exchange other than that specified in Section 351(l) of the PHSA.

(c) Moderna shall have the right to identify Moderna Sole-Prosecuted Patents to list, or respond to relevant communications under any equivalent or similar listing to those described in the preceding Section 10.3.6(b) in any other jurisdiction outside of the United States. If required pursuant to Applicable Law, upon Moderna's request and at Moderna's expense, GBIO shall assist in the preparation of such list and make such response after consulting with Moderna.

(d) The Parties recognize that procedures other than those set forth above in this Section 10.3.6 may be applicable to Biosimilar Applications that are not governed by the PHSA. As a result, in the event that the Parties acting in good faith mutually determine that certain provisions of Applicable Law in the United States or in any other country in the Territory are applicable to actions taken by the Parties with respect to Biosimilar Applications under this Section 10.3.6 in such country, the Parties shall comply with any such Applicable Law in such country in exercising their rights and performing their obligations with respect to Biosimilar Applications under this Section 10.3.6.

10.3.7 Allocation of Recoveries for Licensed Products.

(a) Any recoveries resulting from enforcement against Infringement with respect to a Licensed Product being Developed or Commercialized by or on behalf of Moderna or any of its Affiliates or Sublicensees, or that Moderna has the exclusive right to Develop or Commercialize under this Agreement, whether by settlement or judgment, shall be first applied against payment of each Party's costs and expenses in connection therewith; provided that, if amounts recovered are insufficient to reimburse all such costs and expenses incurred by both Parties, then such recovered amounts shall be shared *pro rata* in proportion to the relative amount of such costs and expenses incurred by each Party. [**]; provided that, (a) [**]; (b) [**]; and (c) [**].

(b) Any recoveries resulting from enforcement of a Joint Collaboration ctLNP Patent Right against Infringement with respect to a Licensed Independent Product in the mRNA Field being Developed or Commercialized by or on behalf of GBIO or any of its Affiliates or Sublicensees, whether by settlement or judgment, shall be first applied against payment of each Party's costs and expenses in connection therewith; provided that, if amounts recovered are insufficient to reimburse all such costs and expenses incurred by both Parties, then such recovered amounts shall be shared *pro rata* in proportion to the relative amount of such costs and expenses incurred by each Party. [**]; provided that, (a) [**]; (b) [**]; and (c) [**].

(c) With respect to recoveries resulting from enforcement against any Infringement that is not set forth in Section 10.3.7(a) or 10.3.7(b) above, the Parties shall [**].

10.3.8 **Cooperation**. At the reasonable request and expense of the Party bringing an action under this Section 10.3, the other Party shall provide reasonable assistance in connection therewith, including by executing reasonably appropriate documents, cooperating in discovery, and joining as a party to the action if required by Applicable Laws to pursue such action. In connection with any such enforcement action, the Party bringing the action shall not enter into any settlement admitting the invalidity or non-infringement of, or otherwise impairing the other Party's rights in, the applicable Patent Rights without the prior written consent of the other Party.

10.4 **Actions Brought By Third Parties**.

10.4.1 **Infringement Actions**.

(a) Each Party shall immediately disclose to the other Party in writing any warning letter or other notice of infringement or misappropriation received by such Party, or any action, suit, or proceeding brought against such Party, alleging infringement of a Patent Right or misappropriation of intellectual property of any Third Party with regard to any aspect of the conduct by either Party or any of its Affiliates or Sublicensees of any activities pursuant to this Agreement (each, a "**Third Party Action**").

(b) Subject to ARTICLE 13, the Party Developing or Commercializing (or whose Affiliate or Sublicensee is Developing or Commercializing) a given Licensed Product shall, at its own expense and through counsel of its choosing, have the sole right, but not the obligation to defend against any Third Party Action in the Territory alleging that Development, Manufacture, or Commercialization of such Licensed Product infringes or misappropriates a Third Party's intellectual property rights. If the other Party is named as a defendant in such suit, such other Party will have the right to participate in such defense and settlement with its own counsel, at its cost.

(c) The Parties may consult with one another on all material aspects of the defense of Third Party Actions. The Parties shall reasonably cooperate with each other in all such actions or proceedings. No Party shall admit the invalidity or unenforceability of any Patent Right owned or controlled (in whole or in part) by the other Party without the other Party's prior written consent.

10.4.2 Invalidity or Unenforceability Defenses or Actions.

(a) Each Party shall promptly notify the other Party in writing of any alleged or threatened assertion of invalidity or unenforceability of any of the Moderna Sole-Prosecuted Patent Rights or GBIO Sole-Prosecuted Patent Rights by a Third Party of which such Party becomes aware, other than as part of Prosecution and Maintenance of such Patent Rights under Section 10.2 or in response to an Infringement action under Section 10.3 (each, a "**Third Party Patent Challenge**").

(b) The Party responsible for the Prosecution and Maintenance of a given Patent Right shall have the first right, but not the obligation, to control the defense of any Third Party Patent Challenge relating to such Patent Right and to compromise, litigate, settle, or otherwise dispose of any such Third Party Patent Challenge, provided that, if the prosecuting Party notifies the non-prosecuting Party that it declines to exercise such first right or fails to exercise such first right within [**] of becoming aware of such Third Party Patent Challenge, then the non-prosecuting Party shall have the right to control such defense and to compromise, litigate, settle or otherwise dispose of such Third Party Patent Challenge. The Party defending the Third Party Patent Challenge shall keep the other Party timely informed of the proceedings and filings, and provide the other Party with copies of all material communications, pertaining to each Third Party Patent Challenge. The Party defending the Third Party Patent Challenge shall not settle, stipulate to any facts, or make any admission with respect to any Third Party Patent Challenge without the other Party's prior written consent (not to be unreasonably withheld, conditioned or delayed) if such settlement, stipulation, or admission would (a) [**]; (b) [**]; or (c) [**] Third Party Patent Challenge.

(c) With respect to any Third Party Patent Challenge, the Party that is defending against Third Party Patent Challenge shall bear [**] percent ([**]%) of the cost, damages, or recovery in connection with such defense.

10.5 **Application of 35 U.S.C. § 102(c)**. The Parties acknowledge and agree that this Agreement is deemed a "joint research agreement" as defined in 35 USC § 100(h). Notwithstanding anything to the contrary in this ARTICLE 10, neither Party will have the right to provide to a court or an agency a statement under 37 C.F.R. §1.104(c)(4)(ii)(A) to disqualify, for purposes of 35 USC § 102(b)(2)(C) or 35 USC § 102(c), prior art under § 102(a)(2) by the other Party without the prior written consent of the other Party, which will not be unreasonably withheld, conditioned or delayed. With respect to any such permitted statement, the Parties shall coordinate their activities with respect to any submissions, filings, or other activities in support thereof. Notwithstanding the foregoing, the other Party's consent under this Section 10.5 shall not be required to permit a party to file with a court or agency a terminal disclaimer under 37 C.F.R. § 1.321(d) to overcome an obviousness-type double patenting rejection in any patent application claiming a Licensed Product or uses thereof, provided that the Party filing such terminal disclaimer shall give reasonable advance notice to the other Party of such filing, and shall consider in good faith any comments made, and actions recommended by, the other Party.

ARTICLE 11 - REPRESENTATIONS AND WARRANTIES; COVENANTS

11.1 **Mutual Representations and Warranties**. Each Party hereby represents and warrants, as of the Effective Date to the other Party, as follows:

11.1.1 Corporate Existence and Power. Such Party is an organization duly organized, validly existing, and in good standing under the laws of the jurisdiction in which it is organized, and has full organizational power and authority and the legal right to own and operate its property and assets and to carry on its business as it is now being conducted and as contemplated in this Agreement, including the right to grant the licenses granted by it hereunder.

11.1.2 Authority and Binding Agreement. Such Party has the organizational power and authority and the legal right to enter into this Agreement and perform its obligations hereunder and has taken all necessary organizational action on its part required to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder. This Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms (except as such enforcement may be limited by bankruptcy, insolvency, fraudulent conveyance, reorganization, moratorium, and other Applicable Laws affecting the rights of creditors generally and general equitable principles (whether considered in a proceeding in equity or at law)). Such Party's execution of, and performance of its obligations under, this Agreement do not and will not conflict with, violate, breach, or constitute a default under (a) any contractual or other legal obligation or restriction (including any confidentiality or non-competition obligation or any exclusivity restriction) to which such Party is legally bound by contract, judicial order, or otherwise existing as of the Effective Date or (b) such Party's organizational documents or any requirement of Applicable Laws existing as of the Effective Date and applicable to such Party.

11.1.3 Government Authorizations. Such Party has obtained all necessary consents, approvals, and authorizations of all Governmental Authorities and other Persons required to be obtained by it as of the Effective Date in connection with the execution, delivery, and performance of this Agreement (as contemplated as of the Effective Date), except for such consents that would not, individually or in the aggregate, have a material adverse effect on the Development, Manufacture, or Commercialization of the Licensed Products. Such Party will maintain throughout the Term all permits, licenses, registrations, and other forms of authorizations and approvals from any Governmental Authority necessary or required to be obtained or maintained by such Party in order for such Party to execute and deliver this Agreement and to perform its obligations hereunder in a manner which complies with all Applicable Laws.

11.1.4 Debarment. Each Party represents, warrants, and covenants to the other Party that neither it nor its representatives or any other Person used by such Party in the performance of the respective Development activities under this Agreement is: (a) debarred or disqualified under the FD&C Act; (b) listed by any government or regulatory agencies as ineligible to participate in any government healthcare programs or government procurement or non-procurement programs (as that term is defined in 42 U.S.C. § 1320a-7b(f)), or excluded, debarred, suspended, or otherwise made ineligible to participate in any such program; or (c) convicted of a criminal offense related to the provision of healthcare items or services, or is subject to any such pending action. Each Party shall not, during the Term, knowingly employ or use, directly or indirectly, including through Affiliates, the services of any such Person. In the event that either Party becomes aware of the debarment or disqualification or threatened debarment or disqualification of any Person providing services to such Party, directly or indirectly, including through Affiliates or Sublicensees, which directly or indirectly relate to activities contemplated under this Agreement, such Party shall promptly notify the other Party in writing and such Party shall cease employing, contracting with, or retaining any such Person to perform any such services.

11.2 **Additional Representations and Warranties of GBIO**. GBIO hereby represents and warrants, as of the Effective Date, to Moderna as follows:

11.2.1 Sufficient Rights. GBIO has all rights, authorizations, and consents necessary to grant all rights and licenses it purports to grant to Moderna under this Agreement, except for authorizations and consents that may be necessary under Antitrust Law. GBIO has Control over all Know-How and Patent Rights owned by it or its Affiliates as of the Effective Date that is reasonably likely (based on GBIO's knowledge of the Parties' plans as of the Effective Date) to be necessary or reasonably useful for the Development, Manufacturing (including formulation), or Commercialization, including the making, using, offering to sell, selling, importing, and exporting, of Licensed Products under this Agreement.

11.2.2 No Conflicting Licenses or Liens. GBIO has not granted any right or license to any Third Party under any GBIO Intellectual Property that conflicts with or limits the scope of the rights or licenses granted to Moderna hereunder. Neither GBIO nor any of its Affiliates has granted any lien or security interest on any of the GBIO Intellectual Property, and such intellectual property is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien, or charge of any kind, in each case that would conflict or limit any of the rights granted to Moderna hereunder. There are no Cell Target Types, Liver Targets, or Non-Liver Targets that are subject to an agreement (or commitment to negotiate or enter into an agreement) between or among GBIO, any of its Affiliates, or any Third Party that would prevent, limit, or conflict with the inclusion of such Cell Target Type, Liver Target, or Non-Liver Target under this Agreement on an exclusive basis or any licenses granted to Moderna herein. GBIO (i) itself is not (and none of its Affiliates is) developing any products Directed to, and (ii) has granted no rights to any Affiliate or Third Party with respect to, any Cell Target Type, Liver Target, or Non-Liver Target that would prevent, limit, or conflict with the inclusion of such Cell Target Type, Liver Target, or Non-Liver Target under this Agreement on an exclusive basis or any licenses granted or to be granted to Moderna herein.

11.2.3 Patent Rights.

(a) As of the Effective Date, all identifiable GBIO Patent Rights existing as of the Effective Date that (i) are issued or subject to a pending application for issuance and (ii) are reasonably likely (based on GBIO's knowledge of the Parties' plans as of the Effective Date) to be necessary or reasonably useful for the Development, Manufacturing (including formulation), or Commercialization, including the making, using, offering to sell, selling, importing, and exporting, of Licensed Products under this Agreement (the "**Existing Relevant GBIO Patent Rights**") are listed on Schedule 11.2.3(a).

(b) To GBIO's knowledge, the Existing Relevant GBIO Patent Rights (i) have been properly and correctly maintained, and no fees applicable thereto when due and payable, as may be or have been extended, have gone unpaid, (ii) to the extent issued (unless otherwise indicated on Schedule 11.2.3(a)) are subsisting and are not invalid or unenforceable, in whole or in part, and (iii) to the extent subject to a pending application for issuance, are being and have been diligently prosecuted in the respective patent offices in which such applications have been filed in accordance with Applicable Laws.

(c) None of (a) the GBIO Patent Rights owned by GBIO or both Controlled and prosecuted by GBIO or (b) to GBIO's knowledge, the GBIO Patent Rights Controlled but not prosecuted by GBIO is subject to any pending re-examination, opposition, interference, or litigation proceeding or inter partes review, post grant review, or covered business methods review.

(d) To GBIO's knowledge, neither GBIO nor any of its Affiliates has taken any action that would render any Existing Relevant GBIO Patent Rights unpatentable.

(e) Except under the Existing In-License Agreements, none of the Existing Relevant GBIO Patent Rights is subject to any existing royalty or other payment obligations to any Third Party under any agreement or understanding entered into by GBIO or any of its Affiliates, and GBIO has no knowledge of any obligation to pay any royalties or other amounts to any Affiliate or Third Party by reason of Moderna's use thereof as contemplated under this Agreement.

(f) GBIO and, to GBIO's knowledge, its Affiliates, have not given any written notice to any Third Party asserting infringement by such Third Party of any of the Existing Relevant GBIO Patent Rights and, to GBIO's knowledge, there is no unauthorized use, infringement, or misappropriation of any GBIO Patent Rights.

11.2.4 **Bayh-Dole**. Except for the Patent Rights set forth on Schedule 11.2.4, the inventions claimed or Covered by the Existing Relevant GBIO Patent Rights: (a) were not conceived, discovered, developed or otherwise made in connection with any research activities funded, in whole or in part, by the federal government of the United States of America or any agency thereof; (b) are not a "subject invention" as that term is described in 35 U.S.C. § 201(e), and (c) are not otherwise subject to the provisions of the Patent and Trademark Law Amendments Act of 1980, as amended, codified at 35 U.S.C. §§ 200-212, as amended, as well as any regulations promulgated pursuant thereto, including in 37 C.F.R. Part 401. GBIO has and, to GBIO's knowledge, the applicable licensor under each Existing In-License Agreement has, if applicable, complied with all obligations under the Bayh-Dole Act to perfect rights to the applicable Patent Rights or Know-How licensed hereunder.

11.2.5 **Existing In-License Agreements**. True and correct copies of the Existing In-License Agreements are set forth in Schedule 11.2.5, and such agreements are in full force and effect. The Existing In-License Agreements are the only agreements pursuant to which GBIO or any of its Affiliates has obtained Control of any GBIO Intellectual Property. Neither GBIO nor, to the knowledge of GBIO, any counterparty under any Existing In-License Agreement is in default with respect to any material obligation under, and none of such parties has claimed or, to GBIO's knowledge, has grounds upon which to claim that the other party is in default with respect to a material obligation under, any Existing In-License Agreement.

11.2.6 **No Action or Claim**. There are no claims, litigations, suits, actions, disputes, arbitrations, or legal, administrative, or other proceedings or governmental investigations pending or, to GBIO's knowledge, threatened against GBIO, and GBIO is not a party to any judgment or settlement, in each case which would be reasonably expected to adversely affect or restrict the ability of GBIO to consummate the transactions contemplated under this Agreement or to perform its obligations or to grant the licenses or rights granted or to be granted to Moderna under this Agreement, or which would materially and adversely affect the GBIO Intellectual Property that is reasonably likely (based on GBIO's knowledge of the Parties' plans as of the Effective Date) to be necessary or reasonably useful for the Development, Manufacturing (including formulation), or Commercialization, including the making, using, offering to sell, selling, importing, and exporting, of Licensed Products under this Agreement, or GBIO's Control thereof. Without limiting the generality of the foregoing, GBIO and its Affiliates: (a) have not received any written notice of any threatened claims or litigation seeking to invalidate or otherwise challenge the Existing Relevant GBIO Patent Rights or GBIO's or its Affiliates' rights therein; and (b) are not aware of any pending or threatened action, suit, proceeding, or claim by a Third Party asserting that GBIO or any of its Affiliates is infringing or has misappropriated or otherwise is violating any Patent Right, trade secret, or other proprietary right of any Third Party as would reasonably be expected to impair the ability of GBIO to fulfill any of its obligations under this Agreement.

11.2.7 Regulatory Documentation. To the extent that GBIO or its Affiliates have generated, prepared, maintained, and retained any Regulatory Documentation that is subject to this Agreement and that is required to be maintained or retained pursuant to and in accordance with, to the extent applicable, GLP or GCP or any other Applicable Laws, all such Regulatory Documentation complies with all such Applicable Laws in all material respects.

11.2.8 Confidentiality. GBIO and its Affiliates have used commercially reasonable efforts to protect the confidentiality of their respective confidential or proprietary information that is applicable to this Agreement.

11.3 **Additional Covenants**. In performing its obligations and exercising its rights under this Agreement, each Party and its Affiliates shall comply in all material respects with all Applicable Laws (including Applicable Laws governing bribery, money laundering, and other corrupt practices and behavior). GBIO shall not do anything that would constitute a breach of the representations and warranties set forth in Section 11.2.5 if such representations and warranties were made or given at the time of such action (and GBIO shall promptly notify Moderna in writing of any such breach).

11.4 **Additional Covenants of GBIO**. GBIO hereby covenants to Moderna:

11.4.1 Covenant Regarding No Knowing Infringement. GBIO will not knowingly use in the conduct of any Research Program any Patent Rights or Know-How that infringe, misappropriate, or violate any Patent Right, trade secret, or other proprietary right of any Third Party without Moderna's prior written consent.

11.4.2 Covenant Regarding Improvements.

(a) All [**], and [**], in each case to the extent (i) arising under any Research Program or (ii) [**], in each case to the extent conceived, invented, discovered, developed, created, or otherwise generated, or falling within the definitions of [**], or [**] and obtained, by or on behalf of GBIO or, subject to Section 15.2, any of its Affiliates ("**Controlled Improvements**") shall be Controlled by GBIO or its applicable Affiliates immediately following such conception, invention, discovery, development, creation or generation, and shall each remain Controlled by GBIO or its applicable Affiliates during the Term for so long as Moderna has an effective license thereto hereunder, in each case to the extent licensed [**] to Moderna hereunder. All Controlled Improvements assigned by Moderna to GBIO shall be Controlled by GBIO upon such assignment, and shall each remain Controlled by GBIO during the Term for so long as Moderna has an effective license thereto hereunder.

(b) To the extent GBIO or, subject to Section 15.2, any of its Affiliates [**] any rights (other than license rights governed by Section 5.2.4) to any [**], in each case conceived, invented, discovered, developed, created, or otherwise generated by or on behalf of GBIO or, subject to Section 15.2, any of its Affiliates, in each case other than the Controlled Improvements (for clarity, other than as assigned to GBIO by Moderna hereunder), [**], GBIO shall ensure that GBIO or its applicable Affiliates Control such rights such that they are (sub)licensed to Moderna under, and in accordance with the terms of, this Agreement; provided that, if such rights are license rights not otherwise governed by Section 5.2.4, the provisions of Section 5.2.4 limiting GBIO's obligation to obtain rights to sublicense to Moderna set forth in Section 5.2.4 shall apply to such license rights and the provisions of Section 5.2.4 conditioning Moderna's sublicense under such rights on Moderna's agreement to accept the applicable obligations, limitations, and conditions of such license and to treat such license as an In-License Agreement shall apply to such sublicense.

11.4.3 Covenant Regarding [**] of Targets. No later than [**] from the Effective Date, GBIO will [**], GBIO shall [**]. For the purposes of this Section [**].

11.4.4 Preservation of Assets Covenant. During the Term, GBIO shall not and shall ensure that its Affiliates do not, in each case, in the absence of prior written consent from Moderna, assign, transfer, convey, or dispose of, license, or otherwise grant any right with respect to (including any option right), or otherwise encumber, any GBIO Intellectual Property, any Liver Target, any Non-Liver Target, any Independent Program Target, or any Cell Target Type, in each case in a manner that would conflict with any of the rights or licenses granted or to be granted to Moderna hereunder.

11.4.5 Existing In-License Agreement. GBIO shall not, and shall ensure that its Affiliates do not, [**] any Existing In-License Agreement in any manner that would materially adversely affect Moderna's rights hereunder, or terminate or cause the termination of any Existing In-License Agreement except to the extent that such termination would not materially adversely affect Moderna's rights hereunder.

11.4.6 Personnel and Equipment. GBIO shall use Commercially Reasonable Efforts to, within a reasonable time, obtain sufficient personnel and equipment to perform the activities assigned to GBIO in each Research Plan (including any amendment thereto). GBIO shall not use disproportionately less efforts to obtain such personnel and equipment than the level of efforts it uses to obtain personnel and equipment to perform activities under any of GBIO's other Development programs, including internal programs and programs in collaboration with Third Parties.

11.5 **Performance by Affiliates**. The Parties recognize that each Party may perform some or all of its obligations under this Agreement through Affiliates. Each Party shall remain responsible for the performance by its Affiliates and shall cause its Affiliates to comply with the provisions of this Agreement in connection with such performance.

11.6 **DISCLAIMER OF WARRANTIES**. EXCEPT FOR THE EXPRESS WARRANTIES SET FORTH HEREIN, NEITHER PARTY MAKES ANY REPRESENTATION OR GRANTS ANY WARRANTY, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, BY STATUTE, OR OTHERWISE, AND EACH PARTY SPECIFICALLY DISCLAIMS ANY OTHER WARRANTIES, WHETHER WRITTEN OR ORAL, OR EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF QUALITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR USE OR PURPOSE, OR ANY WARRANTY AS TO THE VALIDITY OF ANY PATENT RIGHTS OR THE NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHTS OF THIRD PARTIES. EACH PARTY HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY THAT ANY EXPLOITATION OF ANY LICENSED PRODUCT PURSUANT TO THIS AGREEMENT WILL BE SUCCESSFUL OR THAT ANY PARTICULAR SALES LEVEL WITH RESPECT TO ANY LICENSED PRODUCT WILL BE ACHIEVED.

ARTICLE 12 - TERM AND TERMINATION

12.1 **Term**. Unless earlier terminated pursuant to this ARTICLE 12, the term of this Agreement (the "**Term**") shall commence on the Effective Date and shall remain in full force and effect as follows: (a) with respect to the Non-Liver ctLNP Program, until the end of the Non-Liver ctLNP Research Term; (b) with respect to each Liver Program, until the later of (i) the expiration of the Liver Option Exercise Period for the Liver Target in such Liver Program or (ii) the expiration of the Liver Research Term; (c) with respect to each Non-Liver Program, until the later of (i) the expiration of the Non-Liver Option Exercise Period for the Non-Liver Target in such Non-Liver Program or (ii) the expiration of the Non-Liver Research Term; (d) with respect to each Liver Target, (i) in the event no Liver Option has been exercised within the Liver Option Exercise Period for such Liver Target, until the earlier of (A) the expiration of the Liver Option Exercise Period for such Liver Target or (B) the date on which there are no more Liver Options to exercise, and (ii) in the event a Liver Option has been exercised within the Liver Option Exercise Period for such Liver Target, on a Licensed Liver Product-by-Licensed Liver Product and country-by-country basis, until the date of expiration of the Royalty Term for such Licensed Liver Product Directed to such Optioned Liver Target in such country; (e) with respect to each Non-Liver Target, (i) in the event no Non-Liver Option has been exercised within the Non-Liver Option Exercise Period for such Non-Liver Target, until the earlier of (A) the expiration of the Non-Liver Option Exercise Period for such Non-Liver Target or (B) the date on which there are no more Non-Liver Options to exercise, and (ii) in the event a Non-Liver Option has been exercised within the Non-Liver Option Exercise Period for such Non-Liver Target, on a Licensed Non-Liver Product-by-Licensed Non-Liver Product and country-by-country basis, until the date of expiration of the Royalty Term for such Licensed Non-Liver Product Directed to such Optioned Non-Liver Target in such country; (f) with respect to each Cell Target Type, on a Licensed Independent Product-by-Licensed Independent Product and country-by-country basis, until the date of expiration of the Royalty Term for such Licensed Independent Product Directed to such Cell Target Type in such country; and (g) with respect to this Agreement as a whole, until this Agreement has expired with respect to all Liver Targets, all Non-Liver Targets, and all Cell Target Types pursuant to clause (d), (e) and (f), respectively.

12.2 **Termination for Convenience by Moderna**. Moderna shall have the right, at any time, to terminate this Agreement, in its entirety or with respect to a given Research Program, Optioned Liver Target, Optioned Non-Liver Target, Exclusive Target, or Cell Target Type, in its entirety or on a country-by-country (each a "**Terminated Country**") basis, without cause by providing not less than ninety (90) days' prior written notice to GBIO of such termination. If Moderna terminates this Agreement solely with respect to a given Optioned Liver Target, Optioned Non-Liver Target, or Exclusive Target, then such Optioned Liver Target, Optioned Non-Liver Target, Exclusive Target shall thereafter be deemed a Terminated Liver Target, Terminated Non-Liver Target, or Terminated Exclusive Target, respectively (and, if this Agreement is only terminated with respect to one or more Terminated Country(ies), then such Optioned Liver Target, Optioned Non-Liver Target, Exclusive Target shall be deemed a Terminated Liver Target, Terminated Non-Liver Target, or Terminated Exclusive Target only in such Terminated Country(ies)), and Section 12.6 shall apply with respect to such Terminated Liver Target, Terminated Non-Liver Target, or Terminated Exclusive Target.

12.3 **Termination for Cause**.

12.3.1 Right to Terminate for Material Breach.

(a) Material Breach. Either Party (the "**Non-Breaching Party**") may (but is not required to, and without limitation of any other right or remedy such Party may have) terminate this Agreement in its entirety in the event of a material breach of this Agreement by the other Party (the "**Breaching Party**") if the Breaching Party has not cured such breach within [**] (or [**] with respect to any material breach of a payment obligation) after notice thereof (or, if such non-payment breach cannot be cured within [**] from the date of such notice, if the Breaching Party has not commenced or is not diligently continuing in good faith efforts to cure such breach; provided that, in any event, such breach must be cured within [**] from the date of such notice) (such [**] period, the "**Cure Period**"). Such notice will specify the alleged breach in sufficient detail to put the Breaching Party on notice and clearly state the Non-Breaching Party's intent to terminate if the alleged breach is not cured within the Cure Period.

(b) Disputes Regarding Material Breach. If the Parties reasonably and in good faith disagree as to whether there has been a material breach, then the Breaching Party that disputes whether there has been a material breach may contest the allegation in accordance with Section 18.3, and, if such material breach is of a payment obligation, then the applicable Cure Period shall be tolled upon the initiation of such dispute resolution procedures. If, as a result of such dispute resolution process, it is finally determined pursuant to Section 18.3 that the Breaching Party committed a material breach of this Agreement, then unless such alleged breach was cured during the pendency of such Cure Period, this Agreement shall terminate effective as of the expiration of such Cure Period. This Agreement shall remain in full force and effect during the pendency of any such dispute resolution proceeding and all Cure Periods. Any such dispute resolution proceeding shall not suspend any obligations of either Party hereunder and each Party shall use reasonable efforts to mitigate any damages. Any payments that are made by one Party to the other Party pursuant to this Agreement pending resolution of the dispute shall be promptly refunded if it is determined pursuant to Section 18.3 that such payments are to be refunded by one Party to the other Party. If, as a result of such dispute resolution proceeding, it is determined that the Breaching Party did not commit such material breach (or such material breach was cured in accordance with Section 12.3.1(a) or 12.3.1(b)), then no termination of this Agreement shall be effective, and this Agreement shall continue in full force and effect.

12.3.2 Termination for Insolvency. If either Party (a) makes an assignment of all or substantially all of its property for the benefit of creditors, (b) appoints or suffers appointment of a receiver or trustee over all or substantially all of its property, (c) files a petition under any bankruptcy or insolvency act or for reorganization or has any such petition filed against it, and such Party consents to the involuntary bankruptcy or such petition is not discharged within [**] after the filing thereof, or (d) proposes to be a party to any dissolution or liquidation (each, an "**Insolvency Event**"), the other Party may terminate this Agreement in its entirety by providing written notice of its intent to terminate this Agreement to the Party undergoing the Insolvency Event, in which case, this Agreement will terminate on the date on which the Party undergoing the Insolvency Event receives such written notice.

12.4 **Moderna Option to Continue in Lieu of Termination**.

12.4.1 Payment Reductions in Lieu of Termination. With respect to an uncured material breach of this Agreement by GBIO, Moderna shall have the right, at its option and by written notice to GBIO, in lieu of exercising its right to terminate this Agreement or any other right that Moderna may have hereunder or at law, to instead continue this Agreement in accordance with its terms, in which case: (a) the Parties will coordinate wind-down of GBIO's activities under this Agreement, and (b) from and after such time as Moderna delivers such written notice to GBIO, any and all amounts thereafter payable hereunder by Moderna for the Licensed Product that was the subject of GBIO's material breach (including applicable milestone payments and royalties) shall be reduced by [**] percent ([**]%).

12.4.2 Know-How Transfer. Within [**] following Moderna's election not to terminate this Agreement under this Section 12.4, the Parties shall cooperate with each other and put in place a reasonable Know-How transfer plan, and the Parties shall thereafter perform their respective obligations under such Know-How transfer plan, pursuant to which GBIO shall disclose or deliver to Moderna, to the extent not previously provided, copies of all specified relevant data and information in GBIO's (or its Affiliates') possession which is reasonably necessary for Moderna's Development or Commercialization of the Licensed Products (including for regulatory purposes and to otherwise undertake activities that would otherwise have been performed by GBIO and regardless of the stage of any such activities). At Moderna's reasonable request and expense, GBIO shall: (a) provide reasonable technical assistance to Moderna during such disclosure or delivery set forth in the preceding sentence; and (b) make its employees and non-employee consultants reasonably available at their respective places of employment to consult with Moderna on issues arising in the course of Moderna's Development or Commercialization and in connection with any request related to any Licensed Product from any Regulatory Authority, including regulatory, scientific, technical and clinical testing issues.

12.5 **License Survival Upon Insolvency**. All licenses (and to the extent applicable, rights) granted under or pursuant to this Agreement are, and shall otherwise be deemed to be, for purposes of Section 365(n) of 11 U.S.C. Section 101, et. seq. ("**Bankruptcy Code**"), licenses of rights to "intellectual property" as defined under the Paragraph 101(35A) of the Bankruptcy Code (or similar provision in the bankruptcy laws of another applicable jurisdiction). The Parties agree that the non-bankrupt Party that is a licensee of rights under this Agreement shall retain and may fully exercise all of its rights and elections under Applicable Law, including the Bankruptcy Code. Without limiting the generality of the foregoing, the Parties agree that, upon commencement of a bankruptcy proceeding by or against a Party under the Bankruptcy Code, the other Party shall be entitled to complete access to any such intellectual property and all embodiments of such intellectual property, if not already in such other Party's possession. The foregoing provisions of this Section 12.5 are without prejudice to any rights either Party may have arising under the Bankruptcy Code.

12.6 **Effect of Termination**.

12.6.1 General Effects. Subject to the remainder of this Section 12.6: (a) upon termination of this Agreement with respect to a given Research Program, Optioned Liver Target, Optioned Non-Liver Target, Exclusive Target, or Cell Target Type, all licenses and other rights granted hereunder with respect to such Research Program, Optioned Liver Target, Optioned Non-Liver Target, Exclusive Target, or Cell Target Type, as applicable, will immediately terminate and (b) upon termination of this Agreement in its entirety, all licenses and other rights granted hereunder will immediately terminate; provided that, in each case ((a) and (b)) such licenses will continue solely as necessary and only for so long as required for the Parties to complete the orderly wind-down of their activities under this Agreement in accordance with Applicable Law and as otherwise required in accordance with Section 12.6.4. In addition, if, by the time the last-to-expire Research Program has expired or been terminated, the Prepaid Research Funding has not been fully expended in accordance with this Agreement, GBIO shall promptly (but in any event within [**]) refund the remaining balance of the Prepaid Research Funding to Moderna, regardless of whether this Agreement has expired or been terminated by then.

12.6.2 Termination With Respect to Terminated Targets.

(a) From and after such time a given Optioned Liver Target becomes a Terminated Liver Target, a given Optioned Non-Liver Target becomes a Terminated Non-Liver Target, or a given Exclusive Target becomes a Terminated Exclusive Target:

(i) such Optioned Liver Target, Optioned Non-Liver Target, or Exclusive Target shall no longer be an Optioned Liver Target, Optioned Non-Liver Target, or Exclusive Target under this Agreement;

(ii) this Agreement shall terminate with respect to the Optioned Liver Target or the Optioned Non-Liver Target, and Section 2.9.2 shall terminate with respect to such Optioned Liver Target, Optioned Non-Liver Target, or Exclusive Target; and

(iii) except for any perpetual and irrevocable licenses granted hereunder, any licenses that may have become perpetual and irrevocable pursuant to this Agreement by such time, and any licenses granted to Moderna hereunder with respect to Independent Program Targets that are in effect as of such time, all licenses granted by GBIO to Moderna hereunder, and all sublicenses granted by Moderna thereunder, specifically with respect to such Terminated Liver Target, Terminated Non-Liver Target, or Terminated Exclusive Target will immediately terminate.

In the event such Optioned Liver Target becoming a Terminated Liver Target, such Optioned Non-Liver Target becoming a Terminated Non-Liver Target, or such Exclusive Target becoming a Terminated Exclusive Target is limited to one or more Terminated Countries, the foregoing provisions of this Section 12.6.2(a) shall apply to such Terminated Countries only.

(b) Upon any expiration or termination of this Agreement in its entirety, all Optioned Liver Targets, Optioned Non-Liver Targets, and Exclusive Targets shall thereafter be deemed Terminated Liver Targets, Terminated Non-Liver Targets, and Terminated Exclusive Targets, respectively, and shall no longer be Optioned Liver Targets, Optioned Non-Liver Targets, or Exclusive Targets under this Agreement, and Section 12.6.2(a) shall apply to such Terminated Liver Targets, Terminated Non-Liver Targets, and Terminated Exclusive Targets.

12.6.3 Terminated Liver Targets and Terminated Non-Liver Targets. The following provisions shall apply with respect to any Licensed Product Directed to each Terminated Liver Target and each Terminated Non-Liver Target incorporating any ceDNA and actively being clinically Developed or Commercialized by Moderna as of the date of termination of this Agreement with respect to such Terminated Liver Target or Terminated Non-Liver Target (as applicable) (a "**Reversion Product**"):

(a) Upon GBIO's written request delivered within [**] after termination of this Agreement with respect to such Terminated Liver Target or Terminated Non-Liver Target (as applicable), Moderna shall grant, and is hereby deemed to grant, subject to the terms of any applicable in-license agreement, to GBIO a non-exclusive license solely with respect to such Reversion Product, limited to Patent Rights and Know-How (i) Controlled by Moderna or its Affiliates as of the date of termination of this Agreement with respect to such Terminated Liver Target or Terminated Non-Liver Target (as applicable), (ii) specifically Covering the composition of the Reversion Product or its use as of the date of such termination, and (iii) actually used by Moderna or any of its Affiliates to Develop or Commercialize such Reversion Product prior to or as of the date of such termination, for the sole purpose of Developing, or Commercializing the Reversion Product in the Territory; except that GBIO shall only obtain a license under any such Patent Rights or Know-How that constitute Moderna Background Intellectual Property if GBIO requests such license, and, following any such request, the Parties shall negotiate in good faith milestones and royalty terms applicable to such Moderna Background Intellectual Property that fairly reflect Moderna's contribution to the Development of such Reversion Product and the non-exclusive nature of such license. For clarity, such license shall not include the right to, or any Know-How used to, Manufacture such Reversion Product that was, as between the Parties, independently created by or on behalf of Moderna, including Know-How pertaining to and any and all non-ctLNP and non-ceDNA components of the Reversion Product. [**].

(b) At GBIO's reasonable request and expense, Moderna shall provide GBIO with such assistance as is reasonably necessary to effectuate a smooth and orderly transition of any Development and Commercialization activities to GBIO or its designee with respect to any Reversion Product for which GBIO accepts a license under Section 12.6.3(a), so as to minimize the disruption of such activities.

(c) Within [**] after termination of this Agreement with respect to such Terminated Liver Target or Terminated Non-Liver Target (as applicable), Moderna shall provide to GBIO a fair and accurate summary report of the status of Development, Manufacture, and Commercialization activities conducted by Moderna with respect to the applicable Reversion Product.

(d) Moderna shall promptly transfer and assign to GBIO all of Moderna's and its Affiliates' rights, title, and interests in and to the trademarks (other than any Moderna house marks or composite marks including a house mark) owned by Moderna and solely used for the Reversion Product.

(e) Moderna shall, as soon as reasonably practicable, transfer and assign to GBIO all Regulatory Approvals and Regulatory Documentation with respect to the Reversion Product in the Territory and a copy of all of the data comprising the global safety database for such Reversion Product, but Moderna may retain such data and a single copy of such Regulatory Approvals and Regulatory Documentation for its records, and, if such Regulatory Approvals or Regulatory Documentation are necessary or useful for the Development, Manufacture, or Commercialization of any product other than such Reversion Product, in place of transferring or assigning the foregoing, Moderna shall instead grant GBIO a Right of Reference or Use with respect to such approvals or documentation with respect to such Reversion Product.

(f) GBIO shall have the option, exercisable within [**] following the effective date of such termination of this Agreement, to obtain Moderna's inventory of the Reversion Product at a price equal to [**] percent ([**]%) of Moderna's Manufacturing costs for such inventory of such Reversion Product; except that, if Moderna or any of its Affiliates or Sublicensees has any outstanding order of any such Reversion Product, at GBIO's election, either GBIO shall fulfill such order or, notwithstanding GBIO's option to purchase inventory, Moderna may retain sufficient inventory to fulfill such orders. GBIO may exercise such option by written notice to Moderna during such [**] period. In the event GBIO exercises such right to purchase such inventory, Moderna shall grant, and hereby does grant, a royalty-free right and license to any trademarks, names, and logos of Moderna contained therein for a period of [**] solely to permit the orderly sale of such inventory, subject to GBIO meeting reasonable quality control standards imposed by Moderna on the use of such trademarks, names, and logos, which shall be consistent with the standards used by Moderna prior to such termination.

(g) If any Clinical Trial of any Reversion Product is being conducted at the time of the termination of this Agreement with respect to such Terminated Liver Target or Terminated Non-Liver Target (as applicable), each Party hereby agrees to reasonably cooperate in the completion of such Clinical Trial in consultation with the appropriate Regulatory Authorities and any applicable institutional review board(s).

12.6.4 Wind-Down. Upon any termination of this Agreement, the Parties shall cooperate in good faith to wind down any then-ongoing activities under the Research Programs. Within [**] after receipt of an invoice therefor, Moderna shall pay Research Costs that were incurred, accrued, or committed (and are not cancellable) by GBIO prior to the effective date of termination of this Agreement and have not yet been paid by Moderna in accordance with Section 8.4.

12.6.5 Destruction of Materials. Upon any expiration or termination of this Agreement in its entirety, (a) Section 9.6 shall apply and (b) each receiving Party shall destroy all Materials of the providing Party and confirm in writing such destruction.

12.6.6 Conduct During Termination Notice Period. Following any notice of termination permitted under this ARTICLE 12, during any applicable termination notice period, each Party shall continue to perform all of its obligations under this Agreement then in effect in accordance with the terms and conditions of this Agreement.

12.6.7 Sublicense Survival. Any permitted sublicense granted by Moderna or its Affiliate to a Third Party under the licenses granted to Moderna under this Agreement shall automatically terminate upon the termination of this Agreement; provided that, so long as (a) the applicable Sublicensee is not in breach of any of its obligations under the applicable sublicense agreement and has not otherwise caused the termination of this Agreement and (b) GBIO has been paid all amounts owed to GBIO under this Agreement that are within the scope of such Sublicensee's sublicense, such Sublicensee may request that GBIO grant to such Sublicensee a direct license equivalent to the license which Moderna or its Affiliate granted to such Sublicensee in the applicable sublicense agreement (but GBIO shall not be required to agree to any obligations to such Sublicensee that are not expressly set forth in this Agreement). GBIO shall not unreasonably withhold, condition or delay its consent to any such request.

12.7 **Survival**. Expiration or termination of this Agreement will not affect any obligations, including payment of any royalties or other sums, that have accrued as of the date of termination or expiration, and termination of this Agreement by a Party will be without prejudice to other remedies such Party may have at law or equity. In addition, the following provisions will survive expiration or termination of this Agreement (including any other Sections, Articles, or defined terms necessary to give such provisions effect): Sections 2.6.1, 2.7.1 (with respect to all restrictions imposed therein), 2.8, 5.1.1(e), 5.1.2(c), 5.5, 8.6.5, 8.8 through 8.15, 10.1.1, 10.1.3 through 10.1.6, 10.1.8, 10.2.1, 10.2.5, 10.3.2, 10.3.5, 10.3.7, 11.6, 12.5 through 12.7, and 18.1 through 18.9, and ARTICLES 9, 13 and 16.

ARTICLE 13 - INDEMNITY; LIMITATION OF LIABILITY

13.1 **Indemnity**.

13.1.1 By GBIO. GBIO shall defend, indemnify, and hold harmless Moderna, its Affiliates, and each of its and their respective directors, officers, employees, agents, successors, and assigns from and against all liabilities, losses, damages, and expenses, including reasonable attorneys' fees and costs, (each, a "**Liability**") resulting from all Third Party claims, suits, actions, terminations, or demands (each, a "**Claim**") to the extent such Claims relate to or arise out of (a) any breach of this Agreement by GBIO, (b) any negligence, recklessness, or willful misconduct of GBIO in connection with the performance of its obligations or exercise of its rights hereunder, (c) any violation of Applicable Law by GBIO in connection with the performance of its obligations or exercise of its rights hereunder, or (d) the Development, Manufacture, or Commercialization of any Licensed Product by or on behalf of GBIO or any of its Affiliates or Sublicensees, including any failure to test for or provide adequate warnings of adverse side effects, or any manufacturing defect in any Licensed Product, except, in each case ((a)-(d)), to the extent such Liabilities resulted from any action for which Moderna is obligated to indemnify GBIO under Section 13.1.2.

13.1.2 By Moderna. Moderna shall defend, indemnify, and hold harmless GBIO, its Affiliates, and each of its and their respective directors, officers, employees, agents, successors, and assigns from and against all Liabilities resulting from all Claims to the extent such Claims relate to or arise out of (a) [**], (b) [**], (c) [**], (d) [**], or (e) [**], except, in each case ((a)-(e)), to the extent such Liabilities resulted from any action for which GBIO is obligated to indemnify Moderna under Section 13.1.1.

13.2 **Procedure**.

13.2.1 **General**. Promptly after the receipt by a Person seeking indemnification under this ARTICLE 13 (the "**Indemnitee**") of notice of any pending or threatened Claim for which the Indemnitee intends to seek indemnification under this ARTICLE 13, such Indemnitee shall promptly provide notice thereof to the other Party (the "**Indemnitor**"), which notice shall include a reasonable identification of the alleged facts giving rise to such Claim. Any failure by an Indemnitee to give such notice shall not relieve the Indemnitor of its indemnification obligation under this Agreement, except and only to the extent that the Indemnitor is actually prejudiced as a result of such failure to give notice. The Indemnitor shall have the right to participate in, and, to the extent the Indemnitor so desires, to control the defense and settlement thereof with counsel selected by the Indemnitor. However, notwithstanding the foregoing, the Indemnitee shall have the right to participate in, but not control, the defense of any Claim, and request separate counsel, with the fees and expenses to be paid by the Indemnitee, unless (a) representation of such Indemnitee by the counsel retained by the Indemnitor would be inappropriate due to actual or potential differing interests between such Indemnitee and any other Party represented by such counsel in such proceedings or (b) the Indemnitor has failed to assume the defense of the applicable Claim, in which case ((a) or (b)), such fees and expenses shall be paid by the Indemnitor. The Indemnitee shall, and shall cause each of its Affiliates and its and their respective directors, officers, employees, agents, successors, and assigns, as applicable, to, cooperate in the defense of any indemnified Claim and shall furnish such records, information, and testimony, provide such witnesses, and attend such conferences, discovery proceedings, hearings, trials, and appeals, and otherwise providing reasonable access to such indemnitees and other employees and agents of the Indemnitee, in each case as may be reasonably requested in connection therewith. The Indemnitor shall reimburse the Indemnitee for its reasonable and verifiable out-of-pocket expenses in connection therewith. The Indemnitor may not settle any Claim, and the Indemnitee shall not be responsible for or be bound by any settlement of a Claim that imposes an obligation on it, without the prior written consent of the Indemnitee (which consent shall not be unreasonably withheld, conditioned, or delayed), unless such settlement or compromise (i) fully releases the Indemnitee without any liability, loss, cost, or obligation, (ii) admits no liability, wrongdoing, or other admission against interest on the part of the Indemnitee, and (iii) would not have an adverse effect on the Indemnitee's interests (including any rights under this Agreement or the scope or enforceability of the intellectual property licensed hereunder).

13.2.2 **No Acknowledgement**. The assumption of the defense of a Claim by the Indemnitor shall not be construed as an acknowledgment that the Indemnitor is liable to indemnify the Indemnitee in respect of the Claim, nor shall it constitute a waiver by the Indemnitor of any defenses it may assert against the Indemnitee's claim for indemnification.

13.3 **Limitation of Liability**. EXCEPT (A) IN THE EVENT OF THE WILLFUL MISCONDUCT OR FRAUD OF A PARTY, (B) WITH RESPECT TO A PARTY'S BREACH OF ITS OBLIGATIONS UNDER ARTICLE 9, AND (C) TO THE EXTENT ANY SUCH DAMAGES ARE REQUIRED TO BE PAID TO A THIRD PARTY AS PART OF A CLAIM FOR WHICH A PARTY PROVIDES INDEMNIFICATION UNDER THIS ARTICLE 13, NEITHER PARTY NOR ANY OF EITHER PARTY'S AFFILIATES OR (SUB)LICENSEES SHALL BE LIABLE IN CONTRACT, TORT, NEGLIGENCE, BREACH OF STATUTORY DUTY, OR OTHERWISE FOR ANY SPECIAL, PUNITIVE, EXEMPLARY, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR MULTIPLE DAMAGES ARISING OUT OF THIS AGREEMENT OR THE EXERCISE OF ITS RIGHTS UNDER THIS AGREEMENT OR FOR LOST PROFITS SUFFERED BY THE OTHER PARTY OR ANY OTHER LOSS OR INJURY TO A PARTY'S OR ITS AFFILIATES' PROFITS, REVENUES, BUSINESS, OR GOODWILL ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT, IN EACH CASE, REGARDLESS OF ANY PRIOR NOTICE OF SUCH DAMAGES.

ARTICLE 14 - FORCE MAJEURE

Neither Party (nor any of such Party's Affiliates) shall be held liable or responsible to the other Party (or any of such other Party's Affiliates) hereunder, or be deemed to have defaulted under or breached this Agreement, for failure or delay by such Party in fulfilling or performing any term of this Agreement when such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party (or any of its Affiliates), including fire, floods, epidemics or pandemics, embargoes, war, acts of war (whether war be declared or not), insurrections, riots, civil commotions, acts of God, earthquakes, or omissions or delays in acting by any Governmental Authority (each, an "**Event of Force Majeure**"), but the affected Party shall exert Commercially Reasonable Efforts to eliminate, cure, or overcome any such Event of Force Majeure and to resume performance of its obligations promptly. Notwithstanding the foregoing, to the extent that an Event of Force Majeure continues for a period in excess of [**], the affected Party will promptly notify in writing the other Party of such Event of Force Majeure and within [**] of the other Party's receipt of such notice, the Parties will negotiate in good faith a resolution of the Event of Force Majeure, if possible, which resolution may include (a) an extension by mutual agreement of the time period to resolve, eliminate, cure or overcome such Event of Force Majeure, (b) an amendment of this Agreement to the extent reasonably possible, or (c) an early termination of this Agreement.

ARTICLE 15 - ASSIGNMENT; CHANGE OF CONTROL

15.1 **Assignment**. This Agreement may not be assigned or otherwise transferred, nor, except as expressly provided hereunder, may any right or obligations hereunder be assigned or transferred by either Party, without the consent of the other Party, such consent not to be unreasonably withheld, conditioned, or delayed; except that either Party may, without such consent but with notification to the other Party following such assignment and subject to the terms and conditions of this Section 15.1, assign this Agreement in its entirety (a) to any of its Affiliates (for so long as the assignee remains an Affiliate of the assigning Party) or (b) to a Third Party that acquires all or substantially all of such Party's business to which this Agreement relates (whether by merger, reorganization, acquisition, sale, or otherwise). Any such assignment shall not be valid and effective unless and until the assignee agrees in writing to assume all rights and obligations of its assignor under this Agreement and be bound by the terms and conditions of this Agreement applicable to the assignor. In addition, and notwithstanding the foregoing, GBIO may assign its right to receive payments under this Agreement as part of a royalty factoring transaction undertaken for *bona fide* financing purposes. The terms and conditions of this Agreement will be binding on and inure to the benefit of the successors and permitted assigns of the Parties. Any attempted assignment of this Agreement not in accordance with this Section 15.1 shall be void and of no effect.

15.2 **Change of Control**. Notwithstanding anything to the contrary in this Agreement, if a Party undergoes a Change of Control, then any technology or intellectual property rights owned, licensed, or otherwise controlled by the Acquirer or any applicable New Affiliates shall not be included in the technology and intellectual property rights licensed to the other Party hereunder (i) to the extent held by such Acquirer or the New Affiliates prior to such transaction, or (ii) to the extent such technology or intellectual property rights are developed or acquired by such Acquirer or any applicable New Affiliates outside the scope of activities conducted hereunder and without use of or reference to any technology or intellectual property rights of the Party subject to the Change of Control (or any Affiliate of such Party immediately before such Change of Control or any Person that such Party or any such Affiliate controls (directly or indirectly) after the Change of Control) or the other Party or any of such other Party's Affiliates, in each case of (i)-(ii), in the event such Party is GBIO, except pursuant to any In-License Agreement between GBIO and such Acquirer or any New Affiliate.

ARTICLE 16 - SEVERABILITY

Each Party hereby agrees that this Agreement is not intended to violate any public policy, statutory or common laws, rules, regulations, treaty, or decision of any Governmental Authority of any country or community or association of countries. Should one or more provisions of this Agreement be or become invalid or unenforceable under Applicable Law, the Parties hereto shall substitute, by mutual consent, valid and enforceable provisions for such invalid or unenforceable provisions that, in their effect, are sufficiently similar to the invalid or unenforceable provisions that it can be reasonably assumed that the Parties would have entered into this Agreement based on such valid provisions. In case such alternative provisions cannot be agreed upon, suitable and equitable provisions will be substituted therefor in order to carry out, so far as may be valid and enforceable, the intent and purpose of such invalid or unenforceable provisions. In any case, the invalidity or unenforceability of one or several provisions of this Agreement shall not affect the validity or enforceability of this Agreement as a whole or the application of such provision to other Persons or circumstances, nor will such invalidity or unenforceability affect the validity or enforceability of such provision, or the application of such provision, in any other jurisdiction.

ARTICLE 17 - INSURANCE

Each Party will maintain, at its sole cost, reasonable insurance against liability and other risks associated with its activities contemplated by this Agreement, consistent with the normal and customary practices of companies of similar size, nature, and scope. Upon written request, each Party will provide evidence of such insurance in the form of a certificate of insurance. Each Party shall provide the other with [**] advance written notice in the event of any cancellation of such insurance.

ARTICLE 18 - MISCELLANEOUS

18.1 **Notices**. Any consent, notice, or report required or permitted to be given or made under this Agreement by one of the Parties to the other shall be in writing, delivered personally (with tracking capabilities), certified mail (postage prepaid, return receipt requested), or courier (with tracking capabilities), addressed to such other Party at its address indicated below, or to such other address as the addressee shall have last furnished in writing to the other Party in accordance with this Section 18.1. In addition, and not in lieu of any of the foregoing methods of transmission, a copy of any such consent, notice or report (which shall not in itself constitute notice) may be sent by electronic mail to the electronic mail address set forth below. Any such consent, notice, or report shall be effective upon the date of delivery (if delivered personally or by courier) or five (5) Business Days after mailing (if sent by certified mail). This Section 18.1 is not intended to govern the day-to-day business communications necessary between the Parties in performing their obligations under the terms of this Agreement.

If to GBIO:

Generation Bio Co.
301 Binney St.
Cambridge, MA 02142
Attention: Chief Legal Officer and Chief Scientific Officer
Telephone: (617) 655-7500

With a copy to:

WilmerHale
60 State Street
Boston, MA 02109

Attention: Steven D. Barrett
Telephone: (617) 526-6238
Facsimile: (617) 526-5000

If to Moderna:

ModernaTX, Inc.
200 Technology Square
Cambridge, MA 02139
Attention: General Counsel

With a copy to:

[**]

18.2 **Applicable Law**. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to the conflict of law principles thereof that may dictate application of the laws of any other jurisdiction. Notwithstanding anything to the contrary herein, any disputes regarding validity, enforceability, interpretation, and construction of any Patent Rights will be governed in accordance with the laws of the jurisdiction in which such Patent Rights were filed or granted, as the case may be, by a court or patent office of competent jurisdiction in the relevant country or region in which such Patent Rights were issued or, if not issued, in which the underlying patent applications were filed.

18.3 **Dispute Resolution**. The Parties agree that, if any dispute or disagreement arises between Moderna and GBIO in respect of this Agreement (each, a "**Dispute**"), then, subject to Section 18.9, they shall follow the following procedures in an attempt to resolve the dispute or disagreement. The term "Dispute" excludes any matter that is subject to Moderna's final decision-making authority under Section 4.5.

18.3.1 Referral to Executive Officers. Either Party may refer any Dispute to the Executive Officers. The Executive Officers shall discuss any such matter referred to them in good faith and attempt to find a mutually satisfactory resolution to the issue. If the Executive Officers do not reach consensus regarding, or do not resolve, such a matter within [**] after the date on which the matter is referred to the Executive Officers (unless a longer period is agreed to by the Parties), then the matter may be referred to dispute resolution in accordance with Section 18.3.2 below.

18.3.2 Dispute Resolution.

(a) Subject to Section 18.3.2(c), all Disputes arising out of or in connection with this Agreement that are not resolved in accordance with Section 18.3.1 shall be finally settled under the Commercial Arbitration Rules of the American Arbitration Association (the "**Rules**") by three (3) arbitrators appointed in accordance with said Rules, each of whom must be familiar with the biotechnology industry. If the Disputes involve scientific, technical or commercial matters, the arbitrators may engage experts that have educational training or industry experience sufficient to demonstrate a reasonable level of relevant scientific, technical or industry knowledge, as necessary to help resolve the Dispute. The language of the arbitration shall be English. The place of arbitration shall be Boston, Massachusetts. The arbitrators shall award to the prevailing Party, if any, as determined by the arbitrators, its reasonable attorneys' fees and costs. Judgment on an award may be entered in any court having jurisdiction thereof. The Parties shall maintain the confidential nature of the arbitration proceeding and the award, including the hearing, except as may be necessary to prepare for or conduct the arbitration hearing on the merits, or except as may be necessary in connection with a court application for a preliminary remedy, a judicial challenge to an award or its enforcement, or unless otherwise required by Applicable Law or judicial decision.

(b) With respect to any Dispute referred to arbitration that arises from a failure of the JPC to reach Unanimous Agreement on any matter described in Section 4.4.4(b) or the failure by the Parties to agree on the allocation of any Third Party Patent Rights or Know-How pursuant to the last paragraph of Section 1.1.48, the arbitration shall proceed in accordance with the procedures set forth in this Section 18.3.2(b); provided, however, the Parties may agree to, or the arbitrators may set, accelerated timelines for the process set forth in this Section 18.3.2(b) in view of any deadlines set forth by a Governmental Authority (such as a patent office) or under Applicable Law pertaining to such Dispute. Within [**] after appointment of the arbitrators, each Party shall provide to the other Party and the arbitrators a written summary of such Party's proposal, together with a brief or other written memorandum supporting the merits of such Party's proposal, and a copy of the relevant provisions of this Agreement. Within [**] after exchanging each Party's initial proposal, each Party may submit to the arbitrators (with a copy to the other Party) a rebuttal to the other Party's support memorandum and shall at such time have the opportunity to amend its initial proposal based on any new information contained in the other Party's support memorandum. Within [**] after such rebuttal period, the arbitrators shall promptly convene a hearing that will last no longer than [**] on a single Business Day mutually determined by the Parties. Neither Party may call any witnesses in support of its arguments. The arbitrators shall, within [**] after such hearing, select one Party's proposal such arbitrators believe is the most consistent with the intent of the Parties when this Agreement was entered into, and notify the Parties of such selection in writing; provided, however, the arbitrators may not alter the terms of this Agreement or a Party's proposal (as may be amended during the rebuttal period). The decision of the arbitrators shall be final and binding on the Parties.

(c) Unless otherwise agreed by the Parties, a dispute between the Parties relating to the validity, enforceability, ownership, or inventorship of any Patent Right shall not be subject to arbitration, but shall instead be submitted to a court or patent office (as applicable) of competent jurisdiction in the relevant country or jurisdiction in which such Patent Right was issued or, if not issued, in which the underlying patent application was filed.

18.3.3 **Disputed Payments**. In the event of a dispute regarding any payments owing under this Agreement, all undisputed amounts shall be paid promptly when due and the balance, if any, promptly after resolution of the dispute (but in no event longer than [**] thereafter).

18.3.4 **Waiver**. EACH PARTY HERETO WAIVES ITS RIGHT TO TRIAL OF ANY ISSUE BY JURY.

18.4 **Entire Agreement**. This Agreement contains the entire understanding of the Parties with respect to the specific subject matter hereof. All express or implied agreements and understandings, either oral or written, heretofore made (including the Confidentiality Agreement) are expressly superseded by this Agreement. This Agreement may be amended, or any term hereof modified, only by a written instrument duly executed by both Parties and specifically referencing this Agreement.

18.5 **Independent Contractors**. GBIO and Moderna each acknowledge that they are independent contractors and that the relationship between the Parties does not constitute a partnership, joint venture, agency, or any type of fiduciary relationship. Neither GBIO nor Moderna has the authority to make any statements, representations, or commitments of any kind, or to take any action, that is binding on the other Party, without the prior consent of the other Party to do so. Neither Party nor its Affiliates will be deemed to be acting "on behalf of" the other Party under this Agreement, except to the extent expressly otherwise provided.

18.6 **Waiver and Non-Exclusion of Remedies**. The waiver by either Party hereto of any right hereunder or of the failure to perform or of a breach by the other Party shall not be deemed a waiver of any other right hereunder or of any other breach or failure by said other Party whether of a similar nature or otherwise. The rights and remedies provided herein are cumulative and do not exclude any other right or remedy provided by Applicable Law or otherwise available, except as expressly set forth herein.

18.7 **Further Assurances**. Each Party shall execute such additional documents as are necessary to effect the purposes of this Agreement.

18.8 **No Benefit to Third Parties**. The covenants and agreements set forth in this Agreement are for the sole benefit of the Parties and their successors and permitted assigns and they shall not be construed as conferring any rights on any other Person.

18.9 **Equitable Relief**. Each Party acknowledges and agrees that the restrictions set forth in ARTICLE 9 are reasonable and necessary to protect the legitimate interests of the other Party and that any breach or threatened breach of any provision of such Article may result in irreparable injury to such other Party for which there will be no adequate remedy at law. In the event of a breach or threatened breach of any provision of such Article, the non-breaching Party shall be authorized and entitled to seek from any court of competent jurisdiction injunctive relief, whether preliminary or permanent, specific performance and other equitable relief, which rights shall be cumulative and in addition to any other rights or remedies to which such non-breaching Party may be entitled in law or equity. Nothing in this Section 18.9 is intended or should be construed, to limit either Party's right to seek equitable relief or any other remedy for a breach of any other provision of this Agreement.

18.10 **Counterparts**. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be signed or delivered by facsimile or electronically scanned signature page.

(*The remainder of this page has been intentionally left blank. The signature page follows.*)

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the Effective Date.

GENERATION BIO CO.

By: /s/ Geoffrey McDonough

Name: Geoffrey McDonough

Title: President and Chief Executive Officer

MODERNATX, INC.

By: /s/ Said Francis

Name: Said Francis

Title: SVP Business Development and Corporate Strategy

Exhibit 10.3

Execution Version

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential. Double asterisks denote omissions.

SHARE PURCHASE AGREEMENT

By and Between

MODERNATX, INC.

AND

GENERATION BIO CO.

Dated as of March 23, 2023

TABLE OF CONTENTS

SHARE PURCHASE AGREEMENT

THIS SHARE PURCHASE AGREEMENT (this "**Agreement**"), dated as of March 23, 2023, by and between ModernaTX, Inc. (the "**Investor**"), a Delaware corporation, and Generation Bio Co. (the "**Company**"), a Delaware corporation.

WHEREAS, pursuant to the terms and subject to the conditions set forth in this Agreement, the Company desires to issue and sell to the Investor, and the Investor desires to subscribe for and purchase from the Company, certain shares of common stock, par value $0.0001 per share, of the Company (the "**Common Stock**"); and

WHEREAS, in partial consideration for the Investor's willingness to enter into this Agreement, the Company and the Investor are entering into the Collaboration Agreement (as defined below) as of the date hereof.

NOW, THEREFORE, in consideration of the following mutual promises and obligations, and for good and valuable consideration, the adequacy and sufficiency of which are hereby acknowledged, the Investor and the Company agree as follows:

1. Definitions.

1.1 Defined Terms. When used in this Agreement, the following terms shall have the respective meanings specified therefor below:

"**Affiliate**" shall mean, with respect to any Person, another Person which controls, is controlled by or is under common control with such Person. A Person shall be deemed to control another Person if such Person possesses, directly or indirectly, the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise. Without limiting the generality of the foregoing, a Person shall be deemed to "**control**" another Person if any of the following conditions is met: (i) in the case of corporate entities, direct or indirect ownership of more than fifty percent (50%) of the stock or shares having the right to vote for the election of directors or otherwise having the power to control or direct the affairs of such Person; and (ii) in the case of non-corporate entities, direct or indirect ownership of more than fifty percent (50%) of the equity interest or the power to direct the management and policies of such non-corporate entities. For the purposes of this Agreement, in no event shall the Investor or any of its Affiliates be deemed Affiliates of the Company or any of its Affiliates, nor shall the Company or any of its Affiliates be deemed Affiliates of the Investor or any of its Affiliates.

"**Agreement**" shall have the meaning set forth in the Preamble, including all Exhibits attached hereto.

"**Business Day**" shall mean a day on which commercial banking institutions in New York, New York are open for business.

"**Board**" shall mean the Board of Directors of the Company.

"**Change of Control**" with respect to the Company: (a) the acquisition by a Third Party, whether in one transaction or a series of related transactions, of direct or indirect beneficial ownership of more than fifty percent (50%) of the outstanding voting equity securities of the Company; (b) a merger or consolidation involving the Company, as a result of which a Third Party acquires direct or indirect beneficial ownership of more than fifty percent (50%) of the voting power of the surviving entity immediately after such merger, reorganization or consolidation; or (c) a sale of all or substantially all of the assets of the Company in one transaction or a series of related transactions to a Third Party.

"**Collaboration Agreement**" shall mean the Collaboration and License Agreement between the Company and the Investor, dated as of the date hereof.

"**Common Stock Equivalents**" shall mean any options, warrants or other securities or rights convertible into or exercisable or exchangeable for, whether directly or following conversion into or exercise or exchange for other options, warrants or other securities or rights, shares of Common Stock.

"**Effect**" shall have the meaning set forth in the definition of "Material Adverse Effect."

"**Filing Date**" shall mean forty-five (45) days after receipt by the Company of a Demand Request for a Registration Statement to be filed on Form S-3 (or any applicable successor form).

"**FINRA**" shall mean the Financial Industry Regulatory Authority.

"**Governmental Authority**" shall mean any court, agency, authority, department, regulatory body or other instrumentality of any government or country or of any national, federal, state, provincial, regional, county, city or other political subdivision of any such government or country or any supranational organization of which any such country is a member.

"**Intellectual Property**" shall mean any and all of the following, as they exist throughout the world: (a) any national, regional, or international (i) issued patent or pending patent application (including any provisional patent application), (ii) patent application filed either from any of the foregoing or from an application claiming priority to any of the foregoing, including any provisional application, converted provisional, substitution, continuation, continuation-in-part, division, renewal, or continued prosecution application, and any patent granted thereon, (iii) patent-of-addition, revalidation, reissue, reexamination, or extension or restoration (including any supplementary protection certificate or the like) by any existing or future extension or restoration mechanism, including any patent term adjustment, patent term extension, supplementary protection certificate, or any equivalent thereof, (iv) inventor's certificate, utility model, petty patent, innovation patent, or design patent, (v) any other form of government-issued rights comparable in scope to any of the foregoing, including any so-called pipeline protection or any importation, revalidation, confirmation, or introduction patent or registration patent or patent of addition to any of such foregoing, or (vi) United States or foreign counterpart of any of the foregoing; (b) rights in registered and unregistered trademarks, service marks, trade names, trade dress, logos, packaging design, slogans and Internet domain names, and registrations and applications for registration of any of the foregoing; (c) copyrights in both published and unpublished works, including without limitation all compilations, databases and computer programs, manuals and other documentation and all copyright registrations and applications, and all derivatives, translations, adaptations and combinations of the above; (d) rights in inventions (whether or not patentable), invention disclosures, processes, methods, algorithms and formulae, know-how, trade secrets, technology, information, knowledge, practices, formulas, instructions, skills, techniques, scientific and technical data, designs, drawings, computer programs, apparatus, research tools, results of experiments and clinical and pre-clinical tests, test data, including pharmacological, toxicological and clinical data, cell lines, information regarding specially bred animals, therapeutic agents, analytical and quality control data, manufacturing data and descriptions, market data, devices, assays, chemical formulations, notes of experiments, specifications, delivery systems, compositions of matter, physical, chemical and biological materials and compounds, whether in intangible, tangible, written, electronic or other form; (e) any and all other intellectual property rights and/or proprietary rights recognized by Law, including rights of publicity, privacy, moral rights and rights of attribution; and (f) tangible embodiments or subject matter of any of the foregoing.

"**Intellectual Property License**" shall mean any license, permit, authorization, approval, contract or consent granted, issued by, to or with any Person relating to the use of Intellectual Property.

"**Law**" or "**Laws**" shall mean all laws, statutes, rules, regulations, orders, judgments, injunctions and/or ordinances of any Governmental Authority.

"**Material Adverse Effect**" shall mean any change, event or occurrence (each, an "**Effect**") that, individually or when taken together with all other Effects, has (i) a material adverse effect on the business, financial condition, assets, results of operations or prospects of the Company and its subsidiaries, taken as a whole, or (ii) a material adverse effect on the Company's ability to perform its obligations, or consummate the Transaction, in accordance with the terms of this Agreement, except in the case of (i) or (ii) to the extent that any such Effect results from or arises out of: (A) changes in conditions in the United States or global economy or capital or financial markets generally, including changes in interest or exchange rates, (B) changes in general legal, regulatory, political, economic or business conditions or changes in generally accepted accounting principles in the United States or interpretations thereof, (C) the announcement, pendency or performance of this Agreement or the Collaboration Agreement or the identity of the Investor, (D) any change in the trading prices or trading volume of the Common Stock or any failure to meet internal projections or forecasts or published revenue or earnings projections of industry analysts (provided that the underlying events giving risk to any such change shall not be excluded), (E) acts of war, sabotage or terrorism, or any escalation or worsening of any such acts of war, sabotage or terrorism, (F) earthquakes, hurricanes, floods or other natural disasters, (G) any action taken by the Company contemplated by this Agreement or the Collaboration Agreement, or with the Investor's written consent, (H) any breach, violation or non-performance by the Investor or any of its Affiliates under the Collaboration Agreement, or (I) shareholder litigation arising out of or in connection with the execution, delivery or performance of the Transaction Agreements or the Collaboration Agreement; provided, that, with respect to clauses (A), (B), (E) and (F), such Effect does not have a materially disproportionate and adverse effect on the Company relative to other companies in the biotechnology or biopharmaceutical industries.

"**Organizational Documents**" shall mean (i) the Amended and Restated Certificate of Incorporation of the Company, dated as of June 16, 2020, as may be amended and/or restated from time to time and (ii) the Amended and Restated By-laws of the Company, dated as of June 16, 2020, as may be amended and/or restated from time to time.

"**Permitted Transferee**" shall mean (i) a controlled Affiliate of the Investor that is wholly owned, directly or indirectly, by the Investor, or (ii) a controlling Affiliate of the Investor (or any controlled Affiliate of such controlling Affiliate) that wholly owns, directly or indirectly, the Investor; it being understood that for purposes of this definition "wholly owned" shall mean an Affiliate in which the Investor owns, directly or indirectly, at least ninety-nine percent (99%) of the outstanding capital stock of such Affiliate.

"**Person**" shall mean any individual, partnership, limited liability company, firm, corporation, trust, unincorporated organization, government or any department or agency thereof or other entity, as well as any syndicate or group that would be deemed to be a Person under Section 13(d)(3) of the Exchange Act (a "**13D Group**").

"**Prospectus**" shall mean the prospectus forming a part of any Registration Statement, as supplemented by any and all prospectus supplements and as amended by any and all amendments (including post-effective amendments) and including all material incorporated by reference or explicitly deemed to be incorporated by reference in such prospectus.

"**registers**," "**registered**," and "**registration**" refer to a registration effected by preparing and filing a Registration Statement or similar document in compliance with the Securities Act, and the declaration or ordering of effectiveness of such Registration Statement or document by the SEC.

"**Registrable Securities**" shall mean (i) the Shares and any shares of Common Stock purchased pursuant to the Investor's rights in Section 9, in each case together with any Common Stock issued in respect thereof as a result of any share split, share dividend, share exchange, merger, consolidation or similar recapitalization and (ii) any Common Stock issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Common Stock described in clause (i) of this definition, excluding in all cases, however, (A) any Registrable Securities if and after they have been transferred to a Permitted Transferee in a transaction in connection with which registration rights granted hereunder are not assigned or (B) any Registrable Securities sold to or through a broker or dealer or underwriter in a public distribution or a public securities transaction. Registrable Securities shall cease to be Registrable Securities upon the earliest to occur of the following events: (i) such Registrable Securities have been sold by the Investor pursuant to Rule 144 (or other similar rule); (ii) such Registrable Securities have been sold pursuant to an effective Registration Statement; or (iii) ten (10) years after the date of this Agreement. For purposes of this definition, in order to determine whether the Investor is an "affiliate" (as such term is defined and used in Rule 144, including for determining whether volume or manner of sale limitations of Rule 144 apply) the parties will assume that all Common Stock Equivalents have been converted into Common Stock.

"**Registration Statement**" shall mean any registration statement of the Company under the Securities Act that covers any of the Registrable Securities pursuant to the provisions of this Agreement, including the related Prospectus, all amendments and supplements to such registration statement (including post-effective amendments), and all exhibits and all materials incorporated by reference or explicitly deemed to be incorporated by reference in such Registration Statement.

"**Standstill Term**" shall mean the period from the date of this Agreement until the date that is eighteen (18) months after the Closing Date.

"**Third Party**" shall mean any Person (other than a Governmental Authority) other than the Investor, the Company or any Affiliate of the Investor or the Company.

"**Transaction**" shall mean the issuance and sale of the Shares by the Company, and the purchase of the Shares by the Investor, in accordance with the terms hereof.

"**Transaction Agreements**" shall mean this Agreement and the Collaboration Agreement.

"**WKSI**" shall mean a well-known seasoned issuer (within the meaning of Rule 405 under the Securities Act).

1.2 Additional Defined Terms. In addition to the terms defined in Section 1.1, the following terms shall have the respective meanings assigned thereto in the sections indicated below:

Defined Term	Section
Aggregate Purchase Price	Section 2
Alternative Transaction	Section 10.5
Applicable Offering	Section 9.1
ATM	Section 9.2(a)
ATM Notice	Section
ATM Purchase Right	Section 9.3
ATM Sale Right	Section 9.3
automatic shelf registration statement	Section 11.3(n)
Average Sale Price	Section 9.3
Closing	Section 3.1
Closing Date	Section 3.1
Common Stock	Recitals
Company	Preamble
Company SEC Documents	Section 4.11(a)
Controlling Person	Section 11.6
Damages	Section 11.6
Demand Registration	Section 11.1(a)
Demand Request	Section 11.1(a)
Exchange Act	Section 4.11(a)
Expected Pricing Date	Section 9.1
Holder	Section 11.1(a)
Holders' Counsel	Section 11.2
Indemnified Party	Section 11.6(c)
Indemnifying Party	Section 11.6(c)

Defined Term	Section
Interference	Section 11.1(d)
Investor	Preamble
Investor Participation Right	Section 9.1
Modified Clause	Section 12.7
Money Laundering Laws	Section 4.21
New Securities	Section 9.1
Offer Notice	Section 9.1
Permits	Section 4.10
Prior Holders	Section 11.1(c)
Reference Period	Section 9.3
Registration Expenses	Section 11.2
Rule 144	Section 5.9
Sanctions	Section 4.20
SEC	Section 4.7
Securities Act	Section 4.11(a)
Shares	Section 2
Standstill Parties	Section 10.5
Suspension Notice	Section 11.5
Underwriter's Maximum Number	Section 11.1(c)
Underwritten Offering	Section 11.1(a)

2. Purchase and Sale of Common Stock. Subject to the terms and conditions of this Agreement, upon receipt of payment by the Investor in accordance with Section 3.2(b) hereof, the Company shall issue and sell to the Investor, free and clear of all liens, other than any liens arising as a result of any action by the Investor, and the Investor shall purchase from the Company, 5,859,375 shares of Common Stock (the "**Shares**") for $36,000,000 in aggregate (the "**Aggregate Purchase Price**").

3. Closing Date; Deliveries.

3.1 Closing Date. Subject to the satisfaction or waiver of all the conditions to the Closing set forth in Sections 6, 7 and 8 hereof, the closing of the purchase and sale of the Shares hereunder (the "**Closing**") shall be held remotely on the date hereof (the "**Closing Date**)".

3.2 Deliveries.

(a) Deliveries by the Company. Upon receipt of payment by the Investor in accordance with Section 3.2(b) hereof, the Company shall instruct its transfer agent to register the Shares in book-entry in the name of the Investor.

(b) Deliveries by the Investor. Within [**] following the Closing, the Investor shall deliver to the Company the Aggregate Purchase Price by wire transfer of immediately available United States funds to an account designated by the Company. The Company shall notify the Investor in writing of the wiring instructions for such account not less than [**] before the Closing Date.

4. Representations and Warranties of the Company. The Company hereby represents and warrants to the Investor as of the date hereof (except for the representations and warranties that speak as of a specific date, which shall be made as of such date) that:

4.1 Organization, Good Standing and Qualification.

(a) The Company is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware. The Company has all requisite corporate power and corporate authority to own, lease and operate its properties and assets, to carry on its business as now conducted, and as proposed to be conducted as described in the Company SEC Documents, to enter into this Agreement, to issue and sell the Shares, and to perform its obligations under and to carry out the other transactions contemplated by this Agreement.

(b) The Company is qualified to transact business and is in good standing in each jurisdiction in which the character of the properties owned, leased or operated by the Company or the nature of the business conducted by the Company makes such qualification necessary, except where the failure to be so qualified would not have or be reasonably likely to have a Material Adverse Effect.

4.2 Capitalization and Voting Rights.

(a) The authorized capital of the Company as of the date hereof consists of: (i) 150,000,000 shares of Common Stock of which, as of February 17, 2023, 59,665,758 shares were issued and outstanding and (ii) 5,000,000 shares of undesignated preferred stock, par value $0.0001 per share, none of which are issued and outstanding as of the date of this Agreement. All of the issued and outstanding shares of Common Stock (i) have been duly authorized and validly issued, (ii) are fully paid and non-assessable and (iii) were issued in compliance with all applicable federal and state securities Laws and not in violation of any preemptive rights.

(b) All of the authorized shares of Common Stock are entitled to one (1) vote per share.

(c) Except as set forth in the Company SEC Documents, as of the date hereof, there are not: (i) any outstanding equity securities, options, warrants, rights (including conversion or preemptive rights) or other agreements pursuant to which the Company is or may become obligated to issue, sell or repurchase any shares of its capital stock or any other securities of the Company or (ii) any restrictions on the transfer of capital stock of the Company imposed by the Company other than pursuant to state and federal securities Laws.

(d) The Company is not a party to or subject to any agreement or understanding relating to the voting of shares of capital stock of the Company or the giving of written consents by a stockholder or director of the Company.

4.3 Subsidiaries. The Company has disclosed all of its subsidiaries required to be disclosed pursuant to Item 601(b)(21) of Regulation S-K in an exhibit to its Annual Report on Form 10-K. The Company's subsidiary has been duly organized and is validly existing as a corporation in good standing under the Laws of the Commonwealth of Massachusetts and has the power and authority to own and lease its properties and to conduct its businesses as presently conducted. All of the issued and outstanding capital stock or other equity or ownership interests of the Company's subsidiary has been duly authorized and validly issued, is fully paid and nonassessable and is owned by the Company, free and clear of any security interest, mortgage, pledge, lien, encumbrance or adverse claim. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiary listed in Company SEC Documents, other than (a) subsidiaries that either were not required to be disclosed pursuant to Item 601(b)(21) of Regulation S-K as of the filing of the Company's most recent Annual Report on Form 10-K or (b) subsidiaries that were incorporated or organized after the filing of the Company's most recent Annual Report on Form 10-K.

4.4 Authorization.

(a) All requisite corporate action on the part of the Company, its directors and stockholders required by applicable Law for the authorization, execution and delivery by the Company of this Agreement and the performance of all obligations of the Company hereunder, including the authorization, issuance and delivery of the Shares, has been taken.

(b) This Agreement has been duly executed and delivered by the Company, and upon the due execution and delivery of this Agreement by the Investor, this Agreement will constitute valid and legally binding obligations of the Company, enforceable against the Company in accordance with its respective terms (except as such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium or other Laws of general application relating to or affecting enforcement of creditors' rights and (ii) rules of Law governing specific performance, injunctive relief or other equitable remedies and limitations of public policy).

(c) No stop order or suspension of trading of the Common Stock has been imposed by The Nasdaq Stock Market LLC, the SEC or any other Governmental Authority and remains in effect.

4.5 No Defaults. The Company is not in default under or in violation of (a) the Organizational Documents, (b) any provision of applicable Law or any ruling, writ, injunction, order, Permit, judgment or decree of any Governmental Authority having jurisdiction over the Company or (c) other than as described in the Company SEC Documents, any agreement, arrangement or instrument, whether written or oral, by which the Company or any of the Company's assets are bound, except, in the case of subsections (b) and (c), as would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect. To the knowledge of the Company, there exists no condition, event or act which after notice, lapse of time, or both, would constitute a default or violation by the Company under any of the foregoing, except, in the case of subsections (b) and (c), as would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

4.6 No Conflicts. The execution, delivery and performance of the Transaction Agreements, and compliance with the provisions hereof and thereof by the Company do not and shall not: (a) conflict with or violate any provision of applicable Law or any ruling, writ, injunction, order, permit, judgment or decree of any Governmental Authority having jurisdiction over the Company, (b) constitute a breach of, or default under (or an event which, with notice or lapse of time or both, would become a default under) or conflict with, or give rise to any right of termination, cancellation or acceleration of, any agreement, arrangement or instrument, whether written or oral, by which the Company or any of the assets of the Company are bound, (c) result in any encumbrance upon any of the Shares, other than restrictions on resale pursuant to securities Laws, or (d) violate or conflict with any of the provisions of the Company's Organizational Documents , except, in the case of subsections (a) and (b), as would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

4.7 No Governmental Authority or Third-Party Consents. Assuming the accuracy of the representations and warranties set forth in Section 5, no consent, approval, authorization, qualification, designation, declaration or other order of, or filing with, or notice to, any Governmental Authority or other Third Party is required to be obtained or made by the Company in connection with the authorization, execution and delivery by the Company of this Agreement, or with the authorization, issue and sale by the Company of the Shares, except (i) such filings as may be required to be made with the Securities and Exchange Commission (the "**SEC**") and with any state blue sky or securities regulatory authority, which filings shall be made in a timely manner in accordance with all applicable Laws and (ii) with respect to the Shares, the filing with The Nasdaq Stock Market of a Nasdaq Shares Outstanding Change Form.

4.8 Valid Issuance of Shares. When issued, sold and delivered at the Closing in accordance with the terms hereof for the Aggregate Purchase Price, the Shares shall be duly authorized, validly issued, fully paid and nonassessable, free from any liens, encumbrances or restrictions on transfer, including preemptive rights, rights of first refusal or other similar rights, other than as arising as a result of any action by the Investor or under federal or state securities Laws.

4.9 Litigation. There is no action, suit, proceeding or investigation pending (of which the Company has received notice or otherwise has knowledge) or, to the Company's knowledge, threatened, against the Company or which the Company intends to initiate which would, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

4.10 Licenses and Other Rights; Compliance with Laws. The Company and its subsidiary have all franchises, permits, licenses and other rights and privileges ("**Permits**") necessary to permit them to own their properties and to conduct their business as presently conducted and as described in the Company SEC Documents and are in compliance thereunder, except where the failure to be in compliance does not and would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect. To the Company's knowledge, neither the Company nor its subsidiaries have taken any action that would interfere with the Company's or its subsidiaries' ability to renew all such Permit(s), except where the failure to renew such Permit(s) would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect. The Company and its subsidiaries are and have been in compliance with all Laws applicable to their business, properties and assets, and to the products and services sold by them, except where the failure to be in compliance does not and would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

4.11 Company SEC Documents; Financial Statements; Nasdaq Stock Market.

(a) Since January 1, 2021, the Company has timely filed all required reports, schedules, forms, statements and other documents (including exhibits and all other information incorporated therein), and any required amendments to any of the foregoing, with the SEC (the "**Company SEC Documents**"). As of their respective filing dates, each of the Company SEC Documents complied in all material respects with the requirements of the Securities Act of 1933, as amended (the "**Securities Act**"), and the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), and the rules and regulations of the SEC promulgated thereunder applicable to such Company SEC Documents, and no Company SEC Documents when filed, declared effective or mailed, as applicable, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading.

(b) The financial statements of the Company included in its Annual Report on Form 10-K for the fiscal year ended December 31, 2022 comply as to form in all material respects with applicable accounting requirements and the published rules and regulations of the SEC with respect thereto, have been prepared in accordance with United States generally accepted accounting principles applied on a consistent basis during the periods involved (except as may be indicated in the notes thereto) and fairly present in all material respects the financial position of the Company as of the dates thereof and the results of its operations and cash flows for the periods then ended. There are no material unconsolidated subsidiaries of the Company or any material off-balance sheet arrangements of any type (including any off-balance sheet arrangement required to be disclosed pursuant to Item 303(a)(4) of Regulation S-K promulgated under the Securities Act) that have not been so described in the Company SEC Documents filed prior to the date hereof nor any obligations to enter into any such arrangements.

(c) As of the date of this Agreement, the Common Stock is listed on The Nasdaq Global Select Market, and the Company has taken no action designed to, or which to its knowledge is likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act or delisting the Common Stock from The Nasdaq Global Select Market. As of the date of this Agreement, the Company has not received any notification that, and has no knowledge that, the SEC or The Nasdaq Stock Market LLC is contemplating terminating such listing or registration. As of the date of this Agreement, other than as has been disclosed to the Investor, there are no outstanding or unresolved comments in comment letters received from the SEC or its staff.

4.12 Intellectual Property.

(a) The Intellectual Property that is owned or purportedly owned by the Company is owned free from any liens or restrictions, and all of the Company's material Intellectual Property Licenses are in full force and effect in accordance with their terms, are free of any liens or restrictions, and neither the Company nor to the Company's knowledge any other party thereto, is in material breach of any such material Intellectual Property License, and no event has occurred that with notice or lapse of time or both would constitute such a breach or default thereunder or would result in the termination thereof or would cause or permit the acceleration or other change of any right or obligation of the Company thereunder or the loss of any benefit thereunder by the Company except for such failures to be in full force and effect, such liens or restrictions, and such material breaches that would not reasonably be expected to have a Material Adverse Effect. There is no legal claim or demand of any Person pertaining to, or any proceeding which is pending (of which the Company has received notice or otherwise has knowledge) or, to the knowledge of the Company, threatened, (i) challenging the right of the Company in respect of any Intellectual Property owned or purportedly owned, in-licensed, or used by the Company, or (ii) that claims that any default exists under any Intellectual Property License, except, in the case of (i) and (ii) above, where any such claim, demand or proceeding would not, individually or in the aggregate, have or reasonably be likely to have a Material Adverse Effect.

(b) Except as set forth in the Company SEC Documents: (i) to the Company's knowledge after reasonable inquiry, the Company or one of its subsidiaries owns, free and clear of any lien or encumbrance, or has a valid license to, or has an enforceable right to use, as it is used or held for use, all Intellectual Property necessary for the conduct of the Company's business; and (ii) the Company and its subsidiaries have taken reasonable measures to protect such Intellectual Property, consistent with prudent commercial practices in the biotechnology industry, except where failure to take such measures would not have or reasonably be expected to have a Material Adverse Effect.

4.13 Absence of Certain Changes. Since December 31, 2022, there has not occurred any event that would, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

4.14 Offering. Subject to the accuracy of the Investor's representations set forth in Sections 5.5, 5.6, 5.7, 5.9 and 5.10, the offer, sale and issuance of the Shares to be issued in conformity with the terms of this Agreement constitute a transaction which is exempt from the registration requirements of the Securities Act and from all applicable state registration or qualification requirements. Neither the Company nor any Person acting on its behalf will take any action that would cause the loss of such exemption.

4.15 No Integration. The Company has not, directly or through any agent, sold, offered for sale, solicited offers to buy or otherwise negotiated in respect of, any security (as defined in the Securities Act) which is or will be integrated with the Shares sold pursuant to this Agreement in a manner that would require the registration of the Shares under the Securities Act.

4.16 Brokers' or Finders' Fees. No broker, finder, investment banker or other Person is entitled to any brokerage, finder's or other fee or commission from the Company in connection with the transactions contemplated by the Transaction Agreements.

4.17 Internal Controls; Disclosure Controls and Procedures. The Company is in compliance in all material respects with applicable requirements of the Sarbanes-Oxley Act of 2002 and all applicable rules and regulations promulgated by the SEC thereunder. The Company maintains internal control over financial reporting as defined in Rule 13a-15(f) under the Exchange Act. The Company has implemented the "disclosure controls and procedures" (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) required in order for the Principal Executive Officer and Principal Financial Officer of the Company to engage in the review and evaluation process mandated by the Exchange Act and is in compliance with such disclosure controls and procedures in all material respects. Each of the Principal Executive Officer and the Principal Financial Officer of the Company (or each former Principal Executive Officer of the Company and each former Principal Financial Officer of the Company, as applicable) has made all certifications required by Sections 302 and 906 of the Sarbanes-Oxley Act of 2002 with respect to all reports, schedules, forms, statements and other documents required to be filed by the Company with the SEC.

4.18 Investment Company. The Company is not, and upon giving effect to the transaction contemplated by this Agreement will not be, an "investment company" or a company "controlled" by an "investment company," within the meaning of the Investment Company Act of 1940, as amended.

4.19 Anti-Corruption and Anti-Bribery Laws. None of the Company, any of its subsidiaries, or, to the Company's knowledge, any director, officer, agent, employee or other authorized person acting on behalf of the Company or any of its subsidiaries has taken any action, directly or indirectly, in violation by such persons of the Foreign Corrupt Practices Act of 1977, the Prevention of Corruption Acts 1899 to 2010 or the U.K. Bribery Act 2010, each as may be amended, or similar law of any other relevant jurisdiction, or the rules or regulations thereunder; and the Company has instituted and maintain policies and procedures designed to reasonably promote compliance therewith.

4.20 Economic Sanctions. Neither the Company nor, to the Company's knowledge, any director, officer, agent, employee, Affiliate or representative or other authorized Person acting on behalf of the Company is a Person currently the subject of any sanctions administered or enforced by the United States Government or elsewhere including, without limitation, the U.S. Department of the Treasury's Office of Foreign Assets Control, the United Nations Security Council, the European Union, Her Majesty's Treasury, or other relevant sanctions authority (collectively, "**Sanctions**"), nor is the Company located, organized or resident in a country or territory that is the subject of Sanctions. Within the past five (5) years, to the Company's knowledge, it has neither been the subject of any governmental investigation or inquiry regarding compliance with Sanctions nor has it been assessed any fine or penalty in regard to compliance with Sanctions.

4.21 Money Laundering. The operations of the Company are and have been conducted at all times in compliance with applicable financial record-keeping and reporting requirements of the Currency and Foreign Transactions Reporting Act of 1970 and The Criminal Justice (Money Laundering and Terrorist Financing) Act 2010, each as amended, and applicable money laundering statutes and applicable rules and regulations thereunder (collectively, the "**Money Laundering Laws**"), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Money Laundering Laws is pending.

4.22 Tax Returns, Payments and Elections. The Company has filed all tax returns and reports as required, and within the time prescribed, by law and has paid or made provision for the payment of all accrued and unpaid taxes to which the Company is subject and which are not currently due and payable, except where any failure would not, individually or in the aggregate, have or reasonably be likely to have a Material Adverse Effect.

5. Representations and Warranties of the Investor. The Investor hereby represents and warrants to the Company that:

5.1 Organization; Good Standing. The Investor is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware. The Investor has or will have all requisite power and authority to enter into this Agreement, to purchase the Shares and to perform its obligations under and to carry out the other transactions contemplated by this Agreement.

5.2 Authorization. All requisite action on the part of the Investor and its directors and stockholders, required by applicable Law for the authorization, execution and delivery by the Investor of this Agreement and the performance of all of its obligations hereunder, including the subscription for and purchase of the Shares, has been taken. This Agreement has been duly executed and delivered by the Investor and upon the due execution and delivery thereof by the Company, will constitute valid and legally binding obligations of the Investor, enforceable against the Investor in accordance with its respective term (except as such enforceability may be limited by (a) applicable bankruptcy, insolvency, reorganization, moratorium or other Laws of general application relating to or affecting enforcement of creditors' rights and (b) rules of Law governing specific performance, injunctive relief or other equitable remedies and limitations of public policy).

5.3 No Conflicts. The execution, delivery and performance of the Transaction Agreements and compliance with the provisions hereof and thereof by the Investor do not and shall not: (a) violate any provision of applicable Law or any ruling, writ, injunction, order, permit, judgment or decree of any Governmental Authority, (b) constitute a breach of, or default under (or an event which, with notice or lapse of time or both, would become a default under) or conflict with, or give rise to any right of termination, cancellation or acceleration of, any agreement, arrangement or instrument, whether written or oral, by which the Investor or any of its assets, are bound, or (c) violate or conflict with any of the provisions of the Investor's organizational documents (including any articles or memoranda of organization or association, charter, bylaws or similar documents), except, in the case of subsections (a) or (b), as would not materially impair or adversely affect the ability of the Investor to consummate the Transaction and perform its obligations under the Transaction Agreements.

5.4 No Governmental Authority or Third-Party Consents. No consent, approval, authorization or other order of any Governmental Authority or other Third Party is required to be obtained by the Investor in connection with the authorization, execution and delivery of any of this Agreement or with the subscription for and purchase of the Shares.

5.5 Purchase Entirely for Own Account. The Shares shall be acquired for investment for the Investor's own account, not as a nominee or agent, and not with a view to the resale or distribution of any part thereof, and the Investor has no present intention of selling, granting any participation or otherwise distributing the Shares. The Investor can bear the economic risk of an investment in the Shares indefinitely and a total loss with respect to such investment. The Investor does not have and will not have as of the Closing any contract, undertaking, agreement or arrangement with any Person to sell, transfer or grant participation to a Person any of the Shares.

5.6 Disclosure of Information. The Investor has received all the information from the Company and its management that the Investor considers necessary or appropriate for deciding whether to purchase the Shares hereunder. The Investor further represents that it has had an opportunity to ask questions and receive answers from the Company regarding the Company, its financial condition, results of operations and prospects and the terms and conditions of the offering of the Shares sufficient to enable it to evaluate its investment. The Investor acknowledges that copies of the SEC Documents are available on the EDGAR system. Based on the information that the Investor deemed appropriate, it has independently made its own analysis and decision to enter into this Agreement. The Investor is relying on its own investment analysis and due diligence (including professional advice it deems appropriate) with respect to the execution, delivery and performance of this Agreement, the Shares and the business, condition (financial and otherwise), management, operations, properties and prospects of the Company, including but not limited to all business, legal, regulatory, accounting, credit and tax matters.

5.7 Investment Experience and Accredited Investor Status. The Investor is an "accredited investor" (as defined in Regulation D under the Securities Act). The Investor is a sophisticated investor and has such knowledge and experience in financial or business matters that it is capable of evaluating the merits and risks of the investment in the Shares to be purchased hereunder.

5.8 Acquiring Person. As of the date of this Agreement and immediately prior to the Closing, neither the Investor nor any of its Affiliates beneficially owns, or will beneficially own (as determined pursuant to Rule 13d-3 under the Exchange Act without regard for the number of days in which a Person has the right to acquire such beneficial ownership), any securities of the Company, except for securities that may be owned by employee benefit plans of the Investor or its Affiliates in the ordinary course of business.

5.9 Restricted Securities. The Investor understands that the Shares, when issued, shall be "restricted securities" under the federal securities Laws inasmuch as they are being acquired from the Company in a transaction not involving a public offering and that under such Laws the Shares may be resold without registration under the Securities Act only in certain limited circumstances. The Investor represents that it is familiar with Rule 144 of the Securities Act, as presently in effect ("**Rule 144**").

5.10 Legend. The Investor understands that the Shares in book entry form shall be subject to the following legend: "These securities have not been registered under the Securities Act of 1933. They may not be sold, offered for sale, pledged or hypothecated in the absence of a registration statement in effect with respect to the securities under the Securities Act or an opinion of counsel (which counsel shall be reasonably satisfactory to Generation Bio Co.) that such registration is not required or unless sold pursuant to Rule 144 of the Securities Act."

5.11 Financial Assurances. As of the date hereof and as of the Closing Date, the Investor has and will have access to cash in an amount sufficient to pay to the Company the Aggregate Purchase Price.

5.12 Brokers' or Finders' Fees. No broker, finder, investment banker or other Person is entitled to any brokerage, finder's or other fee or commission from the Investor in connection with the transactions contemplated by the Transaction Agreements.

6. Investor's Conditions to Closing. The Investor's obligation to purchase the Shares at the Closing is subject to the fulfillment as of the Closing of the following conditions (unless waived in writing by the Investor):

6.1 Representations and Warranties. The representations and warranties made by the Company in Section 4 hereof shall be true and correct as of the Closing, except to the extent such representations and warranties are specifically made as of a particular date, in which case such representations and warranties shall be true and correct as of such date.

6.2 Covenants. All covenants and agreements contained in this Agreement to be performed or complied with by the Company on or prior to the Closing Date shall have been performed or complied with in all material respects.

6.3 Closing Certificate. An executive officer of the Company shall deliver to the Investor at the Closing a certificate certifying that the conditions specified in Sections 6.1 and 6.2 have been fulfilled.

6.4 Secretary's Certificate. The secretary of the Company shall deliver to the Investor at the Closing a certificate certifying (a) that attached thereto are true and complete copies of the Organizational Documents in effect on the Closing Date, and (b) that attached thereto is a true and complete copy of all resolutions adopted by the Board authorizing the execution, delivery and performance of the Transaction Agreements and the Transaction and that all such resolutions are in full force and effect and are all the resolutions adopted in connection with the transactions contemplated hereby as of the Closing Date.

6.5 Legal Opinion. The Company shall have delivered to the Investor a legal opinion of the Company's counsel in form and substance reasonably satisfactory to the Investor.

6.6 Collaboration Agreement. The Company shall have duly executed and delivered to the Investor the Collaboration Agreement, there shall have been no termination of the Collaboration Agreement that, as of the Closing, has been delivered or is effective.

7. Company's Conditions to Closing. The Company's obligation to issue and sell the Shares at the Closing is subject to the fulfillment as of the Closing of the following conditions (unless waived in writing by the Company):

7.1 Representations and Warranties. The representations and warranties made by the Investor in Section 5 hereof shall be true and correct as of the Closing, except to the extent such representations and warranties are specifically made as of a particular date, in which case such representations and warranties shall be true and correct as of such date.

7.2 Covenants. All covenants and agreements contained in this Agreement to be performed or complied with by the Investor on or prior to the Closing Date shall have been performed or complied with in all material respects.

7.3 Closing Certificate. An executive officer of the Investor shall deliver to the Company at the Closing a certificate certifying that the conditions specified in Sections 7.1 and 7.2 have been fulfilled.

7.4 Collaboration Agreement. The Investor shall have duly executed and delivered to the Company the Collaboration Agreement, and there shall have been no termination of the Collaboration Agreement that, as of the Closing, has been delivered or is effective.

8. Mutual Conditions to Closing. The obligations of the Investor and the Company to consummate the Closing are subject to the fulfillment as of the Closing Date of the following conditions:

8.1 Qualifications. All authorizations, consents, waivers, permits, approvals, qualifications and registrations required to be obtained or effected with any Governmental Authority prior to the Closing, including, without limitation, necessary blue sky permits and qualifications required by any state for the offer and sale to the Investor of the Shares, shall have been obtained and shall be in effect as of the Closing Date and the Company shall provide evidence of such actions promptly upon the request of the Investor.

8.2 Absence of Litigation. There shall be no action, suit, proceeding or investigation by a Governmental Authority pending or currently threatened in writing against the Company or the Investor that questions the validity of any of the Transaction Agreements, the right of the Company or the Investor to enter into any Transaction Agreement or to consummate the transactions contemplated hereby or thereby or which, if determined adversely, would impose substantial monetary damages on the Company or the Investor as a result of the consummation of the transactions contemplated by any Transaction Agreement.

8.3 No Prohibition; Market Listing. (a) No provision of any applicable Law and no judgment, injunction (preliminary or permanent), order or decree that prohibits, makes illegal or enjoins the consummation of the Transaction shall be in effect; and (b) the Common Stock shall be eligible for listing on The Nasdaq Global Select Market.

9. Right to Participate.

9.1 Right to Participate. As long as the Investor owns (together with its Affiliates) not less than [**] percent ([**]%) of the number of Shares the Investor purchased pursuant to Section 2 hereof (adjusted for (i) any stock split, stock dividend, share exchange, merger, consolidation or similar recapitalization and (ii) any Common Stock issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Shares), subject to the terms and conditions of this Section 9 and applicable securities laws, if the Company proposes to offer or sell any shares of Common Stock or any Common Stock Equivalents (the "**New Securities**") other than as set forth in Section 9.2 in a transaction that seeks to raise at least $25,000,000 (excluding amounts from the Investor's participation such transaction) in gross proceeds to the Company (the "**Applicable Offering**"), at least [**] prior to the Expected Pricing Date (as defined below), the Company shall give confidential written notice (the "**Offer Notice**") to the Investor stating (a) its bona fide intention to offer such New Securities, (b) the estimated number of such New Securities to be offered, (c) the expected structure of the proposed offering or sale, and (d) the estimated date on which the Company expects to enter into a definitive agreement for such sale of the New Securities (the "**Expected Pricing Date**"). By written notification to the Company not later than 4:00 pm (New York City time) on the [**] prior to the Expected Pricing Date set forth in the Offer Notice, the Investor may elect to purchase New Securities in an amount up to three and six hundredths percent (3.06 %) of the outstanding shares of Common Stock (for clarity, including the New Securities) of the Company immediately after closing of such offering or sale of the New Securities (the "**Investor Participation Right**"). Such written notification must state the dollar amount, number of New Securities, and/or the desired ultimate ownership of the Company (subject to the share limitation set forth in the previous sentence) reflecting the Investor's elected participation. Such purchase shall be made either (I) upon the same terms and conditions as other purchasers in such offering or (II) in the case of a public offering that is registered under the Securities Act, in a concurrent private placement with such offering exempt from the registration requirements of the Securities Act, but otherwise on the same terms as the shares sold to the public in such offering (including, without limitation, with respect to pricing). Such purchase will be conditioned on the Investor's agreement to execute documents and agreements as may be reasonably requested to effect such sale on such terms. If the Investor does not provide notice of its election to the Company within the time period set forth herein, the Investor shall be deemed to have notified the Company that it does not elect to purchase any New Securities in connection with such Applicable Offering, the Company shall be free to sell such securities in the Applicable Offering and the Investor Participation Right shall terminate along with the ATM Purchase Right in Section 9.3. The Investor shall be entitled to apportion the Investor Participation Right hereby granted to it in such proportions as it deems appropriate, among itself and its Permitted Transferees that are "accredited investors" within the meaning of Rule 501(a) under the Securities Act. The Investor shall have no rights under this Section 9.1 in the event the Investor receives a validly issued ATM Notice as set forth in Section 9.3.

9.2 Limitations. The right to participate set forth in Section 9.1 shall not be applicable to:

(a) securities offered, issued or sold pursuant to an "at-the-market offering" as defined in Rule 415(a)(4) promulgated under the Securities Act (an "**ATM**");

(b) securities issued or issuable in exchange and as consideration pursuant to a *bona fide* acquisition of another corporation or entity by the Company by consolidation, merger, purchase of all or substantially all of the assets, or other *bona fide* reorganization;

(c) securities issued or issuable in exchange and as consideration for the rights obtained in research, collaboration, technology, license, development, marketing, strategic alliance, joint venture or other similar agreements or strategic partnerships;

(d) securities issuable upon conversion of or with respect to any then previously-issued or outstanding securities;

(e) securities issued to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or a real property leasing transaction;

(f) securities issued or issuable for compensatory purposes to employees, officers, directors, contractors, vendors, advisors or consultants of the Company or any of its subsidiaries (whether or not issued pursuant to a Company equity incentive plan);

(g) securities issued as a dividend, stock split or distribution on the Common Stock; and

(h) any right, option or warrant to acquire any securities set forth in Section 9.2(a)-(g) above.

9.3 ATM Purchase Right. As long as the Investor owns (together with its Affiliates) not less than [**] percent ([**]%) of the number of Shares the Investor purchased pursuant to Section 2 hereof (adjusted for (i) any stock split, stock dividend, share exchange, merger, consolidation or similar recapitalization and (ii) any Common Stock issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Shares), subject to the terms and conditions of this Section 9 and applicable securities laws, the Company shall give confidential written notice (the "**ATM Notice**") to the Investor within [**] after completing the sale of at least $25,000,000 of Common Stock from and after the date of this Agreement pursuant to ATMs. The ATM Notice shall include (i) information regarding each sale of Common Stock under ATMs from the date of this Agreement through the date of the ATM Notice (the "**Reference Period**"), including dates of sale, share amounts sold on each date, and the prices at which such shares were sold, (ii) the Company's calculation of the [**] (the "**Average Sale Price**"), and (iii) the then-current number of issued and outstanding shares of Common Stock. If the Investor disputes the Company's calculation of the Average Sale Price, the Company and the Investor shall cooperate in good faith on determining the calculation of the Average Sale Price, which agreed price shall be the Average Sale Price for purposes of this Section 9.3. By written notification to the Company not later than 4:00 pm (New York City time) on the [**] following receipt of the ATM Notice, the Investor may elect to purchase up to three and six hundredths percent (3.06%) of the outstanding shares of Common Stock as of the date of the ATM Notice (for clarity, after giving effect to the purchase of shares pursuant to this ATM Purchase Right) of the Company, at a per share purchase price equal to the Average Sale Price (the "**ATM Purchase Right**"). Such written notification must state the number of shares of Common Stock reflecting the Investor's elected purchase amount. Such purchase shall be made in a private placement exempt from the registration requirements of the Securities Act on substantially the same terms (other than share number and price) as the Shares sold pursuant to Section 2 of this Agreement (excluding Sections 9 and 10.5), and will be conditioned on the Investor's agreement to execute documents and agreements as may be reasonably requested to effect such sale on such terms. If the Investor does not provide notice of its election to the Company within the time period set forth herein, the Investor shall be deemed to have notified the Company that it does not elect to purchase any Common Stock pursuant to the ATM Purchase Right, which shall then terminate along with the Investor Participation Right in Section 9.1. The Investor shall be entitled to apportion the ATM Purchase Right hereby granted to it in such proportions as it deems appropriate, among itself and its Permitted Transferees that are "accredited investors" within the meaning of Rule 501(a) under the Securities Act. The Investor shall have no rights under this Section 9.2 in the event the Investor has elected to purchase Common Stock pursuant to the Investor Participation Right set forth in Section 9.1.

9.4 General Terms.

(a) The rights of the Investor set forth in this Section 9 shall expire upon the earliest to occur of (i) the closing of an Applicable Offering, (ii) the closing of the purchase by the Investor of (or the Investor not electing to purchase) shares of Common Stock pursuant to the ATM Purchase Right or (iii) the closing of a Change of Control of the Company.

(b) The Company and the Investor hereby acknowledge that nothing in this Section 9 constitutes an offer to sell, or the commitment by the Investor to purchase, any New Securities in any financing.

10. Additional Covenants and Agreements.

10.1 Market Listing. The Company shall use commercially reasonable efforts to (a) maintain the listing and trading of the Common Stock on The Nasdaq Global Select Market and (b) effect the listing of the Shares on The Nasdaq Global Select Market.

10.2 Legend Removal. From and after the six (6) month anniversary of the Closing Date and subject to receipt from the Investor by the Company and the transfer agent of customary representations and other documentation reasonably acceptable to the Company and the transfer agent in connection therewith, upon the earliest of such time as the Shares (a) have been sold pursuant to Rule 144 (or similar rule), (b) have been or will be resold under an effective Registration Statement, or (c) are eligible for resale under Rule 144(b)(1) or any successor without the requirement for the Company to be in compliance with the current public information required under Rule 144 as to such Shares and without volume or manner-of-sale restrictions, the Company shall, in accordance with this Section 10.2 and within [**] of any request therefor from the Investor accompanied by such customary and reasonably acceptable documentation referred to above, (i) deliver to the transfer agent irrevocable instructions that the transfer agent shall make a new, unlegended entry for such book entry Shares, and (ii) instruct its counsel to deliver to the transfer agent one or more opinions to the effect that the removal of such legends in such circumstances may be effected under the Securities Act if required by the transfer agent to effect the removal of the legend in accordance with the provisions of this Agreement. Shares subject to legend removal hereunder may be transmitted by the transfer agent to the Investor by crediting the account of the Investor's prime broker with the Depository Trust Company system as directed by such Investor. The Company shall be responsible for the fees of its transfer agent and all Depository Trust Company fees associated with such issuance.

10.3 Book Entry Statement. The Company hereby agrees to deliver to the Investor a book entry statement from the Company's transfer agent showing the Shares registered in the name of the Investor within [**] of the Closing Date.

10.4 Integration. The Company shall not sell, offer for sale or solicit offers to buy or otherwise negotiate in respect of any security (as defined in Section 2 of the Securities Act) that would be integrated with the offer or sale of the Shares in a manner that would require the registration under the Securities Act of the Shares to be issued to the Investor hereunder for purposes of the rules and regulations of any of the following markets or exchanges on which the Common Stock of the Company is listed or quoted for trading on the date in question (including the OTC Markets Group, the OTC Bulletin Board, The Nasdaq Capital Market, The Nasdaq Global Market, The Nasdaq Global Select Market, the NYSE American or the New York Stock Exchange), such that it would require stockholder approval prior to the closing of such other transaction unless stockholder approval is obtained before the closing of such subsequent transaction.

10.5 Standstill. During the Standstill Term, neither the Investor nor any of its Affiliates (collectively, the "**Standstill Parties**") shall (and the Investor shall cause its Affiliates not to) in any manner, directly or indirectly, except as expressly approved or invited in advance in writing by the Company or as provided under Section 9:

(a) effect, offer or propose (whether publicly or otherwise) to effect, or participate in or knowingly encourage any other person to effect, offer or propose (whether publicly or otherwise) (i) any acquisition of any Common Stock, Common Stock Equivalents or other voting securities (or beneficial ownership of any of the foregoing, including derivative securities that give the Investor or any of its Affiliates the economic equivalent of ownership of an amount of Common Stock, Common Stock Equivalents or other voting securities) of the Company, or any rights to acquire any such Common Stock, Common Stock Equivalents or other voting securities; (ii) any purchase of the Company's assets or businesses (other than as may be contemplated by the Collaboration Agreement), (iii) any tender or exchange offer, merger or other business combination involving the Company; (iv) any recapitalization, restructuring, liquidation, dissolution or other similar extraordinary transaction with respect to the Company; or (v) any "solicitation" of "proxies" (as such terms are used in the proxy rules of the SEC) or written consents for any voting securities of the Company;

(b) form, join or in any way participate in a 13D Group with respect to the beneficial ownership of any Common Stock, Common Stock Equivalents or other voting securities of the Company;

(c) otherwise act, alone or in concert with others, to seek to control the Board;

(d) agree or offer to take, or encourage or propose (publicly or otherwise) the taking of, any action referred to in clause (a), (b) or (c) of this Section 10.5; or

(e) enter into any discussions, negotiations, agreements or arrangements with any Third Party with respect to any of the foregoing.

Notwithstanding anything to the contrary contained in this Agreement, (i) the foregoing restrictions set forth in this Section 10.5 shall terminate and be of no further force or effect if at any time (A) a Third Party enters into an agreement with the Company contemplating a Change of Control, including a merger, consolidation or other business combination transaction or tender offer related thereto, or the purchase of all or substantially all of the assets of the Company and its subsidiary, or publicly announces its intention to do so, (B) a Third Party commences a tender or exchange offer that, if consummated, would result in a Change of Control and within [**] after the commencement of such tender or exchange offer, the Company's Board has not publicly taken a position rejecting such tender or exchange offer and recommending that the stockholders of the Company not tender any equity securities of such party into such tender or exchange offer, (C) any Third Party becomes the beneficial owner of [**]% or more of the Company's outstanding Common Stock, or (D) the Company publicly announces its engagement in discussions or negotiations with a Third Party with respect to a merger, consolidation, or business combination, tender or exchange offer for [**]% or more of the Company's outstanding Common Stock, sale of [**]% or more of the Company's consolidated assets, other transaction involving the Company that results in a Third Party acquiring beneficial ownership of [**]% or more of the Common Stock of the Company when aggregated with all other shares of Common Stock held by such Third Party, or any recapitalization, restructuring, liquidation or other extraordinary transaction with respect to the Company (any of these transactions (including any series of transactions having the same purpose or effect), an "**Alternative Transaction**") or the Company publicly announces its exploration of strategic alternatives or a potential sale or Change of Control, (ii) the Investor and its Affiliates shall not be precluded from (A) acquiring securities of, or from entering into any merger or other business combination with, another Person that beneficially owns securities of the Company; provided, that the purpose of entering into such transaction is not to circumvent the terms in this Section 10.5, or (B) owning or acquiring interests in mutual funds or similar entities that own capital stock of the Company, (iii) nothing in this Agreement shall prohibit passive investments by pension or employee benefit plans of the Investor or its Affiliates, (iv) the Investor shall be permitted to make one or more confidential proposals to the Board with respect to any of the matters set forth in this Section 10.5, and (v) the Investor shall not be prevented from participating in any dividends, distributions or other rights granted to holders of Common Stock or Common Stock Equivalents generally. [**].

11. Registration Rights. If, upon or after the six (6) month anniversary of the Closing Date, the Investor (a) becomes an "affiliate" of the Company within the meaning of Rule 144 or (b) holds 10% or more of the outstanding Common Stock, the Investor shall be entitled to the registration rights set forth in this Section 11 for so long as the Investor remains an "affiliate" of the Company or holds 10% or more of the outstanding Common Stock.

11.1 Demand Registration.

(a) Subject to the provisions hereof, the Investor and any Permitted Transferee of the Investor (each a "**Holder**") holding, collectively, a majority of the Registrable Securities then outstanding shall have the right to require the Company to file a Registration Statement (a "**Demand Request**") registering for sale all or part of the Registrable Securities under the Securities Act (a "**Demand Registration**") by delivering a written request therefor to the Company (i) specifying the number of Registrable Securities to be included in such registration by such Holder or Holders, (ii) specifying whether the intended method of disposition thereof is pursuant to an underwritten public offering of Common Stock by the Company (an "**Underwritten Offering**"), and (iii) containing all information about such Holder required to be included in such Registration Statement in accordance with applicable Law. The Company shall use commercially reasonable efforts to effect such registration (including, without limitation, appropriate qualification under applicable blue sky or other state securities Laws and appropriate compliance with applicable regulations issued under the Securities Act and any other governmental requirements or regulations) of the Registrable Securities that the Company has been so requested to register as soon as practicable (and in any case by the applicable Filing Date); provided, however, that the Company shall not be obligated to effect any Demand Registration upon receipt of a Demand Request pursuant to this Section 11.1(a) if:

(i) the Company has, within the twelve (12) month period preceding the date of the Demand Request, already effected [**] Demand Registrations for any Holder pursuant to this Section 11.1(a);

(ii) in the event that the market value of the Registrable Securities proposed to be included in the registration, based on the average closing price during the [**] trading days period prior to the making the Demand Registration, is less than the lesser of (x) $[**] and (y) the total market value of Registrable Securities outstanding; and

(iii) at any time during the period between the Company's receipt of the Demand Request and the completion of the Demand Registration, any Holder is in breach of or has failed to cause its Affiliates to comply with the obligations and restrictions of Section 10.5 of this Agreement, the Company has provided notice of such breach to a Holder and such breach or failure is ongoing and has not been remedied.

(b) If the offering of the Registrable Securities pursuant to such Demand Registration is an Underwritten Offering, (i) the Company shall select the underwriter(s) of the Underwritten Offering, subject to the approval of the Holders of a majority of the Registrable Securities to be sold in the Underwritten Offering, such approval not to be unreasonably withheld, conditioned or delayed, and (ii) the Company shall (together with the Holders proposing to distribute their securities through such underwriting) enter into an underwriting agreement in customary form for underwriting agreements for firm commitment offerings by a selling holder of equity securities with the managing underwriter(s) proposing to distribute their securities through such Underwritten Offering; provided, that (i) the representations and warranties by, and the other agreements on the part of, the Company to and for the benefit of the underwriter(s) shall also be made to and for the benefit of the Holders proposing to distribute their securities through the Underwritten Offering, (ii) no Holder shall be required to make any representations and warranties to, or agreements with, any underwriter in a registration other than customary representations, warranties and agreements and (iii) the liability of each Holder in respect of any indemnification, contribution or other obligation of such Holder arising under such underwriting agreement (a) shall be limited to losses arising out of or based upon an untrue statement or alleged untrue statement or omission or alleged omission made in such Registration Statement, any such preliminary Prospectus, final Prospectus, summary Prospectus, amendment or supplement, incorporated document or other such disclosure document or other document or report, in reliance upon and in conformity with written information furnished to the Company by or on behalf of such Holder expressly for inclusion therein and (b) shall not in any event, absent fraud or intentional misrepresentation, exceed an amount equal to the net proceeds to such Holder (after deduction of all underwriters' discounts and commissions) from the disposition of the Registrable Securities disposed of by such Holder pursuant to such Underwritten Offering.

(c) If, in connection with a Demand Registration in the form of an Underwritten Offering, the managing underwriter(s) give written advice to the Company of the number of securities to which such registration should, in the opinion of the managing underwriter(s) of such registration, in light of marketing factors, be limited (an "**Underwriters' Maximum Number**"), then the Company shall (i) so advise all Holders of Registrable Securities to be included in such Underwritten Offering and (ii) include in such registration the number of securities requested to be included in such registration by all Holders of Registrable Securities to be included in such Underwritten Offering, pro rata on the basis of the aggregate number of Registrable Securities requested to be included by each such Holder, and, subject to the conditions set forth in Section 11.7 hereto, on a *pari passu* basis with the holders of contractual registration rights provided under the Second Amended and Restated Investors' Rights Agreement dated as of January 9, 2020 by and among the Company and the other parties thereto (the "**Prior Holders**").

(d) A registration will not be deemed to have been effected as a Demand Registration unless the Registration Statement relating thereto has been declared effective by the SEC, and at least [**] percent ([**]%) of the Registrable Securities requested to be included in the registration by the Holders are included in such registration, and the Company has complied in all material respects with its obligations under this Agreement with respect thereto; provided, however, that if, after it has become effective, (i) such Registration Statement or the related offer, sale or distribution of Registrable Securities thereunder is or becomes the subject of any stop order, injunction or other order or requirement of the SEC or any other governmental or administrative agency, or if any court prevents or otherwise limits the sale of the Registrable Securities pursuant to the registration (each, an "**Interference**"), which Interference does not result from any act or omission of any Holder whose Registrable Securities are registered pursuant to such Registration Statement and is not cured within [**] thereof, and (ii) in each case less than [**] percent ([**]%) of the Registrable Securities covered by the effective Registration Statement are actually sold by the selling Holder or Holders pursuant to the Registration Statement, then such registration will be deemed not to have been effected for purposes of the last sentence of Section 11.1(a). If (i) a registration requested pursuant to this Section 11.1 is deemed not to have been effected as a Demand Registration or (ii) the registration requested pursuant to this Section 11.1 does not remain continuously effective until the completion of the distribution by the Holders of the Registrable Securities covered by such registration, then the Company shall continue to be obligated to effect a Demand Registration pursuant to this Section 11.1 of the Registrable Securities included in such registration, except as otherwise provided herein. In circumstances not including the events described in the immediately two preceding sentences of this Section 11.1(d), each Holder of Registrable Securities shall be permitted voluntarily to withdraw all or any part of its Registrable Securities from a Demand Registration at any time prior to the commencement of marketing of such Demand Registration, provided that such registration nonetheless shall count as a Demand Registration for purposes of the last sentence of Section 11.1(a).

11.2 Registration Expenses. In connection with registrations pursuant to Section 11.1 or Section 11.1(d) hereof, the Company shall pay all of the costs and expenses incurred by the Company in connection with the registrations thereunder (the "**Registration Expenses**"), including all (i) registration and filing fees and expenses, including, without limitation, those related to filings with the SEC, (ii) fees and expenses of compliance with state securities or blue sky Laws (including reasonable fees and disbursements of counsel in connection with blue sky qualifications of the Registrable Securities), (iii) reasonable processing, duplicating and printing expenses, including expenses of printing Prospectuses reasonably requested by any Holder, (iv) the Company's internal expenses (including, without limitation, all salaries and expenses of its officers and employees performing legal or accounting duties, the expense of any liability insurance and the expense of any annual audit or quarterly review), (v) fees and expenses incurred in connection with listing the Registrable Securities for trading on a national securities exchange, (vi) fees and expenses in connection with the preparation of the registration statement and related documents covering the Registrable Securities, (vii) fees and expenses, if any, incurred with respect to any filing with FINRA, (viii) any documented out-of-pocket expenses of the underwriter(s) incurred with the approval of the Company, (ix) the cost of providing any CUSIP or other identification numbers for the Registrable Securities, (x) fees and expenses and disbursements of counsel for the Company and fees and expenses for independent certified public accountants retained by the Company (including, without limitation, the expenses of any comfort letters or costs associated with the delivery by independent certified public accountants of a comfort letter or comfort letters requested), (xi) fees and expenses of any special experts retained by the Company in connection with such registration, and (xii) reasonable and documented fees and expenses of one firm of counsel for the Holders to be selected by the Holders of a majority of the Registrable Securities to be included in such registration ("**Holders' Counsel**"), such fees and expenses not to exceed $[**] per registration. Notwithstanding the foregoing, the Holders shall be responsible, on a pro rata basis based on the number of Registrable Securities included in the applicable registered offering by each such Holder, for any underwriting discounts, commissions and share transfer fees attributable to the sale of Registrable Securities pursuant to a Registration Statement and any other out-of-pocket expenses of the Holders not required to be paid by the Company pursuant to this Section 11.2. The obligation of the Company to bear the expenses described in this Section 11.2 and to pay or reimburse the Holders for the expenses described in this Section 11.2 shall apply irrespective of whether any sales of Registrable Securities ultimately take place; provided, however, that the Company shall not be required to pay any expenses of any Demand Registration if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses on a pro rata basis based on the number of Registrable Securities included in the applicable registered offering by each such Holder).

11.3 Registration Procedures. In the case of each registration effected by the Company pursuant to this Agreement, the Company shall keep each Holder advised in writing as to the initiation of each registration and as to the completion thereof. In connection with any such registration:

(a) The Company will, within forty-five (45) days after its receipt of the request for registration under Section 11.1(a), prepare and file with the SEC a Registration Statement on Form S-3 or another appropriate Securities Act form reasonably acceptable to the Holders, and use commercially reasonable efforts to cause such Registration Statement to become and remain effective until the completion of the distribution contemplated thereby.

(b) The Company will (i) promptly prepare and file with the SEC such amendments to each Registration Statement as may be necessary to keep such Registration Statement effective for as long as such registration is required to remain effective pursuant to the terms hereof, (ii) cause the Prospectus to be supplemented by any required Prospectus supplement, and, as so supplemented, to be filed pursuant to Rule 424 under the Securities Act, and (iii) comply with the provisions of the Securities Act applicable to it with respect to the disposition of all Registrable Securities covered by such Registration Statement during the applicable period in accordance with the intended methods of disposition by the Holders set forth in such Registration Statement or supplement to the Prospectus.

(c) The Company will, at least [**] prior to filing a Registration Statement or Prospectus or any amendment or supplement to such Registration Statement or Prospectus, furnish to (i) each Holder of Registrable Securities covered by such Registration Statement, (ii) Holders' Counsel and (iii) each underwriter of the Registrable Securities covered by such Registration Statement, copies of such Registration Statement and each amendment or supplement as proposed to be filed, together with any exhibits thereto, which documents will be subject to reasonable review and comment by each of the foregoing Persons, and thereafter, furnish to such Holders, Holders' Counsel and the underwriter(s), if any, such number of copies of such Registration Statement, each amendment and supplement thereto (in each case including all exhibits thereto and documents incorporated by reference therein), the Prospectus included in such Registration Statement (including each preliminary Prospectus) in conformity with the requirements of the Securities Act, and such other documents or information as such Holder, Holders' Counsel or the underwriter(s) may reasonably request in order to facilitate the disposition of the Registrable Securities in accordance with the plan of distribution set forth in the Prospectus included in the Registration Statement.

(d) The Company shall furnish to each Holder a copy of all documents filed with and all correspondence from or to the SEC in connection with the offering of Registrable Securities.

(e) The Company will promptly notify each Holder of any stop order issued or threatened by the SEC and, if entered, use commercially reasonable efforts to prevent the entry of such stop order or to remove it as soon as reasonably possible.

(f) On or prior to the date on which the Registration Statement is declared effective, the Company shall use commercially reasonable efforts to register or qualify such Registrable Securities under such other securities or blue sky Laws of such jurisdictions as any Holder reasonably requests and use commercially reasonable efforts to keep each such registration or qualification (or exemption therefrom) effective during the period which the Registration Statement is required to be kept effective pursuant to the terms hereof; provided that the Company will not be required to (i) qualify generally to do business in any jurisdiction where it would not otherwise be required to qualify but for this paragraph (f), (ii) subject itself to taxation in any such jurisdiction or (iii) consent to general service of process in any such jurisdiction.

(g) The Company will notify each Holder, Holders' Counsel and the underwriter(s) promptly, (i) when a Prospectus or any Prospectus supplement or post-effective amendment has been filed and, with respect to a Registration Statement or any post-effective amendment, when the same has become effective, (ii) of any request by the SEC or any other federal or state governmental authority for amendments or supplements to a Registration Statement or Prospectus or for additional information to be included in any Registration Statement or Prospectus or otherwise, (iii) of the issuance by any state securities commission or other regulatory authority of any order suspending the qualification or exemption from qualification of any of the Registrable Securities under state securities or blue sky Laws or the initiation of any proceedings for that purpose, and (iv) of the happening of any event that requires the making of any changes in a Registration Statement or related Prospectus or any document incorporated or deemed to be incorporated by reference therein so that they will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements in the Registration Statement and Prospectus not misleading in the light of the circumstances in which they were made; and, as promptly as practicable thereafter, prepare and file with the SEC and furnish a supplement or amendment to such Prospectus so that, as thereafter deliverable to the purchasers of such Registrable Securities, such Prospectus will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(h) The Company and the Holders will furnish customary closing certificates and other deliverables to the underwriter(s) (including, if applicable, an underwriting agreement in customary form, including customary representations and warranties to the underwriter(s) regarding the offering documents, the Company's business operations and other customary matters, and customary provisions with respect to indemnification and contribution) and take such other actions as are reasonably required in order to expedite or facilitate the disposition of the Registrable Securities; provided, however, that no Holder (or any of their assignees) shall be required to make any representations, warranties or indemnities except as they relate to such Holder's ownership of Common Stock and authority to enter into the underwriting agreement and to such Holder's intended method of distribution, and the liability of such Holder shall be several and not joint, and limited to an amount equal to the net proceeds from the offering received by such Holder.

(i) The Company will, if necessary, appoint a transfer agent and registrar for all Registrable Securities covered by a registration statement not later than the effective date of such registration statement.

(j) Subject to each Holder to whom the comfort letter is addressed providing a customary representation letter to the independent registered public accounting firm of the Company in form and substance reasonably satisfactory to such accountants, the Company shall (i) use its commercially reasonable efforts to obtain customary "comfort" letters from such accountants (to the extent deliverable in accordance with their professional standards) addressed to the Holders (to the extent consistent with the Statement on Auditing Standards No. 72 of the American Institute of Certified Public Accountants) and the managing underwriter(s), if any, in customary form and covering matters of the type customarily covered in "comfort" letters in connection with underwritten offerings and (ii) use its commercially reasonable efforts to obtain opinions of counsel to the Company and updates thereof covering matters customarily covered in opinions of counsel in connection with underwritten offerings, addressed to the Holders and the managing underwriter(s), if any, provided that the delivery of any "10b-5 statement" and opinion may be conditioned on the prior or concurrent delivery of a comfort letter pursuant to subsection (i) above.

(k) The Company shall use commercially reasonable efforts to cause all Registrable Securities registered pursuant to the terms hereof to be listed on each national securities exchange on which the Common Stock is then listed.

(l) The Company shall use commercially reasonable efforts to cooperate and assist in obtaining of all necessary approvals from FINRA, if any.

(m) The Company otherwise shall use its commercially reasonable efforts to comply with all applicable rules and regulations of the SEC.

(n) To the extent the Company is a WKSI at the time any request for registration pursuant to Section 11.1 is submitted to the Company, which requests that the Company file an automatic shelf registration statement (as defined in Rule 405 under the Securities Act) (an "**automatic shelf registration statement**") on Form S-3, the Company shall file an automatic shelf registration statement that covers those Registrable Securities which are requested to be registered. If the Company does not pay the filing fee covering the Registrable Securities at the time the automatic shelf registration statement is filed, the Company agrees to pay such fee at such time or times as the Registrable Securities are sold.

(o) If at any time when the Company is required to re-evaluate its WKSI status for purposes of an outstanding automatic shelf registration statement used to effect a request for registration in accordance with Section 11.1(d) the Company determines that it is not a WKSI and (i) the registration statement is required to be kept effective in accordance with this Agreement and (ii) the registration rights of the applicable Holders have not terminated, use reasonable best efforts to promptly amend the registration statement on a form the Company is then eligible to use or file a new registration statement on such form, and keep such registration statement effective in accordance with the requirements otherwise applicable under this Agreement.

11.4 Holders' Obligations. The Company may require each Holder to promptly furnish in writing to the Company such information as the Company may from time to time reasonably request in connection with the distribution of the Registrable Securities and such other information as may be legally required in connection with such registration, including all such information as may be requested by the SEC. Each Holder agrees that, notwithstanding the provisions of Section 11.5 hereof, upon receipt of any notice from the Company of the happening of any event of the kind described in Section 11.3(g) hereof, such Holder will forthwith discontinue disposition of Registrable Securities pursuant to the Registration Statement covering such Registrable Securities until such Holder's receipt of the copies of the supplemented or amended Prospectus contemplated by Section 11.3(g) hereof, and, if so directed by the Company, such Holder will deliver to the Company all copies, other than permanent file copies then in such Holder's possession and retained solely in accordance with record retention policies then-applicable to such Holder, of the most recent Prospectus covering such Registrable Securities at the time of receipt of such notice.

11.5 Blackout Provisions. Notwithstanding anything in this Agreement to the contrary, by delivery of written notice to the participating Holders (a "**Suspension Notice**") stating which one or more of the following limitations shall apply to the addressee of such Suspension Notice, the Company may (i) postpone effecting a registration under this Agreement, or (ii) require such addressee to refrain from disposing of Registrable Securities under the registration, in either case for a period of no more than [**] from the delivery of such Suspension Notice (which period may not be extended or renewed). The Company may postpone effecting a registration or apply the limitations on dispositions specified in clause (ii) of this Section 11.5 if (x) within [**] of receipt of a request for Demand Registration under Section 11.1(a), the Company has a good faith expectation to file a registration statement for the public offering of securities for the account of the Company, provided, that the Company is actively employing good faith efforts to cause such registration statement to become effective, (y) the Board, in good faith, determines that such registration or disposition would materially impede, delay or interfere with any material transaction then pending or proposed to be undertaken by the Company or any of its subsidiaries, or (z) the Company in good faith determines that the Company is in possession of material non-public information the disclosure of which during the period specified in such notice the Board, in good faith, reasonably believes would be materially detrimental to the Company; provided, that the Company may not take any actions pursuant to this Section 11.5 more than [**] in any [**] period.

11.6 Indemnification.

(a) Indemnification by the Company. The Company agrees to indemnify and hold harmless each Holder including Registrable Securities in any registration statement filed pursuant to this Section 11 and each of its officers, directors, employees and agents, and each Person, if any, who controls such Holder within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, together with the officers, directors, employees and agents of such controlling Person (each, a "**Controlling Person**"), from and against any and all losses, claims, damages, settlement amounts (only if the Company consented in writing to the settlement, which consent shall not be unreasonably withheld), liabilities, reasonable attorneys' fees, costs and expenses of investigating and defending any such claim (collectively, "**Damages**") and any action in respect thereof to which such Holder, its Controlling Persons and their respective officers, directors, employees and agents may become subject to under the Securities Act or otherwise, insofar as such Damages (or proceedings in respect thereof) arise out of, or are based upon, any untrue statement or alleged untrue statement of a material fact contained in any Registration Statement or Prospectus (or any amendment or supplement thereto) or any preliminary Prospectus of the Company, or arise out of, or are based upon, any omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading in the light of the circumstances in which they were made, except insofar as (i) the same are based upon information furnished in writing to the Company by such Holder, any of its Controlling Persons, or any of their respective officers, directors, employees and agents expressly for use therein, and (ii) any Damages are caused by such Holder's disposition of Registrable Securities during any period during which such Holder is obligated to discontinue any disposition of Registrable Securities as a result of any stop order suspending the effectiveness of any Registration Statement or Prospectus with respect to Registrable Securities of which such Holder has received written notice from the Company. In addition to the indemnity contained herein, the Company will reimburse each such Person intended to be indemnified by this Section 11.6(a) for its reasonable out-of-pocket legal and other expenses (including the reasonable out-of-pocket cost of any investigation, preparation and travel in connection therewith) as reasonably incurred in investigating or defending or preparing to defend against any such Damages or proceedings, as promptly as practicable after such expenses are incurred and invoiced.

(b) Indemnification by the Holders. Each Holder agrees, severally and not jointly, to indemnify and hold harmless the Company, its officers, directors, employees and agents and each Person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, together with the officers, directors, employees and agents of such Controlling Person, to the same extent as the foregoing indemnity from the Company to each Holder, but only with respect to information related to such Holder, its Controlling Persons or its plan of distribution, furnished in writing by such Holder, its Controlling Persons or any of their respective officers, directors, employees and agents to the Company expressly for use in any Registration Statement or Prospectus, or any amendment or supplement thereto, or any preliminary Prospectus. In addition to the indemnity contained herein, such Holder will reimburse each such Person intended to be indemnified by this Section 11.6(b) for its reasonable out-of-pocket legal and other expenses (including the reasonable out-of-pocket cost of any investigation, preparation and travel in connection therewith) as reasonably incurred in investigating or defending or preparing to defend against any such Damages or proceedings , as promptly as practicable after such expenses are incurred and invoiced.

(c) Conduct of Indemnification Proceedings. Promptly after receipt by any Person entitled to indemnification pursuant to Section 11.6(a) or Section 11.6(b) (an "**Indemnified Party**") of notice of any claim or the commencement of any action in respect of which indemnity may be sought pursuant to Section 11.6(a) or Section 11.6(b), the Indemnified Party shall, if a claim in respect thereof is to be made against the Person against whom such indemnity may be sought (an "**Indemnifying Party**"), notify the Indemnifying Party in writing of the claim or the commencement of such action; provided, that the failure to notify the Indemnifying Party shall not relieve it from any liability that it may have to an Indemnified Party other than under Section 11.6(a) or Section 11.6(b) except to the extent of any actual prejudice resulting therefrom. If any such claim or action shall be brought against an Indemnified Party, and it shall notify the Indemnifying Party thereof, the Indemnifying Party shall be entitled to participate therein, and, to the extent that it wishes, jointly with any other similarly notified Indemnifying Party, to assume the defense thereof with counsel reasonably satisfactory to the Indemnified Party. After notice from the Indemnifying Party to the Indemnified Party of its election to assume the defense of such claim or action, the Indemnifying Party shall not be liable to the Indemnified Party for any legal or other expenses subsequently incurred by the Indemnified Party in connection with the defense thereof other than reasonable costs of investigation; provided, that the Indemnified Party shall have the right to employ separate counsel to represent the Indemnified Party and its Controlling Persons who may be subject to liability arising out of any claim in respect of which indemnity may be sought by the Indemnified Party against the Indemnifying Party, but the fees and expenses of such counsel shall be for the account of such Indemnified Party unless (i) the Indemnifying Party and the Indemnified Party shall have mutually agreed to the retention of, and reimbursement of fees for, such counsel or (ii) in the reasonable opinion of counsel to such Indemnified Party representation of both parties by the same counsel would be inappropriate due to actual or potential conflicts of interest between them, it being understood, however, that the Indemnifying Party shall not, in connection with any one such claim or action or separate but substantially similar or related claims or actions in the same jurisdiction arising out of the same general allegations or circumstances, be liable for the fees and expenses of more than one separate firm of attorneys (together with appropriate local counsel) at any time for all Indemnified Parties. No Indemnifying Party shall, without the prior written consent of the Indemnified Party, effect any settlement of any claim or pending or threatened proceeding in respect of which the Indemnified Party is or would reasonably have been a party and indemnity would reasonably have been sought hereunder by such Indemnified Party, unless such settlement includes an unconditional release of such Indemnified Party from all liability arising out of such claim or proceeding. Whether or not the defense of any claim or action is assumed by the Indemnifying Party, such Indemnifying Party will not be subject to any liability for any settlement made without its written consent.

11.7 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not enter into any agreement granting any holder or prospective holder of any Company securities registration rights with respect to such securities under the Securities Act or the Exchange Act that would conflict with or adversely affect any of the rights provided to the Investor in this Section 11 without the prior written consent of the Holders of a majority of the Registrable Securities then outstanding, unless such registration rights are *pari passu* with respect to the cut-back provisions contained in this Section 11.

11.8 Assignment of Registration Rights. The rights to cause the Company to register any Registrable Securities pursuant to this Agreement may be assigned in whole or in part (but only with all restrictions and obligations set forth in this Agreement) by a Holder to a Permitted Transferee which acquires Registrable Securities from such Holder; provided, however, (a) such Holder shall, within [**] prior to such transfer, furnish to the Company written notice of the name and address of such Permitted Transferee, details of its status as a Permitted Transferee and details of the Registrable Securities with respect to which such registration rights are being assigned, (b) the Permitted Transferee, prior to or simultaneously with such transfer or assignment, shall agree in writing to be subject to and bound by all restrictions and obligations set forth in this Agreement, (c) the Investor shall continue to be bound by all restrictions and obligations set forth in this Agreement and (d) such transfer or assignment shall be effective only if immediately following such transfer or assignment the further disposition of such Registrable Securities by the Permitted Transferee is restricted under the Securities Act and other applicable securities Law.

11.9 Term and Termination. The Investor's rights to demand the registration of the Registrable Securities under this Section 11, as well as the Company's obligations hereunder other than pursuant to Section 11.6, shall terminate automatically once all Registrable Securities cease to be Registrable Securities.

12. Miscellaneous.

12.1 Governing Law; Submission to Jurisdiction. This Agreement shall be governed by and construed in accordance with the Laws of the State of Delaware, without regard to the conflict of laws principles thereof that would require the application of the Law of any other jurisdiction. Any action brought, arising out of, or relating to this Agreement shall be brought in the Court of Chancery of the State of Delaware. Each party hereby irrevocably submits to the exclusive jurisdiction of said Court in respect of any claim relating to the validity, interpretation and enforcement of this Agreement, and hereby waives, and agrees not to assert, as a defense in any action, suit or proceeding in which any such claim is made that it is not subject thereto or that such action, suit or proceeding may not be brought or is not maintainable in such courts, or that the venue thereof may not be appropriate or that this agreement may not be enforced in or by such courts. The parties hereby consent to and grant the Court of Chancery of the State of Delaware jurisdiction over such parties and over the subject matter of any such claim and agree that mailing of process or other papers in connection with any such action, suit or proceeding in the manner provided in Section 12.3 or in such other manner as may be permitted by law, shall be valid and sufficient thereof. For the avoidance of doubt, the parties hereby acknowledge that the arbitration provisions in the Collaboration Agreement shall not apply to any action brought, arising out of, or relating to this Agreement.

12.2 Waiver. Waiver by a party of a breach hereunder by the other party shall not be construed as a waiver of any subsequent breach of the same or any other provision. No delay or omission by a party in exercising or availing itself of any right, power or privilege hereunder shall preclude the later exercise of any such right, power or privilege by such party. No waiver shall be effective unless made in writing with specific reference to the relevant provision(s) of this Agreement and signed by a duly authorized representative of the party granting the waiver.

12.3 Notices. Any notice required or permitted to be given under this Agreement will be in writing and will be deemed to have been sufficiently given if delivered in person, sent by email or delivered by express courier service (signature required) to the party to which it is directed at its address set forth on Exhibit A attached hereto or such other address as such party will have last given by notice to the other party. Notices will be deemed effective (a) the next day if sent by express courier service, or (b) on the date sent if sent by email and no delivery failure notification has been received, except any notice sent after 5:00 p.m. (Eastern Time) on a Business Day or on a non-Business Day will be deemed to have been received on the next Business Day. Either Party may change its address for purposes hereof by written notice to the other in accordance with the provisions of this Section 12.3.

12.4 Entire Agreement. This Agreement and the Collaboration Agreement, including the signature pages and Exhibits, contain the entire agreement among the parties with respect to the subject matter hereof and thereof and supersede all prior and contemporaneous arrangements or understandings, whether written or oral, with respect hereto and thereto.

12.5 Amendments. No provision in this Agreement shall be supplemented, deleted or amended except in a writing executed by an authorized representative of each of the Investor and the Company.

12.6 Headings; Nouns and Pronouns; Section References. Headings in this Agreement are for convenience of reference only and shall not be considered in construing this Agreement. Whenever the context may require, any pronouns used herein shall include the corresponding masculine, feminine or neuter forms, and the singular form of names and pronouns shall include the plural and vice-versa. References in this Agreement to a section or subsection shall be deemed to refer to a section or subsection of this Agreement unless otherwise expressly stated.

12.7 Severability. If, under applicable Laws, any provision hereof is invalid or unenforceable, or otherwise directly or indirectly affects the validity of any other material provision(s) of this Agreement in any jurisdiction ("**Modified Clause**"), then, it is mutually agreed that this Agreement shall endure and that the Modified Clause shall be enforced in such jurisdiction to the maximum extent permitted under applicable Laws in such jurisdiction; provided that the parties shall consult and use all reasonable efforts to agree upon, and hereby consent to, any valid and enforceable modification of this Agreement as may be necessary to avoid any unjust enrichment of either party and to match the intent of this Agreement as closely as possible, including the economic benefits and rights contemplated herein.

12.8 Assignment. Except for an assignment by the Investor of this Agreement or any rights hereunder to an Affiliate in connection with a transfer of the Shares by the Investor to an Affiliate of the Investor in compliance with the terms of Section 9 of this Agreement, neither this Agreement nor any of the rights or obligations hereunder may be assigned by either the Investor or the Company without (a) the prior written consent of the Company in the case of any assignment by the Investor or (b) the prior written consent of the Investor in the case of an assignment by the Company.

12.9 Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

12.10 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but which together shall constitute one and the same instrument. Counterparts may be signed or delivered by facsimile or electronically scanned signature page.

12.11 Third Party Beneficiaries. None of the provisions of this Agreement shall be for the benefit of or enforceable by any Third Party, including any creditor of any party hereto, except that each Affiliate of the Investor is an express third-party beneficiary entitled to enforce this agreement directly against the Company. No Third Party shall obtain any right under any provision of this Agreement or shall by reason of any such provision make any claim in respect of any debt, liability or obligation (or otherwise) against any party hereto.

12.12 No Strict Construction. This Agreement has been prepared jointly and will not be construed against either party.

12.13 Survival of Warranties. The representations and warranties of the Company and the Investor contained in this Agreement shall survive the Closing and shall in no way be affected by any investigation or knowledge of the subject matter thereof made by or on behalf of the Investor or the Company. The parties hereby acknowledge and agree that the rights of the parties hereunder are special, unique and of extraordinary character, and that if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, such refusal or failure would result in irreparable injury to the Company or the Investor as the case may be, the exact amount of which would be difficult to ascertain or estimate and the remedies at law for which would not be reasonable or adequate compensation. Accordingly, if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, then, in addition to any other remedy which may be available to any damaged party at law or in equity, such damaged party will be entitled to seek specific performance and injunctive relief, without posting bond or other security, and without the necessity of proving actual or threatened damages, which remedy such damaged party will be entitled to seek in any court of competent jurisdiction.

12.14 Remedies. The rights, powers and remedies of the parties under this Agreement are cumulative and not exclusive of any other right, power or remedy which such parties may have under any other agreement or Law. No single or partial assertion or exercise of any right, power or remedy of a party hereunder shall preclude any other or further assertion or exercise thereof.

12.15 Expenses. Each party shall pay its own fees and expenses in connection with the preparation, negotiation, execution and delivery of the Transaction Agreements.

(*Signature Page Follows*)

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement as of the date first above written.

MODERNATX, INC.
By: /s/ Said Francis
Name: Said Francis
Title: SVP, Business Development and Corporate Strategy

GENERATION BIO CO.
By: /s/ Geoff McDonough, M.D.
Name: Geoff McDonough, M.D.
Title: President and Chief Executive Officer

EXHIBIT A

NOTICES

(a) If to the Investor:

ModernaTX, Inc.
200 Technology Square
Cambridge, MA 01239
Attn: [**]

with a copy to:

[**]

(b) If to the Company:

Generation Bio Co.
301 Binney Street
Cambridge, MA 02142
Attention: [**]

with a copy to:

Wilmer Cutler Pickering Hale and Dorr LLP
60 State Street
Boston, MA 02109
Attention: Stuart Falber, Esq.
Molly Fox, Esq.
Email: stuart.falber@wilmerhale.com; molly.fox@wilmerhale.com

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Geoff McDonough, hereby certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Generation Bio Co.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a15(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 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: May 10, 2023

/s/ Geoff McDonough

Geoff McDonough, M.D.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Matthew Norkunas, hereby certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Generation Bio Co.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a15(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 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: May 10, 2023

/s/ Matthew Norkunas

Matthew Norkunas, M.D., M.B.A.
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Geoff McDonough, certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge, the Quarterly Report on Form 10-Q of Generation Bio Co. for the quarter ended March 31, 2023 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and the information contained in such Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of Generation Bio Co.

/s/ Geoff McDonough

Geoff McDonough, M.D.
President and Chief Executive Officer
(Principal Executive Officer)
May 10, 2023

Exhibit 32.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Matthew Norkunas, certify pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge, the Quarterly Report on Form 10-Q of Generation Bio Co. for the quarter ended March 31, 2023 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and the information contained in such Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of Generation Bio Co.

/s/ Matthew Norkunas

Matthew Norkunas, M.D., M.B.A.
Chief Financial Officer
(Principal Financial and Accounting Officer)
May 10, 2023