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

FORM 10-Q

(Mark One)

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

For the quarterly period ended June 30, 2020

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 000-30171

SANGAMO THERAPEUTICS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**68-0359556**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

7000 Marina Blvd., Brisbane, California, 94005
(Address of principal executive offices) (Zip Code)

(510) 970-6000
(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, par value $0.01 per share	SGMO	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 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 August 3, 2020, 140,988,008 shares of the issuer's common stock, par value $0.01 per share, were outstanding.

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SANGAMO THERAPEUTICS, INC.

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Unless otherwise indicated or the context suggests otherwise, references in this Quarterly Report on Form 10-Q, or Quarterly Report, to "Sangamo," "the Company," "we," "us," and "our" refer to Sangamo Therapeutics, Inc. and our subsidiaries, including Sangamo Therapeutics France S.A.S. (formerly TxCell S.A.) and Sangamo Therapeutics UK Ltd.

Any third-party trade names, trademarks and service marks appearing in this Quarterly Report are the property of their respective holders.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Some statements contained in this report are forward-looking with respect to our operations, research, development and commercialization activities, clinical trials, operating results and financial condition. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performances or achievements expressed or implied by the forward-looking statements. Forward-looking statements may include, but are not limited to, statements about:

- our strategy;
- anticipated product candidate development and potential commercialization of any resulting products;
- the initiation, scope, rate of progress, enrollment, anticipated results and timing of our preclinical studies and clinical trials and those of our collaborators or strategic partners;
- the therapeutic and commercial potential of, technologies used by us in our product candidates, including our zinc finger protein, or ZFP, technology platform, zinc finger nucleases, or ZFNs, and ZFP transcription factors, or ZFP-TFs;
- the expected benefits of the acquisition of Sangamo Therapeutics France S.A.S., or Sangamo France;
- our ability to establish and maintain collaborations and strategic partnerships and realize the expected benefits of such arrangements;
- anticipated revenues from existing and new collaborations and the timing thereof;
- our estimates regarding the impact of the evolving COVID-19 pandemic on our business and operations and the business and operations of our collaborators, including clinical trials and manufacturing, and our ability to manage such impacts;
- our research and development and other expenses;
- our ability to obtain adequate preclinical and clinical supplies of our product candidates from current and potential new suppliers and manufacturers;
- the ability of Sangamo and our collaborators and strategic partners to obtain and maintain regulatory approvals for product candidates;
- our ability to comply with, and the impact of, regulatory requirements, obligations and restrictions on our business and operations;
- our ability to protect our intellectual property and operate our business without infringing upon the intellectual property rights of others, including our ability to obtain rights to the gene transfer technologies required to develop and commercialize our product candidates;
- our estimates regarding the sufficiency of our cash resources and our expenses, capital requirements and need for additional financing, and our ability to obtain additional financing;
- our ability to manage the growth of our business;
- our projected operating and financial performance;
- our operational and legal risks; and
- our plans, objectives, expectations and intentions and any other statements that are not historical facts.

In some cases, you can identify forward-looking statements by terms such as: “anticipates,” “believes,” “continues,” “could,” “estimates,” “expects,” “intends,” “may,” “plans,” “seeks,” “should” and “will” and similar expressions intended to identify forward-looking statements. These statements reflect our current views with respect to future events, are based on assumptions and are subject to risks and uncertainties. Given these risks and uncertainties, you should not place undue reliance on these forward-looking statements. We discuss many of these risks in greater detail under the headings “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Quarterly Report. Except as required by law, we undertake no obligation to update or revise any forward-looking statements to reflect new information or future events or developments. Readers are cautioned not to place undue reliance on the forward-looking statements, which speak only as of the date of this Quarterly Report on Form 10-Q.

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED BALANCE SHEETS
(Unaudited; in thousands)

	June 30, 2020	December 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 467,443	$ 80,428
Marketable securities	197,410	282,046
Interest receivable	534	682
Accounts receivable	5,618	36,909
Prepaid expenses and other current assets	8,395	5,408
Total current assets	679,400	405,473
Marketable securities, non-current	—	21,832
Property and equipment, net	33,907	29,926
Intangible assets	53,219	53,156
Goodwill	39,318	39,273
Operating lease right-of-use assets	73,501	77,289
Other non-current assets	13,814	9,067
Non-current restricted cash	1,500	1,500
Total assets	$ 894,659	$ 637,516
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	$ 19,221	$ 17,556
Accrued compensation and employee benefits	13,332	13,605
Deferred revenues	61,389	38,711
Total current liabilities	93,942	69,872
Deferred revenues, non-current	237,644	81,432
Long-term portion of lease liabilities	39,234	41,192
Deferred income tax	6,578	6,570
Other non-current liabilities	6,055	5,711
Total liabilities	383,453	204,777
Commitments and contingencies		
Stockholders' equity:		
Preferred stock	—	—
Common stock	1,410	1,160
Additional paid-in capital	1,247,527	1,090,828
Accumulated deficit	(735,827)	(656,985)
Accumulated other comprehensive loss	(1,653)	(2,449)
Total Sangamo Therapeutics, Inc. stockholders' equity	511,457	432,554
Non-controlling interest	(251)	185
Total stockholders' equity	511,206	432,739
Total liabilities and stockholders' equity	$ 894,659	$ 637,516

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(Unaudited; in thousands, except per share amounts)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Revenues	$ 21,553	$ 17,548	$ 34,629	$ 25,619
Operating expenses:				
Research and development	41,523	36,455	83,002	71,305
General and administrative	17,927	14,597	34,046	31,715
Total operating expenses	59,450	51,052	117,048	103,020
Loss from operations	(37,897)	(33,504)	(82,419)	(77,401)
Interest and other income, net	1,932	3,148	3,480	4,842
Net loss	(35,965)	(30,356)	(78,939)	(72,559)
Net loss attributable to non-controlling interest	(36)	(72)	(97)	(125)
Net loss attributable to Sangamo Therapeutics, Inc. stockholders	$ (35,929)	$ (30,284)	$ (78,842)	$ (72,434)
Basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	$ (0.26)	$ (0.26)	$ (0.62)	$ (0.67)
Shares used in computing basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	138,977	114,382	127,519	108,360

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(Unaudited; in thousands)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Net loss	$ (35,965)	$ (30,356)	$ (78,939)	$ (72,559)
Foreign currency translation adjustment	1,783	1,442	150	(62)
Change in unrealized gain on available-for-sale securities	392	484	646	737
Comprehensive loss	(33,790)	(28,430)	(78,143)	(71,884)
Comprehensive loss attributable to non-controlling interest	(36)	(72)	(97)	(125)
Comprehensive loss attributable to Sangamo Therapeutics, Inc.	$ (33,754)	$ (28,358)	$ (78,046)	$ (71,759)

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Unaudited; in thousands, except share amounts)

	Three months ended June 30, 2020						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balances at March 31, 2020	116,278,553	$ 1,163	$ 1,096,854	$ (699,898)	$ (3,828)	$ 124	$ 394,415
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	103,262	1	442	—	—	—	443
Issuance of common stock under employee stock purchase plan	171,305	2	1,185	—	—	—	1,187
Issuance of common stock in connection with the Biogen collaboration agreement, net of issuance costs	24,420,157	244	142,282	—	—	—	142,526
Stock-based compensation	—	—	6,764	—	—	—	6,764
Acquisition of additional shares of Sangamo France	—	—	—	—	—	(339)	(339)
Foreign currency translation adjustment	—	—	—	—	1,783	—	1,783
Net unrealized gain on marketable securities	—	—	—	—	392	—	392
Net loss	—	—	—	(35,929)	—	(36)	(35,965)
Balances at June 30, 2020	140,973,277	$ 1,410	$ 1,247,527	$ (735,827)	$ (1,653)	$ (251)	$ 511,206

	Six months ended June 30, 2020						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balance at December 31, 2019	115,972,708	$ 1,160	$ 1,090,828	$ (656,985)	$ (2,449)	$ 185	$ 432,739
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	409,107	4	848	—	—	—	852
Issuance of common stock under employee stock purchase plan	171,305	2	1,185	—	—	—	1,187
Issuance of common stock in connection with the Biogen collaboration agreement, net of issuance costs	24,420,157	244	142,282	—	—	—	142,526
Acquisition of additional shares of Sangamo France	—	—	—	—	—	(339)	(339)
Stock-based compensation	—	—	12,384	—	—	—	12,384
Foreign currency translation adjustment	—	—	—	—	150	—	150
Net unrealized gain on marketable securities	—	—	—	—	646	—	646
Net loss	—	—	—	(78,842)	—	(97)	(78,939)
Balances at June 30, 2020	140,973,277	$ 1,410	$ 1,247,527	$ (735,827)	$ (1,653)	$ (251)	$ 511,206

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Unaudited; in thousands, except share amounts)

	Three months ended June 30, 2019						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balance at March 31, 2019	102,328,752	$ 1,023	$ 934,112	$ (603,949)	$ (2,691)	$ 686	$ 329,181
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	492,635	5	2,439	—	—	—	2,444
Issuance of common stock under employee stock purchase plan	131,709	1	1,137	—	—	—	1,138
Issuance of common stock under public offering, net of issuance costs	12,650,000	127	136,439	—	—	—	136,566
Issuance costs related to public offering	—	—	(18)	—	—	—	(18)
Stock-based compensation	—	—	4,867	—	—	—	4,867
Foreign currency translation adjustment	—	—	—	—	1,442	—	1,442
Net unrealized gain on marketable securities	—	—	—	—	484	—	484
Net loss	—	—	—	(30,284)	—	(72)	(30,356)
Balances at June 30, 2019	115,603,096	$ 1,156	$ 1,078,976	$ (634,233)	$ (765)	$ 614	$ 445,748

	Six months ended June 30, 2019						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balances at December 31, 2018	102,187,471	$ 1,022	$ 929,632	$ (562,696)	$ (1,440)	$ 739	$ 367,257
Cumulative-effect adjustment of ASC Topic 842 on January 1, 2019	—	—	—	897	—	—	897
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	633,916	6	2,654	—	—	—	2,660
Issuance of common stock under employee stock purchase plan	131,709	1	1,137	—	—	—	1,138
Issuance of common stock under public offering, net of issuance costs	12,650,000	127	136,439	—	—	—	136,566
Issuance costs related to Sangamo France Acquisition	—	—	(276)	—	—	—	(276)
Stock-based compensation	—	—	9,390	—	—	—	9,390
Foreign currency translation adjustment	—	—	—	—	(62)	—	(62)
Net unrealized gain on marketable securities	—	—	—	—	737	—	737
Net loss	—	—	—	(72,434)	—	(125)	(72,559)
Balances at June 30, 2019	115,603,096	$ 1,156	$ 1,078,976	$ (634,233)	$ (765)	$ 614	$ 445,748

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited; in thousands)

	Six Months Ended June 30,	
	2020	**2019**
Operating Activities:		
Net loss	$ (78,939)	$ (72,559)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Depreciation and amortization	2,639	1,583
Amortization of discount on marketable securities	(1,146)	(2,455)
Amortization and other changes in right-of-use assets	3,788	1,923
Gain on free shares	(48)	(551)
Stock-based compensation	12,384	9,390
Net loss on lease termination	—	218
Other	—	11
Net changes in operating assets and liabilities:		
Interest receivable	148	(391)
Accounts receivable	31,291	(7,422)
Prepaid expenses and other assets	(7,763)	(5,449)
Accounts payable and accrued liabilities	1,559	1,811
Accrued compensation and employee benefits	(248)	(764)
Deferred revenues	178,890	(10,821)
Long-term portion of lease liabilities	(1,797)	(563)
Other non-current liabilities	345	1,327
Net cash provided by (used in) operating activities	141,103	(84,712)
Investing Activities:		
Purchases of marketable securities	(43,580)	(244,306)
Maturities of marketable securities	151,839	226,884
Purchases of property and equipment	(6,694)	(9,760)
Purchase of additional shares of Sangamo France	(237)	—
Net cash provided by (used in) investing activities	101,328	(27,182)
Financing Activities:		
Proceeds from public offering of common stock, net of issuance costs	—	136,308
Proceeds from issuance of common stock in connection with the Biogen collaboration agreement, net of issuance costs	142,526	—
Taxes paid related to net share settlement of equity awards	(455)	(296)
Proceeds from exercise of stock options and restricted stock units	1,307	4,094
Proceeds from issuance of common stock under employee stock purchase plan	1,187	—
Net cash provided by financing activities	144,565	140,106
Effects of changes in foreign exchange rates	19	592
Net increase in cash, cash equivalents, and restricted cash	387,015	28,804
Cash, cash equivalents, and restricted cash, beginning of period	81,928	143,918
Cash, cash equivalents, and restricted cash, end of period	$ 468,943	$ 172,722
Supplemental disclosure of non-cash activities:		
Property and equipment included in unpaid liabilities	$ 1,977	$ 1,679
Right-of-use assets obtained in exchange for lease obligations	$ —	$ 29,671

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
June 30, 2020
(Unaudited)

NOTE 1—ORGANIZATION, BASIS OF PRESENTATION AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Business Overview

Sangamo Therapeutics, Inc. (“Sangamo” or “the Company”) was incorporated in the State of Delaware in June 1995. Sangamo is a clinical stage biotechnology company focused on translating ground-breaking science into genomic medicines with the potential to transform patients’ lives using the Company's platform technologies in gene therapy, *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* genome regulation.

Basis of Presentation

The accompanying unaudited Condensed Consolidated Financial Statements have been prepared in accordance with generally accepted accounting principles in the United States of America (“U.S. GAAP”) for interim financial information and pursuant to the rules and regulations of the Securities and Exchange Commission (“SEC”). Accordingly, they do not include all of the information and footnotes required by U.S. GAAP for complete financial statements. In the opinion of management, all adjustments (consisting of normal recurring adjustments) considered necessary for a fair presentation have been included. Operating results for the three and six months ended June 30, 2020 are not necessarily indicative of the results that may be expected for the year ending December 31, 2020. The Condensed Consolidated Balance Sheet data at December 31, 2019 was derived from the audited Consolidated Financial Statements included in Sangamo’s Annual Report on Form 10-K for the year ended December 31, 2019 (the “2019 Annual Report”) as filed with the SEC on February 28, 2020.

The accompanying Condensed Consolidated Financial Statements include the accounts of the Company and its subsidiaries. All intercompany balances and transactions have been eliminated in the Condensed Consolidated Financial Statements. For consolidated entities where the Company owns or are exposed to less than 100% of the economics, the Company records net loss attributable to non-controlling interests on the Company's Condensed Consolidated Statements of Operations equal to the percentage of the economic or ownership interest retained in such entities by the respective non-controlling parties.

The accompanying Condensed Consolidated Financial Statements and related financial information should be read together with the audited Consolidated Financial Statements and footnotes for the year ended December 31, 2019, included in the 2019 Annual Report.

Going Concern

Sangamo is currently working on a number of long-term development projects that will involve experimental technology. The projects may require several years and substantial expenditures to complete and ultimately may be unsuccessful. The Company plans to finance operations with available cash resources, collaboration funds, research grants and from the issuance of equity or debt securities. Sangamo believes that its available cash, cash equivalents and marketable securities as of June 30, 2020, and expected revenues from collaborations, strategic partnerships and research grants, will be adequate to fund its operations at least through the next 12 months from the date the financial statements are issued. Sangamo may require additional financial resources to complete the development and commercialization of its products including zinc finger protein (“ZFP”) therapeutic products. Additional capital may not be available on terms acceptable to the Company, or at all. If adequate funds are not available, or if the terms of potential funding sources are unfavorable, the Company’s business and ability to advance its product candidate pipeline would be harmed. Furthermore, any sales of additional equity securities may result in dilution to the Company’s stockholders, and any debt financing may include covenants that restrict the Company’s business.

Summary of Significant Accounting Policies

Use of Estimates

The preparation of these Condensed Consolidated Financial Statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the Condensed Consolidated Financial Statements and the accompanying notes. On an ongoing basis, management evaluates its estimates including critical accounting policies or estimates related to revenue recognition, clinical trial accruals, fair value of assets and liabilities, including from acquisitions, and stock-based compensation. Estimates are based on historical experience and on various other market specific and other relevant assumptions that the Company believes to be 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. Actual results could differ from those estimates.

In March 2020, the Company recorded an adjustment to revenue related to a change in estimate in connection with the collaboration agreement with Sanofi Genzyme ("Sanofi") as a result of a decision made by the joint steering committee of Sanofi and Sangamo to increase the project scope and related project cost, which resulted in a decrease in the measure of proportional cumulative performance. In March 2020, the Company also recorded an adjustment to revenue related to a change in estimate in connection with the hemophilia A collaboration agreement with Pfizer Inc. ("Pfizer"). This adjustment was a direct result of the decision to decrease the project scope and the corresponding costs after the successful investigational new drug ("IND") transfer of the SB-525 product candidate to Pfizer, both of which resulted in an increase in the measure of proportional cumulative performance.

In June 2020, the Company recorded an adjustment to revenue related to a change in estimate in connection with the *C9ORF72* research collaboration and license agreement with Pfizer. This adjustment was a direct result of the decision to decrease the project scope and the corresponding costs due to advancement of the program, which resulted in an increase in the measure of proportional cumulative performance.

The Pfizer-related adjustment in June 2020 increased revenue by $3.0 million, decreased net loss by $3.0 million and decreased the Company's basic net loss per share by $0.02 for the three months ended June 30, 2020.

The Pfizer and Sanofi-related adjustments in March and June 2020 increased revenue by $3.1 million, decreased net loss by $3.1 million and decreased the Company's basic net loss per share by $0.02 for the six months ended June 30, 2020.

Revenue Recognition

The Company accounts for its revenues pursuant to the provisions of Accounting Standards Codification ("ASC") Topic 606, *Revenue from Contracts with Customers* ("ASC Topic 606"). The Company's contract revenues are derived from collaboration agreements including licensing arrangements and research activity grants. Research and licensing agreements typically include upfront signing or license fees, cost reimbursements for research services, minimum sublicense fees, milestone payments and royalties on future licensee's product sales. The Company has agreements with both fixed and variable consideration. Non-refundable upfront fees and funding of research and development activities are considered fixed, while milestone payments are generally identified as variable consideration. Sangamo's research grants are typically multi-year agreements and provide for the reimbursement of qualified expenses for research and development as defined under the terms of the grant agreement. Revenues under research grant agreements are generally recognized when the related qualified research expenses are incurred. Deferred revenue primarily represents the portion of research or license payments received but not earned.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligations under its agreements, the Company performs the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations based on estimated selling prices; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is the unit of account in ASC Topic 606. The Company's performance obligations include license rights, development services and services associated with regulatory submission and approval processes. Revenues from research services earned under collaboration agreements are generally recognized as revenue as the related services are provided. Revenues from non-refundable upfront fees are recognized over time either by measuring progress towards satisfaction of the relevant performance obligation, using the input method (i.e. cumulative actual costs incurred relative to total estimated costs) or on a straight-line basis when a performance obligation is expected to be satisfied evenly over a period of time (or when the entity has a stand-ready obligation). Significant management judgment is required to determine the level of effort required under an arrangement, and the period over which the Company expects to complete its performance obligations under the arrangement, which may include total internal personnel costs and external costs to be incurred as well as, in certain cases, the estimated stand-ready obligation period. Changes in these estimates can have a material effect on revenue recognized. If the Company cannot reasonably estimate when its performance obligations either are completed or become inconsequential, then revenue recognition is deferred until the Company can reasonably make such estimates. The Company includes the unconstrained amount of estimated variable consideration in the transaction price. The amount included in the transaction price is constrained to the amount for which it is probable that a significant reversal of cumulative revenue recognized will not occur. At the end of each subsequent reporting period, the Company re-evaluates the estimated variable consideration included in the transaction price and any related constraint and, if necessary, adjusts its estimate of the overall transaction price. Revenue is then recognized over the remaining estimated period of performance using the cumulative catch-up method. The estimated period of performance and project costs, such as personnel and manufacturing cost, are reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables.

As part of the accounting for these arrangements, the Company must develop assumptions that require judgment to determine the stand-alone selling price of each performance obligation identified in the contract. The Company uses key assumptions to determine the stand-alone selling price, which may include forecasted revenues, development timelines, reimbursement rates for personnel costs, discount rates and probabilities of technical and regulatory success. Related costs and expenses under these arrangements have historically approximated the revenues recognized.

Revenues from major collaboration agreements and research activity grants as a percentage of total revenues were as follows:

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Biogen	38 %	—	24 %	—
Kite Pharma, Inc.	34 %	52 %	42 %	61 %
Pfizer	18 %	26 %	21 %	16 %
Sanofi	8 %	17 %	7 %	18 %

Receivables from collaborations are typically unsecured and are concentrated in the biopharmaceutical industry. Accordingly, the Company may be exposed to credit risk generally associated with biopharmaceutical companies or specific to its collaboration agreements. As of June 30, 2020, the Company had not incurred any losses related to these receivables.

Funds received from third parties under contract or funds received from grant arrangements are generally recorded as revenue if the Company is deemed to be the principal participant in the arrangements because the activities under the contracts or grants are part of the Company's development programs. Contract funds are not refundable and are recognized when the related qualified research and development costs are incurred and there is reasonable assurance that the funds will be received. Funds received in advance are recorded as deferred revenue.

Business Combinations

The Company accounts for acquisitions using the acquisition method of accounting, which requires that assets acquired, including in-process research and development ("IPR&D") projects, liabilities assumed and any non-controlling interests in the acquired target in an acquisition be recorded at their fair values as of the acquisition date on the Company's Consolidated Balance Sheets. Any excess of purchase price over the fair value of net assets acquired is recorded as goodwill. The determination of fair value requires the Company to make significant estimates and assumptions. As a result, the Company may record adjustments to the fair values of assets acquired and liabilities assumed within the measurement period (up to one year from the acquisition date) with the corresponding offset to goodwill. Transaction costs associated with business combinations are expensed as they are incurred.

Goodwill and Intangible Assets

Goodwill represents the excess of the consideration transferred over the fair values of assets acquired and liabilities assumed in a business combination. Intangible assets with indefinite useful lives are related to purchased IPR&D projects and are measured at their respective fair values as of the acquisition date. Goodwill and intangible assets with indefinite useful lives are not amortized. Intangible assets related to IPR&D projects are considered to be indefinite-lived until the completion or abandonment of the associated research and development efforts. If and when development is complete, which generally occurs if and when regulatory approval to market a product is obtained, the associated assets would be deemed finite-lived and would then be amortized based on their respective estimated useful lives at that point in time. The Company tests goodwill and indefinite-lived intangible assets for impairment on an annual basis and between annual tests if the Company becomes aware of any events occurring or changes in circumstances that would indicate the fair values of the assets are below their respective carrying amounts. As of June 30, 2020, no impairment of goodwill or indefinite-lived intangible assets has been identified.

Valuation of Long-Lived Assets

Long-lived assets, including property and equipment and finite-lived intangible assets, are reviewed for impairment whenever facts or circumstances either internally or externally may suggest that the carrying value of an asset may not be recoverable. Recoverability of these assets is measured by comparison of the carrying amount of each asset to the future undiscounted cash flows expected to result from the use of the asset and its eventual disposition. If the asset is considered to be impaired, the amount of any impairment is measured as the difference between the carrying value and the fair value of the impaired asset. As of June 30, 2020, no impairment of any long-lived assets has been identified.

Fair Value Measurements

The carrying amounts for financial instruments consisting of cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities approximate fair value due to their short maturities. Marketable securities are stated at their

estimated fair values. The free shares asset/liability is measured using a binomial-lattice pricing model and is reviewed each reporting period and adjusted, as needed to approximate fair value.

Cash, Cash Equivalents and Restricted Cash

Sangamo considers all highly-liquid investments purchased with original maturities of three months or less at the purchase date to be cash equivalents. Cash and cash equivalents consist of cash, deposits in demand money market accounts and commercial paper. Restricted cash consists of a letter of credit for $1.5 million, representing a deposit for the lease of the corporate headquarters in Brisbane, California.

A reconciliation of cash, cash equivalents and restricted cash reported within the Condensed Consolidated Balance Sheets to the amounts reported within the accompanying Condensed Consolidated Statements of Cash Flows was as follows (in thousands):

	June 30, 2020	December 31, 2019	June 30, 2019	December 31, 2018
Cash and cash equivalents	$ 467,443	$ 80,428	$ 169,222	$ 140,418
Current restricted cash	—	—	2,000	—
Non-current restricted cash	1,500	1,500	1,500	3,500
Cash, cash equivalents and restricted cash as reported within the accompanying Condensed Consolidated Statements of Cash Flows	$ 468,943	$ 81,928	$ 172,722	$ 143,918

Marketable Securities

Sangamo classifies its marketable securities as available-for-sale and records its investments at estimated fair value based on quoted market prices or observable market inputs of almost identical assets, with the unrealized holding gains and losses included in Accumulated Other Comprehensive Income (Loss) (“AOCI”) within stockholders' equity.

The Company’s investments are subject to a periodic impairment review. The Company recognizes an impairment charge, if material, when a decline in the fair value of its investments below the cost basis is judged to be other-than-temporary. If the estimated fair value of a security is below its carrying value, the Company evaluates whether it is more likely than not that it will sell the security before its anticipated recovery in market value and whether evidence indicating that the cost of the investment is recoverable within a reasonable period of time outweighs evidence to the contrary. The Company also evaluates whether or not it intends to sell the investment. If the impairment is considered to be other-than-temporary, the security is written down to its estimated fair value. In addition, the Company considers whether credit losses exist for any securities. A credit loss exists if the present value of cash flows expected to be collected is less than the amortized cost basis of the security. Other-than-temporary declines in estimated fair value and credit losses are included in other income (expense) within the accompanying Condensed Consolidated Statements of Operations. The Company considers various factors in determining whether to recognize an impairment charge, including the length of time and extent to which the estimated fair value has been less than the Company’s cost basis, the financial condition and near-term prospects of the investee and the Company’s intent and ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in the market value. Realized gains and losses on available-for-sale securities are included in interest and other income, net, which are determined using the specific identification method.

Concentrations of Risk

Cash, cash equivalents, and marketable securities consist of financial instruments that potentially subject the Company to a concentration of credit risk to the extent of the fair value recorded in the Condensed Consolidated Balance Sheets. The Company invests cash that is not required for immediate operating needs primarily in highly liquid instruments that bear minimal risk. The Company has established guidelines relating to the quality, diversification, and maturities of securities to enable the Company to manage its credit risk. The Company is exposed to credit risk in the event of a default by the financial institutions holding its cash, cash equivalents and investments and issuers of investments to the extent recorded on the Condensed Consolidated Balance Sheets.

Certain materials and key components that the Company utilizes in its operations are obtained through single suppliers. Since the suppliers of key components and materials must be named in an IND application filed with the U.S. Food and Drug Administration for a product, significant delays can occur if the qualification of a new supplier is required. If delivery of material from the Company’s suppliers were interrupted for any reason, the Company may be unable to supply any of its product candidates for clinical trials.

Leases

The Company determines if an arrangement is or contains a lease at inception by assessing whether the arrangement contains an identified asset and whether it has the right to control the identified asset. Right-of-use ("ROU") assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Lease liabilities are recognized at the lease commencement date based on the present value of future lease payments over the lease term. ROU assets are based on the measurement of the lease liability and also include any lease payments made prior to or on lease commencement and exclude lease incentives and initial direct costs incurred, as applicable.

As the implicit rate in the Company's leases is generally unknown, the Company uses its incremental borrowing rate based on the information available at the lease commencement date in determining the present value of remaining lease payments. The incremental borrowing rate represents an estimate of the interest rate the Company would incur at lease commencement to borrow an amount equal to the lease payments on a collateralized basis over the term of a lease in a similar economic environment. The Company considers its credit risk, term of the lease, total lease payments and adjusts for the impacts of collateral, as necessary, when calculating its incremental borrowing rates. The lease terms may include options to extend or terminate the lease when it is reasonably certain the Company will exercise any such options. Rent expense for the Company's operating leases is recognized on a straight-line basis over the lease term.

The Company has elected to not separate lease and non-lease components for its real estate and copier leases and, as a result, accounts for any lease and non-lease components as a single lease component. The Company has also elected to not apply the recognition requirement to any leases with a term of 12 months or less and does not include an option to purchase the underlying asset that the Company is reasonably certain to exercise.

Foreign Currency Translation

The functional currency of the Company's foreign subsidiaries is primarily the Euro. Assets and liabilities denominated in foreign currencies are translated to U.S. dollars using the exchange rates at the balance sheet date. Foreign currency translation adjustments are recorded as a component of AOCI within stockholders' equity. Revenues and expenses from the Company's foreign subsidiaries are translated using the monthly average exchange rates in effect during the period in which the transactions occur. Foreign currency transaction gains and losses are recorded in interest and other income, net, on the Company's Condensed Consolidated Statements of Operations.

Recent Adopted Accounting Pronouncements

Collaborative Arrangements

In November 2018, the FASB issued Accounting Standards Update ("ASU") 2018-18, *Collaborative Arrangements (ASC Topic 808): Clarifying the Interaction between Topic 808 and Topic 606* ("ASC Topic 808"), which clarifies that certain transactions between participants in a collaborative arrangement should be accounted for under ASC Topic 606 when the counterparty is a customer. In addition, ASC Topic 808 precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer for that transaction. ASU 2018-18 is effective for all interim and annual reporting periods beginning after December 15, 2019. On January 1, 2020, the Company adopted ASU 2018-18. The adoption of ASU 2018-18 did not have a material impact on Company's Condensed Consolidated Financial Statements.

Goodwill Impairment Testing

In January 2017, the FASB issued ASU No. 2017-04, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test of Goodwill Impairment* ("ASU 2017-04"). The new guidance simplifies the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. ASU 2017-04 requires goodwill impairment to be measured as the amount by which a reporting unit's carrying amount exceeds its fair value, not to exceed the carrying amount of its goodwill. ASU 2017-04 requires prospective application and is effective for annual periods beginning after December 15, 2019. ASU 2017-04 will require the Company to amend its methodology for determining any goodwill impairment beginning in 2020. On January 1, 2020, the Company adopted ASU 2017-04. The adoption of ASU 2017-04 did not have a material impact on Company's Condensed Consolidated Financial Statements.

Credit Losses

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments – Credit Losses (Topic 326)* ("ASU 2016-13"). ASU 2016-13 implements an impairment model, known as the current expected credit loss model that is based on expected losses rather than incurred losses. Under the new guidance, an entity will recognize as an allowance its estimate of expected credit losses. ASU 2016-13 is effective for all interim and annual reporting periods beginning after December 15, 2019 and must be adopted using a modified retrospective approach, with certain exceptions. Early adoption is permitted. On January 1, 2020, the

Company adopted ASU 2016-13 by using a modified retrospective approach. The adoption of ASU 2016-13 did not have a material impact on Company's Condensed Consolidated Financial Statements.

Income Taxes

In December 2019, the FASB issued ASU No. 2019-12, *Income Taxes – Simplifying the Accounting for Income Taxes* ("ASU 2019-12"). The guidance removes exceptions to the general principles in *Income Taxes (Topic 740)* for allocating tax expense between financial statement components, accounting basis differences stemming from an ownership change in foreign investments and interim period income tax accounting for year-to-date losses that exceed projected losses. The guidance becomes effective for annual reporting periods beginning after December 15, 2020 and interim periods within those fiscal years with early adoption permitted. On January 1, 2020, the Company early adopted ASU 2019-12. The adoption of ASU 2019-12 did not have a material impact on Company's Condensed Consolidated Financial Statements.

NOTE 2—FAIR VALUE MEASUREMENTS

The Company measures certain financial assets and liabilities at fair value on a recurring basis, including cash equivalents, available-for-sale marketable securities and the free shares asset. Fair value is determined based on a three-tier hierarchy under the authoritative guidance for fair value measurements and disclosures that prioritizes the inputs used in measuring fair value as follows:

Level 1: Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities;

Level 2: Quoted prices in markets that are not active or inputs which are observable, either directly or indirectly, for substantially the full term of the asset or liability; and

Level 3: Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (i.e., supported by little or no market activity).

The fair value measurements of the Company's cash equivalents, marketable securities and the free shares asset are identified at the following levels within the fair value hierarchy (in thousands):

	June 30, 2020			
	Fair Value Measurements			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 116,393	$ 116,393	$ —	$ —
Total	116,393	116,393	—	—
Marketable securities:				
Commercial paper securities	90,179	—	90,179	—
Corporate debt securities	81,844	—	81,844	—
U.S. government-sponsored entity debt securities	25,387	—	25,387	—
Total	197,410	—	197,410	—
Total cash equivalents and marketable securities	$ 313,803	$ 116,393	$ 197,410	$ —
Free shares asset	$ 167	$ —	$ —	$ 167

	December 31, 2019			
	Fair Value Measurements			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 30,496	$ 30,496	$ —	$ —
Commercial paper securities	2,999	—	2,999	—
Total	33,495	30,496	2,999	—
Marketable securities:				
Commercial paper securities	155,368	—	155,368	—
Corporate debt securities	95,017	—	95,017	—
U.S. government-sponsored entity debt securities	53,493	—	53,493	—
Total	303,878	—	303,878	—
Total cash equivalents and marketable securities	$ 337,373	$ 30,496	$ 306,877	$ —
Free shares asset	$ 236	$ —	$ —	$ 236

Cash Equivalents and Marketable Securities

The Company generally classifies its marketable securities and some cash equivalents as Level 2. Instruments are classified as Level 2 when observable market prices for identical securities that are traded in less active markets are used. When observable market prices for identical securities are not available, such instruments are priced using benchmark curves, benchmarking of like securities, sector groupings, matrix pricing and valuation models. These valuation models are proprietary to the pricing providers or brokers and incorporate a number of inputs, including, listed in approximate order of priority: benchmark yields, reported trades, broker/dealer quotes, issuer spreads, two-sided markets, benchmark securities, bids, offers and reference data including market research publications. For certain security types, additional inputs may be used, or some of the standard inputs may not be applicable. Evaluators may prioritize inputs differently on any given day for any security based on market conditions, and not all inputs listed are available for use in the evaluation process for each security evaluation on any given day.

Free Shares Asset

As a result of the July 20, 2018 Share Purchase Agreement ("Sangamo France SPA") to acquire Sangamo France (see Note 10 — *Acquisition of Sangamo Therapeutics France S.A.S.*), the Company entered into arrangements with the holders of approximately 477,000 "free shares" of Sangamo France pursuant to which the Company has the right to purchase such shares from the holders (a call option) and such holders have the right to sell to the Company such shares from time to time through mid-2021 (a put option). The Company initially recorded a liability of $0.2 million on the acquisition date. The put options were classified within Level 3 of the fair value hierarchy as the Company utilized a binomial-lattice pricing model (the "Monte Carlo simulation model") that involved certain market conditions to estimate the fair value of the options. The assumptions used in this simulation model are reviewed on a quarterly basis and adjusted, as needed. Subsequent changes in the fair value of the free shares are recorded in general and administrative expenses in the Condensed Consolidated Statements of Operations. The Company purchased approximately 111,000 shares during 2019 and 117,000 shares during the three months ended June 30, 2020, of the 477,000 total free shares for a cash payment of approximately $0.3 million and $0.2 million respectively, upon exercise of the put options. As of June 30, 2020, approximately 249,000 free shares remain outstanding and subject to purchase by the Company.

The fair value of the free shares asset was approximately $0.2 million at December 31, 2019. The Company recognized an increase in the fair value of the free shares of approximately $0.1 million for the six months ended June 30, 2020, offset by approximately $0.1 million for the shares purchased during the six months ended June 30, 2020, resulting in an asset balance of approximately $0.2 million at June 30, 2020.

Free Shares valuation assumptions:	June 30, 2020	December 31, 2019
Sangamo Stock Price (USD)	$ 8.77	$ 8.68
Sangamo France Stock Price (EUR)	€ 2.16	€ 2.14
USD / EUR Exchange Rate	0.89	0.91
Estimated Correlation Sangamo and Sangamo France Stock Prices	100.0%	100.0%
Sangamo Stock Price (USD) Volatility Estimate	73.8%	72.5%
Sangamo France Stock Price (EUR) Volatility Estimate	73.8%	72.5%
USD / EUR Exchange Rate Volatility Estimate	6.5%	6.6%
Risk Free Rate and Cost of Debt by Expected Exercise Date	Varies	Varies

NOTE 3—CASH EQUIVALENTS AND MARKETABLE SECURITIES

Cash Equivalents and Marketable Securities

The table below summarizes the Company's cash equivalents and marketable securities (in thousands):

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
June 30, 2020				
Assets				
Cash equivalents:				
Money market funds	$ 116,393	$ —	$ —	$ 116,393
Total	116,393	—	—	116,393
Marketable securities:				
Commercial paper securities	89,796	383	—	90,179
Corporate debt securities	81,424	420	—	81,844
U.S. government-sponsored entity debt securities	25,211	176	—	25,387
Total	196,431	979	—	197,410
Total cash equivalents and marketable securities	$ 312,824	$ 979	$ —	$ 313,803
December 31, 2019				
Assets				
Cash equivalents:				
Money market funds	$ 30,496	$ —	$ —	$ 30,496
Commercial paper securities	2,998	1	—	2,999
Total	33,494	1	—	33,495
Marketable securities:				
Commercial paper securities	155,230	145	(7)	155,368
Corporate debt securities	94,905	115	(3)	95,017
U.S. government-sponsored entity debt securities	53,411	91	(9)	53,493
Total	303,546	351	(19)	303,878
Total cash equivalents and marketable securities	$ 337,040	$ 352	$ (19)	$ 337,373

The fair value of investments available-for-sale by contractual maturity were as follows (in thousands):

	June 30, 2020	December 31, 2019
Maturing in one year or less	$ 197,410	$ 282,046
Maturing after one year through five years	—	21,832
Total	$ 197,410	$ 303,878

The Company had no realized losses of its available-for-sale securities for the three and six months ended June 30, 2020 or 2019. The Company periodically reviews the available-for-sale investments for other-than-temporary impairment losses. No investments were other-than-temporarily impaired at either June 30, 2020 or December 31, 2019. The Company considers factors such as the duration, severity and the reason for the decline in value, the potential recovery period, creditworthiness of the issuers of the securities and its intent to sell. For available-for-sale securities, it also considers whether (i) it is more likely than not that the Company will be required to sell the debt securities before recovery of their amortized cost basis, and (ii) the amortized cost basis cannot be recovered as a result of credit losses. No significant facts or circumstances have arisen to indicate that there has been any significant deterioration in the creditworthiness of the issuers of the securities held by the Company. Based on the Company's review of these securities, including the assessment of the duration and severity of the unrealized losses and the Company's ability and intent to hold the investments until maturity, there were no other-than-temporary impairments for these securities at June 30, 2020. All available-for-sale securities with unrealized losses have been in a loss position for less than 12 months.

NOTE 4—BASIC AND DILUTED NET LOSS PER SHARE

Basic net loss per share attributable to Sangamo Therapeutics, Inc. stockholders has been computed by dividing net loss attributable to Sangamo Therapeutics, Inc. stockholders by the weighted-average number of shares of common stock outstanding during the period. Diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders is calculated by dividing net loss attributable to Sangamo Therapeutics, Inc. stockholders by the weighted-average number of shares of common stock and potential dilutive securities outstanding during the period.

The total number of shares subject to stock options and restricted stock units ("RSUs") outstanding and the employee stock purchase plan ("ESPP") shares reserved for issuance, which are all anti-dilutive, were excluded from consideration in the calculation of diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders. Stock options and RSUs outstanding and ESPP shares reserved for issuance as of June 30, 2020 and 2019 totaled 14,964,567 and 10,155,033, respectively.

NOTE 5—MAJOR CUSTOMERS, PARTNERSHIPS AND STRATEGIC ALLIANCES

Biogen MA, Inc.

In February 2020, the Company entered into a collaboration and license agreement with Biogen MA, Inc. ("BIMA") and Biogen International GmbH (together with BIMA, "Biogen") for the research, development and commercialization of gene regulation therapies for the treatment of neurological diseases. The companies plan to leverage the Company's proprietary ZFP technology delivered via adeno-associated virus ("AAV") to modulate expression of key genes involved in neurological diseases. Concurrently with the execution of the collaboration agreement, the Company entered into a stock purchase agreement with BIMA, pursuant to which BIMA agreed to purchase 24,420,157 shares of the Company's common stock (the "Biogen Shares"), at a price per share of $9.2137, for an aggregate purchase price of approximately $225.0 million.

The collaboration agreement became effective in April 2020 following the termination of the waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and satisfaction of other customary closing conditions, including the payment of $225.0 million for the purchase of the Biogen Shares.

Under the collaboration agreement, Biogen paid the Company an upfront license fee of $125.0 million in May 2020. The Company is also eligible to receive research, development, regulatory and commercial milestone payments that could total up to approximately $2.37 billion if Biogen selects all of the targets allowed under the agreement and all the specified milestones set forth in the agreement are achieved, which includes up to $925.0 million in pre-approval milestone payments and up to $1.45 billion in first commercial sale and other sales-based milestone payments. In addition, the Company is also eligible to receive tiered high single-digit to sub-teen royalties on potential net commercial sales of licensed products arising from the collaboration. These royalty payments are subject to reduction due to patent expiration, entry of biosimilar products to the market and payments made under certain licenses for third-party intellectual property.

Under the collaboration agreement, the Company granted to Biogen an exclusive, royalty bearing and worldwide license, under its relevant patents and know-how, to develop, manufacture and commercialize certain ZFP and/or AAV-based products directed to up to 12 neurological disease gene targets selected by Biogen. Biogen has already selected three of these: ST-501 for tauopathies including Alzheimer's disease, ST-502 for synucleinopathies including Parkinson's disease, and a third undisclosed neuromuscular disease target. Biogen has exclusive rights to nominate up to nine additional targets over a target selection period of five years. For each gene target selected by Biogen, the Company performs early research activities, costs for which are shared by the companies, aimed at the development of the combination of proprietary central nervous system delivery vectors and ZFP transcription factors ("ZFP-TFs") (or potential other ZFP products) targeting therapeutically relevant genes. Biogen has assumed responsibility and costs for the IND enabling studies, clinical development, related regulatory interactions, and global commercialization. The Company is responsible for manufacturing activities for the initial clinical trials for the first three products of the collaboration and plans to leverage its in-house manufacturing capacity, where appropriate, which is currently in development. Biogen is responsible for manufacturing activities beyond the first clinical trial for each of the first three products. The Company's research activities for any targets will be performed over the period not to exceed seven years from the effective date of the agreement (i.e. through April 2027). Subject to certain exceptions set forth in the collaboration agreement, the Company is prohibited from developing, manufacturing or commercializing any therapeutic product directed to the targets selected by Biogen.

The collaboration agreement continues on a product-by-product and country-by-country basis until the expiration of all applicable royalty terms. Biogen has the right to terminate the collaboration agreement, in its entirety or on target-by-target basis, for any reason after a specified notice period, and also has the right to replace up to ten targets. Each party has the right to terminate this agreement on account of the other party's bankruptcy or material, uncured breach. In addition, the Company may terminate the collaboration agreement if Biogen challenges any patents licensed by the Company to Biogen.

Pursuant to the terms of the stock purchase agreement, Biogen has agreed not to, without the Company's prior written consent and subject to specified conditions and exceptions, directly or indirectly acquire shares of the Company's outstanding

common stock, seek or propose a tender or exchange offer or merger between the parties, solicit proxies or consents with respect to any matter, or undertake other specified actions related to the potential acquisition of additional equity interests in the Company. Such standstill restrictions expire on the earlier of the three-year anniversary of the effectiveness of the collaboration agreement and the date that Biogen beneficially owns less than 5% of the Company's common stock.

The stock purchase agreement also provides that until the first anniversary of the effectiveness of the collaboration agreement, Biogen will hold and not sell any of the Biogen Shares and from the first anniversary through the second anniversary, Biogen will hold and not sell at least 50% of the Biogen Shares, in addition to being subject to certain volume limitations. The stock purchase agreement further provides that, subject to certain limitations, until such time as all remaining Biogen Shares may be sold pursuant to Rule 144 promulgated under the Securities Exchange Act of 1933, as amended, within a 90-day period, Biogen may request the Company to register for resale any of the Biogen Shares on a registration statement to be filed with the SEC.

In addition, Biogen has agreed that, excluding specified extraordinary matters, it will vote the Biogen Shares in accordance with the Company's recommendation and has granted the Company an irrevocable proxy with respect to the foregoing. Such voting provisions expire on the earlier of (i) the two-year anniversary of the effectiveness of the collaboration agreement, (ii) the date that Biogen beneficially owns less than 5% of the Company's common stock and (iii) the date the collaboration agreement is terminated; provided, however, that in no event shall such expiration date be prior to the one-year anniversary of the effectiveness of the collaboration agreement.

The Company assessed the collaboration agreement with Biogen in accordance with ASC Topic 606 and concluded that Biogen is a customer. As of June 30, 2020, the transaction price includes the upfront license fee of $125.0 million and the excess consideration from the stock purchase of $79.6 million, which represents the difference between the $225.0 million received for the purchase of the Biogen Shares and the $145.4 million estimated fair value of the equity issued. The equity issued to Biogen was valued using an option pricing model to reflect certain holding period restrictions. None of the target selection fees and clinical or regulatory milestones have been included in the transaction price, as all such amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that nomination of additional targets and achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price as uncertain events are resolved or other changes in circumstances occur.

The Company has identified a single performance obligation within the Biogen collaboration agreement, which is a stand-ready obligation consisting of a series of distinct days of research services, during which Biogen obtains access to the Company's license and research resources. Revenue from the upfront license fee relates to access to the license and Company's obligation to stand-ready to perform such research services corresponding to the targets selected by Biogen. As a result of this obligation to perform research services when and if requested throughout the duration of the contract, the upfront license fee and the excess consideration from the stock purchase will be recognized over time on a straight-line basis consistent with the resources expected to be dedicated to providing the research services through April 2027, the estimated period of the obligation. The estimated period of performance is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverable. Revenue from the reimbursement by Biogen of shared costs of early research activities performed by Sangamo is recognized as the research services are performed. As of June 30, 2020, the Company had deferred revenue of $197.8 million related to this agreement.

Revenues recognized under the agreement for the three and six months ended June 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Revenue related to Biogen agreement:				
Recognition of license and stand-ready fee	$ 6,744	$ —	$ 6,744	$ —
Research services	1,434	—	1,434	—
Total	$ 8,178	$ —	$ 8,178	$ —

The Company paid $7.0 million for financial advisory fees during the quarter ended June 30, 2020, equal to 2% of $225.0 million received for the sale of shares and 2% of $125.0 million received for the upfront fee. The fees incurred related to both the collaboration agreement with Biogen and to the stock purchase agreement for the sale of shares. The Company believes that the allocation of fees on a relative fair value basis between the two agreements is reasonable. The Company recognized $4.1 million, which represents 2% of the upfront license fee of $125.0 million and 2% of the excess consideration from the stock purchase of $79.6 million, as a contract asset. This balance will be amortized and included in general and administrative costs on a systematic basis consistent with the transfer of the services to Biogen in accordance with ASC Topic 340, *Other Assets and*

Deferred Costs. The Company recognized $2.9 million, which represents 2% of the $145.4 million estimated fair value of the equity issued, as a share issuance cost and recorded this amount in equity as reduction in proceeds.

Kite Pharma, Inc.

In February 2018, the Company entered into a global collaboration and license agreement with Kite Pharma, Inc. ("Kite"), which became effective in April 2018, and was amended and restated in September 2019, for the research, development and commercialization of potential engineered cell therapies for cancer. In this collaboration, Sangamo is working together with Kite on a research program under which the companies are designing zinc finger nucleases ("ZFNs") and viral vectors to disrupt and insert certain genes in T-cells and natural killer cells ("NK-cells") including the insertion of genes that encode chimeric antigen receptors ("CARs"), T-cell receptors ("TCRs"), and NK-cell receptors ("NKRs") directed to mutually agreed targets. Kite is responsible for all clinical development, manufacturing and commercialization of any resulting products.

Subject to the terms of this agreement, the Company granted Kite an exclusive, royalty-bearing, worldwide sublicensable license under the Company's relevant patents and know-how to develop, manufacture and commercialize, for the purpose of treating cancer, specific cell therapy products that may result from the research program and that are engineered *ex vivo* using selected ZFNs and viral vectors developed under the research program to express CARs, TCRs or NKRs directed to candidate targets.

During the research program term and subject to certain exceptions except pursuant to this agreement, the Company is prohibited from researching, developing, manufacturing and commercializing, for the purpose of treating cancer, any cell therapy product that, as a result of *ex vivo* genome editing, expresses a CAR, TCR or NKR that is directed to a target expressed on or in a human cancer cell. After the research program term concludes and subject to certain exceptions, except pursuant to this agreement, the Company will be prohibited from developing, manufacturing and commercializing, for the purpose of treating cancer, any cell therapy product that, as a result of *ex vivo* genome editing, expresses a CAR, TCR or NKR that is directed to a candidate target.

Following the effective date, the Company received a $150.0 million upfront payment from Kite. Kite reimburses the Company's direct costs to conduct the joint research program. Sangamo is also eligible to receive contingent development- and sales-based milestone payments that could total up to $3.01 billion if all of the specified milestones set forth in this agreement are achieved. Of this amount, approximately $1.26 billion relates to the achievement of specified research, clinical development, regulatory and first commercial sale milestones, and approximately $1.75 billion relates to the achievement of specified sales-based milestones if annual worldwide net sales of licensed products reach specified levels. Each development- and sales-based milestone payment is payable (i) only once for each licensed product regardless of the number of times that the associated milestone event is achieved by such licensed product, and (ii) only for the first ten times that the associated milestone event is achieved regardless of the number of licensed products that may achieve such milestone event. In addition, the Company is entitled to receive escalating, tiered royalty payments with a percentage in the single digits based on future annual worldwide net sales of licensed products. These royalty payments are subject to reduction due to patent expiration, entry of biosimilar products to the market and payments made under certain licenses for third-party intellectual property.

The initial research term in the agreement is six years. Kite has an option to extend the research term of the agreement for up to two additional one-year periods for a separate upfront fee of $10.0 million per year. All contingent payments under the agreement, when earned, will be non-refundable and non-creditable. In connection with the amendment and restatement of the agreement in September 2019, the Company entered into a new research plan with Kite, with estimated reimbursable service cost of approximately $3.4 million, which is included in the total estimated reimbursable service costs. The Company concluded the total transaction price under this agreement is $189.3 million and includes the upfront license fee of $150.0 million and $39.3 million estimated reimbursable service costs for identified research projects over the estimated performance period. Further, the Company concluded the estimated fees for the presumed exercise of the research term extension options and all milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future events which are uncertain at this time. The Company will re-evaluate the transaction price including the estimated variable consideration included in the transaction price and all constrained amounts in each reporting period and as uncertain events are resolved or other changes in circumstances occur. None of the development and sales-based milestone payments have been included in the transaction price.

The Company assessed the agreement with Kite in accordance with ASC Topic 606 and concluded that Kite is a customer. Kite has the right to terminate this agreement in its entirety or on a per licensed product or per candidate target basis for any reason after a specified notice period. Each party has the right to terminate this agreement on account of the other party's bankruptcy or material, uncured breach.

The Company has identified the primary performance obligations within the Kite agreement as: (1) a license to the technology along with the stand-ready obligation to perform research services, and (2) the on-going research services. Revenue from the upfront license fee relates to access to the license and Company's obligation to stand-ready to perform such research

services as additional targets are selected by Kite. As a result of this obligation to perform research services when and if requested throughout the duration of the contract, the fee for the license and the stand-ready obligation will be recognized over time on a straight-line basis through June 2024, the estimated period of the stand-ready obligation. Revenue from the reimbursable costs related to the integrated service deliverable is recognized as the research services are performed. Related costs and expenses under these arrangements have historically approximated the revenues recognized. The estimated period of performance and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. As of June 30, 2020 and December 31, 2019, the Company had deferred revenue of $94.0 million and $106.5 million, respectively, related to this agreement.

Revenues recognized under the agreement for the three and six months ended June 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Revenue related to Kite agreement:				
Recognition of license and stand-ready fee	$ 6,227	$ 6,227	$ 12,454	$ 12,386
Research services	1,195	2,833	2,187	4,986
Total	$ 7,422	$ 9,060	$ 14,641	$ 17,372

Pfizer Inc.

SB-525 Global Collaboration and License Agreement

In May 2017, the Company entered into an exclusive global collaboration and license agreement with Pfizer, pursuant to which it established a collaboration for the research, development and commercialization of SB-525, its gene therapy product candidate for hemophilia A, and closely related products.

Under this agreement, the Company is responsible for conducting the Phase 1/2 clinical trial and for certain manufacturing activities for SB-525, while Pfizer is responsible for subsequent worldwide development, manufacturing, marketing and commercialization of SB-525. Sangamo may also collaborate in the research and development of additional AAV-based gene therapy products for hemophilia A.

Subject to the terms of the agreement, the Company granted Pfizer an exclusive worldwide royalty-bearing license, with the right to grant sublicenses, to use certain technology controlled by the Company for the purpose of developing, manufacturing and commercializing SB-525 and related products. Pfizer granted the Company a non-exclusive, worldwide, royalty free, fully paid license, with the right to grant sublicenses, to use certain manufacturing technology developed under the agreement and controlled by Pfizer to manufacture the Company's products that utilize the AAV delivery system. During a specified period, neither the Company nor Pfizer is permitted to clinically develop or commercialize, outside of the collaboration, certain AAV-based gene therapy products for hemophilia A.

Unless earlier terminated, the agreement has a term that continues on a per product and per country basis until the later of (i) the expiration of patent claims that cover the product in a country, (ii) the expiration of regulatory exclusivity for a product in a country, and (iii) fifteen years after the first commercial sale of a product in a country. Pfizer has the right to terminate the agreement without cause in its entirety or on a per product or per country basis. The agreement may also be terminated by either party based on an uncured material breach by the other party or the bankruptcy of the other party. Upon termination for any reason, the license granted by the Company to Pfizer to develop, manufacture and commercialize SB-525 and related products will automatically terminate. Upon termination by the Company for cause or by Pfizer in any country or countries, Pfizer will automatically grant the Company an exclusive, royalty-bearing license under certain technology controlled by Pfizer to develop, manufacture and commercialize SB-525 in the terminated country or countries.

Upon execution of the agreement, the Company received an upfront fee of $70.0 million and is eligible to receive development milestone payments contingent on the achievement of specified clinical development, intellectual property, regulatory and first commercial sale milestones for SB-525 and potentially other products. In addition, Sangamo is eligible to receive up to $208.5 million in payments upon the achievement of specified clinical development, intellectual property and regulatory milestones and up to $266.5 million in payments upon first commercial sale milestones for SB-525 and potentially other products. The total amount of potential clinical development, intellectual property, regulatory and first commercial sale milestone payments, assuming the achievement of all specified milestones in the agreement, is up to $475.0 million, which includes up to $300.0 million for SB-525 and up to $175.0 million for other products that may be developed under the agreement, subject to reduction on account of payments made under certain licenses for third-party intellectual property. In addition, Pfizer agreed to pay the Company royalties for each potential licensed product developed under the agreement that are an escalating tiered, double-digit percentage of the annual net sales of such product and are subject to reduction due to patent expiration, entry

of biosimilar products to the market and payment made under certain licenses for third-party intellectual property. To date, a $25.0 million milestone has been achieved and paid, however no products have been approved and therefore no royalty fees have been earned under the agreement.

The Company assessed the agreement with Pfizer in accordance with ASC Topic 606 and concluded that Pfizer is a customer. As of June 30, 2020, the total transaction price under this agreement is $104.0 million, which represents the upfront and research services fees of $79.0 million and one unconstrained milestone in the amount of $25.0 million. Sangamo is responsible for internal and external research costs as part of the upfront fee and has the ability to request additional reimbursement from Pfizer if certain conditions are met. None of the clinical or regulatory milestones have been included in the transaction price, as all such milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price, including its estimated variable consideration included in the transaction price and all constrained amounts in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

The Company has identified the performance obligations within the agreement as a license to the technology and on-going research services. The Company concluded that the license is not discrete as it does not have stand-alone value to Pfizer apart from the research services to be performed by the Company pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the on-going research services through 2020, the estimated period the Company will perform research services. The estimation of progress towards the satisfaction of its performance obligation and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. As of June 30, 2020 and December 31, 2019, the Company had deferred revenue of $0.7 million and $4.0 million, respectively, related to this agreement.

In December 2019, the Company entered into an amendment to the agreement, pursuant to which the Company transferred the IND for SB-525 to Pfizer. Upon this transfer the Company achieved a $25.0 million milestone as the conditions for achieving the milestone were met. The Company recognized $1.1 million during the six months ended June 30, 2020 and approximately $24.8 million on a cumulative basis attributed to this milestone as revenue. The balance of this milestone payment of $0.2 million will be recognized as revenue commensurate with the provision of research services over the remaining term of the agreement.

Revenues recognized under the agreement for the three and six months ended June 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Revenue related to Pfizer SB-525 agreement:				
Recognition of upfront fee and research services	$ 326	$ 4,635	$ 2,516	$ 1,595
Milestone achievement	103	—	1,096	—
Total	$ 429	$ 4,635	$ 3,612	$ 1,595

In March 2019, the Company received new data results, and expanded enrollment of patients in the ongoing trial. As a result, the estimated project cost increased and the proportional performance was updated based on the actual services delivered to Pfizer as a percentage of the updated project cost as of March 31, 2019. The increase in project cost resulted in a decrease in the measure of the proportional cumulative performance. During the six months ended June 30, 2019, the Company recorded a revenue reduction of approximately $3.0 million, or 38% of total revenues, due to a decrease in the measure of the proportional cumulative performance.

In March 2020, the Company recorded an adjustment to revenue related to a change in estimate in connection with the hemophilia A collaboration agreement with Pfizer. This adjustment was a direct result of the decision to decrease the project scope and the corresponding costs, after the successful IND transfer of the SB-525 product candidate to Pfizer, both of which resulted in an increase in the measure of proportional cumulative performance. This adjustment increased revenue by $2.4 million, decreased net loss by $2.4 million and decreased the Company's basic net loss per share by $0.02 for the six months ended June 30, 2020.

C9ORF72 Research Collaboration and License Agreement

In December 2017, the Company entered into a separate exclusive, global collaboration and license agreement with Pfizer for the development and commercialization of potential gene therapy products that use ZFP-TFs to treat amyotrophic

lateral sclerosis and frontotemporal lobar degeneration linked to mutations of the *C9ORF72* gene. Pursuant to this agreement, the Company agreed to work with Pfizer on a research program to identify, characterize and preclinically develop ZFP-TFs that bind to and specifically reduce expression of the mutant form of the *C9ORF72* gene.

Subject to the terms of this agreement, the Company granted Pfizer an exclusive, royalty-bearing, worldwide license under the Company's relevant patents and know-how to develop, manufacture and commercialize gene therapy products that use resulting ZFP-TFs that satisfy pre-agreed criteria. During a specified period, neither the Company nor Pfizer will be permitted to research, develop, manufacture or commercialize outside of the collaboration any ZFPs that specifically bind to the *C9ORF72* gene.

Unless earlier terminated, the agreement has a term that continues on a per licensed product and per country basis until the later of (i) the expiration of patent claims that cover the licensed product in a country, (ii) the expiration of regulatory exclusivity for a licensed product in a country, and (iii) fifteen years after the first commercial sale of a licensed product in a major market country. Pfizer also has the right to terminate the agreement without cause in its entirety or on a per product or per country basis. The agreement may also be terminated by either party based on an uncured material breach by the other party or the bankruptcy of the other party. The agreement will also terminate if the Company is unable to identify any lead candidates for development within a specified period of time or if Pfizer elects not to advance a lead candidate beyond a certain development milestone within a specified period of time. Upon termination for any reason, the license granted by the Company to Pfizer to develop, manufacture and commercialize licensed products under the agreement will automatically terminate. Upon termination by the Company for cause or by Pfizer without cause for any licensed product or licensed products in any country or countries, the Company will have the right to negotiate with Pfizer to obtain a non-exclusive, royalty-bearing license under certain technology controlled by Pfizer to develop, manufacture and commercialize the licensed product or licensed products in the terminated country or countries.

Following termination by the Company for Pfizer's material breach, Pfizer will not be permitted to research, develop, manufacture or commercialize ZFPs that specifically bind to the *C9ORF72* gene for a period of time. Following termination by Pfizer for the Company's material breach, the Company will not be permitted to research, develop, manufacture or commercialize ZFPs that specifically bind to the *C9ORF72* gene for a period of time.

The Company assessed the agreement with Pfizer in accordance with ASC Topic 606 and concluded that Pfizer is a customer. The Company received a $12.0 million upfront payment from Pfizer and is eligible to receive up to $60.0 million in development milestone payments from Pfizer contingent on the achievement of specified preclinical development, clinical development and first commercial sale milestones, and up to $90.0 million commercial milestone payments if annual worldwide net sales of the licensed products reach specified levels. In addition, Pfizer will pay the Company royalties based on an escalating tiered, mid- to high-single digit percentage of the annual worldwide net sales of the licensed products. These royalty payments are subject to reduction due to patent expiration, entry of biosimilar products to the market and payments made under certain licenses for third-party intellectual property. Each party will be responsible for the cost of its performance of the research program. Pfizer will be operationally and financially responsible for subsequent development, manufacturing and commercialization of the licensed products.

The Company concluded the total transaction price under this agreement is $12.0 million, which represents the upfront fee. None of the clinical or regulatory milestones have been included in the transaction price, as all milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price, including its estimated variable consideration included in the transaction price and all constrained amounts, in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

The Company has identified the performance obligations within this agreement as a license to the technology and on-going research services. The Company concluded that the license is not discrete as it does not have stand-alone value to Pfizer apart from the services to be performed by the Company pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the on-going services, over the estimated period the Company will perform research services. The estimation of progress towards the satisfaction of its performance obligation and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. As of June 30, 2020 and December 31, 2019, the Company had deferred revenue of $4.2 million and $8.0 million, respectively, related to this agreement.

Revenues recognized under the agreement for the three and six months ended June 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Recognition of upfront fee related to Pfizer *C9ORF72* agreement	$ 3,425	$ 455	$ 3,785	$ 1,070

In June 2020, the Company recorded an adjustment to revenue related to a change in estimate in connection with the *C9ORF72* collaboration agreement with Pfizer. This adjustment was a direct result of the decision to decrease the project scope and the corresponding costs due to advancement of the program, which resulted in an increase in the measure of proportional cumulative performance. This adjustment increased revenue by $3.0 million, decreased net loss by $3.0 million and decreased the Company's basic net loss per share by $0.02 for the six months ended June 30, 2020.

Sanofi Genzyme

In January 2014, the Company entered into an exclusive worldwide collaboration and license agreement to develop therapeutics for hemoglobinopathies, focused on beta thalassemia and sickle cell disease ("SCD"). The agreement was originally signed with BIMA, who subsequently assigned it to Bioverativ Inc., which was later acquired by Sanofi. Under the agreement, the Company is jointly conducting two research programs: the beta thalassemia program and the SCD program. In the beta thalassemia program, the Company is responsible for all discovery, research and development activities through the first human clinical trial. In the SCD program, both parties are responsible for research and development activities through the submission of an IND application for ZFP therapeutics intended to treat SCD.

Under both programs, Sanofi is responsible for subsequent worldwide clinical development, manufacturing and commercialization of licensed products developed under the agreement. At the end of the specified research terms for each program or under certain specified circumstances, Sanofi has the right to step in and take over any of the Company's remaining activities. Furthermore, the Company has an option to co-promote in the U.S. any licensed products to treat beta thalassemia and SCD developed under the agreement, and Sanofi will compensate the Company for such co-promotion activities. Subject to the terms of the agreement, the Company has granted Sanofi an exclusive, royalty-bearing license, with the right to grant sublicenses, to use certain ZFP and other technology controlled by the Company for the purpose of researching, developing, manufacturing and commercializing licensed products developed under the agreement. The Company also granted Sanofi a non-exclusive worldwide, royalty-free fully paid license with the right to grant sublicenses, under the Company's interest in certain other intellectual property developed pursuant to the agreement. During the term of the agreement, the Company is not permitted to research, develop, manufacture or commercialize, outside of the agreement, certain gene therapy products that target genes relevant to the licensed products.

The agreement may be terminated by (i) the Company or Sanofi for the uncured material breach of the other party, (ii) the Company or Sanofi for the bankruptcy or other insolvency proceeding of the other party; (iii) Sanofi, upon 180 days' advance written notice to the Company and (iv) Sanofi, for certain safety reasons upon written notice to, and after consultation with, the Company. As a result, actual future milestone payments could be lower than the amounts stated above.

Under the agreement, the Company received an upfront license fee of $20.0 million and is eligible to receive development and sales milestone payments upon the achievement of specified regulatory, clinical development and sales milestones. In addition, the Company is also eligible to receive up to $115.8 million in payments upon the achievement of specified clinical development and regulatory milestones, as well as up to $160.5 million in payments upon the achievement of specified sales milestones. The total amount of potential regulatory, clinical development and sales milestone payments, assuming the achievement of all specified milestones in the agreement, is up to $276.3 million. In addition, the Company will receive royalty payments for each licensed product that are a tiered double-digit percentage of annual net sales of each product. Sanofi reimburses Sangamo for agreed upon costs incurred in connection with research and development activities conducted by Sangamo. To date, a $6.0 million milestone has been achieved related to ST-400 for beta thalassemia and another $7.5 million milestone has been achieved related to SCD, however no products have been approved and therefore no royalty fees have been earned under the Sanofi agreement.

All contingent payments under the agreement, when earned, will be non-refundable and non-creditable. The transaction price of $93.3 million includes the upfront license fee of $20.0 million, two unconstrained milestones in the amount of $13.5 million and estimated research costs of $59.8 million for identified research projects over the estimated performance period, as all unachieved milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price, including the estimated variable consideration included in the transaction price and all constrained amounts, in each reporting

period and as uncertain events are resolved or other changes in circumstances occur. None of the clinical or regulatory milestones have been included in the transaction price.

The Company assessed the agreement with Sanofi in accordance with ASC Topic 606 and concluded that Sanofi is a customer. The Company has identified the performance obligations within this arrangement as a license to the technology and on-going research services activities. The Company concluded that the license is not discrete as it does not have stand-alone value to Sanofi apart from the research services to be performed pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the ongoing services through 2022, the estimated period the Company will perform research services. The estimation of progress towards the satisfaction of performance obligation and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. Related costs and expenses under these arrangements have historically approximated the revenues recognized. As of June 30, 2020 and December 31, 2019, the Company had deferred revenue of $2.3 million and $1.7 million, respectively, related to this agreement.

In August 2019, the Company achieved a $6.0 million milestone with Sanofi upon dosing of the third subject in the ST-400 beta thalassemia Phase 1 clinical trial. The Company recognized on a cumulative basis approximately $5.6 million as of June 30, 2020 attributed to this milestone as revenue and a revenue reversal of $0.1 million related to a change in scope was recognized during the six months ended June 30, 2020.

In December 2019, the Company achieved a $7.5 million milestone with Sanofi upon dosing of the first subject in the SCD Phase 1 clinical trial. The Company recognized on a cumulative basis approximately $7.0 million as of June 30, 2020 attributed to this milestone as revenue and a revenue reversal of $0.1 million related to a change in scope was recognized during the six months ended June 30, 2020.

Revenues recognized under the agreement for the three and six months ended June 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Revenue related to Sanofi agreement:				
Recognition of upfront fee	$ 380	$ 901	$ (349)	$ 1,654
Research services	1,155	2,158	2,875	3,355
Milestone achievement	257	—	(235)	—
Total	$ 1,792	$ 3,059	$ 2,291	$ 5,009

In March 2020, the Company recorded an adjustment to revenue related to a change in estimate in connection with the collaboration agreement with Sanofi. This adjustment was a direct result of the decision in March 2020 to increase the project scope and the corresponding costs, both of which resulted in a decrease in the measure of proportional cumulative performance. This adjustment decreased revenue by $2.2 million, increased net loss by $2.2 million and increased the Company's basic net loss per share by $0.02 for the six months ended June 30, 2020.

California Institute for Regenerative Medicine

In May 2018, the California Institute for Regenerative Medicine ("CIRM") granted a Strategic Partnership Award for $8.0 million to fund the clinical studies of a potentially curative ZFP therapeutic for the treatment of beta thalassemia based on the application of Sangamo's ZFN genome editing technology. The grant exists through December 31, 2022 and provides matching funds to support the evaluate ST-400, a gene-edited cell therapy candidate for people with transfusion-dependent beta thalassemia. As of June 30, 2020, the Company had received $5.2 million under the award.

Under the terms of the CIRM grants, the Company is obligated to pay royalties and licensing fees based on a low single digit royalty percentage on net sales of CIRM-funded product candidates or CIRM-funded technology. The Company has the option to decline any and all amounts awarded by CIRM and as an alternative to revenue sharing, the Company has the option to convert the award to a loan. No such election has been made as of the date of the issuance of these financial statements. If the Company terminates a CIRM-funded clinical trial, it is obligated to repay any unused CIRM funds received. Therefore, as of June 30, 2020 and December 31, 2019, $6.1 million and $5.7 million, respectively, including interest, related to this award are recorded as a loan in other long-term liabilities on the accompanying Condensed Consolidated Balance Sheets as the Company does not expect to repay these amounts within the next 12 months.

NOTE 6—INCOME TAXES

The Company maintains deferred tax assets that reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. These deferred tax assets include net operating loss carryforwards, research credits and capitalized research and development costs. Realization of deferred tax assets is dependent upon future earnings, if any, the timing and amount of which are uncertain based on Sangamo's history of losses. Accordingly, the Company's net deferred tax assets have been fully offset by a valuation allowance. Utilization of operating losses and credits may be subject to substantial annual limitation due to ownership change provisions of the Internal Revenue Code of 1986, as amended and similar state provisions. The annual limitation may result in the expiration of net operating losses and credits before utilization.

On March 27, 2020, the President signed the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act") into law. The CARES Act is a relief package that includes changes to the US tax code including but not limited to, (1) modifications to the calculation of interest deductibility in 2019 and 2020; (2) changes to rules related to the uses and limitations of net operating loss carryforwards created in 2018-2020 and (3) technical corrections for qualified improvement property. The CARES Act did not have a material impact on the Company's Condensed Consolidated Statements of Operations for the six months ended June 30, 2020.

NOTE 7—COMMITMENTS AND CONTINGENCIES

Leases

Sangamo occupies approximately 87,700 square feet of office and research and development laboratory facilities in Brisbane, California, pursuant to a lease that expires in May 2029. Sangamo also occupies approximately 45,600 square feet of research and office space in Richmond, California pursuant to leases that expire in August 2026. In addition, the Company leases approximately 20,800 square feet of research and office space in Valbonne, France, subject to leases that expire beginning in June 2025 through March 2028.

Certain of these leases include renewal options at the election of the Company to renew or extend the lease for an additional five to ten years. These optional periods have not been considered in the determination of the ROU assets or lease liabilities associated with these leases as the Company did not consider it reasonably certain that it would exercise the options.

The Company performed evaluations of its contracts and determined each of its identified leases are operating leases. For the three and six months ended June 30, 2020, the Company incurred $2.6 million and $5.1 million of lease costs in relation to these operating leases. These lease costs were included in operating expenses in the Condensed Consolidated Statements of Operations. Variable lease expense was $0.5 million and $1.0 million for the three and six months ended June 30, 2020 and was not included in the measurement of the Company's operating ROU assets and lease liabilities. The variable expense consists primarily of the Company's proportionate share of operating expenses, property taxes and insurance and is classified as lease expense, due to the Company's election to not separate lease and non-lease components.

Cash paid for amounts included in the measurement of operating lease liabilities for the six months ended June 30, 2020 was $3.1 million and was included in net cash used in operating activities in the Company's Condensed Consolidated Statements of Cash Flow.

As of June 30, 2020, the maturities of the Company's operating lease liabilities were as follows (in thousands):

	Total
Six months ending December 31, 2020	$ 2,717
2021	6,390
2022	6,468
2023	6,556
2024	6,694
Thereafter	26,141
Total lease payments	54,966
Less:	
Imputed interest	(12,356)
Total	$ 42,610
Reported as of June 30, 2020:	
Operating lease liabilities - current (included in Accounts payable and accrued liabilities on the Condensed Consolidated Balance Sheet)	$ 3,376
Operating lease liabilities - long-term	39,234
Total	$ 42,610

As of June 30, 2020, the weighted-average remaining lease term is 8.3 years and the weighted-average incremental borrowing rate used to determine the operating lease liability was 6.2% for the Company's operating leases.

The Company does not have any financing leases.

Contractual Commitments

As of June 30, 2020, the Company has manufacturing obligations that include a fee of $3.2 million for dedicated capacity pursuant to the Development and Manufacturing Services Agreement with Brammer Bio MA, now a Thermo Fisher Scientific Inc. subsidiary ("Brammer"). The Company also has an Option Agreement ("Option") with Brammer, entered in April 2019, whereby Brammer granted the Company an option to secure dedicated capacity for manufacturing in Brammer's facilities. The Company paid $3.0 million for the Option, which expires on December 31, 2021. In addition, the Company agreed to pay Brammer $2.0 million, $1.0 million of which has been paid, to assist it in establishing its manufacturing capabilities in Brisbane, California, which may increase Sangamo's contractual commitments in the future. Furthermore, the Company has non-cancelable contractual commitments under manufacturing-related supplier arrangements with Brammer, which requires minimum purchase commitments totaling approximately $2.5 million through December 2021, $0.5 million of which was paid upon execution of the agreement.

In May 2020, the Company entered into an amendment to an existing lease to acquire approximately 8,500 square feet of research and office space in Richmond, California that expire in August 2026. Total lease payment over the life of this lease under this amendment are approximately $1.6 million. Variable lease payments include the Company's allocated share of costs incurred and expenditures made by the landlord in the operation and management of the building. The commencement date of this lease was determined to be in the third quarter of 2020, therefore the lease is not included in the Company's operating lease right-of-use asset or operating lease liabilities as of June 30, 2020.

The Company also has $1.2 million of license obligations related to its intellectual property.

Contingencies

Sangamo is not party to any material pending legal proceedings or contingencies. From time to time, the Company may be involved in legal proceedings arising in the ordinary course of business.

NOTE 8—STOCK-BASED COMPENSATION

The following table shows total stock-based compensation expense included in the Condensed Consolidated Statements of Operations for the three and six months ended June 30, 2020 and 2019 (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Research and development	$ 3,578	$ 2,763	$ 6,417	$ 5,061
General and administrative	3,186	2,104	5,967	4,329
Total stock-based compensation expense	$ 6,764	$ 4,867	$ 12,384	$ 9,390

NOTE 9—STOCKHOLDERS' EQUITY

Common Stock

In connection with the collaboration agreement with BIMA described in Note 5 of these Condensed Consolidated Financial Statements, the Company also entered into a stock purchase agreement with BIMA, pursuant to which BIMA agreed to purchase the Biogen Shares at a price per share of $9.2137, for an aggregate purchase price of approximately $225.0 million. The Company closed the sale of the Biogen Shares on April 8, 2020.

In April 2019, Sangamo completed an underwritten public offering of its common stock, in which the Company sold an aggregate of 12.7 million shares of its common stock at a public offering price of $11.50 per share. The net proceeds to Sangamo from the sale of shares in this offering, after deducting underwriting discounts and commissions and other estimated offering expenses, were approximately $136.3 million.

NOTE 10—ACQUISITION OF SANGAMO THERAPEUTICS FRANCE S.A.S.

On July 20, 2018, Sangamo entered into various agreements with the goal of eventually acquiring 100% of Sangamo France's share capital. The Company entered into the Sangamo France SPA with certain shareholders of Sangamo France, pursuant to which it acquired 13,519,036 ordinary shares of Sangamo France ("Ordinary Shares") as part of a block transaction that closed on October 1, 2018 (the "Acquisition Date"). Additionally, the Company and Sangamo France entered into a Tender Offer Agreement pursuant to which Sangamo agreed to acquire 11,528,635 Ordinary Shares for the same price per share as the Sangamo France SPA via a cash tender offer that closed on November 23, 2018. Following the block transaction, cash tender offer, and other open market purchases of shares, the Company owned 98.2% of the Ordinary Shares as of December 31, 2018 (or 25,047,671 Ordinary Shares). In addition to the Sangamo France SPA and the tender offer agreement, the Company also entered into arrangements with the holders of approximately 477,000 "free shares" of Sangamo France pursuant to which the Company has the right to purchase such shares from the holders (a call option) and such holders have the right to sell to the Company such shares from time to time through mid-2021 (a put option) (collectively the "Free Shares Options"). In June 2019, Sangamo France became a société par actions simplifiée ("S.A.S.") and was renamed from "TxCell" to "Sangamo Therapeutics France." During 2019, the Company acquired approximately 111,000 vested free shares, increasing its ownership of the Ordinary Shares from 98.2% to 98.7%. During the three months ended June 30, 2020, the Company acquired approximately 117,000 vested free shares, including 80,000 from a former executive of Sangamo France who is now an executive of Sangamo, pursuant to the exercise of the Free Shares Options for approximately $0.2 million of cash, increasing its ownership of the Ordinary Shares to 99.1% as June 30, 2020.

At the Acquisition Date, the fair value of the Free Shares Options was estimated to be a liability of $0.2 million. See "Note 2 — Fair Value Measurements-*Free Shares Asset*" for information regarding the valuation method. The fair value of the Free Shares Options will vary based on future changes in the Company's stock price during the option period. The fair value of the Free Shares Options was estimated to be an asset of $0.2 million as of June 30, 2020.

The acquisition of Sangamo France was accounted for as a business combination in accordance with ASC Topic 805, *Business Combinations*, in exchange for total consideration of approximately $45.9 million at the Acquisition Date. The operating results of Sangamo France after the Acquisition Date have been included in the Company's Condensed Consolidated Statements of Operations.

There were no goodwill impairments during the six months ended June 30, 2020 or during 2019 and, as noted below, substantially all of the non-controlling interest on the Acquisition Date was subsequently acquired by the Company and, accordingly, substantially all of the goodwill is allocated to the Company as of June 30, 2020 and December 31, 2019.

Non-Controlling Interest

The fair value of the remaining non-controlling was determined based on the number of outstanding shares comprising the non-controlling interest and the $2.99 acquisition price per share as of the Acquisition Date. The non-controlling interest is presented as a component of stockholders' equity on the Company's Condensed Consolidated Balance Sheets.

Non-controlling interest as of June 30, 2020 was as follows (in thousands):

	Total
Balance at December 31, 2019	$ 185
Fair value of additional shares acquired	(339)
Loss attributable to non-controlling interest	(97)
Balance at June 30, 2020	$ (251)

NOTE 11—SUBSEQUENT EVENTS

On July 27, 2020, the Company entered into a collaboration and license agreement with Novartis Institutes for BioMedical Research, Inc. (“Novartis”) for the research, development and commercialization of gene regulation therapies to treat three neurodevelopmental disorders. The collaboration became immediately effective upon execution of the agreement. Under the agreement, the Company granted to Novartis an exclusive, royalty bearing and worldwide license, under its relevant patents and know-how, to develop, manufacture and commercialize certain of its ZFP-TFs targeted to three undisclosed genes that are associated with neurodevelopmental disorders, including autism spectrum disorder and intellectual disability. Over a three-year collaboration period, which may be extended by Novartis for up to two additional years, the Company will perform early research activities for each gene target and manufacture the ZPF-TFs required for such research, costs of which will be funded by Novartis. Novartis is responsible for additional research activities, investigational new drug-enabling studies, clinical development, regulatory approvals, manufacturing of preclinical, clinical and approved products, and global commercialization. Subject to certain exceptions set forth in the agreement, the Company is prohibited from developing, manufacturing or commercializing any therapeutic product targeting any of the three genes that are the subject of the collaboration. Novartis also has the option to license certain of the Company's proprietary AAVs for the sole purpose of developing, manufacturing and commercializing licensed products arising from the collaboration. Under the agreement, Novartis will pay the Company a $75.0 million upfront license fee payment no later than August 27, 2020. In addition, the Company is eligible to earn from Novartis up to $420.0 million in development milestones and up to $300.0 million in commercial milestones. The Company is also eligible to earn from Novartis tiered high single-digit to sub-teen double-digit royalties on potential net commercial sales of licensed products arising from the collaboration. These royalty payments will be subject to reduction due to patent expiration, loss of market exclusivity and payments made under certain licenses for third-party intellectual property. The agreement will continue, on a product-by-product and country-by-country basis, until the expiration of the applicable royalty term. Novartis has the right to terminate the agreement, in its entirety or on a target-by-target basis, for any reason after a specified notice period. Each party has the right to terminate the agreement on account of the other party’s bankruptcy or material, uncured breach.

On August 5, 2020, the Company entered into an Open Market Sale Agreement℠ with Jefferies LLC (“Jefferies”) with respect to an at-the-market offering program under which the Company may offer and sell, from time to time at its sole discretion, shares of the Company’s common stock having an aggregate offering price of up to $150.0 million through Jefferies as the Company’s sales agent or principal. The Company is not obligated to sell any shares under the sales agreement. Subject to the terms and conditions of the sales agreement, Jefferies will use commercially reasonable efforts, consistent with its normal trading and sales practices and applicable laws and regulations, to sell shares of the Company’s common stock from time to time based upon the Company’s instructions, including any price, time or size limits or other customary parameters or conditions the Company specifies, subject to certain limitations. Under the sales agreement, Jefferies may sell shares of the Company’s common stock by any method permitted by law deemed to be an “at-the-market offering.” The Company will pay Jefferies a commission of up to 3% of the gross proceeds from each sale of shares of the Company’s common stock sold through Jefferies under the sales agreement and will provide Jefferies with customary indemnification and contribution rights. In addition, the Company agreed to reimburse certain legal expenses and fees by Jefferies in connection with the offering up to a maximum of $50,000, as well as certain ongoing disbursements of Jefferies’ counsel, if required. The sales agreement will terminate upon the sale of all $150.0 million of shares under the sales agreement, unless earlier terminated by either party as permitted therein.

ITEM 2. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The discussion in “Management’s Discussion and Analysis of Financial Condition and Results of Operations” contains trend analysis, estimates and other forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements include, without limitation, statements containing the words “anticipates,” “believes,” “continues,” “could,” “estimates,” “expects,” “intends,” “may,” “plans,” “seeks,” “should” and “will” and other words of similar import or the negative of those terms or expressions. Such forward-looking statements are subject to known and unknown risks, uncertainties, estimates and other factors

that may cause our actual results, performance or achievements, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Actual results could differ materially from those set forth in such forward-looking statements as a result of, but not limited to the "Risk Factors" in Part II, Item 1A of this Quarterly Report on Form 10-Q. You should read the following discussion and analysis along with the financial statements and notes attached to those statements included elsewhere in this report and in our Annual Report on Form 10-K for the year ended December 31, 2019, or the 2019 Annual Report, as filed with the Securities and Exchange Commission, or SEC, on February 28, 2020.

In addition, the section of this "Management's Discussion and Analysis of Financial Condition and Results of Operations" generally discusses 2020 and 2019 items and quarter-to-quarter comparisons between 2020 and 2019. Discussions of 2019 items and quarter-to-quarter comparisons between 2019 and 2018 are not included in this Quarterly Report on Form 10-Q and can be found in "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Part I, Item 2 of our Quarterly Report on Form 10-Q for the quarter ended June 30, 2019, as filed with the SEC on August 8, 2019.

Overview

We are a clinical stage biotechnology company focused on translating ground-breaking science into genomic medicines with the potential to transform patients' lives using our platform technologies in gene therapy, *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* genome regulation.

Our strategy is to maximize the value and therapeutic use of our technology platforms. For certain therapies, we intend to capture the value of our proprietary gene therapy, cell therapy, genome editing and genome regulation technologies by manufacturing and developing product candidates and commercializing approved products ourselves. For other therapies, we intend to partner with other biopharmaceutical companies to manufacture and develop product candidates and commercialize approved products as appropriate. Decisions to partner product candidates will be based on review of our internal resources, internal know-how, assessment of technical risk, anticipated length and complexity of clinical studies, competitive landscape and other commercial considerations. Our diverse pipeline includes genomic medicine product candidates across multiple therapeutic areas including inherited metabolic disorders, or IMDs, rare blood diseases, central nervous system diseases, neurodevelopmental disorders, oncology and immunology, which comprises inflammatory and autoimmune diseases.

We are a leader in the research and development of zinc finger proteins, or ZFPs, a naturally occurring class of transcription factor proteins found in humans and other species. We have used our internal know-how and technical expertise to develop a proprietary synthetic ZFP platform with potential clinical utility in *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* genome regulation. ZFPs may be engineered to make zinc finger nucleases, or ZFNs, that can be used to selectively modify DNA sequences by knocking in or knocking out genes of choice, or zinc finger protein transcription factors, or ZFP-TFs, that can be used to selectively increase or decrease gene expression. In the process of developing this platform, we have additionally accrued significant scientific, manufacturing and development capabilities, as well as related know-how, all of which are broadly applicable to the field of gene therapy. We have used this knowledge to advance a gene therapy platform.

We have a substantial intellectual property portfolio protecting our technology and product candidates. We continue to license and file new patent applications to strengthen and consolidate our existing patent portfolio. We believe that our intellectual property position is critical to our ability to research, develop, manufacture and commercialize gene therapy, *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* genome regulation products and services.

Business Update

On July 27, 2020, we entered into a collaboration and license agreement with Novartis Institutes for BioMedical Research, Inc., or Novartis, for the research, development and commercialization of gene regulation therapies to treat three neurodevelopmental disorders. The collaboration became immediately effective upon execution of the agreement. Under the agreement, we have granted to Novartis an exclusive, royalty bearing and worldwide license, under our relevant patents and know-how, to develop, manufacture and commercialize certain of our ZFP-TFs targeted to three undisclosed genes that are associated with neurodevelopmental disorders, including autism spectrum disorder and intellectual disability. Over a three-year collaboration period, which may be extended by Novartis for up to two additional years, we will perform early research activities for each gene target and manufacture the ZPF-TFs required for such research, costs of which will be funded by Novartis. Novartis is responsible for additional research activities, investigational new drug-enabling studies, clinical development, regulatory approvals, manufacturing of preclinical, clinical and approved products, and global commercialization. Subject to certain exceptions set forth in the agreement, we are prohibited from developing, manufacturing or commercializing any therapeutic product targeting any of the three genes that are the subject of the collaboration. Novartis also has the option to license certain of our proprietary adeno-associated viruses for the sole purpose of developing, manufacturing and commercializing licensed products arising from the collaboration. Under the agreement, Novartis will pay us a $75.0 million upfront license fee payment no

later than August 27, 2020. In addition, we are eligible to earn from Novartis up to $420.0 million in development milestones and up to $300.0 million in commercial milestones. We are also eligible to earn from Novartis tiered high single-digit to sub-teen double-digit royalties on potential net commercial sales of licensed products arising from the collaboration. These royalty payments will be subject to reduction due to patent expiration, loss of market exclusivity and payments made under certain licenses for third-party intellectual property. The agreement will continue, on a product-by-product and country-by-country basis, until the expiration of the applicable royalty term. Novartis has the right to terminate the agreement, in its entirety or on a target-by-target basis, for any reason after a specified notice period. Each party has the right to terminate the agreement on account of the other party's bankruptcy or material, uncured breach.

In February 2020, we entered into a collaboration and license agreement with Biogen MA, Inc., or BIMA, and Biogen International GmbH (together with BIMA, or Biogen), for the research, development and commercialization of gene regulation therapies for the treatment of neurological diseases, including ST-501 a preclinical ZFP-TF product candidate for tauopathies including Alzheimer's disease, and ST-502, a preclinical ZFP-TF product candidate for alpha-synuclein related diseases including Parkinson's disease, among other targets. Concurrently with the execution of the collaboration and license agreement, we entered into a stock purchase agreement with BIMA in which BIMA agreed to purchase $225.0 million of newly issued shares of our common stock, or the Biogen Shares. In April 2020, the collaboration agreement became effective and we received the stock sale proceeds, and Biogen paid us an upfront license fee of $125.0 million in May 2020. We are also eligible to receive research, development, regulatory and commercial milestone payments that could total up to approximately $2.37 billion if Biogen selects all of the targets allowed under the agreement and all the specified milestones set forth in the agreement are achieved, which includes up to $925.0 million in pre-approval milestone payments and up to $1.45 billion in first commercial sale and other sales-based milestone payments. In addition, we are also eligible to receive tiered royalties on potential net commercial sales of licensed products arising from the collaborations. For more information regarding the Biogen collaboration, see section entitled "—Collaborations—Biogen" in Item 1, Business of our 2019 Annual Report.

In collaboration with our partner, Pfizer Inc., or Pfizer, we are evaluating giroctocogene fitelparvovec (also known as SB-525) gene therapy for the treatment of hemophilia A. In 2019, we completed the manufacturing technology transfer to Pfizer. Pfizer presented updated follow-up data from the Phase 1/2 Alta Study assessing giroctocogene fitelparvovec in adult patients with severe hemophilia A at the World Federation of Hemophilia 2020 World Congress in June 2020. The data demonstrated that giroctocogene fitelparvovec was generally well tolerated, and all five patients with severe hemophilia A who received the 3e13 vg/kg dose showed sustained factor VIII, or FVIII, activity levels, with a median of 64.2% via chromogenic assay (patient-level geometric means after week nine post-infusion). No patients experienced bleeding events or required FVIII infusions. The FVIII activity levels presented reflected measurements up to 61 weeks, the extent of follow-up for the longest-treated patient in the cohort. Pfizer has announced that it is advancing giroctocogene fitelparvovec into a Phase 3 registrational clinical study, which may provide the basis for seeking regulatory approval as a therapeutic, and that it expects to dose the first patient in the study by the end of 2020.

We are also evaluating our wholly owned ST-920 gene therapy for Fabry disease, a rare inherited metabolic disease. In 2019, the IND was accepted by the U.S. Food and Drug Administration, or FDA, and a clinical trial authorization, or CTA, was granted in the United Kingdom. The FDA also granted Orphan Drug Designation to ST-920 for the treatment of Fabry disease. We are currently evaluating ST-920 in adult males with classic Fabry disease in the Phase 1/2 STAAR study, an open-label, dose-ascending clinical trial. We have successfully screened and enrolled patients into the STAAR study and, while we are carefully following the impact of the evolving COVID-19 pandemic on the operations of clinical sites, we currently anticipate infusing the first subject by the end of 2020.

In collaboration with our partner Sanofi Genzyme, or Sanofi, we are evaluating gene-edited cell therapies for two hemoglobinopathies, ST-400 for transfusion dependent beta thalassemia, and BIVV003 for sickle cell disease, or SCD. ST-400 and BIVV003 are both designed to induce the synthesis of fetal hemoglobin, achieved by gene-edited knock out of the erythroid specific enhancer of the *BCL11a* gene, which encodes a strong repressor of the gamma globin gene. In December 2019, we achieved a $7.5 million milestone payment from Sanofi for the first subject dosed in Sanofi's Phase 1/2 PRECIZN-1 trial evaluating BIVV003 for SCD. We have enrolled and dosed five patients into the Thales Study evaluating ST-400 for beta thalassemia. Sanofi continues to enroll sickle cell patients into the PRECIZN-1 study. We and Sanofi will look for an appropriate time to present data from these programs at a future date once both studies have accumulated a sufficient number of patients and follow up.

We are also evaluating chimeric antigen receptor regulatory T cell, or CAR-Treg, cell therapies for the treatment of inflammatory and autoimmune diseases. Our lead CAR-Treg program is TX200, which is being evaluated to treat HLA-A2 mismatched kidney transplantation. In late 2019, we received CTA authorization in the United Kingdom for the TX200 Phase 1/2 STEADFAST clinical trial, and in 2020 we received authorization for the study in the Netherlands. As we plan the initiation of

the STEADFAST trial, we are monitoring the impact of the evolving COVID-19 pandemic on clinical operations for this study and expect to dose the first subject in 2021.

In February 2018, we entered into a global collaboration and license agreement with Kite Pharma, Inc., or Kite, a Gilead Company, which became effective in April 2018, and was amended and restated in September 2019, for the research, development and commercialization of potential engineered cell therapies for cancer. In this collaboration, we are working together with Kite on a research program under which the companies are designing ZFNs and viral vectors to disrupt and insert certain genes in T-cells and natural killer cells, or NK-cells including the insertion of genes that encode chimeric antigen receptors, or CARs, T-cell receptors, or TCRs, and NK-cell receptors, or NKRs directed to mutually agreed targets. Kite is responsible for all clinical development, manufacturing and commercialization of any resulting products. In collaboration with Kite, we are evaluating KITE-037, an allogeneic anti-CD19 CAR-T cell product. Kite has informed us that the timeline for the initiation of the KITE-037 clinical trial planned for 2020 may be delayed due to the impact of the evolving COVID-19 pandemic.

We currently rely on contract manufacturing organizations, or CMOs, to produce our preclinical and clinical product candidates in accordance with FDA and the European Medicines Agency, or EMA, mandated regulations, also known as current good manufacturing practices, or cGMPs. We employ a technical operations staff in the areas of process development, analytical development, quality control, quality assurance, project management, and manufacturing to facilitate appropriate oversight of our CMOs, support of our regulatory filings and execution of clinical trials. We are building a cGMP manufacturing facility in our new headquarters building in Brisbane, CA. This facility is being designed to manufacture Phase 1/2 clinical trial supplies for our gene therapy and cell therapy pipeline and potentially collaboration programs. The gene therapy manufacturing facility is currently anticipated to become operational by the end of 2020. The cell therapy manufacturing facility in Brisbane, as well as another cell therapy manufacturing facility at our site in Valbonne, France, are anticipated to become operational in 2021.

Estimated Impacts of Evolving COVID-19 Pandemic

In March 2020, the World Health Organization characterized COVID-19 as a global pandemic. Also that month, governmental agencies imposed shelter-in-place orders in areas where we operate in California, France and the United Kingdom. The extent to which the COVID-19 pandemic will impact our business, operations and financial condition, either directly or indirectly, will depend on future developments that remain highly uncertain at the present time. As our understanding of events evolves and additional information becomes available, we may materially change our guidance relating to our revenues, expenses and timelines for manufacturing, clinical trials and research and development.

We have implemented an operating plan to continue business operations during the ongoing COVID-19 pandemic in compliance with government orders and restrictions, including enhanced workplace safety protocols and modified working schedules. Office-based employees have been working from home since March 2020. Although certain government orders and restrictions have eased, and phased re-openings are underway, it is not certain when such restrictions and orders will be fully lifted, and recent resurgences in number and rates of infections, reactions to increased testing and further spread of the virus may result in the return of prior orders and restrictions or new orders and restrictions.

We do not anticipate any material negative impact on our financial condition in 2020 as a result of the COVID-19 pandemic. We believe we are well positioned financially to execute on our wholly owned and partnered research and clinical programs. We ended the second quarter of 2020 with $664.9 million in cash, cash equivalents and marketable securities. Although we believe we are well capitalized currently, if the capital markets become impaired for a prolonged period of several years, our financial condition could deteriorate. We do not currently anticipate any material impairments to the valuation of the financial assets or goodwill on our balance sheet as a result of COVID-19. We do not believe that the remote workplace arrangements we have implemented for our office-based employees have affected our financial reporting or control systems.

Our business relies on cooperation with clinical trial sites and with external biopharmaceutical research and manufacturing partners, and we have been working with these sites and partners to minimize any impact of COVID-19 on our clinical trials and our research and development operations. Although our laboratory operations in the United States and France have resumed, enhanced health and safety protocols and modified workplace schedules could result in reduced productivity. In addition to laboratory work supporting our proprietary research, we also conduct research to support collaborations with biopharmaceutical partners, which under certain circumstances provides us with expense reimbursements and other potential payments. While we have experienced periodic short-term disruptions to our laboratory operations due to COVID-19 health and safety protocols, at this time, we do not anticipate any material impact to our ability to conduct our research in a timely manner. We do anticipate that some clinical trial timelines may be impacted due to COVID-19 and the diversion of healthcare resources to fight the pandemic. We will continue to monitor the impact of COVID-19 on our research obligations and timelines of our clinical trials. We are not aware of supply shortages related to COVID-19 that will affect our clinical trials or research operations.

See also the section titled “Risk Factors” for additional information on risks and uncertainties related to the evolving COVID-19 pandemic.

Certain Components of Results of Operations

Our revenues have consisted primarily of revenues derived from collaboration agreements with our strategic partners related to upfront license fees, reimbursable research services, milestone achievements and grant funding. We expect revenues to continue to fluctuate from period to period and there can be no assurance that new collaborations or partner funding will continue beyond their initial terms or that we are able to meet the milestones specified in these agreements.

We have incurred net losses since inception and expect to incur losses in the future as we continue our research and development activities. To date, we have funded our operations primarily through the issuance of equity securities, payments from our strategic partners and research grants.

We expect to continue to devote substantial resources to research and development in the future and expect research and development expenses to increase in the next several years if we are successful in advancing our gene therapy and our genome editing programs in the clinic and, if we are able, to progress our earlier stage product candidates into clinical trials.

Critical Accounting Policies and Estimates

The accompanying management's discussion and analysis of our financial condition and results of operations are based upon our Condensed Consolidated Financial Statements and the related disclosures, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these Condensed Consolidated Financial Statements requires us to make estimates, assumptions and judgments that affect the reported amounts in our Condensed Consolidated Financial Statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be 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. Actual results may differ from these estimates under different assumptions or conditions. There have been no significant changes in our critical accounting policies and estimates disclosed in our 2019 Annual Report.

Results of Operations for the Three and Six Months Ended June 30, 2020 and 2019

Revenues

	Three Months Ended June 30, (in thousands, except percentage values)				Six Months Ended June 30, (in thousands, except percentage values)			
	2020	2019	Change	%	2020	2019	Change	%
Revenues	$ 21,553	$ 17,548	$ 4,005	23%	$ 34,629	$ 25,619	$ 9,010	35%

Total revenues consisted of revenues from collaboration agreements and, to a significantly lesser extent, research grants. We anticipate revenues over the next several years will be derived primarily from our collaboration agreements with Novartis, Biogen, Kite, Pfizer and Sanofi as we continue to recognize upfront and milestone payments received under such agreements over time in revenues.

The increase of $4.0 million in revenues for the three months ended June 30, 2020, compared to the same period in 2019, was primarily due to an increase of $8.2 million in revenue related to our agreement with Biogen, which took effect in April 2020. This increase was partially offset by a decrease of $4.2 million in revenue related to our hemophilia A collaboration agreement with Pfizer after the successful IND transfer of the SB-525 product candidate to Pfizer in December 2019, which resulted in decrease in activities post IND transfer for the three months ended 2020 compared to the same period in 2019.

The increase of $9.0 million in revenues for the six months ended June 30, 2020, compared to the same period in 2019, was primarily due to an increase of $8.2 million in revenue related to our agreement with Biogen, which took effect in April 2020.

Operating expenses

	Three Months Ended June 30, (in thousands, except percentage values)				Six Months Ended June 30, (in thousands, except percentage values)			
	2020	2019	Change	%	2020	2019	Change	%
Operating expenses:								
Research and development	$ 41,523	$ 36,455	$ 5,068	14%	$ 83,002	$ 71,305	$ 11,697	16%
General and administrative	17,927	14,597	3,330	23%	34,046	31,715	2,331	7%
Total operating expenses	$ 59,450	$ 51,052	$ 8,398	16%	$ 117,048	$ 103,020	$ 14,028	14%

Research and Development Expenses

Research and development expenses consisted primarily of compensation related expenses, including stock-based compensation, laboratory supplies and expenses related to preclinical and clinical studies, manufacturing clinical supply, allocated facilities, information technology expenses and contracted research.

The increase of $5.1 million in research and development expenses for the three months ended June 30, 2020, compared to the same period in 2019, was primarily driven by a $5.3 million increase in headcount related compensation expense to support our programs and clinical trials, and a $3.8 million increase in overhead costs as we ramp up our internal manufacturing operations. These increases were partially offset by a decrease of $4.0 million in clinical and manufacturing supply expenses due to timing of our trials and programs. Stock-based compensation expense included in research and development expenses was $3.6 million and $2.8 million for the three months ended June 30, 2020 and 2019, respectively.

The increase of $11.7 million in research and development expenses for the six months ended June 30, 2020, compared to the same period in 2019, was primarily driven by an $8.6 million increase in overhead costs as we ramp up our internal manufacturing operations, an $8.1 million increase in headcount related compensation expense to support our programs and clinical trials, partially offset by a decrease of $5.3 million in clinical and manufacturing supply expenses due to timing of our trials and programs. Stock-based compensation expense included in research and development expenses was $6.4 million and $5.1 million for the six months ended June 30, 2020 and 2019, respectively.

We expect to continue to devote substantial resources to research and development in the future and expect research and development expenses to increase in the next several years if we are successful in advancing our clinical programs and if we are able to progress our earlier stage product candidates into clinical trials.

The length of time required to complete our development programs and our development costs for those programs may be impacted by the scope and timing of enrollment in clinical trials for our product candidates, our decisions to pursue development programs in other therapeutic areas, and whether we pursue development of our product candidates with a partner or collaborator or independently. For example, our product candidates are being developed in multiple therapeutic areas, and we do not yet know how many of those therapeutic areas we will continue to pursue. Furthermore, the scope and number of clinical trials required to obtain regulatory approval for each pursued therapeutic area is subject to the input of the applicable regulatory authorities, and we have not yet sought such input for all potential therapeutic areas that we may elect to pursue, and even after having given such input, applicable regulatory authorities may subsequently require additional clinical studies prior to granting regulatory approval based on new data generated by us or other companies, or for other reasons outside of our control. As a condition to any regulatory approval, we may also be subject to post-marketing development commitments, including additional clinical trial requirements. As a result of the uncertainties discussed above, we are unable to determine the duration of or complete costs associated with our development programs.

In any event, our potential therapeutic products are subject to a lengthy and uncertain regulatory process that may not result in our receipt of any necessary regulatory approvals. Failure to receive the necessary regulatory approvals would prevent us from commercializing the product candidates affected. In addition, clinical trials of our product candidates may fail to demonstrate safety and efficacy, which could prevent or significantly delay regulatory approval. The full extent of the impact of the evolving COVID-19 pandemic on our business, operations and financial results will depend on numerous evolving factors that we may not be able to accurately predict. A discussion of the risks and uncertainties with respect to our research and development activities, including completing the development of our product candidates, and the consequences to our business, financial position and growth prospects can be found in “Risk Factors” in Part II, Item 1A of this Quarterly Report on Form 10-Q.

General and Administrative Expenses

General and administrative expenses consist primarily of compensation related expenses including stock-based compensation for executive, legal, finance and administrative personnel, professional fees, allocated facilities and information technology expenses, and other general corporate expenses.

The increase of $3.3 million in general and administrative expenses for the three months ended June 30, 2020, compared to the same period in 2019, was primarily due to an increase of $2.3 million in professional fees, and an increase of $2.6 million

in headcount driven compensation costs. These increases were partially offset by a decrease of $1.7 million in allocated facility and support costs. Stock-based compensation expense included in general and administrative expenses was $3.2 million and $2.1 million for the three months ended June 30, 2020 and 2019, respectively.

The increase of $2.3 million in general and administrative expenses for the six months ended June 30, 2020, compared to the same period in 2019, was primarily due to an increase of $5.1 million in headcount driven compensation costs, and an increase of $1.4 million in professional fees. These increases were partially offset by a decrease of $3.7 million in allocated facility and support costs, and a decrease of $0.6 million in travel and entertainment costs due to COVID-19 travel restrictions. Stock-based compensation expense included in general and administrative expenses was $6.0 million and $4.3 million for the six months ended June 30, 2020 and 2019, respectively.

As we continue to build out our product portfolio and advance our product candidates into the clinic, we expect higher general and administrative expenses to support the growth of the business.

Interest and other income, net

Interest and other income, net, decreased by $1.2 million for the three months ended June 30, 2020, compared to the same period in 2019, primarily due to a decrease of $1.5 million in interest income reflecting the decline in market interest rates.

Interest and other income, net, decreased by $1.4 million for the six months ended June 30, 2020, compared to the same period in 2019, primarily due to a decrease of $2.1 million in interest income reflecting the decline in market interest rates, partially offset by a decrease of $0.4 million in foreign exchange losses.

Liquidity and Capital Resources

Liquidity

Since inception, we have incurred significant net losses and we have funded our operations primarily through the issuance of equity securities, payments from corporate collaborators and strategic partners and research grants.

As of June 30, 2020, we had cash, cash equivalents, and marketable securities totaling $664.9 million compared to $384.3 million as of December 31, 2019, with the increase primarily attributable to our collaboration with Biogen, which became effective in April 2020. Our most significant use of capital is for employee compensation and external research and development expenses, such as manufacturing, clinical trials and preclinical activity related to our therapeutic programs. Our cash and investment balances are held in a variety of interest-bearing instruments, including U.S. government-sponsored entity debt securities, corporate debt securities, commercial paper securities and money market funds. Cash in excess of immediate requirements is invested in accordance with our investment policy with a view toward capital preservation and liquidity.

Since the beginning of 2017, we have received significant amounts of capital as upfront payments under our collaboration agreements. Our collaboration agreements provide for the payment of development, regulatory, and commercial milestones. In February 2020, we entered into a collaboration and license agreement with Biogen for the research, development and commercialization of gene regulation therapies for the treatment of neurological diseases, which became effective in April 2020. Upon effectiveness of the agreement in April 2020, we received a payment of $225.0 million for the purchase of the Biogen Shares. In addition, Biogen paid us an upfront license fee of $125.0 million in May 2020. For more information see Note 5 — Major Customers, Partnerships and Strategic Alliances in the Condensed Consolidated Financial Statements of this Quarterly Report on Form 10-Q. In July 2020, we entered into a collaboration and license agreement with Novartis for the development and commercialization of gene regulation therapies for the treatment of neurodevelopment disorders. Under the agreement, Novartis is required to pay us a $75.0 million upfront license fee by August 27, 2020. In addition, in August 2020, we entered into an Open Market Sale Agreement with Jefferies LLC, or Jefferies, providing for the sale of up to $150.0 million of our common stock from time to time in ‘at-the-market’ offerings under our existing shelf registration statement. We currently anticipate that our existing cash, cash equivalents and marketable securities, cash flows from operations and access to financing sources, including our at-the-market sale agreement with Jefferies, will continue to be sufficient to meet our cash needs for at least the next 12 months. During the period of uncertainty of volatility related to the evolving COVID-19 pandemic, we will continue to monitor our liquidity.

Cash Flows

Operating activities

Net cash provided by operating activities was $141.1 million for the six months ended June 30, 2020, primarily reflecting an increase in deferred revenues of $178.9 million driven by cash received in connection with the Biogen collaboration agreement, a decrease in accounts receivable of $31.3 million and stock-based compensation of $12.4 million and other activities, partially offset by our net loss of $78.9 million.

Investing activities

Net cash provided by investing activities for the six months ended June 30, 2020 was $101.3 million related to a net increase in maturities of marketable securities, partially offset by purchases of property and equipment.

Financing activities

Net cash provided by financing activities for the six months ended June 30, 2020 was $144.6 million primarily, reflecting the $145.4 million estimated fair value of the Biogen Shares issued, partially offset by $2.9 million of issuance costs related to the issuance of these shares.

Operating Capital and Capital Expenditure Requirements

We anticipate continuing to incur operating losses for at least the next several years. While we expect our rate of cash usage to increase in the future, in particular to support our product development endeavors, we believe that our available cash resources, as well as expected revenues from corporate collaborators, strategic partners and research grants, will be adequate to fund our currently planned operations through at least the next 12 months from the date the financial statements are issued. Future capital requirements beyond the next 12 months will be substantial and if our capital resources are insufficient to meet future capital requirements, we may need to raise additional capital to fund our operations through equity or debt financing. We regularly consider fund raising opportunities and may decide, from time to time, to raise capital based on various factors, including market conditions and our plans of operation. Additional capital may not be available on terms acceptable to us, or at all. If adequate funds are not available, or if the terms of potential funding sources are unfavorable, our business and our ability to advance our product candidate pipeline would be harmed. Furthermore, any sales of additional equity securities, including sales pursuant to our at-the-market financing facility, may result in dilution to our stockholders, and any debt financing may include covenants that restrict our business.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements as defined in Item 303(a)(4)(ii) of Regulation S-K.

Contractual Obligations and Commercial Commitments

In May 2020, we entered into an amendment to an existing lease to acquire approximately 8,500 square feet of research and office space in Richmond, California that expire in August 2026. Total lease payment over the life of this lease under this amendment are approximately $1.6 million. Variable lease payments include our allocated share of costs incurred and expenditures made by the landlord in the operation and management of the building. The commencement date of this lease was determined to be in the third quarter of 2020, therefore the lease is not included in our operating lease right-of-use asset or operating lease liabilities as of June 30, 2020.

There were no other material changes outside of the ordinary course of business in our contractual obligations as of June 30, 2020 from those as of December 31, 2019.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our exposure to market risk relates to our cash, cash equivalents and investments. The goals of our investment policy are preservation of capital, fulfillment of liquidity needs and capturing a market rate of return based on our investment policy parameters and market conditions. We select investments that maximize interest income to the extent possible within these guidelines. To achieve our goals, we maintain a portfolio of cash equivalents and investments in securities of high credit quality and with varying maturities to match projected cash needs.

The securities in our investment portfolio are not leveraged and are classified as available-for-sale. The majority of these available-for-sale securities are short-term in nature and subject to minimal interest rate risk. Our investments currently consist of commercial paper, corporate debt securities and U.S. government-sponsored entity debt securities. Our investment policy, approved by our Board of Directors, limits the amount we may invest in any one type of investment issuer, thereby reducing credit risk concentrations. All investments have a fixed interest rate and are carried at market value, which approximates cost. We do not use derivative financial instruments in our investment portfolio. We do not believe that a change in interest rates would have a material negative impact on the value of our investment portfolio. Our market risks at June 30, 2020 have not changed materially from those discussed in Item 7A of the 2019 Annual Report.

Volatile market conditions arising from the evolving COVID-19 pandemic may result in significant changes to exchange rates relative to the U.S. dollar and may affect our operating results as expressed in U.S. dollars.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to provide reasonable assurance that information required to be disclosed in our Exchange Act reports is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and that such information is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Under the supervision of our principal executive officer and principal financial officer, we evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act) as of June 30, 2020. Based on that evaluation, as of June 30, 2020, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures were effective at the reasonable assurance level.

Inherent Limitations on Controls and Procedures

Our management, including the principal executive officer and principal financial officer, does not expect that our disclosure controls and procedures and our internal control over financial reporting will prevent all error and all fraud. A control system, no matter how well designed and operated, can only provide reasonable assurances that the objectives of the control system are met. The design of a control system reflects resource constraints; the benefits of controls must be considered relative to their costs. Because there are inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, for our company have been or will be detected. As these inherent limitations are known features of the disclosure and financial reporting processes, it is possible to design into the processes safeguards to reduce, though not eliminate, these risks. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns occur because of simple error or mistake. Controls can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the control. The design of any system of controls is based in part upon certain assumptions about the likelihood of future events. While our disclosure controls and procedures and our internal control over financial reporting are designed to provide reasonable assurance of achieving their objectives, there can be no assurance that any design will succeed in achieving its stated goals under all future conditions. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with the policies or procedures. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Changes in Internal Control over Financial Reporting

There has been no change in our internal control over financial reporting that occurred during the six months ended June 30, 2020 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

We have not experienced any material impact to our internal controls over financial reporting even though most of our employees are working remotely due to the evolving COVID-19 pandemic. We continue to monitor and assess the COVID-19 pandemic in order to minimize the impact on the design and operating effectiveness of our internal controls.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

We are not party to any material pending legal proceedings. From time to time, we may be involved in legal proceedings arising in the ordinary course of business.

ITEM 1A. RISK FACTORS

An investment in our common stock involves significant risk. This Form 10-Q contains forward-looking information based on our current expectations. Because our actual results may differ materially from any forward-looking statements made by or on our behalf, this section includes a discussion of important factors that could affect our actual future results, including, but not limited to, our revenues, expenses, net loss and net loss per share. You should carefully consider the information described in the following risk factors in this Quarterly Report on Form 10-Q and in our Annual Report on Form 10-K for the year ended December 31, 2019, or the 2019 Form 10-K, together with the other information appearing elsewhere in this report, before making an investment decision regarding our common stock.

Risks Relating to Research, Development, Commercialization and Regulatory Approval of our Products and Technology

Our success depends substantially on the results of clinical trials of our therapeutic programs and ability to obtain regulatory approval of our product candidates, and we may be unable to demonstrate safety and efficacy of our product candidates.

We are a clinical-stage biotechnology company and have ongoing clinical trials evaluating product candidates that use our platform technologies in gene therapy, *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* genome regulation. We do not have any products that have obtained regulatory approval and are substantially dependent on the results of clinical trials of our therapeutic programs. However, there is no guarantee that we will be able to achieve positive final safety and efficacy results in our current or future clinical trials for our product candidates. If we fail to demonstrate safety or obtain positive clinical trial results, are unable to meet the expected timeline of these clinical trials or release of data for these programs, or if we are unable to obtain regulatory approval of our product candidates, our anticipated revenue from our product candidates and our prospects for profitability would be adversely affected, which would have an adverse effect on our business operations and financial conditions, which may cause a significant decline in our stock price.

We are exposed to numerous risks associated with conducting required clinical trials for the development of our product candidates, and there is no guarantee that we will be successful in any of our clinical trials or obtain marketing approval for any of our product candidates.

We must conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates before we can obtain marketing approval for any such candidates. We have limited experience in conducting later stage clinical trials and may not possess the necessary resources and expertise to complete such trials. Clinical testing is expensive, time consuming and uncertain. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage. Events that may prevent successful or timely completion of clinical development include, among others:

- delays in reaching a consensus with regulatory authorities on trial design;
- delays in reaching agreement on acceptable terms with prospective clinical research organizations, or CROs, and clinical trial sites;
- delays in opening clinical trial sites or obtaining required institutional review board, or IRB, or independent ethics committee approval at each clinical trial site;
- delays in recruiting and enrolling suitable patients to participate in our clinical trials;
- delays in clinical trial activities due to the evolving COVID-19 global pandemic and the diversion of healthcare resources to fight the pandemic;
- imposition of a clinical hold by regulatory authorities as a result of a serious adverse event or after an inspection of our clinical trial operations or trial sites;
- failure by us, any CROs we engage or any other third parties to adhere to clinical trial requirements;
- failure to perform in accordance with the Good Clinical Practice regulations of the U.S. Food and Drug Administration, or FDA, or applicable laws and regulations in the European Union, or EU, and other countries;

- delays in the testing, validation, manufacturing and delivery of our product candidates to the clinical sites, including delays by third parties with whom we have contracted to perform certain of those functions, or as a result of manufacturing or formulation changes to our product candidates;
- delays in having subjects complete participation in a trial or return for post-treatment follow-up;
- clinical trial sites or subjects dropping out of a trial;
- selection of clinical endpoints that require prolonged periods of clinical observation or analysis of the resulting data;
- occurrence of serious adverse events or other safety concerns associated with the product candidate that are viewed to outweigh its potential benefits, result in approval delays or other regulatory restrictions, or harm our reputation;
- occurrence of serious adverse events or other safety concerns in trials of the same class of agents conducted by other sponsors;
- failure to demonstrate that a product candidate is safe and effective for its proposed indication;
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols;
- unexpected costs and expenses and lack of sufficient funding for these programs; and
- loss of licenses to critical intellectual properties.

We have not yet reached agreement with regulatory authorities on the complete development pathway for certain product candidates, and such authorities can change decisions or guidance with respect to approvable endpoints, particularly as the technology continues to develop in these areas. Due to the novelty of certain programs, the endpoints needed to support regulatory approvals will likely be different from those originally anticipated. Any inability to successfully complete preclinical and clinical development of our product candidates, or complete such trials in the time frames anticipated, could result in additional costs to us or impair our ability to generate revenues from product sales, or achieve regulatory and commercialization milestones and royalties, or shorten any periods during which we may have exclusivity. Even if a product candidate were to successfully obtain approval from the FDA and comparable foreign regulatory authorities, any approval might contain significant limitations related to use restrictions for specified age groups, warnings, precautions or contraindications, or may be subject to burdensome post-approval study or risk management requirements. Also, any regulatory approval of our current or future product candidates, once obtained, may be withdrawn. If we are unable to obtain and maintain regulatory approval for our product candidates in one or more jurisdictions, or any approval contains significant limitations, we would not be able to generate anticipated revenues or become profitable, which would have an adverse effect on our business operations and financial conditions.

Success in research and preclinical studies or early clinical trial results may not be indicative of results obtained in later trials. Likewise, preliminary, initial or interim data from clinical trials should be considered carefully and with caution since the final data may be materially different from the preliminary, initial or interim data, particularly as more patient data become available.

Results from preclinical studies or early clinical trials are not necessarily predictive of future clinical trial results, and interim results of a clinical trial are not necessarily indicative of final results. Our product candidates may fail to show the desired safety and efficacy in clinical development despite demonstrating positive results in preclinical studies or having successfully advanced through initial clinical trials or preliminary stages of clinical trials. From time to time, we have and may in the future publish or report preliminary, initial or interim data. Preliminary, initial or interim data from our clinical trials and those of our partners may not be indicative of the final results of the trial and are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and/or more patient data become available. In this regard, such data may show initial evidence of clinical benefit, but as patients continue to be followed and more patient data becomes available, there is a risk that any therapeutic effects will not be durable in patients and/or will decrease over time, or cease entirely. Preliminary, initial or interim data also remain subject to audit and verification procedures that may result in the final data being materially different from such preliminary, initial or interim data. As a result, preliminary, initial or interim data should be considered carefully and with caution until the final data are available.

There is no guarantee that any of our pending clinical trials will be successful. Moreover, we have pending clinical trials involving our zinc finger nucleases, or ZFN, technology, where the clinical benefit has not been demonstrated in analyses conducted to date in the ongoing clinical trials. Although we are planning new clinical trials to evaluate updated ZFNs and other potential modifications to enhance the *in vivo* delivery of the ZFNs, there can be no assurance that we will be able to effectively deliver ZFNs to produce a clinical benefit to patients treated with our product candidates. In addition, our viral delivery systems and ZFN technologies continue to evolve and neither has been fully validated in human clinical trials for the therapeutic areas we are pursuing. If our viral delivery systems or ZFN technologies do not meet the safety criteria or cannot produce the desirable efficacy results we expect, we may be forced to suspend or terminate the affected program or seek alternative technologies to deliver ZFNs.

In addition, there is a high failure rate for drugs, biologic products and cell therapies proceeding through clinical trials. Many companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in late-stage clinical trials even after achieving promising results in preclinical testing and earlier-stage clinical trials. Data obtained from preclinical and clinical activities are subject to varying interpretations, which may delay, limit or prevent regulatory approval. Any such setbacks could adversely affect our business, financial condition, results of operations and prospects.

Our product candidates are subject to a lengthy and uncertain regulatory approval process in each jurisdiction where approval is sought.

A regulatory authority such as the FDA or the European Medicines Agency, or EMA, must approve any human therapeutic product before it can be marketed in such jurisdiction. The process for receiving regulatory approval is long and uncertain, and a potential product may not withstand the rigors of testing under the regulatory approval processes. Before commencing clinical trials in humans in the United States, we must submit an Investigational New Drug application, or IND, to the FDA. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application much like the IND prior to the commencement of human clinical trials. In the EU, for example, a clinical trial authorization, or CTA, must be submitted for each clinical protocol to each country's national health authority and an independent ethics committee. Only after an IND becomes effective and/or the applicable CTA has been accepted may clinical trials begin. See the "Business—Government Regulation" section in our 2019 Form 10-K for details regarding the regulatory approval processes applicable to our product candidates. While there is some overlap, the regulatory requirements to conduct clinical trials and seek marketing approval vary by jurisdiction. There is no guarantee that the safety studies and other data generated will be sufficient to permit us to conduct clinical trials in all jurisdictions where planned, or once generated, that such clinical trial data will be sufficient to obtain marketing approval in all jurisdictions in which we intend to seek such approval. If we are not able to obtain the necessary regulatory approvals to conduct our clinical trials, or commercialize our products, or if such approvals are delayed or suspended, it would have an adverse effect on our business operations and trading price of our common stock.

We may not be able to find suitable patients or may find it difficult to enroll patients for our clinical trials, which could delay or prevent us from proceeding with clinical trials of our product candidates.

Identifying and qualifying patients to participate as subjects in clinical trials of our product candidates is critical to our success. The timing of our clinical trials depends on our ability to recruit patients to participate, as well as completion of required follow-up periods. For example, hemophilia trials often take longer to enroll due to the availability of existing treatments. There are also a number of other product candidates in development by our competitors, who compete for the same limited patient populations. If we are not able to enroll the necessary number of subjects in a timely manner, we may not be able to complete our clinical trials. We may face similar challenges or delays in our other or potential future clinical trials. If patients are unwilling to participate in our gene therapy studies because of negative publicity from adverse events related to the biotechnology or gene therapy fields, competitive clinical trials for similar patient populations or for other reasons, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of our product candidates may be delayed. These delays could result in increased costs, delays in advancing our product candidates, delays in testing the effectiveness of our product candidates or termination of the clinical trials altogether.

We may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics, to complete our clinical trials in a timely manner. Patient enrollment and trial completion is affected by factors including:

- size of the patient population and process for identifying subjects;
- design of the trial protocol;
- eligibility and exclusion criteria;
- perceived risks and benefits of the product candidate under study;
- perceived risks and benefits of gene therapy-based approaches to treatment of diseases;
- availability of competing therapies and clinical trials;
- potential delays related to the evolving COVID-19 global pandemic and the diversion of healthcare resources to fight the pandemic;
- severity of the disease under investigation;
- availability of genetic testing for potential patients;
- proximity and availability of clinical trial sites for prospective subjects;
- ability to obtain and maintain subject consent;
- risk that enrolled subjects will drop out before completion of the trial;

- patient referral practices of physicians; and
- ability to monitor subjects adequately during and after treatment.

If we have difficulty enrolling or maintaining a sufficient number of patients to conduct our clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, or expand to additional jurisdictions, which could impose additional challenges on our company and expose us to risks. If we are not successful in conducting our clinical trials as planned, it would have an adverse effect on our business, financial condition, results of operations and prospects.

We may encounter difficulties that may delay, suspend or scale back our efforts to advance additional research programs through preclinical development, IND and foreign equivalent submissions and into clinical development.

We intend to advance early research programs through preclinical development and to submit new INDs, CTAs and equivalent filings in foreign regulatory jurisdictions necessary to commence and conduct human clinical trials evaluating the preclinical candidates in our pipeline. The preparation and submission of INDs and their foreign equivalents requires us to conduct rigorous and time-consuming preclinical testing, studies, and prepare documentation relating to, among other things, the toxicity, safety, manufacturing, chemistry and clinical protocol of our product candidates. We may experience unforeseen difficulties that could delay or otherwise prevent us from executing this strategy successfully. For example, we may encounter problems in the manufacturing of our products and fail to demonstrate consistency in the formulation of the drug. Our preclinical tests may produce negative or inconclusive results, which may lead us to decide, or regulators may require us, to conduct additional preclinical testing. If we cannot obtain positive results in preclinical testing, we may decide to abandon the projects altogether. In addition, our ability to complete and submit certain IND applications and foreign equivalent filings depends on the support of our partners and the timely performance of their obligations under relevant collaboration agreements. If our partners are not able to perform such obligations or if they choose to slow down or delay the progress, we may not be able to prepare and submit the intended INDs or their foreign equivalents on a timely basis or at all. Furthermore, the submission of several INDs and their foreign equivalents involves significant cost and labor, and we may not have sufficient resources and personnel to complete the filing of all intended INDs and their foreign equivalents, which may force us to scale back the number of INDs and their foreign equivalents or forego potential INDs and foreign equivalents that we believe are promising. Any delay, suspension or reduction of our efforts to pursue our preclinical and IND strategy could have an adverse effect on our business and cause our stock price to decline.

Special regulatory designations, such as RMAT or orphan drug designations, may not be available for our product candidates or may not lead to a faster development or regulatory review or approval process.

We have received regenerative medicine advanced therapy, or RMAT, designation for our product candidate to treat severe hemophilia A. Additionally, some of our product candidates have also been granted Orphan Drug Designation by the FDA, and some have also been designated Orphan Medicinal Products by the EMA. Regulatory authorities in some jurisdictions, including the United States and the EU, may designate drugs for relatively small patient populations as orphan drugs. For additional information regarding these special regulatory designations, see the “Business—Government Regulation” section in our 2019 Form 10-K.

If we request such designations for our other current or future product candidates, there can be no assurances that the FDA or the EMA will grant any of our product candidates such designations. Additionally, such designations do not guarantee that any regulatory agency will accelerate regulatory review of, or ultimately approve, those product candidates, nor does it limit the ability of any regulatory agency to grant such designations to product candidates of other companies that treat the same indications as our product candidates prior to our product candidates receiving exclusive marketing approval. Such designations can also be revoked. RMAT designation can be revoked if the criteria for eligibility cease to be met as clinical data emerges. Orphan drug exclusivity may be revoked if any regulatory agency determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the product to meet the needs of patients with the rare disease or condition.

Our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the approved indications or commercial potential, or result in significant negative consequences following any potential marketing approval.

During the conduct of clinical trials, subjects report changes in their health, including illnesses, injuries and discomforts, to their study doctor. Often, it is not possible to determine if the product candidate being studied caused these conditions, particularly as many of the diseases we are studying have complex comorbidities. If clinical experience indicates that our product candidates have side effects or cause serious or life-threatening side effects, the development of the product candidate may fail or

be delayed, or, if the product candidate has received regulatory approval, such approval may be revoked, which would severely harm our business, prospects, operating results and financial condition.

There have been several significant adverse side effects in gene therapy treatments in the past, including reported cases of leukemia and death seen in other trials using other genomic therapies. Gene therapy is still a relatively new approach to disease treatment and additional adverse side effects could develop. There also is the potential risk of significantly delayed adverse events following exposure to gene therapy products due to persistent biologic activity of the genetic material or other components of products used to carry the genetic material. Possible adverse side effects that could occur with treatment with gene therapy products include an immunologic reaction early after administration that, while not necessarily adverse to the patient's health, could substantially limit the effectiveness of the treatment.

Even if our product development efforts are successful and even if the requisite regulatory approvals are obtained, our products may not gain market acceptance among physicians, patients, healthcare payors and the medical community.

Even if we obtain regulatory approval for any of our product candidates that we may develop or acquire in the future, the applicable product may not gain market acceptance among physicians, healthcare payors, patients or the medical community. Market acceptance of any of our product candidates for which we receive approval depends on a number of factors, including:

- the efficacy and safety of such product candidates as demonstrated in clinical trials;
- the clinical indications and patient populations for which the product candidate is approved;
- acceptance by physicians, treatment centers and patients of the drug as a safe and effective treatment;
- the adoption of novel gene therapies by physicians, hospitals and third-party payors;
- the potential and perceived advantages of product candidates over alternative treatments;
- the safety of product candidates seen in a broader patient group, including use outside approved indications;
- any restrictions on use together with other medications;
- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- the timing of market introduction of our products as well as competitive products;
- the development of manufacturing and distribution processes for our product candidates;
- the cost of treatment in relation to alternative treatments;
- the availability of coverage and adequate reimbursement and the willingness of patients to pay out-of-pocket in the absence of coverage or inadequacy of reimbursement by third-party payors and government authorities;
- relative convenience and ease of administration; and
- the effectiveness of our sales and marketing efforts and those of our collaborators.

If any of our product candidates are approved but fail to achieve market acceptance among physicians, patients, healthcare payors or treatment centers, we will not be able to generate significant revenues, which would compromise our ability to become profitable.

Even if we are able to commercialize our product candidates, the products may not receive coverage and adequate reimbursement from third-party payors in the United States and in other countries in which we seek to commercialize our products, which could harm our business.

Our ability to commercialize any product successfully will depend, in part, on the extent to which coverage and adequate reimbursement for these products and related treatments will be available. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, determine which medications they will cover and establish reimbursement levels, which can affect demand for, or the price of, any product candidate for which we obtain regulatory approval. Given the nature of the product candidates that we are developing, some patients may require treatment only one time (*e.g.*, single dose administration), and there is substantial uncertainty about the pricing structure for such products, and the level of coverage and reimbursement that will be available for a shift to single-dose treatment as compared to chronic therapy over a patient's lifetime. If other companies establish a new pricing structure or business model, including payment based on demonstration of long-term efficacy, our ability to price or obtain reimbursement for our products may be adversely affected. If such pricing structure or business model do not adequately fund the costs of our research and development, manufacturing and commercialization efforts, our business may be adversely affected.

In addition to uncertainty about the potential pricing structure for certain of our product candidates, cost containment is a recurrent trend in the healthcare industry. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for certain medications. We cannot be sure that coverage and adequate

reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be. If reimbursement is not available or is available only at limited levels, we may be unable to successfully commercialize any product candidate for which we obtain regulatory approval. Our inability to promptly obtain coverage and profitable reimbursement rates from both government-funded and private payors for any approved products that we develop could have an adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

Recently enacted and future legislation, including potentially unfavorable pricing regulations or other healthcare reform initiatives, may increase the difficulty and cost for us to obtain regulatory approval of and commercialize our product candidates and affect the prices we may obtain.

The regulations that govern, among other things, regulatory approvals, coverage, pricing and reimbursement for new drug products vary widely from country to country. In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay regulatory approval of our product candidates, restrict or regulate post-approval activities and affect our ability to successfully sell any product candidates for which we obtain regulatory approval. Also, there has been heightened governmental scrutiny recently over pharmaceutical and biological product pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for pharmaceutical and biological products. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, have been designed to encourage importation from other countries and bulk purchasing. For a discussion of health reform activity and the current pricing framework, see the “Business—Government Regulation—Healthcare Reform” and “—Pricing, Coverage and Reimbursement” section in our 2019 Form 10-K.

The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

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

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

Even if we obtain regulatory approval for a product candidate, our products will remain subject to regulatory scrutiny.

Even if we obtain regulatory approval in a jurisdiction, the regulatory authority may still impose significant restrictions on the indicated uses or marketing of our product candidates or impose ongoing requirements for potentially costly post-approval studies, post-market surveillance or patient or drug restrictions. For example, the FDA typically advises that patients treated with gene therapy undergo follow-up observations for potential adverse events for a 15-year period. Additionally, the holder of an approved biologics license application, or BLA, is required to comply with FDA rules and is subject to FDA review and periodic inspections, in addition to other potentially applicable federal and state laws, to ensure compliance with current good manufacturing practices, or cGMP, and adherence to commitments made in the BLA.

If we or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions relative to that product or the manufacturing facility, including requiring recall or withdrawal of the product from the market or suspension of manufacturing. Moreover, product labeling, advertising and promotion for any approved product will be subject to regulatory requirements and continuing regulatory review. Failure to comply with such requirements, when and if applicable, could subject us to a number of actions ranging from warning letters to product seizures or significant fines, among other actions. See the “Business—Government Regulation—U.S. Review and Approval Processes” section in our 2019 Form 10-K for more information.

Any government investigation of alleged violations of laws or regulations could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and generate revenues.

Our employees or contractors may engage in misconduct or other improper activities, including noncompliance with research, development, manufacturing or regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk of fraud or other misconduct by our employees and contractors, including intentional failures to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, provide accurate information to the FDA or comparable foreign regulatory authorities, comply with manufacturing standards we have established, comply with federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, report financial information or data accurately or disclose unauthorized activities to us. Misconduct by our employees and contractors could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and results of operations, including the imposition of significant civil, criminal and administrative penalties, damages, fines, disgorgement, personal imprisonment, exclusion from government funded healthcare programs, such as Medicare and Medicaid, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, and the curtailment or restructuring of our operations.

We may use our financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

We have limited resources and may forego or delay pursuit of certain programs or product candidates that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities or pursue partnering arrangements rather than retain sole responsibility for development. Our current and future research and development programs for product candidates may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may pursue opportunities that end up having a number of competitors that are more advance than our product candidates, or relinquish valuable rights to that product candidate through strategic collaboration, licensing or other royalty arrangements in cases where it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. We may also allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement or which does not prove to have viable commercial opportunities. Any failure to use our financial and human resources efficiently could harm our business and operations.

Even if our technology proves to be effective, it still may not lead to commercially viable products.

Even if we, our collaborators or strategic partners are successful in using our zinc finger protein, or ZFP, technology in drug discovery, protein production, therapeutic development or other areas in which we have licensed our technology, such as plant agriculture, we or they may not be able to commercialize the resulting products or may decide to use other methods competitive with this technology. To date, no company has received marketing approval or has developed or commercialized any therapeutic or agricultural products based on our ZFP technology. Should our technology fail to provide safe, effective, useful or commercially viable approaches to the discovery and development of these product candidates, this would significantly limit our business and future growth and would adversely affect our value.

Risks Relating to Manufacturing

We are building a manufacturing facility that could support future clinical production of our product candidates. We have no experience as a company manufacturing pharmaceutical or biological products, and there can be no assurance that we will be able to build a compliant manufacturing facility or, if built, we will be able to successfully manufacture any of our product candidates.

We expect to utilize both contract manufacturing organizations, or CMOs, and our own facility to meet our projected needs for clinical supply. We intend to expand our manufacturing capacity by designing and building a manufacturing facility in Brisbane, California that we plan to initially use to support our clinical supply needs. To meet these objectives, we will need to transition manufacturing processes and know-how of our product candidates to our own facility. Transferring manufacturing processes and know-how is complex and involves review and incorporation of both documented and undocumented processes that may have evolved over time. In addition, transferring production to different facilities may require utilization of new or different processes to meet the specific requirements of a given facility. Additional studies may also need to be conducted to support the transfer of certain manufacturing processes and process improvements. We cannot be certain that all relevant know-how and data has been adequately incorporated into the manufacturing process until the completion of studies (and the related evaluations) intended to demonstrate the comparability of material previously produced with that generated by our CMOs. Although some of our employees have experience in the manufacturing of pharmaceutical and biological products from prior employment at other companies, we, as a company, have no prior experience in pharmaceutical and biological product manufacturing, and operating this facility will require us to comply with complex regulations and to continue to hire and retain experienced scientific, quality control, quality assurance and manufacturing personnel. Designing and building a manufacturing facility has been and will continue to be time-consuming and expensive, and we may experience delays or cost overruns. In addition, government approvals will be required for us to operate a manufacturing facility and can be time-consuming to obtain. As a manufacturer of pharmaceutical and biological products, we also will be required to demonstrate and maintain cGMP compliance. These requirements include, among other things, quality control, quality assurance and the maintenance of records and documentation. Furthermore, establishing manufacturing operations will require a reallocation of other resources, particularly the time and attention of our senior management. Even if we are able to establish our own manufacturing capabilities, we could encounter challenges in operating the manufacturing facility in compliance with cGMP, regulatory or other applicable requirements, resulting in potential negative consequences, including regulatory actions, which could undermine our ability to utilize this facility for our own manufacturing needs. Any failure or delay in the development of our manufacturing capabilities could adversely impact the development of our product candidates.

Manufacturing our product candidates is costly and difficult and may not support regulatory approval or commercial viability.

There are risks associated with manufacturing our product candidates including, among others, cGMP compliance, cost overruns, technical problems with process scale-up, process reproducibility, stability issues, lot consistency, yields and timely availability of raw materials. Even if efficacy and safety data from our clinical trials would otherwise support regulatory approval for a product candidate, there is no assurance that we or any third-party manufacturer will be able to manufacture our product candidates to specifications at levels necessary to support or maintain regulatory approval by the FDA or other regulatory authorities.

For example, some of our product candidates are biologics and their manufacture involves complex processes, including the development of cell lines or cell systems to produce the biologic, with the challenge of significant variability. Further, there are difficulties in growing large quantities of such cells, consistently and sufficiently isolating certain types of cells and harvesting and purifying the biologic produced by them. The cost to manufacture biologics is generally far higher than traditional small molecule chemical compounds, and the manufacturing process can be difficult to reproduce. Thus, there is no guarantee we will be successful in establishing a larger-scale commercial manufacturing process for our product candidates or obtaining the needed manufacturing capacity. Due to the high cost to manufacture, inherent uncertainty related to manufacturing costs, and uncertainty in our patient population, there is risk that some of our product candidates may not be commercially viable.

We operate laboratories and are building manufacturing facilities that use potentially harmful biological materials and hazardous materials. If we use these materials in a manner that causes injury or violates laws, we may be liable for damages, penalties or fines.

Our research and development activities involve and our planned manufacturing facilities will involve the controlled use of potentially harmful biological materials as well as hazardous materials, chemicals, and various radioactive compounds typically employed in the study of molecular and cellular biology. For example, we routinely use cells in culture and gene delivery vectors, and we employ small amounts of radioisotopes in trace experiments. We are subject to federal, state, and local laws and regulations governing the use, storage, handling, and disposal of these materials and specified waste products. Although we maintain up-to-date licensing and training programs, we cannot eliminate the risk of accidental contamination or injury from the use, storage, handling, or disposal of these materials or the risk of violating laws governing these materials. In the event of contamination or injury or violation of applicable laws, we could be held liable for damages, penalties or fines that result, and any liabilities could exceed our resources. We currently carry insurance covering certain liabilities arising from our use of these

materials. However, if we are unable to maintain adequate insurance coverage at a reasonable cost, we may not have insurance covering these liabilities.

Supply interruptions may disrupt our inventory levels and the availability of our product candidates, and cause delays in obtaining regulatory approval, which could harm our business by reducing our potential revenues.

Our product candidates are manufactured using technically complex processes requiring specialized facilities, highly specific raw materials and other production constraints. The complexity of these processes, as well as strict government standards for the manufacture and storage of our products candidates, subjects us to production risks. While product batches released for use in clinical trials undergo sample testing, some defects may only be identified following product release. In addition, process deviations or unanticipated effects of approved process changes may result in these intermediate products not complying with stability requirements or specifications. For example, our product candidates must be stored and transported at temperatures within a certain range. If these environmental conditions deviate, our product candidates' remaining shelf-lives could be impaired or their efficacy and safety could be adversely affected, making them no longer suitable for use.

The occurrence, or suspected occurrence, of production and distribution difficulties or delays, whether due to the impacts of the evolving COVID-19 pandemic or otherwise, can lead to lost inventories, with consequential reputational damage and the risk of product liability. The investigation and remediation of any identified problems can cause development delays and substantial expense. Any unforeseen failure in the storage of the product or loss in supply could delay our clinical trials and, with respect to our product candidates that may be approved, result in a loss of our market share and negatively affect our business, financial condition, results of operations and prospects.

We currently rely on third parties to conduct some or all aspects of manufacturing of our product candidates for preclinical and clinical development. If one of our third-party manufacturers fails to perform adequately or fulfill our needs, we may be required to incur significant costs and devote significant efforts to find new suppliers or manufacturers.

We currently have limited experience in clinical-scale manufacturing of our product candidates and we rely upon third-party CMOs to manufacture and supply drug product for our preclinical studies and clinical trials. Although we are in the process of building out a cGMP compliant manufacturing facility in our Brisbane facility, it is not yet ready, and will only manufacture limited quantities of our product candidates for our early stage clinical trials. We intend to continue to rely on third parties for the manufacture of product candidates for later stage clinical trials, and commercial-scale manufacturing for any approved product. The manufacture of pharmaceutical and biological products in compliance with the FDA's cGMP requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers of pharmaceutical and biological products often encounter difficulties in production, including difficulties with production costs and yields, quality control, including stability of the product candidate and quality assurance testing, shortages of qualified personnel, as well as compliance with strictly enforced cGMP requirements, other federal and state regulatory requirements and foreign regulations. If our manufacturers were to encounter any of these difficulties or otherwise fail to comply with their obligations to us or under applicable regulations, our ability to provide study biologics in our clinical trials would be jeopardized. Any delay or interruption in the supply of clinical trial materials could delay the completion of our clinical trials, increase the costs associated with maintaining our clinical trial programs and, depending upon the period of delay, require us to commence new studies at significant additional expense or terminate the studies completely.

We and our CMOs must comply with cGMP requirements enforced by the FDA through its facilities inspection program. These requirements include, among other things, quality control, quality assurance and the maintenance of records and documentation. We and our CMOs may be unable to comply with these cGMP requirements and with other FDA, state and foreign regulatory requirements. The FDA or similar foreign regulatory agencies may also implement new standards at any time or change their interpretation and enforcement of existing standards for manufacture, packaging or testing of products. We have limited control over our manufacturers' compliance with these regulations and standards. Failure to comply with these requirements may result in fines and civil penalties, suspension of production, suspension or delay in product approval, product seizure or recall or withdrawal of product approval. If the safety of any product supplied is compromised due to our manufacturers' failure to adhere to applicable laws or for other reasons, we may not be able to obtain regulatory approval for or successfully commercialize our products and we may be held liable for any injuries sustained as a result. Any of these factors could cause a delay of clinical trials, regulatory submissions, approvals or commercialization of our product candidates, entail higher costs or impair our reputation.

Our current agreements with our CMOs do not provide for the entire supply of the drug product necessary for all anticipated clinical trials or for full scale commercialization. If we and our CMOs cannot agree to the terms and conditions for them to provide the drug product necessary for our clinical and commercial supply needs, we may not be able to manufacture the

product candidate until a qualified alternative manufacturer is identified, which could also delay the development of, and impair our ability to commercialize our product candidates.

The number of third-party CMOs with the necessary manufacturing and regulatory expertise and facilities is limited, and it could be expensive and take a significant amount of time to arrange for alternative CMOs, which could have an adverse effect on our business. New manufacturers of any product candidate would be required to qualify under applicable regulatory requirements and would need to have sufficient rights under applicable intellectual property laws to the method of manufacturing the product candidate. Obtaining the necessary FDA approvals or other qualifications under applicable regulatory requirements and ensuring non-infringement of third-party intellectual property rights could result in a significant interruption of supply and could require the new manufacturer to bear significant additional costs which may be passed on to us.

Risks Relating to our Industry

Our product candidates are based on novel technologies, which makes it difficult to predict the timing and costs of development and of subsequently obtaining regulatory approval.

We have concentrated our research and development efforts on gene therapy, gene-edited cell therapy, genome editing and genome regulation. The regulatory approval process for novel product candidates such as ours is unclear and may be lengthier and more expensive than the process for other, better-known or more extensively studied product candidates.

Adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of our product candidates.

These regulatory review committees and advisory groups, and any new guidelines they promulgate, may lengthen the regulatory review process, require us to perform additional preclinical studies or clinical trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our current or future product candidates or lead to significant post-approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of our product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product to market could decrease our ability to generate sufficient product revenue, and our business, financial condition, results of operations and prospects would be harmed. Even if our product candidates are approved, we expect that the FDA will require us to submit follow-up data regarding our clinical trial subjects for a number of years after any approval. If this follow-up data shows negative long-term safety or efficacy outcomes for these patients, the FDA may revoke its approval or change the label of our products in a manner that could have an adverse impact on our business.

In addition, adverse developments in clinical trials of gene therapy or cell therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of our product candidates. The FDA and EMA have only very recent and limited experience in the approval of *in vivo* gene therapy products. As a result, it is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for our product candidates.

If we or our competitors develop, acquire or market technologies or products that are more effective than ours, our financial condition and ability to successfully market or commercialize our product candidates or be profitable would be adversely affected.

The biotechnology and pharmaceutical industries are highly competitive and subject to significant and rapid technological change. We are aware of several companies focused on other methods for editing cells, editing genes and regulating gene expression and a limited number of commercial and academic groups pursuing the development of genome editing and genome regulation technology. The field of applied gene-edited cell therapy, genome editing and genome regulation is highly competitive and we expect competition to persist and intensify in the future from a number of different sources, including pharmaceutical and biotechnology companies, academic and research institutions, and government agencies that will seek to develop competing products as well as technologies that will compete with our ZFP technology platform. For example, in genome editing and gene therapy products, competing proprietary technologies with our product development focus include but are not limited to, recombinant proteins, other gene therapy/cDNAs, antisense, siRNA and microRNA approaches, exon skipping, small molecule drugs, monoclonal antibodies, Clustered Regularly Interspaced Short Palindromic Repeats, or CRISPR/Cas technology and Transcription Activator-Like Effector, or TALE, proteins, meganucleases, and MegaTALs. See the “Business—Competition” section in our 2019 Form 10-K for more information on the competition we may face.

Any products that we or our collaborators or strategic partners develop by using our ZFP technology platform will enter highly competitive markets. Even if we are able to generate products that are safe and effective for their intended use, competing technologies may prove to be more effective or less expensive, which, to the extent these competing technologies achieve market acceptance, will limit our revenue opportunities. In some cases, competing technologies have proven to be effective and less expensive. Competing technologies may include other methods of regulating gene expression or modifying genes. ZFNs and our ZFP transcription factors, or ZFP-TFs, have broad application in the life sciences industry and compete with a broad array of new technologies and approaches being applied to genetic research by many companies.

In addition to possessing competing technologies, our competitors include pharmaceutical and biotechnology companies with:

- substantially greater capital resources than ours;
- larger research and development staffs and facilities than ours; and
- greater experience in product development and in obtaining regulatory approvals and patent protection.

These organizations also compete with us to attract qualified personnel, attract parties for acquisitions, joint ventures or other collaborations and license the proprietary technologies of academic and research institutions that are competitive with our technology, which may preclude us from pursuing similar opportunities. Accordingly, our competitors may succeed in obtaining patent protection or commercializing products before us. Even if our product candidate is more effective, it may be disadvantaged if it is not first to market. In addition, any products that we develop may compete with existing products or services that are well established in the marketplace. Further, some of our product candidates in development are designed to use once. Any success in developing single-dose therapeutics could cause us to lose potential recurring revenues from therapeutics that are designed to be taken over a patient's lifetime.

The evolving global COVID-19 pandemic could adversely affect our business and operations, including at our primary research facilities, which are currently subject to shelter-in-place orders, and at our clinical trial sites, as well as the business and operations of our collaborators, strategic partners, manufacturers, CROs and other third parties with whom we conduct business.

On March 10, 2020, the World Health Organization declared the novel coronavirus, or COVID-19, outbreak a pandemic. Our business and operations could be adversely affected by the effects of the pandemic. Actions taken around the world to help mitigate the spread of the coronavirus include restrictions on travel, and quarantines in certain areas, and forced closures for certain types of public places and businesses, including in the three countries where we have most of our day-to-day operations, the United States, France and the United Kingdom. Our business has been directly impacted by pandemic restrictions aimed at reducing the spread of the disease, including multiple California executive orders, several semi-coordinated San Francisco Bay Area orders, several other state and additional local orders across the country and similar orders outside the United States, which, among other things, direct individuals to shelter at their places of residence, direct businesses and governmental agencies to cease non-essential operations at physical locations, prohibit certain non-essential gatherings, and order cessation of non-essential travel. In response to these public health directives and orders, we have implemented work-from-home policies for most employees and modified working protocols and schedules in our laboratories. The effects of government orders and our work-from-home and laboratory protocols may negatively impact productivity, disrupt our business and delay our pre-clinical and clinical programs and timelines, the magnitude of which will depend, in part, on the length and severity of the restrictions and other limitations on our ability to conduct our business in the ordinary course. For example, we have experienced periodic short-term disruptions to our laboratory operations while administering our health and safety protocols, and adherence to these protocols in the future could result in longer operational disruptions in the event of a significant outbreak of COVID-19 among our laboratory workers. These disruptions, and possibly more severe disruptions in the future that could arise due to the extension of government orders or new government orders applicable in the places we operate or our industry generally or to us or our facilities specifically could impede our ability to conduct research in a timely manner, comply with our research obligations to our collaborators and advance the development of our therapeutic programs. These disruptions could result in negative material impacts to our business, operating results and financial condition.

Although governments have begun phased re-openings, it is uncertain when restrictions will be fully lifted, and if so, when we will be able to resume pre-pandemic work routines. Certain jurisdictions have rolled back such re-openings in light of continued and increased spread of COVID-19. Imposition of government orders, including quarantine and shelter-in-place orders related to COVID-19 or other infectious diseases, is expected to continue to impact personnel at our laboratories and our third-party manufacturing facilities in the United States and other countries, for the foreseeable future, and could impact the availability or cost of materials, which would disrupt our supply chain. Many of our third-party manufacturers which we use for the supply of

materials for product candidates or other materials necessary to manufacture product to conduct preclinical tests and clinical trials are located in countries affected by COVID-19, and should they experience disruptions, such as temporary closures or suspension of services, we would likely experience delays in advancing these tests and trials.

In addition, our clinical trials and clinical trials managed by our collaborators may be affected by the COVID-19 pandemic. Clinical site initiation, patient recruitment and enrollment and dosing of subjects may be delayed due to prioritization of hospital resources toward the COVID-19 pandemic. Some subjects may not be able or willing to comply with clinical trial protocols if quarantines impede subject movement or interrupt healthcare services. Similarly, the pandemic may limit the ability to recruit and retain principal investigators and site staff who, as healthcare providers, may have heightened exposure to COVID-19 and adversely impact our clinical trial operations. For example, we have not yet dosed subjects in our clinical trial for our ST-920 therapy to treat Fabry disease.

The spread of COVID-19, which has caused a broad impact globally, may materially affect us economically. While the potential economic impact brought by, and the duration of, COVID-19 may be difficult to assess or predict, a widespread pandemic could result in significant disruption of global financial markets, reducing our ability to access capital, which could in the future negatively affect our liquidity. In addition, a recession or market correction resulting from the spread of COVID-19 could materially affect our business and the value of our common stock.

The global pandemic of COVID-19 continues to rapidly evolve. The extent to which the COVID-19 pandemic impacts our business, our clinical development and regulatory efforts will depend on future developments that are highly uncertain and cannot be predicted with confidence, such as the ultimate geographic spread of the disease, the duration of the outbreak, travel restrictions, quarantines and social distancing requirements in the United States, France, United Kingdom and other countries, business closures or business disruptions and the effectiveness of actions taken in the United States, France, United Kingdom and other countries to contain and treat the disease. Accordingly, we do not yet know the full extent of potential delays or impacts on our business, sales of our products, our clinical and regulatory activities, healthcare systems or the global economy as a whole. However, these effects could have material adverse impacts on our business, financial condition, results of operations and growth prospects.

In addition, to the extent the evolving COVID-19 pandemic adversely affects our business and results of operations, it may also have the effect of heightening many of the other risks and uncertainties described in this ‘‘Risk Factors’’ section.

Negative public opinion and increased regulatory scrutiny of gene therapy and genomic medicines may damage public perception of the safety of our product candidates and adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.

Genetically modified products are currently subject to public debate and heightened regulatory scrutiny, either of which could prevent or delay production of agricultural products. Gene therapy remains a novel technology, with only two *in vivo* gene therapy products approved for a genetic disease to date in the United States and only a few *in vivo* gene therapy products for genetic diseases approved to date in the EU. Public perception may be influenced by claims that gene therapy is unsafe, and gene therapy may not gain the acceptance of the public or the medical community. For example, reports of serious adverse events in a retroviral gene transfer trial for infants with X-linked severe combined immunodeficiency, or X-linked SCID, in France and subsequent FDA actions putting related trials on hold in the United States had a significant negative impact on the public perception and stock price of certain companies involved in gene therapy, whether or not the specific company was involved with retroviral gene transfer, or whether the specific company’s clinical trials were placed on hold in connection with these events. Other adverse events could occur in the field of gene therapy and genomic medicine that could result in increased regulatory scrutiny, potential regulatory delays or negative impact on public perception of gene therapy and genomic medicines, which could cause our stock price to decline.

In particular, our success will depend upon physicians who specialize in the treatment of genetic diseases targeted by our product candidates, prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments with which they are familiar and for which greater clinical data may be available.

Even if the regulatory approval for genetically modified products developed using our technology is obtained, our success will also depend on public acceptance of the use of genetically modified products including drugs, plants, and plant products. Claims that genetically modified products are unsafe for consumption or pose a danger to the environment may influence public attitudes. Our genetically modified products may not gain public acceptance. More restrictive government regulations or negative public opinion would have an adverse effect on our business, financial condition, results of operations and prospects and may delay or impair the development and commercialization of our product candidates or demand for any products

we may develop. For example, earlier gene therapy trials led to several well-publicized adverse events, including cases of leukemia and death seen in other trials using other vectors. Serious adverse events in our clinical trials, or other clinical trials involving gene therapy products or our competitors' products, even if not ultimately attributable to the relevant product candidates, and the resulting publicity, could result in increased government regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates.

Our current and future relationships with healthcare providers, customers and third-party payors subject us to applicable anti-kickback, fraud and abuse, privacy, data security and other healthcare laws and regulations. If we fail to comply with such laws and regulations, we could face substantial penalties and our business, results of operations, financial condition and prospects could be adversely affected.

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any product candidates for which we obtain regulatory approval. Arrangements with healthcare providers, third-party payors and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we would market, sell and distribute our products. As a biotechnology company, even though we will not control referrals of healthcare services or bill directly to Medicare, Medicaid or other third-party payors, federal and state healthcare laws and regulations pertaining to fraud and abuse, transparency, health privacy and security, and patients' rights are and will be applicable to our business. For details regarding the restrictions under applicable federal and state healthcare laws and regulations that may affect our ability to operate see the "Business—Government Regulation—Additional Regulation" section in our 2019 Form 10-K.

The full scope and enforcement of each of these laws is uncertain and subject to rapid change in the current environment of healthcare reform, especially in light of the lack of applicable precedent and regulations. Scrutiny has continued to increase, which has led to a number of investigations, prosecutions, convictions and settlements in the healthcare industry. Responding to investigations can be time-and resource-consuming and can divert management's attention from the business. Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. If our operations or if any physicians or other healthcare providers or entities with whom we expect to do business are found to not be in compliance with applicable laws or applicable regulations, we and they could be subjected to significant civil, criminal and administrative enforcement actions, see the "Business—Government Regulation—Additional Regulation" section in our 2019 Form 10-K.

Further, we are required to comply with privacy and data security laws, such as the EU General Data Protection Regulation, or GDPR, and the California Consumer Privacy Act of 2018, or CCPA, which apply to the collection, use, disclosure, transfer, or other processing of personal data. For more information regarding these regulations, see the "Business—Government Regulation—Privacy Regulation" section in our 2019 Form 10-K. To comply with the GDPR restrictions on transfer of personal data out of Europe, we have relied on Standard Contractual Clauses. However, a July 2020 decision of the EU's highest court has called into question this practice, and UK authorities may similarly question the viability of the Standard Contractual Clauses as a mechanism for the lawful transfer of personal data outside of Europe. If we are unable to implement safeguards necessary to ensure that our transfers of personal data from and within Europe are lawful, we will face increased exposure to regulatory actions, substantial fines, and injunctions against processing personal data from Europe, and could be required to increase our data processing capabilities in Europe at significant expense. Restrictions on our ability to import personal data from Europe could impact our clinical trial activities in Europe and limit our ability to collaborate with CROs and other third parties subject to European data protection laws. Other countries may adopt similar restrictions to the GDPR, which could further impact our operations.

Any failure or alleged failure (including as a result of deficiencies in our policies, procedures or measures relating to privacy, data security, marketing or communications) by us to comply with laws, regulations, policies, legal or contractual obligations, industry standards or regulatory guidance relating to privacy or data security, may result in governmental investigations and enforcement actions, litigation, fines, penalties, injunctions prohibiting our data processing activities or adverse publicity. In addition, new regulation, legislative actions or changes in interpretation of existing laws or regulations regarding data privacy and security (together with applicable industry standards) may increase our costs of doing business. In this regard, we expect that there will continue to be new proposed laws, regulations and industry standards relating to privacy and data protection in the United States, the EU and other jurisdictions, and we cannot determine the impact such future laws, regulations and standards will have on our business.

Product liability lawsuits against us could cause us to incur substantial liabilities and to limit commercialization of any products that we may develop.

We face an inherent risk of product liability exposure related to the testing of our product candidates in human clinical trials and will face an even greater risk if we commercially sell any products that we may develop. Product liability claims may be brought against us by subjects enrolled in our clinical trials, patients, healthcare providers or others using, administering or selling our products. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- termination of clinical trial sites or entire trial programs;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigation;
- substantial monetary awards to trial subjects or patients;
- loss of revenue;
- diversion of management and scientific resources from our business operations; and
- the inability to commercialize any products that we may develop.

We currently hold product liability insurance coverage at a level that we believe is customary for similarly situated companies and adequate to provide us with insurance coverage for foreseeable risks, but which may not be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise. We intend to expand our insurance coverage for products to include the sale of commercial products if we obtain regulatory approval for our product candidates in development, but we may be unable to obtain commercially reasonable product liability insurance for any products that receive regulatory approval. Large judgments have been awarded in class action lawsuits based on drugs that had unanticipated side effects. A successful product liability claim or series of claims brought against us, particularly if judgments exceed our insurance coverage, could decrease our cash and adversely affect our business.

Risks Relating to our Finances

We have incurred significant operating losses since inception and anticipate that we will incur continued losses for the foreseeable future.

We have generated operating losses since we began operations in 1995. The extent of our future losses and the timing of profitability are uncertain, and we expect to incur losses for the foreseeable future. We have been engaged in developing our ZFP technology since inception, which has and will continue to require significant research and development expenditures. To date, we have generated our funding from issuance of equity securities, revenues derived from collaboration agreements, other strategic partnerships in non-therapeutic applications of our technology, federal government research grants and grants awarded by research foundations. We expect to continue to incur additional operating losses for the next several years as we continue to advance our product candidates. If the time required to generate significant product revenues and achieve profitability is longer than we currently anticipate or if we are unable to generate liquidity through equity financing or other sources of funding, we may be forced to curtail or suspend our operations.

We may be unable to raise additional capital on favorable terms, if at all, which would harm our ability to develop our technology and product candidates and could delay or terminate some or all of our programs. Future issuances of equity securities could also result in substantial dilution to our stockholders.

We have incurred significant operating losses and negative operating cash flows since inception and have not achieved profitability. We expect capital outlays and operating expenditures to increase over the next several years as we expand our infrastructure and research and product development activities. While we believe our available cash resources, as well as funds received from corporate collaborators, strategic partners and research grants will enable us to maintain our currently planned operations through at least the next 12 months from the date the financial statements are issued, we will need to raise substantial additional capital to fund the development, manufacturing and potential commercialization of our product candidates. We regularly consider fund raising opportunities and may decide, from time to time, to raise capital based on various factors, including market conditions and our plans of operation. In addition, as we focus our efforts on proprietary human therapeutics, we will need to seek FDA approvals of our product candidates, a process that could cost in excess of hundreds of millions of dollars per product. We may experience difficulties in accessing the capital markets due to external factors beyond our control, such as volatility in the equity markets for emerging biotechnology companies and general economic and market conditions both in the United States and abroad. For example, our ability to raise additional capital may be adversely impacted by potential worsening global economic conditions and the recent disruptions to and volatility in the credit and financial markets in the United States and

worldwide resulting from the evolving COVID-19 pandemic. We cannot be certain that we will be able to obtain financing on terms acceptable to us, or at all. Our failure to obtain adequate and timely funding will adversely affect our business and our ability to develop our technology and products candidates.

To the extent we raise additional capital by issuing equity securities, our stockholders may experience substantial dilution. We may issue common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. New investors could gain rights superior to our existing stockholders.

Our ability to use net operating losses to offset future taxable income may be subject to limitations.

Although certain amount of our federal net operating loss carryforwards carry forward indefinitely (but are subject to a percentage limitation), a significant amount of our federal and all of our state net operating loss carryforwards will begin to expire, if not utilized, beginning in 2024 and 2029, respectively. The net operating loss carryforwards subject to expiration could expire unused and be unavailable to offset future income tax liabilities. In addition, under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50 percentage point change in its equity ownership value over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income or taxes may be limited. We have experienced an ownership change in the past and we may also experience additional ownership changes in the future as a result of subsequent shifts in our stock ownership, some of which may be outside of our control. If an ownership change occurs and our ability to use our net operating loss carryforwards is materially limited, it would harm our future operating results by effectively increasing our future tax obligations. In addition, at the state level, there may be periods during which the use of net operating loss carryforwards is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed. As a result, if we earn net taxable income, we may be unable to use all or a material portion of our net operating loss carryforwards and other tax attributes, which could potentially result in increased future tax liability to us and adversely affect our future cash flows.

Risks Relating to our Reliance on Third Parties

If conflicts arise between us and our contractors, collaborators or strategic partners, these parties may act in their self-interest, which may limit our ability to implement our strategies and otherwise harm our business and prospects.

If conflicts arise between us and our contractors, corporate or academic collaborators or strategic partners, the other party may act in its self-interest, which may limit our ability to implement our strategies. Some of our academic collaborators and strategic partners are conducting multiple product development efforts within each area that is the subject of the collaboration with us. Our collaborators or strategic partners may develop, either alone or with others, products in related fields that are competitive with the products or potential products that are the subject of these collaborations. Competing products, either developed by the collaborators or strategic partners or to which the collaborators or strategic partners have rights, may result in the withdrawal of partner support for our product candidates.

Some of our collaborators or strategic partners could also become our competitors in the future. Our collaborators or strategic partners could develop or invest in competing products, preclude us from entering into collaborations with their competitors, fail to obtain timely regulatory approvals, terminate their agreements with us prematurely, or fail to devote sufficient resources to the development and commercialization of product candidates covered by the applicable agreement.

In addition, conflicts could arise between us and our collaborators resulting from disputes regarding our or our collaborators' or strategic partners' performance under the applicable agreement, including disputes arising from alleged breaches of our agreements with our collaborators and strategic partners. For example, we have certain confidentiality obligations to our collaborators and strategic partners under our agreements with them, and it is possible that, in connection with the data security incident we disclosed in April 2018, we could be subject to claims that we have breached our confidentiality obligations, which could result in damages payable by us and/or the affected collaborator or strategic partner seeking to terminate its agreement with us.

Any of these developments could harm our product development efforts and otherwise adversely affect our business and prospects.

Our collaborators and strategic partners may control aspects of our research, development and manufacturing programs, including but not limited to, our clinical trials, which could result in delays and other obstacles in the commercialization of our proposed products.

We depend on third-party collaborators and strategic partners to design and conduct our clinical trials for some of our therapeutic programs. As a result, we may not be able to conduct these programs in the manner or on the time schedule we currently contemplate, which may negatively impact our business operations. In addition, if any of these collaborators or strategic partners withdraws support for our programs or proposed products or otherwise impair their development; our business could be negatively affected.

Our lack of control over the clinical development in our agreements with Novartis, Biogen, Kite, Sanofi and Pfizer could cause delays or other difficulties in the development and commercialization of our product candidates, which may prevent us from completing the intended IND filings in a timely fashion and receiving any milestone, royalty payments and other benefits under the agreement. In addition, under their respective agreements, our third-party collaborators have certain rights to terminate the agreements by providing us with advance notices, therefore, the actual milestone payments that we may receive under these agreements may be substantially lower than the full amounts provided for under these agreements.

Our license collaborators or strategic partners may decide to adopt alternative technologies or products or may be unable to develop commercially viable products with our technology, which would negatively impact our revenues and our strategy to develop these products.

Our collaborators or strategic partners may adopt alternative technologies, which could decrease the marketability of ZFP technology. Additionally, because many of our collaborators or strategic partners are likely to be working on more than one development project, they could choose to shift their resources to projects other than those they are working on with us. If they do so, this would delay our ability to test our technology and would delay or terminate the development of potential products based on our ZFP technology. Further, our collaborators and strategic partners may elect not to develop products arising out of our collaborative and strategic partnering arrangements or to devote sufficient resources to the development, manufacturing, marketing or sale of these products. If they terminate the collaborative relationship with us, we will be required to seek the support of other partners or collaborators. We may not have sufficient resources and expertise to develop these programs by ourselves, and we may not be able to identify a suitable partner or negotiate a favorable collaboration agreement to allow us to continue the development of these programs. If any of these events occur, we may not be able to develop our technologies or commercialize our products.

Commercialization of our technologies will depend, in part, on strategic collaborations with other companies. If we are not able to find such collaborators in the future or if our collaborators do not diligently advance the development, regulatory approval and commercialization of our product candidates, we may not be able to develop our technologies or product candidates, which could slow our growth and decrease the value of our stock.

We do not have financial resources ourselves to fully develop, obtain regulatory approval for and commercialize our product candidates. We rely significantly on our strategic collaboration agreements with other companies to provide funding for our research and development efforts, including pre-clinical studies and clinical tests, and expect to rely significantly on such agreements to provide funding for the lengthy regulatory approval processes required to commercialize our product candidates. For example, we have collaboration agreements with Novartis to develop product candidates to treat certain neurodevelopment disorders, including autism and intellectual disability; with Biogen to develop product candidates to treat tauopathies including Alzheimer’s disease, alpha-synuclein related diseases including Parkinson’s disease and other neurological diseases; with Kite to develop product candidates to treat cancer; with Pfizer to develop product candidates to treat hemophilia A and amyotrophic lateral sclerosis and frontotemporal lobar degeneration linked to mutations of the *C9ORF72* gene; and with Sanofi to develop product candidates to treat beta thalassemia and sickle cell disease.

If we are unable to secure additional strategic collaborations or if our collaborators are unable or unwilling to diligently advance the development, regulatory approval and commercialization of our product candidates, our growth may slow and adversely affect our ability to generate funding for development of our technologies and product candidates. In addition, our collaborators may sublicense or abandon development programs with little advance notice or we may have disagreements or disputes with our collaborators, which would cause associated product development to slow or cease. In addition, the business or operations of our collaborators may change significantly through restructurings, acquisitions, other strategic transactions that may negatively impact their ability to advance our programs. The evolving COVID-19 pandemic may similarly impact our ability to realize the expected benefits of our collaborations due to the impacts of the pandemic on our collaborators and their business and operations.

Under typical collaboration agreements, we expect to receive revenue for the research and development of our product candidates based on achievement of specific milestones, as well as royalties based on a percentage of sales of any commercialized

products. Achieving these milestones will depend, in part, on the efforts of our collaborators as well as our own efforts. If we or any collaboration partner fails to meet specific milestones, then the collaboration agreement may be terminated, which could reduce our revenues. In addition, if sales of commercialized products fail to meet expectations, we could receive lower royalties than expected.

Risks Relating to our Intellectual Property

Because it is difficult and costly to protect and maintain our proprietary rights, and third parties may have filed patent applications that are similar to ours, we may not be able to obtain or maintain proprietary protection of our technologies and products or we may only obtain protection in limited jurisdictions.

Our commercial success may depend in part on obtaining and enforcing patent protection for our technology and successfully defending any of our patents that may be challenged. Obtaining and enforcing pharmaceutical and biotechnology patents is costly, time consuming and complex, and we may not be able to file and prosecute all necessary or desirable patent applications, or maintain, enforce and license any patents that may issue from such patent applications, at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. The patent positions of pharmaceutical and biotechnology companies can be highly uncertain and can involve complex legal and factual questions. No consistent policy regarding the breadth of claims allowed in biotechnology patents has emerged to date. Accordingly, we cannot predict the breadth of claims that may issue from any patent applications that we own or license, nor are we able to predict whether any third-party patents might issue with claims that are relevant to our product candidates or technologies. Even if patents do successfully issue and even if such patents cover our product candidates, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed or invalidated. There is no assurance that all of the potentially relevant prior art relating to our patents and patent applications has been found, which can invalidate a patent or prevent a patent from issuing from a pending patent application. Furthermore, if third parties have filed similar patent applications, an interference or derivation proceeding in the United States can be initiated by the United Stated Patent and Trademark Office, or U.S. PTO, a third party, or by us to determine who was the first to invent any of the subject matter covered by the patent claims of our applications.

We are a party to various license agreements that grant us rights under specified patents and patent applications. We are also party to various license agreements by which we grant third parties rights under specified patents and patent applications. Our current licenses contain performance obligations. If we fail to meet those obligations, the licenses could be terminated. If we are unable to continue to license these technologies on commercially reasonable terms, or at all, we may be forced to delay or terminate aspects of our product development and research activities.

With respect to our present and any future sublicenses, because our rights derive from those granted to our sublicensor, we are subject to the risk that our sublicensor may fail to perform its obligations under the master license or fail to inform us of useful improvements in, or additions to, the underlying intellectual property owned by the original licensor.

We are unable to exercise the same degree of control over intellectual property that we license from third parties as we exercise over our internally developed intellectual property. We do not control the prosecution of certain of the patent applications that we license from third parties; therefore, the patent applications may not be prosecuted as we desire or in a timely manner.

The degree of future protection for our proprietary rights is uncertain, and we cannot ensure that:

- we or our licensors were the first to make the inventions covered by each of our pending patent applications;
- we or our licensors were the first to file patent applications for these inventions;
- the patents of others will not have an adverse effect on our ability to do business;
- others will not independently develop similar or alternative technologies or reverse engineer any of our products, processes or technologies;
- any of our pending patent applications will result in issued patents;
- any patents issued or licensed to us, our collaborators or strategic partners will provide a basis for commercially viable products or will provide us with any competitive advantages;
- any patents issued or licensed to us will not be challenged and invalidated by third parties; or
- we will develop additional products, processes or technologies that are patentable.

Others have filed and in the future are likely to file patent applications that are similar to ours. We are aware that there are academic groups and other companies that are attempting to develop technology that is based on the use of zinc finger, TALE, CRISPR/Cas and other DNA-binding proteins, and that these groups and companies have filed patent applications. Several

patents with claims directed to this technology have issued, although we have no current plans to use the claimed inventions. If these or other patent applications issue as patents, it is possible that the holder of any patent or patents granted on these applications may bring an infringement action against us, our collaborators, or strategic partners claiming damages and seeking to enjoin commercial activities relating to the affected products and processes. The costs of litigating the claim could be substantial regardless of outcome. Moreover, we cannot predict whether we, our collaborators, or strategic partners would prevail in any actions. In addition, if the relevant patent claims were upheld as valid and enforceable and our products or processes were found to infringe a patent or patents, we or our collaborators may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, and we may be prevented from making, using, or selling the relevant product or process unless we or our collaborators could obtain a license or were able to design around the patent claims. We can give no assurance that such a license would be available to us or our collaborators on commercially reasonable terms, or at all, or that we would be able to successfully design around the relevant patent claims. There may be significant litigation in the genomics or cell therapy industry regarding patent and other intellectual property rights, which could subject us to litigation. If we become involved in litigation, it could consume a substantial portion of managerial and financial resources.

We rely on trade secrets to protect technology where we believe patent protection is not appropriate or obtainable. Trade secrets, however, are difficult to protect. While we require employees, academic collaborators and consultants to enter into confidentiality agreements, we may not be able to adequately protect our trade secrets or other proprietary information or enforce these confidentiality agreements.

Our collaborators, strategic partners, and scientific advisors have rights to publish data and information in which we may have rights. If we cannot maintain the confidentiality of our technology and other confidential information in connection with our collaborations and strategic partnerships, then we may not be able to receive patent protection or protect our proprietary information.

Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time, and may vary based on jurisdiction.

Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date or from the filing date of the corresponding international application. Various extensions may be available. However, the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired for a product, we may be open to competition from generic medications. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

If we are unable to protect the confidentiality of our trade secrets, the value of our technology could be adversely affected and our business would be harmed.

We rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors, collaborators, partners and contractors. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures have been and may in the future be breached, and we may not have adequate remedies for any breach. See also the risk factor titled, "Significant disruptions of our information technology systems or data security incidents could result in significant financial, legal, regulatory, business and reputational harm to us." In addition, our trade secrets may otherwise become known or be independently discovered by competitors.

Although we expect all of our employees and consultants to assign their inventions to us, and all of our employees, consultants, advisors, collaborators, partners and any third parties who have access to our proprietary know-how, information or technology to enter into confidentiality agreements, we cannot provide any assurances that all such agreements have been duly executed or that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. Misappropriation or unauthorized disclosure of our trade secrets could impair our competitive position and may have an adverse effect on our business. Additionally, if the steps taken to maintain our trade secrets are deemed inadequate, we may have

insufficient recourse against third parties for misappropriating the trade secret. In addition, others may independently discover our trade secrets and proprietary information. For example, the FDA, as part of its Transparency Initiative, is currently considering whether to make additional information publicly available on a routine basis, including information that we may consider to be trade secrets or other proprietary information, and it is not clear at the present time how the FDA's disclosure policies may change in the future, if at all.

Further, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in protecting and defending our intellectual property both in the United States and abroad. If we are unable to prevent material disclosure of the non-patented intellectual property related to our technologies to third parties, and there is no guarantee that we will have any such enforceable trade secret protection, we may not be able to establish or maintain a competitive advantage in our market, which could adversely affect our business, results of operations and financial condition.

We may not be successful in obtaining or maintaining necessary rights to gene or cell therapy product components and processes for our development pipeline through acquisitions and in-licenses.

Presently, we believe we have rights to the intellectual property, through licenses from third parties and under patents that we own, to develop our gene and cell therapy product candidates. Because our programs may involve additional product candidates, such as TX200 and potential future CAR-Treg therapies that may require the use of proprietary rights held by third parties, the growth of our business will likely depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, our product candidates may require specific formulations to work effectively and efficiently and these rights may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify on commercially reasonable terms, if at all. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities.

For example, we sometimes collaborate with U.S. and foreign academic institutions to accelerate our preclinical research or development under written agreements with these institutions. Typically, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the collaboration. Regardless of such right of first negotiation for intellectual property, we may be unable to negotiate a license within the specified time frame or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking our ability to pursue our program.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment. If we are unable to successfully obtain rights to required third-party intellectual property rights, our business, financial condition and prospects for growth could suffer.

If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We are a party to a number of intellectual property license agreements that are important to our business and expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, milestone, royalty and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to market products covered by the license.

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

In many cases, patent prosecution of our in-licensed technology is controlled solely by the licensor. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products using the intellectual property. In certain cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners. Licensing of intellectual property is of critical importance to our business and involves complex legal, business and scientific issues and is complicated by the rapid pace of scientific discovery in our industry. Disputes may arise regarding intellectual property subject to a licensing agreement, including:

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

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

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have an adverse effect on our business, financial condition, results of operations, and prospects. If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates, which could have an adverse effect on our business, financial conditions, results of operations, and prospects. As an example, Sangamo France has exclusively licensed the right to the chimeric antigen receptors, or CAR, for use in TX200 from the University of British Columbia, or UBC. Should UBC terminate this license agreement, we may have to develop or acquire the appropriate CAR which would extend our anticipated development timeline and add expense, and which could result in our failure to realize the anticipated benefits of the acquisition of Sangamo France.

We may be involved in patent or intellectual property lawsuits or similar disputes involving patents under our control or patents of third-parties claiming infringement, which lawsuits could be expensive, time-consuming and impair or prevent development and commercialization activities.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, *ex parte* reexaminations, post-grant review, and *inter partes* review proceedings before the U.S. PTO, and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are pursuing development candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may assert that we are employing their proprietary technology without authorization, and such parties may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. For example, we are aware of certain patents held by a third party related to certain vector manufacturing methods that are currently being used in certain of our product candidates. We have not yet finalized the commercial scale manufacturing process for any of our product candidates. If our commercial scale manufacturing process utilizes these vector manufacturing methods, and if these third-party patents are in force at the time of commercialization, we may need to use or develop a non-infringing manufacturing method or seek a license to these patents. In any event, if any third-party patents were held by a court of competent jurisdiction to cover the manufacturing methods of any of our product candidates, any molecules formed during the manufacturing process or any final product itself, the holders of any such patents may be able to block our ability to commercialize such product candidate unless we obtained a license under

the applicable patents, or until such patents expire. Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy, the holders of any such patents may be able to block our ability to develop and commercialize the applicable product candidate unless we obtained a license, or until such patents expires. Moreover, because patent applications can take many years to issue, there may be currently pending patent applications that may later result in issued patents that our product candidates may infringe.

Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

Competitors may also infringe our patents or the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid, is unenforceable, in whole or in part, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated, held unenforceable or interpreted narrowly and could put our patent applications at risk of not issuing. Moreover, if we or one of our licensing partners initiated legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid and/or unenforceable. Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidate. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection could have an adverse impact on our business.

Interference or derivation proceedings provoked by third parties or brought by us or declared by the U.S. PTO may be necessary to determine the priority of inventions or other matters of inventorship with respect to our patents or patent applications or those of our licensors. An unfavorable outcome could expose us to significant monetary damages, result in the loss of valuable intellectual property, require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms or at all, or if a non-exclusive license is offered and our competitors gain access to the same technology. Our defense of litigation, interference, derivation, or other proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation or administrative proceedings, there is a risk that some of our confidential information could be compromised by disclosure. In addition, any uncertainties resulting from the initiation and continuation of any litigation could have an adverse effect on our ability to raise additional funds or otherwise have an adverse effect on our business, results of operations, financial condition and prospects.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

We employ individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and independent contractors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of any of our employee's former employer or other third parties. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

Changes in patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

As is the case with other biotechnology companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. Changes in either the patent laws or interpretation of the patent laws in the United States or in other jurisdictions in which we seek patent protection could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. The United States enacted the Leahy-Smith America Invents Act, or the America Invents Act, which includes a number of significant changes that affect the way patent applications will be prosecuted and also may affect patent litigation. These include allowing third party submission of prior art to the U.S. PTO during patent prosecution and additional procedures to attack the validity of a patent by U.S. PTO administered post-grant proceedings, including post-grant review, *inter partes* review, and derivation proceedings. Because of a lower evidentiary standard in U.S. PTO proceedings compared to the evidentiary standard in United States federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a U.S. PTO proceeding sufficient for the U.S. PTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. In addition, the challenged patents are not accorded the presumption of validity as they are in Federal District Court. Accordingly, a third party may attempt to use the U.S. PTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. Therefore, the America Invents Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our owned or in-licensed patent applications and the enforcement or defense of our owned or in-licensed issued patents, all of which could have an adverse effect on our business, financial condition, results of operations, and prospects. Moreover, recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, the U.S. PTO, and similar legislative, judicial and regulatory bodies in other jurisdictions, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

We may be unable to license gene transfer technologies that we may need to commercialize our zinc finger protein technology and potential products, if approved.

In order to regulate or modify a gene in a cell, the ZFP must be efficiently delivered to the cell. We have licensed certain gene transfer technologies for our ZFP in research, including adeno-associated virus, or AAV, and mRNA technology and we are evaluating these systems and other technologies that may need to be used in the delivery of ZFP into cells for *in vitro* and *in vivo* applications. We have not developed our own gene transfer technologies, and we rely on our ability to enter into license agreements to provide us with rights to the necessary gene transfer technology. Our approach has been to license appropriate technology as required. For example, we are aware of certain patents held by a third party related to certain vector manufacturing methods that are currently being used in certain of our product candidates. We have not yet finalized the commercial scale manufacturing process for any of our product candidates. If our commercial scale manufacturing process utilizes these vector manufacturing methods, and if these third-party patents are in force at the time of commercialization, we may need to use or develop a non-infringing manufacturing method or seek a license to these patents. However, we may not be able to license the gene transfer technologies on reasonable terms, if at all, required to develop and commercialize our product candidates. The inability to obtain a license to use gene transfer technologies with entities that own such technology on reasonable commercial terms, if at all, could delay or prevent the preclinical evaluation, drug development collaborations, clinical testing, and/or commercialization of our therapeutic product candidates.

We are conducting proprietary research to discover new product candidates. These programs increase our financial risk of product failure, may significantly increase our research expenditures, and may involve conflicts with future collaborators and strategic partners.

Our proprietary research programs consist of research that is funded solely by us or by grant funding and in which we retain exclusive rights to therapeutic products generated by such research. This is in contrast to certain of our research programs that may be funded by corporate partners in which we may share rights to any resulting products. Conducting proprietary research programs may not generate corresponding revenue and may create conflicts with our collaborators or strategic partners over rights to our intellectual property with respect to our proprietary research activities. Any conflict with our collaborators or strategic partners could reduce our ability to enter into future collaborations or partnering agreements and negatively impact our relationship with existing collaborators and partners that could reduce our revenue and delay or terminate our product development. As we continue to focus our strategy on proprietary research and therapeutic development, we expect to experience

greater business risks, expend significantly greater funds and require substantial commitments of time from our management and staff.

Risks Relating to our Business Operations

Significant disruptions of our information technology systems or data security incidents could result in significant financial, legal, regulatory, business and reputational harm to us.

We are increasingly dependent on information technology systems and infrastructure to operate our business, which are large and complex. In the ordinary course of our business, we collect, store, process and transmit large amounts of sensitive information, including intellectual property, proprietary business information, personal information and other confidential information. It is critical that we do so in a secure manner to maintain the confidentiality, integrity and availability of such sensitive information. We have also outsourced elements of our operations (including elements of our information technology infrastructure) to third parties, and as a result, we manage a number of third-party vendors who may or could have access to our computer networks or our confidential information. Many of those third parties in turn subcontract or outsource some of their responsibilities to third parties. While all information technology operations are inherently vulnerable to inadvertent or intentional security breaches, incidents, attacks and exposures, the size, complexity, accessibility and distributed nature of our information technology systems, and the large amounts of sensitive information stored on those systems, make such systems potentially vulnerable to unintentional or malicious, internal and external attacks on our technology environment. Attacks of this nature are increasing in their frequency, levels of persistence, sophistication and intensity.

Significant disruptions of our, our third-party vendors' and/or business partners' information technology systems or other similar data security incidents could adversely affect our business operations and/or result in the loss, misappropriation, and/or unauthorized access, use or disclosure of, or the prevention of access to, sensitive information, which could result in financial and reputational harm to us. For example, in April 2018, we announced a data security incident involving the compromise of a then senior executive's company email account. Upon learning of the incident on March 28, 2018, external network security experts were promptly engaged, and the incident response team worked diligently to investigate the incident. We also promptly notified federal law enforcement of the incident. The investigation concluded that the incident was limited to the compromise of the then senior executive's company email account for approximately 11 weeks. The investigation did not reveal any evidence that our network or other information technology systems were otherwise compromised in connection with the incident or that the incident resulted in the disclosure of or access to personal information about patients or other individuals besides the holder of the company email account that was affected. However, proprietary, confidential and other sensitive information of ours and that of other entities was accessed and may have been compromised as a result of the incident. Unforeseen developments related to this incident could occur, which could have a further adverse impact on us. We do not maintain cyber liability insurance and will therefore have no coverage for any losses resulting from this data security incident. Any litigation or regulatory review arising from this incident could result in significant legal exposure to us. In addition, information technology system disruptions, whether from attacks on our technology environment or from computer viruses, natural disasters, terrorism, war and telecommunication and electrical failures, could result in a material disruption of our facility, development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data.

While we aware of the company email incident described above, there is no way of knowing with certainty whether we have experienced any other data security incidents that have not been discovered. While we have no reason to believe this to be the case, attackers have become very sophisticated in the way they conceal access to systems, and many companies that have been attacked are not aware that they have been attacked. Any event, including the company email incident described above, that leads to unauthorized access, use or disclosure of personal information could, among other consequences, disrupt our business, harm our reputation, compel us to comply with applicable federal and/or state breach notification laws and foreign law equivalents. In addition, failure to maintain effective internal accounting controls related to security breaches and cybersecurity in general could impact our ability to produce timely and accurate financial statements and subject us to regulatory scrutiny. Moreover, data security incidents and other inappropriate access can be difficult to detect, and any delay in identifying them may lead to increased harm of the type described above. While we have implemented security measures intended to protect our information technology systems and infrastructure, there can be no assurance that such measures will successfully prevent service interruptions or further security incidents.

We continue to operate the acquired Sangamo France business in France and the Sangamo UK business in the United Kingdom, which may expose us to unanticipated costs or events.

Sangamo France's historical operations have been based in France and we continue to operate the acquired Sangamo France business in France. Our operation of the acquired Sangamo France business in France involves significant risks, including:

- difficulty hiring and retaining appropriate personnel due to intense competition for such limited resources;
- disruptions in relations with our employees, including legacy Sangamo France employees; and
- compliance with regulatory requirements, including local French employment regulations and organized labor in France.

In addition, we have operations and conduct business in the United Kingdom through Sangamo Therapeutics UK Ltd, or Sangamo UK. As a result of our operations outside of the United States, we have become more exposed to fluctuations in currency exchange rates between the Euro and the U.S. dollar and between the Pound Sterling and the U.S. dollar. Given the volatility of currency exchange rates, there is no assurance that we will be able to effectively manage currency transaction and/or conversion risks. To date, we have not entered into derivative instruments to offset the impact of foreign exchange fluctuations, which fluctuations could have an adverse effect on our financial condition and results of operations. In any event, difficulties resulting from these and other risks related to our operations outside of the United States could expose us to increased expenses, impair our development efforts, adversely affect our financial condition and results of operations and harm our competitive position.

We may face difficulties as we expand our operations into countries in which we have no prior operating experience, and we may be exposed to risks associated with our operations and clinical trials in foreign jurisdictions, which could adversely affect our business.

In addition to Sangamo France and Sangamo UK, we may expand our global footprint in order to enter new markets. Operating in foreign jurisdictions requires significant resources and management attention and subjects us to regulatory, economic and political risks that are different from those we face in the United States. We cannot be sure that any further international expansion will be successful.

Certain countries into which we expand may have less political, social or economic stability and less developed infrastructure and legal systems. It will be costly to establish, develop and maintain international operations and develop and promote our products, if and when approved, in international markets. We may also encounter regulatory, legal, personnel, technological and other difficulties that increase our expenses and/or delay our ability to become profitable in such countries, which could have an adverse effect on our business and operations. Consequently, we are, and will continue to be, subject to risks inherent with operating in foreign countries, in addition to those specific risks associated with Sangamo France and Sangamo UK, which include:

- the increased complexity and costs inherent in managing international operations, including in geographically disparate locations;
- diverse regulatory, financial and legal requirements, and any future changes to such requirements, in one or more countries where we are located or do business;
- differing payor reimbursement regimes, governmental payors or patient self-pay systems and price controls;
- adverse tax consequences, including changes in applicable tax laws and regulations;
- applicable trade laws, tariffs, export quotas, custom duties or other trade restrictions, and any changes to them;
- economic weakness, including inflation, or political or economic instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign currency fluctuations, which could result in increased operating expenses or reduced revenues, and other obligations incident to doing business or operating in another country;
- liabilities for activities of, or related to, our international operations;
- challenges inherent in efficiently managing employees in diverse geographies, including the need to adapt systems, policies, benefits and compliance programs to differing labor and other regulations;
- natural disasters, political and economic instability, including wars, terrorism and political unrest, outbreak of health epidemics, including the evolving COVID-19 pandemic, and the resulting global economic and social impacts;
- workforce uncertainty in countries where labor unrest is more common than in the United States; and
- laws and regulations relating to data security and the unauthorized use of, or access to, commercial and personal information.

The withdrawal of the United Kingdom from the EU, commonly referred to as "Brexit," may adversely impact our ability to obtain regulatory approvals of our product candidates in the EU, result in restrictions or imposition of taxes and

duties for importing our product candidates into the EU and may require us to incur additional expenses in order to develop, manufacture and commercialize our product candidates in the EU.

Following the result of a referendum in 2016, the United Kingdom left the EU on January 31, 2020 pursuant to formal withdrawal agreements between the United Kingdom and the EU. Under these agreements, the United Kingdom will be subject to a transition period until December 31, 2020, during which EU rules will continue to apply. Negotiations between the United Kingdom and the EU are expected to continue in relation to the customs and trading relationship between the United Kingdom and the EU following the expiry of the transition period.

A significant proportion of the regulatory framework in the United Kingdom applicable to our business and our product candidates is derived from EU directives and regulations, and as such, following the transition period, Brexit could negatively impact the regulatory regime with respect to the development, manufacture, importation, approval and commercialization of our product candidates in the United Kingdom or the EU. Any delay in obtaining, or an inability to obtain, any clinical trial authorizations or marketing approvals, as a result of Brexit or otherwise, would prevent us from developing or commercializing our product candidates in the United Kingdom or the EU and restrict our ability to generate revenue and achieve and sustain profitability. In addition, we may be required to pay taxes or duties or be subjected to other hurdles in connection with the importation of our clinical trial materials and/or our product candidates into the EU or into the United Kingdom from the EU, or we may incur expenses in establishing a manufacturing facility in the EU in order to circumvent such hurdles. If any of these outcomes occur, we may be forced to restrict or delay efforts to seek regulatory approval in the United Kingdom or the EU for our product candidates, or incur significant additional expenses to operate our business, which could significantly and significantly harm or delay our ability to generate revenues or achieve profitability of our business. Any further changes in international trade, tariff and import/export regulations as a result of Brexit or otherwise may impose unexpected duty costs or other non-tariff barriers on us. These developments, or the perception that any of them could occur, may significantly reduce global trade and, in particular, trade between the impacted nations and the United Kingdom. It is also possible that Brexit may negatively affect our ability to attract and retain employees, particularly those from the EU.

We and third parties on which we rely may be adversely affected by natural disasters and catastrophic or other events outside of our control, and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster or event.

Natural disasters could severely disrupt our facilities and our operations and have a negative impact on our business, financial condition, results of operations and prospects. If a natural disaster, pandemic or epidemic, including the evolving COVID-19 pandemic, political crisis, power outage or any other event that is out of our control occurred that prevented us or third parties on which we rely from using all or a significant portion of our or their facilities, that damaged critical infrastructure or that otherwise disrupted our or their operations, it may be difficult or, in certain cases, impossible for us to continue our business and operations for a substantial period of time. The disaster recovery and business continuity plans we have in place currently are limited and may not prove adequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have an adverse effect on our business, financial condition, results of operations and prospects. Such disasters or events occurring at facilities of third parties on which we rely could also negatively impact our business and operations.

We will need to grow the size of our organization, and we may experience difficulties in managing this growth and attracting and retaining employees.

We will need to grow the size of our organization in order to support our continued development and potential commercialization of our product candidates. In particular, we will need to add substantial numbers of additional personnel and other resources to support our development and potential commercialization of our product candidates. As our operations expand, we will also need to manage additional relationships with various strategic partners, suppliers and other third parties. We may not be able to attract or retain employees with the appropriate levels of experience and skills to accomplish our objectives. As our development and commercialization plans and strategies continue to develop, or as a result of any future acquisitions, our need for additional managerial, operational, manufacturing, sales, marketing, financial and other resources will increase. Future growth will also impose significant added responsibilities on members of management.

Our future financial performance and our ability to commercialize our product candidates and to compete effectively will depend, in part, on our ability to manage any future growth effectively. To that end, we must be able to manage our development efforts and preclinical studies and clinical trials effectively and hire, train and integrate additional management, research and development, manufacturing, administrative and sales and marketing personnel. Our failure to accomplish any of these tasks could prevent us from successfully growing our company.

We are dependent on certain key members of our executive team and certain of our scientific and manufacturing personnel, the loss of whose services may adversely impact the achievement of our objectives. While we have entered into employment agreements with each of our executive officers, any of them could leave our employment at any time, as all of our employees are "at will" employees. We do not have "key person" insurance on any of our employees. The loss of the services of one or more of such key employees might impede the achievement of our research, development and commercialization objectives.

Recruiting and retaining other qualified employees for our business, including scientific and technical personnel is, and will continue to be, critical to our success. There currently is a shortage of skilled individuals with substantial gene therapy experience, which is likely to continue. As a result, competition for skilled personnel, including in gene therapy research and vector manufacturing, is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies and academic institutions for individuals with similar skill sets. In addition, failure to succeed in preclinical or clinical trials or applications for marketing approval may make it more challenging to recruit and retain qualified personnel. The inability to recruit, or loss of services of certain executives or key employees, may impede the progress of our research, development and commercialization objectives and have an adverse effect on our business, financial condition, results of operations and prospects. Moreover, our ability to recruit and retain qualified executives and employees may be adversely impacted by the evolving COVID-19 pandemic.

We may not successful in our efforts to identify, discover or acquire new potential product candidates and may fail to capitalize on programs or product candidates that may be a greater commercial opportunity or for which there is a greater likelihood of success.

Part of our business strategy is to expand our product candidate pipeline by identifying and validating new product candidates, which we may develop ourselves, in-license or otherwise acquire from others. If our existing product candidates do not receive regulatory approval or are not successfully commercialized, then the success of our business will depend on our ability to continue to expand our product pipeline through in-licensing or other acquisitions. We may be unable to identify relevant product candidates. If we do identify such product candidates, we may be unable to reach acceptable terms with any third party from which we desire to in-license or acquire them. Further, while we seek to mitigate risks and liabilities of potential acquisitions and in-licensing transactions through, among other things, due diligence, there may be risks and liabilities that such due diligence efforts fail to discover, that are not disclosed to us, or that we inadequately assess, or that we are not able to effectively manage. Additionally, we may not realize the anticipated benefits of such transactions for a variety of reasons, including the possibility that acquired product candidates, such as TX200, prove not to be safe or effective in clinical trials, the integration of an acquired product candidate, technology or business gives rise to unforeseen difficulties and expenditures, or that the expected benefits will not otherwise be realized or will not be realized within the expected timeframe.

Additionally, because we have limited resources, we may forego or delay pursuit of opportunities with certain programs or product candidates or for indications that later prove to have greater commercial potential. Our spending on current and future research and development programs may not yield any commercially viable products. If we do not accurately evaluate the commercial potential for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaboration, licensing or other arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. Alternatively, we may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a collaboration arrangement.

Risks Relating to our Common Stock and Corporate Organization

Our stock price has been volatile and may continue to be volatile, which could result in substantial losses for investors, and could be influenced by public perception of genomic medicines and the biotechnology sector.

Our stock price has been volatile and may continue to be volatile, which could cause stockholders to incur substantial losses. An active public market for our common stock may not be sustained, and the market price of our common stock may continue to be highly volatile. The market price of our common stock has fluctuated significantly in response to various factors, some of which are beyond our control, including but not limited to the following:

- announcements by us or collaborators providing updates on the progress or development status of product candidates or data from clinical trials;
- initiation or termination of clinical trials;
- changes in market valuations of similar companies;

- overall market and economic conditions, including the equity markets for emerging biotechnology companies;
- deviations in our results of operations from the guidance given by us;
- announcements by us or our competitors of new or enhanced products, technologies or services or significant contracts, acquisitions, strategic relationships, joint ventures or capital commitments;
- announcement of changes in business and operations by our collaborators and partners, or changes in our existing collaboration agreements;
- changes in public opinion of gene therapy and genomic medicines;
- regulatory developments, including increased regulatory scrutiny of gene therapy and genomic medicines;
- changes, by one or more of our security analysts, in recommendations, ratings or coverage of our stock;
- additions or departures of key personnel; and
- sales of our common stock or other securities by us, management or directors, liquidation of institutional funds that comprised large holdings of our stock and decreases in our cash balances.

In addition, the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies, including very recently in connection with the evolving COVID-19 pandemic, which has resulted in decreased stock prices for many companies notwithstanding the lack of a fundamental change in their underlying business models or prospects. These fluctuations have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors, including potentially worsening economic conditions and other adverse effects or developments relating to the evolving COVID-19 pandemic, and political, regulatory and other market conditions, may negatively affect the market price of shares of our common stock, regardless of our actual operating performance.

Actual or potential sales of significant amounts of shares of our common stock into the market could cause the market price of our common stock to fall or prevent it from increasing for numerous reasons.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. With the exception of shares recently issued to Biogen in connection with our collaboration agreement, our outstanding shares of common stock generally may be freely sold in the public market at any time to the extent permitted by Rules 144 and 701 under the Securities Act of 1933, as amended, or the Securities Act, or to the extent such shares have already been registered under the Securities Act and are held by non-affiliates of ours. While Biogen agreed not to sell any shares until the first anniversary of the effectiveness, and to limit resales through the second anniversary, such restrictions are only temporary. Further, we also agreed, subject to certain limitations, to register for resale any the shares issued Biogen. We have also filed registration statements registering all shares of common stock that we may issue under our equity compensation plans. Such shares can be freely sold in the public market upon issuance, subject to volume limitations and black-out periods applicable to affiliates. Additionally, we recently entered into a sales agreement with Jefferies LLC which permits us from time to time at our discretion to sell up to $150.0 million of shares of our common stock in the public markets at prevailing market prices.

In addition, in accordance with the guidelines specified under Rule 10b5-1 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, and our policies regarding stock transactions, certain of our employees, executive officers and directors have adopted, and may continue to adopt, stock trading plans pursuant to which they have arranged to sell shares of our common stock from time to time in the future. Generally, sales under such plans by our executive officers and directors require public filings. Our employees, executive officers, directors and affiliated stockholders also may buy or sell additional shares outside of a Rule 10b5-1 plan when they are not in possession of material, nonpublic information. Actual or potential sales of our common stock by such persons could be viewed negatively by other investors and could cause the price of our common stock to fall or prevent it from increasing.

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

The trading market for our common stock will depend in part on the research and reports that securities or industry analysts publish about us or our business. In the event securities or industry analysts who cover us downgrade our stock or publish inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

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

We have never declared or paid any cash dividends on our common stock. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends for the foreseeable future. Any return to stockholders will therefore be limited to the appreciation of their stock.

Anti-takeover provisions in our certificate of incorporation, Delaware law and our bylaws could make an acquisition of our company more difficult and could prevent attempts by our stockholders to remove or replace current management.

Anti-takeover provisions of Delaware law and in our certificate of incorporation and our bylaws may discourage, delay or prevent a change in control of our company, even if a change in control would be beneficial to our stockholders. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. In particular, under our certificate of incorporation our board of directors may issue up to 5,000,000 shares of preferred stock with rights and privileges that might be senior to our common stock, without the consent of the holders of the common stock. Moreover, without any further vote or action on the part of the stockholders, the board of directors would have the authority to determine the price, rights, preferences, privileges, and restrictions of the preferred stock. This preferred stock, if it is ever issued, may have preference over, and harm the rights of, the holders of common stock. Although the issuance of this preferred stock would provide us with flexibility in connection with possible acquisitions and other corporate purposes, this issuance may make it more difficult for a third party to acquire a majority of our outstanding voting stock.

Similarly, our authorized but unissued common stock is available for future issuance without stockholder approval. Our certificate of incorporation further provides that stockholders may not take action by written consent.

In addition, our amended and restated bylaws:

- establish advance notice requirements for nominations for election to the board of directors or proposing matters that can be acted upon at stockholders' meetings; and
- prohibit stockholders from calling a special meeting of stockholders.

We are also subject to Section 203 of the General Corporation Law of the State of Delaware, which provides, subject to certain exceptions, that if a person acquires 15% of our voting stock, the person is an "interested stockholder" and may not engage in "business combinations" with us for a period of three years from the time the person acquired 15% or more or our voting stock. The application of Section 203 may, in some circumstances, deter or prevent a change in control of our company even when such change may be beneficial to our stockholders.

Our amended and restated bylaws provide that a state or federal court located within the State of Delaware will be the exclusive forum for the adjudication of certain disputes, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our amended and restated bylaws provide that a state or federal court located within the State of Delaware is the sole and exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee or stockholder of Sangamo to us or our stockholders;
- any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware, our charter or our bylaws, as to which the General Corporation Law of the State of Delaware confers jurisdiction on the Court of Chancery of the State of Delaware; and
- any action asserting a claim governed by the internal affairs doctrine.

This provision further provides that any person or entity that acquires any interest in shares of our capital stock will be deemed to have notice of and consented to the provisions of such provision.

While this provision does not apply to suits brought to enforce a duty or liability created by the Exchange Act or the Securities Act, or any claim for which the federal courts have exclusive jurisdiction, this provision may nonetheless limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers, and other employees. If a court were to find this provision to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could seriously harm our business.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

None.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

Not applicable.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

Open Market Sale Agreement℠

On August 5, 2020, we entered into an Open Market Sale Agreement℠ with Jefferies LLC, or Jefferies, with respect to an at-the-market offering program under which we may offer and sell, from time to time at our sole discretion, shares of our common stock, par value $0.01 per share, having an aggregate offering price of up to $150.0 million through Jefferies as our sales agent or principal.

We are not obligated to sell any shares under the sales agreement. Subject to the terms and conditions of the sales agreement, Jefferies will use commercially reasonable efforts, consistent with its normal trading and sales practices and applicable laws and regulations, to sell shares of our common stock from time to time based upon our instructions, including any price, time or size limits or other customary parameters or conditions we specify, subject to certain limitations. Under the sales agreement, Jefferies may sell shares of our common stock by any method permitted by law deemed to be an "at-the-market offering" as defined in Rule 415(a)(4) under the Securities Act of 1933, as amended.

The issuance and sale, if any, of shares of our common stock by us under the sales agreement will be made pursuant to our effective registration statement on Form S-3 (Registration Statement No. 333-224418), filed with the U.S. Securities and Exchange Commission on April 24, 2018. The offering will be described in our Prospectus dated April 24, 2018, as supplemented by a Prospectus Supplement dated August 5, 2020, to be filed with the SEC on August 5, 2020.

We will pay Jefferies a commission of up to 3% of the gross proceeds from each sale of shares of our common stock sold through Jefferies under the sales agreement and will provide Jefferies with customary indemnification and contribution rights. In addition, we agreed to reimburse certain legal expenses and fees by Jefferies in connection with the offering up to a maximum of $50,000, in addition to certain ongoing disbursements of Jefferies' counsel, if required. The sales agreement will terminate upon the sale of all $150.0 million of shares under the sales agreement, unless earlier terminated by either party as permitted therein.

Cooley LLP, our counsel, has issued a legal opinion relating to the validity of the shares of common stock being offered pursuant to the sales agreement. A copy of such legal opinion, including the consent included therein, is filed as Exhibit 5.1 to this Quarterly Report on Form 10-Q and is incorporated herein by reference.

This Quarterly Report on Form 10-Q shall not constitute an offer to sell or the solicitation of an offer to buy any Shares under the Agreement nor shall there be any offer, solicitation or sale of such Shares in any state in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state.

ITEM 6. EXHIBITS

Exhibit number		Description of Document
1.1+		Open Market Sale Agreement, dated August 5, 2020, between Sangamo Therapeutics, Inc. and Jefferies LLC.
3.1		Composite copy of Seventh Amended and Restated Certificate of Incorporation of Sangamo Therapeutics, Inc., as amended (incorporated by reference to Exhibit 3.1 to the registrant's Quarterly Report on Form 10-Q, filed with the SEC on August 9, 2017).
3.2		Fourth Certificate of Amendment of the Seventh Amended and Restated Certificate of Incorporation of Sangamo Therapeutics, Inc., as amended (incorporated by reference to Exhibit 3.1 to the registrant's Current Report on Form 8-K, filed with the SEC on May 22, 2020).
3.3		Third Amended and Restated Bylaws of Sangamo Therapeutics, Inc. (incorporated by reference to Exhibit 3.1 to the registrant's Current Report on Form 8-K, filed with the SEC on June 15, 2018.
5.1+		Opinion of Cooley LLP.
10.1#+		Employment Agreement between the Company and Mark McClung effective as of April 13, 2020.
10.2#+		Letter Agreement Regarding Andrew Ramelmeier Special Bonus
10.3#		Amended and Restated 2018 Equity Incentive Plan of Sangamo Therapeutics, Inc. (incorporated by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed with the SEC on May 22, 2020).
10.4+		Seventh Amendment to the Triple Net Laboratory Lease Agreement, dated May 20, 2020, between the Registrant and Point Richmond R&D Associates II, LLC.
10.5+		Eighth Amendment to the Triple Net Laboratory Lease Agreement, dated May 29, 2020, between the Registrant and Point Richmond R&D Associates II, LLC.
23.1+		Consent of Cooley LLP (included in Exhibit 5.1 hereto).
31.1+		Rule 13a — 14(a) Certification of Principal Executive Officer.
31.2+		Rule 13a — 14(a) Certification of Principal Financial Officer.
32.1+	*	Certifications Pursuant to 18 U.S.C. Section 1350.
101.INS		XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH		Inline XBRL Taxonomy Extension Schema Document
101.CAL		Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF		Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB		Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE		Inline XBRL Taxonomy Extension Presentation Linkbase Document
104		The cover page from Sangamo's Quarterly Report on Form 10-Q for the six months ended June 30, 2020, is formatted in Inline XBRL and it is contained in Exhibit 101

* The certifications attached as Exhibit 32.1 accompany this Quarterly Report on Form 10-Q pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, and shall not be deemed "filed" by the Registrant for purposes of Section 18 of the Securities Exchange Act of 1934, as amended.

# Indicates management contract or compensatory plan or arrangement.

+ Filed herewith.

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.

Dated: August 5, 2020

SANGAMO THERAPEUTICS, INC.

/s/ SUNG H. LEE

Sung H. Lee
Executive Vice President and Chief Financial Officer
(Duly Authorized Officer and Principal Financial Officer)

OPEN MARKET SALE AGREEMENT[1]

August 5, 2020

JEFFERIES LLC
520 Madison Avenue
New York, New York 10022

Ladies and Gentlemen:

Sangamo Therapeutics, Inc., a Delaware corporation (the "**Company**"), proposes, subject to the terms and conditions stated herein, to issue and sell from time to time through Jefferies LLC, as sales agent and/or principal (the "**Agent**"), shares of the Company's common stock, par value $0.01 per share (the "**Common Shares**"), having an aggregate offering price of up to $150,000,000 on the terms set forth in this agreement (this "**Agreement**").

Section 1. DEFINITIONS

(a) Certain Definitions. For purposes of this Agreement, capitalized terms used herein and not otherwise defined shall have the following respective meanings:

"**Affiliate**" of a Person means another Person that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such first- mentioned Person. The term "control" (including the terms "controlling," "controlled by" and "under common control with") means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise.

"**Agency Period**" means the period commencing on the date of this Agreement and expiring on the earliest to occur of (x) the date on which the Agent shall have placed the Maximum Program Amount pursuant to this Agreement and (y) the date this Agreement is terminated pursuant to Section 7.

"**Agent**" has the meaning set forth in the introductory paragraph of this Agreement.

"**Agreement**" has the meaning set forth in the introductory paragraph of this Agreement.

"**Anti-Money Laundering Laws**" has the meaning set forth in Section 2(ii).

"**Applicable Laws**" has the meaning set forth in Section 2(u).

"**Authorizations**" has the meaning set forth in Section 2(u).

"**Base Prospectus**" has the meaning set forth in Section 2(a).

[SM] "Open Market Sale Agreement" is a service mark of Jefferies LLC

"**Code**" has the meaning set forth in Section 2(cc).

"**Commission**" means the U.S. Securities and Exchange Commission.

"**Common Shares**" has the meaning set forth in the introductory paragraph of this Agreement.

"**Company**" has the meaning set forth in the introductory paragraph of this Agreement.

"**Company Benefit Plans**" has the meaning set forth in Section 2(cc).

"**Company Stock Plans**" has the meaning set forth in Section 2(i).

"**Default**" has the meaning set forth in Section 2(s).

"**EDGAR**" means the Electronic Data Gathering Analysis and Retrieval system.

"**Environmental Laws**" has the meaning set forth in Section 2(bb).

"**ERISA**" has the meaning set forth in Section 2(cc).

"**ERISA Affiliate**" has the meaning set forth in Section 2(cc).

"**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations of the Commission thereunder.

"**Existing Instrument**" has the meaning set forth in Section 2(s).

"**FCPA**" has the meaning set forth in Section 2(hh).

"**FDA**" has the meaning set forth in Section 2(u).

"**FFDCA**" has the meaning set forth in Section 2(v).

"**FINRA**" means the Financial Industry Regulatory Authority, Inc.

"**Floor Price**" means the minimum price set by the Company in the Issuance Notice below which the Agent shall not sell Shares during the applicable period set forth in the Issuance Notice, which may be adjusted by the Company at any time during the period set forth in the Issuance Notice by delivering written notice of such change to the Agent and which in no event shall be less than $1.00 without the prior written consent of the Agent, which consent may be withheld in the Agent's sole discretion.

"**Free Writing Prospectus**" has the meaning set forth in Section 4(e).

"**Hazardous Materials**" has the meaning set forth in Section 2(bb).

"**HMT**" has the meaning set forth in Section 2(jj).

"**Intellectual Property Rights**" has the meaning set forth in Section 2(t).

"**Interim Prospectus Supplement**" has the meaning set forth in Section 4(a).

"**Investment Company Act**" has the meaning set forth in Section 2(x).

"**Issuance Amount**" means the aggregate Sales Price of the Shares to be sold by the Agent pursuant to any Issuance Notice.

"**Issuance Notice**" means a written notice delivered to the Agent by the Company in accordance with this Agreement in the form attached hereto as Exhibit A that is executed by its Chief Executive Officer, President or Chief Financial Officer.

"**Issuance Notice Date**" means any Trading Day during the Agency Period that an Issuance Notice is delivered pursuant to Section 3(b)(i).

"**Issuance Price**" means the Sales Price less the Selling Commission.

"**IT Systems**" has the meaning set forth in Section 2(ss).

"**Material Adverse Effect**" has the meaning set forth in Section 2(f).

"**Maximum Program Amount**" means Common Shares with an aggregate Sales Price of the lesser of (a) the number or dollar amount of Common Shares registered, if any, under the effective Registration Statement (defined below) pursuant to which the offering is being made, (b) the number of authorized but unissued Common Shares (less Common Shares issuable upon exercise, vesting, conversion or exchange of any outstanding securities of the Company or otherwise reserved from the Company's authorized capital stock), (c) the number or dollar amount of Common Shares permitted to be sold under Form S-3, or (d) the number or dollar amount of Common Shares for which the Company has filed a Prospectus (defined below).

"**OFAC**" has the meaning set forth in Section 2(jj).

"**Original Registration Statement**" has the meaning set forth in Section 2(a).

"**Other Offering Amendment**" means an amendment or supplement to the Registration Statement or Prospectus relating solely to the issuance or offering of securities other than the Common Shares.

"**Person**" means an individual or a corporation, partnership, limited liability company, trust, incorporated or unincorporated association, joint venture, joint stock company, governmental authority or other entity of any kind.

"**Personal Data**" has the meaning set forth in Section 2(ss).

"**Principal Market**" means the Nasdaq Global Select Market or such other national securities exchange on which the Common Shares, including any Shares, are then listed.

"**Prospectus**" has the meaning set forth in Section 2(a).

"**Registration Statement**" has the meaning set forth in Section 2(a).

"**Regulation M**" has the meaning set forth in Section 2(nn).

"**Representation Date**" has the meaning set forth in the introductory paragraph of Section 2.

"**Rule 102**" has the meaning set forth in Section 4(u).

"**Sales Price**" means the actual sale execution price of each Share placed by the Agent pursuant to this Agreement.

"**Sanctioned Country**" has the meaning set forth in Section 2(jj).

"**Sanctions**" has the meaning set forth in Section 2(jj).

"**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations of the Commission thereunder.

"**Selling Commission**" means three percent (3%) of the gross proceeds of Shares sold pursuant to this Agreement, or as otherwise agreed between the Company and the Agent with respect to any Shares sold pursuant to this Agreement.

"**Settlement Date**" means the second business day following each Trading Day during the period set forth in the Issuance Notice on which Shares are sold pursuant to this Agreement, when the Company shall deliver to the Agent the amount of Shares sold on such Trading Day and the Agent shall deliver to the Company the Issuance Price received on such sales.

"**Shares**" shall mean the Company's Common Shares issued or issuable pursuant to this Agreement.

"**Specified Courts**" has the meaning set forth in Section 8(g).

"**Stock Options**" has the meaning set forth in Section 2(i).

"**Time of Sale**" has the meaning set forth in Section 3(b)(v).

"**Time of Sale Information**" has the meaning set forth in Section 2(b).

"**Trading Day**" means any day on which the Principal Market is open for trading.

"**Triggering Event Date**" has the meaning set forth in Section 4(o).

"**UNSC**" has the meaning set forth in Section 2(jj).

Section 2. REPRESENTATIONS AND WARRANTIES OF THE COMPANY

The Company represents and warrants to, and agrees with, the Agent that as of (1) the date of this Agreement, (2) each Issuance Notice Date, (3) each Settlement Date, (4) each Triggering Event Date and (5) each Time of Sale (each of the times referenced above is referred to herein as a "**Representation Date**"), except as may be disclosed in the Prospectus (including any documents incorporated by reference therein and any supplements thereto) on or before a Representation Date:

(a) Registration Statement. The Company has prepared and filed with the Commission an "automatic" shelf registration statement, as defined under Rule 405 under the Securities Act on Form S-3ASR (File No. 333-224418), which contains a base prospectus (the "**Base Prospectus**"). Such registration statement registers the issuance and sale by the Company of the Shares under the Securities Act. The Company may file one or more additional registration statements from time to time that will contain a base prospectus and related prospectus or prospectus supplement, if applicable, with respect to the Shares. Except where the context otherwise requires, such registration statement(s), including any information deemed to be a part thereof pursuant to Rule 430B under the Securities Act, including all financial statements, exhibits and schedules thereto and all documents incorporated or deemed to be incorporated therein by reference pursuant to Item 12 of Form S-3ASR under the Securities Act as from time to time amended or supplemented, and including any information contained in a Prospectus (as defined below) subsequently filed with the Commission pursuant to Rule 424(b) under the Securities Act or deemed to be part of such registration statement pursuant to Rule 430(B) of the Securities Act, is herein referred to as the "**Registration Statement**." and the prospectus constituting a part of such registration statement(s), together with any prospectus supplement filed with the Commission pursuant to Rule 424(b) under the Securities Act relating to a particular issuance of the Shares, including all documents incorporated or deemed to be incorporated therein by reference pursuant to Item 12 of Form S-3ASR under the Securities Act, in each case, as from time to time amended or supplemented, is referred to herein as the "**Prospectus**," except that if any revised prospectus is provided to the Agent by the Company for use in connection with the offering of the Shares that is not required to be filed by the Company pursuant to Rule 424(b) under the Securities Act, the term "**Prospectus**" shall refer to such revised prospectus from and after the time it is first provided to the Agent for such use. The Registration Statement at the time it originally became effective is herein called the "**Original Registration Statement**." As used in this Agreement, the terms "amendment" or "supplement" when applied to the Registration Statement or the Prospectus shall be deemed to include the filing by the Company with the Commission of any document under the Exchange Act after the date hereof that is or is deemed to be incorporated therein by reference.

All references in this Agreement to financial statements and schedules and other information which is "contained," "included" or "stated" in, or "part of" the Registration Statement or the Prospectus (and all other references of like import) shall be deemed to mean and include all such financial statements and schedules and other information which is or is deemed to be incorporated by reference in or otherwise deemed under the Securities Act to be a part of or included in the Registration Statement or the Prospectus, as the case may be, as of any specified

date; and all references in this Agreement to amendments or supplements to the Registration Statement or the Prospectus shall be deemed to mean and include, without limitation, the filing of any document under the Exchange Act which is or is deemed to be incorporated by reference in or otherwise deemed under the Securities Act to be a part of or included in the Registration Statement or the Prospectus, as the case may be, as of any specified date. All references in this Agreement to the Registration Statement, the Prospectus or any amendments or supplements thereto, or any Free Writing Prospectus (as defined herein), shall be deemed to include any copy filed with the Commission pursuant to EDGAR.

(b) Compliance with Registration Requirements. The Original Registration Statement became effective under the Securities Act prior to the issuance of any Issuance Notices by the Company. The Company and the transactions contemplated by this Agreement meet the requirements for and comply with the applicable conditions set forth in Form S-3ASR under the Securities Act. The Company has complied to the Commission's satisfaction with all requests of the Commission for additional or supplemental information, if any. No stop order suspending the effectiveness of the Registration Statement or registration statement filed under Rule 462(b) under the Securities Act (a "**Rule 462(b) Registration Statement**") is in effect and no proceedings for such purpose have been instituted or are pending or, to the best knowledge of the Company, are contemplated or threatened by the Commission. At the time the Registration Statement originally became effective and at the time the Company's most recent annual report on Form 10-K was filed with the Commission, the Company met the then-applicable requirements for use of Form S-3ASR under the Securities Act, including, but not limited to, General Instruction I.D. During the Agency Period, each time the Company files an annual report on Form 10-K, the Company will meet the then-applicable requirements for use of Form S-3ASR under the Securities Act, including, but not limited to, General Instruction I.B.1.

The Prospectus when filed complied, and at each Representation Date will comply, in all material respects with the Securities Act and, if filed by electronic transmission pursuant to EDGAR, was identical (except as may be permitted by Regulation S-T under the Securities Act) to the copy thereof delivered to the Agent for use in connection with the issuance and sale of the Shares. Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment or supplement thereto, at the time it became or becomes effective and at each Representation Date, complied and will comply in all material respects with the Securities Act and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. As of the date of this Agreement, the Prospectus and any Free Writing Prospectus considered together (collectively, the "**Time of Sale Information**") did not, and at each Settlement Date 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. The Prospectus, as of its date, did not, and at each Settlement Date, the Prospectus, as amended or supplemented, will not, contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the three immediately preceding sentences do not apply to statements in or omissions from the Registration Statement, any Rule 462(b)

Registration Statement, or any post-effective amendment thereto, or the Prospectus or the Time of Sale Information, or any amendments or supplements thereto, made in reliance upon and in conformity with information relating to the Agent furnished to the Company in writing by the Agent expressly for use therein, it being understood and agreed that the only such information consists of the information described in Section 6 below. There are no contracts or other documents required to be described in the Time of Sale Information or the Prospectus or to be filed as exhibits to the Registration Statement that have not been described or filed as required. The Registration Statement and the offer and sale of the Shares as contemplated hereby meet the requirements of Rule 415 under the Securities Act and comply in all material respects with said Rule.

(c) Status under the Securities Act. At the time of filing the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment thereto, at the earliest time thereafter that the Company or any offering participant made a bona fide offer (within the meaning of Rule 164(h)(2) under the Securities Act) of the Shares and at the date hereof, the Company was not and is not (as applicable) an "ineligible issuer," and is a well-known seasoned issuer, in each case as defined in Rule 405 under the Securities Act. The Company has paid the registration fee for this offering pursuant to Rule 456(b)(1) under the Securities Act or will pay such fee within the time period required by such rule (without giving effect to the proviso therein) and in any event prior to the first Issuance Notice. Any Free Writing Prospectus that the Company is required to file pursuant to Rule 433(d) under the Securities Act has been, or will be, filed with the Commission in accordance with the requirements of the Securities Act. Each Free Writing Prospectus that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act or that was prepared by or on behalf of or used or referred to by the Company complies or will comply in all material respects with the requirements of Rule 433 under the Securities Act including timely filing with the Commission or retention where required and legending, and each such Free Writing Prospectus, as of its issue date and at all subsequent times through the completion of the issuance and sale of the Shares did not, does not and will not include any information that conflicted, conflicts or will conflict with the information contained in the Registration Statement, the Prospectus or the Time of Sale Information, including any document incorporated by reference therein. Except for any Free Writing Prospectus and electronic road shows, if any, furnished to the Agent before first use, the Company has not prepared, used or referred to, and will not, without the prior written consent of the Agent, such consent not to be unreasonably withheld or delayed, prepare, use or refer to, any Free Writing Prospectus.

(d) Incorporated Documents. The documents incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information, when they were filed with the Commission conformed in all material respects to the requirements of the Exchange Act, and none of such documents contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; and any further documents so filed and incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information, when such documents are filed with the Commission, will conform in all material respects to the requirements of the Securities Act or the Exchange Act and 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.

(e) Financial Statements. The financial statements (including the related notes thereto) of the Company and its consolidated subsidiaries included or incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information comply in all material respects with the applicable requirements of the Securities Act and the Exchange Act, as applicable, and present fairly in all material respects the financial position of the Company and its consolidated subsidiaries as of the dates indicated and the results of their operations and the changes in their cash flows for the periods specified; such financial statements have been prepared in conformity with generally accepted accounting principles in the United States applied on a consistent basis throughout the periods covered thereby, and any supporting schedules included or incorporated by reference in the Registration Statement present fairly in all material respects the information required to be stated therein; and the other financial information included or incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information has been derived from the accounting records of the Company and its consolidated subsidiaries and presents fairly the information shown thereby; and the *pro forma* financial information and the related notes thereto included or incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information, if any, have been prepared in accordance with the applicable requirements of the Securities Act and the Exchange Act, as applicable, and the assumptions underlying such *pro forma* financial information are reasonable and are set forth in the Registration Statement, the Prospectus and the Time of Sale Information. No other financial statements or supporting schedules are required to be included in the Registration Statement, the Prospectus and the Time of Sale Information.

(f) No Material Adverse Effect. Since the date of the most recent financial statements of the Company included or incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information, (i) there has not been any material change in the capital stock (other than the issuance of Common Shares upon exercise of stock options and warrants or vesting of restricted stock units described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement, the Prospectus and the Time of Sale Information), short-term debt or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock; (ii) there has not occurred any event, the occurrence of which would, individually or in the aggregate, have a material adverse effect on the business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole or on the performance by the Company of its obligations under this Agreement (a "**Material Adverse Effect**"), or any development involving a prospective Material Adverse Effect; (iii) neither the Company nor any of its subsidiaries has entered into any transaction or agreement (whether or not in the ordinary course of business) that is material to the Company and its subsidiaries taken as a whole or incurred any liability or obligation, direct or contingent, that is material to the Company and its subsidiaries taken as a whole; and (iv) neither the Company nor any of its subsidiaries has sustained any loss or interference with its business that is material to the Company and its subsidiaries taken as a whole and that is either from fire, explosion, flood or

other calamity, including a health epidemic or pandemic outbreak of infectious disease (including without limitation, a further outbreak or escalation of COVID-19 or any related/mutated form of COVID-19), whether or not covered by insurance, or from any labor disturbance or dispute or any action, order or decree of any court or arbitrator or governmental or regulatory authority, except in each case as otherwise disclosed in the Registration Statement, the Prospectus and the Time of Sale Information.

(g) Organization and Good Standing. The Company and each of its subsidiaries have been duly organized and are validly existing and in good standing under the laws of their respective jurisdictions of organization, are duly qualified to do business and are in good standing in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification, and have all power and authority necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to be so qualified or in good standing or have such power or authority would not, individually or in the aggregate, have a Material Adverse Effect. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21 to the Company's most recent annual report on Form 10-K filed with the Commission.

(h) Capitalization. The Company has an authorized capitalization as set forth in the Registration Statement, the Prospectus and the Time of Sale Information; all the outstanding shares of capital stock of the Company have been duly and validly authorized and issued and are fully paid and non-assessable and are not subject to any pre-emptive or similar rights; except as described in or expressly contemplated by the Registration Statement, the Prospectus and the Time of Sale Information, there are no outstanding rights (including, without limitation, pre-emptive rights), warrants or options to acquire, or instruments convertible into or exchangeable for, any shares of capital stock or other equity interest in the Company or any of its subsidiaries, or any contract, commitment, agreement, understanding or arrangement of any kind relating to the issuance of any capital stock of the Company or any such subsidiary, any such convertible or exchangeable securities or any such rights, warrants or options; the capital stock of the Company conforms in all material respects to the description thereof contained in the Registration Statement, the Prospectus and the Time of Sale Information; and all the outstanding shares of capital stock or other equity interests of each subsidiary owned, directly or indirectly, by the Company have been duly and validly authorized and issued, are fully paid and non-assessable except as otherwise described in the Registration Statement, the Prospectus and the Time of Sale Information, and are owned directly or indirectly by the Company, free and clear of any material lien, charge, encumbrance, security interest, restriction on voting or transfer or any other claim of any third party.

(i) Stock Options. With respect to the stock options (the "**Stock Options**") granted pursuant to the stock-based compensation plans of the Company and its subsidiaries (the "**Company Stock Plans**"), (i) each Stock Option intended to qualify as an "incentive stock option" under Section 422 of the Code so qualifies, (ii) each such grant was made in accordance with the terms of the Company Stock Plans, the Exchange Act and all other applicable laws and regulatory rules or requirements, including the rules of the Principal Market and any other

exchange on which Company securities are traded, and (iii) each such grant was properly accounted for in accordance with GAAP in the financial statements (including the related notes) of the Company and disclosed in the Company's filings with the Commission in accordance with the Exchange Act and all other applicable laws.

(j) Due Authorization. The Company has full right, power and authority to execute and deliver this Agreement and to perform its obligations hereunder; and all action required to be taken for the due and proper authorization, execution and delivery by it of this Agreement and the consummation by it of the transactions contemplated hereby has been duly and validly taken.

(k) The Agreement. This Agreement has been duly authorized, executed and delivered by the Company.

(l) The Shares. The Shares to be issued and sold by the Company hereunder have been duly authorized and, when issued and delivered and paid for as provided herein, will be duly and validly issued, will be fully paid and non-assessable and will conform in all material respects to the descriptions thereof in the Registration Statement, the Prospectus and the Time of Sale Information; and the issuance of the Shares is not subject to any preemptive or similar rights.

(m) Stock Exchange Listing. The Common Shares are registered pursuant to Section 12(b) of the Exchange Act and are listed on the Principal Market, and the Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Common Shares under the Exchange Act or delisting the Common Shares from the Principal Market, nor has the Company received any notification that the Commission or the Principal Market is contemplating terminating such registration or listing.

(n) No Violation or Default. Neither the Company nor any of its subsidiaries is (i) in violation of its charter or by-laws or similar organizational documents; (ii) in default, and no event has occurred that, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject; or (iii) in violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (ii) and (iii) above, for any such default or violation that would not, individually or in the aggregate, have a Material Adverse Effect.

(o) No Conflicts. The execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement, the Registration Statement, the Prospectus and the Time of Sale Information will not (i) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or

instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws or similar organizational documents of the Company or any of its subsidiaries or (iii) result in the violation of any law or statute or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority, except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation, default, lien, charge or encumbrance that would not, individually or in the aggregate, have a Material Adverse Effect.

(p) No Consents Required. No consent, approval, authorization, order, license, registration or qualification of or with any court or arbitrator or governmental or regulatory authority is required for the execution, delivery and performance by the Company of this Agreement, the issuance and sale of the Shares and the consummation of the transactions contemplated by this Agreement, except for the registration of the Shares under the Securities Act and such consents, approvals, authorizations, orders and registrations or qualifications as may be required by FINRA and under applicable state securities laws in connection with the purchase and distribution of the Shares by the Agent.

(q) Legal Proceedings. There are no legal, governmental or regulatory investigations, actions, suits or proceedings pending to which the Company or any of its subsidiaries is a party or to which any property of the Company or any of its subsidiaries is the subject that, individually or in the aggregate, if determined adversely to the Company or any of its subsidiaries, could reasonably be expected to have a Material Adverse Effect; no such investigations, actions, suits or proceedings are threatened or, to the knowledge of the Company, contemplated by any governmental or regulatory authority or threatened by others; and there are no current or pending legal, governmental or regulatory actions, suits or proceedings that are required under the Securities Act to be described in the Registration Statement, the Prospectus and the Time of Sale Information that are not so described in the Registration Statement, the Prospectus and the Time of Sale Information.

(r) Independent Auditors. Ernst & Young LLP, who have audited certain financial statements of the Company and its subsidiaries is an independent registered public accounting firm with respect to the Company and its subsidiaries within the applicable rules and regulations adopted by the Commission and the Public Company Accounting Oversight Board (United States) and as required by the Securities Act.

(s) Title to Real and Personal Property. The Company and its subsidiaries have good and marketable title in fee simple (in the case of real property) to, or have valid and marketable rights to lease or otherwise use, all items of real and personal property and assets that are material to the respective businesses of the Company and its subsidiaries, in each case free and clear of all liens, encumbrances, claims and defects and imperfections of title except those that (i) do not materially interfere with the use made and proposed to be made of such property by the Company and its subsidiaries or (ii) would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect.

(t) Intellectual Property. To the Company's knowledge with respect to patents, patent applications, trade and service marks, trade and service mark registrations, and trade names only, the Company and its subsidiaries own, possess, or license, and otherwise have legally enforceable rights to all patents, patent applications, trade and service marks, trade and service mark registrations, trade names, copyrights, licenses, inventions, trade secrets, technology, and know-how, except with regard to off-the-shelf software provided by third parties, (collectively, the "**Intellectual Property Rights**") necessary for the conduct of the Company's business as now conducted or, to the knowledge of the Company, as proposed in the Registration Statement, the Prospectus and the Time of Sale Information to be conducted. Except as disclosed in the Registration Statement, the Prospectus and the Time of Sale Information, (i) to the knowledge of the Company, there are no rights of third parties to any such Intellectual Property Rights that conflict with the Company's right to own, possess or license, as applicable, such Intellectual Property Rights; (ii) the Company is not aware of any material infringement by third parties of any such Intellectual Property Rights; (iii) there is no pending, or to the knowledge of the Company threatened, action, suit, proceeding or claim by others challenging the Company's rights in or to own, possess and license such Intellectual Property Rights, and the Company is unaware of any facts which would form a reasonable basis for any such claim; (iv) there is no pending, or to the knowledge of the Company threatened, action, suit, proceeding or claim by others challenging the validity or scope of any such Intellectual Property Rights, and the Company is unaware of any facts which would form a reasonable basis for any such claim, except for any such action, suit, proceeding or claim that would not have a Material Adverse Effect; (v) there is no pending, or to the knowledge of the Company threatened, action, suit, proceeding or claim by others that the Company infringes or otherwise violates any patent, trademark, copyright, trade secret or other proprietary rights of others, and the Company is unaware of any other fact which would form a reasonable basis for any such claim, except for any such action, suit, proceeding or claim that would not have a Material Adverse Effect; (vi) to the knowledge of the Company, there is no U.S. patent or published U.S. patent application (other than U.S. patents or U.S. patent applications of the Company) which contains claims that dominate or may dominate any Intellectual Property Rights described in the Registration Statement, the Prospectus and the Time of Sale Information as being owned by or licensed to the Company or that interferes with the issued or pending claims of any such Intellectual Property Rights, except for such claims and interferences that would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect; (vii) there is no prior art of which the Company is aware that may render any U.S. patent held by the Company invalid or any U.S. patent application held by the Company unpatentable which has not been disclosed to the U.S. Patent and Trademark Office, and (viii) to the knowledge of the Company, all pertinent prior art references known to the Company or its counsel during the prosecution of the patents and patent applications comprising the Intellectual Property Rights were disclosed to the relevant patent authority and, to the knowledge of the Company, neither such counsel nor the Company nor any licensor made any misrepresentation to, or concealed any material fact from, the relevant patent authority during such prosecution and the Company, and to the knowledge of the Company, any licensor, has complied with all applicable duty of candor requirements of the relevant patent authority with respect to such patents and patent applications. To the knowledge of the Company, all licenses to which the Company and its subsidiaries is a party relating to the Intellectual Property Rights are valid, subsisting, enforceable, and in good standing and each of

the Company and its subsidiaries has, in all material respects, complied with its respective contractual obligations pursuant to all such licenses relating to the Intellectual Property Rights and has not committed any material breach thereof (declared or undeclared). The Company is not a party to or bound by any options, licenses, or agreements with respect to the intellectual property rights of any other person or entity that are required to be disclosed in Registration Statement, the Prospectus and the Time of Sale Information and that are not disclosed therein. None of the Intellectual Property Rights used by the Company and its subsidiaries has been obtained by them or is being used by them in violation of any material contractual obligations binding on the Company, its subsidiaries or, to the knowledge of the Company, any of their officers, directors, or employees. Except as required to be set forth in the Registration Statement, the Prospectus and the Time of Sale Information, (i) the Company and its subsidiaries are not obligated to pay a material royalty, grant a license or provide other consideration to any third party in connection with the Intellectual Property Rights and (ii) no third party, including any academic or governmental organization, possess material rights to the Intellectual Property Rights owned by the Company.

(u) Compliance with Laws. The Company has not been advised, and has no reason to believe, that it and each of its subsidiaries are not conducting business in compliance with all applicable laws, rules and regulations of the jurisdictions in which it is conducting business, except where failure to be so in compliance would not result in a Material Adverse Effect. Except as described in the Registration Statement, the Prospectus and the Time of Sale Information, each of the Company and its subsidiaries: (A) is and at all times has been in material compliance with all statutes, rules or regulations applicable to the ownership, testing, development, manufacture, packaging, processing, use, distribution, marketing, labeling, promotion, sale, offer for sale, storage, import, export or disposal of any product under development, manufactured or distributed by the Company ("**Applicable Laws**"); (B) has not, within the past five years, received any FDA Form 483, notice of adverse finding, warning letter, untitled letter or other correspondence or notice from the U.S. Food and Drug Administration (the "**FDA**") or any other federal, state, local or foreign governmental or regulatory authority alleging or asserting material noncompliance with any Applicable Laws or any licenses, certificates, approvals, clearances, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws ("**Authorizations**"); (C) possesses all material Authorizations and such Authorizations are valid and in full force and effect and the Company is not in material violation of any term of any such Authorizations; (D) has not received notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from the FDA or any other federal, state, local or foreign governmental or regulatory authority or third party alleging that any product operation or activity is in material violation of any Applicable Laws or Authorizations and has no knowledge that the FDA or any other federal, state, local or foreign governmental or regulatory authority or third party is considering any such claim, litigation, arbitration, action, suit, investigation or proceeding; (E) has not received notice that the FDA or any other federal, state, local or foreign governmental or regulatory authority has taken, is taking or intends to take action to limit, suspend, modify or revoke any material Authorizations and has no knowledge that the FDA or any other federal, state, local or foreign governmental or regulatory authority is considering such action; (F) has filed, obtained, maintained or submitted all material reports, documents, forms, notices, applications, records,

claims, submissions and supplements or amendments as required by any Applicable Laws or Authorizations and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were materially complete and correct on the date filed (or were corrected or supplemented by a subsequent submission); and (G) has not, either voluntarily or involuntarily, initiated, conducted, or issued or caused to be initiated, conducted or issued, any recall, market withdrawal or replacement, safety alert, "dear doctor" letter, or other notice or action relating to the alleged lack of safety or efficacy of any product or any alleged product defect or violation and, to the Company's knowledge, no third party has initiated, conducted or intends to initiate any such notice or action.

(v) Clinical Studies. The studies, tests and preclinical and clinical trials conducted by or on behalf of the Company or any of its subsidiaries were and, if still pending, are being conducted in all material respects in accordance with experimental protocols, procedures and controls pursuant to accepted professional scientific standards and all Applicable Laws and Authorizations, including, without limitation, the Federal Food, Drug and Cosmetic Act and the rules and regulations promulgated thereunder (collectively, "**FFDCA**"); the descriptions of the results of such studies, tests and trials contained in the Registration Statement, the Prospectus and the Time of Sale Information are accurate and complete in all material respects and fairly present the data derived from such studies, tests and trials; except as disclosed in the Registration Statement, the Prospectus and the Time of Sale Information, the Company is not aware of any studies, tests or trials, the results of which the Company believes reasonably call into question the study results, test results, or trial results described or referred to in the Registration Statement, the Prospectus and the Time of Sale Information when viewed in the context in which such results are described and the clinical state of development; and, since December 31, 2016, the Company has not received any notices or correspondence from the FDA or any other federal, state, local or foreign governmental or regulatory authority requiring the termination, suspension or material modification of any studies, tests or preclinical or clinical trials conducted by or on behalf of the Company.

(w) No Undisclosed Relationships. No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries, on the one hand, and the directors, officers, stockholders, customers or suppliers of the Company or any of its subsidiaries, on the other, that is required by the Securities Act to be described in the Registration Statement and the Prospectus and that is not so described in such documents and in the Time of Sale Information.

(x) Investment Company Act. The Company is not and, after giving effect to the offering and sale of the Shares and the application of the proceeds thereof as described in the Registration Statement, the Prospectus and the Time of Sale Information, will not be required to register as an "investment company" or an entity "controlled" by an "investment company" within the meaning of the Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder (collectively, the "**Investment Company Act**").

(y) Taxes. The Company and its subsidiaries have paid all material federal, state, local and foreign taxes and filed all tax returns required to be paid or filed through the date hereof; and except as otherwise disclosed in the Registration Statement, the Prospectus and the

Time of Sale Information, there is no material tax deficiency that has been, or could reasonably be expected to be, asserted against the Company or any of its subsidiaries or any of their respective properties or assets.

(z) Licenses or Permits. Except as otherwise described in each of the Registration Statement, the Prospectus and the Time of Sale Information, the Company and its subsidiaries possess all licenses, certificates, permits and other authorizations issued by, and have made all declarations and filings with, the appropriate federal, state, local or foreign governmental or regulatory authorities that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses, except where the failure to possess or make the same would not, individually or in the aggregate, have a Material Adverse Effect; and except as described in each of the Registration Statement, the Prospectus and the Time of Sale Information, neither the Company nor any of its subsidiaries has received notice of any revocation or modification of any such license, certificate, permit or authorization or has any reason to believe that any such license, certificate, permit or authorization will not be renewed in the ordinary course that, individually or in the aggregate, if revoked, modified or failed to renew, could result in a Material Adverse Effect.

(aa) No Labor Disputes. No labor disturbance by or dispute with employees of the Company or any of its subsidiaries exists or, to the knowledge of the Company, is contemplated or threatened, and the Company is not aware of any existing or imminent labor disturbance by, or dispute with, the employees of any of its or its subsidiaries' principal suppliers, contractors or customers, except as would not have a Material Adverse Effect.

(ab) Environmental Laws and Hazardous Materials. Except as described in the Registration Statement, the Prospectus and the Time of Sale Information or except as would not, singly or in the aggregate, result in a Material Adverse Effect, (i) the Company has not been advised, and has no reason to believe, that either the Company or any of its subsidiaries is in violation of any applicable federal, state, local or foreign statute, law, rule, regulation, ordinance, code or rule of common law or any binding and enforceable judicial or administrative interpretation thereof, including any binding and enforceable judicial or administrative order, consent, decree or judgment, relating to pollution or protection of human health or the environment (including, without limitation, ambient air, surface water, groundwater, land surface or subsurface strata), including, without limitation, laws and regulations relating to the release or threatened release of chemicals, pollutants, contaminants, wastes, toxic substances, hazardous substances, petroleum or petroleum products (collectively, "**Hazardous Materials**") or to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Hazardous Materials (collectively, "**Environmental Laws**"), (ii) the Company has not been advised, and has no reason to believe, that the Company and its subsidiaries do not have all permits, authorizations and approvals required under any applicable Environmental Laws to operate the business of the Company as currently conducted or are not each in compliance with their requirements, (iii) there are no pending or to the Company's knowledge, threatened administrative, regulatory or judicial actions, suits, demands, demand letters, claims, liens, notices of noncompliance or violation, investigation or proceedings relating to any Environmental Law against the Company or any of its subsidiaries and (iv) the Company has not

been advised, and has no reason to believe, that there are any events or circumstances that might reasonably be expected to form the basis of an order for clean- up or remediation, or an action, suit or proceeding by any private party or governmental body or agency, against the Company or any of its subsidiaries relating to Hazardous Materials pursuant to any applicable Environmental Laws.

(ac) Compliance with ERISA. The Company and its subsidiaries and any "employee benefit plan" (as defined in Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended (collectively with the regulations and published interpretations thereunder, "**ERISA**")) established or maintained by the Company, its subsidiaries or their "ERISA Affiliates" (as defined below) ("**Company Benefit Plans**") are in compliance in all material respects with ERISA. "**ERISA Affiliate**" means, with respect to the Company or a subsidiary, any member of any group of organizations described in Sections 414(b), (c), (m) or (o) of the Internal Revenue Code of 1986, as amended, and the regulations and published interpretations thereunder (the "**Code**") of which the Company or such subsidiary is a member. No Company Benefit Plan is a multiemployer plan (as defined in Section 4001(a)(3) and Section 3(37) of ERISA) or a "multiple employer plan" (as defined in Section 4063 or 4064 of ERISA). Furthermore, no Company Benefit Plan is a "defined benefit plan" as defined in Section 3(35) of ERISA or plan subject to Part 3, Subtitle B of Title I of ERISA, Section 412 of the Code or Title IV of ERISA. None of the Company, its subsidiaries or any of their ERISA Affiliates has incurred or reasonably expects to incur any material liability under Sections 4975 or 4980B of the Code. Each Company Benefit Plan that is intended to be qualified under Section 401(a) of the Code is so qualified and nothing has occurred, whether by action or failure to act, which would cause the loss of such qualification, except where such act or failure to act would not, individually or in the aggregate, result in a Material Adverse Effect.

(ad) Disclosure Controls. The Company and its subsidiaries maintain an effective system of "disclosure controls and procedures" (as defined in Rule 13a-15(e) of the Exchange Act) that complies with the requirements of the Exchange Act and that has been designed to ensure that information required to be disclosed by the Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management as appropriate to allow timely decisions regarding required disclosure. The Company and its subsidiaries have carried out evaluations of the effectiveness of their disclosure controls and procedures as required by Rule 13a-15 of the Exchange Act.

(ae) Accounting Controls. The Company and its subsidiaries maintain systems of "internal control over financial reporting" (as defined in Rule 13a-15(f) of the Exchange Act) that comply with the requirements of the Exchange Act and have been designed by, or under the supervision of, their respective principal executive and principal financial officers, or persons performing similar functions, 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, including, but not limited to, internal accounting controls sufficient to provide reasonable assurance that (i) transactions are executed

in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management's general or specific authorization; (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences; and (v) interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and is prepared in accordance with the Commission's rules and guidelines applicable thereto. Except as disclosed in the Registration Statement, the Prospectus and the Time of Sale Information, there are no material weaknesses in the Company's internal controls. Based on the most recent evaluation of its disclosure controls and procedures, the Company is not aware of: (i) any significant deficiencies and material weaknesses in the design or operation of internal controls over financial reporting which have materially adversely affected or are reasonably likely to materially adversely affect the Company's ability to record, process, summarize and report financial information; and (ii) any fraud, whether or not material, that involves management or other employees who have a significant role in the Company's internal controls over financial reporting.

(af) eXtensible Business Reporting Language. The interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and has been prepared in accordance with the Commission's rules and guidelines applicable thereto.

(ag) Insurance. The Company and its subsidiaries have insurance covering their respective properties, operations, personnel and businesses, including business interruption insurance, which insurance, to the knowledge of the Company, is in amounts and insures against such losses and risks as are adequate to protect the Company and its subsidiaries and their respective businesses; and neither the Company nor any of its subsidiaries has (i) received notice from any insurer or agent of such insurer that capital improvements or other expenditures are required or necessary to be made in order to continue such insurance or (ii) any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage at reasonable cost from similar insurers as may be necessary to continue its business, except for such notices or non-renewal that would not result in a Material Adverse Effect.

(ah) No Unlawful Payments. Neither the Company nor any of its subsidiaries nor any director, officer or employee of the Company or any of its subsidiaries nor, to the knowledge of the Company, any agent, affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made or taken an act in furtherance of an offer, promise or authorization of any direct or indirect unlawful payment or benefit to any foreign or domestic government official or employee, including of any government-owned or controlled entity or of a public international organization, or any person acting in an official capacity for or on behalf of any of the foregoing, or any

political party or party official or candidate for political office; (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977, as amended (the "**FCPA**"), or any applicable law or regulation implementing the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, or committed an offence under the Bribery Act 2010 of the United Kingdom or any other applicable anti-bribery or anti-corruption law; or (iv) made, offered, agreed, authorized, requested or taken an act in furtherance of any unlawful bribe or other unlawful benefit, including, without limitation, any rebate, payoff, influence payment, kickback or other unlawful or improper payment or benefit. The Company and its subsidiaries have instituted and maintain and enforce, and will continue to maintain and enforce, policies and procedures designed to promote and ensure compliance with all applicable anti-bribery and anti-corruption laws.

(ai) Compliance with Anti-Money Laundering Laws. The operations of the Company and its subsidiaries are, and have been conducted at all times, in compliance with applicable financial recordkeeping and reporting requirements, including those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the applicable money laundering statutes of all jurisdictions where the Company or any of its subsidiaries conducts business, the rules and regulations thereunder and any related or similar applicable rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the "**Anti-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 Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(aj) No Conflicts with Sanctions Laws. Neither the Company nor any of its subsidiaries, directors, officers, nor, to the knowledge of the Company, any employees, agent, affiliate or other person associated with or acting on behalf of the Company or any of its subsidiaries is currently the subject or the target of any sanctions administered or enforced by the U.S. government, (including, without limitation, the Office of Foreign Assets Control of the U.S. Department of the Treasury ("**OFAC**") or the U.S. Department of State and including, without limitation, the designation as a "specially designated national" or "blocked person"), the United Nations Security Council ("**UNSC**"), the European Union, Her Majesty's Treasury ("**HMT**") or other relevant sanctions authority (collectively, "**Sanctions**"), nor is the Company, any of its subsidiaries located, organized or resident in a country or territory that is the subject or target of Sanctions, including, without limitation, Cuba, Iran, North Korea, Syria and Crimea (each, a "**Sanctioned Country**"); and the Company will not directly or indirectly use the proceeds of the offering of the Shares hereunder, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other person or entity (i) to fund or facilitate any activities of or business with any person that, at the time of such funding or facilitation, is the subject or target of Sanctions, (ii) to fund or facilitate any activities of or business in any Sanctioned Country or (iii) in any other manner that will result in a violation by any person (including any person participating in the transaction, whether as underwriter, advisor, investor or otherwise) of Sanctions. For the past five years, the Company and its subsidiaries have not knowingly engaged in and are not now knowingly engaged in any dealings or transactions with

any person that at the time of the dealing or transaction is or was the subject or the target of Sanctions or with any Sanctioned Country.

(ak) No Restrictions on Subsidiaries. No subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such subsidiary's capital stock or similar ownership interest, from repaying to the Company any loans or advances to such subsidiary from the Company or from transferring any of such subsidiary's properties or assets to the Company or any other subsidiary of the Company.

(al) No Broker's Fees. Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or the Agent for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Shares.

(am) No Registration Rights. No person has the right to require the Company or any of its subsidiaries to register any securities for sale under the Securities Act by reason of the filing of the Registration Statement with the Commission or the issuance and sale of the Shares.

(an) No Price Stabilization or Manipulation; Compliance with Regulation M. The Company has not taken, directly or indirectly, any action designed to or that could reasonably be expected to cause or result in stabilization or manipulation of the price of the Common Shares or any other "reference security" (as defined in Rule 100 of Regulation M under the Exchange Act (**"Regulation M"**)) whether to facilitate the sale or resale of the Shares or otherwise, and has taken no action that would directly or indirectly violate Regulation M. The Company acknowledges that the Agent may engage in passive market making transactions in the Shares on the Principal Market in accordance with Regulation M. The Common Shares are "actively traded securities" (as defined in Regulation M).

(ao) Forward-Looking Statements. No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) included or incorporated by reference in any of the Registration Statement, the Prospectus or the Time of Sale Information has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(ap) Statistical and Market Data. Nothing has come to the attention of the Company that has caused the Company to believe that the statistical and market-related data included or incorporated by reference in the Registration Statement, the Prospectus and the Time of Sale Information is not based on or derived from sources that are reliable and accurate in all material respects.

(aq) No Outstanding Loans or Other Extensions of Credit. Since the adoption of Section 13(k) of the Exchange Act, neither the Company nor any of its subsidiaries has extended or maintained credit, arranged for the extension of credit, or renewed any extension of credit, in the form of a personal loan, to or for any director or executive officer (or equivalent thereof) of

the Company and/or such subsidiary except for such extensions of credit as are expressly permitted by Section 13(k) of the Exchange Act.

(ar) No Ratings. There are no debt securities or preferred stock issued or guaranteed by the Company or any of its subsidiaries that are rated by a "nationally recognized statistical rating organization," as such term is defined in Section 3(a)(62) of the Exchange Act.

(as) Cyber Security; Data Protection. The Company and its subsidiaries' information technology assets and equipment, computers, systems, networks, hardware, software, websites, applications, data and databases (collectively, "**IT Systems**") are adequate for, and operate and perform as required in connection with the operation of the business of the Company and the subsidiaries as currently conducted, free and clear of all material bugs, errors, defects, Trojan horses, time bombs, malware and other corruptants, except where such inadequacy in, or failure to operate or perform, would not, individually or in the aggregate, have a Material Adverse Effect. The Company and its subsidiaries have implemented and maintained commercially reasonable controls, policies, procedures, and safeguards to maintain and protect their material confidential information and the integrity, continuous operation, redundancy and security of all IT Systems and data (including all personal, personally identifiable, sensitive, confidential or regulated data ("**Personal Data**")) used in connection with their businesses, and except as otherwise disclosed in the Registration Statement, the Prospectus and the Time of Sale Information, there have been no breaches, violations, outages or unauthorized uses of or accesses to same, except for those that have been remedied without material cost or liability or the duty to notify any other person or as would not, individually or in the aggregate, have a Material Adverse Effect, nor any incidents under internal review or investigations relating to the same. The Company and its subsidiaries are presently in compliance with all applicable laws or statutes and all judgments, orders, rules and regulations of any court or arbitrator or governmental or regulatory authority having jurisdiction over the Company and its subsidiaries or any of their properties or assets, internal policies and contractual obligations relating to the privacy and security of IT Systems and Personal Data and to the protection of such IT Systems and Personal Data from unauthorized use, access, misappropriation or modification, except where such non-compliance or failure to protect would not, individually or in the aggregate, result in a Material Adverse Effect.

(at) FINRA Matters. To enable the Agent to rely on FINRA Rule 5110(b)(7)(C)(i), the Company represents that the Company (i) has a non-affiliate, public common equity float of at least $150 million or a non-affiliate, public common equity float of at least $100 million and annual trading volume of at least three million shares and (ii) has been subject to the Exchange Act reporting requirements for a period of at least 36 months.

(au) Sarbanes-Oxley. The Company is in compliance, in all material respects, with all applicable provisions of the Sarbanes-Oxley Act of 2002 and the rules and regulations promulgated thereunder.

Any certificate signed by any officer or representative of the Company or any of its subsidiaries and delivered to the Agent or counsel for the Agent in connection with an issuance

of Shares shall be deemed a representation and warranty by the Company to the Agent as to the matters covered thereby on the date of such certificate.

The Company acknowledges that the Agent and, for purposes of the opinions to be delivered pursuant to Section 4(p) hereof, counsel to the Company and counsel to the Agent, will rely upon the accuracy and truthfulness of the foregoing representations and hereby consents to such reliance.

Section 3. ISSUANCE AND SALE OF COMMON SHARES

(a) Sale of Securities. On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company and the Agent agree that the Company may from time to time seek to sell Shares through the Agent, acting as sales agent, or directly to the Agent, acting as principal, as follows, with an aggregate Sales Price of up to the Maximum Program Amount, based on and in accordance with Issuance Notices as the Company may deliver, during the Agency Period.

(b) Mechanics of Issuances.

(i) Issuance Notice. Upon the terms and subject to the conditions set forth herein, on any Trading Day during the Agency Period on which the conditions set forth in Section 5 shall have been satisfied, the Company may exercise its right to request an issuance of Shares by delivering to the Agent an Issuance Notice; *provided*, *however*, that (A) in no event may the Company deliver an Issuance Notice to the extent that (I) the sum of (x) the aggregate Sales Price of the requested Issuance Amount, plus (y) the aggregate Sales Price of all Shares issued under all previous Issuance Notices effected pursuant to this Agreement, would exceed the Maximum Program Amount; and (B) prior to delivery of any Issuance Notice, the period set forth for any previous Issuance Notice shall have expired or been terminated. An Issuance Notice shall be considered delivered on the Trading Day that it is received by e‑mail to the persons set forth in Exhibit B hereto and confirmed by the Company by telephone (including a voicemail message to the persons so identified), with the understanding that, with adequate prior written notice, the Agent may modify the list of such persons from time to time.

(ii) Agent Efforts. Upon the terms and subject to the conditions set forth in this Agreement, upon the receipt of an Issuance Notice, the Agent will use its commercially reasonable efforts consistent with its normal sales and trading practices to place the Shares with respect to which the Agent has agreed to act as sales agent, subject to, and in accordance with the information specified in, the Issuance Notice, unless the sale of the Shares described therein has been suspended, cancelled or otherwise terminated in accordance with the terms of this Agreement. For the avoidance of doubt, the parties to this Agreement may modify an Issuance Notice at any time provided they both agree in writing to any such modification.

(iii) Method of Offer and Sale. The Shares may be offered and sold (A) in privately negotiated transactions with the consent of the Company, (B) as block transactions with the consent of the Company or (C) by any other method permitted by law deemed to be an “at the market offering” as defined in Rule 415(a)(4) under the Securities Act, including sales made

directly on the Principal Market or sales made into any other existing trading market of the Common Shares. Nothing in this Agreement shall be deemed to require either party to agree to the method of offer and sale specified in the preceding sentence, and (except as specified in clauses (A) and (B) above) the method of placement of any Shares by the Agent shall be at the Agent's discretion.

(iv) Confirmation to the Company. If acting as sales agent hereunder, the Agent will provide written confirmation to the Company no later than the opening of the Trading Day next following the Trading Day on which it has placed Shares hereunder setting forth the number of Shares sold on such Trading Day, the corresponding Sales Price and the Issuance Price payable to the Company in respect thereof.

(v) Settlement. Each issuance of Shares will be settled on the applicable Settlement Date for such issuance of Shares and, subject to the provisions of Section 5, on or before each Settlement Date, the Company will, or will cause its transfer agent to, electronically transfer the Shares being sold by crediting the Agent's or its designee's account at The Depository Trust Company through its Deposit/Withdrawal At Custodian (DWAC) System, or by such other means of delivery as may be mutually agreed upon by the parties hereto and, upon receipt of such Shares, which in all cases shall be freely tradable, transferable, registered shares in good deliverable form, the Agent will deliver, by wire transfer of immediately available funds, the related Issuance Price in same day funds delivered to an account designated by the Company prior to the Settlement Date. The Company may sell Shares to the Agent as principal at a price agreed upon at each relevant time Shares are sold pursuant to this Agreement (each, a "**Time of Sale**").

(vi) Suspension or Termination of Sales. Consistent with standard market settlement practices, the Company or the Agent may, upon notice to the other party hereto in writing or by telephone (confirmed immediately by verifiable email), suspend any sale of Shares, and the period set forth in an Issuance Notice shall immediately terminate; *provided*, *however*, that (A) such suspension and termination shall not affect or impair either party's obligations with respect to any Shares placed or sold hereunder prior to the receipt of such notice; (B) if the Company suspends or terminates any sale of Shares after the Agent confirms such sale to the Company, the Company shall still be obligated to comply with Section 3(b)(v) with respect to such Shares; and (C) if the Company defaults in its obligation to deliver Shares on a Settlement Date, the Company agrees that it will hold the Agent harmless against any loss, claim, damage or expense (including, without limitation, penalties, interest and reasonable legal fees and expenses), as incurred, arising out of or in connection with such default by the Company. The parties hereto acknowledge and agree that, in performing its obligations under this Agreement, the Agent may borrow Common Shares from stock lenders in the event that the Company has not delivered Shares to settle sales as required by subsection (v) above, and may use the Shares to settle or close out such borrowings. The Company agrees that no such notice shall be effective against the Agent unless it is made to the persons identified in writing by the Agent pursuant to Section 3(b)(i).

(vii) No Guarantee of Placement, Etc. The Company acknowledges and agrees that (A) there can be no assurance that the Agent will be successful in placing Shares; (B) the Agent will incur no liability or obligation to the Company or any other Person if it does not sell Shares; and (C) the Agent shall be under no obligation to purchase Shares on a principal basis pursuant to this Agreement, except as otherwise specifically agreed by the Agent and the Company.

(viii) Material Non-Public Information. Notwithstanding any other provision of this Agreement, the Company and the Agent agree that the Company shall not deliver any Issuance Notice to the Agent, and the Agent shall not be obligated to place any Shares, during any period in which the Company is, or could be deemed to be, in possession of material non-public information.

(c) Fees. As compensation for services rendered, the Company shall pay to the Agent, on the applicable Settlement Date, the Selling Commission for the applicable Issuance Amount (including with respect to any suspended or terminated sale pursuant to Section 3(b)(vi)) by the Agent deducting the Selling Commission from the applicable Issuance Amount.

(d) Expenses. The Company agrees to pay all costs, fees and expenses incurred in connection with the performance of its obligations hereunder and in connection with the transactions contemplated hereby, including without limitation (i) all expenses incident to the issuance and delivery of the Shares (including all printing and engraving costs), (ii) all fees and expenses of the registrar and transfer agent of the Shares, (iii) all necessary issue, transfer and other stamp taxes in connection with the issuance and sale of the Shares, (iv) all fees and expenses of the Company's counsel, independent public or certified public accountants and other advisors, (v) all costs and expenses incurred in connection with the preparation, printing, filing, shipping and distribution of the Registration Statement (including financial statements, exhibits, schedules, consents and certificates of experts), the Prospectus, any Free Writing Prospectus prepared by or on behalf of, used by, or referred to by the Company, and all amendments and supplements thereto, and this Agreement, (vi) all filing fees, attorneys' fees and expenses incurred by the Company or the Agent in connection with qualifying or registering (or obtaining exemptions from the qualification or registration of) all or any part of the Shares for offer and sale under the state securities or blue sky laws, and, if requested by the Agent, preparing and printing a "Blue Sky Survey" or memorandum, and any supplements thereto, advising the Agent of such qualifications, registrations, determinations and exemptions, (vii) the reasonable fees and disbursements of the Agent's counsel, including the reasonable fees and expenses of counsel for the Agent in connection with, FINRA review, if any, and approval of the Agent's participation in the offering and distribution of the Shares, (viii) the filing fees incident to FINRA review, if any, and (ix) the fees and expenses associated with listing the Shares on the Principal Market. The fees and disbursements of Agent's counsel pursuant to subsections (vi) and (vii) above shall not exceed $50,000.

Section 4. ADDITIONAL COVENANTS

The Company covenants and agrees with the Agent as follows, in addition to any other covenants and agreements made elsewhere in this Agreement:

(a) Exchange Act Compliance. During the Agency Period, the Company shall (i) file, on a timely basis, with the Commission all reports and documents required to be filed under Section 13, 14 or 15 of the Exchange Act in the manner and within the time periods required by the Exchange Act and (ii) either (A) include in its quarterly reports on Form 10-Q and its annual reports on Form 10-K, a summary detailing, for the relevant reporting period, (1) the number of Shares sold through the Agent pursuant to this Agreement and (2) the net proceeds received by the Company from such sales or (B) prepare a prospectus supplement containing, or include in such other filing permitted by the Securities Act or Exchange Act (each an "**Interim Prospectus Supplement**")**,** such summary information and, at least once a quarter and subject to this Section 4, file such Interim Prospectus Supplement pursuant to Rule 424(b) under the Securities Act (and within the time periods required by Rule 424(b) and Rule 430B under the Securities Act).

(b) Securities Act Compliance. After the date of this Agreement, the Company shall promptly advise the Agent in writing (i) of the receipt of any comments of, or requests for additional or supplemental information from, the Commission, (ii) of the time and date of any filing of any post-effective amendment to the Registration Statement, any Rule 462(b) Registration Statement or any amendment or supplement to the Prospectus, or any Free Writing Prospectus, (iii) of the time and date that any post-effective amendment to the Registration Statement or any Rule 462(b) Registration Statement becomes effective and (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto, any Rule 462(b) Registration Statement or any amendment or supplement to the Prospectus or of any order preventing or suspending the use of any Free Writing Prospectus or the Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Shares from any securities exchange upon which they are listed for trading or included or designated for quotation, or of the threatening or initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time, the Company will use its best efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees that it shall comply with the provisions of Rule 424(b) and Rule 433, as applicable, under the Securities Act and will use its reasonable efforts to confirm that any filings made by the Company under such Rule 424(b) or Rule 433 were filed in a timely manner with the Commission.

(c) Amendments and Supplements to the Prospectus and Other Securities Act Matters. If any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Prospectus so that the Prospectus does not include an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, not misleading, or if in the opinion of the Agent or counsel for the Agent it is otherwise necessary to amend or supplement the Prospectus to comply with applicable law, including the Securities Act, the Company agrees (subject to Sections 4(d) and 4(f)) to promptly prepare, file with the Commission and furnish at its own expense to the Agent, amendments or supplements to the Prospectus so that the statements in the Prospectus as so amended or supplemented will not include an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus, as amended or supplemented, will comply

with applicable law including the Securities Act. Neither the Agent's consent to, or delivery of, any such amendment or supplement shall constitute a waiver of any of the Company's obligations under Sections 4(b) or (f). Notwithstanding the foregoing, the Company shall not be required to file such amendment or supplement if there is no pending Issuance Notice and the Company believes that it is in its best interests not to file such amendment or supplement.

(d) Agent's Review of Proposed Amendments and Supplements. Prior to amending or supplementing the Registration Statement (including any Rule 462(b) Registration Statement) or the Prospectus (including any amendment or supplement through incorporation of any report filed under the Exchange Act in connection with this Agreement and the Shares) relating to the Shares, the Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of each such proposed amendment or supplement, and the Company shall not file or use any such proposed amendment or supplement without the Agent's prior written consent, such consent not to be unreasonably withheld or delayed, and the Company shall file with the Commission within the applicable period specified in Rule 424(b) under the Securities Act any prospectus required to be filed pursuant to such Rule.

(e) Use of Free Writing Prospectus. Neither the Company nor the Agent has prepared, used, referred to or distributed, or will prepare, use, refer to or distribute, without the other party's prior written consent, any "written communication" that constitutes a "free writing prospectus" as such terms are defined in Rule 405 under the Securities Act with respect to the offering contemplated by this Agreement (any such free writing prospectus being referred to herein as a "**Free Writing Prospectus**").

(f) Free Writing Prospectuses. The Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of each proposed free writing prospectus relating to the Shares or any amendment or supplement thereto to be prepared by or on behalf of, used by, or referred to by the Company and the Company shall not file, use or refer to any proposed free writing prospectus relating to the Shares or any amendment or supplement thereto without the Agent's prior written consent, such consent not to be unreasonably withheld or delayed. The Company shall furnish to the Agent, without charge, as many copies of any free writing prospectus relating to the Shares prepared by or on behalf of, or used by the Company, as the Agent may reasonably request. If at any time when a prospectus is required by the Securities Act (including, without limitation, pursuant to Rule 173(d)) to be delivered (whether physically or through compliance with Rule 172 under the Securities Act or any similar rule) in connection with sales of the Shares (but in any event if at any time through and including the date of this Agreement) there occurred or occurs an event or development as a result of which any free writing prospectus prepared by or on behalf of, used by, or referred to by the Company conflicted or would conflict with the information contained in the Registration Statement or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances prevailing at that subsequent time, not misleading, the Company shall promptly amend or supplement such free writing prospectus to eliminate or correct such conflict or so that the statements in such free writing prospectus as so amended or supplemented will not include an untrue statement of a material fact or omit to state a material fact necessary in order to

make the statements therein, in the light of the circumstances prevailing at such subsequent time, not misleading, as the case may be; *provided*, *however*, that prior to amending or supplementing any such free writing prospectus, the Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of such proposed amended or supplemented free writing prospectus and the Company shall not file, use or refer to any such amended or supplemented free writing prospectus without the Agent's prior written consent, such consent not to be unreasonably withheld or delayed.

(g) Filing of Agent Free Writing Prospectuses. The Company shall not take any action that would result in the Agent or the Company being required to file with the Commission pursuant to Rule 433(d) under the Securities Act a free writing prospectus prepared by or on behalf of the Agent that the Agent otherwise would not have been required to file thereunder.

(h) Copies of Registration Statement and Prospectus. After the date of this Agreement through the last time that a prospectus is required by the Securities Act (including, without limitation, pursuant to Rule 173(d)) to be delivered in connection with sales of the Shares, the Company agrees to furnish the Agent with copies (which may be electronic copies) of the Registration Statement and each amendment thereto, and with copies of the Prospectus and each amendment or supplement thereto in the form in which it is filed with the Commission pursuant to the Securities Act or Rule 424(b) under the Securities Act, both in such quantities as the Agent may reasonably request from time to time; and, if the delivery of a prospectus is required under the Securities Act or under the blue sky or securities laws of any jurisdiction at any time on or prior to the applicable Settlement Date for any period set forth in an Issuance Notice in connection with the offering or sale of the Shares and if at such time any event has occurred as a result of which the Prospectus as then amended or supplemented would include an untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made when such Prospectus is delivered, not misleading, or, if for any other reason it is necessary during such same period to amend or supplement the Prospectus or to file under the Exchange Act any document incorporated by reference in the Prospectus in order to comply with the Securities Act or the Exchange Act, to notify the Agent and to request that the Agent suspend offers to sell Shares (and, if so notified, the Agent shall cease such offers as soon as practicable); and if the Company decides to amend or supplement the Registration Statement or the Prospectus as then amended or supplemented, to advise the Agent promptly by telephone (with confirmation in writing) and to prepare and cause to be filed promptly with the Commission an amendment or supplement to the Registration Statement or the Prospectus as then amended or supplemented that will correct such statement or omission or effect such compliance; provided, however, that if during such same period the Agent is required to deliver a prospectus in respect of transactions in the Shares, the Company shall promptly prepare and file with the Commission such an amendment or supplement.

(i) Blue Sky Compliance. The Company shall cooperate with the Agent and counsel for the Agent to qualify or register the Shares for sale under (or obtain exemptions from the application of) the state securities or blue sky laws or Canadian provincial securities laws (or other foreign laws) of those jurisdictions designated by the Agent, shall comply with such laws

and shall continue such qualifications, registrations and exemptions in effect so long as required for the distribution of the Shares. The Company shall not be required to qualify as a foreign corporation or to take any action that would subject it to general service of process in any such jurisdiction where it is not presently qualified or where it would be subject to taxation as a foreign corporation. The Company will advise the Agent promptly of the suspension of the qualification or registration of (or any such exemption relating to) the Shares for offering, sale or trading in any jurisdiction or any initiation or threat of any proceeding for any such purpose, and in the event of the issuance of any order suspending such qualification, registration or exemption, the Company shall use its best efforts to obtain the withdrawal thereof at the earliest possible moment.

(j) Earnings Statement. As soon as practicable, the Company will make generally available to its security holders and to the Agent an earnings statement (which need not be audited) covering a period of at least 12 months beginning with the first fiscal quarter of the Company occurring after the date of this Agreement which shall satisfy the provisions of Section 11(a) of the Securities Act and Rule 158 under the Securities Act.

(k) Listing; Reservation of Shares. (a) The Company will maintain the listing of the Shares on the Principal Market, and (b) the Company will reserve and keep available at all times, free of preemptive rights, Shares for the purpose of enabling the Company to satisfy its obligations under this Agreement.

(l) Transfer Agent. The Company shall engage and maintain, at its expense, a registrar and transfer agent for the Shares.

(m) Due Diligence. During the term of this Agreement, the Company will reasonably cooperate with any reasonable due diligence review conducted by the Agent in connection with the transactions contemplated hereby, including, without limitation, providing information and making available documents and senior corporate officers, during normal business hours and at the Company's principal offices, as the Agent may reasonably request from time to time.

(n) Representations and Warranties. The Company acknowledges that each delivery of an Issuance Notice and each delivery of Shares on a Settlement Date shall be deemed to be (i) an affirmation to the Agent that the representations and warranties of the Company contained in or made pursuant to this Agreement are true and correct as of the date of such Issuance Notice or of such Settlement Date, as the case may be, as though made at and as of each such date, except as may be disclosed in the Prospectus (including any documents incorporated by reference therein and any supplements thereto), and (ii) an undertaking that the Company will advise the Agent if any of such representations and warranties will not be true and correct as of the Settlement Date for the Shares relating to such Issuance Notice, as though made at and as of each such date (except that such representations and warranties shall be deemed to relate to the Registration Statement and the Prospectus as amended and supplemented relating to such Shares).

(o) Deliverables at Triggering Event Dates; Certificates. The Company agrees that on or prior to the date of the first Issuance Notice and, during the term of this Agreement after the date of the first Issuance Notice, upon:

(A) the filing of the Prospectus or the amendment or supplement of any Registration Statement or Prospectus (other than a prospectus supplement relating solely to an offering of securities other than the Shares or a prospectus filed pursuant to Section 4(a)(ii)(B)), by means of a post-effective amendment, sticker or supplement, but not by means of incorporation of documents by reference into the Registration Statement or Prospectus;

(B) the filing with the Commission of an annual report on Form 10-K or a quarterly report on Form 10-Q (including any Form 10-K/A or Form 10-Q/A containing amended financial information or a material amendment to the previously filed annual report on Form 10-K or quarterly report on Form 10-Q), in each case, of the Company; or

(C) the filing with the Commission of a current report on Form 8-K of the Company containing amended financial information (other than information "furnished" pursuant to Item 2.02 or 7.01 of Form 8-K or to provide disclosure pursuant to Item 8.01 of Form 8-K relating to reclassification of certain properties as discontinued operations in accordance with Statement of Financial Accounting Standards No. 144) if the Agent reasonably determines that such amended financial information is material to the offering of securities of the Company;

(any such event, a "**Triggering Event Date**"), the Company shall furnish the Agent (but in the case of clause (C) above only if the Agent reasonably determines that the information contained in such current report on Form 8-K of the Company is material to the offering of securities of the Company) with a certificate as of the Triggering Event Date, in the form and substance satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as amended or supplemented, (A) confirming that the representations and warranties of the Company contained in this Agreement are true and correct, (B) confirming that the Company has performed all of its obligations hereunder to be performed on or prior to the date of such certificate and as to the matters set forth in Section 5 hereof, and (C) containing any other certification that the Agent shall reasonably request. The requirement to provide a certificate under this Section 4(o) shall be waived for any Triggering Event Date occurring at a time when no Issuance Notice is pending or a suspension is in effect, which waiver shall continue until the earlier to occur of the date the Company delivers instructions for the sale of Shares hereunder (which for such calendar quarter shall be considered a Triggering Event Date) and the next occurring Triggering Event Date. Notwithstanding the foregoing, if the Company subsequently decides to sell Shares following a Triggering Event Date when a suspension was in effect and did not provide the Agent with a certificate under this Section 4(o), then before the Company delivers the instructions for the sale of Shares or the Agent sells any Shares pursuant to such instructions, the Company shall provide the Agent with a certificate in conformity with this Section 4(o) dated as of the date that the instructions for the sale of Shares are issued.

(p) Legal Opinion and Negative Assurances Letter. On or prior to the date of the first Issuance Notice and on or prior to each Triggering Event Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 4(o) for which no waiver is applicable and excluding the date of this Agreement, the Company shall cause to be furnished the written legal opinion and negative assurances letter of Cooley LLP, counsel to the Company, each dated the date of delivery, in form and substance reasonably satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as then amended or supplemented. In lieu of such opinions for subsequent periodic filings, in the discretion of the Agent, the Company may furnish a reliance letter from such counsel to the Agent, permitting the Agent to rely on a previously delivered opinion letter, modified as appropriate for any passage of time or Triggering Event Date (except that statements in such prior opinion shall be deemed to relate to the Registration Statement and the Prospectus as amended or supplemented as of such Triggering Event Date).

(q) Comfort Letter. On or prior to the date of the first Issuance Notice and on or prior to each Triggering Event Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 4(o) for which no waiver is applicable and excluding the date of this Agreement, the Company shall cause Ernst & Young LLP, the independent registered public accounting firm who has audited the financial statements included or incorporated by reference in the Registration Statement, to furnish the Agent a comfort letter, dated the date of delivery, in form and substance reasonably satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel; provided, however, that any such comfort letter will only be required on the Triggering Event Date specified to the extent that it contains financial statements filed with the Commission under the Exchange Act and incorporated or deemed to be incorporated by reference into a Prospectus. If requested by the Agent, the Company shall also cause a comfort letter to be furnished to the Agent within ten (10) Trading Days of the date of occurrence of any material transaction or event requiring the filing of a current report on Form 8-K containing material amended financial information of the Company, including the restatement of the Company's financial statements. The Company shall be required to furnish no more than one comfort letter hereunder per calendar quarter.

(r) Secretary's Certificate. On or prior to the date of the first Issuance Notice, the Company shall furnish the Agent a certificate executed by the Secretary of the Company, signing in such capacity, dated the date of delivery (i) certifying that attached thereto are true and complete copies of the resolutions duly adopted by the Board of Directors of the Company authorizing the execution and delivery of this Agreement and the consummation of the transactions contemplated hereby (including, without limitation, the issuance of the Shares pursuant to this Agreement), which authorization shall be in full force and effect on and as of the date of such certificate, (ii) certifying and attesting to the office, incumbency, due authority and specimen signatures of each Person who executed this Agreement for or on behalf of the Company, and (iii) containing any other certification that the Agent shall reasonably request.

i. Agent's Own Account; Clients' Account. The Company consents to the Agent trading, in compliance with applicable law, in the Common Shares for the Agent's own account and for

the account of its clients at the same time as sales of the Shares occur pursuant to this Agreement.

ii.Investment Limitation. The Company shall not invest, or otherwise use the proceeds received by the Company from its sale of the Shares in such a manner as would require the Company or any of its subsidiaries to register as an investment company under the Investment Company Act.

iii.Market Activities. The Company will not take, and will use reasonable efforts to ensure that no affiliate of the Company will take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Shares or any other reference security, whether to facilitate the sale or resale of the Shares or otherwise, and the Company will, and shall cause each of its affiliates to, comply with all applicable provisions of Regulation M. If the limitations of Rule 102 of Regulation M ("**Rule 102**") do not apply with respect to the Shares or any other reference security pursuant to any exception set forth in Section (d) of Rule 102, then promptly upon notice from the Agent (or, if later, at the time stated in the notice), the Company will, and shall cause each of its affiliates to, comply with Rule 102 as though such exception were not available but the other provisions of Rule 102 (as interpreted by the Commission) did apply. The Company shall promptly notify the Agent if it no longer meets the requirements set forth in Section (d) of Rule 102.

iv.Notice of Other Sale. Without the written consent of the Agent, the Company will not, directly or indirectly, offer to sell, sell, contract to sell, grant any option to sell or otherwise dispose of any Common Shares or securities convertible into or exchangeable for Common Shares (other than Shares hereunder), warrants or any rights to purchase or acquire Common Shares, during the period beginning on the third Trading Day immediately prior to the date on which any Issuance Notice is delivered to the Agent hereunder and ending on the third Trading Day immediately following the Settlement Date with respect to Shares sold pursuant to such Issuance Notice; and will not directly or indirectly enter into any other "at the market" or continuous equity transaction offer to sell, contract to sell, grant any option to sell or otherwise dispose of any Common Shares (other than the Shares offered pursuant to this Agreement) or securities convertible into or exchangeable for Common Shares, warrants or any rights to purchase or acquire, Common Shares prior to the termination of this Agreement; *provided*, *however*, that such restriction will not be required in connection with the Company's (i) issuance or sale of Common Shares, options to purchase Common Shares or Common Shares issuable upon the exercise or settlement of options, restricted stock unit awards or other equity awards pursuant to any employee, consultant or director share option, incentive or benefit plan, share purchase or ownership plan, long-term incentive plan, dividend reinvestment plan, inducement award or inducement award plan under the rules of the Principal Market or other compensation plan of the Company or its subsidiaries, as in effect on the date of this Agreement, (ii) issuance or sale of Common Shares issuable upon exchange, conversion or redemption of securities or the exercise or vesting or settlement of warrants, options, restricted stock unit awards or other equity awards outstanding at the date of this Agreement, and (iii) modification of any outstanding options, restricted stock unit awards, warrants or of any other rights to purchase or acquire Common Shares.

v.Use of Proceeds. The Company intends to apply the net proceeds from the sale of the Shares sold by it in the manner described under the caption "Use of Proceeds" in the Registration Statement and the Prospectus.

Section 5. CONDITIONS TO DELIVERY OF ISSUANCE NOTICES AND TO SETTLEMENT

vi.Conditions Precedent to the Right of the Company to Deliver an Issuance Notice and the Obligation of the Agent to Sell Shares. The right of the Company to deliver an Issuance Notice hereunder is subject to the satisfaction, on the date of delivery of such Issuance Notice, and the obligation of the Agent to use its commercially reasonable efforts to place Shares during the applicable period set forth in the Issuance Notice is subject to the satisfaction, on each Trading Day during the applicable period set forth in the Issuance Notice, of each of the following conditions:

vii.Accuracy of the Company's Representations and Warranties; Performance by the Company. The Company shall have delivered the certificate required to be delivered pursuant to Section 4(o) on or before the date on which delivery of such certificate is required pursuant to Section 4(o). The Company shall have performed, satisfied and complied with all covenants, agreements and conditions required by this Agreement to be performed, satisfied or complied with by the Company at or prior to such date, including, but not limited to, the covenants contained in Section 4(p), Section 4(q) and Section 4(r).

(c) No Injunction. No statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by any court or governmental authority of competent jurisdiction or any self-regulatory organization having authority over the matters contemplated hereby that prohibits or directly and materially adversely affects any of the transactions contemplated by this Agreement, and no proceeding shall have been commenced that may have the effect of prohibiting or materially adversely affecting any of the transactions contemplated by this Agreement.

(d) Material Adverse Effects. Except as disclosed in the Prospectus and the Time of Sale Information, (a) in the judgment of the Agent there shall not have occurred any Material Adverse Effect; and (b) there shall not have occurred any downgrading, nor shall any notice have been given of any intended or potential downgrading or of any review for a possible change that does not indicate the direction of the possible change, in the rating accorded any securities of the Company or any of its subsidiaries by any "nationally recognized statistical rating organization" as such term is defined under Section 3(a)(62) of the Exchange Act.

(e) No Suspension of Trading in or Delisting of Common Shares; Other Events. The trading of the Common Shares (including without limitation the Shares) shall not have been suspended by the Commission, the Principal Market or FINRA and the Common Shares (including without limitation the Shares) shall have been approved for listing or quotation on and shall not have been delisted from the Nasdaq Stock Market, the New York Stock Exchange or any of their constituent markets. There shall not have occurred (and be continuing in the case of occurrences under clauses (i) and (ii) below) any of the following: (i) trading or quotation in any

of the Company's securities shall have been suspended or limited by the Commission or by the Principal Market, or trading in securities generally on either the Principal Market shall have been suspended or limited, or minimum or maximum prices shall have been generally established on any of such stock exchanges by the Commission or FINRA; (ii) a general banking moratorium shall have been declared by any of federal, New York or Delaware authorities; or (iii) there shall have occurred any outbreak or escalation of national or international hostilities or any crisis or calamity, or any change in the United States or international financial markets, or any substantial change or development involving a prospective substantial change in United States' or international political, financial or economic conditions, as in the judgment of the Agent is material and adverse and makes it impracticable to market the Shares in the manner and on the terms described in the Prospectus or to enforce contracts for the sale of securities;

i. Documents Required to be Delivered on each Issuance Notice Date. The Agent's obligation to use its commercially reasonable efforts to place Shares hereunder shall additionally be conditioned upon the delivery to the Agent on or before the Issuance Notice Date of a certificate in form and substance reasonably satisfactory to the Agent, executed by the Chief Executive Officer, President or Chief Financial Officer of the Company, to the effect that all conditions to the delivery of such Issuance Notice shall have been satisfied as at the date of such certificate as required to be delivered pursuant to Section 4(o) (which certificate shall not be required if the foregoing representations shall be set forth in the Issuance Notice).

ii. No Misstatement or Material Omission. Agent shall not have advised the Company that the Registration Statement, the Prospectus or the Time of Sale Information, or any amendment or supplement thereto, contains an untrue statement of fact that in the Agent's reasonable opinion is material, or omits to state a fact that in the Agent's reasonable opinion is material and is required to be stated therein or is necessary to make the statements therein not misleading.

iii. Other Materials. On each date on which the Company is required to deliver a certificate pursuant to Section 4(o), the Company shall have furnished to the Agent such appropriate further information, certificates and documents as the Agent may have reasonably requested. All such opinions, certificates, letters and other documents shall have been in compliance with the provisions hereof. The Company will furnish the Agent with such conformed copies of such opinions, certificates, letters and other documents as the Agent shall have reasonably requested.

iv. Securities Act Filings Made. All filings with the Commission required by Rule 424 under the Securities Act with respect to the Shares to have been filed prior to the issuance of any Issuance Notice hereunder shall have been made within the applicable time period prescribed for such filing by Rule 424.

Section 6. INDEMNIFICATION AND CONTRIBUTION

v. Indemnification of the Agent. The Company agrees to indemnify and hold harmless the Agent, its officers and employees, and each person, if any, who controls the Agent within the meaning of the Securities Act or the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which the Agent or such officer, employee or controlling person may become subject, under the Securities Act, the Exchange Act, other federal or state statutory law

or regulation, or the laws or regulations of foreign jurisdictions where Shares have been offered or sold or at common law or otherwise (including in settlement of any litigation), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430B under the Securities Act, or the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading; or (ii) any untrue statement or alleged untrue statement of a material fact included or incorporated by reference in the Prospectus or any Free Writing Prospectus that the Company has used, referred to or filed, or is required to file, pursuant to Rule 433(d) of the Securities Act or the Prospectus (or any amendment or supplement to the foregoing), or the omission or alleged omission to state therein a material fact necessary in order to make the statements, in the light of the circumstances under which they were made, not misleading; and to reimburse the Agent and each such officer, employee and controlling person for any and all expenses (including the reasonable and documented fees and disbursements of counsel chosen by the Agent) as such expenses are reasonably incurred by the Agent or such officer, employee or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action; provided, however, that the foregoing indemnity agreement shall not apply to any loss, claim, damage, liability or expense to the extent, but only to the extent, arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Agent expressly for use in the Registration Statement, any such Free Writing Prospectus or the Prospectus (or any amendment or supplement thereto), it being understood and agreed that the only such information furnished by the Agent to the Company consists of the information described in subsection (b) below. The indemnity agreement set forth in this Section 6(a) shall be in addition to any liabilities that the Company may otherwise have.

vi. Indemnification of the Company and its Directors and Officers. The Agent agrees to indemnify and hold harmless the Company, each of its directors, each of its officers who signed the Registration Statement, and each person, if any, who controls the Company within the meaning of the Securities Act or the Exchange Act, against any loss, claim, damage, liability or expense, as incurred, to which the Company, or any such director, officer, or controlling person may become subject, under the Securities Act, the Exchange Act, or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, or 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 or (ii) any untrue statement or alleged untrue statement of a material fact included or incorporated by reference in any Free Writing Prospectus or the Prospectus that the Company has used, referred to or filed, or is required to file, pursuant to Rule 433 of the Securities Act or the Prospectus (or any such amendment or supplement) or the omission or alleged omission to state therein a material fact necessary in order to make the statements, in the light of the circumstances under which they were made, not

misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in the Registration Statement, Free Writing Prospectus or the Prospectus (or any such amendment or supplement), in reliance upon and in conformity with information relating to the Agent furnished to the Company by the Agent in writing expressly for use therein; and to reimburse the Company, or any such director, officer, or controlling person for any and all expenses (including the fees and disbursements of counsel) as such expenses are incurred by the Company, or any such director, officer, or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action. The Company hereby acknowledges that the only information that the Agent have furnished to the Company expressly for use in the Registration Statement, any Free Writing Prospectus that the Company has filed, or is required to file, pursuant to Rule 433(d) of the Securities Act or the Prospectus (or any amendment or supplement to the foregoing) is the information set forth in the first sentence of the ninth paragraph under the caption "Plan of Distribution" in the Prospectus. The indemnity agreement set forth in this Section 6(b) shall be in addition to any liabilities that the Agent may otherwise have.

vii. Notifications and Other Indemnification Procedures. Promptly after receipt by an indemnified party under this Section 6 of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against an indemnifying party under this Section 6, notify the indemnifying party in writing of the commencement thereof, but the omission so to notify the indemnifying party will not relieve the indemnifying party from any liability which it may have to any indemnified party for contribution or otherwise than under the indemnity agreement contained in this Section 6 or to the extent the indemnifying party is not prejudiced as a proximate result of such failure and shall not in any event relieve the indemnifying party from any liability that it may have otherwise than on account of this indemnity agreement. In case any such action is brought against any indemnified party and such indemnified party seeks or intends to seek indemnity from an indemnifying party, the indemnifying party will be entitled to participate in, and, to the extent that it shall elect, jointly with all other indemnifying parties similarly notified, by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel reasonably satisfactory to such indemnified party; *provided, however,* that if the defendants in any such action include both the indemnified party and the indemnifying party and the indemnified party shall have reasonably concluded based on the advice of counsel that a conflict may arise between the positions of the indemnifying party and the indemnified party in conducting the defense of any such action or that there may be legal defenses available to it and/or other indemnified parties which are different from or additional to those available to the indemnifying party, the indemnified party or parties shall have the right to select separate counsel to assume such legal defenses and to otherwise participate in the defense of such action on behalf of such indemnified party or parties. Upon receipt of notice from the indemnifying party to such indemnified party of such indemnifying party's election so to assume the defense of such action and approval by the indemnified party of counsel, the indemnifying party will not be liable to such indemnified party under this Section 6 for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof unless (i) the indemnified party shall have employed separate counsel in accordance with the

proviso to the preceding sentence (it being understood, however, that the indemnifying party shall not be liable for the fees and expenses of more than one separate counsel (together with local counsel), representing the indemnified parties who are parties to such action), which counsel (together with any local counsel) for the indemnified parties shall be selected by the Agent (in the case of counsel for the indemnified parties referred to in Section 6(a) above), (ii) the indemnifying party shall not have employed counsel satisfactory to the indemnified party to represent the indemnified party within a reasonable time after notice of commencement of the action or (iii) the indemnifying party has authorized in writing the employment of counsel for the indemnified party at the expense of the indemnifying party, in each of which cases the fees and expenses of counsel shall be at the expense of the indemnifying party and shall be paid as they are incurred.

viii. Settlements. The indemnifying party under this Section 6 shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party against any loss, claim, damage, liability or expense by reason of such settlement or judgment. Notwithstanding the foregoing sentence, if at any time an indemnified party shall have requested an indemnifying party to reimburse the indemnified party for fees and expenses of counsel as contemplated by Section 6(b) hereof, the indemnifying party shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 30 days after receipt by such indemnifying party of the aforesaid request and (ii) such indemnifying party shall not have reimbursed the indemnified party in accordance with such request prior to the date of such settlement. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement, compromise or consent to the entry of judgment in any pending or threatened action, suit or proceeding in respect of which any indemnified party is or could have been a party and indemnity was or could have been sought hereunder by such indemnified party, unless such settlement, compromise or consent includes an unconditional release of such indemnified party from all liability on claims that are the subject matter of such action, suit or proceeding.

ix. Contribution. If the indemnification provided for in this Section 6 is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party in respect of any losses, claims, damages, liabilities or expenses referred to therein, then each indemnifying party shall contribute to the aggregate amount paid or payable by such indemnified party, as incurred, as a result of any losses, claims, damages, liabilities or expenses referred to therein (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Agent, on the other hand, from the offering of the Shares pursuant to this Agreement or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company, on the one hand, and the Agent, on the other hand, in connection with the statements or omissions which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Agent, on the other hand, in connection with the offering of the Shares pursuant to this Agreement shall be deemed to be in the same respective proportions as the total gross proceeds from the offering

of the Shares pursuant to this Agreement (before deducting expenses) received by the Company bear to the total Selling Commission received by the Agent. The relative fault of the Company, on the one hand, and the Agent, on the other hand, shall be determined by reference to, among other things, whether any such untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact relates to information supplied by the Company, on the one hand, or the Agent, on the other hand, and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in Section 6(c), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 6(c) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 6(e); *provided, however,* that no additional notice shall be required with respect to any action for which notice has been given under Section 6(c) for purposes of indemnification.

The Company and the Agent agree that it would not be just and equitable if contribution pursuant to this Section 6(e) were determined by pro rata allocation or by any other method of allocation which does not take account of the equitable considerations referred to in this Section 6(e).

Notwithstanding the provisions of this Section 6(e), the Agent shall not be required to contribute any amount in excess of the Selling Commission received by the Agent in connection with the offering contemplated hereby. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. For purposes of this Section 6(e), each officer and employee of the Agent and each person, if any, who controls the Agent within the meaning of the Securities Act or the Exchange Act shall have the same rights to contribution as the Agent, and each director of the Company, each officer of the Company who signed the Registration Statement, and each person, if any, who controls the Company within the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as the Company.

Section 7. TERMINATION & SURVIVAL

x.Term. Subject to the provisions of this Section 7, the term of this Agreement shall continue from the date of this Agreement until the end of the Agency Period, unless earlier terminated by the parties to this Agreement pursuant to this Section 7.

xi.Termination; Survival Following Termination. (i) Either party may terminate this Agreement prior to the end of the Agency Period, by giving written notice as required by this Agreement, upon ten (10) Trading Days' notice to the other party; provided that, (A) if the Company terminates this Agreement after the Agent confirms to the Company any sale of Shares, the Company shall remain obligated to comply with Section 3(b)(v) with respect to such Shares and (B) Section 2, Section 6, Section 7 and Section 8 shall survive

termination of this Agreement. If termination shall occur prior to the Settlement Date for any sale of Shares, such sale shall nevertheless settle in accordance with the terms of this Agreement.

(ii) In addition to the survival provision of Section 7(b)(i), the respective indemnities, agreements, representations, warranties and other statements of the Company, of its officers and of the Agent set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation made by or on behalf of the Agent or the Company or any of its or their partners, officers or directors or any controlling person, as the case may be, and, anything herein to the contrary notwithstanding, will survive delivery of and payment for the Shares sold hereunder and any termination of this Agreement.

Section 8. MISCELLANEOUS

xii. Press Releases and Disclosure. The Company may issue a press release describing the material terms of the transactions contemplated hereby as soon as practicable following the date of this Agreement, and may file with the Commission a current report on Form 8-K, with this Agreement attached as an exhibit thereto, describing the material terms of the transactions contemplated hereby, and the Company shall consult with the Agent prior to making such disclosures, and the parties hereto shall use all commercially reasonable efforts, acting in good faith, to agree upon a text for such disclosures that is reasonably satisfactory to all parties hereto. No party hereto shall issue thereafter any press release or like public statement (including, without limitation, any disclosure required in reports filed with the Commission pursuant to the Exchange Act) related to this Agreement or any of the transactions contemplated hereby without the prior written approval of the other party hereto, except as may be necessary or appropriate in the reasonable opinion of the party seeking to make disclosure to comply with the requirements of applicable law or stock exchange rules. If any such press release or like public statement is so required, the party making such disclosure shall consult with the other party prior to making such disclosure, and the parties shall use all commercially reasonable efforts, acting in good faith, to agree upon a text for such disclosure that is reasonably satisfactory to all parties hereto.

xiii. No Advisory or Fiduciary Relationship. The Company acknowledges and agrees that (i) the transactions contemplated by this Agreement, including the determination of any fees, are arm's-length commercial transactions between the Company and the Agent, (ii) when acting as a principal under this Agreement, the Agent is and has been acting solely as a principal and is not the agent or fiduciary of the Company, or its stockholders, creditors, employees or any other party, (iii) the Agent has not assumed nor will assume an advisory or fiduciary responsibility in favor of the Company with respect to the transactions contemplated hereby or the process leading thereto (irrespective of whether the Agent has advised or is currently advising the Company on other matters) and the Agent does not have any obligation to the Company with respect to the transactions contemplated hereby except the obligations expressly set forth in this Agreement, (iv) the Agent and its respective affiliates may be engaged in a broad range of transactions that involve interests that differ from those of the Company, and (v) the Agent has not provided any legal, accounting, regulatory or tax advice with respect to the transactions contemplated hereby and the Company has consulted its own legal, accounting, regulatory and tax advisors to the extent it deemed appropriate.

xiv.Research Analyst Independence. The Company acknowledges that the Agent's research analysts and research departments are required to and should be independent from their respective investment banking divisions and are subject to certain regulations and internal policies, and as such the Agent's research analysts may hold views and make statements or investment recommendations and/or publish research reports with respect to the Company or the offering that differ from the views of their respective investment banking divisions. The Company understands that the Agent is a full service securities firm and as such from time to time, subject to applicable securities laws, may effect transactions for its own account or the account of its customers and hold long or short positions in debt or equity securities of the companies that may be the subject of the transactions contemplated by this Agreement.

xv.Notices. All communications hereunder shall be in writing and shall be mailed, hand delivered or telecopied and confirmed to the parties hereto as follows:

If to the Agent:

Jefferies LLC
520 Madison Avenue
New York, NY 10022
Facsimile: (646) 619-4437
Attention: General Counsel

with a copy to (which shall not constitute a notice):

White & Case LLP
1221 Avenue of the Americas
New York, NY 10020-1095
Facsimile: (212) 354-8113

If to the Company:

Sangamo Therapeutics, Inc.
7000 Marina Boulevard
Brisbane, CA 94005
Facsimile: (510) 236-8951
Attention: General Counsel

with a copy to (which shall not constitute a notice):

Cooley LLP
101 California Street, 5th Floor
San Francisco, CA 94111
Facsimile: (415) 693-2222
Attention: Chadwick Mills

Any party hereto may change the address for receipt of communications by giving written notice to the others in accordance with this Section 8(d).

xvi. Successors. This Agreement will inure to the benefit of and be binding upon the parties hereto, and to the benefit of the affiliates, agents, employees, officers and directors and controlling persons referred to in Section 6, and in each case their respective successors and personal representatives, and no other person will have any right or obligation hereunder. The term "**successors**" shall not include any purchaser of the Shares as such from the Agent merely by reason of such purchase.

xvii. Partial Unenforceability. The invalidity or unenforceability of any Article, Section, paragraph or provision of this Agreement shall not affect the validity or enforceability of any other Article, Section, paragraph or provision hereof. If any Article, Section, paragraph or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

xviii. Governing Law Provisions. This Agreement shall be governed by and construed in accordance with the internal laws of the State of New York applicable to agreements made and to be performed in such state. Any legal suit, action or proceeding arising out of or based upon this Agreement or the transactions contemplated hereby may be instituted in the federal courts of the United States of America located in the Borough of Manhattan in the City of New York or the courts of the State of New York in each case located in the Borough of Manhattan in the City of New York (collectively, the "**Specified Courts**"), and each party irrevocably submits to the exclusive jurisdiction (except for proceedings instituted in regard to the enforcement of a judgment of any such court, as to which such jurisdiction is non-exclusive) of such courts in any such suit, action or proceeding. Service of any process, summons, notice or document by mail to such party's address set forth above shall be effective service of process for any suit, action or other proceeding brought in any such court. The parties irrevocably and unconditionally waive any objection to the laying of venue of any suit, action or other proceeding in the Specified Courts and irrevocably and unconditionally waive and agree not to plead or claim in any such court that any such suit, action or other proceeding brought in any such court has been brought in an inconvenient forum.

xix. Recognition of the U.S. Special Resolution Regimes. In the event that the Agent is a Covered Entity that becomes subject to a proceeding under a U.S. Special Resolution Regime, the transfer from the Agent, and any interest and obligation in or under this Agreement, will be effective to the same extent as the transfer would be effective under the U.S. Special Resolution Regime if this Agreement, and any such interest and obligation, were governed by the laws of the United States or a state of the United States. In the event that the Agent is a Covered Entity that becomes, or a BHC Act Affiliate of the Agent becomes, subject to a proceeding under a U.S. Special Resolution Regime, Default Rights under this Agreement that may be exercised against the Agent are permitted to be exercised to no greater extent than such Default Rights could be exercised under the U.S. Special Resolution Regime if this Agreement were governed by the laws of the United States or a state of the United States.

For purposes of this Section 8(h), a "**BHC Act Affiliate**" has the meaning assigned to the term "affiliate" in, and shall be interpreted in accordance with, 12 U.S.C. § 1841(k). "**Covered Entity**" means any of the following: (i) a "covered entity" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b); (ii) a "covered bank" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b); or (iii) a "covered FSI" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b). "**Default Right**" has the meaning assigned to that term in, and shall be interpreted in accordance with, 12 C.F.R. §§ 252.81, 47.2 or 382.1, as applicable. "**U.S. Special Resolution Regime**" means each of (i) the Federal Deposit Insurance Act and the regulations promulgated thereunder and (ii) Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act and the regulations promulgated thereunder.

xx.General Provisions. This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may be executed in two or more counterparts, each one of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument, and may be delivered by facsimile transmission or by electronic delivery of a portable document format (PDF) file. The words "execution," "execute", "signed," "sign," "signature," and words of like import in or related to any document to be signed in connection with this Agreement and the transactions contemplated hereby shall be deemed to include electronic signatures, or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. The Article and Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

[Signature Page Immediately Follows]

If the foregoing is in accordance with your understanding of our agreement, kindly sign and return to the Company the enclosed copies hereof, whereupon this instrument, along with all counterparts hereof, shall become a binding agreement in accordance with its terms.

Very truly yours,

SANGAMO THERAPEUTICS, INC.

By: /s/ Sung H. Lee
Name: Sung H. Lee
Title: Chief Financial Officer

The foregoing Agreement is hereby confirmed and accepted by the Agent in New York, New York as of the date first above written.

JEFFERIES LLC

By: /s/ Michael Brinkman
Name: Michael Brinkman
Title: Managing Director

EXHIBIT A

ISSUANCE NOTICE

[Date]

Jefferies LLC
520 Madison Avenue
New York, New York 10022

Attn: [_____]

Reference is made to the Open Market Sale Agreement between Sangamo Therapeutics, Inc. (the "**Company**") and Jefferies LLC (the "**Agent**") dated as of August 5, 2020. The Company confirms that all conditions to the delivery of this Issuance Notice are satisfied as of the date hereof.

Date of Delivery of Issuance Notice (determined pursuant to Section 3(b)(i)): _____

Issuance Amount (equal to the total Sales Price for such Shares):

$__

Number of days in selling period: __

First date of selling period: __

Last date of selling period: __

Settlement Date(s) if other than standard T+2 settlement:

__

Floor Price Limitation (in no event less than $1.00 without the prior written consent of the Agent, which consent may be withheld in the Agent's sole discretion): $ ____ per share

Comments: _____

SANGAMO THERAPEUTICS, INC.

By: ____
Name:
Title:

EXHIBIT B

Notice Parties

The Company

Alexander Macrae
Sung H. Lee
Gary H. Loeb
Holly Cuneo

The Agent

Michael Magarro
Donald Lynaugh

Exhibit 5.1

Chadwick L. Mills
+1 650 843 5654
cmills@cooley.com

August 5, 2020

Sangamo Therapeutics, Inc.
7000 Marina Blvd.
Brisbane, California 94005

Ladies and Gentlemen:

We have acted as counsel to Sangamo Therapeutics, Inc., a Delaware corporation (the "***Company***"), in connection with the sale of shares of its common stock, par value $0.01 per share (the "***Common Stock***"), having an aggregate offering price of up to $150.0 million (the "***Shares***") pursuant to the Registration Statement on Form S-3 (File No. 333-224418) (the "***Registration Statement***") filed with the Securities and Exchange Commission (the "***Commission***") under the Securities Act of 1933, as amended (the "***Act***"), the prospectus included in the Registration Statement (the "***Base Prospectus***") and the prospectus supplement dated August 5, 2020 to be filed with the Commission pursuant to Rule 424(b) promulgated under the Act (together with the Base Prospectus, the "***Prospectus***"). The Shares are to be sold by the Company in accordance with that certain Open Market Sale Agreement, dated August 5, 2020, by and between the Company and Jefferies LLC (the "***Agreement***"), as described in the Prospectus.

In connection with this opinion, we have examined and relied upon the Registration Statement and the Prospectus, the Agreement, the Company's Seventh Amended and Restated Certificate of Incorporation, as amended, the Company's Third Amended and Restated Bylaws, each as currently in effect, and originals, or copies certified to our satisfaction, of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. In rendering this opinion, we have assumed the genuineness of all signatures; the authenticity of all documents submitted to us as originals; the conformity to originals of all documents submitted to us as copies; the accuracy, completeness and authenticity of certificates of public officials; and the due authorization, execution and delivery by all persons other than the Company of all documents where authorization, execution and delivery are prerequisites to the effectiveness thereof. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not independently verified such matters.

We have assumed (i) that each sale of Shares will be duly authorized by the Board of Directors of the Company, a duly authorized committee thereof or a person or body pursuant to an authorization granted in accordance with Section 152 of the General Corporation Law of the State of Delaware (the "***DGCL***"), (ii) that no more than 30.0 million Shares will be sold under the Agreement pursuant to the Prospectus and (iii) that the price at which the Shares are sold will equal or exceed the par value of the Common Stock. We express no opinion to the extent that future issuances of securities of the Company and/or anti-dilution adjustments to outstanding securities of the Company cause the number of shares of Common Stock outstanding or issuable upon conversion or exercise of outstanding securities of the Company to exceed the number of Shares then issuable under the Agreement.

Our opinion herein is expressed solely with respect to the DGCL. Our opinion is based on these laws as in effect on the date hereof. We express no opinion to the extent that any other laws are applicable to the subject matter hereof and express no opinion and provide no assurance as to compliance with any federal or state securities law, rule or regulation.

Cooley

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares, when sold and issued against payment therefor in accordance with the Agreement, the Registration Statement and the Prospectus, will be validly issued, fully paid and nonassessable.

We consent to the reference to our firm under the caption “Legal Matters” in the Prospectus and to the filing of this opinion as an exhibit to the Company’s Quarterly Report on Form 10-Q filed with the Commission on the date hereof and incorporated by reference into the Registration Statement.

Sincerely,

Cooley LLP

By: /s/ Chadwick L. Mills
Chadwick L. Mills

Cooley LLP 101 California Street 5th Floor San Francisco, CA 94111-5800
t: (415) 693-2000 f: (415) 693-2222 cooley.com

EXECUTIVE EMPLOYMENT AGREEMENT

Employment Agreement ("Agreement") made as of the 13th day of April, 2020 by and between Sangamo Therapeutics, Inc., a Delaware corporation (the "Company"), and Mark McClung ("Executive") (collectively, the "Parties").

R E C I T A L S

WHEREAS, the Company desires to employ Executive, and Executive desires to be employed by the Company, on the terms and conditions set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual promises set forth herein, the Parties agree follows:

1. **Employment**.

The Company hereby agrees to employ Executive and Executive hereby agrees to accept such employment, on the terms and conditions set forth in this Agreement, with a start date of 1st day of May, 2020 (the "Effective Date").

2. **At-Will Employment**.

1. Executive shall be employed on an at-will basis. Either Executive or the Company may terminate employment at any time, with or without cause, and with or without advance notice.

2. **Position, Duties and Obligations**.

1. Executive shall be appointed as the Executive Vice President and Chief Business Officer and shall serve in such position, and in such other positions as the Board and the Company may from time to time reasonably determine, subject at all times to the direction, supervision and authority of the Chief Executive Officer.

2. During Executive's employment, Executive shall perform Executive's duties faithfully and to the best of Executive's ability, and shall devote substantially all of Executive's business time, attention, knowledge, skills and interests to the business of the Company (and its affiliates or subsidiaries).

3. During Executive's employment, Executive shall not, whether directly or indirectly, render any services of a commercial or professional nature to any other person or organization, whether for compensation or otherwise, without the prior written consent of the Chief Executive Officer.

4. The foregoing in this Section 3 shall not preclude Executive from serving on any corporate, civic or charitable boards or committees on which Executive is serving as of the Effective Date and discloses to the Chief Executive Officer prior to the Effective Date or on

which Executive commences service following such date with the Chief Executive Officer's prior written approval, so long as such activities do not interfere with the performance of Executive's responsibilities hereunder.

5. Executive's principal place of business will be located in Brisbane, California.

6. Executive represents that Executive may enter into this Agreement, and as of the Effective Date, 1) accept employment with the Company under the terms of this Agreement, and 2) perform the duties and responsibilities contemplated by this Agreement without violating any other agreement or agreements with other parties including but not limited to and any prior employers.

3. **Compensation and Benefits**.

7. **Base Compensation**. The Company shall pay to Executive an annual base salary of $415,000 Dollars, prorated for any partial employment period and payable in equal monthly installments in accordance with the Company's payroll schedule. The Compensation Committee of the Board shall annually review the then-current level of Executive's base salary (for increase only) to determine the amount, if any, of change to such salary.

8. **Annual Performance Bonus**. Executive is eligible to earn an annual performance bonus commencing with the 2019 calendar year performance period. The target amount of Executive's annual cash bonus shall be 40% percent of Executive's annual base salary. The Board shall have sole discretion to determine whether any annual cash bonus will be paid based upon achievement of both corporate objectives and Executive's personal objectives, and the reasonable discretion to determine that actual amount of any such bonus. Executive must be an employee in good standing on the date that the Board makes such determination in order to earn any such bonus, which determination shall be made by the Board no later than March 31 of the calendar year first following the performance period calendar year. The actual bonus may be more or less than the target amount based upon the Company's achievement over the year. Any bonus to which Executive becomes entitled for a particular calendar year shall be paid in accordance with the terms of the applicable bonus plan, but in no event later than the second payroll period following such Board determination. The Compensation Committee of the Board shall annually review Executive's then target amount for the annual cash bonus (for increase only) to determine the amount, if any, of change to such target amount.

9. **Executive Severance Plan**. Executive shall be deemed an Eligible Employee and an Executive Officer and entitled to receive certain severance benefits under the Sangamo Therapeutics, Inc. Executive Severance Plan dated February 6, 2019 (the "Severance Plan") subject to the terms and conditions of the Severance Plan. A copy of the Severance Plan has been provided to Executive concurrently with this Agreement. Notwithstanding the foregoing, in the event that the Company withdraws this offer after it is signed by Executive or terminates this Agreement prior to the Effective Date for any reason other than Executive's failure to successfully pass the requirements for a background check clearance, satisfactory reference check, and satisfactory proof of Executive's legal right to work in the United States

required under Section 8(a) herein, then Executive shall be entitled to severance under the Severance Plan as though his employment was terminated by the Company other than for Cause to the same extent as he would otherwise be entitled had such termination occurred after the Effective Date; provided, however, that Executive shall not be entitled to such severance if he has not notified his current employer of his intent to resign his employment at the time the Company informs him of the withdrawal or termination of this Agreement.

10. **Benefits**. Executive will be entitled to the employee benefits generally provided to other executive officers of the Company pursuant to the terms of the applicable benefit plans. Executive will not be subject to a formal paid time off program. Executive is free to take paid time off from work for vacation, medical appointments, and other short-term absences due to illnesses or other personal reasons. If Executive desires to take time off for a duration longer than two (2) weeks manager approval is required. Unlimited paid time off is available from the first day of employment.

11. **Equity**. Effective as of May 25th 2020 or the trading day immediately preceding in the event May 25th 2020 is not a trading day (the “Grant Date”), the Compensation Committee of the Board shall grant you astock option to purchase up to 200,000 shares of the Company’s Common Stock subject to the terms and conditions of the Company’s 2018 Equity Incentive Plan (the “Plan”),with an exercise price per share equal to the fair market value of the Company’s Common Stock on the Grant Date (the “Option”). The Option will be evidenced by the standard stock option agreement under the Plan and will be subject to the terms and conditions of that agreement and the Plan, with one-quarter of the Option shares vesting twelve (12) months from the Grant Date and the remainder vesting in equal monthly installments for thirty-six (36) months thereafter, provided Executive remains a full-time employee through each such vesting date. Vesting of the Option and any subsequent equity grants will cease upon termination of Executive’s service by either party for any reason.

12. Also, subject to approval by the Compensation Committee of the Board, we intend to grant you 100,000 restricted stock units ("Restricted Stock Units") under the Plan. Each Restricted Stock Unit represents the right to receive one share of the Company's common stock upon the specified issuance date following vesting. Your Restricted Stock Units will vest in a series of three (3) successive equal annual installments upon your completion of each year of service to the Company measured from the Vesting Commencement Date. The issuance of the underlying shares of common stock in settlement of vested Restricted Stock Units will be subject to the Company's collection of all applicable withholding taxes. The Restricted Stock Units will be evidenced by the Plan's form of Restricted Stock Unit Issuance Agreement and will be subject to its terms and conditions and the Plan.

13. **Retention Bonus Advance.** Executive shall be advanced a retention bonus (the “Retention Bonus”) in the amount of one hundred thousand dollars ($150,000), payable in the first regularly rescheduled payroll after the Effective Date. Although the Retention Bonus is advanced at the beginning of Executive’s employment, it is expressly conditioned on Executive not terminating employment prior to the first (1st) anniversary of the Effective Date under any circumstances other than a termination that would entitle Executive to

receive benefits under the Severance Plan, and such advanced Retention Bonus shall not be deemed earned by Executive until such service condition has been met. If Executive's employment terminates at any time prior to the first (1st) anniversary of the Effective Date and Executive is not entitled to receive benefits under the Severance Plan (such termination, a "Disqualifying Termination"), then, Executive shall at the time of such Disqualifying Termination promptly repay the full Retention Bonus to the Company. In the event Executive does not earn and fails to promptly repay the Retention Bonus in connection with a Disqualifying Termination, then the Company shall be further entitled to recover from Executive its costs and expenses incurred in enforcing Executive's repayment obligation, including reasonable attorney's fees and costs.

14. **Clawback**. Notwithstanding anything to the contrary in this Agreement, all compensation paid to Executive by the Company (whether payable pursuant to this Agreement or otherwise) will be subject to reduction, recovery and/or recoupment to the extent required by any present or future law, government regulation or stock exchange listing requirement (or any policy adopted by the Company which ensures compliance with the requirements of any such law, government regulation or stock exchange listing requirement).

15. **Resignation from Positions**. Notwithstanding any other provision of this Agreement to the contrary, upon any termination of employment (whether voluntary or involuntary), Executive, upon written request from the Board, shall immediately resign from any positions Executive has with the Company (or any subsidiary), whether as an executive, officer, employee, consultant, director, trustee, fiduciary or otherwise.

4. **Confidentiality**. Executive agrees to abide by the terms and conditions of the Employee Confidential Information and Invention Assignment Agreement between Executive and the Company, a copy of which is attached as Exhibit A. Executive further agrees that at all times both during Executive's employment by the Company and after Executive's employment ends, Executive will keep in confidence and trust, and will not use or disclose, except as directed by the Company, any confidential or proprietary information of the Company.

5. **Tax Withholdings**. Any and all cash compensation and other benefits (including without limitation, base salary, annual bonus and sign-on bonus) paid to Executive under this Agreement shall be subject to all applicable tax withholding requirements, and the Company shall make such other deductions as may be required and/or allowed by applicable law and/or as authorized in writing by Executive.

6. **Arbitration**. Any dispute, controversy, or claim, whether contractual or non-contractual, between Executive and the Company shall be resolved by binding arbitration before the Judicial Arbitration and Mediation Service (the "JAMS"), in accordance with the JAMS Employment Arbitration Rules and Procedures, available at www.jamsadr.com. Executive and the Company each agree that before proceeding to arbitration, they will mediate disputes before the JAMS by a mediator approved by the JAMS. If mediation fails to resolve the matter, any subsequent arbitration shall be conducted by an arbitrator approved by the JAMS and mutually acceptable to Executive and the Company. All disputes, controversies, and claims shall be conducted by a single arbitrator, who shall: (i) allow discovery authorized by California Code of Civil Procedure

Section 1282, et seq., or any other discovery required by applicable law; and (ii) issue a written award that sets forth the essential findings of fact and conclusions of law on which the award is based. The arbitrator shall have the authority to award any relief authorized by law in connection with the asserted claims or disputes. Judgment upon the arbitrator's award may be entered in any court having jurisdiction thereof. If Executive and the Company are unable to agree on the mediator or the arbitrator, then the JAMS shall select the mediator/arbitrator. The resolution of the dispute by the arbitrator shall be final, binding, non-appealable, and fully enforceable by a court of competent jurisdiction under the Federal Arbitration Act. The arbitration award shall be in writing and shall include a statement of the reasons for the award. The arbitration shall be held in San Francisco, California. The Company shall pay all JAMS, mediation, and arbitrator's fees and costs, irrespective of who raised the claim and the outcome of arbitration.

7. **Miscellaneous**.

16. **Conditions to Agreement**. This Agreement is contingent upon a background check clearance, satisfactory reference check, and satisfactory proof of Executive's legal right to work in the United States. Executive agrees to provide any documentation or information at the Company's request to facilitate these processes.

17. **Governing Law**. This Agreement shall be interpreted, construed, governed and enforced according to the laws of the State of California.

18. **Attorneys' Fees**. In the event of any controversy, claim or dispute between the parties, arising out of or relating to this Agreement or the breach hereof, or the interpretation hereof, each party shall bear its own legal fees and expenses. Notwithstanding the foregoing, in the event of a finding by any court having jurisdiction over such matter that any party initiating an action under this Agreement failed to have a reasonable prospect of prevailing on its claim, the arbitrator shall have discretion to award the prevailing party attorneys' fees and costs incurred by it with respect to such claim or action. The "prevailing party" means the party determined by the arbitrator to have most nearly prevailed, even if such party did not prevail in all matters, not necessarily the one in whose favor a judgment is rendered.

19. **Amendments**. No amendment or modification of the terms or conditions of this Agreement shall be valid unless in writing and signed by the Parties hereto.

20. **Severability**. If any provision of this Agreement as applied to any party or to any circumstance should be adjudged by a court of competent jurisdiction (or determined by the arbitrator) to be void or unenforceable for any reason, the invalidity of that provision shall in no way affect (to the maximum extent permissible by law) the application of such provision under circumstances different from those adjudicated by the court or determined by the arbitrator, the application of any other provision of this Agreement, or the enforceability or invalidity of this Agreement as a whole. Should any provision of this Agreement become or be deemed invalid, illegal or unenforceable in any jurisdiction by reason of the scope, extent or duration of its coverage, then such provision shall be deemed amended to the extent necessary to conform to applicable law so as to be valid and enforceable or, if such provision cannot be so

amended without materially altering the intention of the parties, then such provision will be stricken, and the remainder of this Agreement shall continue in full force and effect.

21. **Successors and Assigns**. The rights and obligations of the Company under this Agreement shall inure to the benefit of and shall be binding upon the successors and assigns of the Company. Executive shall not be entitled to assign any of Executive's rights or obligations under this Agreement.

22. **Entire Agreement**. This Agreement, along with any other agreements set forth herein, including without limitation, the Proprietary Information and Inventions Agreement, constitutes the entire agreement between the parties with respect to the employment of Executive.

SANGAMO THERAPEUTICS, INC.

By:

/s/ Alexander Macrae

Title: CEO

Date: Apr 22, 2020

/s/ Mark McClung

Title: CBO

EXHIBIT A

EMPLOYEE CONFIDENTIAL INFORMATION AND INVENTION ASSIGNMENT AGREEMENT

In consideration of my employment or continued employment by Sangamo Therapeutics, Inc. ("Sangamo"), its direct and indirect subsidiaries, parents, affiliates, predecessors, successors and assigns (together with Sangamo, the "**Company**"), and the compensation and benefits provided to me now and during my employment with the Company, I hereby enter into this Employee Confidential Information and Invention Assignment Agreement (the "**Agreement**"), which will be deemed effective as of the first day of my employment with the Company:

1. **Confidential Information Protections.**

a. **Recognition of Company's Rights; Nondisclosure.** I understand and acknowledge that my employment by Company creates a relationship of confidence and trust with respect to Company's Confidential Information (as defined below) and that Company has a protectable interest therein. At all times during and after my employment, I will hold in confidence and will not disclose, use, lecture upon, or publish any of Company's Confidential Information, except as such disclosure, use or publication may be required in connection with my work for Company, or unless an officer of Company expressly authorizes such disclosure. I will obtain Company's written approval before publishing or submitting for publication any material (written, oral, or otherwise) that discloses and/or incorporates any Confidential Information. I hereby assign to Sangamo any rights I may have or acquire in such Confidential Information and recognize that all Confidential Information shall be the sole and exclusive property of Sangamo and its assigns. I will take all reasonable precautions to prevent the inadvertent accidental disclosure of Confidential Information. Notwithstanding the foregoing, pursuant to 18 U.S.C. Section 1833(b), I shall not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that: (1) is made in confidence to a federal, state, or local government official, either directly or indirectly, or to an attorney, and solely for the purpose of reporting or investigating a suspected violation of law; or (2) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal.

b. **Confidential Information.** The term **"Confidential Information"** shall mean any and all confidential knowledge, data or information of Company. By way of illustration but not limitation, **"Confidential Information"** includes (a) trade secrets, inventions, mask works, ideas, processes, formulas, software in source or object code versions, data, programs, other works of authorship, know-how, improvements, discoveries, developments, designs and techniques and any other proprietary technology and all Intellectual Property Rights therein (collectively, **"Inventions"**); (b) information regarding research, development, new products, marketing and selling, business plans, budgets and unpublished financial statements, licenses, prices and costs, margins, discounts, credit terms, pricing and billing policies, quoting procedures, methods of obtaining business, forecasts, future plans and potential strategies, financial projections and business strategies, operational plans, financing and capital-raising plans, activities and agreements, internal services and operational manuals, methods of conducting Company business, suppliers and supplier information, and purchasing; (c) information regarding customers and potential customers of Company, including customer lists, names, representatives, their needs or desires with respect to the types of products or services offered by Company, proposals, bids, contracts and their contents and parties, the type and quantity of products and services provided or sought to be provided to customers and potential customers of Company and other non-public information relating to customers and potential customers; (d) information regarding any of Company's business partners and their services, including names, representatives, proposals, bids, contracts and their contents and parties, the type and quantity of products and services received by Company, and other non-public information relating to business partners; (e) information regarding personnel, employee lists, compensation, and employee skills; and (f) any other non-public information which a competitor of Company could use to the competitive disadvantage of Company. Notwithstanding the foregoing, it is understood that, at all such times, I am free to use information which is generally known in the trade or industry through no

breach of this Agreement or other act or omission by me. Further, notwithstanding the foregoing or anything to the contrary in this Agreement or any other agreement between the Company and me, nothing in this Agreement shall limit my right to discuss my employment or report possible violations of law or regulation with any federal government agency or similar state or local agency or to discuss the terms and conditions of my employment with others to the extent expressly permitted by Section 7 of the National Labor Relations Act.

c. **Third Party Information.** I understand, in addition, that Company has received, and in the future will receive, from third parties their confidential and/or proprietary knowledge, data or information (**"Third Party Information"**) subject to a duty on Company's part to maintain the confidentiality of such information and to use it only for certain limited purposes. During my employment and thereafter, I will hold Third Party Information in confidence and will not disclose to anyone (other than Company personnel who need to know such information in connection with their work for Company) or use, except in connection with my work for Company, Third Party Information unless expressly authorized by an officer of Company in writing.

d. **No Improper Use of Information of Prior Employers and Others.** During my employment by Company, I will not improperly use or disclose confidential information or trade secrets, if any, of any former employer or any other person to whom I have an obligation of confidentiality, and I will not bring onto the premises of Company any unpublished documents or any property belonging to any former employer or any other person to whom I have an obligation of confidentiality unless consented to in writing by that former employer or person.

2. **Assignments of Inventions.**

a. **Definitions.** As used in this Agreement, the term **"Intellectual Property Rights"** means all trade secrets, Copyrights, trademarks, mask work rights, patents and other intellectual property rights recognized by the laws of any jurisdiction or country; the term **"Copyright"** means the exclusive legal right to reproduce, perform, display, distribute and make derivative works of a work of authorship (as a literary, musical, or artistic work) recognized by the laws of any jurisdiction or country; and the term **"Moral Rights"** means all paternity, integrity, disclosure, withdrawal, special and any other similar rights recognized by the laws of any jurisdiction or country.

b. **Excluded Inventions and Other Inventions.** Attached hereto as **Attachment 1** is a list describing all existing Inventions, if any, that may relate to Company's business or actual or demonstrably anticipated research or development and that were made by me or acquired by me prior to the commencement of my employment with, and which are not to be assigned to, Company (**"Excluded Inventions"**). If no such list is attached, I represent and agree that it is because I have no rights in any existing Inventions that may relate to Company's business or actual or demonstrably anticipated research or development. For purposes of this Agreement, **"Other Inventions"** means Inventions in which I have or may have an interest, as of the commencement of my employment, other than Company Inventions (defined below) and Excluded Inventions. I acknowledge and agree that if I use any Excluded Inventions or any Other Inventions in the scope of my employment, or if I include any Excluded Inventions or Other Inventions in any product or service of Company, or if my rights in any Excluded Inventions or Other Inventions may block or interfere with, or may otherwise be required for, the exercise by Company of any rights assigned to Company under this Agreement, I will immediately so notify Company in writing. Unless Company and I agree otherwise in writing as to particular Excluded Inventions or Other Inventions, I hereby grant to Company, in such circumstances (whether or not I give Company notice as required above), a non-exclusive, perpetual, transferable, fully-paid and royalty-free, irrevocable and worldwide license, with rights to sublicense through multiple levels of sublicensees, to reproduce, make derivative works of, distribute, publicly perform, and publicly display in any form or medium, whether now known or later developed, make, have made, use, sell, import, offer for sale, and exercise any and all present or future rights in, such Excluded Inventions and Other Inventions. To the extent that any third parties have rights in any such Excluded Inventions or Other Inventions, I hereby represent and warrant that such third party or parties have validly and irrevocably granted to me the right to grant the license stated above.

c. **Assignment of Company Inventions.** Inventions assigned to Sangamo, or to a third party as directed by Sangamo pursuant to Section 2.6, are referred to in this Agreement as **"Company Inventions."** Subject to Section 2.4 (Unassigned or Nonassignable Inventions) and except for Excluded

Inventions set forth in **Attachment 1** and Other Inventions, I hereby assign to Sangamo all my right, title, and interest in and to any and all Inventions (and all Intellectual Property Rights with respect thereto) made, conceived, reduced to practice, or learned by me, either alone or with others, during the period of my employment by Company. To the extent required by applicable Copyright laws, I agree to assign in the future (when any copyrightable Inventions are first fixed in a tangible medium of expression) my Copyright rights in and to such Inventions. Any assignment of Company Inventions (and all Intellectual Property Rights with respect thereto) hereunder includes an assignment of all Moral Rights. To the extent such Moral Rights cannot be assigned to Sangamo and to the extent the following is allowed by the laws in any country where Moral Rights exist, I hereby unconditionally and irrevocably waive the enforcement of such Moral Rights, and all claims and causes of action of any kind against Company or related to Company's customers, with respect to such rights. I further acknowledge and agree that neither my successors-in-interest nor legal heirs retain any Moral Rights in any Company Inventions (and any Intellectual Property Rights with respect thereto).

d. **Unassigned or Nonassignable Inventions.** I recognize that this Agreement will not be deemed to require assignment of any Invention that is covered under California Labor Code section 2870(a) (the "**Specific Inventions Law**"), as detailed on **Attachment 2**.

e. **Obligation to Keep Company Informed.** During the period of my employment and for one (1) year after termination of my employment, I will promptly and fully disclose to Company in writing all Inventions authored, conceived, or reduced to practice by me, either alone or jointly with others. In addition, I will promptly disclose to Company all patent applications filed by me or on my behalf within one (1) year after termination of employment. At the time of each such disclosure, I will advise Company in writing of any Inventions that I believe fully qualify for protection under the provisions of the Specific Inventions Law; and I will at that time provide to Company in writing all evidence necessary to substantiate that belief. Company will keep in confidence and will not use for any purpose or disclose to third parties without my consent any confidential information disclosed in writing to Company pursuant to this Agreement relating to Inventions that qualify fully for protection under the Specific Inventions Law. I will preserve the confidentiality of any Invention that does not fully qualify for protection under the Specific Inventions Law.

f. **Government or Third Party.** I agree that, as directed by Company, I will assign to a third party, including without limitation the United States, all my right, title, and interest in and to any particular Company Invention.

g. **Ownership of Work Product.** I agree that Sangamo will exclusively own all work product that is made by me (solely or jointly with others) within the scope of my employment, and I hereby irrevocably and unconditionally assign to Sangamo all right, title, and interest worldwide in and to such work product. I acknowledge that all original works of authorship which are made by me (solely or jointly with others) within the scope of my employment and which are protectable by Copyright are "works made for hire," pursuant to United States Copyright Act (17 U.S.C., Section 101). I understand and agree that I have no right to publish on, submit for publishing, or use for any publication any work product protected by this Section, except as necessary to perform services for Company.

h. **Enforcement of Intellectual Property Rights and Assistance.** I will assist Company in every proper way to obtain, and from time to time enforce, United States and foreign Intellectual Property Rights and Moral Rights relating to Company Inventions in any and all countries. To that end I will execute, verify and deliver such documents and perform such other acts (including appearances as a witness) as Company may reasonably request for use in applying for, obtaining, perfecting, evidencing, sustaining and enforcing such Intellectual Property Rights and the assignment thereof. In addition, I will execute, verify and deliver assignments of such Intellectual Property Rights to Sangamo or its designee, including the United States or any third party designated by Sangamo. My obligation to assist Company with respect to Intellectual Property Rights relating to such Company Inventions in any and all countries will continue beyond the termination of my employment, but Company will compensate me at a reasonable rate after my termination for the time actually spent by me at Company's request on such assistance. In the event Company is unable for any reason, after reasonable effort, to secure my signature on any document needed in connection with the actions specified in this paragraph, I hereby irrevocably designate and appoint Company and its duly authorized officers and agents as my agent and attorney in fact, which appointment is coupled with an interest, to act for

and in my behalf to execute, verify and file any such documents and to do all other lawfully permitted acts to further the purposes of this Agreement with the same legal force and effect as if executed by me. I hereby waive and quitclaim to Company any and all claims, of any nature whatsoever, which I now or may hereafter have for infringement of any Intellectual Property Rights assigned under this Agreement to Sangamo.

i. **Incorporation of Software Code.** I agree that I will not incorporate into any Company software or otherwise deliver to Company any software code licensed under the GNU General Public License or Lesser General Public License or any other license that, by its terms, requires or conditions the use or distribution of such code on the disclosure, licensing, or distribution of any source code owned or licensed by Company **except** in strict compliance with Company's policies regarding the use of such software.

3. **Records.** I agree to keep and maintain adequate and current records (in the form of notes, sketches, drawings and in any other form that is required by Company) of all Confidential Information developed by me and all Company Inventions made by me during the period of my employment at Company, which records will be available to and remain the sole property of Company at all times.

4. **Duty of Loyalty During Employment.** I agree that during the period of my employment by Company I will not, without Company's express written consent, directly or indirectly (a) engage in any other employment or (b) engage in any other activities that are competitive with, or would otherwise conflict with, my employment by Company.

5. **No Solicitation of Employees, Consultants, or Contractors.** I agree that during the period of my employment and for the one (1) year period after the date my employment ends for any reason, including but not limited to voluntary termination by me or involuntary termination by Company, I will not, as an officer, director, employee, consultant, owner, partner, or in any other capacity, either directly or through others, except on behalf of Company, solicit, induce, encourage, or participate in soliciting, inducing or encouraging any employee, consultant, or independent contractor of Company to terminate his, her or its relationship with Company, even if I did not initiate the discussion or seek out the contact.

6. **Reasonableness of Restrictions.** I agree that I have read this entire Agreement and understand it. I agree that this Agreement does not prevent me from earning a living or pursuing my career. I agree that the restrictions contained in this Agreement are reasonable, proper, and necessitated by Company's legitimate business interests. I represent and agree that I am entering into this Agreement freely and with knowledge of its contents with the intent to be bound by the Agreement and the restrictions contained in it.

7. **No Conflicting Agreement or Obligation.** I represent that my employment by Company does not and will not breach any agreement with any former employer or third party, including any noncompete agreement or any agreement to keep in confidence or refrain from using information acquired by me prior to my employment by Company. I further represent that I have not entered into, and will not enter into, any agreement, either written or oral, in conflict with my obligations under this Agreement.

8. **Return Of Company Property.** Subject to the nondisclosure requirements of Section 1.1 above, upon termination of my employment or upon Company's request at any other time, I will deliver to Company any and all of Company's property and equipment and any and all drawings, notes, memoranda, specifications, devices, formulas and documents, together with all copies thereof, and any other material containing or disclosing any Company Inventions, Third Party Information or Confidential Information of Company. I agree that I will not copy, delete, or alter any information contained upon my Company computer or Company equipment before I return it to Company. In addition, if I have used any personal computer, server, or e-mail system to receive, store, review, prepare or transmit any Company information, including but not limited to, Confidential Information, I agree to provide Company with a computer-useable copy of all such Confidential Information and then permanently delete and expunge such Confidential Information from those systems; and I agree to provide Company access to my system as reasonably requested to verify that the necessary copying and/or deletion is completed. I further agree that any property situated on Company's premises and owned by Company, including disks and other storage media, filing cabinets or other work areas, is subject to inspection by Company's personnel at any time with or without notice.

9. **Legal and Equitable Remedies.**

a. I agree that it may be impossible to assess the damages caused by my violation of this Agreement or any of its terms. I agree that any

threatened or actual violation of this Agreement or any of its terms will constitute immediate and irreparable injury to Company, and Company will have the right to enforce this Agreement and any of its provisions by injunction, specific performance or other equitable relief, without bond and without prejudice to any other rights and remedies that Company may have for a breach or threatened breach of this Agreement.

b. In the event Company enforces this Agreement through a court or arbitration order, I agree that the restrictions of Sections 5 will remain in effect for a period of twelve (12) months from the effective date of the order enforcing the Agreement.

10. **Notices.** Any notices required or permitted under this Agreement will be given to Company at its headquarters location at the time notice is given, and to me at my address as listed on Company payroll, or at such other address as Company or I may designate by written notice to the other. Notice will be effective upon receipt or refusal of delivery. If delivered by certified or registered mail, notice will be considered to have been given five (5) business days after it was mailed, as evidenced by the postmark. If delivered by courier or express mail service, notice will be considered to have been given on the delivery date reflected by the courier or express mail service receipt.

11. **Notification Of New Employer.** If I leave the employ of Company, I consent to the notification of my new employer of my rights and obligations under this Agreement, by Company providing a copy of this Agreement or otherwise.

12. **General Provisions.**

a. **Governing Law.** This Agreement will be governed by and construed according to the laws of the State of California as such laws are applied to agreements entered into and to be performed entirely within California between California residents.

b. **Severability.** In case any one or more of the provisions, subsections, or sentences contained in this Agreement will, for any reason, be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability will not affect the other provisions of this Agreement, and this Agreement will be construed as if such invalid, illegal or unenforceable provision had never been contained in this Agreement. If moreover, any one or more of the provisions contained in this Agreement will for any reason be held to be excessively broad as to duration, geographical scope, activity or subject, it will be construed by limiting and reducing it, so as to be enforceable to the extent compatible with the applicable law as it will then appear.

c. **Successors and Assigns.** This Agreement is for my benefit and the benefit of Company, its successors, assigns, parent corporations, direct and indirect subsidiaries, affiliates, and purchasers, and will be binding upon my heirs, executors, administrators and other legal representatives.

d. **Survival.** This Agreement shall survive the termination of my employment, regardless of the reason, and the assignment of this Agreement by Company to any successor in interest or other assignee.

e. **Employment At-Will.** I agree and understand that nothing in this Agreement will change my at-will employment status or confer any right with respect to continuation of employment by Company, nor will it interfere in any way with my right or Company's right to terminate my employment at any time, with or without cause or advance notice.

f. **Waiver.** No waiver by Company of any breach of this Agreement will be a waiver of any preceding or succeeding breach. No waiver by Company of any right under this Agreement will be construed as a waiver of any other right. Company will not be required to give notice to enforce strict adherence to all terms of this Agreement.

g. **Export.** I agree not to export, reexport, or transfer, directly or indirectly, any U.S. technical data acquired from Company or any products utilizing such data, in violation of the United States export laws or regulations.

h. **Entire Agreement.** This Agreement is the final, complete and exclusive agreement of the parties with respect to the subject matter of this Agreement and supersedes and merges all prior discussions between the parties; provided, however, prior to the execution of this Agreement, if Company and I were parties to any agreement regarding the subject matter hereof, that agreement will be superseded by this Agreement prospectively only. No modification of or amendment to this Agreement, or any waiver of any rights under this Agreement, will be effective unless in writing and signed by me and an authorized officer of the Company. Any subsequent change or changes in my duties, salary or compensation will not affect the validity or scope of this Agreement. If no other agreement governs nondisclosure and assignment of inventions during any period in which I was previously engaged or

am in the future engaged by Company as an independent contractor, the obligations pursuant to sections of this Agreement titled “Confidential Information Protections” and “Assignment of Inventions” shall apply.

Mark McClung:

I have read, understand, and Accept this agreement.

____

(Signature)

By:_____

Title:_____

Date: _____

SANGAMO THERAPEUTICS, INC.:

Accepted and agreed:

____

(Signature)

By: _____

Title: _____

Date: _____

Attachment 1

Prior Inventions

TO: Sangamo Therapeutics, Inc.

FROM: Mark McClung

DATE:

SUBJECT: Prior Inventions

1. Except as listed in Section 2 below, the following is a complete list of all inventions or improvements relevant to the subject matter of my employment by Sangamo Therapeutics, Inc. ("**Company**") that have been made or conceived or first reduced to practice by me alone or jointly with others prior to my engagement by Company:

No inventions or improvements.

See below:

____

____

____

Additional sheets attached.

2. Due to a prior confidentiality agreement, I cannot complete the disclosure under Section 1 above with respect to inventions or improvements generally listed below, the intellectual property rights and duty of confidentiality with respect to which I owe to the following party(ies):

Invention or Improvement Party(ies) Relationship

1.

2.

3.

Additional sheets attached.

Attachment 2

Limited Exclusion Notification

This is to notify you in accordance with Section 2872 of the California Labor Code that the foregoing Agreement between you and Company does not require you to assign or offer to assign to Company any Invention that you develop entirely on your own time without using Company's equipment, supplies, facilities or trade secret information, except for those Inventions that either:

i. Relate at the time of conception or reduction to practice to Company's business, or actual or demonstrably anticipated research or development; or

ii. Result from any work performed by you for Company.

To the extent a provision in the foregoing Agreement purports to require you to assign an Invention otherwise excluded from the preceding paragraph, the provision is against the public policy of this state and is unenforceable.

This limited exclusion does not apply to any patent or Invention covered by a contract between Company and the United States or any of its agencies requiring full title to such patent or Invention to be in the United States.

Dear Andy:

The Executive Leadership Team recognizes your recent contributions and the critical importance of your leadership and experience to Sangamo's manufacturing strategy. Therefore, on behalf of Sangamo, you have been awarded a one-time Spot Bonus as of December 19, 2019 to acknowledge your accomplishments, subject to the terms and conditions set out below.

The Spot Bonus will be in the gross aggregate amount of $100,000 (subject to applicable withholdings and taxes), with 25% of such amount payable on July 1, 2020, December 1, 2020, July 1, 2021 and December 1, 2021, subject to your continued full-time employment with Sangamo through and including each payment date.

I appreciate your continued effort and dedication to Sangamo and look forward to continuing working with you. If you have any questions concerning this Spot Bonus, please contact me.

We appreciate your contributions and support as we collectively work towards transforming patients' lives.

Sincerely,

/s/ Sandy Macrae

Sandy Macrae
Chief Executive Officer

SEVENTH AMENDMENT TO LEASE

THIS SEVENTH AMENDMENT TO LEASE (this "Seventh Amendment") is entered into as of May 20, 2020 (the "Effective Date"), by and between POINT RICHMOND R&D ASSOCIATES II, LLC, a California limited liability company ("Landlord"), and SANGAMO THERAPEUTICS, INC., a Delaware corporation (formerly known as Sangamo Biosciences, Inc., a Delaware corporation) ("Tenant"), with reference to the following facts:

A. Landlord and Tenant entered into that certain Triple Net Laboratory Lease dated as of May 23, 1997, together with an Addendum thereto dated May 28, 1997 (collectively, the "Original Lease"), as amended by those certain letter agreements dated June 15, 1999, April 21, 2000 (the "April 21, 2000 Letter Agreement") and November 3, 2000, that certain First Amendment to Lease dated March 12, 2004 (the "First Amendment"), that certain Lease Addendum dated December 12, 2006 ("Lease Addendum II"), that certain Second Amendment to Lease dated March 15, 2007, that certain Lease Addendum III dated April 2, 2012 ("Lease Addendum III"), that certain Third Amendment to Lease dated August 1, 2013, that certain Lease Addendum dated December 1, 2013 ("Lease Addendum IV", and collectively with Lease Addendum II and Lease Addendum III, the "Storage Space Lease Addenda"), that certain Fourth Amendment to Lease dated June 10, 2016, that certain Fifth Amendment to Lease dated July 10, 2017 (the "Fifth Amendment"), and that certain Sixth Amendment to Lease dated May 11, 2018 (the "Sixth Amendment"), pursuant to which Tenant leases certain premises consisting of approximately 26,629 rentable square feet known as Suites A, B and C-1 ("Suites A, B and C-1"), approximately 5,165 rentable square feet known as Suite C-2 ("Suite C-2"), and approximately 6,153 rentable square feet known as Suite F ("Suite F", and collectively with Suites A, B and C-1, and Suite C-2, the "Existing Premises"), in the building located at 501 Canal Boulevard, Point Richmond, California (the "Building"). The Original Lease, as so amended, is collectively referred to herein as the "Existing Lease"; provided, however, the Storage Space Lease Addenda are no longer in effect pursuant to the terms of the Fifth Amendment.

B. Tenant has requested that additional space described as approximately 8,541 rentable square feet known as Suite Nos. G, H & J, (of which Suite J alone contains approximately 700 rentable square feet; hereinafter, the "Suite J Expansion Space") as shown on Exhibit A hereto (collectively, the "Suite Nos. G, H & J Expansion Space"), be added to the Premises and that the Existing Lease be appropriately amended, and Landlord is willing to do the same on the following terms and conditions.

NOW, THEREFORE, in consideration of the foregoing, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Incorporation of Recitals and Defined Terms. The Recitals above are hereby incorporated herein. As of the Effective Date, unless context clearly indicates otherwise, all references to "the Lease" or "this Lease" in the Existing Lease or in this Seventh Amendment

shall be deemed to refer to the Existing Lease, as amended by this Seventh Amendment. Capitalized terms which are not otherwise defined in this Seventh Amendment shall have the meanings set forth in the Existing Lease.

2. Expansion. Effective as of the later of (i) October 1, 2020 and (ii) the date the Suite Nos. G, H & J Expansion Space is delivered to Tenant with the work described in the last sentence of Section 7(a) below completed (the "Suite Nos. G, H & J Expansion Effective Date"), the Premises, as defined in the Existing Lease, is increased from approximately 37,947 rentable square feet to approximately 46,488 rentable square feet by the addition of the Suite Nos. G, H & J Expansion Space, and from and after the Suite Nos. G, H & J Expansion Effective Date, the Existing Premises and the Suite Nos. G, H & J Expansion Space, collectively, shall be deemed the Premises, as defined in the Existing Lease, for all purposes under the Existing Lease, including, without limitation, Section 8 of the First Amendment (as amended by Section 2 of the Third Amendment, Section 14 of the Fifth Amendment, and Section 6 of the Sixth Amendment). The Term for the Suite Nos. G, H & J Expansion Space shall commence on the Suite Nos. G, H & J Expansion Effective Date and end on the Second Extended Expiration Date (as defined in the Sixth Amendment). The Suite Nos. G, H & J Expansion Space is subject to all the terms and conditions of the Existing Lease except as expressly modified herein and except that Tenant shall not be entitled to receive any allowances, abatements or other financial concessions granted with respect to the Existing Premises.

3. Base Monthly Rent. As of the Suite Nos. G, H & J Expansion Date, in addition to the Base Monthly Rent payable for the Existing Premises, Tenant shall pay Base Monthly Rent payable with respect to Suite Nos. G, H & J as follows:

Period	Base Monthly Rent
10/01/20 – 08/31/21	$21,352.50
09/01/21 – 08/31/22	$21,886.31
09/01/22 – 08/31/23	$22,433.47
09/01/23 – 08/31/24	$22,994.31
09/01/24 – 08/31/25	$23,569.17
09/01/25 – 08/31/26	$24,158.40

All such Monthly Base Rent shall be payable by Tenant in accordance with the terms of the Existing Lease.

4. Additional Security Deposit. Upon Tenant's execution hereof, Tenant shall pay Landlord the sum of $21,352.50 which is added to and becomes part of the Security Deposit, if any, held by Landlord as provided under Section 4.3.2 of the Original Lease, Section 9 of the Fourth Amendment and Section 10 of the Fifth Amendment, as security for payment of Rent and the performance of the other terms and conditions of the Lease by Tenant. Accordingly, simultaneous with the execution hereof, the Security Deposit is increased from $32,367.00 to $53,719.50.

5. Tenant's Pro Rata Share. For the period commencing with the Suite Nos. G, H & J Expansion Effective Date and continuing through the Second Extended Expiration Date,

Tenant's Pro Rata Share for the Premises (including Suite Nos. G, H & J Expansion Space) is 57.17%.

6. Operating Expenses. For the period commencing with the Suite Nos. G, H & J Expansion Effective Date, Tenant shall pay for Tenant's Pro Rata Share of Operating Expenses applicable to the Suite Nos. G, H & J Expansion Space in accordance with the terms of the Existing Lease. As of the Suite Nos. G, H & J Expansion Effective Date as to Suite Nos. G, H & J Expansion Space and ending as of the Second Extended Expiration Date, Tenant's Pro Rata Share of Operating Expenses (exclusive of Taxes) shall not increase by more than 5% per calendar year on a compounding and cumulative basis (e.g., Tenant's Pro Rata Share of Operating Expenses (other than Taxes) for calendar year 2021 shall not exceed 105% of Tenant's Pro Rata Share of Operating Expenses (other than Taxes) for 2020; Tenant's Pro Rata Share of Operating Expenses (other than Taxes) for calendar year 2022 shall not exceed 105% of the maximum allowable amount of Tenant's Pro Rata Share of Operating Expenses (other than Taxes) permitted for 2021, etc.).

7. Improvements to Suite Nos. G, H & J Expansion Space.

(a) *Condition of Suite Nos. G, H & J Expansion Space*. Tenant has inspected the Suite Nos. G, H & J Expansion Space and agrees to accept the same "as is" without any agreements, representations, understandings or obligations on the part of Landlord to perform any alterations, repairs or improvements, except as may be expressly provided otherwise in this Amendment. Landlord represents and warrants that the mechanical, electrical, plumbing and drainage systems within and serving the Suite Nos. G, H & J Expansion Space are and will be, as of the Suite Nos. G, H & J Expansion Effective Date, in good working order and free from defects. Should Tenant determine that there is any noncompliance with the foregoing representation and provide Landlord with a written notice thereof, Landlord shall promptly after receipt of written notice from Tenant setting forth with specificity the nature and extent of such noncompliance, rectify the same; such noncompliance shall not, however, entitle Tenant to an abatement of rent or to terminate the Lease, or otherwise release Tenant from any of Tenant's obligations under the Lease. Prior to the Suite Nos. G, H & J Expansion Effective Date, Landlord shall replace air conditioning unit No. 7 (serving Suite H) with a new air conditioning unit of equal quality to the other air conditioning units serving the Suite Nos. G, H & J Expansion Space.

(b) *Responsibility for Improvements to Suite Nos. G, H & J Expansion Space*. Tenant may perform improvements to the Suite Nos. G, H & J Expansion Space in accordance with Section 7.3 of the Existing Lease; provided, however, that Landlord shall not unreasonably withhold its consent to any proposed Alterations. Landlord shall respond to any request by Tenant for approval of proposed Alterations within seven (7) business days, and if Landlord disapproves of the proposed Alterations, it shall provide Tenant with written notice of the reason for such disapproval. If within such seven (7) business day period, Landlord informs Tenant that Landlord has submitted the proposed Alterations to an outside third party for review, then Landlord shall make diligent, good faith efforts to have such outside third-party review completed, and to deliver to Tenant an approval or any written notice of additional required revisions to or comments regarding the proposed Alterations, within not less than twenty (20)

business days. In the event Landlord fails to respond to Tenant's request for approval of the proposed Alterations within the original seven (7) business day period, Tenant shall send a reminder notice to Landlord, and if Landlord fails to respond to the reminder notice within three (3) business days after receipt thereof, the proposed Alterations shall be deemed approved. Provided that Tenant is not in breach of any of its obligations under the Existing Lease beyond any notice or cure period(s), Tenant shall be entitled to an allowance (the "Suite Nos. G, H & J Expansion Space Improvement Allowance") in an amount not to exceed the sum of $256,230.00 (i.e., $30.00 per rentable square foot of the Suite Nos. G, H & J Expansion Space) for the costs (the "Suite Nos. G, H & J Expansion Space Improvement Costs") relating to the design, permitting and construction of Tenant's improvements which are permanently affixed to the Suite Nos. G, H & J Expansion Space (the "Suite Nos. G, H & J Expansion Space Work"). As used herein the term "Suite Nos. G, H & J Expansion Space Improvement Costs" shall mean payments to contractors, subcontractors, architects, engineers and material suppliers for services, labor and materials with respect to the Suite Nos. G, H & J Expansion Space Work. Landlord shall be entitled to deduct from the Suite Nos. G, H & J Expansion Space Improvement Allowance a construction management fee for Landlord's oversight of the improvements in an amount equal to 3% of the total hard costs of the improvements. The Suite Nos. G, H & J Expansion Space Improvement Allowance (or so much of same as qualifies for disbursement under this Section 6(b)) shall be paid to Tenant in a single-lump sum following the date that Tenant has satisfied all of the following conditions: (i) Tenant has delivered to Landlord reasonable evidence of the amounts so incurred and paid by Tenant in connection with the refurbishment of the Suite Nos. G, H & J Expansion Space; (ii) Tenant shall have provided Landlord the final unconditional lien waivers and releases from all parties providing labor or materials on behalf of Tenant at the Suite Nos. G, H & J Expansion Space in a form reasonably satisfactory to Landlord; (iii) Tenant shall have provided as-built drawings (.pdf and CAD formats) for the Suite Nos. G, H & J Expansion Space Work; and (iv) the Suite Nos. G, H & J Expansion Space Work shall have been completed in compliance with the requirements imposed on Alterations pursuant to Section 7.3 of the Existing Lease. If Tenant does not submit a request for disbursement of the entire Suite Nos. G, H & J Expansion Space Improvement Allowance in accordance with the provisions contained in this Section 6(b) by August 31, 2022, the Suite Nos. G, H & J Expansion Space Improvement Expansion Space Improvement Allowance, or any unused portion thereof, shall be forfeited and shall accrue for the sole benefit of Landlord.

8. Early Access to Expansion Space. Tenant may enter the portion of the Suite Nos. G, H & J Expansion Space that constitutes Suite Nos. G & H as of the Effective Date of this Seventh Amendment, but any early entry into the portion of the Suite Nos. G, H & J Expansion Space that constitutes Suite No. J requires not less than forty-five (45) days prior written notice to Landlord. During any period that Tenant shall be permitted to enter the Suite Nos. G, H & J Expansion Space prior to the Suite Nos. G, H & J Expansion Effective Date (e.g., to perform alterations or improvements, if any), Tenant shall comply with all terms and provisions of the Existing Lease, except those provisions requiring payment of Base Rent or Additional Rent as to the Suite Nos. G, H & J Expansion Space. If Tenant takes possession of and occupies the Suite J Expansion Space prior to the Suite Nos. G, H & J Expansion Effective Date for any reason whatsoever (other than the performance of work in the Suite J Expansion Space with Landlord's prior approval), such possession shall be subject to all the terms and conditions of the Existing Lease and this Seventh Amendment, and Tenant shall pay Base Monthly Rent and Additional

Rent as applicable to the Suite J Expansion Space occupied to Landlord on a per diem basis for each day of occupancy prior to the Suite Nos. G, H & J Expansion Effective Date (such occupancy date is hereafter defined as the "Suite J Expansion Space Early Occupancy Date") in accordance with Paragraphs 2 and 3 of the Suite J Expansion Space Early Occupancy Date Letter (whether or not the same is delivered to Tenant). At Landlord's option, promptly after the determination of the Suite J Expansion Space Early Occupancy Date, if any, Landlord and Tenant shall execute and deliver a commencement letter in the form attached hereto as Exhibit B (the "Suite J Expansion Space Early Occupancy Date Letter"). Tenant's failure to execute and return the Suite J Expansion Space Early Occupancy Date Letter, or to provide written objection to the statements contained in the Suite J Expansion Space Early Occupancy Date Letter, within thirty (30) days after the date such Suite J Expansion Space Early Occupancy Date Letter is delivered to Tenant, if at all, shall be deemed an approval by Tenant of the statements contained therein.

9. Parking. For the period commencing with the Suite Nos. G & H Expansion Effective Date and continuing through the Second Extended Expiration Date, in addition to the parking spaces available to Tenant for the Existing Premises in accordance with the Existing Lease, Tenant shall be entitled to up to twenty-five (25) unreserved off-street parking spaces (i.e., 3 spaces per 1,000 rentable square feet of the Suite Nos. G, H & J Expansion Space) in the surface lot serving the Building at no additional cost to Tenant.

10. April 21, 2000 Letter Agreement. The parties acknowledge and agree that (a) neither party currently has a copy of or knows the terms of the April 21, 2000 Letter Agreement, (b) to the extent such a copy is located by either party, such party shall provide such copy to the other party, and (c) both parties agree to remain bound by the terms of the April 21, 2000 Letter Agreement.

11. Brokers. Tenant shall be solely responsible for any commission, fees or costs payable to any real estate broker, sales person or finder claiming to have represented Tenant in connection with this Seventh Amendment, any future amendment to the Lease and/or Tenant's exercise of any extension option or right of first refusal contained in the Existing Lease. Tenant shall indemnify, defend and hold Landlord harmless from and against any and all claims by any real estate broker, salesperson or finder claiming to have represented Tenant for a commission, finder's fee or other compensation in connection with this Seventh Amendment. Landlord shall be solely responsible for any commission, fees or costs payable to any real estate broker, sales person or finder claiming to have represented Landlord in connection with this Seventh Amendment, any future amendment to the Lease and/or Tenant's exercise of any extension option or right of first refusal contained in the Existing Lease. Landlord shall indemnify, defend and hold Tenant harmless from and against any and all claims by any real estate broker, salesperson or finder claiming to have represented Landlord for a commission, finder's fee or other compensation in connection with this Seventh Amendment.

12. Inspection by a CASp in Accordance with Civil Code Section 1938. To Landlord's actual knowledge, the property being leased or rented pursuant to the Existing Lease (as amended by this Seventh Amendment) has not undergone inspection by a Certified Access Specialist (CASp). A Certified Access Specialist (CASp) can inspect the subject premises and

determine whether the subject premises comply with all of the applicable construction-related accessibility standards under state law. Although state law does not require a CASp inspection of the subject premises, the commercial property owner or lessor may not prohibit the lessee or tenant from obtaining a CASp inspection of the subject premises for the occupancy or potential occupancy of the lessee or tenant, if requested by the lessee or tenant. The parties shall mutually agree on the arrangements for the time and manner of the CASp inspection, the payment of the fee for the CASp inspection, and the cost of making any repairs necessary to correct violations of construction-related accessibility standards within the premises. The foregoing verification is included in this Seventh Amendment solely for the purpose of complying with California Civil Code Section 1938 and, except as otherwise expressly stated above, shall not in any manner affect Landlord's and Tenant's respective responsibilities for compliance with construction-related accessibility standards as provided under the Existing Lease.

13. OFAC. Tenant represents and warrants to Landlord that Tenant is currently in compliance with and shall at all times during the Term of the Existing Lease remain in compliance with the regulations of the Office of Foreign Asset Control ("OFAC") of the Department of the Treasury and any statute, executive order (including the September 24, 2001, Executive Order Blocking Property and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism), or other governmental action relating thereto.

14. Counterparts; PDF. This Seventh Amendment may be executed in multiple counterparts each of which is deemed an original but together constitute one and the same instrument. This Seventh Amendment may be executed in so-called "pdf" format and each party has the right to rely upon a pdf counterpart of this Seventh Amendment signed by the other party to the same extent as if such party had received an original counterpart.

15. Authority. This Seventh Amendment shall be binding upon and inure to the benefit of the parties, their respective heirs, legal representatives, successors and assigns. Each party hereto and the persons signing below warrant that the person signing below on such party's behalf is authorized to do so and to bind such party to the terms of this Seventh Amendment.

16. Status of Existing Lease. Except as amended hereby, the Existing Lease is unchanged, and, as amended hereby, the Existing Lease remains in full force and effect.

IN WITNESS WHEREOF, Landlord and Tenant have entered into this Seventh Amendment as of the date first set forth above.

Landlord: POINT RICHMOND R&D ASSOCIATES II, LLC,
a California limited liability company

By: Wareham-NZL, LLC, its Manager

By: /s/ Richard K. Robbins

Its Manager

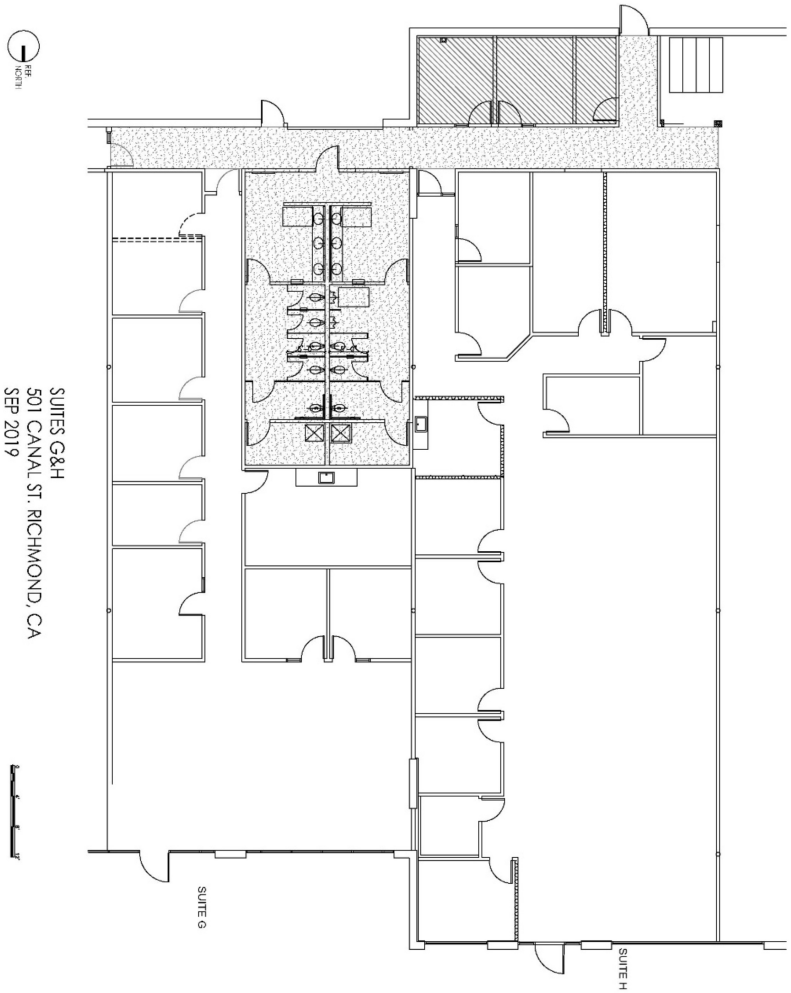
Tenant: SANGAMO THERAPEUTICS, INC.,

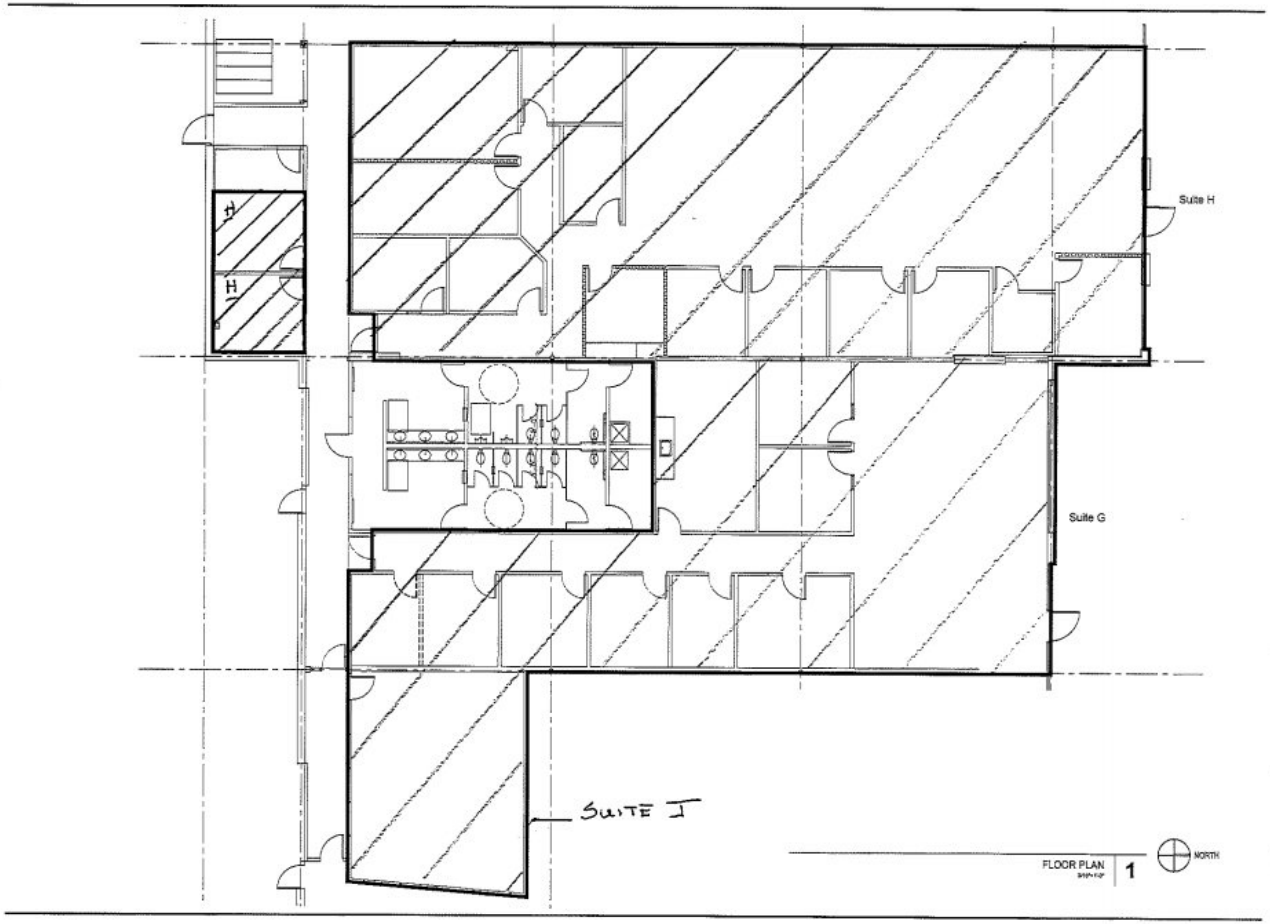
a Delaware corporation
By:

Name: Sandy Macrae
Title: CEO

EXHIBIT A

SUITE NOS. G, H & J EXPANSION SPACE





Roland Lazzarotto
Architect

CONSULTANT

STAMPS

ISSUE / REVISIONS

PROJECT

SUITE J

501 CANAL STREET,
RICHMOND, CA

KEY PLAN

EXISTING FLOOR PLAN

J-1

PROJECT NO.

SHEET NO.

EXHIBIT B

SUITE J EXPANSION SPACE EARLY OCCUPANCY DATE LETTER

Date: _____

Tenant: _____
Address: _____
_____
_____

Re: Suite J Expansion Space Early Occupancy Date Letter with respect to that certain Seventh Amendment to Lease dated as of May __, 2020 (the "Amendment"), by and Point Richmond R&D Associates II, LLC, a California limited liability company, as Landlord, and Sangamo Therapeutics, Inc., a Delaware corporation (formerly known as Sangamo Biosciences, Inc., a Delaware corporation), as Tenant, for approximately 700 rentable square known as Suite J within building located at 501 Canal Boulevard, Point Richmond, California.

Dear Tenant:

Capitalized terms used in this Suite J Expansion Space Early Occupancy Date Letter and not otherwise defined herein shall have the meanings given such terms in the Amendment. In accordance with the terms and conditions of the Amendment, Tenant accepts possession of the Suite J Expansion Space and acknowledges that:

1. The Suite J Expansion Space Early Occupancy Date under the Amendment is _____, 2020.

2. As of the Suite J Expansion Space Early Occupancy Date, Tenant's Base Monthly Rent under the Lease is increased by $1,750.00, calculated on a daily basis from the Suite J Expansion Space Early Occupancy Date through the day before the Suite Nos. G, H & J Expansion Effective Date.

3. As of the Suite J Expansion Space Early Occupancy Date, Tenant's Pro Rata Share for the Premises is increased by 0.86%, calculated on a daily basis from the Suite J Expansion Space Early Occupancy Date through the day before the Suite Nos. G, H & J Expansion Effective Date.

4. As of the Suite Nos. G, H & J Expansion Effective Date, the provisions of Sections 3 and 5 of the Amendment shall apply in lieu of Paragraphs 2 and 3 above, because as of that date, the Suite J Expansion Space shall be reflected in the Base Monthly Rent and Tenant's Pro Rata Share as shown in those Sections 3 and 5.

Please acknowledge the foregoing and your acceptance of possession of the Suite J Expansion Space by signing all three (3) counterparts of this Suite J Expansion Space Early Occupancy Date Letter in the space provided and returning two (2) fully executed counterparts to my attention. Tenant's failure to execute and return this Suite J Expansion Space Early Occupancy Date Letter, or to provide written objection to the statements contained in this Suite J Expansion Space Early Occupancy Date Letter, within thirty (30) days after the date this Suite J

Expansion Space Early Occupancy Date Letter is delivered shall be deemed an approval by Tenant of the statements contained herein.

Sincerely,

_____
Authorized Signatory

Acknowledged and Accepted:

Tenant:

Sangamo Therapeutics, Inc.,
a Delaware corporation
By: _____
Name: _____
Title: _____
Date: _____

EIGHTH AMENDMENT TO LEASE

THIS EIGHTH AMENDMENT TO LEASE (this "Eighth Amendment") is entered into as of May 29, 2020 (the "Effective Date"), by and between POINT RICHMOND R&D ASSOCIATES II, LLC, a California limited liability company ("Landlord"), and SANGAMO THERAPEUTICS, INC., a Delaware corporation (formerly known as Sangamo Biosciences, Inc., a Delaware corporation) ("Tenant"), with reference to the following facts:

A. Landlord and Tenant entered into that certain Triple Net Laboratory Lease dated as of May 23, 1997, together with an Addendum thereto dated May 28, 1997 (collectively, the "Original Lease"), as amended by those certain letter agreements dated June 15, 1999, April 21, 2000 and November 3, 2000, that certain First Amendment to Lease dated March 12, 2004, that certain Lease Addendum dated December 12, 2006 , that certain Second Amendment to Lease dated March 15, 2007, that certain Lease Addendum III dated April 2, 2012 , that certain Third Amendment to Lease dated August 1, 2013, that certain Lease Addendum dated December 1, 2013 , that certain Fourth Amendment to Lease dated June 10, 2016, that certain Fifth Amendment to Lease dated July 10, 2017, that certain Sixth Amendment to Lease dated May 11, 2018 (the "Sixth Amendment"), and that certain Seventh Amendment to Lease dated May 20, 2020, pursuant to which Tenant leases certain premises consisting of approximately 46,488 rentable square feet known as Suites A, B, C-1, C-2, F, G, H and J, in the building located at 501 Canal Boulevard, Point Richmond, California. The Original Lease, as so amended, is collectively referred to herein as the "Existing Lease".

B. Tenant has requested that Landlord extend the date by which Tenant must apply to receive the Suites A, B and C-1 Allowances (as defined in the Sixth Amendment), and Landlord is willing to do the same on the following terms and conditions.

NOW, THEREFORE, in consideration of the foregoing, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Incorporation of Recitals and Defined Terms. The Recitals above are hereby incorporated herein. As of the Effective Date, unless context clearly indicates otherwise, all references to "the Lease" or "this Lease" in the Existing Lease or in this Eighth Amendment shall be deemed to refer to the Existing Lease, as amended by this Eighth Amendment. Capitalized terms which are not otherwise defined in this Eighth Amendment shall have the meanings set forth in the Existing Lease.

2. Suites A, B and C-1 Allowances. Section 1.2 of Exhibit A to the Sixth Amendment is hereby amended to change the date therein from "August 31, 2021" to "November 30, 2021".

3. Counterparts; PDF. This Eighth Amendment may be executed in multiple counterparts each of which is deemed an original but together constitute one and the same instrument. This Eighth Amendment may be executed in so-called "pdf" format and each party

has the right to rely upon a pdf counterpart of this Eighth Amendment signed by the other party to the same extent as if such party had received an original counterpart.

4. Status of Existing Lease. Except as amended hereby, the Existing Lease is unchanged, and, as amended hereby, the Existing Lease remains in full force and effect.

IN WITNESS WHEREOF, Landlord and Tenant have entered into this Eighth Amendment as of the date first set forth above.

Landlord: POINT RICHMOND R&D ASSOCIATES II, LLC,
a California limited liability company
By: Wareham-NZL, LLC, its Manager
By: /s/ Richard K. Robbins

Its Manager

Tenant: SANGAMO THERAPEUTICS, INC.,

a Delaware corporation
By: Sung Lee

Name: Sung Lee
Title: EVP & CEO

Exhibit 31.1

CERTIFICATION

I, Alexander D. Macrae, M.B., Ch.B., Ph.D., certify that:

1. I have reviewed this quarterly report on Form 10-Q of Sangamo Therapeutics, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 5, 2020

/s/ ALEXANDER D. MACRAE

Alexander D. Macrae, M.B., Ch.B., Ph.D.

President and Chief Executive Officer

(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Sung H. Lee, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Sangamo Therapeutics, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 5, 2020

/s/ SUNG H. LEE

Sung H. Lee

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

Exhibit 32.1

Certifications Pursuant to 18 U.S.C. §1350, as Adopted

Pursuant to §906 of the Sarbanes-Oxley Act of 2002

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), each of the undersigned hereby certifies in his capacity as an officer of Sangamo Therapeutics, Inc. (the "Company"), that, to the best of his knowledge:

(1) the Company's Quarterly Report on Form 10-Q for the period ended June 30, 2020, to which this Certification is attached as Exhibit 32.1 (the "Report") fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ ALEXANDER D. MACRAE

Alexander D. Macrae, M.B., Ch.B., Ph.D.

President and Chief Executive Officer

(Principal Executive Officer)

Date: August 5, 2020

/s/ SUNG H. LEE

Sung H. Lee

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

Date: August 5, 2020

This certification accompanies the Quarterly Report on Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Sangamo Therapeutics, Inc. under the Securities Act of 1933, as amended, or the Exchange Act (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing. A signed original of this written statement required by Section 906 of the Sarbanes-Oxley Act of 2002 has been provided to Sangamo Therapeutics, Inc. and will be retained by Sangamo Therapeutics, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.