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 September 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 October 30, 2020, 141,441,378 shares of the issuer's common stock, par value $0.01 per share, were outstanding.

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SANGAMO THERAPEUTICS, INC.

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)

	September 30, 2020	December 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 259,393	$ 80,428
Marketable securities	389,434	282,046
Interest receivable	822	682
Accounts receivable	39,487	36,909
Prepaid expenses and other current assets	11,158	5,408
Total current assets	700,294	405,473
Marketable securities, non-current	45,761	21,832
Property and equipment, net	35,282	29,926
Intangible assets	55,569	53,156
Goodwill	40,984	39,273
Operating lease right-of-use assets	71,637	77,289
Other non-current assets	12,683	9,067
Restricted cash	1,500	1,500
Total assets	$ 963,710	$ 637,516
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	$ 17,897	$ 17,556
Accrued compensation and employee benefits	17,873	13,605
Deferred revenues	87,791	38,711
Total current liabilities	123,561	69,872
Deferred revenues, non-current	267,903	81,432
Long-term portion of lease liabilities	38,259	41,192
Deferred income tax	6,868	6,570
Other non-current liabilities	6,238	5,711
Total liabilities	442,829	204,777
Commitments and contingencies		
Stockholders' equity:		
Preferred stock	—	—
Common stock	1,412	1,160
Additional paid-in capital	1,255,823	1,090,828
Accumulated deficit	(737,377)	(656,985)
Accumulated other comprehensive income (loss)	1,553	(2,449)
Total Sangamo Therapeutics, Inc. stockholders' equity	521,411	432,554
Non-controlling interest	(530)	185
Total stockholders' equity	520,881	432,739
Total liabilities and stockholders' equity	$ 963,710	$ 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 September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenues	$ 57,763	$ 21,958	$ 92,392	$ 47,577
Operating expenses:				
Research and development	45,287	36,288	128,289	107,593
General and administrative	16,177	14,918	50,223	46,633
Total operating expenses	61,464	51,206	178,512	154,226
Loss from operations	(3,701)	(29,248)	(86,120)	(106,649)
Interest and other income, net	2,430	1,887	5,910	6,729
Loss before taxes	(1,271)	(27,361)	(80,210)	(99,920)
Income tax expense	(237)	—	(237)	—
Net loss	(1,508)	(27,361)	(80,447)	(99,920)
Net income (loss) attributable to non-controlling interest	42	(54)	(55)	(179)
Net loss attributable to Sangamo Therapeutics, Inc. stockholders	$ (1,550)	$ (27,307)	$ (80,392)	$ (99,741)
Basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	$ (0.01)	$ (0.24)	$ (0.61)	$ (0.90)
Shares used in computing basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	141,100	115,710	132,079	110,837

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Net loss	$ (1,508)	$ (27,361)	$ (80,447)	$ (99,920)
Foreign currency translation adjustment	3,839	(4,077)	3,989	(4,139)
Change in unrealized (loss) gain on available-for-sale securities	(633)	(59)	13	678
Comprehensive income (loss)	1,698	(31,497)	(76,445)	(103,381)
Comprehensive income (loss) attributable to non-controlling interest	42	(54)	(55)	(179)
Comprehensive income (loss) attributable to Sangamo Therapeutics, Inc.	$ 1,656	$ (31,443)	$ (76,390)	$ (103,202)

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 September 30, 2020						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balances at June 30, 2020	140,973,277	$ 1,410	$ 1,247,527	$ (735,827)	$ (1,653)	$ (251)	$ 511,206
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	239,553	2	1,614	—	—	—	1,616
Stock-based compensation	—	—	6,682	—	—	—	6,682
Acquisition of additional shares of Sangamo France	—	—	—	—	—	(321)	(321)
Foreign currency translation adjustment	—	—	—	—	3,839	—	3,839
Net unrealized loss on marketable securities	—	—	—	—	(633)	—	(633)
Net (loss) income	—	—	—	(1,550)	—	42	(1,508)
Balances at September 30, 2020	141,212,830	$ 1,412	$ 1,255,823	$ (737,377)	$ 1,553	$ (530)	$ 520,881

	Nine Months Ended September 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	648,660	6	2,462	—	—	—	2,468
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	—	—	—	—	—	(660)	(660)
Stock-based compensation	—	—	19,066	—	—	—	19,066
Foreign currency translation adjustment	—	—	—	—	3,989	—	3,989
Net unrealized gain on marketable securities	—	—	—	—	13	—	13
Net loss	—	—	—	(80,392)	—	(55)	(80,447)
Balances at September 30, 2020	141,212,830	$ 1,412	$ 1,255,823	$ (737,377)	$ 1,553	$ (530)	$ 520,881

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 September 30, 2019						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balance at June 30, 2019	115,603,096	$ 1,156	$ 1,078,976	$ (634,233)	$ (765)	$ 614	$ 445,748
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	166,902	2	702	—	—	—	704
Issuance of common stock under public offering, net of issuance costs				—	—	(321)	(321)
Issuance costs related to Sangamo France Acquisition	—	—	(7)	—	—	—	(7)
Stock-based compensation	—	—	4,701	—	—	—	4,701
Foreign currency translation adjustment	—	—	—	—	(4,077)	—	(4,077)
Net unrealized loss on marketable securities	—	—	—	—	(59)	—	(59)
Net loss	—	—	—	(27,307)	—	(54)	(27,361)
Balances at September 30, 2019	115,769,998	$ 1,158	$ 1,084,372	$ (661,540)	$ (4,901)	$ 239	$ 419,328

	Nine Months Ended September 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	800,818	8	3,355	—	—	—	3,363
Issuance of common stock under employee stock purchase plan	131,709	1	1,138	—	—	—	1,139
Issuance of common stock under public offering, net of issuance costs	12,650,000	127	136,181	—	—	—	136,308
Acquisition of additional shares of Sangamo France	—	—	—	—	—	(321)	(321)
Issuance costs related to Sangamo France Acquisition	—	—	(25)	—	—	—	(25)
Stock-based compensation	—	—	14,091	—	—	—	14,091
Foreign currency translation adjustment	—	—	—	—	(4,139)	—	(4,139)
Net unrealized gain on marketable securities	—	—	—	—	678	—	678
Net loss	—	—	—	(99,741)	—	(179)	(99,920)
Balances at September 30, 2019	115,769,998	$ 1,158	$ 1,084,372	$ (661,540)	$ (4,901)	$ 239	$ 419,328

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

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

	Nine Months Ended September 30,	
	2020	**2019**
Operating Activities:		
Net loss	$ (80,447)	$ (99,920)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Depreciation and amortization	3,999	2,742
Amortization of discount on marketable securities	(1,344)	(3,715)
Amortization and other changes in operating lease right-of-use assets	5,706	3,796
Gain on free shares	(31)	(488)
Stock-based compensation	19,066	14,091
Loss on disposal of property and equipment	197	—
Net loss on lease termination	—	218
Other	—	(29)
Net changes in operating assets and liabilities:		
Interest receivable	(140)	(305)
Accounts receivable	(2,578)	(17,280)
Prepaid expenses and other assets	(9,098)	(4,734)
Accounts payable and accrued liabilities	1,336	(1,753)
Accrued compensation and employee benefits	4,186	1,608
Deferred revenues	235,551	(20,477)
Long-term portion of lease liabilities	(2,760)	(920)
Other non-current liabilities	527	3,580
Net cash provided by (used in) operating activities	174,170	(123,586)
Investing Activities:		
Purchases of marketable securities	(335,002)	(321,390)
Maturities of marketable securities	205,039	292,147
Purchases of property and equipment	(10,703)	(13,894)
Purchase of additional shares of Sangamo France	(503)	(262)
Net cash used in investing activities	(141,169)	(43,399)
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	(573)	(388)
Proceeds from exercise of stock options and restricted stock units	3,041	3,751
Proceeds from issuance of common stock under employee stock purchase plan	1,187	1,139
Net cash provided by financing activities	146,181	140,810
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	(217)	48
Net increase (decrease) in cash, cash equivalents, and restricted cash	178,965	(26,127)
Cash, cash equivalents, and restricted cash, beginning of period	81,928	143,918
Cash, cash equivalents, and restricted cash, end of period	$ 260,893	$ 117,791
Supplemental disclosure of non-cash activities:		
Property and equipment included in unpaid liabilities	$ 899	$ 4,257
Right-of-use assets obtained in exchange for lease obligations	$ —	$ 29,647

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
September 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 of these financial statements for the periods presented have been included. Operating results for the three and nine months ended September 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 income (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 September 30, 2020, when combined with expected revenues from collaborations, strategic partnerships and research grants, will be adequate to fund its currently planned operations through at least the next 12 months from the date these 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.

During the three months ended March 31, 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. 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 application ("IND") transfer of the SB-525 product candidate to Pfizer, both of which resulted in an increase in the measure of proportional cumulative performance.

During the nine months ended September 30, 2020, the Company recorded adjustments to revenue related to changes in estimates in connection with the *C9ORF72* research collaboration and license agreement with Pfizer. These adjustments were 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 September 2020 increased revenue by $5.8 million, decreased net loss by $5.8 million and decreased the Company's basic net loss per share by $0.04 for the three months ended September 30, 2020.

The Pfizer and Sanofi-related adjustments increased revenue by $8.9 million, decreased net loss by $8.9 million and decreased the Company's basic net loss per share by $0.06 for the nine months ended September 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 the Company 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 September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Pfizer	68 %	16 %	51 %	11 %
Biogen	16 %	—	19 %	—
Kite Pharma, Inc.	13 %	40 %	24 %	55 %
Sanofi	3 %	40 %	4 %	29 %

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 September 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 September 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 September 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):

	September 30, 2020	December 31, 2019	September 30, 2019	December 31, 2018
Cash and cash equivalents	$ 259,393	$ 80,428	$ 114,291	$ 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	$ 260,893	$ 81,928	$ 117,791	$ 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 policies 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, and 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* ("ASU 2018-18"), 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, ASU 2018-18 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 the 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 the 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 the 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 the 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 measurements 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):

	September 30, 2020			
	Fair Value Measurements			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 172,508	$ 172,508	$ —	$ —
Commercial paper securities	5,999	—	5,999	—
Total	178,507	172,508	5,999	—
Marketable securities:				
Commercial paper securities	238,398	—	238,398	—
Corporate debt securities	122,484	—	122,484	—
Asset-backed securities	13,066	—	13,066	—
U.S. government-sponsored entity debt securities	61,247	—	61,247	—
Total	435,195	—	435,195	—
Total cash equivalents and marketable securities	$ 613,702	$ 172,508	$ 441,194	$ —
Free shares asset	$ 129	$ —	$ —	$ 129

	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 228,000 shares during the nine months ended September 30, 2020, of the 477,000 total free shares, for a cash payment of approximately $0.3 million and $0.5 million respectively, upon exercise of the put options. As of September 30, 2020, approximately 138,000 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 immaterial increase in the fair value of the free shares, offset by approximately $0.1 million for the shares purchased during the nine months ended September 30, 2020, resulting in an asset balance of approximately $0.1 million at September 30, 2020.

Free Shares valuation assumptions	September 30, 2020	December 31, 2019
Sangamo stock price (USD)	$ 10.31	$ 8.68
Sangamo France stock price (EUR)	€ 2.55	€ 2.14
EUR / USD exchange rate	0.84	0.91
Estimated correlation Sangamo and Sangamo France stock prices	100.0%	100.0%
Sangamo stock price (USD) volatility estimate	65.7%	72.5%
Sangamo France stock price (EUR) volatility estimate	65.7%	72.5%
EUR / USD exchange rate volatility estimate	6.4%	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
September 30, 2020				
Assets				
Cash equivalents:				
Money market funds	$ 172,508	$ —	$ —	$ 172,508
Commercial paper securities	5,998	1	—	5,999
Total	178,506	1	—	178,507
Marketable securities:				
Commercial paper securities	238,248	169	(19)	238,398
Corporate debt securities	122,364	156	(36)	122,484
Asset-backed securities	13,067	3	(4)	13,066
U.S. government-sponsored entity debt securities	61,171	76	—	61,247
Total	434,850	404	(59)	435,195
Total cash equivalents and marketable securities	$ 613,356	$ 405	$ (59)	$ 613,702
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):

	September 30, 2020	December 31, 2019
Maturing in one year or less	$ 389,434	$ 282,046
Maturing after one year through five years	45,761	21,832
Total	$ 435,195	$ 303,878

The Company had no realized losses of its available-for-sale securities for the three and nine months ended September 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 September 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 September 30, 2020.

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 September 30, 2020 and 2019 totaled 14,768,646 and 10,370,481, respectively.

NOTE 5—MAJOR CUSTOMERS, PARTNERSHIPS AND STRATEGIC ALLIANCES

Novartis Institutes for BioMedical Research, Inc.

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. Under the agreement, which was effective upon execution, the Company granted Novartis an exclusive, royalty bearing and worldwide license, under its relevant patents and know-how, to develop, manufacture and commercialize certain of its ZFP transcription factors ("ZFP-TFs") targeted to three undisclosed genes that are associated with certain neurodevelopmental disorders, including autism spectrum disorder and intellectual disability. The Company will perform early research activities over the collaboration period 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 adeno-associated viruses ("AAVs") for the sole purpose of developing, manufacturing and commercializing licensed products arising from the collaboration.

Under the agreement, Novartis paid the Company a $75.0 million upfront license fee in August 2020. In addition to this fee and the cost reimbursements for early research activities, 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 also has the right to terminate the agreement on account of the other party's bankruptcy or material, uncured breach.

All payments received under the agreement, when earned are non-refundable and non-creditable. The transaction price of $95.1 million includes the upfront license fee of $75.0 million and estimated research costs of $20.1 million to be provided over the estimated research period. All clinical or regulatory milestone amounts were considered fully constrained at inception of the agreement. 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.

The Company assessed the agreement with Novartis in accordance with ASC Topic 606 and concluded that Novartis is a customer. The Company has identified a single performance obligation within this arrangement as a license to the technology and ongoing research services. The Company concluded that the license is not discrete as it does not have stand-alone value to Novartis 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 research services through the estimated research period. 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 performance obligation. As of September 30, 2020, the Company had deferred revenue of $75.0 million related to this agreement.

No revenues have been recognized under the agreement as of September 30, 2020.

The Company paid $1.5 million for financial advisory fees during the quarter ended September 30, 2020, equal to 2% of $75.0 million received for the upfront license fee related to the collaboration and license agreement with Novartis. The Company recognized $1.5 million as a contract asset as such amount represents a cost of obtaining the agreement. This balance will be amortized and included in general and administrative costs on a systematic basis consistent with the transfer of the services to Novartis in accordance with ASC Topic 340, *Other Assets and Deferred Costs*.

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 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-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 September 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 September 30, 2020, the Company had deferred revenue of $190.5 million related to this agreement.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenue related to Biogen agreement:				
Recognition of license and stand-ready fee	$ 7,306	$ —	$ 14,050	$ —
Research services	2,315	—	3,749	—
Total	$ 9,621	$ —	$ 17,799	$ —

The Company paid $7.0 million for financial advisory fees during the nine months ended September 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 amortized $0.1 million and $0.3 million for the three and nine months ended September 30, 2020, respectively. 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 ongoing 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 September 30, 2020, and December 31, 2019, the Company had deferred revenue of $87.7 million and $106.5 million, respectively, related to this agreement.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenue related to Kite agreement:				
Recognition of license and stand-ready fee	$ 6,296	$ 6,296	$ 18,750	$ 18,682
Research services	998	2,565	3,185	7,551
Total	$ 7,294	$ 8,861	$ 21,935	$ 26,233

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, two milestones of $55.0 million in aggregate have been achieved, 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 September 30, 2020, the total transaction price under this agreement is $134.0 million, which represents the

upfront fee and research services fees of $79.0 million and two unconstrained milestones achieved of an aggregate amount of $55.0 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 constrained clinical or regulatory milestones have been included in the transaction price. 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 ongoing 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 ongoing 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 September 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 $1.2 million during the nine months ended September 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.

In September 2020, the Company determined that there was a high probability of achievement of a $30.0 million milestone with Pfizer for SB-525. The milestone was subsequently achieved upon dosing of the first subject in a Phase 3 clinical trial in early October 2020. The Company recognized on a cumulative basis approximately $29.8 million in the three and nine months ended September 30, 2020 related to this milestone. The balance of this milestone amount 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 nine months ended September 30, 2020 and 2019 were as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenue related to Pfizer SB-525 agreement:				
Recognition of upfront fee and research services	$ 221	$ 3,440	$ 2,737	$ 5,035
Milestone achievement	29,863	—	30,959	—
Total	$ 30,084	$ 3,440	$ 33,696	$ 5,035

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 nine months ended September 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 nine months ended September 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 ("ALS") 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 $17.0 million, which represents the upfront fees of $12.0 million and one unconstrained milestone in the amount of $5.0 million. None of the constrained clinical or regulatory milestones have not been included in the transaction price. 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 ongoing 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 ongoing research 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 September 30, 2020, and December 31, 2019, the Company had deferred revenue of $0.0 million and $8.0 million, respectively, related to this agreement.

In September 2020, the Company earned a $5.0 million milestone associated with the completion of the Company's research activities in its collaboration with Pfizer to develop gene regulation therapies using ZFP-TFs for the treatment of *C9ORF72*-related ALS and frontotemporal lobar degeneration. This milestone is achieved upon Pfizer's notification to the Company of its election to pay the first development milestone payment under the collaboration agreement. This milestone payment is non-refundable, and then upon payment, the term will be extended for two years for the selection of the lead

development compound. The Company recognized on a cumulative basis $5.0 million for the three and nine months ended September 30, 2020.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenue related to Pfizer *C9ORF72* agreement:				
Recognition of upfront fee	$ 4,200	$ 468	$ 7,985	$ 1,538
Milestone achievement	5,000	—	5,000	—
Total	$ 9,200	$ 468	$ 12,985	$ 1,538

During the nine months ended September 30, 2020, the Company recorded adjustments to revenue related to changes in estimate in connection with the *C9ORF72* collaboration agreement with Pfizer. These adjustments were 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. These adjustments increased revenue by $8.8 million, decreased net loss by $8.8 million and decreased the Company's basic net loss per share by $0.07 for the nine months ended September 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 constrained 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 ongoing 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 research 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 September 30, 2020, and December 31, 2019, the Company had deferred revenue of $1.7 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 $5.7 million as of September 30, 2020 attributed to this milestone as revenue and an immaterial revenue reversal related to a change in scope was recognized during the nine months ended September 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 $7.1 million as of September 30, 2020 attributed to this milestone as revenue and an immaterial revenue reversal related to a change in scope was recognized during the nine months ended September 30, 2020.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Revenue related to Sanofi agreement:				
Recognition of upfront fee	$ 321	$ 940	$ (28)	$ 2,594
Research services	961	1,814	3,836	5,169
Milestone achievement	216	—	(19)	—
Total	$ 1,498	$ 2,754	$ 3,789	$ 7,763

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 nine months ended September 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 September 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 September 30, 2020, and December 31, 2019, $6.2 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's provision for income taxes for interim periods is determined using an estimate of its annual effective tax rate, adjusted for discrete items, if any, that arise during the period. Each quarter, the Company updates its estimate of the annual effective tax rate, and if the estimated annual effective tax rate changes, the Company makes a cumulative adjustment in such period. In the nine months ended September 30, 2020 and 2019, the Company recorded income tax expense of $0.2 million and $0.0 million, respectively. The Company continues to maintain a full valuation allowance on its U.S. federal and state net deferred tax assets as the Company believes it is not more likely than not that the benefit will be realized. The tax expense for the nine months ended September 30, 2020 and 2019 was primarily due to foreign and state income tax expense.

On March 27, 2020, the Coronavirus Aid, Relief and Economic Security Act (the "CARES Act") was signed into law. The CARES Act includes provisions relating to net operating loss carryback periods, alternative minimum tax credit refunds, modifications to the net interest deduction limitations and technical corrections to tax depreciation methods for qualified improvement property. These provisions are not expected to have a material impact on the Company's Condensed Consolidated Financial Statements.

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 nine months ended September 30, 2020, the Company incurred $4.0 million and $7.7 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 $1.0 million and $1.6 million for the three and nine months ended September 30, 2020 and was not included in the measurement of the Company's operating ROU assets and lease liabilities. This 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 nine months ended September 30, 2020 was $4.7 million and was included in net cash provided by operating activities in the Company's Condensed Consolidated Statements of Cash Flows.

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

	Total
Three months ending December 31, 2020:	$ 1,100
2021	6,401
2022	6,479
2023	6,567
2024	6,705
Thereafter	26,156
Total lease payments	53,408
Less:	
Imputed interest	(11,708)
Total	$ 41,700
Reported as of September 30, 2020:	
Operating lease liabilities - current (included in Accounts payable and accrued liabilities on the Condensed Consolidated Balance Sheet)	$ 3,441
Operating lease liabilities - long-term	38,259
Total	$ 41,700

As of September 30, 2020, the weighted-average remaining lease term is 8.1 years and the weighted-average incremental borrowing rate used to determine the operating lease liability was 6.2% for the Company's operating leases.

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 expires in August 2026. Total lease payments over the life of this amended lease 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 October 1, 2020. Therefore, the lease is not included in the Company's operating lease ROU asset or operating lease liabilities as of September 30, 2020.

The Company does not have any financing leases.

Contractual Commitments

The following table sets forth the non-cancelable material contractual commitments under manufacturing-related supplier arrangements as of September 30, 2020 (in thousands):

Party	Total commitments	Expiry date
Brammer Bio MA - a Thermo Fisher Scientific Inc. subsidiary	$ 9,314	December 2021
Lonza Netherlands, B.V.	14,999	December 2022
Total contractual commitments	$ 24,313	

The Company also had $1.9 million of license obligations related to its intellectual property as of September 30, 2020.

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 nine months ended September 30, 2020 and 2019 (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2020	2019	2020	2019
Research and development	$ 3,573	$ 2,268	$ 9,990	$ 7,329
General and administrative	3,109	2,433	9,076	6,762
Total stock-based compensation expense	$ 6,682	$ 4,701	$ 19,066	$ 14,091

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 $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.

At-the-Market Offering Agreement

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. As of September 30, 2020, no shares have been sold under the sales agreement.

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"). During 2019, the Company acquired approximately 111,000 vested free shares upon exercise of the put options, increasing its ownership of the Ordinary Shares from 98.2% to 98.7%. During the nine months ended September 30, 2020, the Company acquired approximately 228,000 vested free shares, including 132,700 from a former executive of Sangamo, pursuant to the exercise of the put options for approximately $0.5 million of cash, increasing its ownership of the Ordinary Shares to 99.4% as September 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 $0.1 million as of September 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 nine months ended September 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 September 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 September 30, 2020 was as follows (in thousands):

	Total
Balance at December 31, 2019	$ 185
Fair value of additional shares acquired	(660)
Loss attributable to non-controlling interest	(55)
Balance at September 30, 2020	$ (530)

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 in conjunction with our Condensed Consolidated Financial Statements and accompanying notes included in this report and the Consolidated Financial Statements and accompanying notes thereto included 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.

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 genomic medicines. We have used this knowledge to advance a genomic medicine 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

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 October 2020, Pfizer dosed the first patient in the registrational Phase 3 AFFINE (efficAcy and saFety Factor vIii geNe thErapy in hemophilia A patients) study. The AFFINE study is an open-label, multicenter, single arm study to evaluate the efficacy and safety of a single infusion of giroctocogene fitelparvovec in more than 60 adult (ages 18-64 years) male participants with moderately severe to severe hemophilia A. Eligible study participants will have completed at least six months of routine Factor VIII, or FVIII, prophylaxis therapy during the lead-in Phase 3 study in order to collect pretreatment data for efficacy and selected safety parameters. The primary endpoint is impact on annualized bleeding rate, or ABR, through 12 months following treatment. This will be compared to ABR while on Factor VIII replacement therapy collected in the Phase 3 lead-in study, which will provide a baseline for Phase 3 study participants. The secondary endpoints include FVIII activity level after the onset of steady state, over 12 months. Participants will be analyzed throughout the 5-year study period following the single infusion to further assess durability of efficacy and safety. Pfizer has announced that it expects a pivotal data readout from the AFFINE study in 2022 and a potential commercial launch of giroctocogene fitelparvovec in 2023. In October 2020, we earned a $30.0 million milestone from Pfizer in connection with the initiation of the AFFINE study, which we expect to receive in the fourth quarter of 2020.

In September 2020, Pfizer presented updated data from the Phase 1/2 Alta study evaluating giroctocogene fitelparvovec in adult males with severe hemophilia A. The data showed sustained clinically meaningful FVIII activity levels reflecting a geometric mean of approximately 71% between weeks nine and 52 in patients treated with a dose of 3E13 vg/kg of giroctocogene fitelparvovec, the highest dose cohort. Patients with data beyond 52 weeks show sustained FVIII levels, up to 85 weeks for the longest treated patient. Importantly, there have been no bleeds and no need for prophylactic factor with this treated cohort. Pfizer has announced that it expects to present further follow-up data from the Alta study in the next few months when all five patients in the high dose cohort have been followed for at least one year and additional follow-up data over the next year and a half.

We are evaluating our wholly owned gene therapy, ST-920, for the treatment of Fabry disease, a rare IMD. The goal of this gene therapy is to provide a predictable and durable expression of the α-Gal-A enzyme, which is deficient in patients with Fabry disease due to mutations in the *GLA* gene, resulting in the accumulation of the substrates Gb3 and its soluble derivative lyso-Gb3. We are currently conducting the Phase 1/2 STAAR study, an open-label, multicenter, dose-ascending clinical trial, evaluating the safety and tolerability of ST-920 in adult males with classic Fabry disease. Study participants will receive a single intravenous infusion of ST-920 followed by one year of observation and monitoring of clinical endpoints such as α-Gal A activity and assessment of Gb3 and lyso-Gb3 levels. We will also be conducting a long-term follow-up study to monitor patients for an additional four years. In August and September 2020, we completed dosing of the first and second patients, which comprises the first cohort in the STAAR study, and enrollment of patients in the second cohort is ongoing. We expect to share initial data from the STAAR study toward the end of 2021 after we have identified a dose for cohort expansion. We believe that ST-920 may offer a potentially differentiated treatment for Fabry disease with the potential to deliver efficacy with preserved renal function and reduced cardiac morbidity and neuropathy. As a liver-directed gene therapy, ST-920 does not require any preconditioning regimen for patients.

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. We continue to receive the necessary regulatory approvals which we believe will allow us to initiate in 2021 the first-in-human Phase 1/2 STEADFAST clinical study evaluating TX200 in kidney transplantation. The goal for this study is the prevention of transplant rejection through the engineering of CAR-Tregs to express an HLA-A2 Chimeric Antigen Receptor, or CAR, allowing the CAR-Tregs to localize to the renal graft and activate upon recognition of the HLA-A2 antigen. The CAR-Tregs may prevent immune-mediated rejection through the inhibition and modulation of inflammatory immune cells and the release of anti-inflammatory cytokines to induce a tolerogenic environment within the graft. We presented preclinical data last month demonstrating that the TX200 HLA-A2 CAR-Tregs efficiently prevented rejection in both graft-versus-host-disease and skin transplantation models. They were also shown to be safe and well tolerated in our *in vivo* studies.

Similar to other genetically engineered cell therapy approaches, patients will undergo a leukapheresis procedure, from which their Treg cells will be isolated and engineered then cryopreserved. The HLA-A2 negative patients will subsequently undergo transplantation surgery and following a recovery period, will receive their personalized TX200 drug-candidate. As a result of this detailed process, we expect dosing of the first patient in the STEADFAST study will occur several months after study initiation and patient enrollment.

In collaboration with our partner Sanofi S.A., or Sanofi, we are also evaluating cell therapies to treat sickle cell disease (BIVV003) and transfusion dependent beta thalassemia (ST-400). Sanofi has announced that it expects to share in 2021 the first clinical trial data readout from the Phase 1/2 PRECIZN-1 study evaluating BIVV003. We anticipate sharing at the same time follow-up clinical trial data from the Phase 1/2 Thales study evaluating ST-400.

In collaboration with our partner Kite Pharma, Inc., or Kite, a division of Gilead Sciences, Inc., we are also evaluating KITE-037, an allogeneic anti-CD19 CAR-T cell therapy to treat cancer. Kite expects to submit an investigational new drug application, or IND, by the end of 2020, and to initiate a clinical trial evaluating KITE-037 in 2021.

In collaboration with our partner Pfizer, we are developing potential gene therapies that use ZFP-TFs to treat amyotrophic lateral sclerosis, or ALS, and frontotemporal lobar degeneration linked to mutations of the *C9ORF72* gene. In September 2020, we earned a $5.0 million milestone from Pfizer associated with this program and also completed our research obligations under the program. We expect to receive the payment from Pfizer in the fourth quarter of 2020.

In July 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 for three neurodevelopmental disorder gene targets. Under the collaboration 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, IND-enabling studies, clinical development, regulatory approvals, manufacturing of preclinical, clinical and approved products, and global commercialization. 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 paid us a $75.0 million upfront license fee, which we received in the third quarter. 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.

We are currently building a cGMP manufacturing facility in our headquarters building in Brisbane, California to manufacture Phase 1/2 clinical trial supplies for our gene therapy and cell therapy pipeline and potentially collaboration programs. We expect the gene therapy manufacturing facility 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. To comply with these orders, we implemented an operating plan to continue business operations during the ongoing COVID-19 pandemic, including enhanced workplace safety protocols and modified working schedules in our laboratories. Office-based employees have been predominantly and working from home since March 2020 and continue to do so. These modifications have slowed our productivity and disrupted our business to a moderate degree and could continue to do so in the future. 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. Such disruptions could impact our ability to support our biopharmaceutical partners as contemplated in our collaboration agreements.

Additionally, our business partners, including biopharmaceutical collaborators and clinical trial sites, have also modified their operations in ways which have disrupted our business and may continue to do so. For example, our clinical study timelines for our Fabry and TX200 programs have periodically required adjustment due to COVID-19 impacts and the diversion of healthcare resources to fight the pandemic. While we have been working with our business partners to minimize any impact of COVID-19 on clinical trials and research and development operations conducted by us and our collaborators, we do expect that at least some of our programs will nonetheless experience delays and disruptions in the future due to COVID-19 impacts on the operations of us and our partners. These delays and disruptions have in the past and could in the future relate to clinical site

initiation, patient recruitment and enrollment or dosing of subjects. Some subjects and clinical study staff may not be able or willing to comply with clinical trial protocols if quarantines impede movement or interrupt healthcare services. We are not presently aware of supply shortages related to COVID-19 that we anticipate will affect our or our business partners' clinical trials or research operations.

Going forward, we will continue to monitor the impact of COVID-19 on our operations, research commitments and clinical trials and those of our business partners. The magnitude of these impacts will depend, in part, on the length and severity of the COVID-19 pandemic and related government orders and restrictions, and how the pandemic limits the ability of us and our business partners to operate business in the ordinary course. Disruptions to these operations, 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 and 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 delays and disruptions could result in adverse material impacts to our business, operating results and financial condition.

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 in the near term to execute on our wholly owned and partnered research and clinical programs. We ended the third quarter of 2020 with $694.6 million in cash, cash equivalents and marketable securities. Although we believe we are well capitalized currently, the effects of the evolving pandemic could result in disruption of global financial markets, impairing our ability to access capital, which could in the future negatively affect our liquidity. 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.

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. 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 quarantine and shelter-in-place orders or other restrictions. 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.

See also the section titled "Risk Factors" included in Part II, Item 1A of this Quarterly Report on Form 10-Q 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 Nine Months Ended September 30, 2020 and 2019

Revenues

	Three Months Ended September 30, (in thousands, except percentage values)				Nine Months Ended September 30, (in thousands, except percentage values)			
	2020	2019	Change	%	2020	2019	Change	%
Revenues	$ 57,763	$ 21,958	$ 35,805	163%	$ 92,392	$ 47,577	$ 44,815	94%

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

The increase of $35.8 million in revenues for the three months ended September 30, 2020, compared to the same period in 2019, was primarily attributed to a $30.0 million milestone related to our hemophilia A collaboration agreement with Pfizer. The milestone event subsequently occurred in early October 2020 upon dosing of the first subject in the Phase 3 clinical trial. We recognized revenue related to this milestone during the three months ended September 30, 2020 due to the high probability of achievement assessed at the end of the reporting period. In addition, we earned a milestone of $5.0 million associated with the completion of our research activities in our *C9ORF72* collaboration agreement with Pfizer to develop gene regulation therapies using ZFP-TFs for the treatment of *C9ORF72*-related ALS and frontotemporal lobar degeneration.

The increase of $44.8 million in revenues for the nine months ended September 30, 2020, compared to the same period in 2019, was primarily attributed to $30.0 million and $5.0 million milestones as discussed above. In addition, we recognized revenues of $17.8 million in the nine months ended September 30, 2020 related to our collaboration agreement with Biogen. These increases were partially offset by a decrease of $10.0 million in revenue related to our agreement with Sanofi.

Operating expenses

	Three Months Ended September 30, (in thousands, except percentage values)				Nine Months Ended September 30, (in thousands, except percentage values)			
	2020	2019	Change	%	2020	2019	Change	%
Operating expenses:								
Research and development	$ 45,287	$ 36,288	$ 8,999	25%	$ 128,289	$ 107,593	$ 20,696	19%
General and administrative	16,177	14,918	1,259	8%	50,223	46,633	3,590	8%
Total operating expenses	$ 61,464	$ 51,206	$ 10,258	20%	$ 178,512	$ 154,226	$ 24,286	16%

Research and Development Expenses

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

The increase of $9.0 million in research and development expenses for the three months ended September 30, 2020, compared to the same period in 2019, was primarily driven by a $6.3 million increase in compensation expense as a result of increased headcount to support our programs, clinical trials and start-up of our manufacturing operations, and a $3.0 million increase in facility overhead costs as we ramp up our internal manufacturing operations. Stock-based compensation expense included in research and development expenses was $3.6 million and $2.3 million for the three months ended September 30, 2020 and 2019, respectively.

The increase of $20.7 million in research and development expenses for the nine months ended September 30, 2020, compared to the same period in 2019, was primarily driven by a $14.4 million increase in compensation expense as a result of increased headcount to support our programs, clinical trials and start-up of our manufacturing operations, and an $11.6 million increase in overhead costs as we ramp up our internal manufacturing operations. These increases were partially offset by a decrease of $4.4 million in clinical and manufacturing supply expenses due to timing of our trials and programs and a decrease of $1.2 million in travel and entertainment costs due to COVID-19 travel restrictions. Stock-based compensation expense included in research and development expenses was $10.0 million and $7.3 million for the nine months ended September 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 $1.3 million in general and administrative expenses for the three months ended September 30, 2020, compared to the same period in 2019, was primarily due to an increase of $1.9 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 $2.3 million in allocated facility and support costs. Stock-based compensation expense included in general and administrative expenses was $3.1 million and $2.4 million for the three months ended September 30, 2020 and 2019, respectively.

The increase of $3.6 million in general and administrative expenses for the nine months ended September 30, 2020, compared to the same period in 2019, was primarily due to an increase of $7.0 million in headcount driven compensation costs, and an increase of $3.6 million in professional fees. These increases were partially offset by a decrease of $6.0 million in allocated facility and support costs, and a decrease of $0.8 million in travel and entertainment costs due to COVID-19 travel restrictions. Stock-based compensation expense included in general and administrative expenses was $9.1 million and $6.8 million for the nine months ended September 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, increased by $0.5 million for the three months ended September 30, 2020, compared to the same period in 2019, primarily due to an increase of $2.0 million in foreign exchange gains as a result of higher foreign exchange rates. This increase was partially offset by a decrease of $1.6 million in interest income reflecting the significant decline in market interest rates.

Interest and other income, net, decreased by $0.8 million for the nine months ended September 30, 2020, compared to the same period in 2019, primarily due to a decrease of $3.8 million in interest income reflecting the decline in market interest rates, partially offset by an increase of $2.4 million in foreign exchange gains as a result of higher foreign exchange rates.

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 September 30, 2020, we had cash, cash equivalents, and marketable securities totaling $694.6 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 sale of 24,420,157 shares of common stock to Biogen, or the Biogen Shares, and our collaboration with Novartis, which became effective in July 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. 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 paid us a $75.0 million upfront license fee in August 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 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. To date, we have not sold any shares of our common stock under the sales agreement.

We currently believe that our available cash, cash equivalents and marketable securities, when combined with expected revenues from collaborations, strategic partnerships 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. 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 $174.2 million for the nine months ended September 30, 2020, primarily reflecting an increase in deferred revenues of $235.6 million due to cash received in connection with the Biogen collaboration agreement and the Novartis collaboration agreement, and $23.1 million of non-cash expenses related to stock-based compensation and depreciation, partially offset by our net loss of $80.4 million.

Investing activities

Net cash used in investing activities for the nine months ended September 30, 2020 was $141.2 million related to a net increase in purchase of marketable securities, and purchases of property and equipment.

Financing activities

Net cash provided by financing activities for the nine months ended September 30, 2020 was $146.2 million, primarily reflecting the $145.4 million estimated fair value of the Biogen Shares issued offset by $2.9 million of issuance costs related to the issuance, and an increase of $4.2 million related to proceeds from the exercise of stock options and restricted stock units and purchases under the employee stock purchase plan.

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, when combined with expected revenues from collaborations, 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. Although we believe we are well capitalized currently, the effects of the ongoing COVID-19 pandemic could result in significant disruption of global financial markets, impairing our ability to access capital, which could in the future negatively affect our

liquidity. 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

Our future minimum contractual obligations as of December 31, 2019 were reported in the 2019 Annual Report. Other than as described below, during the nine months ended September 30, 2020, there have been no other material changes outside the ordinary course of our business from the contractual obligations previously disclosed in the 2019 Annual Report.

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 expires in August 2026. Total lease payments over the life of this amended lease 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 October 1, 2020. Therefore, the lease is not included in our operating lease ROU asset or operating lease liabilities as of September 30, 2020.

In July 2020, we executed a manufacturing service agreement with Lonza Netherlands, B.V., pursuant to which we have had non-cancelable manufacturing obligations of $15.0 million as of September 30, 2020.

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 September 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 September 30, 2020. Based on that evaluation, as of September 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 quarter ended September 30, 2020 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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 revenues 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, such as the delays that have previously impacted clinical trial timelines for our Fabry and TX200 programs;
- 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. For example, we are aware of another company developing a gene therapy to treat hemophilia A whom the FDA recommended complete its Phase 3 study and submit two-year follow-up safety and efficacy data on all study participants notwithstanding the company's contention that it and the FDA had previously agreed on the extent of data necessary to support a Biologic License Application, or BLA.

Due to the novelty of certain of our 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 are 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 revenues 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 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. The evaluation of the commercial potential or target market for a particular product candidate is forward looking and based upon assumptions involving, for example and not limited to, market evolution, advances in disease standard of care, competition and reimbursement. This reliance on assumptions means that, if our assumptions prove to be inaccurate or incomplete, we may pursue opportunities that end up having a number of competitors that are more advanced than our product candidates, or we may relinquish valuable rights to a 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. 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 manufacturing facilities 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 are currently our manufacturing capacity by designing and building manufacturing facilities in Brisbane, California and Valbonne, France 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 facilities. 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 these facilities 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 manufacturing facilities 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 facilities 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 approved products, causing delays in conducting or completing clinical trials and obtaining regulatory approvals of our product candidates and challenging our ability to meet commercial demand for our approved products, which could harm our business.

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 and the disruption of our supply chain, with consequential reputational damage, risk of product liability and delays in conducting or completing clinical trials and/or obtaining regulatory approval. For example, the imposition of government orders, including quarantine and shelter-in-place orders related to COVID-19, is expected to continue to impact 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 heavily affected by the COVID-19 pandemic, 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, the investigation and remediation of any identified problems can cause development delays and substantial expense. In any event, any failure in the storage of the product or loss or disruption 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 cGMP compliant manufacturing facilities in Brisbane, California and Valbonne, France, they are 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 materially and adversely affect our business and operations, including at our primary research facilities, 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 materially and 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 slowed our productivity and disrupted our business to a moderate degree, and could continue to do so in the future, 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 material adverse impacts to our business, operating results and financial condition.

Additionally, our business partners, including biopharmaceutical collaborators and clinical trial sites, have also modified their operations in ways which have disrupted our business and may continue to do so. For example, our clinical study timelines for our Fabry and TX200 programs have periodically required adjustment due to COVID-19 impacts and the diversion of healthcare resources to fight the pandemic. While we have been working with our business partners to minimize any impact of COVID-19 on clinical trials and research and development operations conducted by us and our collaborators, we do expect that at least some of our programs will nonetheless experience delays and disruptions in the future due to COVID-19 impacts on the operations of us and our partners. These delays and disruptions have in the past and could in the future relate to clinical site initiation, patient recruitment and enrollment or dosing of subjects. Some subjects and clinical study staff may not be able or willing to comply with clinical trial protocols if quarantines impede movement or interrupt healthcare services.

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 heavily affected by the COVID-19 pandemic, and should they experience disruptions, such as temporary closures or suspension of services, we would likely experience delays in advancing these tests and trials.

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, the effects of the ongoing pandemic could result in significant disruption of global financial markets, impairing 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 remain highly uncertain and cannot be predicted with confidence at this time, such as the ultimate duration and severity of the pandemic, 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 revenues;
- 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, cash equivalents and marketable securities as of September 30, 2020, when combined with expected revenues from collaborations, 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 in this Quarterly Report on Form 10-Q 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, Takeda 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 are 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 ZFP 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 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 revenues 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 revenues 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. In addition, the effects of the COVID-19 pandemic have intensified our dependence on information technology systems as many of our critical business activities are currently being conducted remotely and our increase reliance on personnel working from home could increase our cybersecurity risk.

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 are 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. Under the formal withdrawal arrangements between the United Kingdom and the EU, the parties had until June 30, 2020 to agree to extend the transition period if required. No such extension was agreed to prior to such date. No agreement has yet been reached between the United Kingdom and the EU, and it may be the case that no formal customs and trading agreement will be reached prior to the expiry of the transition period on December 31, 2020.

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 revenues 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 be 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. 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 the issuance of such shares has already been registered under the Securities Act and are held by non-affiliates of ours. While Biogen agreed not to sell any of the shares that we issued to Biogen in April 2020 until the first anniversary of the effectiveness of the Biogen collaboration, 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 under the Securities Act any the shares we issued to 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

None.

ITEM 6. EXHIBITS

Exhibit number		Description of Document
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.
10.1#		2020 Employee Stock Purchase Plan of Sangamo Therapeutics, Inc. (incorporated by reference to Exhibit 99.1 to the registrant's registration statement on Form S-8, filed with the SEC on October 15, 2020).
10.2+		Collaboration and License Agreement between the Company and Novartis Institutes for BioMedical Research, Inc., dated July 27, 2020.
10.3+		Amendment No. 2 to Research Collaboration and License Agreement between the Company and Pfizer Inc., dated July 21, 2020.
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 nine months ended September 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: November 4, 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)

Exhibit 10.3

[*] = Certain confidential information contained in this document, marked by brackets, is omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

Amendment No. 2 to Agreement
("Amendment No. 2")

Amendment No. 2 Date: **31 July 2020**

Name of Original Agreement: Research Collaboration and License Agreement (the "Agreement")

Effective Date of Original Agreement: 28 December 2017 ("Effective Date")

Parties: Pfizer Inc. ("Pfizer") and Sangamo Therapeutics, Inc. ("Sangamo"). Individually a "Party" and collectively the "Parties."

Dates of Previous Amendment(s): 21 March 2019

WHEREAS, the Parties desire to amend the definition and requirements for identifying a Lead Development Compound under the Agreement.

NOW, THEREFORE, in order to accommodate the desired amendment(s), the Parties hereby agree as follows:

1. Defined Terms. Capitalized terms used but not defined herein shall have the respective meanings ascribed to such terms in the Agreement.

2. Amendment(s) to the Agreement.

   The last paragraph of Section 1.42 is amended and restated as follows:

   Notwithstanding the foregoing, (i) a Compound shall be deemed a "Lead Development Compound" if Pfizer elects, [*], to conduct any [*] study of a Product containing such Compound, and upon making such election (a) Pfizer shall provide Sangamo, prior to initiating such study, with written notice that it intends to conduct such study and (b) the first Development Milestone Event set forth in Section 5.2(a) shall be deemed achieved and payable; provided that if Pfizer does not [*] of a Product [*], then the Research Term will be automatically extended [*] and the Research Term will end on [*]; however, should Pfizer

not [*] of a Product [*], this Agreement will be deemed terminated pursuant to Section 8.2(a), and (ii) if, [*], Pfizer, [*], elects to [*], without having identified a Compound that satisfies the criteria set forth in this Sections 1.42(a) through 1.42(c), then upon [*], the Research Term will be extended [*] and the Research Term will end on [*]; provided that if, by the end of the [*] extension, (A) a Compound satisfying the criteria set forth in Section 1.42(a) through 1.42(c) is not identified [*], or (B) a Compound has not been declared as "Lead Development Compound" pursuant to the following paragraph, this Agreement will be deemed terminated pursuant to Section 8.2(a).

Notwithstanding the criteria set forth in Sections 1.42 (a) through 1.42 (c), during the Research Term, Pfizer, [*], may declare a Compound [*] as a Lead Development Compound, whether or not such Compound has been identified as meeting the criteria set forth in Sections 1.42(a) through 1.42(c) by providing Sangamo with written notice of Pfizer's declaration of such Compound as a Lead Development Compound. As of the date of such written notice, such Compound shall be deemed a Lead Development Compound and the first Development Milestone Event set forth in Section 5.2(a) shall be deemed achieved and payable if on the date of such notice, the first Development Milestone Event under Section 5.2(a) has not already been deemed achieved and payment under Sections 1.42(i) and 1.42(ii).

3. Section 3.1 is amended and restated as follows:

   a. **Scope of Research and Research Plan**. Beginning on the Effective Date and ending on the third anniversary thereof, unless extended to [*] pursuant to Section 1.42(i) or to [*] pursuant to Section 1.42(ii) (the "Research Term"), Pfizer and Sangamo will collaborate to conduct research to identify, screen and evaluate Compounds in accordance with a research plan as set forth on **Exhibit B** (the "Research Plan") and the terms and conditions set forth in this Article 3.

4. Ratification of the Agreement. Except as expressly set forth in this Amendment No. 2, the Agreement shall remain unmodified and in full force and effect. The execution, delivery and effectiveness of this Amendment No. 2 shall not, except as expressly provided herein, operate as a waiver of any right, power or remedy of the parties to the Agreement, nor constitute a waiver of any provision of the Agreement.

5. Counterparts. This Amendment No. 2 may be executed in any number of counterparts, each of which shall be an original instrument and all of which, when taken together, shall constitute one and the same agreement.

SIGNATURES IMMEDIATELY FOLLOWING ON NEXT PAGE

[*] = Certain confidential information contained in this document, marked by brackets, is omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

IN WITNESS WHEREOF, the duly authorized representatives of Pfizer and Sangamo have executed this Amendment No. 2 as of the Amendment No. 2 Date.

Pfizer Inc.

By: _____

Print Name: _____

Title: _____

Date: _____
(Duly authorized)

Sangamo Therapeutics, Inc.

By: _____

Print Name: _____

Title: _____

Date: _____
(Duly authorized)

[*] = Certain confidential information contained in this document, marked by brackets, is omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

[*]

[*] = Certain confidential information contained in this document, marked by brackets, is omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

Exhibit 10.2

Confidential Execution Version

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

COLLABORATION AND LICENSE AGREEMENT

by and between

Sangamo Therapeutics, Inc.

and

Novartis Institutes for BioMedical Research, Inc.

July 27, 2020

COLLABORATION AND LICENSE AGREEMENT

This **Collaboration and License Agreement** (this "**Agreement**") is made as of July 27, 2020 (the "**Effective Date**"), by and between **Sangamo Therapeutics, Inc.**, a Delaware corporation having an office at 501 Canal Blvd., Suite A100, Richmond, CA 94804 ("**Sangamo**"), and **Novartis Institutes for BioMedical Research, Inc.**, a Delaware corporation having an office at 250 Massachusetts Avenue, Cambridge, MA 02139 ("**Novartis**"). Novartis and Sangamo are referred to in this Agreement individually as a "**Party**" and collectively as the "**Parties**".

RECITALS

WHEREAS, Novartis is a pharmaceutical company engaged, together with its Affiliates, in the research, development, manufacturing and commercialization of biopharmaceutical products for the treatment of human disease.

WHEREAS, Sangamo is a clinical stage biotechnology company focused on the research, development and commercialization of genome editing and gene therapy products targeting genetic diseases with unmet medical needs.

WHEREAS, Novartis and Sangamo desire to establish a collaboration for the research and development and, if successful, commercialization of zinc finger protein-based products targeting the modulation of neuroscience targets, all under the terms and conditions set forth herein.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the receipt and sufficiency of which are hereby acknowledged, Novartis and Sangamo hereby agree as follows:

Article 1.

DEFINITIONS

Unless the context otherwise requires, the terms in this Agreement with initial letters capitalized shall have the meanings set forth below:

a. "**AAV Vector**" means any adeno-associated virus vector, including the capsid.

b. "**Accounting Standards**" means (a) with respect to Novartis, International Financial Reporting Standards ("**IFRS**") and (b) with respect to Sangamo, GAAP, in each case, consistently applied throughout the applicable Party's organization. Each Party shall promptly notify the other Party in the event that it changes the Accounting Standards pursuant to which its records are maintained; *provided*, that each Party may only use internationally-recognized accounting principles (e.g., IFRS, GAAP, etc.) as its Accounting Standards.

c. "**Additional Cure Period**" shall have the meaning set forth in Section 12.2(b)(ii).

d. "**Affiliate**" means, with respect to any Person, any other Person that (directly or indirectly) controls, is controlled by, or is under common control with, such Person. For

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

purposes of this Agreement, a Person shall be deemed to control another Person if it owns or controls, directly or indirectly, at least fifty percent (50%) of the equity securities (or other ownership interests, by contract or otherwise) of such other Person entitled to vote in the election of directors (or, in the case that such other Person is not a corporation, for the election of the corresponding managing authority) or otherwise has the power to direct the management and policies of such other Person. The Parties acknowledge that in the case of Persons organized under the laws of certain countries where the maximum percentage ownership permitted under applicable Law for a foreign investor is less than fifty percent (50%), such lower percentage shall be substituted in the preceding sentence; *provided*, that such foreign investor has the power to direct the management and policies of such other Person.

a. "**Agreement**" shall have the meaning set forth in the Preamble.

b. "**Alliance Manager**" shall have the meaning set forth in Section 3.1.

a. "**Auditor**" shall have the meaning set forth in Section 9.8(a).

a. "**Biosimilar Product**" means, with respect to a Product that is being sold in a country or regulatory jurisdiction in the Territory (the "**Reference Product**"), any biopharmaceutical product that (a) contains the same or "highly similar" (as such term is used in 42 U.S.C. § 262(i)(2) or analogous laws and regulations outside the U.S.) active ingredient as such Reference Product; (b) is marketed or sold in such country or jurisdiction by a Third Party that (i) has not obtained the rights to market or sell such product as a Sublicensee or distributor of Novartis or any of its Affiliates or Sublicensees, including pursuant to a license or settlement in connection with litigation with Novartis, its Affiliate or a Sublicensee under the Biologics Price Competition and Innovation Act of 2009 or an equivalent under foreign law and (ii) did not purchase such product in a chain of distribution that included Novartis or any of its Affiliates or Sublicensees; and (c) has obtained Regulatory Approval (with all references in the definition Regulatory Approval to "Product" to be deemed references to such biopharmaceutical product) in such country or jurisdiction through reference to the MAA and Regulatory Approval of the Reference Product pursuant to an expedited or abbreviated approval pathway established by the Regulatory Authorities in such country or jurisdiction pursuant to applicable Laws, including any such product that (i) with respect to such product in the U.S., has been approved or licensed as a biosimilar or interchangeable product by FDA pursuant to Section 351(k) of the Public Health Service Act (42 U.S.C. § 262(k)) or any subsequent or superseding law, statute or regulation, (ii) with respect to such product subject to the regulatory jurisdiction of the EMA, has been approved as a similar biological medicine product by EMA as described in CHMP/437/04, issued 30 October 2005 or any subsequent or superseding law, statute or regulation, and (iii) with respect to such product outside the U.S. and in a country which is not subject to the regulatory jurisdiction of the EMA, has obtained Regulatory Approval (with all references in such definition to "Product" to be deemed references to such biopharmaceutical product) by Regulatory Authorities in such other jurisdictions under analogous laws and regulations as those described the foregoing subsections (i) or (ii).

b. "**BLA**" or "**Biologics License Application**" means a Biologics License Application, as defined in the U.S. Public Health Service Act and applicable regulations

promulgated thereunder by the FDA. For clarity, BLA does not include application for Pricing Approval, and BLA approval does not include Pricing Approval.

c. "**Blocked Target**" shall have the meaning set forth in Section 4.8(b).

d. "**Breach Notice**" shall have the meaning set forth in Section 12.2(b)(i).

e. "**Business Day**" means a day other than a Saturday, Sunday, or a bank or other public holiday in California or Massachusetts, United States or Basel, Switzerland.

f. "**Calendar Quarter**" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 or December 31, during the Term, or the applicable part thereof during the first or last calendar quarter of the Term.

g. "**Calendar Year**" means any calendar year ending on December 31, or the applicable part thereof during the first or last calendar year of the Term.

h. "**Change of Control**" means, with respect to a Party, (a) a merger, reorganization, combination or consolidation of such Party with a Third Party that results in the holders of beneficial ownership of the voting securities or other voting interests of such Party (or, if applicable, the ultimate parent of such Party) immediately prior to such merger, reorganization, combination or consolidation ceasing to hold beneficial ownership of at least fifty percent (50%) of the combined voting power of the surviving entity or the ultimate parent of the surviving entity immediately after such merger, reorganization, combination or consolidation, (b) a transaction or series of related transactions in which a Third Party, together with its Affiliates, becomes the beneficial owner of fifty percent (50%) or more of the combined voting power of the outstanding securities or other voting interest of such Party, or (c) the sale or other transfer (in one (1) transaction or a series of related transactions) to a Third Party of all or substantially all of such Party's assets.

a. "**Claims**" shall have the meaning set forth in Section 14.1.

b. "**Clinical Trial**" means any clinical trial in humans, including any Phase 1 Clinical Trial, Phase 2 Clinical Trial, Pivotal Trial or any post-approval clinical trial in humans.

c. "**Code**" means the United States Bankruptcy Code, 11 U.S.C. § 101 et seq.

d. "**Collaboration**" shall have the meaning set forth in Section 4.1.

e. "**Collaboration Budget**" shall have the meaning set forth in Section 4.2(a).

f. "**Collaboration Candidate**" means, on an Exclusive Gene Target-by-Exclusive Gene Target basis, any [*] or any [*] ZFP, in each case, that [*] such Exclusive Gene Target.

g. "**Collaboration Costs**" shall have the meaning set forth in Section 4.4(a).

h. "**Collaboration Plan**" shall have the meaning set forth in Section 4.2(a).

i. "**Collaboration Product**" means any Genome Regulation Product that comprises a polynucleotide encoding a Collaboration ZFP, whether alone or in combination with other active or inactive components or ingredients, and a delivery technology, such as an AAV Vector.

a. "**Collaboration Term**" shall have the meaning set forth in Section 4.1.

b. "**Collaboration ZFP**" means (a) a fusion protein generated by Sangamo under the Collaboration Plan that (i) comprises a ZFP and a Transcription Factor and (ii) [*] an Exclusive Gene Target and (b) any fusion protein that comprises (i) the same ZFP contained in any Collaboration ZFP described in the foregoing clause (a) and (ii) a Transcription Factor. For clarity, Collaboration ZFP does not include [*].

c. "**Commercial Milestone Event**" shall have the meaning set forth in Section 9.2(b).

d. "**Commercial Milestone Payment**" shall have the meaning set forth in Section 9.2(b).

a. "**Commercialize**" or "**Commercialization**" means all activities directed to marketing, promoting, pricing, distributing, detailing or selling a biopharmaceutical product (as well as importing and exporting activities in connection therewith), including all activities directed to obtaining Pricing Approvals.

b. "**Commercially Reasonable Efforts**" means, (a) where applied to carrying out specific tasks and obligations of a Party under this Agreement (other than the Development or Commercialization of a Product), expending reasonable, diligent, good faith efforts and resources of such Party to accomplish such task or obligation as [*] would normally use to accomplish a similar task or obligation under similar circumstances; and (b) where applied to the Development or Commercialization of a Product, the use of such efforts and resources as [*] in connection with the development and commercialization of products of similar market potential at a similar stage of product life, taking into account the product's safety and efficacy data, the cost to develop the product, the product's intended patient population, the competitiveness of the relevant marketplace, the intellectual property positions of Third Parties, the applicable regulatory situation (including the likelihood of regulatory approval), applicable manufacturing considerations, the profitability and commercial viability of the product, and other relevant development, manufacturing and commercialization factors based upon then-prevailing conditions. For clarity, level of efforts required to qualify as "Commercially Reasonable Efforts" shall not be changed as a result of a Change of Control of a Party or the assignment of this Agreement by a Party.

c. "**Committee**" means the JSC, the JRC, the JPC or any joint subcommittee established by the JSC, as applicable.

d. "**Competing Program**" shall have the meaning set forth in Section 2.5(c).

e. "**Confidential Information**" of a Party means all Know-How, or other information, including proprietary information (whether or not patentable), regarding or embodying such Party's or any of its Affiliates' technology, products, business or objectives, including unpublished patent applications and other non-public information and data of a financial, commercial, business, operational or technical nature (including information comprising or relating to concepts, discoveries, inventions, data, designs or formulae), that is disclosed by or on behalf of such Party or any of its Affiliates or otherwise made available to the other Party or any of its Affiliates, whether made available orally, in writing or in electronic form, in connection with this Agreement on or after the Effective Date (or before the Effective Date under the Confidentiality Agreement as provided in Section 15.8). For clarity, (a) any Licensed Technology which is solely and specifically related to any Product, including the [*], shall be deemed to constitute the Confidential Information of each Party during the Term and (b) any [*] Technology which is solely and specifically related to any [*], including the [*], shall be deemed to constitute the Confidential Information of each Party during the Term.

f. "**Confidentiality Agreement**" shall have the meaning set forth in Section 15.8.

g. "**Control**" or "**Controlled**" means, with respect to any Patent Rights, Know-How or other intellectual property right, that a Party (a) owns or (b) has a license (other than a license granted to such Party under this Agreement) to such Patent Rights, Know-How or intellectual property right and, in each case, has the ability to grant to the other Party a license, sublicense or access (as applicable) to the foregoing on the terms and conditions set forth in this Agreement without violating the terms of any then-existing agreement or arrangement with any Third Party.

h. "**Core Jurisdictions**" shall have the meaning set forth in Section 10.2(a)(i).

i. "**Cover**" means, with respect to given product (or component thereof) and Patent Right, that a Valid Claim of such Patent Right would, absent a license thereunder or ownership thereof, be infringed by the making, having made, use, sale, offer for sale or importation of such product or component, and for purposes of determining such infringement, considering claims of pending patent applications as Valid Claims (to the extent such claims would otherwise constitute Valid Claims) as if they have already been issued.

j. "**CPI**" shall have the meaning set forth in Section 1.70.

k. "**Critical Patent Challenge**" shall have the meaning set forth in Section 12.2(c)(ii).

a. "**Develop**" or "**Development**" means all research and development activities for any biopharmaceutical product, including conducting pre-clinical and clinical studies, manufacturing process development, and toxicology studies of such product for use in Clinical Trials (including placebos and comparators), statistical analyses, and the preparation, filing and prosecution of any MAA for such product, as well as all regulatory activities related to any of the foregoing, in each case, prior to Regulatory Approval of such product.

b. "**[*]**" means any [*] ZFP that has been selected by Novartis as a "[*]" for further Development under this Agreement. For clarity, [*] do not include cells, tissues, or organisms that have been modified *ex vivo* using ZFPs.

c. "**[*]**" means, with respect to an Exclusive Gene Target, the first selection by Novartis of one (1) or more [*] for such Exclusive Gene Target.

a. "**Development Milestone Event**" shall have the meaning set forth in Section 9.2(a).

b. "**Development Milestone Payment**" shall have the meaning set forth in Section 9.2(a).

c. "**Development Report**" shall have the meaning set forth in Section 5.7.

d. "**Diagnostic Field**" means the diagnosis of disease in any and all indications.

e. "**Disclosing Party**" shall have the meaning set forth in Section 11.1(a).

a. "**Disparaging Against**" means, with respect to an issued or pending Patent Right, [*].

b. "**Dispute**" shall have the meaning set forth in Section 15.5(a).

c. "**Divestiture**" means, with respect to a Competing Program, the divestiture of such Competing Program through: (a) an outright sale or assignment of all rights in such Competing Program to a Third Party; (b) an exclusive out-license to a Third Party of all Development, Commercialization, and other Exploitation rights with respect to such Competing Program, [*]; or (c) a combination of the transactions contemplated by the foregoing sub-clauses (a) and (b). When used as a verb, "**Divest**" means to cause or have caused a Divestiture.

d. "**Dollar**" means the U.S. dollar, and "$" shall be interpreted accordingly.

e. "**Effective Date**" shall have the meaning set forth in the Preamble.

f. "**EMA**" means the European Medicines Agency or any successor entity thereto.

g. "**EU**" means the European Union, as its membership may be constituted from time to time, and any successor thereto; *provided*, that, for purposes of this Agreement, the EU will be deemed to include France, Germany, Italy, Spain, and the United Kingdom, irrespective of whether any such country leaves or is not then a member of the European Union.

h. "**EU Major Market**" means [*].

i. "**[*]**" means, with respect to a Product, [*].

j. "**Ex-US Major Markets**" means the [*].

k. "**Excluded Claim**" shall have the meaning set forth in Section 15.5(f).

l. "**Excluded Target**" means each of the human genes set forth in the **Exhibit A**.

a. "**Excluded Upstream Licenses**" means the agreements between Sangamo (or its Affiliate) with a Third Party as set forth and as described on **Exhibit B** (as updated from time to time in accordance with Section 2.4(c) or Section 13.5(e)), including any agreement that is deemed an "Excluded Upstream License" pursuant to Section 2.4.

a. "**Excluded Upstream Technology**" means all Know-How and Patent Rights Controlled by Sangamo or any of its Affiliates as of the Effective Date or during the Term pursuant to any Excluded Upstream License.

b. "**Exclusive Gene Target**" means (a) [*]; (b) [*]; (c) [*]; (d) any Proposed Replacement Target (for so long as it remains a Proposed Replacement Target) and (e) any Replacement Target; *provided*, *however*, that Exclusive Gene Targets shall exclude all Terminated Targets.

c. "**[*] Exclusivity Period**" means a Novartis [*] Exclusivity Period or a Sangamo [*] Exclusivity Period, as applicable.

d. "**Executive Officers**" means, for Sangamo, the Chief Executive Officer or his/her designee, and for Novartis, the President or his/her designee; *provided*, that, in each case such person is not a member of the JSC at the time that the applicable disagreement arises.

e. "**Exploit**" means Develop, have Developed, make, have made, use, have used, perform medical affairs, have performed medical affairs, offer for sale, have offered for sale, sell, have sold, export, have exported, import, have imported, Manufacture, have Manufactured, Commercialize or have Commercialized. "**Exploitation**" and "**Exploiting**" will be construed accordingly.

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

g. "**Field**" means the Diagnostic Field or the Therapeutic Field.

h. "**First Commercial Sale**" means, with respect to a particular Product in a particular country in the Territory, the first sale of such Product by Novartis or an Affiliate or Sublicensee to a Third Party in such country after such Product has been granted Regulatory Approval in such country. For clarity, sales or transfers of reasonable quantities of a Product for Development, including proof of concept studies or other Clinical Trial purposes, or for compassionate or similar use, shall not be considered a First Commercial Sale.

i. "**FTE**" means a full-time, non-Executive Officer, non-administrative person year or, in the case of less than a full-time, non-Executive Officer, non-administrative person year, a full-time equivalent person year, in each case, based upon a total of [*] of work per year on Development, Manufacturing, regulatory support, technology transfer or any other activities

contemplated by Section 5.8. In the case that any full-time person works partially on activities under this Agreement and partially on other work in a given year, then the full-time equivalent to be attributed to such person's work hereunder shall be equal to the percentage of such person's total work time in such year or portion thereof that such person spent working on such activities under this Agreement. In no event shall any one (1) person be counted as more than one (1) FTE. For clarity, indirect personnel (including support functions such as managerial, financial, legal or business development) shall not constitute FTEs; provided, however, that Development, regulatory and technical operations managers may constitute FTEs.

j. "**FTE Rate**" means the rate of [*] per FTE per year. Commencing on [*], the FTE Rate shall be changed as of such anniversary and at the beginning of each Calendar Year thereafter to reflect the year-to-year percentage increase (if any) in the Consumer Price Index for All Urban Consumers for the San Francisco Bay Area, as published by the U.S. Department of Labor, Bureau of Labor Statistics ("**CPI**") (based on the change in the CPI from the most recent index available as of the Effective Date to the most recent index available as of the date of the calculation of such revised FTE Rate). For the avoidance of doubt, the FTE Rate is intended to cover the cost of salaries, benefits, infrastructure, travel, general laboratory or general office supplies, postage, insurance, training and all other general expenses and overhead items.

k. "**GAAP**" means the U.S. generally accepted accounting principles, consistently applied.

l. "**GCP**" means the then-current good clinical practice standards for Clinical Trials for biopharmaceuticals or diagnostics (as applicable), as set forth in the United States Food, Drug and Cosmetic Act or other applicable law, and such standards of good clinical practice as are required by the Regulatory Authorities of the EU and other countries for which the applicable biopharmaceutical or diagnostic is intended to be developed, to the extent such standards are not less stringent than United States GCP.

m. "**[*] Patent**" shall have the meaning set forth in Section 10.3(b)(ii)(2).

n. "**Genome Regulation Product**" means any product or therapy whose principal mechanism of action involves the activation or repression of transcription of genomic DNA, excluding any product or therapy that involves: (a) the administration or transplantation of modified cells into a human patient; (b) the introduction and expression of a transgene in cells of a patient for the treatment or prevention of a disease or condition; or (c) the modification of genomic DNA by the insertion, deletion, chemical modification or replacement of one (1) or more nucleotides, genomic fragments, or genes (or part thereof), except to the extent caused by the natural integration of an AAV Vector into the genome.

o. "**GLP**" means the then-current good laboratory practice standards promulgated or endorsed by the FDA as defined in 21 C.F.R. Part 58 or the successor thereto, or comparable regulatory standards in jurisdictions outside the United States.

p. "**[*]**" means a [*] of a Product [*].

q. "**GMP**" or "**cGMP**" means the then-current good manufacturing practices as specified in 21 C.F.R. Parts 11, 210 and 211, ICH Guideline Q7A, or equivalent laws, rules, or regulations of an applicable Regulatory Authority at the time of manufacture.

r. "**Governmental Authority**" means any national, international, federal, state, provincial or local government, or political subdivision thereof, any multinational organization or any authority, agency or commission entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing authority or power, any court or tribunal (or any department, bureau or division thereof, or any governmental arbitrator or arbitral body).

a. "**IFRS**" shall have the meaning set forth in Section 1.2.

b. "**[*] Criteria**" means, with respect to an Exclusive Gene Target, those criteria for ZFPs directed to such Exclusive Gene Target that are (a) set forth in the applicable Collaboration Plan as the "[*] Criteria" for such Exclusive Gene Target (which criteria, for clarity, shall require that such ZFPs [*]) and (b) intended to demonstrate that such ZFPs are [*].

c. **"[*]"** shall have the meaning set forth in Section 3.2(d).

d. "**[*] ZFP**" means (a) a fusion protein that (i) comprises a ZFP and a Transcription Factor, (ii) [*] an Exclusive Gene Target, (iii) is demonstrated by Sangamo as meeting the [*] Criteria in accordance with the applicable Collaboration Plan, and (iv) is selected by the JSC as an "[*] ZFP" and (b) any fusion protein that is generated by or on behalf of Novartis or its Affiliate or Sublicensee pursuant to this Agreement that comprises (i) the same ZFP contained in any [*] ZFP described in the foregoing clause (a) and (ii) a Transcription Factor. For clarity, [*] ZFP does not include [*].

e. "**[*] ZFP Selection**" shall have the meaning set forth in Section 3.2(d).

f. "**IND**" means any investigational new drug application, clinical trial application, clinical trial exemption or similar or equivalent application or submission in the U.S. and any other country for approval to conduct human clinical investigations.

g. "**Indemnified Party**" shall have the meaning set forth in Section 14.3(a).

h. "**Indemnifying Party**" shall have the meaning set forth in Section 14.3(a).

i. "**Indirect Tax**" shall have the meaning set forth in Section 9.7(a).

j. "**Initiate**" or "**Initiation**" means, with respect to a Clinical Trial of a Product, the first dosing of the first human subject in such Clinical Trial.

k. "**Insolvency Event**" shall have the meaning set forth in Section 12.2(e).

a. "**Internal Costs**" means the product of: (a) the total FTEs utilized by a Party or any of its Affiliates in the particular period in the direct performance of the activities allocated to such Party under this Agreement; and (b) the FTE Rate.

b. "**Invention**" means any invention, discovery or other Know-How that is discovered, generated, conceived or reduced to practice by or on behalf of a Party or its Affiliate or sublicensee through activities conducted under this Agreement (which, for clarity, includes any Development, Manufacture or Commercialization of a Collaboration Candidate or Product and all activities under a Collaboration Plan), including all right, title and interest in and to the intellectual property rights therein and thereto.

c. "**Invoice**" means an invoice from Sangamo substantially in the form of **Exhibit C**.

d. "**JAMS Rules**" shall have the meaning set forth in Section 15.5(a).

e. "**Joint Inventions**" shall have the meaning set forth in Section 10.1(a).

f. "**Joint Patents**" shall have the meaning set forth in Section 10.1(a).

g. "**Joint Research Agreement**" shall have the meaning set forth in Section 10.2(g).

h. "**JPC**" shall have the meaning set forth in Section 3.4.

i. "**JRC**" shall have the meaning set forth in Section 3.3.

j. "**JSC**" shall have the meaning set forth in Section 3.2.

k. "**Know-How**" means any information, including discoveries, improvements, modifications, processes, methods, assays, designs, protocols, formulas, data, inventions, know-how and trade secrets (in each case, patentable, copyrightable or otherwise), but excluding any Patent Rights.

l. "**Law**" means any federal, state, local, foreign or multinational law, statute, standard, ordinance, code, rule, regulation, resolution or promulgation, or any order by any Governmental Authority, or any license, franchise, permit or similar right granted under any of the foregoing, or any similar provision having the force or effect of law, including GCP, GMP, and GLP, as applicable.

m. "**Liabilities**" shall have the meaning set forth in Section 14.1.

n. "**Licensed Know-How**" means the Know-How included in the Licensed Technology.

o. "**Licensed Patents**" means the Patent Rights included in the Licensed Technology.

p. "**Licensed Technology**" means all Know-How and Patent Rights that are Controlled by Sangamo or any of its Affiliates as of the Effective Date or during the Term, including Sangamo's interest in Joint Inventions and Joint Patents, that are necessary or useful for the Development, Manufacture, use, sale, offer for sale, importation, Commercialization or

other Exploitation of any Product in the Field in the Territory; *provided*, *however*, that Licensed Technology shall exclude all Know-How and Patent Rights that:

1. are owned or otherwise controlled by any Third Party (including such Third Party's Affiliates) that becomes an Affiliate or assignee of Sangamo after the Effective Date as a result of a Change of Control of Sangamo or a permitted assignment of this Agreement, except to the extent that any such Know-How or Patent Rights (i) arise from [*] or (ii) are [*];

1. constitute Excluded Upstream Technology; or

2. related to [*], except and solely to the extent necessary for the [*].

a. "**Loss of Market Exclusivity**" means, with respect to a Product and a country, that the following has occurred: (a) Net Sales of such Product in such country in any Calendar Quarter are [*] as compared with the Net Sales of such Product in such country in the Calendar Quarter preceding the first marketing or sale in such country of the first [*] with respect thereto; and (b) such decline in such sales is [*]; *provided*, that, with respect to any [*], such decline in sales shall take into account such [*] unless (i) [*].

a. "**MAA**" means an application to the appropriate Regulatory Authority for approval to market a biopharmaceutical product (but excluding Pricing Approval) in any particular jurisdiction (including a BLA in the U.S.) and all amendments and supplements thereto.

b. "**Manufacture**" means activities directed to manufacturing, processing, packaging, labeling, filling, finishing, assembly, quality assurance, quality control, testing, and release, shipping, or storage of any biopharmaceutical product (or any components or process steps involving any biopharmaceutical product or any companion diagnostic), placebo, or comparator agent, as the case may be, including process development, qualification, and validation, scale-up, pre-clinical, clinical, and commercial manufacture and analytic development, product characterization, and stability testing, but excluding activities directed to Development or Commercialization. "**Manufacturing**" will be construed accordingly.

c. "**Materials**" shall have the meaning set forth in Section 4.9.

d. "**Milestone Events**" means the Commercial Milestone Events and the Development Milestone Events.

e. "**Milestone Payments**" means the Commercial Milestone Payments and the Development Milestone Payments.

a. "**Net Sales**" means the net sales recorded by Novartis or any of its Affiliates or Sublicensees for any Product sold to Third Parties other than Sublicensees as determined in accordance with Novartis' Accounting Standards as consistently applied, less a deduction of [*] for [*]. The deductions booked on an accrual basis by Novartis and its Affiliates under its Accounting Standards to calculate the recorded net sales from gross sales include the following:

1. normal trade and cash discounts;

2. amounts repaid or credited by reasons of defects, rejections, recalls or returns;

3. rebates and chargebacks to customers and other Third Parties (including Medicare, Medicaid, Managed Healthcare and similar types of rebates);

4. amounts provided or credited to customers through coupons and other discount programs;

5. delayed ship order credits, discounts or other deductions of the type described herein related to the impact of price increases between purchase and shipping dates or retroactive price reductions;

6. fee for service payments to customers for any non-separable services (including compensation for maintaining agreed inventory levels and providing information); and

7. other reductions or specifically identifiable amounts deducted for reasons similar to those listed above in accordance with Novartis' Accounting Standards.

With respect to the calculation of Net Sales:

(i) Net Sales only include the value charged or invoiced on the first arm's length sale to a Third Party;

(ii) Sales between or among Novartis and its Affiliates and Sublicensees shall be disregarded for purposes of calculating Net Sales;

(iii) Disposal or use of Products in Clinical Trials or under compassionate use, patient assistance, named patient use, or test marketing programs, or non-registrational studies or other similar programs or studies, in each case where the Product is supplied [*], shall be disregarded for purposes of calculating Net Sales; and

(iv) If a Product is delivered to a Third Party before being invoiced (or is not invoiced), Net Sales will be calculated at the time all the revenue recognition criteria under Novartis' Accounting Standards are met.

a. "**Novartis**" shall have the meaning set forth in the Preamble.

b. "**Novartis Background Technology**" means any Know-How and Patent Rights that are owned or otherwise controlled by Novartis or any of its Affiliates, which Know-How and Patent Rights: (a) are in existence as of the Effective Date; or (b) arise outside of activities under this Agreement after the Effective Date.

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

c. "**Novartis Collaboration Technology**" means any Know-How and Patent Rights that are Controlled by Novartis or any of its Affiliates as of the Effective Date or during the Collaboration Term (a) that are directed to the applicable [*] used in any ZFP product that is the subject of a Collaboration Plan or (b) that are otherwise necessary or useful for Sangamo to perform its activities under a Collaboration Plan; *provided*, *however*, that Novartis Collaboration Technology shall exclude all Know-How and Patent Rights that are owned or otherwise controlled by any Third Party (including such Third Party's Affiliates) that becomes an Affiliate or assignee of Novartis after the Effective Date as a result of a Change of Control of Novartis or a permitted assignment of this Agreement, except to the extent that any such Know-How or Patent Rights (i) arise from participation by employees or consultants of such Third Party or any of its pre-Change of Control Affiliates in activities under this Agreement after the consummation of such Change of Control or assignment or (ii) are included in or used in activities under this Agreement by such Third Party or any of its Affiliates after the consummation of such Change of Control or assignment.

d. "**Novartis [*] Exclusivity Period**" shall have the meaning set forth in Section 2.5(a)(ii).

e. "**Novartis Indemnitees**" shall have the meaning set forth in Section 14.1.

f. "**Novartis [*] Technology**" means all (a) [*], in each case, generated by or on behalf of Novartis, its Affiliates or Sublicensees (including their contractors) in the [*] and (b) any other Know-How that is [*] the [*], including all [*].

g. "**Novartis Product Technology**" means (a) all Patent Rights that are Controlled by Novartis or its Affiliates that Cover, or are used (as of the effective date of termination) by or on behalf of Novartis, its Affiliates or Sublicensees (including their contractors) in, the Development, Manufacture or Commercialization of any Reversion Product, (b) all (i) [*] pre-clinical data and results and (ii) clinical data and results, in each case of (i) and (ii), generated by or on behalf of Novartis, its Affiliates or Sublicensees (including their contractors) in the Development of any Reversion Product, and (c) all other Know-How that is Controlled by Novartis or its Affiliates that are [*], the Development, Manufacture or Commercialization of any Reversion Product; *provided*, that if any Reversion Product [*] by Novartis, its Affiliate or Sublicensee [*], then references in this Section 1.119 to [*] shall be deemed to be references [*]; *provided*, *further*, that Novartis Product Technology shall exclude all Novartis [*] Technology.

h. "**Novartis Prosecuted Other Joint Patents**" shall have the meaning set forth in Section 10.2(d)(iii)(1).

a. "**Other Joint Patent**" means any Joint Patent which does not constitute a [*] Joint Patent.

b. "**Out-of-Pocket Costs**" means, with respect to any activity (including Development), direct project-related expenses paid or payable to Third Parties which are specifically identifiable and incurred by a Party or any of its Affiliates with respect to such activity; *provided*, that such expenses shall have been recorded as income statement items in

accordance with such Party's Accounting Standards and shall not include any pre-paid amounts, capital expenditures, or items intended to be covered by Internal Costs.

c. "**Party**" or "**Parties**" shall have the meaning set forth in the Preamble.

d. "**Patent Rights**" means any and all (a) issued patents, (b) pending patent applications, including all provisional applications, substitutions, continuations, continuations-in-part, divisions and renewals, and all patents granted thereon, (c) patents-of-addition, reissues, reexaminations and extensions or restorations by existing or future extension or restoration mechanisms, including patent term adjustments, patent term extensions, supplementary protection certificates or the equivalent thereof, (d) inventor's certificates, (e) other forms of government-issued rights substantially similar to any of the foregoing, and (f) United States and foreign counterparts of any of the foregoing.

e. "**Person**" means any individual, partnership, limited liability company, firm, corporation, association, trust, unincorporated organization, Governmental Authority or other entity.

f. "**Pharma Investor**" shall have the meaning set forth in Section 11.3(a).

g. "**Phase 1 Clinical Trial**" means a human clinical trial of a biopharmaceutical product that would satisfy the requirements of 21C.F.R. 312.21(a) or foreign equivalent.

h. "**Phase 2 Clinical Trial**" means a human clinical trial of a biopharmaceutical product that would satisfy the requirements of 21C.F.R. 312.21(b) or foreign equivalent.

i. "**Pivotal Trial**" means a human clinical trial of a biopharmaceutical product that is designed to ascertain efficacy and safety of such product in support of the preparation and submission of an MAA for such product to a competent Regulatory Authority without the need for additional future Clinical Trials, regardless of whether such trial is referred to as a phase 2, phase 2b, or phase 3 clinical trial.

j. "**[*]**" means, with respect to a Product and a Clinical Trial that [*] at the [*], the earlier of (a) the date on which [*] or (b) the date on which [*].

k. "**Pricing Approval**" means, in any country where a Governmental Authority authorizes reimbursement for, or approves or determines pricing for, biopharmaceutical products, receipt (or, if required to make such authorization, approval or determination effective, publication) of such reimbursement authorization or pricing approval or determination (as the case may be).

l. "**Product**" means any Genome Regulation Product that comprises a polynucleotide encoding a Collaboration Candidate, whether alone or in combination with other active or inactive components or ingredients, and a delivery technology, such as an AAV Vector.

m. "**Product Infringement**" shall have the meaning set forth in Section 10.3(a).

n. "**[*] Joint Patent**" means any Joint Patent that (a) [*]; or (b) [*].

o. "**[*] Licensed Patent**" means any Licensed Patent, other than a Joint Patent, that (a) [*]; or (b) [*].

a. "**Product Trademarks**" means all Trademarks that are Controlled by Novartis or its Affiliates and are being used (as of the effective date of termination) in connection with the Commercialization of any Reversion Product (or, if any Reversion Product is not being Commercialized as of the effective date of termination, then Trademarks that are Controlled by Novartis or its Affiliates and were being used in the Commercialization of such Reversion Product at the time such Reversion Product stopped being Commercialized), excluding, in each case, the corporate name or logos of Novartis and its Affiliates or Sublicensees.

b. "**Proposed Replacement Target**" shall have the meaning set forth in Section 4.8(b).

c. "**Proprietary**" means, with respect to any product or component thereof (including any [*] or other component of any Product or other Materials), the possession by a Party or any of its Affiliates of ownership (whether sole or joint) or an exclusive license or sublicense (other than pursuant to the license grants under this Agreement) of Patent Rights that Cover such product or component thereof or any non-public Know-How that is used in connection with the Exploitation of such product or component thereof.

d. "**Publications**" shall have the meaning set forth in Section 11.5(a).

e. "**Qualifying Terminated Product**" means, with respect to a Terminated Target, any Terminated Product that Specifically Binds to such Terminated Target and for which Novartis, its Affiliate or Sublicensee [*] prior to the applicable notice of termination.

f. "**Receiving Party**" shall have the meaning set forth in Section 11.1(a).

g. "**Reference Product**" shall have the meaning set forth in Section 1.8.

h. "**Regulatory Approval**" means all licenses, registrations, authorizations and approvals (including approvals of MAAs, supplements and amendments, pre- and post- approvals and labeling approvals) necessary for the Commercialization of a Product in a given country or regulatory jurisdiction, but excluding, in each case, Pricing Approvals.

i. "**Regulatory Authority**" means with respect to a country in the Territory, any national, supra-national, regional, state or local regulatory agency, department, bureau, commission, council or other Governmental Authority involved in granting Regulatory Approvals or Pricing Approvals for biopharmaceutical products in such country, including the FDA, the EMA and any corresponding national or regional regulatory authorities.

j. "**Regulatory Exclusivity**" means any exclusive marketing rights or data protection or other exclusivity rights (other than Patent Rights) conferred by any Regulatory Authority with respect to a Product in a country or jurisdiction in the Territory, including orphan

drug exclusivity, pediatric exclusivity, rights conferred in the U.S. under 42 U.S.C. § 262(k)(2), in the EU under Directive 2001/83/EC, any successor provisions to such Laws, or rights similar thereto in other countries or regulatory jurisdictions in the Territory.

k. "**Regulatory Materials**" means all regulatory applications, submissions, notifications, communications, correspondences, registrations, approvals and other filings submitted to, received from or otherwise conducted with a Regulatory Authority in order to Develop, Manufacture, Commercialize or otherwise Exploit a Product in a particular country or jurisdiction. Regulatory Materials include all INDs, MAAs, other Regulatory Approvals and Pricing Approvals.

l. "**Replacement Target**" means a Proposed Replacement Target for which a Collaboration Plan has been approved by the JSC.

m. "**Replacement Target Right**" shall have the meaning set forth in Section 4.8(a)(i).

n. "**Reversion Product**" means any Qualifying Terminated Product that Specifically Binds to a Terminated Target that is being actively Developed or Commercialized by Novartis, its Affiliate or Sublicensee as of the applicable notice of termination or, if no such Qualifying Terminated Product that Specifically Binds to such Terminated Target is being actively Developed or Commercialized by Novartis, its Affiliate or Sublicensee as of such time, the most recent Qualifying Terminated Product that Specifically Binds to such Terminated Target to have been under Development or Commercialization by Novartis, its Affiliate or Sublicensee.

o. "**Royalty Term**" shall have the meaning set forth in Section 9.3(d).

p. **[*]**.

q. "**Sangamo**" shall have the meaning set forth in the Preamble.

r. "**Sangamo Background Technology**" means any Know-How and Patent Rights that are owned or otherwise controlled by Sangamo or any of its Affiliates, which Know-How and Patent Rights: (a) are in existence as of the Effective Date; or (b) arise outside of activities under this Agreement after the Effective Date. For clarity, Know-How and Patent Rights that arise through Sangamo's or its Affiliate's AAV Vector-related activities that are not included under a Collaboration Plan and are not otherwise undertaken in connection with this Agreement shall be part of the Sangamo Background Technology.

s. "**Sangamo Collaboration Technology**" means any Know-How and Patent Rights that are Controlled by Sangamo or any of its Affiliates as of the Effective Date or during the Collaboration Term (a) that are directed to the applicable ZFP contained in any [*] ZFP or the applicable AAV Vector provided to Novartis for use with any [*] ZFP or (b) that are otherwise necessary or useful for Novartis to perform its activities under a Collaboration Plan; *provided*, *however*, that Sangamo Collaboration Technology shall exclude all Know-How and Patent Rights that:

8. are owned or otherwise controlled by any Third Party (including such Third Party's Affiliates) that becomes an Affiliate or assignee of Sangamo after the Effective Date as a result of a Change of Control of Sangamo or a permitted assignment of this Agreement, except to the extent that any such Know-How or Patent Rights (i) arise from [*] or (ii) are [*];

9. constitute Excluded Upstream Technology; or

10. are related to [*], except and solely to the extent necessary for Novartis to [*].

a. "**Sangamo [*] Exclusivity Period**" shall have the meaning set forth in Section 2.5(a)(i).

a. "**Sangamo [*] Technology**" means any Know-How and Patent Rights that are Controlled by Sangamo or any of its Affiliates as of the Effective Date or during the Term that are necessary or useful for the Development or Manufacture of any [*] in the Field in the Territory; *provided*, *however*, that Sangamo [*] Technology shall exclude all Know-How and Patent Rights that:

1. are owned or otherwise controlled by any Third Party (including such Third Party's Affiliates) that becomes an Affiliate or assignee of Sangamo after the Effective Date as a result of a Change of Control of Sangamo or a permitted assignment of this Agreement, except to the extent that any such Know-How or Patent Rights (i) arise from [*] or (ii) are [*];

2. constitute Excluded Upstream Technology; or

1. are related to the [*], except and solely to the extent necessary for [*].

b. "**Sangamo Indemnitees**" shall have the meaning set forth in Section 14.2.

c. "**Sangamo Patent**" means any Licensed Patent which claims one (1) or more Inventions and does not constitute a [*] Licensed Patent or a Joint Patent.

d. "**Sangamo Patent Challenge**" shall have the meaning set forth in Section 12.2(c)(i).

e. "**Sangamo [*] Invention**" means any Invention (whether or not patentable) that is [*]. For clarity, if such [*] were patentable and a Patent Right was filed that [*], then, if such Patent Right were a Licensed Patent, [*].

f. "**Sangamo [*] Patent**" means any Sangamo Patent that includes [*].

g. "**Sangamo Proprietary Activities**" shall have the meaning set forth in Section 2.1(a)(v).

h. "**Sangamo Prosecuted Other Joint Patents**" shall have the meaning set forth on Section 10.2(d)(ii)(1).

i. "**Segregate**" means, with respect to a Competing Program, to segregate the Development, Commercialization and other Exploitation activities relating to such Competing Program from the Exploitation of [*] ZFPs, Collaboration Candidates, or Products under this Agreement, including ensuring that: (a) no personnel performing Development, Commercialization or other Exploitation activities, as applicable, of such Competing Program have access to (i) any non-public Know-How [*] to the Exploitation of any [*] ZFP, Collaboration Candidate, or Product, (ii) any other [*] or (iii) to the extent [*], the [*]; and (b) no personnel performing the Exploitation activities of any [*] ZFP, Collaboration Candidate, or Product have access to any [*]; *provided*, that the requirements described in sub-clauses (a) and (b) shall not apply to any personnel who have [*].

j. "**Sole Inventions**" shall have the meaning set forth in Section 10.1(a).

a. "**Specifically Bind**" means, with respect to a ZFP or other therapeutic agent and a Target, that such ZFP or therapeutic agent [*] binds to such Target [*], as reasonably determined (at the time of when such evaluation is performed) in good faith (a) by Sangamo in the course of performing work pursuant to a Collaboration Plan with respect to any ZFP under the Collaboration as described in Section 4.1, (b) solely with respect to Section 2.5, by the applicable Party or its Affiliate that is Developing or Commercializing such product, (c) solely with respect to Section 4.8(b), by Sangamo, or (d) solely with respect to Section 10.3(a) and Section 10.3(e), by the applicable Party that became aware of such infringement. Notwithstanding anything to the contrary contained in this Agreement, from and after Sangamo's determination that an [*] ZFP Specifically Binds to an Exclusive Gene Target as contemplated by clause (a) above, for all purposes under this Agreement [*], irrespective of any [*], whether as a result of [*] (*provided*, that [*]).

a. "**Sublicensee**" means any Third Party (excluding distributors and wholesalers) to whom a Party or any of its Affiliates grants a sublicense of its rights hereunder to Exploit any Product.

b. "**[*]**" means any [*].

c. "**[*] Other Joint Patent**" shall have the meaning set forth on Section 10.2(d)(iii)(1).

a. "**Target**" means any human gene (other than an Excluded Target) the expression or activity of which is demonstrated to, as its primary effect, treat, prevent or otherwise have a disease-modifying effect, on any neurological or psychiatric disease or disorder. For clarity: (a) a gene includes protein coding regions as well as introns, promoters and termination regions; and (b) a disease or disorder that primarily affects cells other than neurons, glia or myocytes, or a system other than the central or peripheral nervous system, shall not be considered a neurological or psychiatric disease or disorder even if such disease or disorder causes neurological symptoms, and any gene that is associated with oncology, immunology (including all HLA genes), metabolic disease, hematology or infectious disease cannot be a Target. For clarity, the indications included within the Therapeutic Field and the Diagnostic Field shall not be limited by the fact that, in order for a human gene to constitute a Target, the expression or activity of such

gene must treat, prevent or otherwise have a disease-modifying effect on the diseases or disorders described above.

b. "**Term**" shall have the meaning set forth in Section 12.1.

c. "**Terminated Candidate**" shall have the meaning set forth in Section 12.3(a).

d. "**Terminated Product**" shall have the meaning set forth in Section 12.3(a).

e. "**Terminated Target**" means (a) any Exclusive Gene Target with respect to which this Agreement is terminated pursuant to Article 12, (b) any Exclusive Gene Target for which Novartis has provided notice to Sangamo pursuant to Section 4.8 exercising its right to replace such Target, and (c) in the event of termination of this Agreement in its entirety, all Exclusive Gene Targets.

f. "**Territory**" means worldwide.

g. "**Therapeutic Field**" means the treatment or prevention of disease in any and all indications.

h. "**Third Party**" means any Person other than a Party or an Affiliate of a Party.

i. "**Third Party Infringement Notice**" shall have the meaning set forth in Section 10.4.

j. "**Third Party Therapy**" means, with respect to a Product that is being sold in a country or regulatory jurisdiction in the Territory, [*], that: (a) is sold in such country or jurisdiction by a Third Party that (i) has not obtained the rights to market or sell such product as a Sublicensee or distributor of Novartis or any of its Affiliates or Sublicensees, including pursuant to a license or settlement in connection with litigation with Novartis, its Affiliate or a Sublicensee under the Biologics Price Competition and Innovation Act of 2009 or an equivalent under foreign law and (ii) did not purchase such product in a chain of distribution that included Novartis or any of its Affiliates or Sublicensees; and (b) [*].

k. "**Trademarks**" means all trademarks, service marks, trade names, service names, internet domain names, brand names, logos, protectable slogans, and trade dress rights, whether registered or unregistered, and all applications, registrations, and renewals thereof.

l. "**Transcription Factor**" means a transcriptional regulatory domain.

m. "**United States**" or "**U.S.**" means the United States of America, including its territories and possessions.

n. "**Upstream License**" shall have the meaning set forth on Section 2.4(c). For clarity, Upstream License does not include any Excluded Upstream License.

o. "**Upstream License Notice**" shall have the meaning set forth on Section 2.4(a).

p. "**Upstream Licensor**" shall have the meaning set forth on Section 2.4(c).

q. "**Valid Claim**" means either (a) a claim of an issued and unexpired Licensed Patent that (i) has not been revoked or held unenforceable, unpatentable or invalid by a decision of a court or other Governmental Authority of competent jurisdiction that is not appealable or has not been appealed within the time allowed for appeal, and (ii) has not been canceled, withdrawn, abandoned, disclaimed, denied or admitted to be invalid or unenforceable through reissue, re-examination or disclaimer or otherwise, or (b) a claim of a Licensed Patent that is a pending patent application that (i) has not been cancelled, withdrawn, abandoned or finally rejected by an administrative agency action from which no appeal can be taken, and (ii) has been pending for less than [*] years from the earliest date on which such claim claims priority.

r. "**VAT**" means any value added or similar tax.

s. "**ZFP**" means a zinc finger protein.

t. "**[*]**" means any [*] that is: (a) [*]; and (b) [*].

u. "**[*] Other Joint Patent**" shall have the meaning set forth on Section 10.2(d)(ii)(1).

v. **Interpretation**. Except where the context expressly requires otherwise, (a) the use of any gender herein shall be deemed to encompass references to either or both genders, and the use of the singular shall be deemed to include the plural (and vice versa), (b) the words "include", "includes" and "including" shall be deemed to be followed by the phrase "without limitation", (c) the word "will" will be construed to have the same meaning and effect as the word "shall", (d) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein), (e) any reference herein to any Person shall be construed to include the Person's successors and assigns, (f) the words "herein", "hereof" and "hereunder", and words of similar import, shall be construed to refer to this Agreement in its entirety and not to any particular provision hereof, (g) the word "or" is used in the inclusive sense ("and/or"), unless explicitly indicated otherwise by the term "either/or;" (h) all references herein to Sections, Exhibits or Schedules shall be construed to refer to Sections, Exhibits or Schedules of this Agreement, and references to this Agreement include all Exhibits and Schedules hereto, (i) the word "notice" means notice in writing (whether or not specifically stated) and shall include notices, consents, approvals and other written communications contemplated under this Agreement, (j) provisions that require that a Party, the Parties or any Committee "agree," "consent" or "approve" or the like shall require that such agreement, consent or approval be specific and in writing, whether by written agreement, letter, approved minutes or otherwise (but excluding instant messaging), and (k) references to any specific law, rule or regulation, or article, section or other division thereof, shall be deemed to include the then-current amendments thereto or any replacement or successor law, rule or regulation thereof.

Article 2.

LICENSES; EXCLUSIVITY

a. Licenses to Novartis.

2. License Grants.

i. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Novartis an exclusive (even as to Sangamo and its Affiliates except as provided in Section 2.1c)), royalty-bearing license, with the right to sublicense solely as provided in Section 2.1b), under the Licensed Technology, to Exploit the Products in the Therapeutic Field in the Territory.

ii. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Novartis a non-exclusive, royalty-bearing license, with the right to sublicense solely as provided in Section 2.1b), under the Licensed Technology, to Exploit the Products in the Diagnostic Field in the Territory.

iii. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Novartis a non-exclusive, worldwide license, with the right to grant sublicenses solely as provided in Section 2.1b), under the Sangamo Collaboration Technology, solely to perform Novartis' obligations under the Collaboration Plans.

iv. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Novartis a non-exclusive, worldwide license, with the right to grant sublicenses solely as provided in Section 2.1b), under the Sangamo [*] Technology, solely to (A) research and pre-clinically Develop [*] in furtherance of the Development of Products in the Territory and (B) Manufacture [*] solely for use in accordance with the foregoing sub-clause (A).

v. For clarity and notwithstanding anything to the contrary in this Agreement, the licenses granted by Sangamo to Novartis hereunder do not include any right to (A) (i) [*] without Sangamo's prior consent, (ii) [*] without Sangamo's prior consent, or (iii) [*] (the activities in the foregoing clauses (i), (ii) and (iii), the "**Sangamo Proprietary Activities**"), (B) modify any Product to include a component that (i) was not included in the applicable [*] ZFP in the form selected by the JSC and (ii) [*], (C) clinically Develop, Manufacture, Commercialize or otherwise Exploit [*], or (D) Develop, Manufacture, Commercialize or otherwise Exploit any [*].

3. Sublicenses. Subject to the terms and conditions of this Agreement, Novartis shall have the right to grant to its Affiliates or Third Parties, in each case, through one (1) or more tiers, sublicenses under the licenses granted by Sangamo to Novartis under Section 2.1a); *provided*, that: (i) each sublicense agreement shall be consistent with the terms and conditions of this Agreement; (ii) Novartis shall remain responsible for the performance of all of its Sublicensees to the same extent as if such activities were conducted by Novartis, and shall remain responsible for any payments due to Sangamo under this Agreement with respect to activities of any Sublicensees; (iii) Novartis shall ensure that its Sublicensees comply with the

terms and conditions of this Agreement; (iv) any sublicense of the license granted pursuant to Section 2.1(a)(iii) or Section 2.1(a)(iv) shall be limited to sublicenses to Affiliates and Third Party subcontractors; and (v) within [*] days after the execution of any sublicense agreement [*], Novartis shall provide Sangamo with a copy of such sublicense agreement, [*] (*provided*, that Novartis shall have the right to redact any terms of such sublicense agreement to the extent not pertinent to either Party's rights or obligations under this Agreement or verification of compliance with the requirements of this Agreement).

4. **Retained Rights**. Notwithstanding the exclusive license granted by Sangamo to Novartis under Section 2.1a)i), Sangamo retains the rights under the Licensed Technology to perform its obligations and to exercise its rights under this Agreement, whether directly or through one (1) or more subcontractors. In addition, Sangamo retains the exclusive right to practice and license the Licensed Technology to develop, manufacture and commercialize research reagents directed to any Target.

b. **Licenses to Sangamo; Sublicenses**.

5. Subject to the terms and conditions of this Agreement, Novartis hereby grants to Sangamo a non-exclusive, fully paid, royalty-free, worldwide license, with the right to grant sublicenses solely as provided in Section 2.2(b), under the Novartis Collaboration Technology, solely to perform Sangamo's obligations under the Collaboration Plans.

6. Subject to the terms and conditions of this Agreement, Sangamo shall have the right to grant, solely to its Affiliates or Third Party subcontractors, sublicenses under the licenses granted by Novartis to Sangamo under Section 2.2(a); *provided*, that: (i) each sublicense agreement shall be consistent with the terms and conditions of this Agreement; (ii) Sangamo shall remain responsible for the performance of all of its sublicensees to the same extent as if such activities were conducted by Sangamo; (iii) Sangamo shall remain responsible for any payments owed by Sangamo to such sublicensees under such sublicense agreement with respect to activities of any sublicensees; and (iv) Sangamo shall ensure that its sublicensees comply with the terms and conditions of this Agreement.

c. **No Implied Licenses; Negative Covenant**. Except as expressly set forth herein, neither Party shall acquire any license or other intellectual property interest, by implication or otherwise, under or to any Patent Rights, Know-How, or other intellectual property owned or otherwise controlled by the other Party. Neither Party shall, nor shall permit any of its Affiliates or Sublicensees to, practice any Patent Rights or Know-How licensed to it by the other Party outside the scope of the licenses granted to it under this Agreement.

d. **Addition of Upstream Licenses**.

1. If, during the Term, Sangamo enters into any agreement with a Third Party pursuant to which it obtains a licensable or sublicensable (in accordance with the terms of this Agreement) right or license from such Third Party to any Know-How or Patent Rights that [*] constitute Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable, then Sangamo shall promptly notify Novartis in writing, including (i)

a description of such Know-How or Patent Rights, (ii) all payments that Sangamo would be obligated to pay to such Third Party in connection with the grant, maintenance or exercise of a license or sublicense to or by Novartis under such Know-How or Patent Rights and (iii) all material obligations with which Novartis would be required to comply as a licensee or sublicensee under such agreement (such notice, an "**Upstream License Notice**"). If Sangamo reasonably believes that any Know-How or Patent Rights would, but for the provisions of this Section 2.4, constitute Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable, then, [*].

1. If, within [*] days after the receipt of an Upstream License Notice, Novartis provides Sangamo with written notice indicating interest in obtaining a license or sublicense under such Know-How or Patent Rights, then Sangamo shall promptly provide Novartis with a copy of such agreement, which copy may be redacted to exclude terms not material to the rights or obligations that Novartis would receive or assume if it were to exercise its rights under this Section 2.4 to include such Know-How or Patent Rights in Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable.

2. If, within [*] days after receipt of such copy, Novartis provides Sangamo with written notice in which (w) Novartis consents to including the applicable Know-How or Patent Rights in the Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable (x) Novartis agrees, subject to Section 2.4(d), to make all payments when due and provide all reports and other information required under such agreement to the extent arising out of the grant, maintenance or exercise of a license or sublicense to or by Novartis under such Know-How or Patent Rights, including Novartis's and its Affiliates' and Sublicensees' Development, Manufacture, Commercialization or other Exploitation of Products, (y) Novartis acknowledges and agrees in writing that its license or sublicense under such agreement is subject to the terms and conditions of such agreement that have been fully disclosed to Novartis under this Section 2.4 and (z) Novartis agrees to be bound by and comply with such terms and conditions to the extent applicable to it in its capacity as a licensee or sublicensee under such Know-How or Patent Rights, then (A) such agreement shall be deemed an "**Upstream License**" and such Third Party shall be deemed an "**Upstream Licensor**" and (B) any such Know-How or Patent Rights, to the extent falling within the definition of Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable shall be added to Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable and licensed or sublicensed to Novartis under this Agreement. If Novartis does not provide such a written notice to Sangamo within such [*]-day or [*]-day period, as applicable, then such agreement shall be deemed an Excluded Upstream License, such Know-How and Patent Rights shall be deemed Excluded Upstream Technology, and [*]. For clarity, this Section 2.4 shall not apply to any Know-How or Patent Rights of any Third Party (including such Third Party's Affiliates) that becomes an Affiliate of Sangamo after the Effective Date as a result of a Change of Control of Sangamo, which Know-How or Patent Rights shall be excluded from Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable in accordance with the provisions of clause (a) of the definition of Licensed Technology, Sangamo Collaboration Technology or Sangamo [*] Technology, as applicable. Notwithstanding anything to the contrary set forth in this Agreement, Licensed

Technology, Sangamo Collaboration Technology and Sangamo [*] Technology, as applicable, shall not include any Patent Rights or Know-How which Sangamo Controls pursuant to any agreement between Sangamo (or its Affiliate) and a Third Party entered into after the Effective Date unless such agreement is deemed an Upstream License pursuant to this Section 2.4(c).

3. Notwithstanding Section 2.4(a), with respect to any payment obligation under an Upstream License that may be triggered by but is not specific to the grant, maintenance or exercise of a license or sublicense to or by Novartis under such Know-How or Patent Rights, including Novartis's and its Affiliates' and Sublicensees' Development, Manufacture and Commercialization of Products, Novartis shall [*], in each case, taking into account, *inter alia*, [*].

1. Nothing in this Section 2.4 shall limit or restrict Novartis' right to obtain its own license or other rights with respect to such Know-How or Patent Rights from such Third Party directly, in which case the terms of Section 9.3(e)(iii) shall apply with respect to the license or other rights obtained by Novartis.

e. Exclusivity.

2. Exclusivity Obligations. Subject to Section 2.5(b) and Section 2.5(c):

vi. On [*]-by-[*] basis, during the time period starting on the Effective Date and ending upon the earliest of (1) the date that such [*] ceases to be [*], and (2) the end of the Term for such [*] (each such period, a "**Sangamo [*] Exclusivity Period**"), except for activities conducted pursuant to this Agreement, Sangamo shall not, whether by itself or with or through any of its Affiliates or any Third Party, and shall not enable or facilitate any of its Affiliates or any Third Party to, (A) Develop or Commercialize in the Therapeutic Field any [*] or (B) Develop or Commercialize any Collaboration Candidate or Product; and

i.On [*]-by-[*] basis, during the time period starting on the Effective Date and ending upon the earlier of (1) the date that such [*] ceases to be [*], and (2) [*] for such [*] (each such period, a "**Novartis [*] Exclusivity Period**"), except for activities conducted pursuant to this Agreement, Novartis shall not, whether by itself or with or through any of its Affiliates ([*]) or any Third Party, and shall not enable or facilitate any of its Affiliates ([*]) or any Third Party to, Develop or Commercialize [*] (A) that [*] and (B) that [*].

a. General Exceptions. Notwithstanding the foregoing in Section 2.5(a), the following activities shall not constitute a breach of Section 2.5(a): (i) each Party and their respective Affiliates and Third Party licensees, collaborators and service providers may perform [*], (ii) Sangamo and its Affiliates and their Third Party service providers ([*]) may use, for internal research purposes only, [*] but are not Collaboration Candidates or [*], (iii) Sangamo, its Affiliates and Third Party licensees, collaborators and service providers may Develop, Manufacture or Commercialize any (1) [*], (2) [*] or (3) [*]; and (iv) Novartis and its Affiliates may [*].

b. Competing Program Exception. Notwithstanding Section 2.5a), if a Third Party becomes an Affiliate of a Party during the [*] Exclusivity Period for a particular Exclusive Gene Target through merger, acquisition, consolidation or other similar transaction and such new Affiliate, as of the effective date of such transaction, is engaged, or has a documented then-existing plan to engage, in Development or Commercialization activities that, if conducted by such Party, would be in breach of its exclusivity obligations set forth in Section 2.5(a)(i) with respect to such Exclusive Gene Target (such activities, together with any further Development, Commercialization or other Exploitation of the applicable products, a "**Competing Program**"):

i. If such transaction [*], then such new Affiliate shall have the right to continue such Competing Program and such continuation shall not constitute a breach by such Party of its exclusivity obligation set forth in Section 2.5a); *provided*, that such new Affiliate Segregates such Competing Program.

ii. If such transaction [*], then:

a. if such Party is Sangamo, then Sangamo and its new Affiliate shall have [*] from the closing date of such transaction to wind down or Divest such Competing Program, and its new Affiliate's conduct of such Competing Program during such [*] period shall not constitute a breach by Sangamo of its exclusivity obligations set forth in Section 2.5a); *provided*, that such new Affiliate Segregates such Competing Program during such [*] period; or

b. if such Party is Novartis, then such new Affiliate's conduct of such Competing Program shall not constitute a breach by Novartis of its exclusivity obligations set forth in Section 2.5a) if: (x) such new Affiliate Segregates such Competing Program; or (y) Novartis and its new Affiliate wind down or Divest such Competing Program within [*] from the closing date of such transaction (*provided*, that such new Affiliate Segregates such Competing Program during such [*] period).

Article 3.

GOVERNANCE

a. Alliance Managers. Promptly after the Effective Date, each Party shall appoint a representative to act as its alliance manager under this Agreement (each, an "**Alliance Manager**") by providing written notification to the other Party. The Alliance Managers shall be primarily responsible for facilitating the flow of information and otherwise promoting communication, coordination and collaboration between the Parties under this Agreement and providing support and guidance to the JSC. Unless otherwise agreed upon in writing by the Alliance Managers, all requests for information from one Party to the other Party shall be made through the Alliance Managers. The Alliance Managers shall have the right to attend all meetings of the JSC, the JRC and all other Committees (if any) as non-voting members, and shall bring matters to the attention of the relevant Committee if the Alliance Manager reasonably believes that such matter warrants such attention. Each Party may replace its Alliance Manager at any time upon written notice to the other Party.

b. Joint Steering Committee. The Parties hereby establish a joint steering committee (the "**JSC**"), composed of two (2) (or a larger number agreed by the Parties) senior representatives of each Party, to manage the Parties' activities under the Collaboration. The JSC shall:

3. coordinate the activities of the Parties under the Collaboration, including facilitating communications between the Parties with respect thereto;

4. review, discuss and determine whether to approve any new Collaboration Plan (including the Collaboration Budget set forth therein) and amendments to any existing Collaboration Plans (including the Collaboration Budget set forth therein);

1. review, discuss and determine whether there has been a scientific or technical failure with respect to the Development under a Collaboration Plan of ZFPs that Specifically Bind to the applicable Exclusive Gene Target;

2. select (i) up to a maximum of [*] ZFP-containing molecules recommended by the JRC as [*] ZFP(s) for each Exclusive Gene Target (which number shall not include any non-human versions of such molecules) as [*] ZFPs and (ii) up to a maximum of [*] ZFP-containing molecules recommended by the JRC and designed to bind to the mouse cognate of such Exclusive Gene Target (each, an "**[*]**" and each such selection under (i) and (ii), an "**[*] Selection**"); *provided*, that, in each case, each such ZFP-containing molecule meets the [*] Criteria set forth in the applicable Collaboration Plan;

3. establish joint subcommittees as it deems necessary or advisable to further the purpose of this Agreement;

4. direct and oversee the operation of the JRC and any other joint subcommittee established by JSC, including resolving any disputed matter of such Committees; and

5. perform such other functions as appropriate to further the purposes of this Agreement, as expressly set forth in this Agreement or allocated to it by the Parties' written agreement.

c. Joint Research Committee. The Parties hereby establish a joint research committee (the "**JRC**") as a joint subcommittee under the JSC, composed of three (3) (or a larger number agreed by the Parties) representatives of each Party, each of whom will have the appropriate experience and expertise to perform its responsibilities on the JRC. The JRC shall:

6. coordinate the Collaboration and facilitate communications between the Parties with respect to the Collaboration;

7. prepare a Collaboration Plan (including the Collaboration Budget and the [*] Criteria set forth therein) for any Proposed Replacement Target and submit the Collaboration Plan to the JSC to review, discuss and determine whether to approve;

8. prepare amendments to any Collaboration Plan (including the Collaboration Budget and the [*] Criteria set forth therein) and submit the Collaboration Plan to the JSC to review, discuss and determine whether to approve;

9. discuss the results of performance of the Collaboration Plans and the anticipated timeline for initiating and completing the activities set forth therein;

10. review and discuss any updates or reports prepared by either Party pursuant to Section 4.7;

1. review and discuss whether there has been a scientific or technical failure with respect to the Development under a Collaboration Plan of ZFPs that Specifically Bind to the applicable Exclusive Gene Target and make recommendation to the JSC with respect thereto;

2. discuss, disclose data (other than [*] data) relating to and recommend to the JSC, for [*] ZFP Selection, one (1) or more ZFP-containing molecules that each meet the [*] Criteria set forth in the applicable Collaboration Plan;

1. discuss and disclose data relating to one (1) or more [*] ZFP(s);

2. review and discuss the AAV Vector reports submitted by Sangamo pursuant to Section 4.5;

1. perform such other functions as may be appropriate to further the purposes of this Agreement with respect to the research of the Products, as directed by the JSC.

a. Joint Patent Committee. The Parties hereby establish a joint patent committee (the "**JPC**") as a joint subcommittee, composed of one (1) (or a larger number agreed by the Parties) representative of each Party, each of whom will be a patent attorney with at least five (5) years of experience prosecuting patents and will have the appropriate experience and expertise to perform its responsibilities on the JPC. The JPC shall:

1. discuss any prior art, inequitable conduct or fraud on the patent office or inventorship disputes, in each case that either Party believes would have a materially adverse effect on either Party's rights under this Agreement;

2. review, discuss and decide on the patent prosecution strategy for each Invention (other than any of Novartis' Sole Inventions);

3. review, discuss and decide on, in accordance with Section 10.1, the inventorship of each Invention and the categorization of each Invention as either Novartis' Sole Invention, Sangamo's Sole Invention or a Joint Invention, including whether such Invention is (i) [*], (ii) [*] or (iii) both (A) [*] and (B) [*];

1. review, discuss and decide if any patent application claiming an Invention should not include a statement that such Invention has been generated under a Joint Research Agreement;

2. review, comment on and decide on edits or changes to, drafts of all proposed material filings and correspondence to any patent authorities with respect to Sangamo Patents, [*] Licensed Patents, [*] Joint Patents and Other Joint Patents;

1. review and discuss each Third Party Infringement Notice; and

2. review, discuss and decide, at the request of a Party's JPC representative, whether the other Party's attempted exercise of its final decision making authority under Section 3.6(b)(i) or Section 3.6(b)(ii) could have an adverse effect as described therein.

b. Committee Membership and Meetings.

3. **Committee Members**. Within [*] days after the Effective Date, each Party shall appoint its representatives on the JSC, the JRC and the JPC by providing written notification to the other Party. Each Party may replace its representatives on any Committee on written notice to the other Party, but each Party shall strive to maintain continuity in the representation of its Committee members. Each Party shall appoint one (1) of its representatives on each Committee to act as a co-chairperson of such Committee. The co-chairpersons shall jointly prepare and circulate agendas to the applicable Committee's members at least [*] Business Days before each Committee meeting and shall direct the preparation of reasonably detailed minutes for each Committee meeting, which shall be approved by the co-chairpersons and circulated to Committee members within [*] days of such meeting. Each Party shall be solely responsible for the costs incurred by its representatives in attending any Committee meeting.

4. **Meetings**. Each Committee shall hold meetings at such times as it elects to do so, but in no event shall such meetings be held less frequently than (i) for the JSC, [*], (ii) for the JRC, [*] (unless otherwise agreed by the JRC) until completion of the Collaboration and (iii) for the JPC, [*] (unless otherwise agreed by the JPC). Committee meetings may be held in person or by audio or video teleconference; *provided*, that unless otherwise agreed by both Parties, at least one (1) meeting per year of the JSC and the JRC shall be held in person. All in-person meetings shall alternate between locations in (x) the San Francisco Bay Area and (y) the Greater Boston Area, East Hanover, New Jersey, or another location in the continental United States, as designated by Novartis. Each Party shall be responsible for all of its own costs and expenses of participating in any Committee meetings. No action taken at any Committee meeting shall be effective unless at least one (1) representative of each Party is participating.

5. **Ad Hoc Meetings**. On [*] Business Days' prior written notice, either Party may request an ad-hoc meeting of a Committee to discuss issues that urgently need to be addressed prior to the next scheduled Committee meeting and such Party will provide the relevant Committee materials reasonably adequate to enable an informed discussion by its members reasonably in advance of such meeting. Ad-hoc meetings may occur via audio or video teleconference or in-person as the Parties may agree.

6. **Non-Member Attendance**. Each Party may from time to time invite a reasonable number of participants, in addition to its representatives, to attend the Committee

meetings in a non-voting capacity; *provided*, that if either Party intends to have any Third Party (including any consultant) attend such a meeting, then such Party shall provide at least [*] days' prior written notice to the other Party and obtain the other Party's approval for such Third Party to attend such meeting, which approval shall not be unreasonably withheld, conditioned, or delayed. Such Party shall ensure that such Third Party is bound by confidentiality and non-use obligations consistent with the terms of this Agreement.

c. Decision-Making.

7. Consensus; Escalation. All decisions within the authority of each Committee shall be made by unanimous vote, with each Party's representatives collectively having one (1) vote. If a Committee (other than the JPC) is unable to reach agreement as to a particular matter within such Committee's jurisdiction, within [*] Business Days (or a later date mutually agreed to by the Parties) after such matter has been brought to such Committee for resolution, then such disagreement shall (i) in case of disagreement of the JRC or other joint subcommittee (other than the JPC), be referred to the JSC for resolution, and (ii) in the case of disagreement of the JSC, except as expressly provided in Section 3.6(c), be referred to the Executive Officers of the Parties for resolution.

1. JPC Final Decision Making. If the JPC is unable to reach agreement as to a particular matter within the JPC's jurisdiction, within [*] Business Days (or a later date mutually agreed to by the Parties) after such matter has been brought to the JPC for resolution, then:

i. in the case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of a [*], the final decision shall be made by [*], except to the extent that [*] notifies the JPC that it believes in good faith that such decision could be Disparaging Against [*]. As used herein;

ii. in the case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of a [*], the final decision shall be made by [*], except to the extent that [*] notifies the JPC that it believes in good faith that such decision could be Disparaging Against [*];

i. in the case of a disagreement at the JPC with respect to (A) the patent prosecution strategy for any Invention (other than any of Novartis' Sole Inventions), (B) the inventorship of any Invention, (C) the classification of any Invention as either Novartis' Sole Invention, Sangamo's Sole Invention or a Joint Invention, including whether such Invention is (x) [*], (y) [*] or (z) both (1) [*] and (2) [*], (D) whether or not a decision a Party attempts to make under Section 3.6(b)(i) or Section 3.6(b)(ii) could be Disparaging Against other [*], (E) the filing, prosecution or maintenance of a [*] in the event an attempted decision under Section 3.6(b)(i) or Section 3.6(b)(ii) could be Disparaging Against [*] or (F) whether any Patent Right application claiming an Invention should not include a statement that such Invention has been generated under a Joint Research Agreement, then in each case of (A) – (F), upon notice from either Party, such matter shall be resolved by an expedited arbitration proceeding by a single arbitrator pursuant to the terms set forth on **Exhibit D**.

1. JSC Final Decision Making. If the Executive Officers do not fully resolve any matter within the JSC's authority and referred to them under Section 3.6(a) within [*] Business Days (or a later date mutually agreed to by the Parties) of the matter being referred to them, then, except as provided below, the Parties must mutually agree and no action will be taken with respect to the applicable matter until such agreement has been reached. Notwithstanding the foregoing, Novartis shall have the final decision-making authority (i) with respect to [*] ZFP Selection without such matter being referred to the Executive Officers or otherwise being escalated in accordance with this Section 3.6, (ii) to amend a Collaboration Plan; *provided*, that, (A) Novartis may not amend any Collaboration Plan to [*] and (B) Novartis may not [*], and (iii) to amend a Collaboration Budget; *provided*, that (A) Novartis may not [*], and (B) for clarity, Novartis shall be obligated to [*] and (iv) to determine in good faith that there has been a scientific or technical failure with respect to the Development under a Collaboration Plan of ZFPs that Specifically Bind to the applicable Exclusive Gene Target.

d. Limitations of Committee Authority. Each Committee shall only have the powers expressly assigned to it in this Article 3 and elsewhere in this Agreement and shall not have the authority to: (a) modify or amend the terms and conditions of this Agreement; (b) waive or determine either Party's compliance with the terms and conditions of under this Agreement; or (c) decide any issue in a manner that would conflict with the express terms and conditions of this Agreement. For clarity, the authority and activities of each Committee with respect to an Exclusive Gene Target shall end as of the expiration of the Collaboration Term with respect to such Exclusive Gene Target.

e. Discontinuation of Participation on a Committee. The activities to be performed by each Committee shall solely relate to governance under this Agreement, and are not intended to be or involve the delivery of services. Each Committee shall continue to exist until the first to occur of: (a) the Parties mutually agreeing to disband the Committee; (b) Sangamo providing written notice to Novartis of its intention to disband and no longer participate in such Committee; or (c) (i) with respect to the JSC and the JRC, the expiration of the last-to-expire Collaboration Term and (ii) with respect to the JPC, on an Exclusive Gene Target-by-Exclusive Gene Target basis, [*]. Once a Committee ceases to exist as provided in the previous sentence, such Committee shall have no further obligations under this Agreement; *provided*, that, (A) if the Committee (other than the JPC) ceases to exist prior to the expiration of the Collaboration Term for any Exclusive Gene Target, then for the remainder of the Collaboration Term for such Exclusive Gene Target, the decisions of such Committee with respect to the Collaboration Plan (including the Collaboration Budget) for, or ZFPs that Specifically Bind to, such Exclusive Gene Target shall be decisions as between the Parties, subject to the other terms and conditions of this Agreement (including the decision-making provisions applicable to such Committee, which shall apply to decisions of the Parties, *mutatis mutandis*) and (B) if the JPC ceases to exist while the prosecution for any Sangamo Patent, [*] Licensed Patent, [*] Joint Patent or Other Joint Patent is still ongoing, then each Party shall appoint a representative and for as long as such prosecution is ongoing, those representatives will coordinate and assume all roles and responsibilities of the JPC, and the Parties will assume all decisions of the JPC, in each case, with respect to such Patent Rights and, if applicable, the corresponding Inventions.

a. Post-Collaboration Term Activities. On an Exclusive Gene Target-by-Exclusive Gene Target basis, effective upon the end of the Collaboration Term with respect to such Exclusive Gene Target, such Exclusive Gene Target (including any corresponding Collaboration Candidates and Products) shall thereafter be outside the scope of the Collaboration and the Committees (other than the JPC to the extent contemplated by Section 3.8).

Article 4.

COLLABORATION

a. General. Subject to the terms and conditions of this Agreement, starting on the Effective Date and ending on an Exclusive Gene Target-by-Exclusive Gene Target basis on the earliest of (a) the third (3rd) anniversary of the Effective Date (*provided*, *however*, that Novartis shall have the right, on an Exclusive Gene Target-by-Exclusive Gene Target basis, to extend such period for [*] extensions upon written notice to Sangamo prior to the expiration of the then-current period for up to a maximum period of five (5) years from the Effective Date), (b) [*] for such Exclusive Gene Target, and (c) if applicable, the date on which such Exclusive Gene Target becomes a Terminated Target (the "**Collaboration Term**"), the Parties shall undertake a research collaboration for the Exclusive Gene Targets (the "**Collaboration**"), pursuant to which (i) Sangamo will perform activities related to the discovery and *in vitro* testing of ZFPs in *in vitro* studies for use in the Therapeutic Field that Specifically Bind to an Exclusive Gene Target (including determining whether a given ZFP Specifically Binds to an Exclusive Gene Target), (ii) the JSC will make each [*] ZFP Selection with respect to each Exclusive Gene Target (*provided*, that each such [*] ZFP and [*] has been demonstrated by Sangamo as meeting the [*] Criteria set forth in the applicable Collaboration Plan) and (iii) Novartis will perform activities, including activities related to [*], on such [*] ZFP(s) and [*] for purposes of determining such [*] ZFP(s)' [*], with the goal of [*] for subsequent Exploitation by Novartis. Novartis shall not [*] on any [*] ZFP (or any corresponding [*]) until it has selected such [*] ZFP as a [*]. The Collaboration will not include any activities to be performed by Sangamo relating to the screening, discovery, designing, modification or optimization of any AAV Vector.

b. Collaboration Plans.

2. The Collaboration shall be carried out for each Exclusive Gene Target pursuant to a separate written research plan (each, a "**Collaboration Plan**") for such Exclusive Gene Target that is approved by the JSC. Each Collaboration Plan shall include the applicable detailed budget for the Internal Costs and Out-of-Pocket Costs for Sangamo's research activities thereunder (the "**Collaboration Budget**") and set forth:

ii. a description of [*];

iii. the research activities to be undertaken by Sangamo to [*] for the applicable Exclusive Gene Target, through achievement of the [*] Criteria;

iv. criteria for the [*] Criteria; and

i. all other research activities, if any, to be undertaken by the Parties under the Collaboration, other than (A) [*], (B) [*] or (C) other activities to be performed by Novartis or its Affiliates that are not related to the Development or Manufacture of a ZFP or ZFP-containing product.

For clarity, the Collaboration Plan for each Exclusive Gene Target shall specify all Development work to be performed by Novartis or its Affiliates under the Collaboration on [*] ZFP(s) that Specifically Bind to such Exclusive Gene Target at any time prior to [*] for such Exclusive Gene Target, and Novartis shall not conduct any Development activities under the Collaboration with respect to such [*] ZFP(s) during such period that are not specified in such Collaboration Plan. The Collaboration Plan shall also set forth the timelines for such activities.

3. As of the Effective Date, the Parties have agreed upon initial Collaboration Plans for each Exclusive Gene Target, which are attached to this Agreement as **Exhibit E**.

4. After the selection of a Proposed Replacement Target under Section 4.8, the JRC shall promptly prepare a new Collaboration Plan for such Target and submit such new Collaboration Plan to the JSC, and the JSC shall review and decide whether to approve such new Collaboration Plan (which shall include any modification or amendment approved by the JSC) within [*] days after the selection of such new Replacement Target.

5. From time to time but no less than annually, the JRC shall prepare an amendment to each of the then-current Collaboration Plans and shall submit each such amendment to the JSC for review and approval. Once approved by the JSC, such amended Collaboration Plan shall become effective and replace the prior Collaboration Plan.

6. If the terms of any Collaboration Plan contradicts, or creates inconsistencies or ambiguities with, the terms of this Agreement, then the terms of this Agreement shall govern.

c. Conduct of Collaboration. Each Party shall (a) perform the activities assigned to it under each Collaboration Plan, (b) use Commercially Reasonable Efforts to achieve the objectives allocated to it under each Collaboration Plan, and (c) use Commercially Reasonable Efforts to perform such activities in accordance with the timeline and other requirements set forth therein. Each Party shall conduct such activities in good scientific manner and in compliance with all applicable Laws, including cGMP, GLP and GCP, as applicable.

d. Collaboration Costs.

7. Novartis shall be responsible for one hundred percent (100%) of its own costs incurred in performing the activities assigned to it under the applicable Collaboration Plan and, subject to this Section 4.4, one hundred percent (100%) of the Internal Costs (comprised of up to [*], plus, to the extent approved in advance by Novartis, any [*]) and Out-of-Pocket Costs incurred by Sangamo in performing the activities assigned to it under the applicable Collaboration Plan (comprised of the total Out-of-Pocket Costs set forth on **Exhibit K** ([*]), as

such Out-of-Pocket Costs may be reallocated in accordance with Section 4.4(e); *provided*, that the total Out-of-Pocket Costs set forth on **Exhibit K** shall automatically be deemed to be updated to account for any amended Collaboration Budget approved by the JSC in accordance with Section 4.2 and confirmed in writing by the Parties) (such Internal Costs and Out-of-Pocket Costs, the "**Collaboration Costs**"); *provided*, that, prior to Sangamo having any obligation to incur Internal Costs or Out-of-Pocket Costs in excess of the Collaboration Costs as a result of (i) Novartis electing to extend the Collaboration Term pursuant to Section 4.1 or (ii) Novartis selecting a Replacement Target in accordance with Section 4.8, the Parties shall agree upon revised Collaboration Costs (including a revised number of FTEs over a revised period of time for Internal Costs) with respect to Sangamo's performance of the activities assigned to it under the Collaboration Plan with respect to the extended Collaboration Term or the Replacement Target, as applicable.

8. No later than [*] Business Days following the beginning of each Calendar Quarter, Sangamo shall provide to Novartis a good faith, non-binding estimate (in a form to be agreed by the Parties promptly following the Effective Date) of the Collaboration Costs it anticipates incurring during such Calendar Quarter under each Collaboration Plan.

9. Within [*] days after the end of each Calendar Quarter during the performance of the Collaboration, Sangamo shall submit to Novartis an Invoice (accompanied by reasonable supporting documents) setting forth the Collaboration Costs incurred by Sangamo in such Calendar Quarter to perform activities assigned to it under a Collaboration Plan in accordance with the Collaboration Budget set forth therein. Novartis shall pay the undisputed amount of all such Invoices within [*] days after the date of its receipt of such Invoice.

10. If Novartis disputes in good faith any portion of an Invoice for Collaboration Costs provided by Sangamo pursuant to this Section 4.4, Novartis shall promptly notify Sangamo and the Parties shall use good faith efforts to resolve such dispute expediently. Any Collaboration Costs subject to such dispute shall be paid by Novartis within [*] days after the resolution of such dispute.

11. The Collaboration Costs to be reimbursed to Sangamo by Novartis must be incurred in accordance with the Collaboration Plan and shall not exceed the Collaboration Budget set forth therein (i) for any [*] or (ii) by more than [*] (x) in a [*] or (y) in [*]; *provided*, that, subject to Section 4.4(a), Sangamo shall have the right to re-allocate the funding under the Collaboration Budget between Internal Costs and Out-of-Pocket Costs. Sangamo shall promptly notify Novartis in the event that it anticipates incurring Collaboration Costs which would exceed the foregoing thresholds. Any amount exceeding the aforementioned [*] variance threshold in a [*] will [*], as applicable, and will be [*]. In the event Sangamo provides Novartis with advance notice that anticipated Out-of-Pocket Costs for a Collaboration Plan will exceed the total amount set forth on **Exhibit K** and the JSC does not amend the Collaboration Budget (and as a result, does not amend **Exhibit K**) to include such increased Out-of-Pocket Costs, then Sangamo shall have no obligation to incur any such Out-of-Pocket Costs and shall have no obligation to conduct the corresponding activity(ies) assigned to Sangamo under the applicable Collaboration Plan. At

the end of the aforementioned three (3)-Calendar Year period, any such Collaboration Costs incurred by Sangamo in excess thereof shall [*].

e. AAV Vector Know-How Disclosure and Selection. In addition to the reports to be provided pursuant to Section 4.7, on a [*] basis during each Collaboration Term and for a period of [*] months after the expiration of the last Collaboration Term under this Agreement, Sangamo will furnish the JRC a [*] on its [*] activities with respect to AAV Vectors that are [*] the subject of one (1) or more Collaboration Plans. Upon the written request of Novartis, (a) subject to Section 4.9, Sangamo shall provide AAV Vector material to Novartis, at Novartis's cost and expense, for up to a maximum of [*] such AAV Vectors per Exclusive Gene Target for Novartis to use in conducting its Development activities under the Collaboration Plan for such Exclusive Gene Target, and (b) Sangamo shall disclose [*] selected by Novartis to be incorporated into a Product containing a [*] that Specifically Binds to such Exclusive Gene Target for Development and Commercialization by Novartis, *provided, however*, that Sangamo shall only be obligated to provide [*] per Exclusive Gene Target and a cumulative maximum of [*] for all Exclusive Gene Targets.

f. Collaboration Records. Each Party shall maintain, consistent with applicable Law, the requirements of Regulatory Authorities, and its then-current internal policies and practices, and cause its employees and subcontractors to maintain, records and laboratory notebooks of its activities under the Collaboration Plans in sufficient detail and in a good scientific manner appropriate for regulatory and intellectual property protection purposes. Such records and laboratory notebooks (which can be recorded and maintained using an electronic notebook system) shall be complete and accurate in all material respects and shall fully and properly reflect all work done, data and developments made, and results achieved.

g. Collaboration Reports. Each Party shall keep the other Party reasonably informed on the status, progress and results of its activities under the Collaboration Plans through the regularly scheduled JRC meetings, including by delivering written reports of its research activities (which may be in the form of a PowerPoint presentation or similar meeting materials) to the JRC at least [*] in advance of each regularly scheduled JRC meeting (unless otherwise agreed by the JRC). Notwithstanding anything to the contrary in this Agreement, Sangamo shall not be obligated to disclose to Novartis (a) [*] unless and until such [*], in each case, pursuant to this Agreement and (b) [*] except in accordance with Section 4.5.

h. Replacement Targets.

12. Replacement Target Right.

i.**Exercise for [*]**. If [*], in each case, tested by Sangamo [*], then Sangamo shall promptly disclose the results of such testing to Novartis and, Novartis shall have [*] right (but not the obligation) to replace any such Exclusive Gene Target (each, a "**Replacement Target Right**") by (A) providing notice thereof to Sangamo, and (B) nominating a replacement Target (which nomination will including the applicable GenBank reference number for such gene) within [*] days of such notice. Upon Sangamo's receipt of such notice, such Exclusive Gene Target shall cease to be an Exclusive Gene Target. For clarity, Novartis

shall have the right to exercise the Replacement Target Right a maximum of [*], whether such Replacement Target Right is exercised pursuant to this Section 4.8(a)(i) or Section 4.8(a)(ii) below.

ii. **Early Exercise for [*]**. Without limiting the foregoing in Section 4.8(a)(i), at any time prior to Sangamo disclosing to Novartis whether [*], in the event the JSC determines that [*], Novartis shall have the right (but not the obligation) to exercise [*] Replacement Target Right with respect to such Exclusive Gene Target by (A) providing notice thereof to Sangamo, and (B) nominating a replacement Target (which nomination will including the applicable GenBank reference number for such gene) within [*] days of such notice. Upon Sangamo's receipt of such notice, such Exclusive Gene Target shall cease to be an Exclusive Gene Target.

13. **Blocked Targets**. Within [*] days after the receipt of the notice from Novartis nominating a Target as a Replacement Target, Sangamo shall notify Novartis in writing confirming whether: (i) Sangamo has [*] with respect to such Target [*] that is [*] that is [*]; (ii) such Target is [*] that [*]; or (iii) such Target [*] under which [*] (each, a "**Blocked Target**"). If the Target nominated by Novartis is a Blocked Target, then Novartis may nominate another Target pursuant to Section 4.8(a), which shall be subject to the same confirmation procedure set forth herein. If the Target nominated by Novartis is not a Blocked Target, then such Target shall be a "**Proposed Replacement Target**" and it shall be submitted by the Parties to the JSC for approval of a Collaboration Plan in accordance with Section 4.2(c).

1. **Replacement Target**. A Proposed Replacement Target shall become a Replacement Target as of the JSC's approval of a Collaboration Plan for such Proposed Replacement Target. Any Proposed Replacement Target shall cease to be such (and as a result shall cease to be an Exclusive Gene Target) upon the expiration of the [*]-day period set forth in Section 4.2(c) without the JSC having approved a Collaboration Plan for such Proposed Replacement Target.

i. **Materials.** To facilitate the conduct of the Collaboration or the performance of other activities under this Agreement, either Party may provide to the other Party certain biological materials or chemical compounds Controlled by the supplying Party for use by the other Party (such materials or compounds and any progeny and derivatives thereof, collectively, "**Materials**"). All such Materials shall remain the sole property of the supplying Party, shall be used only in the fulfillment of obligations or exercise of rights under and in accordance with this Agreement subject to any limitations specified in writing by the supplying Party in connection with such provision and solely under the control of the receiving Party, shall not be used or delivered to or for the benefit of any Third Party (including any Third Party to which the non-supplying Party has granted a sublicense hereunder) without the prior written consent of the supplying Party (such consent not to be unreasonably withheld, conditioned, or delayed) and shall not be used in research or testing involving human subjects, unless expressly agreed. Without limiting the foregoing, neither Party shall reverse engineer, disassemble, compile or determine the composition or sequence of any Materials provided to such Party hereunder. Except as otherwise set forth in this Agreement, THE MATERIALS ARE PROVIDED "AS IS"

AND WITHOUT ANY REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY WARRANTY THAT THE USE OF THE MATERIALS WILL NOT INFRINGE OR VIOLATE ANY PATENT RIGHT OR OTHER PROPRIETARY RIGHTS OF ANY THIRD PARTY.

j. Subcontractors. Each Party shall have the right to engage subcontractors to exercise its rights or perform its obligations under this Agreement, including the activities assigned to such Party under the Collaboration Plan; *provided*, that any such subcontractor is bound by written obligations of confidentiality and non-use consistent with this Agreement and has agreed to assign to such Party (or exclusively license to such Party, with the right to grant sublicenses) all inventions or other intellectual property made by such subcontractor in the course of performing such subcontracted work that specifically relate to the Products or their use, manufacture or sale. Each Party shall be responsible for providing oversight of subcontractors, for any obligations that have been delegated or subcontracted to any subcontractor, and for the performance of its subcontractors.

Article 5.

DEVELOPMENT

a. General. Subject to the terms and conditions of this Agreement, on an Exclusive Gene Target-by-Exclusive Gene Target basis, other than with respect to the activities set forth in the applicable Collaboration Plan for such Exclusive Gene Target, as between the Parties, Novartis shall be solely responsible for the Development of the applicable Products in the Field in the Territory, at its own cost and expense.

b. Development Diligence. Beginning upon selection of the first Collaboration Candidate that Specifically Binds to each Exclusive Gene Target, Novartis shall (by itself or with or through its Affiliates, Sublicensees, or other Third Parties) use Commercially Reasonable Efforts to Develop and obtain Regulatory Approval and, to the extent applicable, Pricing Approval for [*] that Specifically Binds to such Exclusive Gene Target in the Therapeutic Field [*].

c. Product Modifications. Subject to Section 2.1(a)(v), in connection with Novartis' Exploitation of any Collaboration Candidate or Product, Novartis shall have the right to modify or optimize such Collaboration Candidate or Product or any component thereof in its discretion, including to (a) use an alternative delivery mechanism for such Product, (b) modify or optimize Sangamo's Proprietary AAV Vector used in such Product, and (c) modify, optimize or replace the [*] in a Collaboration Candidate or the [*] used for such [*] in such Collaboration Candidate. Notwithstanding anything to the contrary in this Agreement, Novartis shall not [*].

d. Technology Transfer. Subject to the remainder of this Section 5.4, after completion of all research activities allocated to Sangamo under the applicable Collaboration Plan (or, if earlier, the end of the applicable Collaboration Term) for a given Exclusive Gene Target, Sangamo shall promptly (but in no event later than [*] days thereafter) transfer to Novartis copies of all relevant Licensed Know-How then existing and not previously provided to

Novartis that [*] to (a) the Collaboration Candidates or [*] for the applicable Exclusive Gene Target or (b) the delivery mechanism used by Sangamo therewith under such Collaboration Plan. Notwithstanding the foregoing, nothing in this Agreement shall require Sangamo to transfer or disclose any Know-How related to (i) Sangamo Proprietary Activities or (ii) except with respect to [*], the Manufacture of [*], Collaboration Candidates, and Products containing Collaboration Candidates.

e. Conduct of Development. Novartis shall conduct Development work for the Products in good scientific manner and in compliance with all applicable Laws, including GMP, GLP and GCP, as well as regulations involving investigations of human subjects.

f. Development Records. Novartis shall maintain, consistent with applicable Law, the requirements of Regulatory Authorities, and its then-current internal policies and practices, and cause its Affiliates, Sublicensees and subcontractors (including their respective employees) to maintain, records and laboratory notebooks of the Development work conducted for any Product, including all data and results of such Development work.

g. Development Reports. On an Exclusive Gene Target-by-Exclusive Gene Target basis, beginning upon [*] with respect to such Exclusive Gene Target, Novartis shall provide Sangamo, with a written Development report in the form attached hereto as **Exhibit F** once every [*] which describes, in at least the level of detail described in such form, the specified Development activities performed since the last report and the specified planned Development activities, in each case, with respect to such Exclusive Gene Target (each a "**Development Report**"). Upon Sangamo's reasonable request submitted within [*] following its receipt of such Development Report, Novartis shall make its applicable representatives involved in the Development activities for such Exclusive Gene Target available for a meeting (in person or by phone) to respond to Sangamo's reasonable questions with respect to such Development Report. For clarity, all Development Reports shall constitute Confidential Information of Novartis.

h. Assistance and Cooperation.

1. The Parties understand and agree that, from time to time, Novartis may reasonably request assistance and cooperation from Sangamo in connection with:

i. following expiration of the Collaboration Term with respect to an Exclusive Gene Target, the technology transfer contemplated by Section 5.4, including reasonable technical assistance in the practice of the Licensed Technology in the Development and Manufacture of the Products that Specifically Bind to such Exclusive Gene Target, including reasonable access to Sangamo's technical personnel involved in the Development of the applicable [*] and Products and, solely with respect to any AAV Vector contained in any Product, the Manufacture of the applicable [*] and Products; *provided*, that such assistance relating to such Manufacture shall be limited to consulting activities and shall not include any Manufacturing technology transfer except to the extent contemplated by Section 5.4;

ii. during the [*] period following expiration of the Collaboration Term with respect to an Exclusive Gene Target, the further Exploitation of the corresponding [*] and Products containing [*]; and

iii. the preparation and submission of any Regulatory Materials to obtain, support or maintain Regulatory Approvals and Pricing Approvals.

2. Sangamo will provide up to an aggregate of [*] of work relating to any assistance and cooperation contemplated by this Section 5.8 for all Exclusive Gene Targets combined without additional compensation or reimbursement, above which Sangamo shall be entitled to be reimbursed, as follows. Sangamo may invoice Novartis for the Internal Costs which relate to any such work that exceeds such [*] cap, and the reasonable documented Out-of-Pocket Costs, in each case, incurred by Sangamo to provide such requested assistance or cooperation and Novartis shall pay all such undisputed Invoices within [*] days of the date of its receipt of such Invoice; *provided*, that the scope of Sangamo's assistance and cooperation and the related costs are discussed and agreed by the Parties prior to Sangamo's provision thereof.

Article 6.

REGULATORY

a. General. Subject to the terms and conditions of this Agreement, as between the Parties, Novartis shall be solely responsible for all regulatory activities required for obtaining and maintaining Regulatory Approval and Pricing Approval for the Products in the Field in the Territory, at its own cost and expense. As between the Parties, Novartis shall own and hold all Regulatory Materials for the Products in the Field in the Territory. For clarity, Novartis shall be solely entitled to use and receive the benefit of any priority review vouchers received with respect to any Product, including any proceeds received if it elects to transfer to a Third Party or otherwise monetize such priority review voucher.

b. Certain Regulatory Materials. Novartis shall promptly notify Sangamo of any INDs and MAAs submitted by Novartis (or its Affiliates and Sublicensees) relating to any Product in the U.S. or any Ex-US Major Market after submission thereof.

c. Product Recalls. Novartis shall decide and have control over whether to conduct a recall or market withdrawal of any Product or to take other corrective action in any country and the manner in which any such recall, market withdrawal or corrective action shall be conducted, and Novartis shall be solely responsible for the costs and expenses of such recall, market withdrawal or corrective action. Novartis shall promptly provide Sangamo with written notice of any such recall, market withdrawal or corrective action.

Article 7.

MANUFACTURE AND SUPPLY

a. General. Unless otherwise agreed upon by the Parties in writing, as between the Parties, Novartis shall be solely responsible for the Manufacture of Collaboration Candidates and Products, at its own cost and expense, except that Sangamo shall Manufacture any and all

requirements of ZFP products to be used by Sangamo in the conduct of Sangamo's activities under a Collaboration Plan and all Internal Costs and reasonable documented Out-of-Pocket Costs incurred in connection with such Manufacture in accordance with the Collaboration Plan shall be included in the Collaboration Costs and paid by Novartis pursuant to Section 4.4.

Article 8.

COMMERCIALIZATION

a. General. Subject to the terms and conditions of this Agreement, as between the Parties, Novartis shall be solely responsible, at its sole cost and expense, for the Commercialization of Products in the Field in the Territory, including, to the extent applicable: (a) negotiating with applicable Governmental Authorities regarding price and reimbursement status; (b) marketing and promotion; (c) booking sales and distribution and performance of related services; (d) handling all aspects of order processing, invoicing and collection, inventory and receivables; and (e) providing customer support, including handling medical queries and performing other related functions.

b. Commercial Diligence. Novartis shall (by itself or with or through its Affiliates, Sublicensees, or other Third Parties) use Commercially Reasonable Efforts to Commercialize [*] that Specifically Binds to each Exclusive Gene Target in the Therapeutic Field [*] after obtaining Regulatory Approval and, to the extent applicable, Pricing Approval for such Product in such country.

a. Trademarks. Novartis shall have the right to brand the Products using Trademarks it determines appropriate, which may vary by country or within a country. As between the Parties, Novartis shall own all rights in such Trademarks and shall register and maintain such Trademarks in the countries and regions that it determines reasonably necessary, at Novartis's cost and expense.

Article 9.

FINANCIAL PROVISIONS

a. Upfront Payment. Novartis shall pay to Sangamo a one (1)-time, non-refundable, non-creditable upfront payment of seventy-five million Dollars ($75,000,000) within thirty (30) days after receipt by Novartis of an Invoice from Sangamo which is issued promptly following the Effective Date.

b. Milestone Payments.

3. Development Milestone Events. Subject to the remainder of this Section 9.2, on an Exclusive Gene Target-by-Exclusive Gene Target basis, Novartis shall pay to Sangamo the non-refundable, non-creditable payments set forth in the table below (each, a "**Development Milestone Payment**") upon the first achievement of the applicable event listed below (each, a "**Development Milestone Event**") by Novartis, any of its Affiliates or Sublicensees with respect to a ZFP, [*] or Product, as applicable, that Specifically Binds to such Exclusive Gene Target:

Development Milestone Event	Development Milestone Payment
[*]	[*]
[*]	[*]
[*]	[*]
[*]	[*]
[*]	[*]
[*]	[*]

4. **Commercial Milestones**. Subject to the remainder of this Section 9.2, on an Exclusive Gene Target-by-Exclusive Gene Target basis, Novartis shall pay to Sangamo the non-refundable, non-creditable payments set forth in the table below (each, a "**Commercial Milestone Payment**") upon the first achievement of worldwide annual Net Sales for all Products that Specifically Bind to such Exclusive Gene Target achieving the applicable thresholds in a given Calendar Year listed below (each, a "**Commercial Milestone Event**"):

Commercial Milestone Event	Commercial Milestone Payment
[*]	[*]
[*]	[*]
[*]	[*]
[*]	[*]

5. **Milestone Conditions.**

iv. Each Milestone Payment set forth above shall be due and payable only once for each Exclusive Gene Target, regardless of how many times such Milestone Event is achieved or the number of Products that achieve such Milestone Event. The aggregate total of all Development Milestone Payments made: (A) with respect to [*] shall not exceed [*], and (B) with respect to all Exclusive Gene Targets shall not exceed Four Hundred Twenty Million Dollars ($420,000,000). The aggregate total of all Commercial Milestone Payments made: (x) with respect to [*] shall not exceed [*], and (y) with respect to all Exclusive Gene Targets shall not exceed Three Hundred Million Dollars ($300,000,000).

v.Each Milestone Payment set forth above shall be due and payable irrespective of whether such Milestone Event is achieved by Novartis or its Affiliate or Sublicensee.

vi. In the event that any Milestone Event has not been achieved at the time of achievement of a Milestone Event having a higher number than a skipped Milestone Event, then each such skipped Milestone Event shall be deemed achieved at the time of achievement of the higher number Milestone Event, except that a Milestone Event in one country or jurisdiction will not be deemed to be achieved and payable solely because a subsequent Milestone Event was achieved in a different country or jurisdiction. In addition, if [*], then such [*] shall be deemed

[*] and the Development Milestone Event listed in Section [*] shall be deemed achieved (to the extent not previously achieved) on [*] with respect to such [*].

1. Notice and Payment. Novartis shall provide Sangamo with written notice of the achievement of (i) each Development Milestone Event within [*] days after such achievement and (ii) each Commercial Milestone Event in the report provided pursuant to Section 9.3(f) for the Calendar Quarter of the Calendar Year in which such Commercial Milestone Event was achieved. After its receipt of such notice or report, as applicable, Sangamo shall submit an Invoice to Novartis for the corresponding Milestone Payment. Novartis shall pay to Sangamo each Milestone Payment within [*] days after receipt by Novartis of the applicable Invoice.

c. Royalty Payments.

2. Therapeutic Field Royalty Rates. Subject to the remainder of this Section 9.3, Novartis shall make non-refundable, non-creditable royalty payments to Sangamo on the aggregate worldwide Net Sales of all Products that Specifically Bind to a given Exclusive Gene Target sold by Novartis, its Affiliates and Sublicensees in the Therapeutic Field in the Territory, as calculated by multiplying the applicable royalty rate set forth in the table below by the corresponding amount of incremental annual worldwide Net Sales of such Products in the applicable Calendar Year:

Portion of aggregate annual worldwide Net Sales of all Products that Specifically Bind to a given Exclusive Gene Target in a given Calendar Year:	**Royalty Rate**
Less than or equal to [*]	[*]
Greater than [*] but less than or equal to [*]	[*]
Greater than [*]	[*]

3. Aggregation of Net Sales. For the purposes of determining the applicable royalty tier for a Calendar Year, Net Sales in such Calendar Year of all Products that Specifically Bind to the same Exclusive Gene Target shall be aggregated together. For example, if Net Sales in a Calendar Year for all Products that Specifically Bind to the same Exclusive Gene Target equal [*], the royalty payments on such Net Sales will be equal to [*], calculated as follows: (i) [*] on the amount of Net Sales less than or equal to [*]; (ii) [*] on the amount of Net Sales greater than [*] but less than or equal to [*]; and (iii) [*] on the amount of Net Sales greater than [*].

4. One Royalty. Only one (1) royalty shall be due under this Agreement: (i) with respect to the sale of the same unit of Product; and (ii) on the sale of a Product even if the Manufacture or Commercialization of such Product in the Therapeutic Field is Covered by more than one (1) Valid Claim.

5. Royalty Term. Novartis's royalty payment obligations under Section 9.3a) shall expire, on a Product-by-Product and country-by-country basis, upon the latest of: (i) with respect to all Products that Specifically Bind to a given Exclusive Gene Target, the tenth (10^{th}) anniversary of the First Commercial Sale of the first Product that Specifically Binds to

such Target in such country; (ii) the expiration of the last-to-expire Valid Claim in the Licensed Patents in such country that Covers the sale or use of such Product in the Therapeutic Field or the Manufacture of such Product intended for use or sale in the Therapeutic Field; and (iii) the expiration of all Regulatory Exclusivity, if any, granted for such Product in such country in the Therapeutic Field (the "**Royalty Term**"). For clarity, if a new Regulatory Approval is required for a particular Product, then it shall be deemed to be a separate Product from the Product that first obtained Regulatory Approval.

6. Royalty Reductions.

vii.*Know-How Royalty*. If a Product is sold in a country in the Territory during the applicable Royalty Term at a time when there is no Valid Claim in such country that Covers the sale or use of such Product in the Therapeutic Field or the Manufacture of such Product intended for use or sale in the Therapeutic Field and all Regulatory Exclusivity, if any, granted for such Product in the Therapeutic Field in such country has expired, then, for purposes of Section 9.3(a), the royalty rate applicable to the Net Sales of such Product in such country during such time shall be reduced by [*] of the average royalty rate otherwise applicable under Section 9.3(a).

viii.*Loss of Market Exclusivity*. If a Product is sold in a country in the Territory during the applicable Royalty Term at a time when a Loss of Market Exclusivity has occurred with respect to such Product in such country, then, for purposes of Section 9.3(a), the royalty rate applicable to the Net Sales of such Product in such country during the Calendar Quarter in which such Loss of Market Exclusivity occurred [*] shall be reduced by [*] of the average royalty rate otherwise applicable under Section 9.3(a), [*].

i.*Third Party Obligations*. If Novartis reasonably determines that rights to any [*] owned or otherwise controlled by a Third Party are [*] in order to Develop, Manufacture or Commercialize a Product in a country in the Territory, Novartis shall have the right to negotiate and enter into an agreement to acquire such rights through a license or otherwise and to deduct, from the royalties due to Sangamo hereunder with respect to such Product, [*] of (A) any [*] by Novartis or its Affiliate to such Third Party under such agreement that are [*] and (B) [*] by Novartis or its Affiliate to such Third Party under such agreement that are [*]; *provided*, *however*, that Novartis shall not have any right to deduct any portion of any amounts paid to such Third Party under such agreement that are (x) [*] or (y) [*].

ii.*Royalty Floor.* Notwithstanding the foregoing, in no event shall the operation of Section 9.3(e)(i), Section 9.3(e)(ii) or Section 9.3(e)(iii), individually or in combination, reduce the royalties paid to Sangamo with respect to the Net Sales of any Product in any country in the Territory in any Calendar Quarter to less than [*] of the royalty payment that would otherwise have been due pursuant to Section 9.3a) with respect to such Net Sales; *provided*, that, in each of the foregoing circumstances, any such reduction with respect to a Product not fully taken as a result of the application of this Section 9.3(e)(iv) may be carried forward and applied against future royalties otherwise owed with respect to [*], in each case, in such country in the Territory.

iii.*Example Royalty Reduction Calculations*. **Exhibit G** sets forth examples of the application of the royalty reductions set forth in this Section 9.3(e).

7. Reports and Payment. Within [*] days after each Calendar Quarter, commencing with the Calendar Quarter during which any Net Sales of any Products are made anywhere in the Territory, Novartis shall provide Sangamo with a report that contains the following information for the applicable Calendar Quarter, on a Product-by-Product and country-by-country basis: (i) the amount of Net Sales of each Product in Dollars, (ii) a calculation of the royalty payment due on such Net Sales, including the application of any reduction made in accordance with Section 9.3e), and (iii) the aggregate annual Net Sales and whether any Commercial Milestone Event has been achieved. After its receipt of such report, Sangamo shall submit an Invoice to Novartis for the corresponding royalty payment. Novartis shall pay to Sangamo such amount within [*] days after receipt by Novartis of such Invoice.

1. Diagnostic Field Royalties. Prior to Developing or Commercializing any Product for the Diagnostic Field, Novartis shall provide written notice of such intent to Develop or Commercialize such Product for the Diagnostic Field and the Parties shall negotiate in good faith an amendment to this Agreement setting forth reasonable royalties (including royalty rate, royalty term and any royalty reductions) payable by Novartis to Sangamo with respect to the Commercialization of any such Product in the Diagnostic Field. If the Parties cannot agree on such financial terms within a period of [*] days of Sangamo's receipt of such written notice from Novartis, then such dispute shall be referred to the Executive Officers of the Parties for resolution. If the Executive Officers do not fully resolve such matter within [*] Business Days (or a later date agreed to by the Parties) of the matter being referred to them, then such financial terms shall be decided by baseball arbitration pursuant to the terms set forth on **Exhibit H**. On a Product-by-Product basis, Novartis, its Affiliates and Sublicensees shall not have the right to Commercialize any Product in the Diagnostic Field until the Parties have executed an amendment to this Agreement setting forth the agreed upon royalty payment obligations with respect to the Commercialization of such Product in the Diagnostic Field.

d. Currency; Exchange Rate. All amounts payable and calculations under this Agreement shall be in Dollars. All payments to be made by Novartis to Sangamo under this Agreement shall be made in Dollars by bank wire transfer in immediately available funds to a bank account designated by written notice from Sangamo. The rate of exchange to be used in computing the amount of currency equivalent in Dollars for the payment due shall be made by using Novartis's then-current standard exchange rate methodology as applied in its external reporting for the conversion of foreign currency sales into Dollars.

e. Currency Restrictions. In the event that, by reason of applicable Law in any country, it becomes impossible or illegal for a Party to transfer, or have transferred on its behalf, payments owed the other Party under this Agreement, such Party will promptly notify the other Party of the conditions preventing such transfer and such payments will be deposited in local currency in the relevant country to the credit of the other Party in a recognized banking institution designated by the other Party (or, if none is designated by the other Party within a

period of [*] days of the other Party's receipt of such notice, in a recognized banking institution selected by the transferring Party) and identified in a written notice given to the other Party.

f. Late Payments. If Novartis fails to make any payment of any sum due under this Agreement by the date on which such payment is due, then, without limiting any other right or remedy of Sangamo, such late payment shall be paid together with interest thereon at an annual rate (but with interest accruing on a daily basis) of [*] plus the three (3)-month USD-LIBOR rate (or, if the three (3)-month USD LIBOR rate is no longer available, its official successor or such other comparable interbank three (3)-month borrowing rate) as quoted on Bloomberg (or, if Bloomberg no longer exists, a similarly authoritative source) from the date on which such payment was originally due until the date of payment; *provided*, that such rate shall not exceed the rate permissible under applicable Law.

g. Tax.

2. Indirect Taxes. Except as otherwise provided in this Section 9.7, any payments made under this Agreement are exclusive of any transfer taxes such as sales, use, transfer, documentary, stamp, registration, VAT, goods or service (GST), or similar tax (each, an "**Indirect Tax**"), which shall be added thereon as applicable. If any Indirect Tax is required with respect to the transactions, payments or the related transfer of rights or other property pursuant to the terms of this Agreement pursuant to applicable Law, Novartis shall pay such Indirect Tax (and shall indemnify Sangamo for such Indirect Taxes) at the applicable rate with respect to any such payments following the receipt of a valid invoice. The Parties will reasonably cooperate to issue valid tax invoices for all amounts due under this Agreement consistent with applicable Law. The Parties shall reasonably cooperate to report, eliminate or minimize the amount of any Indirect Tax imposed on the transactions contemplated in this Agreement.

3. Income and Withholding Taxes. Except as otherwise provided in this Section 9.7, each Party shall be responsible for its own taxes (including taxes imposed on or measured by Net Sales, capital, franchise or similar taxes pursuant to applicable Law). In the event any payments made by Novartis to Sangamo pursuant to this Agreement shall become subject to withholding taxes under the laws or regulation of any jurisdiction, Novartis shall deduct and withhold the amount of such taxes for the account of Sangamo to the extent required by applicable laws. Notwithstanding the foregoing, if an action taken by Novartis (including any assignment pursuant to Section 15.2, any sublicense of its rights or obligations under this Agreement, any transfer of payment obligations hereunder, a change in Tax residency of Novartis, or payments arise or are deemed to arise through a branch of Novartis or any failure to comply with applicable Laws or filing or record retention requirements) leads to the imposition of withholding tax liability on payment to Sangamo that would not have been imposed in the absence of such action or an increase in such liability above the liability that would have been imposed in the absence of such action, then the sum payable by Novartis (with respect to which such deduction or withholding is required to be made) shall be increased to the extent necessary to ensure that Sangamo receives a sum equal to the sum it would have received had no such action occurred. Any payments due to Sangamo pursuant to this Section 9.7(b) shall promptly be paid by Novartis upon request from Sangamo.

4. **Tax Cooperation**. To the extent that Novartis is required to deduct and withhold taxes on any payments under this Agreement, Novartis shall pay the amounts of such taxes to the proper Governmental Authority in a timely manner and promptly transmit to Sangamo an official tax certificate or other evidence of such withholding sufficient to enable Sangamo to claim such payments of taxes. Novartis shall request from Sangamo any tax forms that may be reasonably necessary in order for Novartis not to withhold tax or to withhold tax at a reduced rate under an applicable bilateral income tax treaty. Sangamo shall use reasonable efforts to provide any such tax forms to Novartis at least [*] days prior to the due date for any payments for which Sangamo desires that Novartis apply a reduced withholding rate. Each Party shall provide the other Party with reasonable assistance to enable the recovery, as permitted by applicable Law, of withholding taxes, VAT, or similar obligations resulting from payments made under this Agreement, such recovery to be for the benefit of the Party bearing such withholding tax, Indirect Taxes, or similar obligations.

h. Financial Records and Audit.

5. Each Party shall keep complete, true and accurate books and records in accordance with its Accounting Standards in relation to this Agreement in sufficient detail to permit the other Party to confirm the accuracy of the amount of Collaboration Costs subject to sharing or reimbursement, royalty payments, and achievement of Commercial Milestone Events. Each Party will keep such books and records for at least [*] years following the Calendar Year to which they pertain. The auditing Party may, upon written request, cause an internationally-recognized independent accounting firm which is reasonably acceptable to audited Party (the "**Auditor**") to inspect the relevant books and records of the audited Party and its Affiliates to verify such Collaboration Costs, royalty payments, achievement of Commercial Milestone Events, and other amounts payable by the audited Party and the related reports, statements and books of accounts, as applicable. Before beginning its audit, the Auditor shall execute an agreement reasonably acceptable to the audited Party pursuant to which the Auditor agrees to keep confidential all information reviewed during the audit.

6. The audited Party and its Affiliates shall make their records available for inspection by the Auditor during regular business hours at such place or places where such records are customarily kept, upon receipt of reasonable advance notice from the auditing Party. The records shall be reviewed solely to verify the accuracy of payments made by the audited Party. Such inspection right shall not be exercised more than once in any Calendar Year and not more frequently than once with respect to records covering any specific period of time. In addition, the auditing Party shall only be entitled to audit the books and records of the auditing Party from the [*] Calendar Years prior to the Calendar Year in which the audit request is made. The auditing Party agrees to hold in strict confidence all information received and all information learned in the course of any audit, except to the extent necessary to enforce its rights under this Agreement or to the extent required to comply with any applicable Law. The Auditor shall provide its audit report and basis for any determination to the audited Party at the time such report is provided to the auditing Party before it is considered final. The Auditor shall have the right to disclose to the auditing Party only its conclusions regarding any payments owed under this Agreement**.**

7. The audited Party shall have the right to request a further determination by such Auditor as to matters which the audited Party disputes within [*] days following receipt of such report. The audited Party will provide the auditing Party and the Auditor with a reasonably detailed statement of the grounds upon which it disputes any findings in the audit report and the Auditor shall undertake to complete such further determination within [*] days after the dispute notice is provided, which determination shall be limited to the disputed matters. Any matter that remains unresolved shall be resolved in accordance with Section 15.5.

8. In the event that the final result of the inspection reveals an undisputed underpayment or overpayment by the audited Party, the underpaid or overpaid amount shall be settled promptly. The auditing Party shall pay for such inspections, as well as its expenses associated with enforcing its rights with respect to any payments hereunder. Notwithstanding the foregoing, if an underpayment of more than [*] of the total payments due for the applicable audit period is discovered, the fees and expenses charged by the Auditor shall be paid by the audited Party.

i. No Projections. Sangamo and Novartis acknowledge and agree that nothing in this Agreement shall be construed as representing an estimate or projection of whether any Milestone Event will be achieved or of anticipated sales of any Product, and that the Milestone Events and Net Sales levels set forth above or elsewhere in this Agreement or that have otherwise been discussed by the Parties are merely intended to define the Milestone Payments and royalty obligations to Sangamo in the event the corresponding Milestone Events or such Net Sales levels are achieved. NEITHER SANGAMO NOR NOVARTIS MAKES ANY REPRESENTATION OR WARRANTY, EITHER EXPRESS OR IMPLIED, THAT IT WILL BE ABLE TO SUCCESSFULLY DEVELOP OR COMMERCIALIZE ANY PRODUCT OR, IF COMMERCIALIZED, THAT ANY PARTICULAR MILESTONE EVENT OR NET SALES LEVEL OF SUCH PRODUCT WILL BE ACHIEVED.

j. Non-Refundable and Non-Creditable Payments. Notwithstanding the non-refundable or non-creditable nature of any payments hereunder, but subject to the limitations set forth in Section 14.5, nothing in this Agreement shall limit either Party's rights to assert or obtain damages for breach of this Agreement, including damages calculated based on the payments made under this Agreement.

Article 10.

INTELLECTUAL PROPERTY RIGHTS

a. Ownership of Inventions.

9. By Inventorship. Except as set forth in Section 10.1(b), Section 10.1(c) and Section 10.1(d) below, ownership of all Inventions shall be based on inventorship, as determined in accordance with the rules of inventorship under United States patent laws. Each Party shall solely own any Inventions made solely by its and its Affiliates' and Sublicensees' employees, agents, or independent contractors ("**Sole Inventions**"). The Parties shall jointly own any Inventions that are made jointly by employees, agents, or independent contractors of one Party and its Affiliates and Sublicensees together with employees, agents, or independent

contractors of the other Party and its Affiliates and Sublicensees ("**Joint Inventions**"). All Patent Rights claiming patentable Joint Inventions shall be referred to herein as "**Joint Patents**". Except to the extent either Party is restricted by the licenses granted to the other Party under this Agreement, each Party shall be entitled to practice, license (through multiple tiers), assign and otherwise exploit the Joint Inventions and Joint Patents in all countries and jurisdictions without the duty of accounting or seeking consent from the other Party.

10. **[*]**. Notwithstanding Section 10.1(a) and subject to Section 10.1(d), Sangamo shall solely own (i) all Inventions that are [*] and (ii) all [*] Inventions. To the extent any such Invention that belongs to Sangamo under this Section 10.1(b) is made by Novartis, its Affiliates or Sublicensees or its or their employees, agents, or independent contractors, whether solely or jointly, Novartis shall and hereby does assign and transfer to Sangamo, without additional consideration, all right, title and interest in and to such Invention (including all rights of action and claims for damages and benefits arising due to past and present infringement of such Invention), and such Invention shall be deemed Sangamo's Sole Invention and Sangamo's Confidential Information (and not the Confidential Information of Novartis). For clarity, if Novartis modifies an [*], in each case, that is [*], such Invention will be [*], as applicable, and solely owned by Sangamo. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Novartis a perpetual, irrevocable, non-exclusive, fully-paid, royalty-free, worldwide, freely sublicensable license, to use the Inventions assigned to Sangamo pursuant to this Section 10.1(b), for any and all purposes.

11. **[*]**. Notwithstanding Section 10.1(a) and subject to Section 10.1(d), Novartis shall solely own all Inventions that are [*]. To the extent any such Invention that belongs to Novartis under this Section 10.1(c) is made by Sangamo, its Affiliates or Sublicensees or its or their employees, agents, or independent contractors, whether solely or jointly, Sangamo shall and hereby does assign and transfer to Novartis, without additional consideration, all right, title and interest in and to such Invention (including all rights of action and claims for damages and benefits arising due to past and present infringement of such Invention), and such Invention shall be deemed Novartis' Sole Invention and Novartis' Confidential Information (and not the Confidential Information of Sangamo). For clarity, if Sangamo [*], in each case, that is [*], such Invention will be [*] and solely owned by Novartis. The [*], shall not, in itself, be [*]. Subject to the terms and conditions of this Agreement, Novartis hereby grants to Sangamo a perpetual, irrevocable, non-exclusive, fully-paid, royalty-free, worldwide, freely sublicensable license, to use the Inventions assigned to Novartis pursuant to this Section 10.1(c), for any and all purposes.

1. **[*]**. Notwithstanding Section 10.1(a), all Inventions that are both (i) [*] and (ii) [*] shall be deemed Joint Inventions and jointly owned by the Parties.

2. **Disclosure**. Each Party shall promptly disclose to the JPC all Inventions, including all invention disclosures or other similar documents submitted to such Party by its, or its Affiliates' or Sublicensees', employees, agents or independent contractors relating to such Inventions, and shall also respond promptly to reasonable requests from the JPC for additional information relating to such Inventions.

3. Personnel Obligations. Each employee, agent or independent contractor of a Party or its respective Affiliates or Sublicensees performing work under this Agreement shall, prior to commencing such work, be bound by invention assignment obligations, including: (i) promptly reporting any invention, discovery, process or other intellectual property right to the applicable Party, its Affiliate or Sublicensee; (ii) presently assigning to the applicable Party, its Affiliate or Sublicensee all of his or her right, title and interest in and to any invention, discovery, process or other intellectual property; (iii) cooperating in the preparation, filing, prosecution, maintenance and enforcement of any patent and patent application with respect to such invention, discovery, process or other intellectual property; and (iv) performing all acts and signing, executing, acknowledging and delivering any and all documents required for effecting the obligations and purposes of this Agreement. It is understood and agreed that any such invention assignment agreement need not reference or be specific to this Agreement.

b. Patent Prosecution.

4. Sangamo Patents.

iv. As between the Parties, Sangamo shall have the first right, but not the obligation, to file, prosecute and maintain all Sangamo Patents throughout the world, and Sangamo shall be solely responsible for all costs and expenses incurred in connection with such filing, prosecution and maintenance in each jurisdiction listed on **Exhibit I** (the "**Core Jurisdictions**"). If Novartis desires that Sangamo file, prosecute or maintain any Sangamo Patents in any jurisdictions other than the Core Jurisdictions, Novartis shall notify Sangamo, and provided that such notice is timely received by Sangamo, Sangamo shall file, prosecute or maintain, as applicable, such Sangamo Patents in such jurisdictions, and Novartis shall be solely responsible for all Out-of-Pocket Costs incurred by Sangamo in connection with the filing, prosecution and maintenance of such Sangamo Patents in such jurisdictions. Sangamo shall keep the JPC reasonably informed of the status of such Sangamo Patents and shall promptly provide the JPC with material correspondence received from any patent authorities in connection therewith. In addition, Sangamo shall promptly provide the JPC with drafts of all proposed material filings and correspondence to any patent authorities with respect to such Sangamo Patents for the JPC's review and comment prior to the submission of such proposed filings and correspondence. Sangamo shall incorporate the JPC's comments prior to submitting such filings and correspondence; *provided*, that Novartis' representative to the JPC provides such comments to the JPC within [*] Business Days of receiving the draft filings and correspondence from Sangamo. If Novartis' representative to the JPC does not provide comments within such period of time, then Novartis' representative to the JPC shall be deemed to have no comment to such proposed filings or correspondence. Subject to Novartis' right pursuant to Section 10.2(a)(ii) below to continue prosecution and maintenance of any such Sangamo Patents for which Sangamo decides to cease prosecution or maintenance, in case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of such Sangamo Patents, such dispute shall be resolved in accordance with Section 3.6(b).

v.Sangamo shall notify Novartis of any decision to cease prosecution or maintenance of any Sangamo Patent in any country. Sangamo shall provide such notice at least

[*] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such Sangamo Patent. In such event, Sangamo shall permit Novartis, at its discretion and expense, to continue prosecution or maintenance of such Sangamo Patent in such country.

i.For the purpose of this Article 10, "prosecution" shall include any post-grant proceeding, including supplemental examination, post grant review proceeding, inter partes review proceeding, patent interference proceeding, opposition proceeding, reissue and reexamination.

1. [*] Licensed Patents.

i.For any Invention that can be claimed in both a [*] Licensed Patent and in a Sangamo Patent, Sangamo shall have the first right, but not the obligation, at its sole cost and expense, to draft and prepare the specification for each such [*] Licensed Patent that will be consistent with the specification for such corresponding Sangamo Patent; *provided*, that (A) the rights of the JPC to review and comment on such specification set forth in Section 10.2(a)(i) shall apply to the drafting and preparation of such specification for the [*] Licensed Patent and (B) in case of a disagreement at the JPC with respect to the draft specification for such [*] Licensed Patent, such dispute shall be resolved in accordance with Section 3.6(b)(ii). The Parties, through the JPC, will coordinate with respect to the patent strategy for any such [*] Licensed Patent and any such Sangamo Patent that claim the same Invention and, unless the JPC agrees otherwise (with no final decision making authority), the applications for such Sangamo Patent and such [*] Licensed Patent shall be filed on the same date by Sangamo and Novartis, respectively, and the [*] Licensed Patent application shall have the specification drafted and prepared in accordance with this Section 10.2(b)(i).

ii. Subject to Section 10.2(b)(i), as between the Parties, Novartis shall have the first right, but not the obligation, to file, prosecute and maintain all [*] Licensed Patents throughout the world, and Novartis shall be solely responsible for all costs and expenses incurred in connection with such filing, prosecution and maintenance. Novartis shall keep the JPC reasonably informed of the status of such [*] Licensed Patents and shall promptly provide the JPC with material correspondence received from any patent authorities in connection therewith. In addition, Novartis shall promptly provide the JPC with drafts of all proposed material filings and correspondence to any patent authorities with respect to such [*] Licensed Patents for the JPC's review and comment prior to the submission of such proposed filings and correspondence. Novartis shall incorporate the JPC's comments prior to submitting such filings and correspondence; *provided*, that Sangamo's representative to the JPC provides such comments to the JPC within [*] Business Days of receiving the draft filings and correspondence from Novartis. If Sangamo's representative to the JPC does not provide comments within such period of time, then Sangamo's representative to the JPC shall be deemed to have no comment to such proposed filings or correspondence. Subject to Sangamo's right pursuant to Section 10.2(b)(iii) below to continue prosecution and maintenance of any such [*] Licensed Patents for which Novartis decides to cease prosecution or maintenance, in case of a disagreement at the JPC with

respect to the filing, prosecution or maintenance of such [*] Licensed Patents, such dispute shall be resolved in accordance with Section 3.6(b).

iii. Novartis shall notify Sangamo of any decision to cease prosecution or maintenance of any [*] Licensed Patent in any country. Novartis shall provide such notice at least [*] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such [*] Licensed Patent. In such event, Novartis shall permit Sangamo, at its discretion and expense, to continue prosecution or maintenance of such [*] Licensed Patent in such country, and thereafter such [*] Licensed Patent shall no longer constitute a Licensed Patent in such country unless such [*] Licensed Patent contains the last to expire Valid Claim in the Licensed Patents in such country that Covers the sale or use of any Product in the Therapeutic Field or the Manufacture of any Product intended for use or sale in the Therapeutic Field, in which case such [*] Licensed Patent shall only cease to be a Licensed Patent in such country if Sangamo provides written notice to Novartis that Sangamo, in its discretion, has terminated Novartis' licenses to such [*] Licensed Patent.

iv. Subject to this Section 10.2, in the event that Novartis reasonably believes that Sangamo may be able to file a [*] Licensed Patent pursuant to the exercise of its rights with respect to Sangamo Patents or Other Joint Patents, then Novartis shall provide Sangamo written notice thereof, and the Parties shall promptly meet thereafter to discuss in good faith such matters.

1. [*] Joint Patents.

i. For any Joint Invention that can be claimed in both a [*] Joint Patent and in an Other Joint Patent, Sangamo shall have the first right, but not the obligation, at its sole cost and expense, to draft and prepare the specification for each such [*] Joint Patent that will be consistent with the specification for such corresponding Other Joint Patent; *provided*, that (A) the rights of the JPC to review and comment on such specification set forth in Section 10.2(b)(i) shall apply to the drafting and preparation of such specification for the [*] Joint Patent, and (B) in case of a disagreement at the JPC with respect to the draft specification for such [*] Joint Patent, such dispute shall be resolved in accordance with Section 3.6(b)(ii). The Parties, through the JPC, will coordinate with respect to the patent strategy for any such [*] Joint Patent and any such Other Joint Patent that claim the same Joint Invention and, unless the JPC agrees otherwise (with no final decision making authority), the applications for such Other Joint Patent and such [*] Joint Patent shall be filed on the same date by Sangamo and Novartis, respectively, and the [*] Joint Patent application shall have the specification drafted and prepared in accordance with this Section 10.2(c)(i).

i. Subject to Section 10.2(c)(i), as between the Parties, Novartis shall have the first right, but not the obligation, to file, prosecute and maintain all [*] Joint Patents throughout the world, and Novartis shall be solely responsible for all costs and expenses incurred in connection with such filing, prosecution and maintenance. Novartis shall keep the JPC reasonably informed of the status of [*] Joint Patents and shall promptly provide the JPC with material correspondence received from any patent authorities in connection therewith. In addition, Novartis shall promptly provide the JPC with drafts of all proposed material filings and

correspondence to any patent authorities with respect to [*] Joint Patents for the JPC's review and comment prior to the submission of such proposed filings and correspondence. Novartis shall incorporate the JPC's comments prior to submitting such filings and correspondence; *provided*, that Sangamo's representative to the JPC provides such comments within [*] Business Days of receiving the draft filings and correspondence from Novartis. If Sangamo's representative to the JPC does not provide comments within such period of time, then Sangamo's representative to the JPC shall be deemed to have no comment to such proposed filings or correspondence. Subject to Sangamo's right pursuant to Section 10.2(c)(iii) below to continue prosecution and maintenance of any such [*] Joint Patents for which Novartis decides to cease prosecution or maintenance, in case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of [*] Joint Patents, such dispute shall be resolved in accordance with Section 3.6(b).

ii. Novartis shall notify Sangamo of any decision to cease prosecution or maintenance of any [*] Joint Patent in any country. Novartis shall provide such notice at least [*] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such [*] Joint Patent. In such event, Novartis shall permit Sangamo, at its discretion and expense, to continue prosecution or maintenance of such [*] Joint Patent in such country.

1. Other Joint Patents.

i.Allocation of Rights and Responsibilities. Prior to the filing, prosecution or maintenance of any Other Joint Patent anywhere in the world that is not a [*] Other Joint Patent or a [*] Other Joint Patent, upon the request of either Party, the Parties shall meet and discuss in good faith the allocation of rights and responsibilities between the Parties with respect to such activities for such Other Joint Patents. If the Parties cannot agree on such allocation within a period of [*] days of the applicable Party's receipt of such request, then such dispute shall be referred to the Executive Officers of the Parties for resolution.

ii.Sangamo Prosecuted Other Joint Patents.

a. As between the Parties, Sangamo shall have the first right, but not the obligation, to file, prosecute and maintain (A) all Other Joint Patents throughout the world that claim an Invention that [*] (a "**[*] Other Joint Patent**") and (B) any Other Joint Patent that the Parties agree pursuant to Section 10.2(d)(i) will be first prosecuted by Sangamo (collectively, with [*] Other Joint Patents, the "**Sangamo Prosecuted Other Joint Patents**"), and Sangamo shall be solely responsible for all costs and expenses incurred in connection with such filing, prosecution and maintenance in the Core Jurisdictions. If Novartis desires that Sangamo file, prosecute or maintain any Sangamo Prosecuted Other Joint Patent in any jurisdictions other than the Core Jurisdictions, Novartis shall notify Sangamo, and provided that such notice is timely received by Sangamo, Sangamo shall file, prosecute or maintain, as applicable, such Sangamo Prosecuted Other Joint Patents in such jurisdictions, and Novartis shall be solely responsible for all Out-of-Pocket Costs incurred by Sangamo in connection with the filing, prosecution and maintenance of such Sangamo Prosecuted Other Joint Patents in such jurisdictions. Sangamo shall keep the JPC reasonably informed of the status of Sangamo

Prosecuted Other Joint Patents and shall promptly provide the JPC with material correspondence received from any patent authorities in connection therewith. In addition, Sangamo shall promptly provide the JPC with drafts of all proposed material filings and correspondence to any patent authorities with respect to Sangamo Prosecuted Other Joint Patents for the JPC's review and comment prior to the submission of such proposed filings and correspondence. Sangamo shall incorporate the JPC's comments prior to submitting such filings and correspondence; *provided*, that Novartis's representative to the JPC provides such comments within [*] Business Days of receiving the draft filings and correspondence from Sangamo. If Novartis's representative to the JPC does not provide comments within such period of time, then Novartis's representative to the JPC shall be deemed to have no comment to such proposed filings or correspondence. Subject to Novartis's right pursuant to Section 10.2(d)(ii)(2) below to continue prosecution and maintenance of any such Sangamo Prosecuted Other Joint Patents for which Sangamo decides to cease prosecution or maintenance, in case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of Sangamo Prosecuted Other Joint Patents, such dispute shall be resolved in accordance with Section 3.6(b).

b. Sangamo shall notify Novartis of any decision to cease prosecution or maintenance of any Sangamo Prosecuted Other Joint Patent in any country. Sangamo shall provide such notice at least [*] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such Sangamo Prosecuted Other Joint Patent. In such event, Sangamo shall permit Novartis, at its discretion and expense, to continue prosecution or maintenance of such Sangamo Prosecuted Other Joint Patent in such country.

iii.Novartis Prosecuted Other Joint Patents.

c. As between the Parties, Novartis shall have the first right, but not the obligation, to file, prosecute and maintain (A) all Other Joint Patents throughout the world that claim an Invention that primary relates to [*] (a "**[*] Other Joint Patent**") and (B) any Other Joint Patent that the Parties agree pursuant to Section 10.2(d)(i) will be first prosecuted by Novartis (collectively, with [*] Other Joint Patents, the "**Novartis Prosecuted Other Joint Patents**"), and Novartis shall be solely responsible for all costs and expenses incurred in connection with such filing, prosecution and maintenance. Novartis shall keep the JPC reasonably informed of the status of Novartis Prosecuted Other Joint Patents and shall promptly provide the JPC with material correspondence received from any patent authorities in connection therewith. In addition, Novartis shall promptly provide the JPC with drafts of all proposed material filings and correspondence to any patent authorities with respect to Novartis Prosecuted Other Joint Patents for the JPC's review and comment prior to the submission of such proposed filings and correspondence. Novartis shall incorporate the JPC's comments prior to submitting such filings and correspondence; *provided*, that Sangamo's representative to the JPC provides such comments within [*] Business Days of receiving the draft filings and correspondence from Novartis. If Sangamo's representative to the JPC does not provide comments within such period of time, then Sangamo's representative to the JPC shall be deemed to have no comment to such proposed filings or correspondence. Subject to Sangamo's right pursuant to Section 10.2(d)(iii)(2) below to continue prosecution and maintenance of any such

Novartis Prosecuted Other Joint Patents for which Novartis decides to cease prosecution or maintenance, in case of a disagreement at the JPC with respect to the filing, prosecution or maintenance of Novartis Prosecuted Other Joint Patents, such dispute shall be resolved in accordance with Section 3.6(b).

d. Novartis shall notify Sangamo of any decision to cease prosecution or maintenance of any Novartis Prosecuted Other Joint Patent in any country. Novartis shall provide such notice at least [*] days prior to any filing or payment due date, or any other due date that requires action in order to avoid loss of rights, in connection with such Novartis Prosecuted Other Joint Patent. In such event, Novartis shall permit Sangamo, at its discretion and expense, to continue prosecution or maintenance of such Novartis Prosecuted Other Joint Patent in such country.

2. Other Sangamo Patents. As between the Parties, Sangamo shall have the sole right, but not the obligation, to file, prosecute and maintain throughout the world, at its own expense, (i) all Licensed Patents that are not Sangamo Patents, [*] Licensed Patents or Joint Patents and (ii) all Patent Rights controlled by Sangamo that are not Licensed Patents or Joint Patents.

3. Novartis Patents. As between the Parties, Novartis shall have the sole right, but not the obligation, to file, prosecute and maintain throughout the world, at its own expense, all Patent Rights controlled by Novartis that are not Joint Patents.

4. Cooperation. Each Party shall provide the other Party, at the other Party's request and expense, all reasonable assistance and cooperation in the patent prosecution efforts under this Section 10.2, including providing any necessary powers of attorney and executing any other required documents or instruments for such prosecution. The Parties shall take reasonable measures to coordinate the filing of applications for related [*] Joint Patents and Other Joint Patents and for related Sangamo Patents and [*] Licensed Patents with the goal of minimizing prior art issues. The Parties acknowledge and agree that this Agreement will be deemed a "joint research agreement" as defined under 35 U.S.C. § 100(h) (a "**Joint Research Agreement**"). Unless the JPC otherwise agrees, each Patent Right application filed under this Agreement claiming an Invention shall specify that such Invention has been generated under a Joint Research Agreement.

c. Patent Enforcement.

5. Notification. If either Party becomes aware of any (i) infringement, anywhere in the world, of any issued patent within the Licensed Patents on account of a Third Party's manufacture, use, importation, offer for sale or sale of any therapeutic product containing a ZFP that Specifically Binds to any Exclusive Gene Target, including any BLA filed by a Third Party for a Biosimilar Product that names a Product as a Reference Product (or similar filing in a country other than the U.S.) or (ii) declaratory judgment action by a Third Party that is developing or commercializing any therapeutic product containing a ZFP that Specifically Binds to any Exclusive Gene Target alleging the invalidity, unenforceability or non-infringement of

any of the Licensed Patents (collectively, a "**Product Infringement**"), such Party shall promptly notify the other Party in writing to that effect.

6. Enforcement Rights.

iv.[*] Licensed Patents and [*] Joint Patents. For any Product Infringement of a [*] Licensed Patent or a [*] Joint Patent, as between the Parties, Novartis shall have the first right, but not the obligation, to bring an appropriate suit or take other action against any person or entity engaged in such Product Infringement, at its own cost and expense. If Novartis fails to institute and prosecute an action or proceeding to abate such Product Infringement within a period of [*] after the first notice of such Product Infringement under Section 10.3a) (or such shorter period as may be necessary to bring or defend and maintain such action without loss of rights), then [*], Sangamo shall have the second right, but not the obligation, to commence a suit or take other action to enforce the applicable [*] Licensed Patent or a [*] Joint Patent against such Product Infringement at its own cost and expense. In the event that Novartis does not [*], Sangamo may [*] and, thereafter, Novartis shall [*].

v.Sangamo Patents. For any Product Infringement of a Sangamo Patent, as between the Parties, Sangamo shall have the first right, but not the obligation, to bring an appropriate suit or take other action against any person or entity engaged in such Product Infringement, at its own cost and expense. If Sangamo fails to institute and prosecute an action or proceeding to abate such Product Infringement within a period of [*] after the first notice of such Product Infringement under Section 10.3a) (or such shorter period as may be necessary to bring or defend and maintain such action without loss of rights), then:

a. upon Sangamo's written consent (not to be unreasonably withheld, conditioned, or delayed), Novartis shall have the second right, but not the obligation, to commence a suit or take other action to enforce the applicable Sangamo Patent, other than any Sangamo [*] Patent, against such Product Infringement at its own cost and expense; or

b. Novartis shall have the second right, but not the obligation, to commence a suit or take other action to enforce the applicable Sangamo [*] Patent against such Product Infringement at its own cost and expense; *provided*, that, to the extent that Sangamo has either (A) [*] or (B) [*] (each such Sangamo [*] Patent, a "**[*] Patent**"), then, in each case of (A) or (B), at the time of Sangamo's election not to commence a suit or take other action to enforce the applicable Sangamo [*] Patent, Sangamo shall notify Novartis that such Sangamo [*] Patent is a [*] Patent and Novartis may only commence such suit or take such other action upon Sangamo's written consent (not to be unreasonably withheld, conditioned, or delayed).

In the event that Sangamo does not provide such consent as described above, Novartis may provide Sangamo with a written notice requesting for Sangamo to provide a reasonable explanation as to its decision not to permit Novartis to exercise such back-up enforcement right and, thereafter, Sangamo shall make its applicable representatives involved in such decision available (in person or by phone) to provide such an explanation to Novartis.

vi.Other Joint Patents. For any Product Infringement of an Other Joint Patent, as between the Parties, the Party allocated the right to file, prosecute and maintain such Patent Right in accordance with Section 10.2(d) shall have the first right, but not the obligation, to bring an appropriate suit or take other action against any person or entity engaged in such Product Infringement, at its own cost and expense. If such Party fails to institute and prosecute an action or proceeding to abate such Product Infringement within a period of [*] after the first notice of such Product Infringement under Section 10.3a) (or such shorter period as may be necessary to bring or defend and maintain such action without loss of rights), then the other Party shall have the second right, but not the obligation, to commence a suit or take other action to enforce the applicable Other Joint Patent against such Product Infringement at its own cost and expense.

7. Collaboration. Each Party shall provide to the enforcing Party reasonable assistance in any enforcement claim, suit or action brought under Section 10.3b), at such enforcing Party's request and expense, including to be named in such claim, suit or action if required by applicable Laws to pursue such action. The enforcing Party shall keep the other Party regularly informed of the status and progress of such enforcement efforts, shall reasonably consider the other Party's comments on any such efforts, including determination of litigation strategy and filing of material papers to the competent court. The non-enforcing Party shall be entitled to separate representation in such matter by counsel of its own choice and at its own expense, but such Party shall at all times cooperate fully with the enforcing Party. The enforcing Party shall not settle any claim, suit or action that it brought under Section 10.3b) in any manner that would negatively affect the applicable Licensed Patents or Joint Patents, without the prior written consent of the other Party, which consent shall not be unreasonably withheld, conditioned or delayed.

8. Expenses and Recoveries. The enforcing Party bringing a claim, suit or action under Section 10.3b) shall be solely responsible for any expenses incurred by such Party as a result of such claim, suit or action. Any recovery of monetary damages in connection with such claim, suit or action shall be allocated first to the reimbursement of any Out-of-Pocket Costs incurred by the Party bringing suit, second to the reimbursement of any Out-of-Pocket Costs incurred by the other Party in such claim, suit or action, and any remaining amounts shall be (i) [*] if [*] is the enforcing Party, to the extent relating to any Product Infringement of a [*] Licensed Patent, [*] Joint Patent, or Sangamo [*] Patent ([*]) and (ii) to the extent relating to Product Infringement of any Sangamo Patent or other Joint Patent or, where [*] is the enforcing Party, to the extent relating to any Product Infringement of a [*] Licensed Patent, [*] Joint Patent, or Other Joint Patent, [*] as follows: [*] to [*], and [*] to [*].

9. Other Infringement. Sangamo shall have the sole right, but not the obligation, to bring and control, at its own cost and expense, any legal action in connection with (i) any infringement of any Licensed Patent that is not a Product Infringement or (ii) any infringement of (x) any Licensed Patent that is not a Sangamo Patent, a [*] Licensed Patent or Joint Patent or (y) any Patent Right controlled by Sangamo that is not a Licensed Patent (including, to the extent applicable, Patent Rights related to Sangamo Proprietary Activities).

a. Notice. If a Party becomes aware of any actual or potential claim, action, suit, or proceeding alleging that Sangamo's or any of its Affiliates' or contractors' ZFP screening, generating, design or optimization activities under the Collaboration or the Exploitation of any [*] ZFP, Collaboration Candidate, or Product under this Agreement infringes, misappropriates, or otherwise violates any intellectual property rights of a Third Party, then such Party will notify the JPC thereof promptly following the date on which such Party becomes aware of such actual or potential claim, action, suit, or proceeding (each, a "**Third Party Infringement Notice**").

b. Patent Extensions. Novartis shall have the exclusive right, but not the obligation, to seek, in Sangamo's name, if so required, patent term extensions, patent term restorations and supplemental protection certificates or the like available under applicable Law, including 35 U.S.C § 156 and applicable foreign counterparts, in any country in the Territory in relation to the [*] Licensed Patents and [*] Joint Patents. Sangamo and Novartis shall cooperate in connection with all such activities. Novartis, its agents and attorneys shall give due consideration to all suggestions and comments of Sangamo regarding any such activities, but in the event of a disagreement between the Parties, Novartis shall have the final decision making authority; *provided*, that [*] shall [*], including through the use of supplemental protection certificates and the like.

c. Patents Licensed From Third Parties. Each Party's rights under Sections 10.2, 10.3 and 10.4 with respect to any Licensed Patent that is licensed by Sangamo from a Third Party shall be subject to the rights retained by such Third Party pursuant to the applicable Upstream License.

Article 11.

CONFIDENTIALITY; PUBLICATION

a. Duty of Confidence. Subject to the other provisions of this Article 11:

10. during the Term and for [*] years thereafter, all Confidential Information of a Party or any of its Affiliates (the "**Disclosing Party**") shall be maintained in confidence and otherwise safeguarded by the other Party and its Affiliates (the "**Receiving Party**"), in the same manner and with the same protections as the Receiving Party maintains its own confidential information, but in any event no less than reasonable efforts;

11. the Receiving Party may only use any such Confidential Information for the purposes of performing its obligations or exercising its rights under this Agreement;

12. the Receiving Party may only disclose Confidential Information of the other Party to: (i) its Affiliates, licensees and Sublicensees; and (ii) employees, directors, agents, contractors, consultants and advisers of the Receiving Party and its Affiliates and Sublicensees, in each case ((i) and (ii)), to the extent reasonably necessary for the purposes of performing its obligations or exercising its rights under this Agreement; *provided*, that such Persons are bound by legally enforceable obligations to maintain the confidentiality and limit the use of the Confidential Information in a manner consistent with the confidentiality and non-use provisions of this Agreement; and

1. the terms and conditions of this Agreement shall be considered Confidential Information of both Parties.

b. Exceptions. The foregoing obligations as to particular Confidential Information of a Disclosing Party shall not apply to the extent that the Receiving Party can demonstrate that such Confidential Information:

2. is known by the Receiving Party at the time of its receipt without an obligation of confidentiality, and not through a prior disclosure by the Disclosing Party, as documented by the Receiving Party's business records;

3. is in the public domain before its receipt from the Disclosing Party, or thereafter enters the public domain through no fault of the Receiving Party;

4. is subsequently disclosed to the Receiving Party by a Third Party who may lawfully do so and is not under an obligation of confidentiality to the Disclosing Party; or

5. is discovered or developed by the Receiving Party independently and without use of or reference to any Confidential Information received from the Disclosing Party, as documented by the Receiving Party's business records.

Any combination of features or disclosures shall not be deemed to fall within the foregoing exclusions merely because individual features are published or available to the general public or in the rightful possession of the Receiving Party unless the combination itself and principle of operation are published or available to the general public or in the rightful possession of the Receiving Party.

c. Authorized Disclosures. Notwithstanding the obligations set forth in Sections 11.1 and 11.6, a Party may disclose the other Party's Confidential Information (including this Agreement and the terms herein) to the extent:

6. such disclosure is reasonably necessary: (i) to such Party's directors, attorneys, independent accountants or financial advisors for the sole purpose of enabling such directors, attorneys, independent accountants or financial advisors to provide advice to such Party; *provided*, that in each such case (x) such recipients are bound by confidentiality and non-use obligations that are at least as restrictive as those contained in this Agreement and (y) the term of confidentiality for such recipients may be shorter than the period set forth in this Agreement as long as it is no less than [*]; or (ii) (1) to actual or potential investors, lenders or acquirors, (2) in the case of Novartis, to its Sublicensees, or (3) in the case of Sangamo, to any sublicensee of any license granted to Sangamo pursuant to Section 12.3(b), solely in each such case for the purpose of evaluating or carrying out an actual or potential investment, financing, acquisition, loan or sublicense; *provided*, that in each such case (x) such recipients are bound by confidentiality and non-use obligations at least as restrictive as those contained in the Agreement and (y) the term of confidentiality for recipients may be shorter than the period set forth in this Agreement as long as it is no less than [*]; *provided*, *further*, that, solely in the case of any disclosure by a Party pursuant to (ii)(1) to an actual or potential investor or lender (but not an

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

actual or potential acquiror) that is a pharmaceutical or biotechnology company (a "**Pharma Investor**"), (1) except for the following categories of information described in (A) – (D), all such disclosures of Confidential Information of the other Party will be provided to [*] bound by confidentiality and non-use obligations in accordance with the previous proviso and [*]: (A) the terms of this Agreement, (B) the [*], (C) anticipated [*] and (D) summary [*], (2) to the extent any [*] such Pharma Investor receives Confidential Information of Novartis or any of its Affiliates that is not also disclosed [*] in accordance with the terms of this Agreement, such [*] will be entitled to [*] only a [*], which may include (i) a [*] or (ii) statements [*] the applicable Confidential Information of Novartis or its Affiliates [*] provides a reasonable basis for [*] made in accordance with this Agreement, but in no event shall such [*] be authorized to disclose to [*] any Confidential Information of Novartis or its Affiliates that is [*] in accordance with the terms of this Agreement, (3) such Party shall not disclose any Confidential Information to such Pharma Investor that is not also disclosed to such Party's other actual or potential investors or lenders with respect to the applicable investment, financing or loan, and (4) such Party shall provide the other Party, prior to or contemporaneously with such disclosure, written notice that [*] (*provided*, that, for clarity, [*]);

7. such disclosure is to a Governmental Authority and necessary or desirable (i) to obtain or maintain INDs, Regulatory Approvals or Pricing Approvals for any Product within the Territory, (ii) in order to respond to inquiries, requests or investigations by such Governmental Authority relating to Products or this Agreement, or (iii) in connection with the filing, prosecution and maintenance of Patent Rights as permitted by this Agreement;

8. such disclosure is required by applicable Law, judicial or administrative process; *provided*, that (x) except for disclosures governed by the last two (2) sentences of Section 11.4, in such event such Party shall promptly inform the other Party of such required disclosure and provide the other Party an opportunity to challenge or limit the disclosure obligations, (y) Confidential Information that is disclosed pursuant to Section 11.3b) or this Section 11.3c) shall remain otherwise subject to the confidentiality and non-use provisions of this Article 11 (*provided*, that such disclosure is not a public disclosure), and (z) the Party disclosing Confidential Information to a Governmental Authority or pursuant to applicable Law or court order shall cooperate with and reasonably assist the other Party (at the other Party's cost) if the other Party seeks a protective order or other remedy in respect of any such disclosure and furnish only that portion of the Confidential Information which, in the opinion of Party's legal counsel, is responsive to such requirement or request;

9. such disclosure is necessary in order to enforce its rights under the Agreement; or

10. such disclosure is reasonably necessary for Sangamo to comply with its obligations under any Upstream Licenses.

d. SEC Filings and Other Disclosures. Either Party may disclose the terms of this Agreement and make any other public written disclosure regarding the existence of, or performance under, this Agreement, to the extent required, in the reasonable opinion of such Party's legal counsel, to comply with (a) applicable Law, including the rules and regulations

promulgated by the United States Securities and Exchange Commission or (b) any equivalent Governmental Authority, securities exchange or securities regulator in any country in the Territory. Before disclosing this Agreement or any of the terms hereof pursuant to this Section 11.4, the Parties shall consult with one another with respect to the timing, form, and content of such disclosure. If so requested by the other Party, the Party subject to such obligation shall use reasonable efforts to obtain an order protecting, to the maximum extent possible and not prohibited by applicable Law (as reasonably determined by the disclosing Party in consultation with its legal counsel), the confidentiality of such provisions of this Agreement as reasonably requested by the other Party. Notwithstanding the foregoing, if the Parties are unable to agree on the form or content of any required disclosure, such disclosure shall be limited to the minimum required as reasonably determined by the disclosing Party in consultation with its legal counsel. Without limiting the foregoing, each Party shall provide the other Party with each proposed filing by such Party with the United States Securities and Exchange Commission or any equivalent Governmental Authority, securities exchange or securities regulator in any country in the Territory which describes the terms of this Agreement (including any filings of this Agreement) reasonably in advance of submission of such filing, and shall reasonably consider in good faith the reasonable comments of the reviewing Party relating to such filing, including the provisions of this Agreement for which confidential treatment should be sought.

e. Technical Publication.

11. Subject to Section 11.3 and Section 11.4, Sangamo may publish peer reviewed manuscripts, or give other forms of public disclosure such as abstracts and presentations with respect to the activities hereunder or the transactions contemplated hereby (collectively, "**Publications**"), in each case, solely to the extent related to Sangamo's ZFP platform technology generally (and not specifically related to any specific Exclusive Gene Target, [*] ZFP, [*], Collaboration Candidate, or Product); *provided*, that (i) prior to making any such Publication, Sangamo shall comply with Section 11.5(d) and (ii) such Publication does not contain any Novartis Confidential Information.

1. Subject to Section 11.3 and Section 11.4, and in addition to the rights granted under Section 11.5(a), Sangamo may make Publications with respect to the activities hereunder or the transactions contemplated hereby that are related to both (i) Sangamo's ZFP platform technology and (ii) any Exclusive Gene Target that has been publicly disclosed as being subject to this Agreement (and not specifically related to any other Exclusive Gene Target or any [*] ZFP, [*], Collaboration Candidate, or Product); *provided*, that (A) prior to making any such Publication, Sangamo, as the Party seeking publication, shall obtain Novartis' prior written consent and comply with Section 11.5(d), and (B) such Publication does not contain any Novartis Confidential Information or any data generated through the use or testing of any [*] ZFP, [*], Collaboration Candidate, or Product.

2. Subject to Section 11.3 and Section 11.4, Novartis shall have the right to make Publications with respect to the activities hereunder or the transactions contemplated hereby without first obtaining the prior written consent of Sangamo; *provided*, that (i) such Publication does not contain any Sangamo Confidential Information, (ii) until [*] with respect to

an Exclusive Gene Target, Novartis shall comply with Section 11.5(d) prior to making any Publication containing any data generated under this Agreement with respect to such Exclusive Gene Target and (iii) after [*] with respect to an Exclusive Gene Target, prior to making any Publication containing any data generated under this Agreement with respect to such Exclusive Gene Target, Novartis shall provide Sangamo a copy of such proposed Publication at least [*] days prior to its intended submission for publication.

3. To the extent required pursuant to Section 11.5(a), Section 11.5(b) or Section 11.5(c), a Party seeking to make a Publication shall provide the other Party the opportunity to review and comment on any proposed Publication at least [*] days prior to its intended submission for publication. The other Party shall provide the Party seeking publication with its comments in writing, if any, within [*] days after receipt of such proposed Publication. The Party seeking publication shall consider in good faith any comments thereto provided by the other Party and shall comply with the other Party's request received within such [*] day period to remove any and all of such other Party's Confidential Information from the proposed Publication. In addition, the Party seeking publication shall delay the submission for a period up to [*] days in the event that the other Party can demonstrate reasonable need for such delay, including the preparation and filing of a patent application. If the other Party fails to provide its comments to the Party seeking publication within such [*] day period, such other Party shall be deemed to not have any comments, and the Party seeking publication shall be free to publish in accordance with this Section 11.5 after the thirty [*]-day period has elapsed. The Party seeking publication shall provide the other Party a copy of the manuscript at the time of the submission. Each Party agrees to acknowledge the contributions of the other Party and its employees in all publications as scientifically appropriate.

1. Except to the extent permitted under this Section 11.5, neither Party may make any Publication without the prior written consent of the other Party.

f. Publicity.

2. **Initial Press Release**. Sangamo may issue a press release announcing this Agreement, in the form attached hereto as **Exhibit J**, on or promptly following the Effective Date.

3. **Other Press Releases**. Other than the press release set forth in **Exhibit J** and disclosures under Section 11.4, the Parties agree that any other news release or other public announcement relating to this Agreement or the performance hereunder by either Party shall first be reviewed and approved by the other Party (with such approval not to be unreasonably withheld, conditioned or delayed); *provided*, *however*, that notwithstanding the foregoing, Sangamo shall have the right to disclose publicly (including in its securities filings and earning calls) the achievement of any Milestone Event (other than Development Milestone Event (1)) and the receipt (and the amount) of any corresponding Milestone Payment; *provided*, that (i) Novartis shall have at least [*] Business Days to review and provide edits and comments to any public disclosure proposed by Sangamo under this sentence, and (ii) Sangamo shall reasonably incorporate any edits and address any comments provided by Novartis in such proposed public disclosure.

4. Reissue Public Disclosures. The Parties agree that after a press release (including the initial press release) or other public announcement has been reviewed and approved by Novartis under this Section 11.6, Sangamo may reissue the public disclosures contained in such press release (in the same or similar format) without having to obtain Novartis' prior consent and approval.

5. Use of Names.

vii. Each Party agrees that the other Party shall have the right to use (without prior approval) such first Party's name and corporate logos in presentations, such Party's website, collateral materials, slide decks and corporate overviews solely to disclose the fact that the Parties are in a collaboration relationship (and, for clarity, without identifying specific Targets or Products unless and until such Targets or Products are publicly known to be subject to this Agreement), as well as in taglines of press releases issued pursuant to this Section 11.6.

viii. Subject to Section 11.6(d)(i), neither Party shall use the name, trade name, service marks, trademarks, trade, dress or logos of the other Party (or any of its Affiliates) in publicity releases, advertising or any other publication, without the other Party's prior written consent in each instance.

Article 12.

TERM AND TERMINATION

a. Term. The term of this Agreement shall commence upon the Effective Date and continue in full force and effect, on a Product-by-Product and country-by-country basis, until the expiration of the Royalty Term for such Product in such country, unless earlier terminated as set forth in Section 12.2 below (the "**Term**"). Upon expiration (but not earlier termination) of this Agreement for a particular Product in a particular country, the licenses granted by Sangamo to Novartis under Section 2.1a) for such Product in such country shall continue and shall become fully paid, royalty free, perpetual and irrevocable.

b. Termination.

6. Termination by Novartis for Convenience. Novartis may terminate this Agreement on an Exclusive Gene Target-by-Exclusive Gene Target basis, or in its entirety, without cause, for any or no reason, by providing written notice of termination to Sangamo, which notice includes an effective date of termination at least [*] days after the notice if Novartis has not [*] for any Product that Specifically Binds to such Exclusive Gene Target, and at least [*] days after the date of the notice if Novartis has [*] for any Product that Specifically Binds to such Exclusive Gene Target.

7. Termination for Material Breach.

ix. Breach Notice. If either Party believes that the other Party is in material breach of its obligations hereunder, then the non-breaching Party may deliver notice of such breach ("**Breach Notice**") to the other Party. Subject to Section 12.2(b)(ii), if the Party receiving

notice of breach fails to cure such breach within the applicable period set forth below, then the Party originally delivering the notice of breach may terminate this Agreement effective on written notice of termination to the other Party. For all such breaches other than a failure to make a payment as set forth in this Agreement, the allegedly breaching Party shall have [*] days from such Breach Notice to cure such breach. For any such breach arising from a failure to make a payment set forth in this Agreement, the cure period shall be [*] days. For clarity, any failure to make an upfront payment or Milestone Payment when due shall be a material breach of this Agreement.

x.Disputes Regarding Material Breach. In case the breaching Party disputes the occurrence of such material breach, then the alleged breaching Party shall give written notice of such dispute no later than [*] days after its receipt of the Breach Notice and the issue of whether the non-breaching Party may properly terminate this Agreement on expiration of the applicable cure period will be resolved in accordance with Section 15.5. This Agreement will remain in full force and effect during the pendency of such dispute resolution proceeding and the cure periods set forth in Section 12.2(b)(i) will be tolled during such dispute resolution proceeding, such proceeding will not suspend any obligations of either Party hereunder, and each Party will use reasonable efforts to mitigate any damages. If as a result of such dispute resolution process, it is determined that the breaching Party committed a material breach of this Agreement and the breaching Party does not cure such material breach within (A) [*] days in the case of a material breach caused by failure to make a payment set forth in this Agreement or (B) [*] days in the case of any other material breach, as applicable, after the date of such determination, (the "**Additional Cure Period**"), then such termination will be effective as of the expiration of the Additional Cure Period. If, as a result of such dispute resolution proceeding, it is determined that the alleged breaching Party did not commit a material breach of this Agreement, then no termination will be effective, and this Agreement will continue in full force and effect.

1. Patent Challenge. Except to the extent the following is unenforceable under the laws of a particular jurisdiction, if Novartis or its Affiliates or Sublicensees, individually or in association with any other Person, commences a legal action anywhere in the world challenging the validity, enforceability or scope of:

i.any Sangamo Patent and at such time [*] (each, a "**Sangamo Patent Challenge**"), and Novartis, its Affiliate or Sublicensee, as applicable, is not successful in such challenge (based on the determination of a court or other Governmental Authority which is not appealable to the Federal Circuit (or any corresponding court outside of the U.S., as applicable) or has not been appealed to such court within the time allowed for appeal), then at Sangamo's election (A) Sangamo shall have the right to increase all future [*] payable by Novartis hereunder by [*] with respect to Products Covered by (i) the Sangamo Patent subject to such Sangamo Patent Challenge or (ii) any [*] and (B) Novartis shall [*]; or

ii.any Licensed Patent under circumstances not addressed under subsection (i) above, including any [*] Licensed Patent or any [*] Joint Patent (each, a "**Critical Patent Challenge**"), then (A) at Sangamo's election at any time after the commencement of such legal

action, such challenged Patent Right shall no longer constitute a Licensed Patent worldwide, (B) if Sangamo does not elect to have such Patent Right no longer constitute a Licensed Patent pursuant to subsection (A) above, and Novartis, its Affiliate or Sublicensee, as applicable, is not successful in such challenge (based on the determination of a court or other Governmental Authority which is not appealable to the Federal Circuit (or any corresponding court outside of the U.S., as applicable) or has not been appealed to such court within the time allowed for appeal), then at Sangamo's election, Sangamo shall have the right to increase all future [*] payable by Novartis hereunder by [*] with respect to Products Covered by (i) the Licensed Patent subject to such Critical Patent Challenge or (ii) any [*] and (C) if Novartis, its Affiliate or Sublicensee, as applicable, is not successful in such challenge (based on the determination of a court or other Governmental Authority which is not appealable to the Federal Circuit (or any corresponding court outside of the U.S., as applicable) or has not been appealed to such court within the time allowed for appeal), then, at Sangamo's election, Novartis shall [*].

Notwithstanding the foregoing, Sangamo shall not have the right to elect any remedies under Section 12.2(c)(i) or Section 12.2(c)(ii) on account of (x) any such legal action commenced by a Sublicensee of Novartis or its Affiliates if Novartis or its Affiliate, as applicable, terminates such Sublicensee's sublicense to the Licensed Technology within [*] days of becoming aware of such legal action, (y) any such legal action commenced in [*] or (z) any such legal action commenced by a Third Party that becomes an Affiliate of Novartis as a result of an acquisition of such Third Party by Novartis, *provided*, that such legal action was commenced prior to such acquisition of such Third Party by Novartis.

2. Novartis Special Remedy. In the event that Novartis would have the right to terminate this Agreement under Section 12.2(b) due to Sangamo's uncured material breach of (i) [*] or (ii) any other Section of this Agreement as a result of [*] (except where Sangamo in good faith disputes that such obligation exists), then Novartis may, in its sole discretion, elect to either exercise such termination right or, in lieu of exercising such termination right, and without limiting Novartis' rights otherwise set forth under this Agreement: (A) terminate all licenses granted by Novartis to Sangamo hereunder except pursuant to Section 12.3, including any sublicenses granted by Sangamo under such licenses; (B) terminate any [*] hereunder with respect to [*], including under [*]; (C) except with respect to the Collaboration (including the Collaboration Plan and Collaboration Budget) and with respect to intellectual property matters, terminate any [*] rights of Sangamo under this Agreement, including any [*]; (D) reduce Novartis' ongoing [*] reporting obligations to a [*]; or (E) reduce the amount of any future [*] payable by Novartis hereunder by [*] (*provided*, that, to the extent Novartis brings an action against Sangamo for such material breach and Novartis is awarded damages as a result of such action, (x) the amount of such damages will be reduced by the amount, if any, of any reductions to such [*] that Novartis has taken pursuant to sub-clause (E) at the time of such damages award and (y) any reductions to [*] that Novartis is entitled to take pursuant to sub-clause (E) after such damages award shall be reduced by the amount, if any, of the awarded damages paid by Sangamo as a result of such action). For clarity, Novartis shall only be considered to have the right to terminate this Agreement under Section 12.2(b) after the applicable notice period and, if applicable, the Additional Cure Period have expired without a

cure. In no event shall Novartis be entitled to elect the remedy under this Section 12.2(d) more than one (1) time.

3. Termination for Insolvency. To the extent permitted by applicable Law, either Party may terminate this Agreement following the Effective Date upon (i) the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, including such proceedings commenced by the other Party seeking to have an order for relief entered with respect to such Party, seeking to adjudicate such Party as bankrupt or insolvent, or seeking reorganization, arrangement, adjustment, winding-up, liquidation, dissolution, composition or other relief with respect to such Party or its debts, (ii) the appointment of a receiver, trustee, custodian, conservator or other similar official over all or substantially all property of the other Party, or (iii) an assignment of a substantial portion of the assets for the benefit of creditors by the other Party (each of the events or occurrences described in sub-clauses (i) through (iii), an "**Insolvency Event**"); *provided*, *however*, that, in the case of any involuntary bankruptcy proceeding, such right to terminate will only become effective if the Party consents to the involuntary bankruptcy or such proceeding is not dismissed within [*] days after the filing thereof.

a. Effects of Termination.

4. General. Upon termination of this Agreement, (i) all licenses and other rights granted by Sangamo to Novartis under this Agreement shall terminate, all sublicenses granted by Novartis shall terminate, all Products with respect to which this Agreement is terminated shall become "**Terminated Products**" and all Collaboration Candidates with respect to which this Agreement is terminated shall become "**Terminated Candidates**"; and (ii) all licenses and other rights granted by Novartis to Sangamo under Section 2.2 (and all sublicenses thereunder granted by Sangamo) shall terminate with respect to Terminated Targets, Terminated Products and Terminated Candidates; *provided*, *however*, that if this Agreement is terminated on an Exclusive Gene Target-by-Exclusive Gene Target basis, then this Section 12.3 shall only apply to the Terminated Target(s), only Products that Specifically Bind to such Terminated Target(s) shall be Terminated Products and only Collaboration Candidates that Specifically Bind to such Terminated Target(s) shall be Terminated Candidates. For clarity, if an Exclusive Gene Target constitutes a Terminated Target pursuant to Section 1.174(b), then the Agreement shall be terminated with respect to such Target. Upon termination of this Agreement, Novartis and its Affiliates shall not, and shall not enable or facilitate any Third Party to, practice or use any Invention jointly owned by Novartis pursuant to the terms of this Agreement (including any Patent Rights claiming any such Invention) to Develop, Commercialize or otherwise Exploit any (i) (A) fusion protein comprising a ZFP contained in a Collaboration ZFP, (B) polynucleotide encoding any such fusion protein or (C) method of using any such fusion protein or (ii) product incorporating or using a fusion protein, polynucleotide or method described in the foregoing subsection (i).

5. License to Sangamo. Effective upon termination of this Agreement by Sangamo pursuant to Section 12.2(b) or Section 12.2(e) or by Novartis pursuant to Section 12.2(a), Novartis hereby grants Sangamo an exclusive worldwide, fee-bearing (subject to Section

12.3(c)) license, with the right to grant sublicenses through multiple tiers, (i) under its interest in Novartis Product Technology to Develop, Manufacture, Commercialize and otherwise Exploit Reversion Products in the Field and (ii) under its interest in Product Trademarks to Develop, Manufacture, Commercialize and otherwise Exploit in the Field Reversion Products that are being Commercialized as of the effective date of termination.

6. Negotiation of Financial Terms for Reversion License. Upon any termination of this Agreement by Sangamo pursuant to [*] or by Novartis pursuant to [*], to the extent requested by either Party in writing within [*] days following the effective date of such termination, the Parties shall negotiate in good faith reasonable financial compensation payable by Sangamo to Novartis with respect to the exercise of the license granted to Sangamo pursuant to Section 12.3(b). If the Parties cannot agree on such financial terms within a period of [*] days of receipt of such written notice by Sangamo, then such dispute shall be referred to the Executive Officers of the Parties for resolution. If the Executive Officers do not fully resolve such matter within [*] Business Days (or a later date agreed to by each of the Parties) of the matter being referred to them, then such financial terms shall be decided by baseball arbitration pursuant to the terms set forth on **Exhibit H**.

7. Transition to Sangamo. Within a reasonable period of time following the receipt of notice of termination given under this Agreement by Sangamo pursuant to Section 12.2(b) or Section 12.2(e) or by Novartis pursuant to Section 12.2(a), the Parties shall meet to mutually agree upon a transition plan to effect an orderly and timely transition to Sangamo of applicable Development, Manufacture and Commercialization activities and responsibilities with respect to the Reversion Products, which shall be subject to Novartis's sell off right in Section 12.3(e), if applicable, and which shall incorporate the following elements (which elements do not require mutual agreement after notice of termination) and other provisions as mutually agreed upon by the Parties:

iii. Upon Sangamo's written request, (A) assignment and transfer to Sangamo (or its designee) of all Regulatory Materials [*] to the Reversion Products in the Territory and (B) to the extent not already assigned or transferred pursuant to (A) above, grant a right of reference or use with respect to any DMF that relates to any Reversion Product in the Territory to the extent [*] for preparing and submitting Regulatory Materials for such Reversion Product to a competent Regulatory Authority or to the extent used or referenced by Novartis, its Affiliates or Sublicensees in its Regulatory Materials for such Reversion Product, and Novartis shall take other actions reasonably requested by Sangamo to provide Sangamo or its designee access to and the benefit of such DMF, including the data contained or referenced therein. If Novartis is prohibited by applicable Law from assigning or transferring ownership of any of the foregoing items to Sangamo, Novartis shall grant Sangamo (or its designee) a right of reference or use to such item as provided above and shall take other actions reasonably requested by Sangamo to provide Sangamo or its designee access to and such benefit of such Regulatory Materials, including the data contained or referenced therein. Each Party shall take actions reasonably necessary to effect such assignment and transfer or grant of right of reference or use to Sangamo (or its designee), including by making such filings with Regulatory Authorities in the Territory that may be necessary to record such assignment or effect such transfer and, at Sangamo's

written request, to complete any pending regulatory filings with respect to the Reversion Products.

iv. Upon Sangamo's written request, transfer to Sangamo (or its designee) a copy of all Know-How within the Novartis Product Technology with respect to the applicable Reversion Product. For clarity, such Know-How that is solely and specifically related to any Reversion Product shall be deemed to constitute the Confidential Information of each Party.

v.Upon Sangamo's written request, provide to Sangamo a final Development Report which describes, in at least the level of detail described in **Exhibit F**, the specified Development activities performed since the last report with respect to each Terminated Product.

vi. Novartis shall promptly provide Sangamo with a copy of each agreement between Novartis (or its Affiliates) and a Third Party directly relating to any Reversion Product or the Development, Manufacture and Commercialization of any Reversion Product, and upon Sangamo's request, Novartis shall assign or sublicense, and shall ensure that its Affiliates assign or sublicense, to Sangamo (A) any such agreement that solely relates to Reversion Products, to the extent permitted under the terms thereof, and (B) for any such agreement that does not solely relate to Reversion Products and to the extent permitted under the terms of such agreement, the portion of such agreement (e.g., a work order or statement of work) that relates solely to Reversion Products. Upon Sangamo's request, Novartis shall provide reasonable assistance to Sangamo in connection with Sangamo obtaining rights under any such agreement that is not assignable to Sangamo (or equivalent rights), such as (x) subject to appropriate indemnification and to the extent permitted by the applicable agreement, working to effect a practical assignment of the rights and obligations under such agreement to Sangamo solely with respect to such Reversion Product as if Sangamo was a party to such agreement for a reasonable period of time or (y) introducing Sangamo to such Third Party.

vii. Novartis shall promptly deliver to Sangamo a list of the inventory then in its (or its Affiliates') possession or control for each Reversion Product. At Sangamo's request, Novartis shall deliver to Sangamo all or part of such inventory, and Sangamo shall reimburse Novartis for its cost of goods for such delivered inventory of Reversion Product, *provided*, that such inventory complies with specifications and has been manufactured in compliance with all applicable Law, including cGMP.

viii. If Novartis is, itself or through its Affiliate, manufacturing any Reversion Product at the time of the notice of termination, Novartis shall, upon Sangamo's request, supply such Reversion Product to Sangamo at its [*] for both clinical and commercial supply for a reasonable period of time (not to exceed [*] months) until Sangamo establishes an alternative supplier, and reasonably assist Sangamo in establishing an alternative supplier for such Reversion Product.

ix. If any Novartis [*] Technology is (A) necessary or reasonably useful in order to [*] and (B) [*], in each case, such that [*], then, upon the written request of Sangamo, the Parties shall negotiate in good faith for up to [*] a reasonable [*], which [*] may include (w)

Novartis [*], (x) to the extent not [*] the proprietary nature of the Novartis [*] Technology, Novartis [*] and Novartis [*], subject to reasonable terms and conditions [*], or (y) Novartis [*] on terms and conditions agreed upon by the Parties, including [*] and other reasonable terms and conditions in order to [*].

x. Upon the reasonable request of Sangamo, Novartis will provide reasonable consulting assistance and cooperation in connection with the transition of the Development, Manufacture and Commercialization of any Reversion Products to the extent contemplated by this Section 12.3(d). Novartis will provide up to an aggregate of [*] hours of work relating to any assistance and cooperation contemplated by this Section 12.3(d)(viii) for all Reversion Products combined without additional compensation or reimbursement, above which Novartis shall be entitled to be reimbursed, as follows: Novartis may invoice Sangamo at the rate of [*] per hour for Novartis' internal costs which relate to any such work that exceeds such [*]-hour cap, and the reasonable documented Out-of-Pocket Costs, in each case, incurred by Novartis to provide such requested assistance or cooperation and Sangamo shall pay all such undisputed invoices within [*] days of the date of its receipt of such invoice; *provided*, that the scope of Novartis' assistance and cooperation and the related costs are discussed and agreed by the Parties prior to Novartis' provision thereof.

xi. If, at the time of such termination, Novartis (or its Affiliates or Sublicensees) is conducting any Clinical Trials for any Reversion Product, then, at Novartis' election on a trial-by-trial and site-by-site basis: (1) to the extent agreed by Sangamo, Novartis shall transfer the conduct of all such Clinical Trials at such sites to Sangamo and, in each such case, Sangamo shall assume any and all liability for such Clinical Trials at such sites after the effective date of such termination; or (2) with respect to any Clinical Trials which are not assumed by Sangamo under clause (1), Novartis (or its Affiliates or Sublicensees) shall, at their expense, continue to conduct, or wind down, such Clinical Trials, as determined by Novartis in its sole discretion.

8. Sell-Off Right. Effective upon any termination other than a termination by Novartis pursuant to Section 12.2(a) and subject to the payment of all amounts required under Section 9.2 and Section 9.3, Novartis will have the right to sell or otherwise dispose of any inventory of any Terminated Product on hand at the time of such termination or in the process of Manufacturing for a period of [*] months following the effective date of termination; *provided*, *however*, that any revenue obtained from such disposal will be treated as Net Sales and the provisions of Article 9 will apply to such Net Sales and, in the event that such sales result in the achievement of a Milestone Event, the Milestone Payment due upon achievement of such Milestone Event will be payable.

9. Return of Confidential Information. Except as otherwise provided herein, within [*] days after any termination of this Agreement, each Party shall destroy or return to the other Party (at the other Party's discretion) all tangible items bearing, containing, or contained in, any of the Confidential Information of the other Party. If the material is destroyed, it shall provide the other Party written certification of such destruction. For clarity, Sangamo shall not be required to destroy or return to Novartis pursuant to this Section 12.3(f) any

Confidential Information of Novartis to which Sangamo has licenses or other rights pursuant to this Section 12.3.

b. Rights in Insolvency. The Parties agree that this Agreement constitutes an executory contract under Section 365 of the Code for the license of "intellectual property" as defined under Section 101 of the Code and constitutes a license of "intellectual property" for purposes of any similar laws in any other country in the Territory. The Parties further agree that Novartis, as licensee of such rights under this Agreement, will retain and may fully exercise all of its protections, rights and elections under the Code, including under Section 365(n) of the Code, and any similar laws in any other country in the Territory. The Parties further agree that, in the event of an Insolvency Event by or against Sangamo under the Code and any similar laws in any other country in the Territory, Novartis will be entitled to a complete duplicate of (or complete access to, as appropriate) any such intellectual property and all embodiments of such intellectual property, and the same, if not already in its possession, will be promptly delivered to it: (i) upon any such commencement of an Insolvency Event upon its written request therefor, unless Sangamo elects to continue to perform all of its obligations under this Agreement; or (ii) if not delivered under sub-clause (i), following the rejection of this Agreement upon written request therefor by Novartis. All rights, powers and remedies of Novartis provided for in this Section 12.4 are in addition to and not in substitution for any and all other rights, powers and remedies now or hereafter existing at law or in equity (including under the Code and any similar laws in any other country in the Territory).

c. Survival. Expiration or termination of this Agreement shall not relieve the Parties of any obligation accruing prior to such expiration or termination. For clarity, termination of this Agreement for any reason shall be without prejudice to the Parties' right to receive all payments (including, in the case of Sangamo, Milestone Payments and royalties) accrued prior to the effective date of termination. Without limiting the foregoing, the following provisions shall survive the expiration or termination of this Agreement: [*].

d. Termination Not Sole Remedy. Termination is not the sole remedy under this Agreement and, whether or not termination is effected and notwithstanding anything contained in this Agreement to the contrary, all other remedies shall remain available except as agreed to otherwise herein.

Article 13.

REPRESENTATIONS AND WARRANTIES; COVENANTS

a. Mutual Representations and Warranties. Each Party represents and warrants to the other Party as of the Effective Date that:

10. such Party is duly organized, validly existing and in good standing under the laws of the jurisdiction in which it is organized;

11. such Party: (i) has the requisite power and authority and the legal right to enter into this Agreement and to perform its obligations hereunder, and (ii) has taken all requisite

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

action on its part to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder;

12. this Agreement has been duly executed on behalf of such Party and is a legal, valid and binding obligation on such Party, enforceable against such Party in accordance with its terms;

13. all necessary consents, approvals and authorizations of all Governmental Authorities and other Persons required to be obtained by such Party in connection with the execution and delivery of this Agreement, the transactions contemplated by this Agreement, or the performance by such Party of its obligations under this Agreement have been obtained, except, in each case, to the extent required to conduct Clinical Trials or to seek or obtain Regulatory Approvals, Pricing Approvals or other applicable Regulatory Materials; and

14. the execution and delivery of this Agreement and the performance of such Party's obligations hereunder: (i) do not conflict with or violate any requirement of applicable Laws, regulations or orders of Governmental Authorities, (ii) do not conflict with, or constitute a breach or default under, any contractual obligation of such Party, and (iii) do not conflict with or result in a breach of any provision of the organizational documents of such Party.

b. Additional Representations and Warranties by Sangamo. Sangamo represents and warrants to Novartis as of the Effective Date that:

15. Sangamo has the full right, power and authority (i) to grant the licenses to Novartis under the Licensed Technology as purported to be granted pursuant to this Agreement and (ii) except to the extent relating to infringement of any Patent Right or misappropriation of any Know-How, in each case, of any Third Party, to perform its obligations under each initial Collaboration Plan attached to this Agreement as **Exhibit E**;

16. Sangamo has not granted any license or other interest to any Third Party under the Licensed Technology that is inconsistent with the licenses granted to Novartis hereunder;

17. Sangamo has not granted any Third Party any right, title or interest in or to, or any license under, any Licensed Technology that conflicts with the rights granted to Novartis hereunder;

18. there are no Upstream Licenses in existence;

1. there are no judgments, orders, decrees, or settlements against or owed by Sangamo or any of its Affiliates, and there are no actual, pending, or, to Sangamo's knowledge, alleged or threatened in writing, adverse actions, demands, arbitrations, suits, proceedings, or other claims against Sangamo or any of its Affiliates, in each case, involving the Licensed Technology or the transactions contemplated by this Agreement;

2. there is no pending action by a Third Party that challenges the inventorship, ownership, scope, validity or enforceability, or Sangamo's or any of its Affiliates' rights in or to, of any Licensed Patents;

3. Sangamo's right, title and interest to the Licensed Technology is free of any lien or security interest;

4. the inventorship of the Licensed Patents is properly identified on each issued patent or patent application in the Licensed Patents;

5. Sangamo has obtained, or caused its Affiliates, as applicable, to obtain, assignments from the inventors of any Licensed Technology who were employees or consultants of Sangamo or its Affiliates at the time of invention of all inventorship rights to such Licensed Technology, and all such assignments are valid and enforceable;

6. Sangamo has valid and enforceable agreements with all persons employed by Sangamo or any of its Affiliates who will conduct activities under this Agreement which are sufficient to enable Sangamo to comply with Section 10.1(f);

1. Sangamo has made any and all payments owing by Sangamo or any of its Affiliates to any inventor of any Licensed Technology owned by Sangamo or such Affiliate that is required in connection with the creation or exploitation of or transfer of rights to such Licensed Technology;

2. except as set forth on Schedule 13.2(l), Sangamo has not received any written notice (or, to Sangamo's knowledge, any other notice) from any Third Party asserting or alleging that the Sangamo Proprietary Activities infringe or misappropriate the intellectual property rights of such Third Party;

3. to Sangamo's knowledge, Sangamo's conduct of the activities anticipated to be conducted by Sangamo under the initial Collaboration Plans attached to this Agreement as **Exhibit E** as of the Effective Date will not infringe any Patent Right or misappropriate any Know-How, in each case, of any Third Party;

4. to Sangamo's knowledge, no Third Party is infringing or misappropriating any Licensed Technology with respect to any Exclusive Gene Target; and

5. no Licensed Technology is subject to any funding agreement with or obligation to any Governmental Authority.

c. Additional Representations and Warranties by Novartis. Novartis represents and warrants to Sangamo as of the Effective Date that:

1. Novartis has the full right, power and authority to grant the licenses to Sangamo under the Novartis Collaboration Technology as purported to be granted pursuant to this Agreement; and

1. Novartis has valid and enforceable agreements with all persons employed by Novartis or any of its Affiliates who will conduct activities under this Agreement which are sufficient to enable Novartis to comply with Section 10.1(f).

d. Mutual Covenants.

2. **No Debarment**. In the course of the Development, Manufacture and Commercialization of the Products, neither Party nor any of its Affiliates or Sublicensees shall use any employee or consultant who has been debarred by any Regulatory Authority, or, to such Party's or its Affiliates' knowledge, is the subject of debarment proceedings by a Regulatory Authority. Each Party shall notify the other Party promptly upon becoming aware that any of its or its Affiliates' or Sublicensees' employees or consultants has been debarred or is the subject of debarment proceedings by any Regulatory Authority.

3. **Compliance**. Each Party and its Affiliates shall comply in all material respects with all applicable Laws (including all anti-bribery laws) in the Development, Manufacture and Commercialization of the Products and performance of its obligations under this Agreement.

4. **Invention Remuneration for Joint Inventions**. For any inventor of a Joint Invention, the Party that directly or indirectly through its Affiliates or Sublicensees employed, contracted with or otherwise retained such inventor to perform activities under this Agreement shall pay any and all payments owing by such Party or any of its Affiliates to any such inventor that is required in connection with the creation or exploitation of or transfer of rights to such Joint Invention.

a. Additional Covenants of Sangamo.

5. Sangamo shall not, and shall cause its Affiliates not to: (i) grant any license or other interest to any Third Party under the Licensed Technology that is inconsistent with the licenses granted to Novartis hereunder; or (ii) incur or permit to exist any lien, security interest or other encumbrance, other than licenses entered into in the ordinary course of business, on the Licensed Technology unless, in each case, such lien, security interest or other encumbrance is subject to the terms of this Agreement (including Novartis' licenses hereunder).

6. Sangamo shall, and shall cause its Affiliates to, use reasonable precautions to preserve the confidentiality of the Licensed Know-How.

7. Sangamo shall make any and all payments owing by Sangamo or any of its Affiliates to any inventor of any Licensed Technology (other than Joint Inventions and Joint Patents) owned by Sangamo or such Affiliate that is required in connection with the creation or exploitation of or transfer of rights to such Licensed Technology;

8. Sangamo shall provide Novartis with a list from time to time that reflects the Patent Rights that become Licensed Patents during the Term.

1. Upon Novartis' written request, Sangamo shall negotiate in good faith regarding the entry into an agreement (or amendment of this Agreement) on commercially reasonable terms, consistent with the terms of this Agreement, pursuant to which Sangamo would grant to Novartis a sublicense, under the Excluded Upstream Technology under one (1) or more of the Excluded Upstream Licenses, to Exploit the Products in the Field in the Territory and, if such negotiations result in the grant of such a sublicense, Sangamo shall provide Novartis with an updated version of **Exhibit B** that excludes such Excluded Upstream License.

2. With respect to each Upstream License, Sangamo shall, and shall cause its Affiliates to: (i) not take any action with respect to any Patent Rights and Know-How sublicensed to Novartis under such Upstream License that would permit the counterparty thereto to terminate such sublicense; (ii) not breach such Upstream License in a manner that would permit the counterparty thereto to terminate such Upstream License or otherwise diminish the scope or exclusivity of the sublicenses granted to Novartis under applicable Licensed Technology; and (iii) not terminate such Upstream License in a manner that would terminate rights that are sublicensed to Novartis or otherwise diminish the scope or exclusivity of the sublicenses granted to Novartis under the applicable Licensed Technology. In the event that Sangamo or any of its Affiliates receives notice of an alleged breach by Sangamo or any of its Affiliates under any such Upstream License, where termination of such Upstream License or any diminishment of the scope or exclusivity of the sublicenses granted to Novartis under the applicable Licensed Technology is being or could be sought by the counterparty, then Sangamo shall promptly, but in no event less than [*] Business Days thereafter, provide written notice thereof to Novartis and if Sangamo does not cure such alleged breach within the greater of (A) [*] Business Days remaining in the applicable cure period under the Upstream License and (B) [*] of the applicable cure period remaining under the Upstream License (*provided*, that such period of time shall be extended to include the entire duration of any cure period remaining under the Upstream License after any election by Sangamo not to take any action to attempt to cure such breach and not to attempt to negotiate a resolution with such Third Party and, in such case, Sangamo shall provide prompt written notice thereof to Novartis), then Novartis shall have the right (but not the obligation) to: (i) cure such alleged breach; and (ii) offset any costs or expenses [*] against any [*] under this Agreement. Sangamo shall not, and shall cause its Affiliates not to, amend any Upstream License in any manner that adversely affects Novartis' exclusive rights to Exploit any Products pursuant to this Agreement without first obtaining Novartis' prior written consent.

3. In the event Sangamo enters into any [*], Sangamo shall be responsible for [*].

1. Sangamo shall not, without the prior written consent of Novartis, transfer or provide any [*] ZFP or any [*] to any Third Party (other than a Third Party subcontractors of Sangamo in accordance with Section 4.10).

b. No Other Warranties. EXCEPT AS EXPRESSLY STATED IN THIS ARTICLE 13, (A) NO REPRESENTATION, CONDITION OR WARRANTY WHATSOEVER IS MADE OR GIVEN BY OR ON BEHALF OF NOVARTIS OR SANGAMO; AND (B) ALL

OTHER CONDITIONS AND WARRANTIES WHETHER ARISING BY OPERATION OF LAW OR OTHERWISE ARE HEREBY EXPRESSLY EXCLUDED, INCLUDING ANY CONDITIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. Both Parties understand that the Products are the subject of ongoing research and development and that neither Party can assure the safety, effectiveness, Regulatory Approval, Pricing Approval or commercial success of any Product.

Article 14.

INDEMNIFICATION; LIABILITY; INSURANCE

a. Indemnification by Sangamo. Sangamo shall indemnify, defend and hold harmless Novartis and its Affiliates and Sublicensees, and each of their respective directors, officers, employees and agents (collectively "**Novartis Indemnitees**"), from and against all losses, liabilities, damages and expenses, Taxes (including penalties and interest), including reasonable attorneys' fees and costs (collectively, "**Liabilities**"), to the extent resulting from any claims, demands, actions or other proceedings by any Third Party (collectively, "**Claims**") arising out of:

2. the breach of any representation, warranty or covenant by Sangamo under this Agreement;

3. the negligence or intentional misconduct of any Sangamo Indemnitees;

1. Sangamo's or any of its Affiliates', licensees' or contractors' activities in connection with the Collaboration, except to the extent such Claim arises out of the alleged infringement (including alleged induced or contributory infringement) or misappropriation of the intellectual property rights of a Third Party;

2. the Development, Manufacture, or Commercialization of any Terminated Candidate or Terminated Product by or on behalf of Sangamo or its Affiliates or licensees; or

3. the alleged infringement (including alleged [*]) or misappropriation of the intellectual property rights of a Third Party based on Sangamo's or any of its Affiliates' or contractors' [*] activities under the Collaboration (which, for clarity, shall not include any Claims to the extent arising out of [*] or any other [*]);

except, in each case, to the extent such Claims fall within the scope of Novartis' indemnification obligations under Section 14.2.

b. Indemnification by Novartis. Novartis shall indemnify, defend and hold harmless Sangamo and its Affiliates, any Upstream Licensors and each of their respective directors, officers, employees and agents (collectively "**Sangamo Indemnitees**"), from and against all Liabilities to the extent resulting from any claims, demands, actions or other proceedings by any Third Party arising out of:

4. the breach of any representation, warranty or covenant by Novartis under this Agreement;

5. the negligence or intentional misconduct of any Novartis Indemnitees;

1. Novartis' or any of its Affiliates', Sublicensees' or contractors' activities in connection with the Collaboration, except to the extent such Claim arises out of the alleged infringement (including alleged induced or contributory infringement) or misappropriation of the intellectual property rights of a Third Party; or

2. the Development, Manufacture, or Commercialization of any Collaboration Candidate or any Product by or on behalf of Novartis or its Affiliates or Sublicensees;

except, in each case, to the extent such Claims fall within the scope of Sangamo's indemnification obligations under Section 14.1.

c. Indemnification Procedure.

3. **Notice.** If either Party is seeking indemnification under Section 14.1 or Section 14.2 (the "**Indemnified Party**"), it shall promptly inform the other Party (the "**Indemnifying Party**") of the claim giving rise to the obligation to indemnify pursuant to such Section as soon as reasonably practicable after receiving notice of the claim; *provided*, *however*, that no delay on the part of the Indemnified Party in notifying the Indemnifying Party shall relieve the Indemnifying Party from any obligation hereunder unless (and then only to the extent that) the Indemnifying Party is prejudiced thereby.

4. **Control.** The Indemnifying Party shall have the right, exercisable by notice to the Indemnified Party within [*] days after receipt of notice from the Indemnified Party of the commencement of or assertion of any Third Party claim, to assume the direction and control of the defense, litigation, settlement, appeal or other disposition of any such claim for which it is obligated to indemnify the Indemnified Party (including the right to settle the claim solely for monetary consideration) with counsel selected by the Indemnifying Party and reasonably acceptable to the Indemnified Party. During such time as the Indemnifying Party is controlling the defense of such Third Party claim, the Indemnified Party shall cooperate with the Indemnifying Party, and shall cause its Affiliates and agents to cooperate upon request of the Indemnifying Party, in the defense or prosecution of the claim, including by furnishing such records, information and testimony and attending such conferences, discovery proceedings, hearings, trials or appeals as may reasonably be requested by the Indemnifying Party. In the event that the Indemnifying Party does not notify the Indemnified Party of the Indemnifying Party's intent to defend any Third Party claim within [*] days after notice thereof, the Indemnified Party may assume the defense thereof with counsel of its choice and at the Indemnifying Party's expense (including reasonable, out-of-pocket attorneys' fees and costs and expenses of enforcement or defense). The Indemnifying Party or the Indemnified Party, as the case may be, shall have the right to participate (including the right to conduct discovery, interview and examine witnesses and participate in all settlement conferences), but not control, at

its own expense and with counsel of its choice, in the defense of any claim that has been assumed by the other Party.

5. Settlement. The Indemnifying Party shall not, without the prior written consent of the Indemnified Party, enter into any compromise or settlement that commits the Indemnified Party to take, or to forbear to take, any action. Neither the Indemnifying Party nor the Indemnified Party shall make any admission of liability in respect of any claim without the prior written consent of the other Party. If the Parties cannot agree as to the application of Section 14.1 or Section 14.2 as to any claim, pending resolution of such dispute, the Parties may conduct separate defenses of such claims, with each Party retaining the right to claim indemnification from the other Party in accordance with Section 14.1 or Section 14.2 upon resolution of the underlying claim.

d. Mitigation of Loss. Each Indemnified Party shall take and shall procure that its Affiliates take all such reasonable steps and action as are reasonably necessary or as the Indemnifying Party may reasonably require in order to mitigate any claims (or potential losses or damages) under this Article 14. Nothing in this Agreement shall or shall be deemed to relieve any Party of any common law or other duty to mitigate any losses incurred by it.

e. Limitation of Liability. NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, PUNITIVE, OR INDIRECT DAMAGES ARISING FROM OR RELATING TO ANY BREACH OF THIS AGREEMENT, REGARDLESS OF ANY NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. NOTWITHSTANDING THE FOREGOING, NOTHING IN THIS SECTION 14.5 IS INTENDED TO OR SHALL LIMIT OR RESTRICT (A) THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF ANY PARTY UNDER SECTION 14.1 OR SECTION 14.2, (B) ANY DAMAGES AVAILABLE FOR (I) A PARTY'S BREACH OF ITS EXCLUSIVITY OBLIGATIONS IN SECTION 2.5 OR ITS CONFIDENTIALITY OBLIGATIONS IN Article 11 OR (II) SANGAMO'S BREACH OF ITS EXCLUSIVITY OBLIGATIONS IN section 2.1(a), or (C) any DAMAGES AVAILABLE FOR A PARTY'S GROSS NEGLIGENCE, INTENTIONAL MISCONDUCT OR FRAUD.

f. Insurance. Each Party shall procure and maintain, during the Term, commercial general liability insurance, including product liability insurance, with minimum "A-" Best rated insurance carriers to cover its indemnification obligations under Section 14.1 or Section 14.2, as applicable, in each case, with limits of not less than [*] per occurrence and in the aggregate. Each Party shall provide the other Party with evidence of such insurance upon written request and shall provide the other Party with written notice at least [*] days prior to the cancellation, non-renewal or material changes in such insurance. It is understood that such insurance shall not be construed to create a limit of either Party's liability, including with respect to its indemnification obligations under this Article 14.

Article 15.
GENERAL PROVISIONS

a. Force Majeure. Neither Party shall be held liable to the other Party nor be deemed to have defaulted under or breached this Agreement for failure or delay in performing any obligation under this Agreement to the extent such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party, potentially including embargoes, war, acts of war (whether war be declared or not), acts of terrorism, insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, epidemics, pandemics, fire, floods, earthquakes or other acts of God, or acts, generally applicable action or inaction by any Governmental Authority (but excluding any government action or inaction that is specific to such Party, its Affiliates or Sublicensees, such as revocation or non-renewal of such Party's license to conduct business), or omissions or delays in acting by the other Party. The affected Party shall notify the other Party in writing of such force majeure circumstances as soon as reasonably practical, and shall promptly undertake and continue diligently all Commercially Reasonable Efforts necessary to mitigate or cure such force majeure circumstances or to perform its obligations in spite of the ongoing circumstances.

b. Assignment. This Agreement may not be assigned or otherwise transferred, nor may any right or obligation hereunder be assigned or transferred, by either Party without the prior written consent of the other Party. Notwithstanding the foregoing, (a) either Party may, without consent of the other Party, assign this Agreement or any of its rights or obligations hereunder in whole or in part to an Affiliate of such Party or to a successor in interest in connection with the sale of all or substantially all of its assets or business to which this Agreement relates, whether by merger, acquisition or similar transaction and (b) subject to Sangamo's compliance with applicable securities laws, Sangamo may, without Novartis' consent, sell or transfer (in whole and not in part) its right to receive unpaid royalty payments hereunder to a single Third Party that is not a pharmaceutical or biotechnology company (*provided*, that such transfer shall not constitute an assignment of this Agreement or any portion hereof and any such transferee shall not have any rights (including the right to seek payment) under this Agreement, all of which shall be retained by Sangamo). Each Party shall promptly notify the other Party of any assignment or transfer under the provisions of this Section 15.2, other than an assignment or transfer to an Affiliate. An assignment shall not relieve the assignor of any of its obligations under this Agreement. Any attempted assignment not in accordance with the foregoing shall be null and void and of no legal effect. Any permitted assignee shall assume all applicable assigned obligations of its assignor under this Agreement (or related to the assigned portion, in case of a partial assignment). The terms and conditions of this Agreement shall be binding upon, and shall inure to the benefit of, the Parties and their respected successors and permitted assigns.

c. Severability. If any one or more of the provisions contained in this Agreement is held invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby, unless the absence of the invalidated provision(s) adversely affects the substantive rights of the Parties. The Parties shall in such an instance use their Commercially Reasonable Efforts to replace the invalid, illegal or unenforceable provision(s) with valid, legal and enforceable provision(s) which, insofar as practical, implement the purposes of this Agreement.

d. Notices. All notices which are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by electronic mail (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, return receipt requested, addressed as follows:

If to Sangamo:

Sangamo Therapeutics, Inc.
7000 Marina Blvd.
Brisbane, CA 94005
Attn: Chief Executive Officer
Email: [*]

with a copy to:

Sangamo Therapeutics, Inc.
7000 Marina Blvd
Brisbane, CA 94005
Attn: General Counsel
Email: [*]

and

Cooley LLP
3175 Hanover Street
Palo Alto, CA 94304
Attn: Marya Postner, Ph.D.
Email: mpostner@cooley.com

If to Novartis:

Novartis Institutes for BioMedical Research, Inc.
250 Massachusetts Avenue
Cambridge, MA 02139
Attn: General Counsel
Email: [*]

with a copy to:

Hogan Lovells US LLP
390 Madison Avenue
New York, NY 10017
Attn: Adam H. Golden
Email: adam.golden@hoganlovells.com

or to such other address(es) as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such notice shall be deemed to have been given: (a) when delivered if personally delivered on a Business Day (or if delivered or sent on a

non-Business Day, then on the next Business Day); (b) on the Business Day after dispatch if sent by nationally-recognized overnight courier; (c) on the fifth (5th) Business Day following the date of mailing, if sent by mail; or (d) on the date that receipt is confirmed, if sent by electronic mail.

e. Dispute Resolution.

6. Informal Dispute Resolution; Arbitration. The Parties recognize that disputes as to certain matters may from time to time arise that relate to either Party's rights or obligations hereunder, including the interpretation, alleged breach, enforcement, termination or validity of this Agreement (each, a "**Dispute**"). For clarity, Dispute shall not include matters within the JSC's authority or the JPC's authority, which shall be resolved in accordance with Section 3.6. It is the objective of the Parties to establish procedures to facilitate the resolution of such Disputes arising under this Agreement in an expedient manner by mutual cooperation. To accomplish this objective, the Parties agree that if a Dispute arises under this Agreement, and the Parties are unable to resolve such Dispute within [*] days after such Dispute is first identified by either Party in writing to the other Party, the Parties shall refer such Dispute to the Executive Officers of the Parties for attempted resolution by good faith negotiations within [*] days after such notice is received. If the Executive Officers are not able to resolve such Dispute within [*] days, then such Dispute (other than Excluded Claim as defined in Section 15.5f) below) shall be finally resolved by binding arbitration administered by JAMS pursuant to JAMS' Streamlined Arbitration Rules and Procedures then in effect (the "**JAMS Rules**"), and judgment on the arbitration award may be entered in any court having jurisdiction thereof.

7. Number of Arbitrators; Arbitral Seat. The arbitration shall be conducted by a panel of three (3) arbitrators experienced in the pharmaceutical business. Within [*] days after initiation of arbitration, each Party shall select one (1) person to act as arbitrator; *provided*, that if a Party fails to appoint an arbitrator within [*] days of the arbitration being initiated, such appointment shall be made by JAMS. The two (2) arbitrators appointed in accordance with the preceding sentence shall appoint the third arbitrator, who shall be the chairperson of the tribunal. If the arbitrators selected pursuant to the first sentence of this Section 15.5b) are unable or fail to agree upon the third arbitrator within [*] days of the appointment of the second arbitrator, the third arbitrator shall be appointed by JAMS. The place of arbitration shall be [*] and all proceedings and communications shall be in English.

8. Powers of the Arbitrators. The arbitrators shall have the discretion to hear and determine at any stage of the arbitration any issue asserted by any Party to be dispositive of any claim or counterclaim, in whole or part, in accordance with such procedure as the arbitrators may deem appropriate, and the arbitrators may render an award on such issue. In addition to the authority conferred on the arbitrators by the JAMS Rules, and without prejudice to any provisional measures that may be available from a court of competent jurisdiction, the arbitrators shall have the power to grant any provisional measures that the arbitrators deem appropriate, including provisional injunctive relief until the arbitration award is rendered or the controversy is otherwise resolved and any provisional measures ordered by the arbitrators may, to the extent permitted by applicable Law, be deemed to be a final award on the subject matter of the measures and shall be enforceable as such. Either Party also may, without waiving any

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remedy under this Agreement, seek from any court having jurisdiction any injunctive or provisional relief necessary to protect the rights or property of that Party pending the arbitration award. The arbitrators shall have no authority to award punitive or any other type of damages not measured by a Party's compensatory damages. Each Party shall bear its own costs and expenses and attorneys' fees and an equal share of the arbitrators' fees and any administrative fees of arbitration, except to the extent that the arbitrators award such fees to the prevailing Party, if any.

9. Statute of Limitations. In no event shall an arbitration be initiated after the date when commencement of a legal or equitable proceeding based on the dispute, controversy or claim would be barred by the applicable New York statute of limitations.

10. Confidentiality. Any arbitration and information relating thereto, including documentary or other evidence given by a Party or witness in the arbitration, shall be deemed the Confidential Information of both Parties; *provided*, that either Party shall have the right to use and disclose such Confidential Information to the extent necessary to confirm the arbitration award.

11. Excluded Claims. As used in this Section 15.5, the term "**Excluded Claim**" shall mean a dispute, controversy or claim that concerns (i) the scope, validity, enforceability, inventorship or infringement of a patent, patent application, trademark or copyright; or (ii) any antitrust, anti-monopoly or competition law or regulation, whether or not statutory.

f. Governing Law; Waiver of Jury Trial. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, USA without reference to any rules of conflict of laws; *provided*, that the United Nations Convention on Contracts for International Sale of Goods shall not apply. TO THE EXTENT NOT PROHIBITED BY APPLICABLE LAW THAT CANNOT BE WAIVED, THE PARTIES HEREBY WAIVE, AND COVENANT THAT THEY WILL NOT ASSERT (WHETHER AS PLAINTIFF, DEFENDANT OR OTHERWISE), ANY RIGHT TO TRIAL BY JURY IN ANY ACTION ARISING IN WHOLE OR IN PART UNDER OR IN CONNECTION WITH THIS AGREEMENT, WHETHER NOW EXISTING OR HEREAFTER ARISING, AND WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE. THE PARTIES AGREE THAT ANY OF THEM MAY FILE A COPY OF THIS PARAGRAPH WITH ANY COURT AS WRITTEN EVIDENCE OF THE KNOWING, VOLUNTARY AND BARGAINED-FOR AGREEMENT AMONG THE PARTIES IRREVOCABLY TO WAIVE ITS RIGHT TO TRIAL BY JURY IN ANY PROCEEDING WHATSOEVER BETWEEN THEM RELATING TO AN EXCLUDED CLAIM UNDER THIS AGREEMENT WILL INSTEAD BE TRIED IN A COURT OF COMPETENT JURISDICTION BY A JUDGE SITTING WITHOUT A JURY.

g. Export Control. This Agreement is made subject to any restrictions concerning the export of products or technical information from the United States of America or other countries which may be imposed upon or related to Sangamo or Novartis from time to time, and both Parties agrees to comply with all such export control laws.

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h. Entire Agreement; Amendments. This Agreement, together with the Exhibits and Schedules hereto, contains the entire understanding of the Parties with respect to the subject matter hereof. Any other express or implied agreements and understandings, negotiations, writings and commitments, either oral or written, with respect to the subject matter hereof are superseded by the terms of this Agreement. The Exhibits and Schedules to this Agreement are incorporated herein by reference and shall be deemed a part of this Agreement. This Agreement may be amended, or any term hereof modified, only by a written instrument duly executed by authorized representative(s) of both Parties hereto. The Parties agree that the Confidentiality Agreement between the Parties dated as of [*], as amended by that Amendment No.#1, dated [*] (the "**Confidentiality Agreement**") is hereby terminated as of the Effective Date, but each Party's information that was the subject of confidentiality obligations under such Confidentiality Agreement shall been deemed to be Confidential Information of such Party under this Agreement.

i. Headings. The captions to the several Articles, Sections (and subsections), Exhibits and Schedules hereof are not a part of this Agreement, but are merely for convenience to assist in locating and reading the several Articles, Sections, Exhibits and Schedules hereof.

j. Independent Contractors. It is expressly agreed that Sangamo and Novartis shall be independent contractors and that the relationship between the two Parties shall not constitute a partnership, joint venture or agency. Neither Sangamo nor Novartis shall have the authority to make any statements, representations or commitments of any kind, or to take any action, which shall be binding on the other Party, without the prior written consent of the other Party. Neither Party (nor any successor, assignee, transferee, or Affiliate of a Party) shall treat or report the relationship between the Parties arising under this Agreement as a partnership for United States tax purposes, unless required by law.

k. Waiver. No provision of this Agreement shall be waived by any act, omission or knowledge of a Party or its agents or employees except by an instrument in writing expressly waiving such provision and signed by a duly authorized officer of the waiving Party. The waiver by either Party of any right hereunder, or of any failure of the other Party to perform, or of any breach by the other Party, shall not be deemed a waiver of any other right hereunder or of any other breach by or failure of such other Party whether of a similar nature or otherwise.

l. Cumulative Remedies. No remedy referred to in this Agreement is intended to be exclusive, but each shall be cumulative and in addition to any other remedy referred to in this Agreement or otherwise available under law.

m. Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement shall be construed against the drafting Party shall not apply.

n. Business Day Requirements. In the event that any notice or other action or omission is required to be taken by a Party under this Agreement on a day that is not a Business

Day, then such notice or other action or omission shall be deemed to be required to be taken on the next occurring Business Day.

o. Further Actions. Each Party agrees to execute, acknowledge and deliver such further instruments, and to do all such other acts, as necessary or appropriate in order to carry out the purposes and intent of this Agreement.

a. No Third Party Beneficiary Rights. The provisions of this Agreement are for the sole benefit of the Parties and their successors and permitted assigns, and they shall not be construed as conferring any rights to any Third Party (including any third party beneficiary rights), except with respect to certain Novartis Indemnitees and certain Sangamo Indemnitees who are Third Parties solely with respect to Article 14.

b. Extension to Affiliates. Each Party may discharge any obligations and exercise any rights under this Agreement through delegation of its obligations or rights to any of its Affiliates. Each Party will cause its Affiliates to comply with the provisions of this Agreement in connection with such performance. Any breach by a Party's Affiliate of any of such Party's obligations under this Agreement will be a breach by such Party, and the other Party may proceed directly against such Party without any obligation to first proceed against such Party's Affiliate.

c. Expenses. Except as otherwise expressly provided in this Agreement, each Party shall pay the fees and expenses of its respective lawyers and other experts and all other expenses and costs incurred by such Party incurred in connection with the negotiation, preparation, execution, delivery and performance of this Agreement.

d. Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via electronic mail, including Adobe™ Portable Document Format (PDF) or any electronic signature complying with the U.S. Federal ESIGN Act of 2000, and any counterpart so delivered will be deemed to be original signatures, will be valid and binding upon the Parties, and, upon delivery, will constitute due execution of this Agreement.

<Signature page follows>

IN WITNESS WHEREOF, the Parties intending to be bound have caused this Collaboration and License Agreement to be executed by their duly authorized representatives as of the Effective Date.

Sangamo Therapeutics, Inc.

By: /s/ Dr. Sandy Macrae

Name: Dr. Sandy Macrae

Title: President and CEO

Novartis Institutes for BioMedical Research, Inc.

By: /s/ Scott Brown

Name: Scott Brown

Title: General Counsel and Chief Administrative Officer

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List of Exhibits:

List of Schedules:

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Exhibit A

Excluded Targets

[*]

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Exhibit B

Excluded Upstream Licenses

[*]

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Exhibit C

Form of Invoice

[*]

{4 pages omitted}

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Exhibit D

Expedited Arbitration

1. Any arbitration proceedings conducted under this **Exhibit D** shall be referred to a patent counsel selected by the JPC who (and whose firm, if applicable): (a) is not, and was not at any time during the five (5) years prior to such dispute, an employee, consultant, legal advisor, officer, director or stockholder of, and does not have any conflict of interest with respect to, either Party; (b) has at least ten (10) years' experience practicing patent law in the life sciences industry; and (c) possesses expertise with respect to genome regulation patents (the "**Joint Patent Counsel**").

2. The JPC will select and retain such Joint Patent Counsel within [*] Business Days of after election by a Party for arbitration. If the Parties do not agree on such Joint Patent Counsel within such [*]-Business Day period, each Party shall have [*] Business Days thereafter to submit the names of no more than three (3) prospective patent counsel, each of whom meets the criteria set forth in Section 1 above, and the JPC will arrange the random selection of patent counsel to preside over the proceedings anticipated in this **Exhibit D** as the Joint Patent Counsel.

3. Within [*] Business Days of the Joint Patent Counsel's selection, each Party will deliver to both the Joint Patent Counsel and the other Party a detailed written proposal setting forth its proposed terms for the resolution of the dispute at issue (the "**Proposed Patent Terms**") and a memorandum (the "**Support Memorandum**") in support thereof, not exceeding five (5) pages in length. The Parties will also provide the Joint Patent Counsel with a copy of this Agreement, as may be amended at such time, and any relevant prosecution filings.

4. Within [*] Business Days after receipt of the other Party's Proposed Terms and Support Memorandum, each Party may submit to the Joint Patent Counsel (with a copy to the other Party) a response to the other Party's Proposed Patent Terms and Support Memorandum, such response not exceeding two (2) pages in length.

5. Neither Party may have any other communications (either written or oral) with the Joint Patent Counsel other than for the sole purpose of engaging the Joint Patent Counsel or as expressly permitted in this **Exhibit D**; *provided*, that the Joint Patent Counsel may, in his or her discretion and upon mutual agreement of the Parties, promptly convene a hearing to ask questions of the Parties regarding each Party's Proposed Patent Terms and Support Memorandum, at which time each Party shall have an agreed upon amount of time to present its Proposed Patent Terms.

6. Within [*] days after the Joint Patent Counsel's selection, the Joint Patent Counsel shall select one (1) of the two (2) Proposed Patent Terms (without modification) provided by the Parties which most closely reflects: (a) a commercially reasonable interpretation of the terms of this Agreement, including of Section 10.1 and Section 10.2; (ii) in the event of any dispute pursuant to Section 3.6b)iii), the likelihood of success of a Party's Proposed Patent Terms, including the likelihood that a Party's prosecution and maintenance strategy will result in

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issued and valid patent claims of maximum scope and duration while minimizing the negative impact on the applicable Patent Rights referenced in Section 3.6(b)(i) or Section 3.6(b)(ii), as applicable; and (c) fairness to the Parties (e.g., a resolution that does not result in a loss of rights for, or material adverse effect on, a single Party).

7. In making its selection, the Joint Patent Counsel: (a) shall not (i) modify the terms or conditions of either Party's Proposed Patent Terms or (ii) combine provisions from both Proposed Patent Terms; and (b) shall consider the terms and conditions of this Agreement, the relative merits of the Proposed Patent Terms, the Support Memoranda and responses thereto and, if applicable, the oral presentations of the Parties. The Joint Patent Counsel shall make the final decision known to both Parties in writing. The decision of the Joint Patent Counsel shall be final and binding on the Parties and unappealable, and specific performance may be ordered by any court of competent jurisdiction.

8. Each Party shall bear its own costs and expenses in connection with any dispute resolution under this **Exhibit D**; *provided*, that the Parties shall share equally the cost of the Joint Patent Counsel.

9. The time frames set forth in this **Exhibit D** shall be shortened as necessary by the Joint Patent Counsel to avoid any forfeiture or loss of rights of either Party.

1.

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Exhibit E

Initial Collaboration Plans

* * *

[*]

{26 pages omitted}

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Exhibit F

Form of Development Report

[*]

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted because it is both (i) not material and (ii) would be competitively harmful if publicly disclosed.

Exhibit G

Example Royalty Reduction Calculations

[*]

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Exhibit H

Baseball Arbitration

1. Any arbitration proceedings conducted under this **Exhibit H** shall be conducted through expedited "baseball arbitration" conducted by a single, independent arbitrator with at least five (5) years' expertise in the negotiation of biotechnology and pharmaceutical license agreements, including, if applicable, expertise with companion diagnostic license agreements.

2. If the Parties do not agree on such a single arbitrator within [*] days after request by a Party for arbitration, then each Party shall select, within the following [*] days, a representative who meets the foregoing arbitrator criteria, and the two (2) representatives shall select, within [*] days after the selection of the second representative, an arbitrator who meets the foregoing criteria.

3. Within [*] days after the arbitrator's selection, each Party will deliver to both the arbitrator and the other Party a detailed written proposal setting forth (a) in the event of any dispute pursuant to Section 9.3(g), its proposed royalty terms for the Commercialization of a Product in the Diagnostic Field, or (b) in the event of any dispute pursuant to Section 12.3(c), its proposed financial compensation for the exercise of the license(s) granted to Sangamo pursuant to Section 12.3(b) (such proposal under (a) or (b), as applicable, the "**Proposed Terms**" of such Party). The Parties will also provide the arbitrator a copy of this Agreement, as may be amended at such time.

4. Neither Party may have any other communications (either written or oral) with the arbitrator other than for the sole purpose of engaging the arbitrator or as expressly permitted in this **Exhibit H**.

5. Within [*] days after the arbitrator's selection, the arbitrator will select one of the two Proposed Terms (without modification) provided by the Parties that he or she believes is most consistent with the intention underlying and agreed principles set forth in this Agreement and most accurately reflects industry norms for a transaction of this type. The decision of the arbitrator shall be final, binding and unappealable.

6. For clarity, the arbitrator must select one of the two sets of Proposed Terms and may not combine elements of both Proposed Terms or take any other action.

7. Each Party shall bear its own attorneys' fees, costs and disbursements arising out of the arbitration, and shall pay an equal share of the fees and costs of the arbitrator.

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Exhibit I

Core Jurisdictions

[*]

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Exhibit J

Form of Press Release

* * *

[*]

{3 pages omitted}

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Exhibit K

Collaboration Costs

[*]

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Schedule 13.2(l)

Exceptions to Additional Representations and Warranties by Sangamo

[*]

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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: November 4, 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: November 4, 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 September 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: November 4, 2020

/s/ SUNG H. LEE

Sung H. Lee

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

Date: November 4, 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.