Table of Contents

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, 2019

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.)**

501 Canal Boulevard	**Richmond**	**California**	**94804**
(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 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 x No o

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 x No o

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	o
Non-accelerated filer	o	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. o

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

As of November 1, 2019, 115,937,618 shares of the issuer's common stock, par value $0.01 per share, were outstanding.

INDEX

SANGAMO THERAPEUTICS, INC.

PART I. FINANCIAL INFORMATION

PART II. OTHER INFORMATION

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.).

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, and the ability of Sangamo and our collaborators or strategic partners to advance the development of, product candidates using our zinc finger protein, or ZFP, technology platform, including our ability to effectively deliver our zinc finger nucleases, or ZFNs, and ZFP transcription factors, or ZFP TFs, to produce a clinical benefit;
- the benefits of the acquisition of Sangamo Therapeutics France S.A.S. (formerly known as TxCell S.A.);
- our ability to establish and maintain collaborative, licensing and other similar arrangements;
- anticipated revenues from existing and new collaborations and the timing thereof;
- 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 or strategic partners to obtain and maintain regulatory approvals for product candidates using our ZFP technology platform;
- our ability to comply with, and the impact of, regulatory requirements, obligations and restrictions on our business;
- 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 Conditions 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, 2019	December 31, 2018
ASSETS		
Current assets:		
Cash and cash equivalents	$ 114,291	$ 140,418
Restricted cash, current portion	2,000	—
Marketable securities	240,561	259,715
Interest receivable	680	375
Accounts receivable	21,953	4,673
Prepaid expenses and other current assets	4,691	5,340
Total current assets	384,176	410,521
Marketable securities, non-current	52,789	—
Property and equipment, net	26,516	78,723
Intangible assets	51,741	54,243
Goodwill	38,270	40,044
Operating lease right-of-use assets	77,505	—
Other non-current assets	7,725	3,364
Non-current restricted cash	1,500	3,500
Total assets	$ 640,222	$ 590,395
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued liabilities	$ 21,965	$ 21,457
Accrued compensation and employee benefits	11,024	9,490
Deferred revenues	47,561	47,564
Total current liabilities	80,550	78,511
Deferred revenues, non-current	87,798	108,273
Long-term portion of lease liabilities	40,609	27,689
Deferred income tax	6,395	6,705
Other non-current liabilities	5,542	1,960
Total liabilities	220,894	223,138
Commitments and contingencies		
Stockholders' equity:		
Common stock	1,158	1,022
Additional paid-in capital	1,084,372	929,632
Accumulated deficit	(661,540)	(562,696)
Accumulated other comprehensive loss	(4,901)	(1,440)
Total Sangamo Therapeutics, Inc. stockholders' equity	419,089	366,518
Non-controlling interest	239	739
Total stockholders' equity	419,328	367,257
Total liabilities and stockholders' equity	$ 640,222	$ 590,395

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,	
	2019	2018	2019	2018
Revenues	$ 21,958	$ 23,562	$ 47,577	$ 57,615
Operating expenses:				
Research and development	36,288	28,810	107,593	81,612
General and administrative	14,918	10,993	46,633	32,381
Total operating expenses	51,206	39,803	154,226	113,993
Loss from operations	(29,248)	(16,241)	(106,649)	(56,378)
Interest and other income, net	1,887	3,398	6,729	6,708
Net loss	(27,361)	(12,843)	(99,920)	(49,670)
Net loss attributable to non-controlling interest	(54)	—	(179)	—
Net loss to Sangamo Therapeutics, Inc. stockholders	$ (27,307)	$ (12,843)	$ (99,741)	$ (49,670)
Basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	$ (0.24)	$ (0.13)	$ (0.90)	$ (0.52)
Shares used in computing basic and diluted net loss per share attributable to Sangamo Therapeutics, Inc. stockholders	115,710	101,725	110,837	95,165

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Net loss	$ (27,361)	$ (12,843)	$ (99,920)	$ (49,670)
Foreign currency translation adjustment	(4,077)	—	(4,139)	—
Change in unrealized (loss) gain on available-for-sale securities	(59)	(87)	678	42
Comprehensive loss	(31,497)	(12,930)	(103,381)	(49,628)
Comprehensive loss attributable to non-controlling interest	(54)	—	(179)	—
Comprehensive loss attributable to Sangamo Therapeutics, Inc.	$ (31,443)	$ (12,930)	$ (103,202)	$ (49,628)

See accompanying Notes to Condensed Consolidated Financial Statements.

SANGAMO THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(Unaudited; in thousands)

	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					
Balances at June 30, 2019	115,603	$ 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	167	2	702	—	—	—	704
Stock-based compensation	—	—	4,701	—	—	—	4,701
Acquisition of additional shares of Sangamo France	—	—	—	—	—	(321)	(321)
Issuance costs related to Sangamo France Acquisition	—	—	(7)	—	—	—	(7)
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	115,770	$ 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	102,188	$ 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	8	3,355	—	—	—	3,363
Issuance of common stock under employee stock purchase plan	132	1	1,138	—	—	—	1,139
Issuance of common stock under public offering, net of issuance costs	12,650	127	136,181	—	—	—	136,308
Stock-based compensation	—	—	14,091	—	—	—	14,091
Acquisition of additional shares of TxCell	—	—	—	—	—	(321)	(321)
Issuance costs related to TxCell Acquisition	—	—	(25)	—	—	—	(25)
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	115,770	$ 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 STOCKHOLDERS' EQUITY (CONTINUED)
(Unaudited; in thousands)

	Three months ended September 30, 2018						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balances at June 30, 2018	101,624	$ 1,016	$ 918,197	$ (531,189)	$ (157)	$ —	$ 387,867
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	216	2	1,157	—	—	—	1,159
Stock-based compensation	—	—	3,810	—	—	—	3,810
Net unrealized loss on marketable securities	—	—	—	—	(87)	—	(87)
Net loss	—	—	—	(12,843)	—	—	(12,843)
Balances at September 30, 2018	101,840	$ 1,018	$ 923,164	$ (544,032)	$ (244)	$ —	$ 379,906

	Nine months ended September 30, 2018						
	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Non-Controlling Interest	Total Stockholders' Equity
	Shares	Amount					
Balances at December 31, 2017	85,598	$ 856	$ 682,809	$ (495,479)	$ (286)	$ —	$ 187,900
Cumulative-effect adjustment of ASC Topic 606 on January 1, 2018	—	—	—	1,117	—	—	1,117
Issuance of common stock upon exercise of stock options and in connection with restricted stock units, net of tax	1,922	18	13,678	—	—	—	13,696
Issuance of common stock under employee stock purchase plan	163	2	688	—	—	—	690
Issuance of common stock under public offering, net of issuance costs	14,157	142	215,615	—	—	—	215,757
Stock-based compensation	—	—	10,374	—	—	—	10,374
Net unrealized gain on marketable securities	—	—	—	—	42	—	42
Net loss	—	—	—	(49,670)	—	—	(49,670)
Balances at September 30, 2018	101,840	$ 1,018	$ 923,164	$ (544,032)	$ (244)	$ —	$ 379,906

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,	
	2019	**2018**
Operating Activities:		
Net loss	$ (99,920)	$ (49,670)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:		
Depreciation and amortization	2,742	1,668
Amortization of discount on marketable securities	(3,715)	(4,043)
Gain on free shares	(488)	—
Stock-based compensation	14,091	10,374
Net loss on lease termination	218	—
Other	(29)	715
Net changes in operating assets and liabilities:		
Interest receivable	(305)	(443)
Accounts receivable	(17,280)	(2,225)
Prepaid expenses and other assets	(4,734)	(1,851)
Operating lease right-of-use assets	3,796	—
Accounts payable and accrued liabilities	(1,753)	789
Accrued compensation and employee benefits	1,608	1,127
Deferred revenues	(20,477)	118,540
Long-term portion of lease liabilities	(920)	—
Other non-current liabilities	3,580	1,730
Net cash (used in) provided by operating activities	(123,586)	76,711
Investing Activities:		
Purchases of marketable securities	(321,390)	(451,239)
Maturities of marketable securities	292,147	230,547
Purchases of property and equipment	(13,894)	(15,028)
Purchase of additional Sangamo France shares	(262)	—
Other investment	—	(5,221)
Net cash used in investing activities	(43,399)	(240,941)
Financing Activities:		
Proceeds from public offering of common stock, net of issuance costs	136,308	215,757
Taxes paid related to net share settlement of equity awards	(388)	(83)
Proceeds from issuance of common stock	4,890	14,469
Net cash provided by financing activities	140,810	230,143
Effects of changes in foreign exchange rates	48	—
Net (decrease) increase in cash, cash equivalents, and restricted cash	(26,127)	65,913
Cash, cash equivalents, and restricted cash, beginning of period	143,918	53,326
Cash, cash equivalents, and restricted cash, end of period	$ 117,791	$ 119,239
Supplemental disclosure of non-cash activities:		
Property and equipment included in unpaid liabilities	$ 4,257	$ 5,813
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, 2019
(Unaudited)

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

Overview

Sangamo Therapeutics, Inc. ("Sangamo" or the "Company") was incorporated in the State of Delaware in June 1995 and changed its name from Sangamo Biosciences, Inc. in January 2017. Sangamo is focused on the research, development and commercialization of novel therapeutic strategies for unmet medical needs. Sangamo's genome editing and gene regulation technology platform is enabled by the engineering of a class of transcription factors known as zinc finger DNA-binding proteins ("ZFPs"). Potential applications of Sangamo's technology include development of human therapeutics, plant agriculture and enhancement of pharmaceutical protein production.

Basis of Presentation

The accompanying unaudited Condensed Consolidated Financial Statements have been prepared in accordance with generally accepted accounting principles in the United States of America ("U.S. GAAP") for interim financial information and pursuant to the rules and regulations of the Securities and Exchange Commission ("SEC"). Accordingly, they do not include all of the information and footnotes required by U.S. GAAP for complete financial statements. In the opinion of management, all adjustments (consisting of normal recurring adjustments) considered necessary for a fair presentation have been included. Operating results for the three and nine months ended September 30, 2019 are not necessarily indicative of the results that may be expected for the year ending December 31, 2019. The Condensed Consolidated Balance Sheet data at December 31, 2018 was derived from the audited consolidated financial statements included in Sangamo's Annual Report on Form 10-K for the year ended December 31, 2018 (the "2018 Annual Report") as filed with the SEC on March 1, 2019. The accompanying Condensed Consolidated Financial Statements and related financial information should be read in conjunction with the audited financial statements and footnotes thereto for the year ended December 31, 2018, included in the 2018 Annual Report.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and the accompanying notes. On an ongoing basis, management evaluates its estimates including critical accounting policies or estimates related to revenue recognition, clinical trial accruals, fair value of assets and liabilities, including from acquisitions, and stock-based compensation. Estimates are based on historical experience and on various other market specific and other relevant assumptions that the Company believes to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results could differ from those estimates. In March 2019, the Company 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 increase in project scope during the first quarter of 2019 and the corresponding costs which resulted in a decrease in the measure of proportional performance. This adjustment decreased revenue by $3.0 million, increased net loss by $3.0 million and increased the Company's basic net loss per share by $0.03 for the nine months ended September 30, 2019.

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 Accumulated Other Comprehensive Income (Loss) ("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.

Reclassifications

Certain prior period amounts in the accompanying Condensed Consolidated Financial Statements have been reclassified to conform to the current period presentation. These reclassifications had no effect on the reported results of operations. The Company reclassified $0.6 million from Intangible assets to Other non-current assets on the Condensed Consolidated Balance Sheet as of December 31, 2018.

Cash and Cash Equivalents

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.

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 AOCI.

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. The Company considers various factors in determining whether to recognize an impairment charge, including the length of time and extent to which the 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 other income, net, which are determined using the specific identification method.

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, collaborations and strategic partnerships funds, research grants and from the issuance of equity or debt securities. Sangamo believes that its available cash, cash equivalents and investments as of September 30, 2019, and expected revenues from collaborations, strategic partnerships and research grants, will be adequate to fund its operations at least through the next twelve months from the date the financial statements are issued. Sangamo will require additional financial resources to complete the development and commercialization of its products including 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 develop its technology and ZFP therapeutic products 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.

Concentrations of Risk

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

Certain materials and key components that the Company utilizes in its operations are obtained through single suppliers. Since the suppliers of key components and materials must be named in an investigational new drug 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.

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 share asset/liability is measured using a binomial-lattice pricing model and is reviewed each reporting period and adjusted, as needed and is expected to approximate fair value.

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 gives consideration to its credit risk, term of the lease, total lease payments and adjusts for the impacts of collateral, as necessary, when calculating its incremental borrowing rates. The lease terms may include options to extend or terminate the lease when it is reasonably certain the Company will exercise any such options. Rent expense for the Company's operating leases is recognized on a straight-line basis over the lease term.

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

Revenue Recognition

Effective January 1, 2018, the Company adopted the provisions of Accounting Standards Codification ("ASC") Topic 606 - *Revenue from Contracts with Customers* ("ASC Topic 606") using the modified retrospective method, resulting in a change to its accounting policy for revenue recognition. ASC Topic 606 establishes a unified model to determine how revenue is recognized.

The Company's contract revenues consist of strategic partnering collaboration agreements and research activity grants and licensing. Research and licensing agreements typically include upfront signing or license fees, cost reimbursements, research services, minimum sublicense fees, milestone payments and royalties on future licensee's product sales. The Company has both fixed and variable consideration. Non-refundable upfront fees and funding of research and development activities are considered fixed, while milestone payments are 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 recognized when the related qualified research expenses are incurred. Deferred revenue represents the portion of research or license payments received and incurred but not earned.

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

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is the unit of account in ASC Topic 606. The Company's performance obligations include license rights, development services and services associated with regulatory submission and approval processes. Revenues from research services are made under strategic partnering agreements and collaborations are generally recognized as the services are provided while revenues from non-refundable upfront fees are recognized over time either by measuring progress towards satisfaction of the relevant performance obligation, using input method or on a straight-line basis when a performance obligation is assumed 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 reimbursement rates for personnel costs, external reimbursable costs, estimated period of performance and estimating the progress towards the satisfaction of performance obligation. 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.

For the nine months ended September 30, 2019, revenues related to Kite Pharma, Inc. (“Kite”), a wholly-owned subsidiary of Gilead Sciences, Inc., Bioverativ Inc., (now Sanofi Genzyme, a global business unit of Sanofi S.A. (“Sanofi”)), and the Company's hemophilia A collaboration agreement with Pfizer represented 55%, 29% and 11%, respectively, of the Company’s total revenue. For the three months ended September 30, 2019, revenues related to Kite, Sanofi and the Company's hemophilia A collaboration agreement with Pfizer represented 40%, 40% and 16%, respectively, of the Company’s total revenue. During the nine months ended September 30, 2018, revenues related to the Company's hemophilia A collaboration agreement with Pfizer, Kite and Sanofi represented 46%, 29% and 19% respectively, of the Company’s total revenue. For the three months ended September 30, 2018, revenues related to the Company's hemophilia A collaboration agreement with Pfizer, Kite and Sanofi represented 44%, 38% and 10%, respectively, of the Company’s total revenue. 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. To date, the Company has not experienced any losses related to these receivables.

Funds received from third parties under contract or grant arrangements are 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 received 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.

Recent Accounting Pronouncements

Recently Adopted

Simplified Disclosure

In August 2018, the SEC adopted amendments to certain disclosure requirements in Securities Act Release No. 33-10532, *Disclosure Update and Simplification*, as updated. These amendments eliminate, modify, or integrate into other SEC requirements certain disclosure rules. Among the amendments is the requirement to present an analysis of changes in stockholders’ equity in the interim financial statements included in quarterly reports on Form 10-Q. The analysis, which can be presented as a footnote or separate statement, is required for the current and comparative quarter and year-to-date interim periods. The amendments are effective for all filings made on or after November 5, 2018. As such, the Company adopted these SEC amendments on November 5, 2018 and has presented the analysis of changes in stockholders’ equity in these interim financial statements for September 30, 2019 and 2018 presented in this Quarterly Report on Form 10-Q. The Company’s adoption of these SEC amendments had no material effect on the Company’s reporting of financial position, results of operations, cash flows or stockholders’ equity.

Accounting for Leases

In February 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2016-2, *Leases* (“ASC Topic 842”). ASC Topic 842 amends a number of aspects of lease accounting, including requiring lessees to recognize almost all leases with a term greater than one year as a ROU asset and corresponding liability, measured at the present value of the lease payments. On January 1, 2019, the Company adopted ASC Topic 842 using the modified retrospective approach with a cumulative-effect adjustment of $0.9 million reflected as a decrease to the opening balance of accumulated deficit as of the adoption date. Results for the three and nine months ended September 30, 2019 are presented under ASC Topic 842. No prior period amounts were adjusted and continue to be reported in accordance with previous lease guidance, ASC Topic 840 — *Leases* (“ASC Topic 840”).

ASC Topic 842 provides a number of optional practical expedients in transition. The Company elected the practical expedients to not reassess its prior conclusions about lease identification under the new standard, to not reassess lease classification, and to not reassess initial direct costs. The Company did not elect the practical expedient allowing the use-of-hindsight which would require the Company to reassess the lease term of its leases based on all facts and circumstances through the effective date and did not elect the practical expedient pertaining to land easements as this is not applicable to the current contract portfolio.

The impact of the adoption of ASC Topic 842 on the accompanying Condensed Consolidated Balance Sheet as of January 1, 2019 was as follows (in thousands):

	December 31, 2018	Adjustments Due to the Adoption of ASC Topic 842	January 1, 2019
Assets:			
Property and equipment, net	$ 78,723	$ (62,500)	$ 16,223
Operating lease right-of-use assets	—	8,753	8,753
Prepaid rent	—	36,025	36,025
Liabilities:			
Operating lease liabilities - current[(1)]	—	1,408	1,408
Deferred rent[(1)]	271	(271)	—
Build-to-suit lease obligation[(2)]	27,689	(27,689)	—
Operating lease liabilities - long-term[(2)]	—	7,933	7,933
Accumulated deficit	(562,696)	897	(561,799)

(1) Operating lease liabilities – current and deferred rent are included in accounts payable and accrued liabilities on the Condensed Consolidated Balance Sheets.
(2) Build-to-suit lease obligation and operating lease liabilities – long-term are included in long-term portion of lease liabilities on the Condensed Consolidated Balance Sheets.

The adjustments due to the adoption of ASC Topic 842 primarily related to the recognition of operating lease ROU assets and operating lease liabilities for the Company's leases. In addition, the adoption of ASC Topic 842 resulted in a change in accounting of the build-to-suit component of two leases under ASC Topic 840 to operating leases under ASC Topic 842 and as a result the Company derecognized the estimated fair value of the building shells that were included in Property and equipment, net as of December 31, 2018, as the Company had been deemed to own these buildings under ASC Topic 840. For additional discussion of the build-to-suit properties, see "Note 7 – *Property and equipment, net*" to the Company's consolidated financial statements included in its Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on March 1, 2019. For a description of the leases, see "Note 7 – *Commitments and Contingencies – Leases*" in these Condensed Consolidated Financial Statements.

Not yet adopted

Collaborative Arrangements

In November 2018, the FASB issued ASU 2018-18, *Collaborative Arrangements (ASC Topic 808): Clarifying the Interaction between Topic 808 and Topic 606* ("ASC Topic 808"), which clarifies that certain transactions between participants in a collaborative arrangement should be accounted for under ASC Topic 606 when the counterparty is a customer. In addition, ASC Topic 808 precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer for that transaction. This guidance will be effective for the Company beginning January 1, 2020. The Company is currently evaluating the impact of the adoption of this standard on its consolidated financial statements.

Goodwill Impairment Testing

In January 2017, the FASB issued ASU No. 2017-4, *Intangibles – Goodwill and Other (Topic 350): Simplifying the Test of Goodwill Impairment* ("ASU 2017-4"). The new guidance simplifies the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. ASU 2017-4 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 2017-4 requires prospective application and is effective for annual periods beginning after December 15, 2019. ASU 2017-4 will require the Company to amend its methodology for determining any goodwill impairment beginning in 2020.

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 share asset/liability. Fair value is determined based on a three-tier

hierarchy under the authoritative guidance for fair value measurements and disclosures that prioritizes the inputs used in measuring fair value as follows:

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

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

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

The fair value measurements of the Company's cash equivalents, available-for-sale marketable securities and the free share asset/liability are identified at the following levels within the fair value hierarchy (in thousands):

	September 30, 2019 Fair Value Measurements			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 77,213	$ 77,213	$ —	$ —
Total	77,213	77,213	—	—
Marketable securities:				
Commercial paper securities	180,812	—	180,812	—
Corporate debt securities	71,114	—	71,114	—
U.S. government-sponsored entity debt securities	41,424	—	41,424	—
Total	293,350	—	293,350	—
Total cash equivalents and marketable securities	$ 370,563	$ 77,213	$ 293,350	$ —
Free shares asset	$ 239	$ —	$ —	$ 239

	December 31, 2018 Fair Value Measurements			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 103,291	$ 103,291	$ —	$ —
Total	103,291	103,291	—	—
Marketable securities:				
Commercial paper securities	177,224	—	177,224	—
Corporate debt securities	63,870	—	63,870	—
U.S. government-sponsored entity debt securities	18,621	—	18,621	—
Total	259,715	—	259,715	—
Total cash equivalents and marketable securities	$ 363,006	$ 103,291	$ 259,715	$ —
Liabilities:				
Free shares liability	$ 154	$ —	$ —	$ 154

Cash Equivalents and Marketable Securities

The Company generally classifies its marketable securities 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 Share Asset/Liability

As a result of the July 20, 2018 Share Purchase Agreement ("SPA") to acquire TxCell S.A. ("TxCell" or "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 TxCell pursuant to which the Company has the right to purchase such shares from the holders thereof (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. During the three months ended September 30, 2019, the Company purchased approximately 111,000 shares of the 477,000 total free shares for a cash payment of approximately $0.3 million upon exercise of the put options. As of September 30, 2019, approximately 366,000 free shares remain outstanding and subject to purchase by the Company.

The free shares liability was approximately $0.2 million at December 31, 2018 and the Company recognized a gain due to an increase in the fair value of the free shares of approximately $0.5 million for the nine months ended September 30, 2019, offset by approximately $0.1 million for the shares purchased in September 2019, bringing the balance to an asset of approximately $0.2 million at September 30, 2019.

Free Shares valuation assumptions:	September 30, 2019	December 31, 2018
Sangamo Stock Price (USD)	$ 9.05	$ 11.48
TxCell Stock Price (EUR)	€ 2.23	€ 2.58
EUR / USD Exchange Rate	0.91	0.87
Estimated Correlation Sangamo and TxCell Stock Prices	100.0%	—
Sangamo Stock Price (USD) Volatility Estimate	75.0%	79.9%
TxCell Stock Price (EUR) Volatility Estimate	75.0%	8.6%
EUR / USD Exchange Rate Volatility Estimate	6.8%	7.7%
Risk Free Rate and Cost of Debt by Expected Exercise Date	Varies	Varies

NOTE 3—CASH AND MARKETABLE SECURITIES

Cash, Cash Equivalents and Restricted Cash

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, 2019	December 31, 2018	September 30, 2018	December 31, 2017
Cash and cash equivalents	$ 114,291	$ 140,418	$ 39,298	$ 49,826
Restricted cash included in Restricted cash, current portion	2,000	—	—	—
Restricted cash included in Non-current restricted cash	1,500	3,500	79,941	3,500
Cash, cash equivalents and restricted cash as reported within the accompanying Condensed Consolidated Statements of Cash Flows	$ 117,791	$ 143,918	$ 119,239	$ 53,326

Restricted cash consists of a letter of credit for $3.5 million as a deposit for the Brisbane lease, of which $2.0 million was released in October 2019.

Cash Equivalents and Available-for-sale Securities

The table below summarizes the Company's cash equivalents and available-for-sale securities (in thousands):

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
September 30, 2019				
Assets				
Cash equivalents:				
Money market funds	$ 77,213	$ —	$ —	$ 77,213
Total	77,213	—	—	77,213
Available-for-sale securities:				
Commercial paper securities	180,590	224	(2)	180,812
Corporate debt securities	70,947	167	—	71,114
U.S. government-sponsored entity debt securities	41,394	30	—	41,424
Total	292,931	421	(2)	293,350
Total cash equivalents and available-for-sale securities	$ 370,144	$ 421	$ (2)	$ 370,563
December 31, 2018				
Assets				
Cash equivalents:				
Money market funds	$ 103,291	$ —	$ —	$ 103,291
Total	103,291	—	—	103,291
Available-for-sale securities:				
Commercial paper securities	177,353	—	(129)	177,224
Corporate debt securities	63,981	—	(111)	63,870
U.S. government-sponsored entity debt securities	18,640	—	(19)	18,621
Total	259,974	—	(259)	259,715
Total cash equivalents and available-for-sale securities	$ 363,265	$ —	$ (259)	$ 363,006

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

	September 30, 2019	December 31, 2018
Maturing in one year or less	$ 240,561	$ 259,715
Maturing after one year through five years	52,789	—
Total	$ 293,350	$ 259,715

The Company had no material realized losses of its available-for-sale securities for the three and nine months ended September 30, 2019 or 2018. Sangamo has the intent and ability to hold its investments for a period of time sufficient to allow for any anticipated recovery in market value. No investments were other-than-temporarily impaired at either September 30, 2019 or December 31, 2018.

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, 2019 and 2018 totaled 10,370,481 and 8,770,775, respectively.

NOTE 5—MAJOR CUSTOMERS, PARTNERSHIPS AND STRATEGIC ALLIANCES

Kite Pharma, Inc.

In February 2018, the Company entered into a global collaboration and license agreement with Kite, which it 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 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, T-cell receptors, and NK-cell receptors directed to mutually agreed targets. Kite is responsible for all clinical development and commercialization of any resulting products and has announced that they expect to initiate a clinical trial evaluating KITE-037, an allogeneic anti-CD19 CAR-T cell therapy, in 2020. The Kite agreement became effective on April 5, 2018.

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 zinc finger nucleases ("ZFNs") and viral vectors developed under the research program to express chimeric antigen receptors ("CARs"), T-cell receptors ("TCRs") or NK-cell receptors ("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, in April 2018, the Company received a $150.0 million upfront payment from Kite. In addition, Kite will reimburse the Company's direct costs to conduct the joint research program, and Kite will be responsible for all subsequent development, manufacturing and commercialization of any licensed products. 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 will be entitled to receive escalating, tiered royalty payments with a percentage in the single digits based on potential future annual worldwide net sales of licensed products. These royalty payments will be 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. 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.

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 by ready obligation to perform research services, and (2) the on-going research services. Revenue

from the upfront license fee relates to access to the license and Company's obligation to stand-ready to perform such research services as additional targets are selected by Kite. As a result of this obligation to perform research services when and if requested throughout the duration of the contract, the fee for the license and the stand-ready obligation will be recognized over time on a straight-line basis through June 2024, the estimated period of the stand-ready obligation. Revenue from the reimbursable costs related to the integrated service deliverable is recognized as the research services are performed. 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, 2019 and December 31, 2018, the Company had deferred revenue of $112.8 million and $131.5 million, respectively, related to this agreement.

Revenues recognized under the agreement for the three and nine months ended September 30, 2019 and 2018 were as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenue related to Kite agreement:				
Recognition of license and stand-ready fee	$ 6,296	$ 6,296	$ 18,682	$ 12,249
Research services	2,565	2,732	7,551	4,295
Total	$ 8,861	$ 9,028	$ 26,233	$ 16,544

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.

The Company originally 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 hemophilia A Pfizer 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, no milestone payments have been received and no products have been approved and therefore no royalty fees have been earned under the hemophilia A Pfizer agreement.

The Company concluded the total transaction price under this agreement is $70.0 million, which represents the upfront fee received. Sangamo is responsible for internal and external research costs as part of the upfront fee and has the ability to request additional reimbursement from Pfizer if certain conditions are met. None of the clinical or regulatory milestones have been included in the transaction price, as all milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price, including its estimated variable consideration included in the transaction price and all constrained amounts in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

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 will be 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.

The Company has identified the performance obligations within the hemophilia A Pfizer agreement as a license to the technology and on-going research services. The Company concluded that the license is not discrete as it does not have stand-alone value to Pfizer apart from the research services to be performed by the Company pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the on-going 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, 2019 and December 31, 2018, the Company had deferred revenue of $12.4 million and $10.0 million, respectively, related to this agreement.

Revenues recognized under the agreement for the three and nine months ended September 30, 2019 and 2018 were as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Recognition of upfront fee related to Pfizer SB-525 agreement	$ 3,440	$ 10,421	$ 5,035	$ 26,262

In the first quarter of 2019, the Company updated its estimated project cost and related revenues under this program. This adjustment was a direct result of the increase in project scope during the first quarter of 2019 and the corresponding costs which resulted in a decrease in the measure of proportional performance. During the nine months ended September 30, 2019, the Company recognized $5.0 million in revenues related to the Pfizer SB-525 agreement which were net of the approximately $3.0 million reduction in revenues recorded in the three months ended March 31, 2019 related to the updated estimated project cost.

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 transcription factors ("TFs") to treat amyotrophic lateral sclerosis ("ALS") and frontotemporal lobar degeneration ("FTLD") 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.

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

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

consideration included in the transaction price and all constrained amounts, in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

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 has identified the performance obligations within this agreement as a license to the technology and on-going research services. The Company concluded that the license is not discrete as it does not have stand-alone value to Pfizer apart from the services to be performed by the Company pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the on-going services, over the estimated period the Company will perform research services. The estimation of progress towards the satisfaction of its performance obligation and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. As of September 30, 2019 and December 31, 2018, the Company had deferred revenue of $8.3 million and $9.8 million, respectively, related to this agreement.

Revenues recognized under the agreement for the three and nine months ended September 30, 2019 and 2018 were as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Recognition of upfront fee related to Pfizer C9ORF72 agreement	$ 468	$ 394	$ 1,538	$ 1,470

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 Biogen MA Inc., 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 investigational new drug ("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.

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 will also be 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, however no products have been approved and therefore no royalty fees have been earned under the Sanofi agreement.

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.

All contingent payments under the agreement, when earned, will be non-refundable and non-creditable. The transaction price of $75.7 million includes the upfront license fee of $20.0 million and $55.7 million estimated research service costs for identified research projects over the estimated performance period, as all unachieved milestone amounts are fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including the fact that achievement of the milestones at this time is uncertain and contingent upon future periods when the uncertainty related to the variable consideration is resolved. The Company will re-evaluate the transaction price, including the estimated variable consideration included in the transaction price and all constrained amounts, in each reporting period and as uncertain events are resolved or other changes in circumstances occur. None of the clinical or regulatory milestones have been included in the transaction price.

The Company has identified the performance obligations within this arrangement as a license to the technology and on-going research services activities. The Company concluded that the license is not discrete as it does not have stand-alone value to Sanofi apart from the research services to be performed pursuant to the agreement. As a result, the Company recognizes revenue from the upfront payment based on proportional performance of the ongoing services through 2022, the estimated period the Company will perform research services. The estimation of progress towards the satisfaction of performance obligation and project cost is reviewed quarterly and adjusted, as needed, to reflect the Company's current assumptions regarding the timing of its deliverables. As of September 30, 2019 and December 31, 2018, the Company had deferred revenue of $2.0 million and $4.6 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 I clinical trial. This milestone was recognized as revenue during the three and nine months ended September 30, 2019.

Revenues recognized under the agreement, excluding the milestone revenue, for the three and nine months ended September 30, 2019 and 2018 were as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Revenue related to Sanofi agreement:				
Recognition of upfront fee	$ 940	$ 1,094	$ 2,594	$ 3,432
Research services	1,814	1,146	5,169	7,707
Total	$ 2,754	$ 2,240	$ 7,763	$ 11,139

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, 2019 and December 31, 2018, the Company had received $5.2 million and $1.7 million, respectively, 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. In the event that the Company terminates a CIRM-funded clinical trial, it will be obligated to repay the remaining CIRM funds on hand. Therefore, as of September 30, 2019 and December 31, 2018, the $5.5 million and $1.8 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 with the next 12 months.

NOTE 6—INCOME TAXES

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

NOTE 7—COMMITMENTS AND CONTINGENCIES

Leases

Sangamo occupies approximately 87,700 square feet of office and research and development laboratory facilities in Brisbane, CA pursuant to a lease that expires in May 2029. Sangamo also leases approximately 37,900 square feet of office and laboratory space in Richmond, CA through August 2026. The Company leases approximately 7,700 square feet of additional research and office space located in Richmond, CA pursuant to a lease that expires in December 2019. In addition, the Company leases two properties in Valbonne, France. The first lease is for approximately 14,036 square feet of research and office space that expires in June 2025. The second lease, which commenced on April 1, 2019, is for approximately 6,800 square feet of office space and expires in March 2028.

Certain of these leases also 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 it would exercise the options.

With respect to the Brisbane lease, the commencement date for approximately 35,080 square feet of the office space occurred in January 2019 while the commencement date for the remaining approximately 52,620 square feet occurred in June 2019. The Company has the right to make tenant improvements, including the addition of laboratory space, with a lease incentive allowance of $6.8 million on the first portion of the space occupied and $10.2 million on the portion of the lease that commenced in June 2019.

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, 2019, the Company incurred $2.6 million and $5.3 million, respectively, of lease costs included in operating expenses in the Condensed Consolidated Statements of Operations in relation to these operating leases. Variable lease expense was $0.6 million and $1.2 million for the three and nine months ended September 30, 2019, respectively, and was not included in the measurement of the Company's operating ROU assets and lease liabilities. The variable expense consists primarily of the Company's proportionate share of operating expenses, property taxes and insurance and is classified as lease expense due to the Company's election to not separate lease and non-lease components.

Cash paid for amounts included in the measurement of operating lease liabilities for the nine months ended September 30, 2019 was $2.0 million and was included in net cash used in operating activities in the Company's Condensed Consolidated Statements of Cash Flow.

As of September 30, 2019, the maturities of the Company's operating lease liabilities were as follows (in thousands):

	Total
Three months ending December 31, 2019	$ 1,073
2020	6,055
2021	6,097
2022	6,165
2023	6,243
Thereafter	31,946
Total lease payments	57,579
Less:	
Imputed interest	(13,976)
Total	$ 43,603
Reported as of September 30, 2019:	
Operating lease liabilities - current (included in Accounts payable and accrued liabilities on the Condensed Consolidated Balance Sheet)	$ 2,994
Operating lease liabilities - long-term	40,609
Total	$ 43,603

As of September 30, 2019, the weighted-average remaining lease term is 9.1 years and the weighted-average incremental borrowing rate used to determine the operating lease liability was 6.9% for the Company's operating leases.

The Company does not have any financing leases.

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, 2019 and 2018 (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2019	2018	2019	2018
Research and development	$ 2,268	$ 2,093	$ 7,329	$ 5,972
General and administrative	2,433	1,717	6,762	4,402
Total stock-based compensation expense	$ 4,701	$ 3,810	$ 14,091	$ 10,374

NOTE 9—STOCKHOLDERS' EQUITY

Common Stock

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.

In April 2018, Sangamo completed an underwritten public offering of its common stock, in which the Company sold an aggregate of 14.2 million shares of its common stock at a public offering price of $16.25 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 $215.8 million.

At-the-Market Offering Agreement

In May 2017, the Company entered into an amended and restated "at-the-market" offering program sales agreement with Cowen and Company, LLC ("Cowen"), pursuant to which the Company may issue and sell from time to time up to $75.0 million

of the Company's common stock through Cowen as the sales agent (the "ATM Agreement"). Sales of the Company's common stock, if any, will be made at market prices by any method that is deemed to be an "at-the-market offering" as defined in Rule 415 under the Securities Act of 1933, as amended. As of September 30, 2019, the Company has not sold any common stock under the ATM Agreement and the full $75.0 million remained available for sale, subject to certain conditions as specified in the 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 TxCell's share capital. The Company entered into a Share Purchase Agreement ("SPA") with certain shareholders of TxCell, pursuant to which it acquired 13,519,036 ordinary shares of TxCell ("TxCell Ordinary Shares") as part of a block transaction that closed on October 1, 2018 (the "Acquisition Date"). Additionally, the Company and TxCell entered into a Tender Offer Agreement pursuant to which it agreed to acquire 11,528,635 TxCell Ordinary Shares for the same price per share 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 TxCell Ordinary Shares as of December 31, 2018 (or 25,047,671 TxCell Ordinary Shares). In addition to the SPA and the tender offer agreement, the Company also entered into arrangements with the holders of approximately 477,000 "free shares" of TxCell pursuant to which the Company has the right to purchase such shares from the holders thereof (a call option) and such holders have the right to sell to the Company such shares from time to time through mid-2021 (a put option) (collectively the "Free Shares Options"). In June 2019, TxCell became a *société par actions simplifiée* (S.A.S.) and was renamed "Sangamo Therapeutics France." During the three months ended September 30, 2019, the Company acquired approximately 111,000 vested free shares, including 52,700 from a former executive of TxCell who is now an executive of Sangamo, pursuant to the exercise of the Free Shares Options for approximately $0.3 million of cash, increasing its ownership of the TxCell Ordinary Shares to 98.7% as of September 30, 2019.

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 Measurement-*Free Shares Asset/Liability"* for information regarding the valuation method. The fair value of the Free Shares Options will vary based on future changes in the Company's stock price during the option period. The fair value of the Free Shares Options was estimated to be an asset of $0.2 million as of September 30, 2019.

The acquisition of Sangamo France was accounted for as a business combination in accordance with ASC Topic 805, *Business Combinations*. 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, 2019 or during 2018 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, 2019 and December 31, 2018.

The following table summarizes the estimated consideration transferred and the fair value of the net assets acquired as of the Acquisition Date (in thousands):

	October 1, 2018
Consideration transferred	$ 45,911
Fair value of non-controlling interest	35,829
Fair value of TxCell	$ 81,740
Cash	$ 4,779
Current assets	2,427
Property and equipment	1,857
IPR&D	55,019
Other assets	155
Current liabilities	(9,761)
Assumed debt liabilities	(4,933)
Deferred tax liability, net	(6,798)
Fair value of net identifiable assets acquired	42,745
Goodwill	38,995
Total fair value of net assets acquired	$ 81,740

Non-Controlling Interest

The fair value of the non-controlling interest at the Acquisition Date was based on the $2.99 acquisition price per share for the 11,981,867 TxCell Ordinary Shares that were not purchased by the Company in the block transaction on the Acquisition Date. Subsequent to the Acquisition Date and through December 31, 2018, the Company acquired 11,528,635 TxCell Ordinary Shares, which when aggregated with the 13,519,036 TxCell Ordinary Shares acquired at the Acquisition Date, resulted in the Company owning 98.2% of all TxCell Ordinary Shares as of December 31, 2018. During the three months ended September 30, 2019, the Company acquired approximately 111,000 vested free shares for approximately $0.3 million of cash, pursuant to the exercise of the Free Shares Options, increasing its ownership of the TxCell Ordinary Shares to 98.7% as of September 30, 2019.

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, 2019 was as follows (in thousands):

Non-controlling interest at December 31, 2018	$	739
Fair value of additional shares acquired		(321)
Loss attributable to non-controlling interest		(179)
Non-controlling interest at September 30, 2019	$	239

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 "believes," "anticipates," "expects," "continue," "intend," "plan," "will" and other words of similar import or the negative of those terms or expressions. Such forward-looking statements are subject to known and unknown risks, uncertainties, estimates and other factors that may cause our actual results, performance or achievements, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Actual results could differ materially from those set forth in such forward-looking statements as a result of, but not limited to the "Risk Factors" in Part II, Item 1A of this Quarterly Report on Form 10-Q. You should read the following discussion and analysis along with the financial statements and notes attached to those statements included elsewhere in this report and in our Annual Report on Form 10-K for the year ended December 31, 2018, or the 2018 Annual Report, as filed with the Securities and Exchange Commission, or SEC, on March 1, 2019.

Overview

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

Our strategy is to maximize the value and therapeutic use of our technology platforms. In certain therapeutic areas we intend to capture the value of our proprietary gene therapy and genome editing products by forward integrating into manufacturing, development and commercial operations. In other therapeutic areas we intend to partner with biopharmaceutical companies to develop products as appropriate. Decisions to partner product candidates or not will be based on the best way to bring new medicines to patients and on an evaluation of our capacity to bring such products to commercial stage rapidly and efficiently on our own. For our proprietary clinical development programs, we are focused on three therapeutic areas: inherited metabolic diseases, or IMDs, central nervous system diseases and inflammatory and autoimmune diseases.

We are a leader in the research and development of zinc finger proteins, or ZFPs, a naturally occurring class of proteins found in humans. We have used our knowledge and expertise to develop a proprietary synthetic ZFP technology platform with potential clinical utility in both genome editing and gene regulation. ZFPs can be engineered to make zinc finger nucleases, or ZFNs, proteins that can be used to specifically modify DNA sequences by adding or knocking out specific genes, or genome editing, and ZFP transcription-factors, or ZFP-TFs, proteins that can be used to increase or decrease gene expression, or gene regulation. In the process of developing this platform, we have accrued significant scientific, manufacturing, development

capabilities, and know-how that are broadly applicable in the field of gene therapy and have used this knowledge to advance a conventional gene therapy platform.

We have a substantial intellectual property position that includes the design, selection, manufacture, composition and use of engineered ZFPs, CAR-Tregs and other cell therapies to support our research and development activities. 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 a critical element in our ability to research, develop, manufacture and commercialize gene therapy, *ex vivo* gene-edited cell therapy, *in vivo* genome editing and *in vivo* gene regulation products and services.

Business Update

Gene therapy programs

We are conducting the Phase 1/2 Alta study, an open-label, ascending-dose clinical trial to evaluate investigational SB-525 gene therapy for severe hemophilia A. SB-525 is being developed under global collaboration with Pfizer Inc., or Pfizer, for the research, development and commercialization of gene therapy product candidates for severe hemophilia A. Under this agreement, we are responsible for conducting the Phase 1/2 clinical trial and certain manufacturing activities for SB-525, while Pfizer is responsible for the subsequent worldwide development, manufacturing, marketing and commercialization of SB-525.

In July 2019, we and Pfizer announced updated initial data from 10 patients treated in the Alta study. Across the four dosage cohorts evaluated, patients demonstrated a dose-dependent increase in Factor VIII, or FVIII, levels, and a dose-dependent reduction in the use of FVIII replacement therapy was also observed, with patients in the highest dose cohort not requiring factor replacement therapy after initial use of prophylactic factor and experiencing no bleeding events as of the data cut-off date. For the four patients in the highest dose (3e13 vg/kg) cohort, FVIII activity data were available through 24, 19, 6, and 4 weeks of follow-up, respectively. The first two patients treated in the 3e13 vg/kg cohort (Patients 7 and 8) achieved FVIII levels with rapid kinetics in the normal range, as measured using a chromogenic assay, through weeks 24 and 19 of follow-up, respectively. The next two patients treated in the 3e13 vg/kg cohort (Patients 9 and 10), with 6 and 4 weeks of follow-up, respectively, demonstrated rapid FVIII activity kinetics and FVIII levels that appeared consistent with those in Patients 7 and 8 at similar early time points. SB-525 was generally well-tolerated, with one patient (treated at the 3e13 vg/kg dose) reporting a treatment-related serious adverse event of hypotension and fever, which occurred following vector infusion and resolved with treatment within 24 hours of completing the vector infusion. The fifth patient in the 3e13 vg/kg cohort (Patient 11) was treated in July 2019. Updated Alta study data will be presented in a December 7, 2019 poster presentation at the 61st Annual Meeting of the American Society of Hematology, or ASH. The SB-525 poster will include updated analyses of the Alta study data, including the durability of FVIII levels, bleeding rates, factor usage and safety, with data from all five of the patients treated in the high dose (3e13 vg/kg) cohort, with follow up ranging from approximately four months to 11 months after treatment with SB-525.

Based on the results from the Alta study, the U.S. Food and Drug Administration, or FDA, has granted regenerative medicine advanced therapy, or RMAT, designation for SB-525 gene therapy to treat severe hemophilia A. RMAT designation is granted to regenerative medicine therapies intended to treat, modify, reverse, or cure a serious condition, for which preliminary clinical evidence indicates that the medicine has the potential to address an unmet medical need. The RMAT designation includes all the benefits of the fast track and breakthrough therapy designation programs, including early interactions with the FDA.

We have made significant recent progress with advancing SB-525 towards a Phase 3 registrational study which will be run by Pfizer, who is responsible for late-stage clinical development, manufacturing and commercialization of SB-525. We have recently completed manufacturing technology transfer to Pfizer, and have initiated the transfer of the SB-525 IND to Pfizer. Pfizer has enrolled the first patient in a six-month Phase 3 lead-in study, which will serve as the baseline control for the Phase 3 study, which is expected to provide the basis for regulatory authorizations.

We are also evaluating our wholly-owned investigational ST-920 gene therapy for Fabry disease, an inherited metabolic disease. An investigational new drug application, or IND, was accepted by the FDA in February 2019, and a clinical trial authorization, or CTA, in the United Kingdom was granted in October 2019. The FDA also granted Orphan Drug Designation to ST-920 for the treatment of Fabry disease. Several clinical sites for a Phase 1/2 clinical trial have been activated, and we expect to enroll the first subject in the study by the end of 2019.

Ex vivo gene edited cell therapy programs

We are conducting the Phase 1/2 THALES study, an open-label, single arm clinical trial to evaluate the safety and efficacy of ST-400 in up to six subjects with beta thalassemia. ST-400 is an *ex vivo* gene-edited cell therapy that involves gene editing of a patient's own hematopoietic stem progenitor cells using non-viral delivery of ZFN technology. ST-400 is being developed in collaboration with Sanofi Genzyme, or Sanofi, to research, develop and commercialize therapeutic gene-edited cell therapy products in hemoglobinopathies, including beta thalassemia and sickle cell disease, or SCD. Sanofi is responsible for the subsequent development, manufacturing and commercialization of all licensed products. The collaboration includes a related

program evaluating BIVV003 for the treatment of SCD. BIVV003 uses the same technology as ST-400 and is currently being evaluated in a Phase 1/2 clinical trial conducted by Sanofi.

Recruitment of this study is ongoing, with five of six patients enrolled. In August 2019 a third patient was dosed in the THALES study, following dosing we achieved a $6.0 million milestone with Sanofi and received $2.1 million from the California Institute for Regenerative Medicine.

Updated data from the THALES study data will be presented in a December 9, 2019 poster presentation at the 61st Annual Meeting of ASH. The poster presentation will show preliminary results from the first three patients enrolled in the Phase 1/2 THALES study. The first three patients all have severe beta thalassemia genotypes: â0/â0, homozygous for the severe â+ IVS-I-5 (G>C) mutation, and â0/â+ genotype including the severe IVS-II-654 (C>T) mutation, respectively. In the THALES study abstract published by ASH on November 6, 2019, Patient 1 and Patient 2 experienced prompt hematopoietic reconstitution. Patient 1 had increasing fetal hemoglobin (HbF) fraction that contributed to a stable total hemoglobin. After being free from packed red blood cell (PRBC) transfusions for 6 weeks, the patient subsequently required intermittent transfusions. Patient 2 had rising HbF levels observed through 90 days post-infusion. For both patients, as of the most recent follow-up reported in the abstract, on-target insertions and deletions (indels) were present in circulating white blood cells. Patient 3 had just completed ST-400 manufacturing at the time of abstract submission. As previously disclosed, patient 1 experienced an SAE of hypersensitivity during ST-400 infusion considered by the investigator to be related to the product cryoprotectant, DMSO, and which resolved by the end of the infusion. No other SAEs related to ST-400 have been reported and all other AEs have been consistent with myeloablation. No clonal hematopoiesis has been observed. Longer follow-up will be required to assess the clinical significance of these early results.

In February 2018, we entered into a global collaboration and license agreement that we amended and restated in September 2019 with Kite Pharma, Inc., or Kite, a wholly owned subsidiary of Gilead Sciences, Inc., for the research, development and commercialization of potential engineered cell therapies for cancer. In this collaboration, we are working together with Kite on a research program under which we are designing ZFNs and viral vectors to disrupt and insert select genes in T-cells and natural killer cells, or NK-cells, including the insertion of genes that encode chimeric antigen receptors, T-cell receptors, and NK-cell receptors directed to mutually agreed targets. Kite is responsible for all clinical development and commercialization of any resulting products and has announced that they expect to initiate a clinical trial evaluating KITE-037, an allogeneic anti-CD19 CAR-T cell therapy, in 2020.

Following the October 2018 acquisition of TxCell, S.A., which we have subsequently renamed Sangamo Therapeutics France S.A.S., or Sangamo France, we are evaluating the potential of CAR-Tregs (regulatory T-cells, or Tregs, genetically modified with a chimeric antigen receptor, or CAR) in solid organ transplantation. We are also conducting preclinical studies to determine whether such agents have potential clinical utility in autoimmune and inflammatory diseases, such as multiple sclerosis and inflammatory bowel diseases. In addition, we intend to use our ZFN gene editing technology to potentially develop next-generation autologous and allogeneic CAR-Treg cell therapies for use in the treatment of autoimmune and inflammatory diseases. We submitted a CTA in Europe for TX-200, an autologous CAR-Treg cell therapy for the prevention of solid organ transplant rejection, and we expect to initiate the TX-200 clinical trial in 2020.

In vivo genome editing and gene regulation programs

We have three proprietary *in vivo* genome editing programs being evaluated in Phase 1/2 clinical trials: SB-913 (Mucopolysaccharidosis type II, or MPS II), SB-318 (MPS I), and SB-FIX (hemophilia B). In April 2019, we announced that we are no longer treating additional patients in our SB-913, SB-318 and SB-FIX clinical trials with first generation ZFNs given that clinical benefit has not been demonstrated in analyses conducted to date.

We are planning a new clinical trial for SB-913 to treat MPS II to evaluate second-generation ZFNs and other potential modifications that have the potential to enhance the clinical efficacy of this product. These include modifications that have the potential to enhance the *in vivo* delivery of the ZFNs.

We expect to initiate this clinical trial by year end 2020, and expect to use data from the new study evaluating second generation ZFNs to make a Phase 3 decision for the SB-913 program and to define the next steps, if any, for the SB-318 and SB-FIX programs.

We also have several preclinical programs evaluating our zinc finger protein transcription factor, or ZFP TF, gene regulation technology. ZFP TFs act at the DNA level to selectively repress or activate the expression of specific genes to achieve a desired therapeutic effect. Gene regulation differs from other genome editing approaches as it is designed to enable precise, robust, and long-term repression of a selected gene following a single administration of AAV and does not cut or modify the target DNA.

In March and April 2019, we presented new preclinical data describing the effects of ZFP TFs targeting tau, delivered with AAVs in the mouse and nonhuman primate, or NHP, brain. Intra-hippocampal ZFP TF delivery to adult mice resulted in

more than 80% tau reduction, and intravenous ZFP TF administration reduced tau levels by 50-70% across the entire mouse brain. AAV ZFP TFs targeting tau were administered to the adult NHP hippocampus using real-time MRI-guided stereotaxic infusion. The lowering of tau in the hippocampus and entorhinal cortex of NHP was correlated with the transgene expression levels. The treatment was well tolerated for the duration of the study. We believe that together, these preclinical data from mice and NHPs highlight the potential for a single administration of a ZFP TF to lower tau as a treatment for tauopathies, including Alzheimer's disease.

In December 2017, we entered into a research 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, or ALS, and frontotemporal lobar degeneration, or FTLD, linked to mutations in the C9ORF72 gene. Under this agreement, we are working with Pfizer on a research program to identify, characterize and preclinically develop ZFP TFs that satisfy pre-agreed criteria. Pfizer is responsible for subsequent development, manufacturing and commercialization of licensed products.

Pursuant to a collaboration agreement with Takeda Pharmaceutical Company Limited, or Takeda, we have a preclinical program for Huntington's disease in which we are evaluating a ZFP TF designed to differentially down regulate the mutated disease-causing Huntingtin, or HTT, gene, while leaving expression of the normal gene unchanged.

Certain Components of Results of Operations

Our revenues have consisted primarily of revenues from our corporate partners, contractual payments from strategic partners for research services and milestones and research 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, revenues from corporate collaborations 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. Pursuant to the terms of the agreements with Kite and Sanofi, certain expenses related to research and development activities will be reimbursed to us. The reimbursement funds to be received from Kite and Sanofi will be recognized as revenue as the costs are incurred and collection is reasonably assured.

Comparability

We adopted Accounting Standards Codification Topic 842—*Leases*, or ASC Topic 842, on January 1, 2019, resulting in changes to our accounting policy for leases. We used the modified retrospective approach and recognized the cumulative effect of initially applying ASC Topic 842 as an adjustment to the opening balances of the lease related accounts and accumulated deficit at January 1, 2019. Accordingly, comparative information has not been adjusted and continues to be reported under previous accounting standards. Refer to Note 1 in Part I, Item 1 of this Quarterly Report on Form 10-Q for additional information and details on lease related accounts impacted by ASC Topic 842.

Critical Accounting Estimates

The accompanying 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 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. Except for the change in estimate for revenue reversal related to our Pfizer agreement as described in Note 1, Item 1 of this Quarterly Report on Form 10-Q, and for the change to our accounting policy for leases as a result of adopting ASC Topic 842, there have been no significant changes in our critical accounting policies and estimates disclosed in the 2018 Annual Report.

Results of Operations for the Three and Nine Months Ended September 30, 2019 and 2018

Revenues

	Three Months Ended September 30, (in thousands, except percentage values)				Nine Months Ended September 30, (in thousands, except percentage values)			
	2019	2018	Change	%	2019	2018	Change	%
Revenues	$ 21,958	$ 23,562	$ (1,604)	(7%)	$ 47,577	$ 57,615	$ (10,038)	(17%)

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

The decrease of $1.6 million in revenues for the three months ended September 30, 2019, compared to the same period in 2018, was primarily due to a decrease of $7.0 million in revenues related to our agreements with Pfizer due to a change in estimate as a result of the increase in project scope during the first quarter of 2019 and the corresponding costs, which resulted in a decrease in the measure of proportional performance, and $1.4 million decrease in royalty revenues, partially offset by an increase of $6.5 million in revenue related to our agreement with Sanofi as we achieved a $6.0 million milestone upon dosing of the third subject in the Phase 1/2 THALES study in August 2019.

The decrease of $10.0 million in revenues for the nine months ended September 30, 2019, compared to the same period in 2018, was primarily due to a decrease of $21.2 million in revenues related to our agreements with Pfizer due to a change in estimate as a result of the increase in project scope during the first quarter of 2019 and the corresponding costs which resulted in a decrease in the measure of proportional performance, and $1.4 million decrease in royalty revenues, partially offset by an increase of $9.7 million in revenue related to our agreement with Kite, which took effect in April 2018, and $2.6 million increase in revenues related to our agreement with Sanofi partially reflecting the $6.0 million milestone achievement upon dosing of the third subject in the Phase 1/2 THALES study in August 2019.

Operating Expenses

	Three Months Ended September 30, (in thousands, except percentage values)				Nine Months Ended September 30, (in thousands, except percentage values)			
	2019	2018	Change	%	2019	2018	Change	%
Operating expenses:								
Research and development	$ 36,288	$ 28,810	$ 7,478	26%	$ 107,593	$ 81,612	$ 25,981	32%
General and administrative	14,918	10,993	3,925	36%	46,633	32,381	14,252	44%
Total operating expenses	$ 51,206	$ 39,803	$ 11,403	29%	$ 154,226	$ 113,993	$ 40,233	35%

Research and Development Expenses

Research and development expenses consist primarily of salaries and personnel-related expenses including stock-based compensation, laboratory supplies, expenses related to preclinical and clinical studies, manufacturing clinical supply expenses, allocated facilities expenses, contracted research expenses and expenses for technology licenses. 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. Overall increases in the current period include activities attributed to Sangamo France, which was acquired on October 1, 2018.

The increase of $7.5 million in research and development expenses for the three months ended September 30, 2019, compared to the same period in 2018, was primarily driven by $3.4 million increase in compensation costs due to headcount growth in our development and technical operations teams to support clinical development trials and $3.2 million increase in facility expense primarily related to our Brisbane facility.

The increase of $26.0 million in research and development expenses for the nine months ended September 30, 2019, compared to the same period in 2018, was primarily driven by $13.0 million increase in compensation cost due to headcount growth in our development and technical operations teams to support clinical development trials, $5.0 million increase in facility expense primarily related to our Brisbane facility, $3.3 million increase in research, preclinical and clinical expenses and $3.2 million increase in lab supply expense.

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. 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 salaries and personnel related expenses for executive, finance and administrative personnel, stock-based compensation expenses, professional fees, allocated facilities expenses, patent prosecution expenses and other general corporate expenses. As we continue to build out our product portfolio and advance our product candidates into and through the clinic, we expect the growth of our business to require increased general and administrative expenses. Overall increases in the current period include activities attributed to Sangamo France, which was acquired on October 1, 2018.

The increase of $3.9 million in general and administrative expenses for the three months ended September 30, 2019, compared to the same period in 2018, was primarily due to $3.4 million higher compensation costs due to headcount growth and $1.0 million increased facility expense primarily related to our new Brisbane facility, partially offset by a decrease of $0.5 million in consulting and professional fees, which in 2018 included costs to support the acquisition of Sangamo France.

The increase of $14.3 million in general and administrative expenses for the nine months ended September 30, 2019, compared to the same period in 2018, was primarily due to increases of $9.7 million in compensation related costs due to headcount growth, $2.8 million increase in facility expense primarily related to our new Brisbane facility, and $1.4 million increase in consulting and professional fees. The increases were primarily due to the growth of our business to support the continued advancement of our product candidates into clinical trials.

Interest and other income, net

The decreases of $1.5 million in interest and other income, net, for the three months ended September 30, 2019, compared to the same period in 2018, were primarily due to an increase of $1.4 million in foreign exchange losses.

There was no change in interest and other income, net, for the nine months ended September 30, 2019, compared to the same period in 2018, as the foreign exchange losses incurred during the period were offset by other income from Sangamo France during the year.

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, 2019, we had cash, cash equivalents, marketable securities and interest receivable totaling $408.3 million compared to $400.5 million as of December 31, 2018, with the increase primarily attributable to the proceeds from the underwritten public offering completed in April 2019, partially offset by operating expenditures. Our most significant use of capital pertains to our 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.

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

In May 2017, we entered into an amended and restated sales agreement with Cowen and Company, LLC, or Cowen, pursuant to which we may offer and sell, in our sole discretion, shares of common stock having an aggregate offering price of up to $75.0 million through Cowen acting as our sales agent, or the ATM Facility. Sales of our common stock, if any, will be made at market prices by any method that is deemed to be an "at-the-market offering" as defined in Rule 415 under the Securities Act of 1933, as amended. We have not sold any common stock under the ATM Facility. As of September 30, 2019, the full $75.0 million provided for under the ATM Facility remained available for sale, subject to certain conditions as specified in the agreement.

Since the beginning of 2017, we have received significant amounts of capital as upfront payments under the following collaboration arrangements: $70.0 million received in May 2017 from Pfizer under our hemophilia A agreement, $12.0 million received in January 2018 from Pfizer under our C9ORF72 agreement, and $150.0 million received in April 2018 under our collaboration agreement with Kite. Our collaboration agreements provide for the payment of development, regulatory, and commercial milestones. 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.

Cash Flows

Operating activities

Net cash used in operating activities was $123.6 million for the nine months ended September 30, 2019 primarily reflecting our net loss of $99.9 million, a decrease in deferred revenues of $20.5 million, an increase in accounts receivable of $17.3 million, partially offset by stock-based compensation of $14.1 million and other activities.

Net cash provided by operating activities of $76.7 million for the nine months ended September 30, 2018 primarily reflected the increase in deferred revenue of $118.5 million due to the $150.0 million upfront license payment from Kite and stock-based compensation of $10.4 million, partially offset by the net loss of $49.7 million.

Investing activities

Net cash used in investing activities for the nine months ended September 30, 2019 and 2018, was $43.4 million and $240.9 million, respectively. The decrease in net cash used in the nine months ended September 30, 2019, compared to the same period in 2018, was due primarily to a net decrease in purchases and maturities of marketable securities.

Financing activities

Net cash provided by financing activities for the nine months ended September 30, 2019 was $140.8 million mainly reflecting $136.3 million related to our April 2019 underwritten public offering and $4.9 million related to exercise of stock options.

Net cash provided by financing activities for the nine months ended September 30, 2018 was $230.1 million mainly reflecting $215.8 million related to our April 2018 underwritten public offering and $14.5 million related to exercise of stock options.

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 the available cash resources, as well as funds received from corporate collaborators, strategic partners and research grants will enable us to maintain our currently planned operations through at least the next twelve months from the date the financial statements are issued. Future capital requirements will be substantial and if our capital resources are insufficient to meet future capital requirements, we will 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 any sales under our ATM Facility, may result in dilution to our stockholders, and any debt financing may include covenants that restrict our business.

Our future capital requirements will depend on many factors and include, but are not limited to the following:

- the initiation, progress, timing and completion of clinical trials for our product candidates and potential product candidates;
- the outcome, timing and cost of regulatory approvals;

- the success of our collaboration agreements;
- delays that may be caused by changing regulatory requirements;
- the number of product candidates that we pursue;
- the costs involved in filing and prosecuting patent applications and enforcing and defending patent claims;
- the timing and terms of future in-licensing and out-licensing transactions;
- the cost and timing of establishing sales, marketing, manufacturing and distribution capabilities;
- the cost of procuring clinical and commercial supplies of our product candidates;
- the extent to which we acquire or invest in businesses, products or technologies, including the costs associated with such acquisitions and investments; and
- the possible costs of litigation.

Off-Balance Sheet Arrangements

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

Contractual Obligations and Commercial Commitments

Our future minimum contractual commitments were reported in the 2018 Annual Report and there have been no material changes outside the ordinary course of business in the previously disclosed contractual commitments during the nine months ended September 30, 2019. In April 2019, we entered into an Option Agreement, or the Option, with Brammer Bio MA, now a Thermo Fisher Scientific Inc. company, or Brammer, whereby Brammer granted us an option to secure dedicated capacity for manufacturing in Brammer's facilities. We paid $3.0 million for the Option, which expires on July 31, 2020. In addition, we will pay Brammer $2.0 million to assist us in establishing our manufacturing capabilities in Brisbane, CA, which may increase our contractual commitments in the future.

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, are classified as available-for-sale and are, due to their short-term nature, subject to minimal interest rate risk. Our investments currently consist of U.S. government-sponsored entity debt securities, corporate debt securities, commercial paper securities and money market funds. 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, 2019 have not changed materially from those discussed in Item 7A of the 2018 Annual Report.

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 Securities and Exchange Commission'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, 2019. Based on that evaluation, as of September 30, 2019, 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 three months ended September 30, 2019 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, together with the other information appearing elsewhere in this report, before making an investment decision regarding our common stock.

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

Our success depends substantially on the results of clinical trials of our lead therapeutic programs, and we may not be able to demonstrate safety and efficacy of our product candidates.

We do not have any products that have gained regulatory approval, and we are therefore substantially dependent on the results of clinical trials of our lead therapeutic programs. Our failure to enroll sufficient patients to conduct these clinical trials, demonstrate safety or obtain positive clinical trial results, or our inability to meet the expected timeline of these clinical trials or release of data for these programs, would have a material adverse effect on our business operations and financial conditions, which may cause a significant decline in our stock price.

Our ability to conduct and complete clinical trials successfully and on a timely basis for these programs is subject to a number of additional risks, including but are not limited to the following:

- disagreement with the design or implementation of our clinical trials;
- the ability to identify and recruit sufficient number of acceptable patients to complete enrollment of trials;
- failure to demonstrate that a product candidate is safe and effective for its proposed indication;
- the occurrence of unexpected adverse events or toxicity;
- disagreement with the U.S. Food and Drug Administration, or FDA, or foreign regulatory authorities, on the interpretation of data from preclinical studies or our clinical trial results;
- failure of clinical trials to meet the level of statistical significance required for approval;
- the insufficiency of data collected from clinical trials of our product candidates to support the submission and filing of a biologics license application, or BLA, or other submission or to obtain regulatory approval;
- changes in the approval policies or regulations that render our preclinical and clinical data insufficient for approval;
- failure to obtain approval of our manufacturing processes or facilities of third-party manufacturers with whom we contract for clinical and commercial supplies or our own manufacturing facility;
- defects in the preparation and manufacturing of our product candidates;
- failure by third parties, including vendors, manufacturers and clinical trial organizations, to provide timely and adequate supplies and services;
- development of similar gene therapies by our competitors;
- unexpected costs and expenses and lack of sufficient funding for these programs; and
- loss of licenses to critical intellectual properties.

We have ongoing clinical trials evaluating product candidates for the treatment of various conditions. Even if we are able to complete our clinical trials for these programs successfully, we will be required to conduct additional clinical trials with larger patient populations, before obtaining the necessary regulatory approval to commercialize any products, which involves significantly greater resources, commitments and expertise. We also have limited experience in conducting later stage clinical trials and may not possess the necessary resources and expertise to complete such trials. Therefore, we may be required to scale up our operations and enter into collaborative relationships with pharmaceutical companies that could assume responsibility for late-stage development and commercialization. In this regard, while we have entered into collaborative agreements to provide funding and assistance in the development of certain product candidates through the clinical trial process, there is no guarantee that we will be able to enter into future collaborative relationships with third parties that can provide us with the funding and expertise for later stage trials. In addition, there is no guarantee that any positive results achieved in our clinical trials will be indicative of long-term efficacy and safety in later stage clinical trials. If a larger patient population does not demonstrate an acceptable safety and efficacy profile, or if any positive results in our clinical trials are not suitable and/or reproducible, our

products may not receive approval from the FDA or foreign regulatory authorities, which could have a material adverse effect on our business.

In addition, we have not yet reached agreement with regulatory authorities on the complete development pathway for our product candidates. Further, regulatory authorities have the ability to change decisions or guidance with respect to approvable endpoints, especially as the technology continues to develop in these areas. As a result, we have not yet determined what endpoints would support approval for certain of our programs, and due to the novelty of certain programs, such as SB-FIX, SB-913 and SB-318, the endpoints needed to support regulatory approvals will likely be different from originally anticipated.

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. If we are unable to obtain regulatory approval for one of our product candidates in one or more jurisdictions, or any approval contains significant limitations, we may not be able to obtain sufficient funding to continue the development of that product or generate revenues attributable to that product candidate. Also, any regulatory approval of our current or future product candidates, once obtained, may be withdrawn.

Success in preclinical studies or early clinical trials 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 previous 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.

We have ongoing clinical trials evaluating product candidates for the treatment of hemophilia A (SB-525), hemophilia B (SB-FIX), MPS I (SB-318), MPS II (SB-913), and beta thalassemia (ST-400), and there is no guarantee that we can achieve positive final safety and efficacy results in our Phase 1/2 clinical trials for these product candidates. There is no guarantee that any of our pending clinical trials will be successful. Moreover, we have pending clinical trials involving our 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 delivery systems or ZFN platform 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].

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. In addition, we may experience regulatory delays or rejections as a result of many factors, including due to changes in regulatory policy during the period of our product candidate development. Any such delays could materially and adversely affect our business, financial condition, results of operations and prospects.

Our potential products 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, 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 European Union, 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. While we have stated our intention to submit additional IND and CTA applications in the future, this is only a statement of intent, and we may not be able to do so because the associated product candidates may not meet the necessary preclinical requirements. In addition, there can be no assurance that, once submitted, an IND or CTA will result in the actual initiation of clinical trials or that we will be able to meet our targeted timeline for the initiation of clinical trials. Clinical trials are subject to oversight by institutional review boards, or IRBs, and the applicable regulatory authority. In addition to FDA and IRB oversight, under guidelines promulgated by the National Institutes of Health, or NIH, gene therapy clinical trials are also subject to review and oversight by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees research utilizing recombinant or synthetic nucleic acid molecules at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment. While the NIH guidelines are not mandatory unless the research in question is being conducted at or sponsored by institutions receiving NIH funding of recombinant or synthetic nucleic acid molecule research, many companies and other institutions not otherwise subject to the NIH guidelines voluntarily follow them. Although the FDA decides whether individual gene therapy protocols may proceed, the review process and determinations of other reviewing bodies can impede or delay the initiation of a clinical trial, even if the FDA has reviewed the trial and approved its initiation.

Clinical trials:

- must be conducted in conformance with the FDA's good clinical practices, within the guidelines of the International Council for Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use, or ICH, and other applicable regulations;
- must meet requirements for IRB oversight;
- must follow IBC and NIH guidelines where applicable;
- must meet requirements for informed consent;
- are subject to continuing FDA or similar foreign government oversight;
- may require oversight by a Data Monitoring Committee, or DMC;
- may require large numbers of test subjects; and
- may be suspended by a commercial partner, the FDA, applicable foreign regulatory authorities or us at any time if it is believed that the subjects participating in these trials are being exposed to unacceptable health risks or if the FDA or applicable foreign regulatory authorities find deficiencies in our INDs or their foreign equivalents or the conduct of these trials.

If we are not able to obtain the necessary regulatory approval to commercialize our products or if such approval is delayed or suspended, it would have a material adverse effect on our business operations and trading price of our common stock.

We may encounter difficulties that may delay, suspend or scale back our efforts to advance additional early 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 a material adverse effect on our business and cause our stock price to decline.

We may not successfully identify, acquire, develop or commercialize new potential product candidates.

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. For example, through the acquisition of Sangamo France, we acquired the rights, among others, to our first CAR-Treg product candidate, TX-200. If we are unable to successfully develop and obtain regulatory approval for TX-200 or other CAR-Treg therapies and effectively commercialize them, or if we are unable to achieve the expected accelerated development timeline, we may not realize the anticipated benefits from the TxCell Acquisition, resulting in possible impairments or other charges or losses which may materially and adversely affect our results of operations and financial condition.

In the event that 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. Even if we are able to successfully identify and acquire such product candidates, we may not be able to successfully manage the risks associated with integrating acquired or in-licensed product candidates or technologies or the risks arising from anticipated and unanticipated problems in connection with an acquisition or in-licensing transaction. 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 TX-200, 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.

We may encounter substantial delays in our clinical trials or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates. Clinical testing is expensive, time consuming and uncertain as to outcome. 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 of testing. Events that may prevent successful or timely completion of clinical development include:

- delays in reaching a consensus with regulatory authorities on trial design;
- delays in reaching agreement on acceptable terms with prospective CROs and clinical trial sites;
- delays in opening clinical trial sites or obtaining required IRB or independent ethics committee approval at each clinical trial site;
- delays in recruiting suitable subjects to participate in our clinical trials;
- 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 FDA good clinical practices, or GCP, or applicable regulatory guidelines in the European Union 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;
- 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 associated with the product candidate that are viewed to outweigh its potential benefits;
- occurrence of serious adverse events in trials of the same class of agents conducted by other sponsors; or
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

Any inability to successfully complete preclinical and clinical development could result in additional costs to us or impair our ability to generate revenues from product sales, regulatory and commercialization milestones and royalties. In addition, if we make manufacturing or formulation changes to our product candidates, we may need to conduct additional studies to bridge our modified product candidates to earlier versions. Clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do, which could impair our ability to successfully commercialize our product candidates and may harm our business, financial condition, results of operations and prospects.

Additionally, if the results of our clinical trials are inconclusive or if there are safety concerns or serious adverse events associated with our product candidates, we may:

- be delayed in obtaining marketing approval for our product candidates, if at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to changes in the way the product is administered;
- be required to perform additional clinical trials to support approval or be subject to additional post-marketing testing requirements;
- have regulatory authorities withdraw, or suspend, their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy;
- be subject to the addition of labeling statements, such as warnings or contraindications;
- be sued; or
- experience damage to our reputation.

We may not be able to find acceptable patients or may experience delays in enrolling 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 in clinical trials of our product candidates is critical to our success. The timing of our clinical trials depends on our ability to recruit patients to participate as well as completion of required follow-up periods. For example, hemophilia trials often take longer to enroll due to the availability of existing treatments. We infused the first patient in the Phase 1/2 clinical trial evaluating ST-400 for the treatment of beta thalassemia in the first quarter of 2019. If we are not able to enroll the necessary number of patients 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;
- 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 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.

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

During the conduct of clinical trials, patients report changes in their health, including illnesses, injuries and discomforts, to their study doctor. Often, it is not possible to determine whether or not 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.

We may be unable to obtain additional orphan drug designations or orphan drug exclusivity for certain of our products. If our competitors are able to obtain orphan drug exclusivity for products that constitute the same drug and treat the same indications as our product candidates, we may not be able to have competing products approved by the applicable regulatory authority for a significant period of time.

Regulatory authorities in some jurisdictions, including the United States and the European Union, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983, the FDA may designate a product candidate as an Orphan Drug if it is intended to treat a rare disease or condition, which is generally defined as having a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. In the European Union, the EMA's Committee for Orphan Medicinal Products grants such designation to promote the development of products that are intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition affecting not more than five in 10,000 persons in the European Union. Additionally, orphan designation is granted for products intended for the diagnosis, prevention or treatment of a life-threatening, seriously debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the drug or biologic product.

Some of our advanced product candidates have been granted Orphan Drug Designation by the FDA, and some have also been designated Orphan Medicinal Products by the EMA. If we request such designation 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 designation. Additionally, such designation does not guarantee that any regulatory agency will accelerate regulatory review of, or ultimately approve, that product candidate, nor does it limit the ability of any regulatory agency to grant such designation to product candidates of other companies that treat the same indications as our product candidates prior to our product candidates receiving exclusive marketing approval.

Generally, if a product candidate with an orphan drug designation receives the first marketing approval for the indication for which it has such designation, the product is entitled to a period of marketing exclusivity, which precludes the FDA or the EMA from approving another marketing application for a product that constitutes the same drug treating the same indication for that marketing exclusivity period, except in limited circumstances. If another sponsor receives such approval before we do (regardless of our orphan drug designation), we will be precluded from receiving marketing approval for our product for the applicable exclusivity period. The applicable period is seven years in the United States and 10 years in the European Union. The exclusivity period in the United States can be extended by six months if the BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The exclusivity period in the European Union can be reduced to six years if a product no longer meets the criteria for orphan drug designation or if the product is sufficiently profitable so that market exclusivity is no longer justified. 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.

Even if we obtain orphan drug exclusivity for a product candidate, that exclusivity may not effectively protect the product candidate from competition because different drugs can be approved for the same condition. In the United States, even after an orphan drug is approved, the FDA may subsequently approve another drug for the same condition if the FDA concludes that the latter drug is not the same drug or is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. In the European Union, marketing authorization may be granted to a similar medicinal product for the same orphan indication if:

- the second applicant can establish in its application that its medicinal product, although similar to the orphan medicinal product already authorized, is safer, more effective or otherwise clinically superior;
- the holder of the marketing authorization for the original orphan medicinal product consents to a second orphan medicinal product application; or
- the holder of the marketing authorization for the original orphan medicinal product cannot supply sufficient quantities of orphan medicinal product.

Regenerative Medicine Advanced Therapy, or RMAT, designation, may not lead to a faster development or regulatory review or approval process and it does not increase the likelihood that our product will receive marketing approval.

We have received Regenerative Medicine Advanced Therapy, or RMAT, designation for one of our products to treat severe hemophilia A. RMAT designation is intended to expedite review of a cell therapy, therapeutic tissue engineering product, human cell and tissue product, or any combination product using such therapies or products, intended to treat, modify, reverse, or cure a serious or life-threatening disease or condition and for which preliminary clinical evidence indicates the potential to address unmet medical needs for such a disease or condition. RMAT designation provides potential benefits that include more frequent meetings with the FDA to discuss the development plan for the product candidate, and eligibility for rolling review and priority review of the related BLA. Products granted RMAT designation may also be eligible for accelerated approval on the basis of a surrogate or intermediate endpoint reasonably likely to predict long-term clinical benefit, or reliance upon data obtained from a meaningful number of sites, including through expansion to additional sites. There is no assurance that we will be able to obtain additional RMAT designations for any of our other product candidates. RMAT designation does not change the FDA's standards for product approval, and there is no assurance that such designation will result in expedited review or approval or that the approved indication will not be narrower than the indication covered by the designation. Additionally, RMAT designation can be revoked if the criteria for eligibility cease to be met as clinical data emerges.

Commercialization of our technologies will depend, in part, on strategic partnering with other companies. If we are not able to find partners in the future or if our partners do not diligently pursue product development efforts, 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 expect to rely, to some extent, on our strategic partners to provide funding in support of our research and to perform independent research and preclinical and clinical testing. Our technology is broad-based, and we do not currently possess the resources necessary to fully develop and commercialize potential products that may result from our technologies or the resources or capabilities to complete the lengthy marketing approval processes that may be required for the products. Therefore, we plan to rely on strategic partnerships to help us develop and commercialize our products. We have entered into collaborative agreements to provide funding and assistance in the development of certain product candidates through the clinical trial process. For example, we have an agreement with Kite for potential engineered cell therapies for cancer, two separate agreements with Pfizer, one for SB-525 for hemophilia A, and another for amyotrophic lateral sclerosis and frontotemporal lobar degeneration linked to mutations of the *C9ORF72* gene, and an agreement with Sanofi for our beta thalassemia and sickle cell disease product candidates.

If we are unable to find additional partners or if the partners are unable or unwilling to advance our programs, or if they do not diligently pursue product approval, this may slow our progress and adversely affect our ability to generate revenues. In addition, our partners may sublicense or abandon development programs or we may have disagreements or disputes with our partners, which would cause associated product development to slow or cease. In addition, the business or operations of our partners may change significantly through restructuring, acquisition or other strategic transactions or decisions that may negatively impact their ability to advance our programs.

The loss of partnering agreements or inability to find future partnering agreements may delay or terminate the potential development or commercialization of products we may derive from our technologies, but it may also delay or terminate our ability to test our product candidates. If any partner fails to conduct the collaborative activities successfully or in a timely manner, the preclinical or clinical development or commercialization of the affected product candidates or research programs could be delayed or terminated.

Under typical partnering agreements, we would 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 the commercialized products. Achieving these milestones will depend, in part, on the efforts of our partner as well as our own. If we, or any partner, fail to meet specific milestones, then the partnership may be terminated, which could reduce our revenues. For more information on risks relating to our third-party collaborative agreements, see "Risks Relating to our Relationships with Collaborators and Strategic Partners."

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

In order to regulate or modify a gene in a cell, the zinc finger protein, or 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. 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. However, we may not be able to license the gene transfer technologies required to develop and commercialize our product candidates. 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. The inability to obtain a license to use gene transfer technologies with entities that own such technology

on reasonable commercial terms, if at all, could delay or prevent the preclinical evaluation, drug development collaborations, clinical testing, and/or commercialization of our therapeutic product candidates.

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

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

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 ZFP technology in drug discovery, protein production, therapeutic development or other areas in which we have licensed our technology, such as plant agriculture, 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.

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, major cancer 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 its use outside the 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 from government health administration authorities, private health insurers and other organizations.

Government authorities and third-party payors, such as private health insurers and health maintenance organizations, determine which medications they will cover and establish reimbursement levels. A primary trend in the healthcare industry is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Third-party payors may also seek additional clinical evidence, beyond the data required to obtain regulatory approval, demonstrating clinical benefits and value in specific patient populations before covering our products for those patients. 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. Coverage and reimbursement may impact the demand for, or the price of, any product candidate for which we obtain regulatory approval. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize any product candidate for which we obtain regulatory approval.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or comparable foreign regulatory authorities. Moreover, eligibility for coverage and reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may only be temporary. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors in the United States often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies, but also have their own methods and approval process apart from Medicare determinations. 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 a material 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. In particular, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively, the Affordable Care Act, was enacted, which substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The Affordable Care Act and its implementing regulations, among other things, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics, including products similar to our product candidates, that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program, extended the Medicaid Drug Rebate Program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations, subjected manufacturers to new annual fees and taxes for certain branded prescription drugs, created a new Patient Centered Outcomes Research Institute, which provides incentives to programs that increase the federal government’s comparative effectiveness research, established a new Medicare Part D coverage gap discount program, in which manufacturers must now agree to offer 70% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer’s outpatient drugs to be covered under Medicare Part D, and created a licensure framework for follow-on biologic products.

Also, there has been heightened governmental scrutiny recently over pharmaceutical 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 products, some of which are included in the current administration's budget proposal for fiscal years 2019 and 2020. Additionally, the current administration released a "Blueprint" to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products and reduce the out of pocket costs of drug products paid by consumers. The U.S. Department of Health and Human Services, or the HHS, has begun soliciting feedback on some of these measures and, at the same time, is implementing others under its existing authority. Number of these measures will require additional authorization to become effective. Congress and the executive branch have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. 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.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

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

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

Legislative and regulatory proposals have been made to expand post-approval requirements and restrict sales and promotional activities for pharmaceutical products. We cannot be sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance or interpretations will be changed, or what the impact of such changes on the regulatory approvals of our product candidates, if any, may be.

In the United States, the European Union and other potentially significant markets for our product candidates, government authorities and third-party payors are increasingly attempting to limit or regulate the price of medical products and services, particularly for new and innovative products and therapies, which has resulted in lower average selling prices. Furthermore, the increased emphasis on managed healthcare in the United States and on country and regional pricing and reimbursement controls in the European Union will put additional pressure on product pricing, reimbursement and usage, which may adversely affect our future product sales and results of operations. These pressures can arise from rules and practices of managed care groups, judicial decisions and governmental laws and regulations related to Medicare, Medicaid and healthcare reform, pharmaceutical reimbursement policies and pricing in general.

Price controls may be imposed in local and foreign markets, which may adversely affect our future profitability.

In some states and localities within the United States and in some countries, particularly member states of the European Union, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of regulatory approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various European Union member states and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. In some countries, we, or our collaborators, may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our product candidates to other available therapies in order to obtain or maintain reimbursement or pricing approval. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be adversely affected.

Even if we complete the necessary preclinical and clinical studies, we cannot predict when or if we will obtain regulatory approval to commercialize a product candidate or the approval may be for a more narrow indication than we expect.

We cannot commercialize a product until the appropriate regulatory authorities have reviewed and approved the product candidate. Even if our product candidates demonstrate safety and efficacy in clinical studies, the regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval. Additional delays may result if an FDA Advisory Committee or other regulatory advisory group or authority recommends non-approval or restrictions on approval. In addition, we may experience delays or rejections based upon additional government regulation from future legislation or administrative action, or changes in regulatory agency policy during the period of product development, clinical studies and the review process. Regulatory agencies also may approve a treatment candidate for fewer or more limited indications than requested or may grant approval subject to the performance of post-marketing studies. In addition, regulatory agencies may not approve the labeling claims that are necessary or desirable for the successful commercialization of our treatment candidates. For example, the development of certain product candidates for pediatric use is an important part of our current business strategy, and if we are unable to obtain regulatory approval for the desired age ranges, our business may suffer.

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 obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. The holder of an approved BLA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws.

In addition, products are subject to payment of annual program user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with good manufacturing practices, or GMP, 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, if any of our product candidates is approved, our product labeling, advertising and promotion will be subject to regulatory requirements and continuing regulatory review. The FDA and foreign regulatory authorities strictly regulate the promotional claims that may be made about drug and biologic products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling.

If we fail to comply with applicable regulatory requirements following approval of any of our product candidates, a regulatory agency may:

- issue a warning letter asserting that we are in violation of the law;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend or withdraw regulatory approval;
- suspend any ongoing clinical studies;
- refuse to approve a pending marketing application, such as a BLA or supplements to a BLA submitted by us;
- seize product; or
- refuse to allow us to enter into supply contracts, including government contracts.

Any government investigation of alleged violations of law 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.

Failure to obtain regulatory approval in international jurisdictions would prevent our product candidates from being marketed abroad.

In addition to regulations in the United States, to market and sell our products in the European Union, many Asian countries and other jurisdictions, we must obtain separate regulatory approvals and comply with numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. Clinical trials accepted in one country may not be accepted by regulatory authorities in other countries. In addition, many countries outside the United States require that a

product be approved for reimbursement before it can be approved for sale in that country. A product candidate that has been approved for sale in a particular country may not receive reimbursement approval in that country. We may not be able to obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. We may not be able to file for regulatory approvals and may not receive necessary approvals to commercialize our products in any market. If we are unable to obtain approval of any of our product candidates by the FDA or regulatory authorities in the European Union, Asia or elsewhere, the commercial prospects of that product candidate may be significantly diminished, our business prospects could decline and this could materially adversely affect our business, results of operations and financial condition.

Our current and future relationships with healthcare providers, customers and third-party payors subject us to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations. If we fail to comply with federal, state and foreign laws and regulations, including healthcare, privacy and data security 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. Our current and future 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 and patients' rights are and will be applicable to our business. Restrictions under applicable federal and state healthcare laws and regulations that may affect our ability to operate include the following:

- the federal healthcare Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under a federal healthcare program such as Medicare and Medicaid;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the federal False Claims Act, which can be enforced through civil whistleblower or qui tam actions, prohibits, among other things, individuals or entities from knowingly presenting, or causing to be presented, to the federal government, including the Medicare and Medicaid programs, claims for payment or approval that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program and also created federal criminal laws that prohibit, among other things, knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statements in connection with the delivery of or payment for healthcare benefits, items or services;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their implementing regulations, impose obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information held by certain healthcare providers, health plans and healthcare clearinghouses, known as covered entities, and individuals and entities that perform services for them that involve individually identifiable health information, known as business associates;
- the federal Physician Payments Sunshine Act created under the Affordable Care Act requires certain manufacturers of drugs, devices, biologics and medical supplies to report annually to the CMS information related to payments and other transfers of value to physicians and teaching hospitals, and ownership and investment interests held by physicians and their immediate family members;
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government, require drug manufacturers to report information related to payments and other transfers of value to other healthcare providers and healthcare entities, marketing expenditures; or drug pricing; and/or ensure the registration and compliance of sales personnel; and
- state and foreign laws govern the privacy and security of health information in specified circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

The scope and enforcement of each of these laws is uncertain and subject to rapid change in the current environment of healthcare reform, especially in light of the lack of applicable precedent and regulations. Federal and state enforcement bodies have recently increased their scrutiny of interactions between healthcare companies, healthcare providers and other third parties, including charitable foundations, 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. Any such investigation or settlement could increase our costs or otherwise have an adverse effect on our business.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and 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. 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, they may be subject to criminal, civil or administrative sanctions, including exclusion from government funded healthcare programs.

In addition, the provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is also prohibited in the European Union. The provision of benefits or advantages to physicians is governed by the national anti-bribery laws of European Union Member States, such as the UK Bribery Act. Infringement of these laws could result in substantial fines and imprisonment. Moreover, payments made to physicians in certain European Union Member States must be publicly disclosed. Agreements with physicians often must also be the subject of prior notification and approval by the physician's employer, his or her competent professional organization and/or the regulatory authorities of the individual European Union Member States. These requirements are provided in the national laws, industry codes or professional codes of conduct, applicable in the European Union Member States. Failure to comply with these requirements could result in reputational risk, public reprimands, administrative penalties, fines or imprisonment.

The collection, use, disclosure, transfer, or other processing of personal data regarding individuals in the European Union, including personal health data, is subject to the EU General Data Protection Regulation, or the GDPR, which became effective on May 25, 2018. The GDPR, which is wide-ranging in scope, imposes several requirements relating to the control over personal data by individuals to whom the personal data relates, the information provided to the individuals, the documentation we must maintain, the security and confidentiality of the personal data, data breach notification and the use of third party processors in connection with the processing of personal data. The GDPR also imposes strict rules on the transfer of personal data out of the European Union, provides an enforcement authority and authorizes the imposition of large penalties for noncompliance, including the potential for fines of up to €20 million or 4% of the annual global revenues of the non-compliant company, whichever is greater. The GDPR requirements apply not only to third-party transactions, but also to transfers of information between us and our subsidiaries such as Sangamo France, including employee information. The GDPR has increased our responsibility and potential liability in relation to personal data that we process compared to prior European Union law, particularly in light of the acquisition of Sangamo France, and we may be required to put in place additional mechanisms to ensure compliance with the GDPR, which could divert management's attention and increase our cost of doing business. However, despite our ongoing efforts to bring our practices into compliance with the GDPR, we may not be successful either due to various factors within our control or other factors outside our control. It is also possible that local data protection authorities may have different interpretations of the GDPR, leading to potential inconsistencies amongst various European Union Member States. 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 and penalties 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 European Union and other jurisdictions, such as the California Consumer Privacy Act of 2018 that will go into effect beginning January 1, 2020, and we cannot determine the impact such future laws, regulations and standards will have on our business.

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

We are exposed to the risk of employee fraud or other misconduct, 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. Employee misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter employee 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.

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

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

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

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

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 contract manufacturing organizations to manufacture and supply drug product for our preclinical and clinical studies. The manufacture of pharmaceutical products in compliance with the FDA's current good manufacturing practices, or cGMP, requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers of pharmaceutical 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 studies would be jeopardized. Any delay or interruption in the supply of clinical study materials could delay the completion of our clinical studies, increase the costs associated with maintaining our clinical study programs and, depending upon the period of delay, require us to commence new studies at significant additional expense or terminate the studies completely.

All manufacturers of our product candidates 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. Manufacturers of our product candidates 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 studies, regulatory submissions, approvals or commercialization of our product candidates, entail higher costs or impair our reputation.

Our current agreements with our suppliers do not provide for the entire supply of the drug product necessary for all anticipated clinical studies or for full scale commercialization. If we and our suppliers 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 supplier is identified, which could also delay the development of, and impair our ability to commercialize, our product candidates.

The number of third-party suppliers 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 suppliers, which could have a material adverse effect on our business. New suppliers 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.

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

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

There are risks associated with manufacturing for clinical and commercial use. Manufacturing biological components at the appropriate scale and quality is complex and difficult.

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. In addition, we may not be able to manufacture our product candidates in sufficient quantities to meet the requirements for a potential launch or to meet potential future demand. If we or our third-party manufacturers are unable to produce sufficient quantities of the approved product for commercialization, either on a timely basis or at all, our commercialization efforts would be impaired, which would have a material adverse effect on our business, financial condition, results of operations and growth prospects.

We face uncertainties and risks associated with the manufacture of our product candidates. 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. There is no guarantee we will be successful in establishing a larger-scale commercial manufacturing process for our pipeline 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 do not currently have the infrastructure or capability to manufacture, market and sell therapeutic products on a commercial scale.

In order for us to commercialize our therapeutic products directly, we would need to develop, or obtain through outsourcing arrangements, the capability to manufacture, market and sell our products on a commercial scale. Currently, we do not have the ability nor the financial resources to establish the infrastructure and organizations needed to execute these functions, including such infrastructure needed for the commercialization of any product based on our ZFP technology, which can be complex and costly. If we are unable to establish adequate manufacturing, sales, marketing and distribution capabilities, we will not be able to directly commercialize our therapeutics products, which would limit our future growth.

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

We 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. In addition, 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. Our management, personnel and systems currently in place may not be adequate to support this future growth. Future growth would impose significant added responsibilities on members of management, including:

- managing our preclinical studies and clinical trials effectively;
- identifying, recruiting, maintaining, motivating and integrating additional employees;
- managing our internal development efforts effectively while complying with our contractual obligations to licensors, licensees, contractors and other third parties;
- improving our managerial, development, operational, information technology, and finance systems; and
- expanding our facilities.

As our operations expand, we will also need to manage additional relationships with various strategic partners, suppliers and other third parties. 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.

Risks Relating to our Industry

If our competitors develop, acquire, or market technologies or products that are more effective than ours, this would reduce or eliminate our commercial opportunity.

Any products that we or our collaborators or strategic partners develop by using our ZFP technology platform will enter into 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 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. Competing proprietary technologies with our product development focus include but are not limited to:

- For genome editing and gene therapy products:
  - recombinant proteins;
  - other gene therapy/cDNAs;
  - antisense;
  - siRNA and microRNA approaches, exon skipping;
  - small molecule drugs;
  - monoclonal antibodies;
  - CRISPR/Cas technology; and
  - TALE proteins, meganucleases, and MegaTALs.
- Our non-therapeutic applications compete against similar technologies:
  - For protein production: gene amplification, CRISPR/Cas technology, TALE technology, insulator technology, and mini-chromosomes;
  - For target validation: antisense, siRNA, TALE technology and CRISPR/Cas technology;
  - For plant agriculture: recombination approaches, mutagenesis approaches, TALE technology, CRISPR/Cas technology, mini-chromosomes; and
  - For transgenic animals: somatic nuclear transfer, embryonic stem cell, TALE, CRISPR/Cas technology and transposase technologies.

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. In addition, any products that we develop may compete with existing products or services that are well established in the marketplace.

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 genome editing, gene therapy, gene regulation and cell therapy. 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.

Negative public opinion and increased regulatory scrutiny of gene therapy 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.

Gene therapy remains a novel technology, with only one *in vivo* gene therapy product approved for a genetic disease to date in the United States and only two *in vivo* gene therapy products for genetic diseases approved to date in the European Union. 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. 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. 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.

Laws or public sentiment may limit the production of genetically modified agricultural products, and these laws could reduce our partner's ability to sell such products.

Genetically modified products are currently subject to public debate and heightened regulatory scrutiny, either of which could prevent or delay production of agricultural products. We have exclusive right to use our ZFP technology to modify the genomes or alter the nucleic acid or protein expression of plant cells, plants or plant cell cultures. The field-testing, production and marketing of genetically modified plants and plant products are subject to federal, state, local and foreign governmental regulation. Regulatory agencies administering existing or future regulations or legislation may not allow production and marketing of our genetically modified products in a timely manner or under technically or commercially feasible conditions. In addition, regulatory action or private litigation could result in expenses, delays or other impediments to our product development programs or the commercialization of resulting products.

The FDA currently applies the same regulatory standards to foods developed through genetic engineering as those applied to foods developed through traditional plant breeding. Genetically engineered food products, however, will be subject to pre-market review if these products raise safety questions or are deemed to be food additives. Governmental authorities could also, for social or other purposes, limit the use of genetically modified products created with our gene regulation technology.

Even if the regulatory approval for genetically modified products developed using our ZFP 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. The subject of genetically modified organisms has received negative publicity in the United States and particularly in Europe, and such publicity has aroused public debate. The adverse publicity in Europe could lead to greater regulation and trade restrictions on imports of genetically altered products. Similar adverse public reaction or sentiment in the United States to genetic research and its resulting products could result in greater domestic regulation and could decrease the demand for our technology and products.

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, which would harm our ability to develop our technology and product candidates.

We have incurred significant operating losses and negative operating cash flows since inception and have not achieved profitability. We expect capital outlays and operating expenditures to increase over the next several years as we expand our infrastructure and research and product development activities. While we believe our available cash resources, as well as funds received from corporate collaborators, strategic partners and research grants will enable us to maintain our currently planned operations through at least the next twelve months from the date the financial statements are issued, we will need to raise substantial additional capital to fund the development, manufacturing and potential commercialization of our product candidates. We regularly consider fund raising opportunities and may decide, from time to time, to raise capital based on various factors, including market conditions and our plans of operation. In addition, as we focus our efforts on proprietary human therapeutics, we will need to seek FDA approvals of potential products, a process that could cost in excess of hundreds of millions of dollars per product. We may experience difficulties in accessing the capital market 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. 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 materially adversely affect our business and our ability to develop our technology and products candidates and to realize the anticipated benefits of the acquisition of Sangamo France. Furthermore, any sales of additional equity securities may result in dilution to our stockholders and any debt financing may include business and financial covenants that restricts our operations.

We are at the development phase of operations and may not succeed or become profitable.

We began operations in 1995, are in the early phases of product development for the most advanced candidates in our therapeutics pipeline, and we have incurred significant losses since inception. To date, our revenues have been generated from collaboration agreements, other collaborations in non-therapeutic applications of our technology, federal government research grants and grants awarded by research foundations. Our focus on higher-value therapeutic product development and related collaboration requires us to incur substantial expenses associated with product development. In addition, the preclinical or clinical failure of any single product may have a significant effect on the actual or perceived value of our stock. Our business is subject to all of the risks inherent in the development of a new technology, which includes the need to:

- attract and retain qualified scientific and technical staff and management, particularly scientific staff with expertise to develop our early-stage technology into therapeutic products;
- obtain sufficient capital to support the expense of developing our technology platform and developing, testing and commercializing products;
- develop a market for our products; and
- successfully transition from a company with a research focus to a company capable of supporting commercial activities.

Comprehensive U.S. tax reform legislation could increase the tax burden on our orphan drug programs and adversely affect our business and financial condition.

The U.S. government enacted comprehensive tax legislation in 2017 that included significant changes to the taxation of business entities. These changes included, among others, (i) a permanent reduction to the corporate income tax rate from a top marginal rate of 35% to a flat rate of 21%, (ii) a partial limitation on the deductibility of business interest expense and net operating loss carryforwards, (iii) a shift of the U.S. taxation of multinational corporations from a tax on worldwide income to a territorial system (along with certain rules designed to prevent erosion of the U.S. income tax base) and (iv) a one-time tax on accumulated offshore earnings held in cash and illiquid assets, with the latter taxed at a lower rate. Further, the comprehensive tax legislation, among other things, reduced the orphan drug tax credit from 50% to 25% of qualifying expenditures. When and if we become profitable, this reduction in tax credits may result in an increased federal income tax burden on our orphan drug programs as it may cause us to pay federal income taxes earlier under the revised tax law than under the prior law and, despite being partially off-set by a reduction in the corporate tax rate as described above, may increase our total federal tax liability attributable to such programs.

Notwithstanding the reduction in the corporate income tax rate, the overall impact of this comprehensive tax legislation resulted in an overall reduction in our deferred tax assets, and our business and financial condition could still be adversely affected as additional guidance and regulations are issued with respect to the original tax law change. In addition, it is uncertain if and to what extent various states will conform to this comprehensive tax legislation. The impact of this comprehensive tax legislation on holders of our common stock is also uncertain and could be adverse. Investors should consult with their legal and tax advisors with respect to this comprehensive tax legislation and the potential tax consequences of investing in or holding our common stock.

Risks Relating to our Relationships with Collaborators and Strategic Partners

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

Our collaborators or strategic partners may decide to adopt alternative technologies 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.

If the licensed products under our non-therapeutic license agreements are not successfully commercialized, or our third-party licensees terminate our agreements, our ability to generate revenue under these license agreements may be limited.

We have a number of collaboration agreements with third parties whereby we licensed our ZFP technologies to develop products in non-therapeutic fields, such as laboratory research reagents, protein pharmaceuticals, and, transgenic animals, as well as plant agriculture.

We cannot be certain that we or our collaboration partners will succeed in the development of commercially viable products in these non-therapeutic fields of use, and there is no guarantee that we or our collaboration partners will achieve the milestones set forth in the respective license agreements. To the extent we or our collaboration partners do not succeed in developing and commercializing products or if we or our collaboration partners fail to achieve such milestones, our revenues and benefits under the license agreements will be limited. In the event our third party licensees decide to terminate the license agreements, our ability to generate revenue under such license agreements will cease.

Risks Relating to our Intellectual Property

Because it is difficult and costly to protect our proprietary rights, and third parties may have filed patent applications that are similar to ours, we cannot guarantee the proprietary protection of our technologies and products.

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.

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.

If we are unable to obtain or protect intellectual property rights related to our product candidates, we may not be able to compete effectively in the intended markets.

We rely upon a combination of patents, trade secret protection and confidentiality agreements to protect the intellectual property related to our product candidates. The strength of patents in the biotechnology and pharmaceutical field involves complex legal and scientific questions and can be uncertain. The patent applications that we own or in-license may fail to result in issued patents with claims that cover our product candidates in the United States or in other foreign countries. 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. 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. Furthermore, even if they are unchallenged, our patents and patent applications may not adequately protect our intellectual property, provide exclusivity for our product candidates or prevent others from designing around our claims. Our competitors may be able to circumvent our patents by developing similar or alternative product candidates in a non-infringing manner. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

If the patent applications we hold or have in-licensed with respect to our programs or product candidates fail to issue, if their breadth or strength of protection is threatened, or if they fail to provide meaningful exclusivity for our product candidates, it could dissuade companies from collaborating with us to develop product candidates, and threaten our ability to commercialize, future products. We have filed several patent applications covering our product candidates recently. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful challenge to these patents or any other patents owned by or licensed to us could deprive us of rights necessary for the successful commercialization of any product candidates that we may develop. Further, if we encounter delays in regulatory approvals, the period of time during which we could market a product candidate under patent protection could be reduced. Since patent applications in the United States and most other countries are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we were the first to file any patent application related to a product candidate. Furthermore, if third parties have filed such patent applications, an interference or derivation proceeding in the United States can be initiated by a third party to determine who was the first to invent any of the subject matter covered by the patent claims of our applications.

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

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 materially 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 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 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 a material 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 materially adversely affect our business, results of operations and financial condition.

Third-party claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

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. Patent and Trademark Office, or 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. In either case, such a license may not be available on commercially

reasonable terms or at all. The inability to obtain required licenses on reasonable commercial terms, if at all, could delay or prevent the preclinical evaluation, drug development collaborations, clinical testing, and/or commercialization of the affected product candidates. Moreover, because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our product candidates. Defense of these claims, 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. 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 a material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operations, financial condition and prospects.

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 TX-200 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 a material 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 a material adverse effect on our business, financial conditions, results of operations, and prospects. As an example, Sangamo France has exclusively licensed the right to the CAR for use in TX-200 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 lawsuits or similar proceedings to protect or enforce our patents or the patents of our licensors, which could be expensive, time-consuming and unsuccessful.

Competitors may 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. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the U.S. PTO, or made a misleading statement, during prosecution. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, *inter partes* review and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidate. For example, Sangamo France has exclusively licensed the rights to technology related to redirected Treg cells from the Yeda Research and Development Company, or Yeda. A patent included in this exclusive license agreement with Yeda was granted in Europe in July 2016. Subsequent to this grant, the patent was opposed by several parties in May 2017 and revoked in November 2018. 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 a material 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 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, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock.

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.

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

We may also be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on 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.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to be paid to the U.S. PTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. We have systems in place to remind us to pay these fees, and we employ an outside firm and rely on our outside counsel to pay these fees due to non-U.S. patent agencies. The U.S. PTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

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

As is the case with other biotechnology companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. Changes in either the patent laws or interpretation of the patent laws in the United States or in other jurisdictions in which we seek patent protection could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. The United States enacted the Leahy-Smith America Invents Act, or the America Invents Act, which includes a number of significant changes that affect the

way patent applications will be prosecuted and also may affect patent litigation. These include allowing third party submission of prior art to the U.S. PTO during patent prosecution and additional procedures to attack the validity of a patent by U.S. PTO administered post-grant proceedings, including post-grant review, *inter partes* review, and derivation proceedings. Because of a lower evidentiary standard in U.S. PTO proceedings compared to the evidentiary standard in United States federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a U.S. PTO proceeding sufficient for the U.S. PTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. In addition, the challenged patents are not accorded the presumption of validity as they are in Federal District Court. Accordingly, a third party may attempt to use the U.S. PTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. Therefore, the America Invents Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our owned or in-licensed patent applications and the enforcement or defense of our owned or in-licensed issued patents, all of which could have a material 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 not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

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

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, including mobile technologies, to operate our business. 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. In addition, many of those third parties in turn subcontract or outsource some of their responsibilities to third parties. As a result, our information technology systems, including the functions of third parties that are involved or have access to those systems, is very large and complex. 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. Potential vulnerabilities can be exploited from inadvertent or intentional actions of our employees, third-party vendors, business partners, or by malicious third parties. Attacks of this nature are increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives (including, but not limited to, industrial espionage) and expertise, including organized criminal groups, "hacktivists," nation states and others. In addition to the extraction of sensitive information, such attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. In addition, the prevalent use of mobile devices increases the risk of data security incidents.

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, legal, regulatory, business 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 development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data.

While we aware of the company email incident described above, there is no way of knowing with certainty whether we have experienced any other data security incidents that have not been discovered. While we have no reason to believe this to be the case, attackers have become very sophisticated in the way they conceal access to systems, and many companies that have been attacked are not aware that they have been attacked. Any event, including the company email incident described above, that leads to unauthorized access, use or disclosure of personal information, including but not limited to personal information regarding our patients or employees, could disrupt our business, harm our reputation, compel us to comply with applicable federal and/or state breach notification laws and foreign law equivalents, subject us to time consuming, distracting and expensive litigation, regulatory investigation and oversight, mandatory corrective action, require us to verify the correctness of database contents, or otherwise subject us to liability under laws, regulations and contractual obligations, including those that protect the privacy and security of personal information. This could result in increased costs to us, and result in significant legal and financial exposure and/or reputational harm. In addition, any failure or perceived failure by us or our vendors or business partners to comply with our privacy, confidentiality or data security-related legal or other obligations to third parties, or any further security incidents or other inappropriate access events that result in the unauthorized access, release or transfer of sensitive information, which could include personally identifiable information, may result in governmental investigations, enforcement actions, regulatory fines, litigation, or public statements against us by advocacy groups or others, and could cause third parties, including clinical sites, regulators or current and potential partners, to lose trust in us or we could be subject to claims by third parties that we have breached our privacy- or confidentiality-related obligations, which could materially and adversely affect our business and prospects. 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 may not realize the anticipated benefits of the acquisition of Sangamo France or be able to successfully integrate the acquired Sangamo France operations.

The continued integration of Sangamo France involves numerous uncertainties and risks, and has required, and will continue to require, significant efforts and expenditures, including with respect to integrating the acquired Sangamo France operations with our operations. We may not be able to accomplish this integration process smoothly or successfully. The integration of certain of the acquired Sangamo France operations will take additional time and will require the dedication of

significant management resources, which may temporarily distract our management's attention from the routine business of the combined company. In any event, we may encounter unexpected difficulties, or incur unexpected costs, in connection with our transition activities and integration efforts, which include:

- the potential disruption of our historical core business;
- the risk that our relative lack of historical experience in CAR-Treg development and developing product candidates and technology for immunological diseases will not allow us to advance the development of CAR-Treg therapies, including TX-200, on the timeframes we expect, or at all;
- the strain on, and need to continue to expand, our existing operational, technical, financial and administrative infrastructure;
- the difficulties in assimilating employees and corporate cultures;
- the difficulties in effectively managing transition and integration activities given the distance between our headquarters and U.S.-based management team and Sangamo France's offices in France;
- the failure to retain key managers and other personnel, including the employees from the acquired Sangamo France business who might experience uncertainty about their future roles with us;
- the challenges in controlling additional costs and expenses in connection with and as a result of the acquisition of Sangamo France;
- the diversion of our management's attention to integration of operations and corporate and administrative infrastructures; and
- any unanticipated liabilities for activities of or related to Sangamo France or its operations, technologies or product candidates.

If any of these factors impairs our ability to integrate successfully, we may be required to spend time or money on integration activities that otherwise would be spent on the development and expansion of our business. Further, because of the structure of the acquisition, we do not own 100% of Sangamo France's equity interests. Until such time, if ever, that we acquire 100% of the equity interests of Sangamo France, we will need to consider the rights of, and duties owed to, the minority shareholders of Sangamo France under French law when making future decisions that might impact Sangamo France, its business or its operations, which could adversely affect our business and our ability to realize the anticipated benefits of the acquisition.

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

Sangamo France's historical operations have been based in France and we plan to 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, as a result of our operations in France, we have become more exposed to fluctuations in currency exchange rates between the Euro 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 a material adverse effect on our financial condition and results of operations. In any event, difficulties resulting from these and other risks related to our anticipated operations in France 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 are also exposed to general risks associated with our operations outside of the United States, which could adversely affect our business.

In addition to our French operations as a result of the acquisition of Sangamo France, we also have operations and conduct business in other countries outside the United States, and have a UK subsidiary. We may plan to expand these activities or in to additional countries in the future. 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, 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;
- 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 potential withdrawal of the United Kingdom from the European Union, commonly referred to as "Brexit," may adversely impact our ability to obtain regulatory approvals of our product candidates in the European Union and may require us to incur additional expenses in order to develop, manufacture and commercialize our product candidates in the European Union.

In June 2016, UK voters approved a referendum to withdraw from the European Union, commonly referred to as "Brexit." Pursuant to Article 50 of the Treaty on European Union, the United Kingdom will cease to be a European Union Member State either on the effective date of a withdrawal agreement (which requires UK parliamentary approval) or, failing that, two years following the United Kingdom's notification of its intention to leave the European Union, unless extended. Given that no formal withdrawal agreements have been agreed and there have been several extensions granted, the United Kingdom has yet to formally leave the European Union, and it is uncertain as to when it will occur, if ever.

Brexit could adversely affect European or worldwide political, regulatory, economic or market conditions and could contribute to instability in global political institutions, regulatory agencies and financial markets. 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 European Union for our product candidates, or incur significant additional expenses to operate our business, which could significantly and materially harm or delay our ability to generate revenues or achieve profitability of our business. Because a significant proportion of the regulatory framework in the United Kingdom applicable to our business and our product candidates is derived from European Union directives and regulations, Brexit could materially impact the regulatory regime with respect to the development, manufacture, importation, approval and commercialization of our product candidates in the United Kingdom or the European Union. In the near term, there is a risk of disrupted import and export processes due to a lack of administrative processing capacity by the respective UK and European Union customs agencies that may delay time-sensitive shipments and may negatively impact our product supply chain. 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. It is also possible that Brexit may negatively affect our ability to attract and retain employees, particularly those from the European Union.

If we use biological and hazardous materials in a manner that causes injury or violates laws, we may be liable for damages.

Our research and development activities 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. We routinely use cells in culture and gene delivery vectors, and we employ small amounts of radioisotopes in trace experiments. Although we maintain up-to-date licensing and training programs, we cannot completely eliminate the risk of accidental contamination or injury from the use, storage, handling, or disposal of these materials. In the event of contamination or injury, we could be held liable for damages that result, and any liability could exceed our resources. We currently carry insurance covering certain claims arising from our use of these materials. However, if we are unable to maintain our insurance coverage at a reasonable cost and with adequate coverage, our insurance may not cover any liability that may arise. 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.

Third parties on which we rely and we may be adversely affected by natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Natural disasters could severely disrupt our operations and have a material adverse effect on our business, financial condition, results of operations and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business 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 a material adverse effect on our business, financial condition, results of operations and prospects.

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.

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;
- 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;
- regulatory developments;
- changes, by one or more of our security analysts, in recommendations, ratings or coverage of our stock;
- additions or departures of key personnel;
- future 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.

Actual or potential sales of our common stock by our employees, including our executive officers, pursuant to pre-arranged stock trading plans could cause our stock price to fall or prevent it from increasing for numerous reasons, and actual or potential sales by such persons could be viewed negatively by other investors.

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, a number of our employees, including executive officers and members of our board of 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. Actual or potential sales of our common stock by such persons could cause the price of our common stock to fall or prevent it from increasing for numerous reasons.

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

Additional capital will be needed in the future to continue our planned operations. To the extent we raise additional capital by issuing equity securities, our stockholders may experience substantial dilution. We may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. If we sell common stock, convertible securities or other equity securities in more than one transaction, investors may be materially diluted by subsequent sales. These sales may also result in material dilution to our existing stockholders, and new investors could gain rights superior to our existing stockholders.

Our stock price is also influenced by public perception of gene therapy and government regulation of potential products.

Reports of serious adverse events in a retroviral gene transfer trial for infants with X-linked severe combined immunodeficiency (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. Stock prices of these companies declined whether or not the specific company was involved with retroviral gene transfer for the treatment of infants with X-linked SCID, or whether the specific company’s clinical trials were placed on hold in connection with these events. Other potential adverse events in the field of gene therapy may occur in the future that could result in greater governmental regulation of our potential products and potential regulatory delays relating to the testing or approval of our potential products.

These external events may have a negative impact on public perception of our business, which could cause our stock price to decline.

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 of 1933, as amended, 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 SAFEY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

None.

ITEM 6. EXHIBITS

(a) Exhibits:

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 (File No. 000-30171), filed with the SEC on August 9, 2017).
3.2		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 (File No. 000-30171), filed with the SEC on June 15, 2018).
10.1	†	Amended and Restated Collaboration and License Agreement between the Company and Kite Pharma, Inc., dated as of September 11, 2019.
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 three months ended September 30, 2019, 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.

† Certain portions of this exhibit (indicated by "[*]") have been omitted because they are both (i) not material and (ii) would be competitively harmful if publicly disclosed.

SIGNATURES

Pursuant to the requirements of the Securities and 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 6, 2019

SANGAMO THERAPEUTICS, INC.

/s/ ALEXANDER D. MACRAE

Alexander D. Macrae

President and Chief Executive Officer

(Duly Authorized Officer and Principal Executive Officer)

/s/ PRATHYUSHA DURAIBABU

Prathyusha Duraibabu

Vice President, Finance

(Principal Accounting Officer)

[*] = 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 10.1

AMENDED AND RESTATED
COLLABORATION AND LICENSE AGREEMENT

This **AMENDED AND RESTATED COLLABORATION AND LICENSE AGREEMENT** (this "**Amendment and Restatement**") is made as of September 11, 2019 (the "**Amendment Date**"), by and between **Sangamo Therapeutics, Inc.**, a Delaware corporation having an office at 501 Canal Blvd., Richmond, CA 94804 ("**Sangamo**"), and **Kite Pharma, Inc.**, a Delaware corporation having an office at 2225 Colorado Avenue, Santa Monica, CA 90404 ("**Kite**"). Gilead Sciences, Inc., a Delaware corporation having an office at 333 Lakeside Drive, Foster City, CA 94404 ("**Gilead**"), is a party to this Agreement solely for purposes of Section 16.18. Kite and Sangamo are referred to in this Agreement individually as a "**Party**" and collectively as the "**Parties**".

RECITALS

WHEREAS, Kite is a biopharmaceutical company engaged in the development of novel immunotherapy products, with a primary focus on engineered T cell therapies for the treatment of oncology indications;

WHEREAS, Sangamo, a biopharmaceutical company, has technology and expertise in genome editing technology, including through the use of zinc finger nucleases and adeno-associated viruses, and is applying such technology to develop therapeutic products for the treatment of genetic diseases, infectious diseases and cancers;

WHEREAS, the Parties entered into that certain Collaboration and License Agreement (the "**Original Agreement**"), dated February 20, 2018 (the "**Execution Date**"); and

WHEREAS, the Parties desire to amend and restate the Original Agreement, as of the Amendment Date, as set forth in this Amendment and Restatement.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants contained herein, the receipt and sufficiency of which are hereby acknowledged, Kite and Sangamo hereby agree that, as of the Amendment Date, the Original Agreement is hereby amended and restated as follows:

DEFINITIONS

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

1.1 "**AAV**" means (a) adeno-associated virus type 2/6, which has the inverted terminal repeats from adeno-associated virus type 2 and the capsid from adeno-associated virus type 6 or (b) any other adeno-associated virus that (i) is useful in Immune Cells and (ii) is included in a Research Plan.

1.2 "**Acquired Competing Product**" means any Directly Competing Product acquired by Kite or its Affiliates, whether as part of a Competing Collaboration or Competing Acquisition.

1.3 "**Acquired Non-Competing Product**" means any product acquired by Kite or its Affiliates as part of a Competing Program that is not a Directly Competing Product.

1.4 "**Affiliate**" means, with respect to any Person, any other Person that controls, is controlled by, or is under common control with, such Person. For 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 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 certain entities organized under the laws of certain countries outside the United States, the maximum percentage ownership permitted by law for a foreign investor may be less than fifty percent (50%), and that in such case such lower percentage will be substituted in the preceding sentence, provided that such foreign investor has the power to direct the management and policies of such entity.

1.5 "**Agreement**" means: (a) with respect to the period prior to the Amendment Date, the Original Agreement; and (b) with respect to the period from and after the Amendment Date, this Amendment and Restatement.

1.6 "**Allogeneic Modification**" means a gene disruption (knock-out) or gene insertion ([*]) in an Immune Cell (or the Stem Cell from which the Immune Cell is differentiated).

1.7 "**Allo HD Licensed Product**" means a product that incorporates, uses or administers a Modified Cell that was created from Immune Cells obtained from healthy donors.

1.8 "**Allo UCL Licensed Product**" means a product that incorporates, uses or administers a Modified Cell that was differentiated from a Universal Cell Line.

1.9 "[*]" means, with respect to [*], as applicable, [*], either: (a) [*], if such Licensed Product [*], or (b), [*], if such Licensed Product [*].

1.10 "**Auto Licensed Product**" means a product that incorporates, uses or administers a Modified Cell that was created from the individual patient that is treated with such product.

1.11 "[*]" means the [*] or [*].

1.12 "**Biosimilar Product**" means, in a particular country with respect to a particular Licensed Product, any biopharmaceutical product that: (a) has received all necessary approvals by the applicable Regulatory Authorities in such country to market and sell such product as a biopharmaceutical product; (b) is marketed or sold by a Third Party that either (i) has not obtained the rights to market or sell such product as a Sublicensee or as a distributor of Kite or any of its Affiliates or Sublicensees, in each case with respect to such Licensed Product or (ii) received the right to market or sell such product pursuant to a license or settlement, in each case in connection with litigation with Kite, its Affiliate or a Sublicensee under the Biologics Price Competition and Innovation Act of 2009 or an equivalent under foreign law; and (c) is approved as (i) a "biosimilar" (in the United States) of such Licensed Product, (ii) a "similar biological medicinal product" (in the EU) with respect to which such Licensed Product is the "reference medicinal product", or (iii) if not in the US or EU, the foreign equivalent of a "biosimilar" or "similar biological medicinal product" of such Licensed Product; in each case for use in such country pursuant to an expedited regulatory approval process governing approval of generic biologics based on the then-current standards for regulatory approval in such country (e.g., the Biologics Price Competition and Innovation Act of 2009 or an equivalent under foreign law) and where such regulatory approval was based in part upon clinical data generated by a Party or any of its Affiliates, licensees or sublicensees with respect to such Licensed Product.

1.13 "**BLA**" means a Biologic License Application, as defined in the U.S. Public Health Service Act, as amended, and applicable regulations promulgated thereunder by the FDA.

1.14 "**Business Day**" means a day other than a Saturday, Sunday or a day on which banking institutions in San Francisco, California are required by law to remain closed, or December 26 through December 31.

1.15 "Calendar Quarter" means each successive period of three (3) calendar months commencing on January 1, April 1, July 1 and October 1, except that the first Calendar Quarter of the Term shall commence on the Effective Date and end on the day immediately prior to the first to occur of January 1, April 1, July 1 or October 1 after the Effective Date, and the last Calendar Quarter shall end on the last day of the Term.

1.16 "Calendar Year" means each successive period of twelve (12) calendar months commencing on January 1 and ending on December 31, except that the first Calendar Year of the Term shall commence on the Effective Date and end on December 31 of the year in which the Effective Date occurs and the last Calendar Year of the Term shall commence on January 1 of the year in which the Term ends and end on the last day of the Term.

1.17 "**Candidate Target**" means [*], and any Other Target selected pursuant to Section 4.4(a), in each case unless and until any such Target is no longer considered a Candidate Target pursuant to Section 4.4(b) or 13.3(a).

1.18 "**CAR**" means a chimeric antigen receptor.

1.19 "[*]" means [*] or [*].

1.20 "**cGMP**" means current Good Manufacturing Practices as specified in the United States Code of Federal Regulations, ICH Guideline Q7A, or equivalent laws, rules, or regulations of an applicable Regulatory Authority at the time of manufacture.

1.21 "**Change of Control**" means, with respect to a Party, (a) a merger or consolidation of such Party with a Third Party that results in the voting securities of such Party outstanding immediately prior thereto, or any securities into which such voting securities have been converted or exchanged, ceasing to represent at least fifty percent (50%) of the combined voting power of the surviving entity or the parent of the surviving entity immediately after such merger or consolidation, or (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 of such Party, or (c) the sale or other transfer to a Third Party of all or substantially all of such Party's business.

1.22 "**Combination**" means (a) a biopharmaceutical product in finished form containing both a Modified Cell and one or more Other Compounds that are separate and distinct from such Modified Cell, in which the Modified Cell and Other Compounds are co-formulated or co-packaged within a single box or sales unit or (b) a Modified Cell and Other Compounds are approved for use in combination and are sold by Kite, its Affiliate or a Sublicensee in separate packages but at a single price point.

1.23 "**Commercially Reasonable Efforts**" means, with respect to a Party, the efforts and resources typically used by biotechnology or pharmaceutical companies similar in size and scope to such Party (together with its Affiliates) to perform the obligation at issue, which efforts shall be substantially the same as those efforts made with respect to other products at a similar stage of development or in a similar stage of product life, with similar developmental risk profiles, of similar market and commercial potential, taking into account the competitiveness of the marketplace, the proprietary position of the products, the regulatory structure involved, Regulatory Authority approved labeling, product profile, the profitability of the applicable products, issues of safety and efficacy, the likely timing of the product's entry into the market, the likelihood of receiving Marketing Approval and other relevant scientific, technical and commercial factors.

1.24 "**Committee**" means the JSC, Project Team and any subcommittee established by the JSC, as applicable.

1.25 "**Competing Acquisition**" means acquisition of a Third Party or a portion of the business of a Third Party (whether by merger, stock purchase or purchase of assets) that is, prior to such acquisition, conducting one or more Competing Programs involving one or more Candidate Targets.

1.26 "**Competing Collaboration**" means entry of a license, collaboration or other arrangement with a Third Party with respect to one or more Competing Programs involving one or

more Candidate Targets, or an amendment to an existing license, collaboration or other arrangement to include a Competing Program involving a Candidate Target.

1.27 "**Confidential Information**" of a Party means all Know-How, 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. The terms and conditions of this Agreement shall constitute the Confidential Information of both Parties.

1.28 "**Control**" or "**Controlled**" means the possession of the ability to grant a license or sublicense of, or access to, Patent Rights, Know-How, or other tangible or intangible rights as provided for herein, other than any such ability obtained pursuant to a license granted under this Agreement, without violating the terms of any agreement or arrangement with any Third Party. Notwithstanding anything in this Agreement to the contrary, a Party (or an Affiliate of a Party, as applicable) shall be deemed not to Control any Patent Rights or Know-How or such other rights that are owned or controlled by a Third Party described in the definition of "Change of Control" or such Third Party's Affiliates (other than such Party and its Affiliates in existence immediately prior to such Change of Control), except to the extent such Patent Rights or Know-How or other rights: (a) arise from activities conducted by such Third Party or its Affiliates under this Agreement after such Change of Control; or (b) are developed or conceived by such Third Party or its Affiliates after such Change of Control using or incorporating such Party's or such Party's Affiliates' technology prior to such Change of Control, including any improvements thereto.

1.29 "**Cover**" means, with respect to a product and Patent Right, that but for a license granted to a Person under such Patent Right (or ownership thereof), the manufacture, use, or sale of such product by such Person would infringe a Valid Claim included in such Patent Right (considering pending patent applications under clause (b) of the definition of Valid Claims to be issued with the then-pending claims).

1.30 "**Directly Competing Product**" means, with respect to a Licensed Product, a product that is the subject of a Competing Program and that (a) [*]; (b) [*]; (c) [*]; and (d) [*]. For clarity, [*] for purposes of the preceding clause (d).

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

1.32 "**Effective Date**" means April 5, 2018.

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

1.2 "**EU**" means the European Union and its member states as of the Execution Date and any member states added during the Term, and will be deemed to include the United Kingdom.

1.3 "**Excluded Third Party Licenses**" means those agreements related to AAV manufacturing listed on **Exhibit A**.

[*] = 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.

1.4 "**Executive Officer**" means (a) with respect to Sangamo, the Chief Executive Officer (or equivalent) of Sangamo or (b) with respect to Kite, Executive Vice President, Oncology Therapeutics (or equivalent).

1.5 "**Existing Third Party Licensor**" means any licensor of an Existing Third Party License.

1.6 "**Existing Third Party Licenses**" means any agreements entered into by Sangamo with a Third Party prior to the Execution Date, including any amendments thereto as of the Execution Date, pursuant to which Sangamo Controls any Sangamo Technology, but excluding all Excluded Third Party Licenses. All Existing Third Party Licenses are listed on **Exhibit B**.

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

1.8 "**Field**" means the treatment, adjuvant treatment or palliation of cancer.

1.9 "**Filing**" of a BLA or MAA means the acceptance for filing by a Regulatory Authority of such filed or submitted BLA or MAA.

1.10 "**Final AAV**" means an AAV that (a) [*] and (b) [*].

1.1 "[*]" means [*] that (a) [*], (b) [*], and (c) [*]. [*], there may be [*].

1.2 "**Final Vector**" means, with respect to a Licensed Product, any [*] for such Licensed Product under the Research Plan for such Licensed Product. For each CAR, TCR, NKR or other gene insertion specified in a Research Plan, the Final Vector(s) may be [*].

1.3 "**Final ZFN**" means a ZFN that (a) [*], and (b) [*].

1.4 "**First Commercial Sale**" means, with respect to a particular Licensed Product and country, the first sale in such country of such Licensed Product after Marketing Approval of such Licensed Product in such country.

1.5 "**FTE**" means the equivalent of a full time person, working for a minimum of [*] hours per year, conducting activities under a Research Plan, technology transfer activities, regulatory support activities, or other activities requested by Kite. In the case that any individual works partially on such activities under this Agreement and partially on other work in a given year, then the full-time equivalent to be attributed to such individual's work hereunder shall be equal to the percentage of such individual's total work time in such year that such individual spent working on such activities under this Agreement. In no event shall (a) any one individual be counted as more than one (1) FTE; or (b) indirect personnel (including support functions such as managerial, financial, legal or business development) constitute FTEs, except for research, development, regulatory and technical operations managers, in each case, who conduct activities under a Research Plan, technology transfer activities, regulatory support activities, or other activities requested by Kite. Alliance managers and project managers will constitute FTEs solely to the extent included in a budget under a JSC approved Research Plan.

1.6 "**FTE Rate**" means an initial rate of [*] per FTE per year. Commencing on January 1, 2019, the FTE Rate shall be changed annually [*]; provided that the FTE Rate will in no event be less than [*] per FTE per year.

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

1.8 "**GCP**" means the then current good clinical practice standards for clinical trials for pharmaceuticals, as set forth in the United States Food, Drug and Cosmetic Act, as amended from time to time, or other applicable law, and such standards of good clinical practice as are required by the Regulatory Authorities of the EU and other organizations and Governmental Authorities in countries for which the applicable Licensed Product is intended to be developed, to the extent such standards are not less stringent than United States GCP.

1.9 "**Genome Editing**" means [*].

1.10 "[*]" mean [*] that [*].

1.11 "**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 comparable regulatory standards in jurisdictions outside the United States.

1.12 "**Governmental Authority**" means any national, international, federal, state, provincial or local government, or political subdivision thereof, or 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).

1.13 "**HSR Act**" means the Hart-Scott-Rodino Act of 1976.

1.14 "**Immune Cells**" means T-lymphocytes (T cells) and natural killer (NK) cells, including [*].

1.15 "**IND**" means any investigational new drug application, clinical trial application, clinical trial exemption or similar or equivalent application or submission for approval to conduct human clinical investigations filed with or submitted to a Regulatory Authority in conformance with the requirements of such Regulatory Authority.

1.16 "**IND Acceptance**" means, with respect to an IND, the earlier of (a) receipt by Kite, its Affiliate or a Sublicensee of written confirmation from a Regulatory Authority or other applicable Person that human clinical studies may proceed under such IND, and (b) expiration of the applicable waiting period after which human clinical studies may proceed under such IND.

1.17 "**Invention**" means any information, including discoveries, improvements, modifications, processes, methods, assay, designs, protocols, formulas, data, inventions, know-how and trade secrets, patentable or otherwise, that is discovered, generated, conceived and/or reduced to practice by or on behalf of a Party or its Affiliate or sublicensee pursuant to activities conducted

under this Agreement, including all rights, title and interest in and to the intellectual property rights therein and thereto.

1.1 "[*]" means [*] that (a) [*], or (b) [*], in each case ((a) and (b)), [*].

1.2 "[*] **IP**" means [*] that include [*] and Patent Rights claiming [*].

1.3 "[*] **Patents**" means all Patent Rights claiming [*].

1.4 "[*] **Patents**" means all Patent Rights claiming [*].

1.5 "[*] **IP**" means (a) [*] and (b) all Patent Rights claiming [*].

1.1 "**Kite Technology**" means all Know-How and Patent Rights that are Controlled by Kite or its Affiliates as of the Execution Date or during the Research Term and necessary or useful for Sangamo to perform its obligations under this Agreement.

1.2 "**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, including Materials.

1.3 "**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.

1.4 "**Licensed Product**" means an Auto Licensed Product, Allo HD Licensed Product or Allo UCL Licensed Product.

1.5 "**MAA**" or "**Marketing Authorization Application**" means an application to the appropriate Regulatory Authority outside of the U.S. for approval to market a Licensed Product (but excluding Pricing Approval) in any particular jurisdiction, and all amendments and supplements thereto.

1.6 "**Major EU Countries**" means France, Germany, Italy, Spain, and United Kingdom.

1.7 "**Major Market Countries**" means [*].

1.8 "**Marketing Approval**" means all approvals, licenses, registrations, or authorizations necessary for the commercial sale of a Licensed Product in a given country or regulatory jurisdiction. Marketing Approval shall include Pricing Approval if Pricing Approval is necessary for commercial sale of such Licensed Product in such country or regulatory jurisdiction.

1.9 "**Modified Cell**" means an Immune Cell that [*].

1.10 "**MRC Agreement**" means that certain Intellectual Property Agreement between Sangamo, as successor in interest to Gendaq Limited (formerly known as Endlock Limited), and the Medical Research Council, dated May 21, 1999.

1.11 "**Net Sales**" means the gross amount invoiced for sales of a Licensed Product by Kite, its Affiliates or Sublicensees to Third Parties, less:

(a) Normal and customary trade, cash and quantity discounts actually given, credits, price adjustments or allowances for damaged Licensed Products, returns or rejections of Licensed Products;

(b) Adjustments, allowances, credits, fees, reimbursements, chargeback payments and rebates (or the equivalent thereof) for Licensed Products granted to group purchasing organizations or other buying groups, managed health care organizations, pharmacy benefit management companies, health maintenance organizations and any other providers of health insurance coverage, health care institutions (including hospitals) or other health care organizations, Third Party health care administrators or patient assistance or other similar programs, or to federal, state/provincial, local and other governments, including their agencies, or to wholesalers, distributors or other trade customers;

(c) Compulsory payments and cash rebates related to the sales of such Licensed Product paid to a governmental authority (or agent thereof) pursuant to governmental regulations by reason of any national or local health insurance program or similar program, including required chargebacks and retroactive price reductions, to the extent allowed and taken; including government levied fees as a result of healthcare reform policies, to the extent such fees are specifically allocated to sales of such Licensed Product as a percentage of Kite's, its Affiliate's or a Sublicensee's entire pharmaceutical product sales;

(d) Amounts invoiced for sales of Licensed Product that are written off as uncollectible after reasonable collection efforts, in accordance with standard practices of Kite; provided that any such amounts subsequently collected will be included in Net Sales for the period in which such amounts were collected;

(e) Reasonable and customary freight, shipping insurance and other transportation expenses, each directly related to the sale of the Licensed Products (if actually borne by Kite, its Affiliates or Sublicensees without reimbursement from any Third Party); and

(f) Sales or excise taxes, tariffs and duties, including, without limitation, VAT and U.S. sales tax, and all other taxes and government charges related to the sale of Licensed Product, in each case to the extent that each such item is actually borne by Kite, its Affiliates or Sublicensees without reimbursement from any Third Party (but excluding taxes properly assessed or assessable against the income derived by Kite, its Affiliates or Sublicensees from such sale).

The transfer of Licensed Products by Kite or one of its Affiliates or Sublicensees to another Affiliate or Sublicensee shall not be considered Net Sales, unless such Affiliate or Sublicensee is an end user. Net Sales will include the cash consideration received on a sale and the fair market

value of all non-cash consideration. Disposition of Licensed Product for, or use of the Licensed Product in, clinical trials or other scientific testing, as free samples, or under named patient use, compassionate use, patient assistance, or test marketing programs or other similar programs or studies, in each case where the Licensed Product is provided at or below cost, shall not result in any Net Sales.

All discounts, allowances, credits, rebates, and other deductions shall be fairly and equitably allocated to the Licensed Product and other products or services of Kite, its Affiliates, and Sublicensees such that the Licensed Product does not bear a disproportionate portion of such deductions. In the event that any discounts, reductions, payments, or rebates are offered for a Licensed Product sold in a grouped set of products or services, the applicable discount, reduction, payment, or rebate for the Licensed Product in such set shall be based on the weighted average discount, reduction, payment, or rebate of such grouped set of products or services, each to the extent consistent with GAAP and Kite's, its Affiliate's, or Sublicensee's usual course of dealing for its products and services other than the Licensed Product.

The foregoing amounts shall be determined from the books and records of Kite, its Affiliates or Sublicensees maintained in accordance with GAAP, consistently applied. For clarity, if a single item falls into more than one of the categories set forth in clauses (a) to (f) above, such item may not be deducted more than once. With respect to Net Sales not denominated in U.S. Dollars, Kite shall convert such Net Sales from the applicable foreign currency into U.S. Dollars in accordance with Section 9.8.

Net Sales for a Combination in a country shall be calculated as follows:

(i) If the Modified Cell in such Combination and the Other Compounds each are sold separately in such country in the applicable Calendar Year and are not sold together at a single price point that is less than A+B, Net Sales will be calculated by multiplying the total Net Sales (as defined above) of the Combination by the fraction A/(A+B), where A is the public or list price in such country of the Modified Cell sold separately in the same formulation and dosage and for a comparable indication, and B is the (sum of the) public or list price(s) in such country of the Other Compounds sold separately in the same formulation and dosage and for a comparable indication, during the applicable Calendar Year.

(ii) If such Modified Cell is sold independently for the same formulation and dosage and for a comparable indication of the Other Compounds in such country in such Calendar Year, but the public or list price in such country of the Other Compounds cannot be determined, Net Sales will be calculated by multiplying the total Net Sales (as defined above) of such Combination by the fraction A/C, where A is the public or list price in such country of such Modified Cell sold independently and C is the public or list price in such country of the Combination during the applicable Calendar Year.

(iii) If the public or list price in such country of such Modified Cell cannot be determined and/or if the Modified Cell and Other Compound are sold together at a single price point that is less than A+B, the Parties shall discuss an appropriate allocation of Net Sales to the Modified Cell and to the Other Compounds in good faith based on an equitable method of

[*] = 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.

determining the same that takes into account variations in potency, the relative contribution of each therapeutically active ingredient, and relative value to the end user of each therapeutically active ingredient. If the Parties fail to agree on such allocation, it will be determined by an independent Third Party expert agreed by the Parties, whose decision will be final and binding on the Parties.

For clarity, no allocation of Net Sales will be applied for a combination therapy in which a Modified Cell and one or more Other Compounds are each sold at a different price point and such Modified Cell is invoiced by Kite, its Affiliate or a Sublicensee and one or more of such Other Compounds are invoiced by a Third Party.

1.12 "**NKR**" means a Natural Killer activating receptor.

1.13 "**Other Compound**" means, with respect to a Modified Cell, (a) any pharmaceutically or therapeutically active compound or molecule that is not within, on the cell surface of, or secreted by, such Modified Cell or (b) any pharmaceutically or therapeutically active cell that is not such Modified Cell or another Modified Cell.

1.14 "**Other Sangamo Patent**" means any Sangamo Patent (excluding any Joint Patent) that [*].

1.15 "**Other Target**" means any Target other than the [*].

1.16 "**Patent Rights**" means all patents and patent applications (which for the purpose of this Agreement shall be deemed to include certificates of invention and applications for certificates of invention), including all divisionals, continuations, substitutions, continuations-in-part, re-examinations, reissues, additions, renewals, revalidations, extensions, registrations and supplemental protection certificates and the like of any such patents and patent applications, and any and all foreign equivalents of the foregoing.

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

1.18 "**Phase 1 Clinical Trial**" means a human clinical trial of a Licensed Product that would satisfy the requirements of 21 C.F.R. 312.21(a) or corresponding foreign regulations.

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

1.20 "**Phase 2 Clinical Trial**" means a human clinical trial of a Licensed Product that would satisfy the requirements of 21 C.F.R. 312.21(b) and that is intended to explore a variety of doses, dose response, and duration of effect, and to generate evidence of clinical safety and effectiveness for a particular therapeutic indication or therapeutic indications in a target patient

population, or a similar study prescribed by the relevant Regulatory Authorities in a country other than the United States.

1.21 "**Pivotal Clinical Trial**" means a human clinical trial of a Licensed Product that (a) would satisfy the requirements of 21 C.F.R. 312.21(c) or corresponding foreign regulations; or (b) that is intended to provide sufficient efficacy data to support the Filing of a BLA or MAA for such Licensed Product in such country.

1.22 "**PMDA**" means Japan's Pharmaceuticals and Medical Devices Agency or any successor entity thereto.

1.23 "**Pricing Approval**" means such governmental approval, agreement, determination or decision establishing prices for a Licensed Product that can be charged and/or reimbursed in regulatory jurisdictions where the applicable Governmental Authorities approve or determine the price and/or reimbursement of pharmaceutical products.

1.24 "[*] **Sangamo Patent**" means any Sangamo Patent (excluding Sangamo's interest in any Joint Patent) that [*].

1.25 "**Regulatory Authority**" means any applicable Governmental Authority responsible for granting INDs or Marketing Approvals for Licensed Products, including the FDA, EMA, PMDA and any corresponding national or regional regulatory authorities.

1.26 "**Regulatory Exclusivity**" means any exclusive marketing rights or data exclusivity rights conferred by any Regulatory Authority with respect to a biopharmaceutical product other than Patent Rights, including orphan drug exclusivity, new chemical entity exclusivity, data exclusivity, pediatric exclusivity, rights conferred in the United States under the Hatch-Waxman Act, the FDA Modernization Act of 1997 or the Biologics Price Competition and Innovation Act, or rights similar thereto outside the United States.

1.27 "**Regulatory Materials**" means any regulatory application, submission, notification, communication, correspondence, registration and other filings and submissions made to, received from or otherwise conducted with a Regulatory Authority in order to research, develop, manufacture, or commercialize a Licensed Product in a particular country or jurisdiction. "Regulatory Materials" include all INDs, BLAs, MAAs and Marketing Approvals.

1.28 "[*] **IP**" means any Know-How or Patent Rights to the extent [*].

1.1 "[*] **IP**" means [*] that (a) [*], or (b) [*] which is, in each case ((a) and (b)), [*].

1.2 "[*] **IP**" means [*] that include [*] and Patent Rights claiming [*].

1.3 "**Sangamo Equivalent Product**" means, with respect to an Acquired Competing Product or Acquired Non-Competing Product, as applicable, a product that (a) [*], (b) [*], (c) [*], and (d) [*]. For clarity, [*] for purposes of the preceding clause (d).

1.4 "**Sangamo Genome Technology**" means all Know-How and Patent Rights that are Controlled by Sangamo or its Affiliates as of the Execution Date or during the Term (excluding Sangamo's interest in any Joint Inventions and Joint Patents) that are (a) related to (i) Genome Editing using ZFNs, [*]; and (b) necessary or useful to develop, manufacture, use, sell, offer for sale, import or otherwise commercialize a Modified Cell as part of a Licensed Product in the Field in the Territory; provided however that Sangamo Genome Technology shall exclude (i) ZFN Design IP, (ii) any Know-How and Patent Rights licensed to Sangamo or its Affiliates by a Third Party pursuant to an Excluded Third Party License or any other license agreement that is not a Third Party License, and (iii) [*].

1.5 "[*] **Patents**" mean all Patent Rights claiming [*]. For clarity, [*].

1.6 "**Sangamo Patents**" means the Patent Rights included in (a) the Sangamo Genome Technology; or (b) the Sangamo Product Technology, and including for the avoidance of doubt, any Product-Specific Sangamo Patents. The Sangamo Patents existing as of the Execution Date are listed on **Exhibit C**.

1.7 "**Sangamo Product Technology**" mean all Know-How and Patent Rights that are Controlled by Sangamo or its Affiliates as of the Execution Date or during the Term (excluding Sangamo's interest in any Joint Inventions and Joint Patents) that are necessary or useful to develop, manufacture, use, sell, offer for sale, import or otherwise commercialize a Licensed Product in the Field in the Territory; provided however that Sangamo Product Technology shall exclude (a) Sangamo Genome Technology; [*].

1.8 "[*] **IP**" means (a) [*] and (b) all Patent Rights claiming [*].

1.9 "**Sangamo Technology**" means Sangamo Genome Technology and Sangamo Product Technology.

1.10 "**Stem Cells**" means cells that have the ability to renew and divide in culture or *in-vivo* and to give rise to multiple cell lineages and specialized cells, including Immune Cells. Stem Cells include renewable cell sources such as induced pluripotent stem cells ("**iPSCs**") and embryonic stem cells and hematopoietic stem and progenitor cells.

1.11 "**Sublicensee**" means (a) a Third Party to whom Kite or its Affiliates has granted or grants rights to develop, manufacture or commercialize a Licensed Product or (b) any further permitted sublicensee or other grantee of such rights (regardless of the number of tiers, layers or levels of sublicenses or other grant of such rights), but in each case excluding for the avoidance of doubt, any distributors or subcontractors.

1.12 "**Target**" means any single antigen (and not a family of antigens) that is expressed on or in a human malignant tumor cell.

1.13 "**TCR**" means a T cell receptor comprising several subunits including (a) two heterologous protein subunits including an alpha chain encoded by the TCRA gene (HGNC ID12027) and a beta chain encoded by the TCRB gene (HGNC ID 12155); (b) two heterologous

protein subunits including a gamma chain encoded by the TCRG gene (HGNC ID12271) and a delta chain encoded by the TCRD gene (HGNC ID12252); (c) the pre-TCR-alpha protein encoded by the PTCRA gene (HGNC:21290) or the murine counterpart, alone or in conjunction with an alpha, beta, gamma, or delta chain as defined in (a) and (b); or (d) a single molecule, heterodimer, chimera or any engineered variant of such alpha, beta, gamma, delta, pre-TCR-alpha human or murine chain combinations.

1.14 "**Territory**" means worldwide.

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

1.16 "**Third Party Licenses**" means the Existing Third Party Licenses and any Third Party agreement that is deemed to be a Third Party License pursuant to Section 2.5(b), including [*].

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

1.18 "[*]" means [*].

1.19 "**Universal Cell Lines**" means [*] created through the *ex vivo* use of [*].

1.20 "**Valid Claim**" means (a) a claim of an issued and unexpired patent (as may be extended through supplementary protection certificate or patent term extension or the like) that (i) has not been revoked or held unenforceable, unpatentable or invalid by a decision of a court or other governmental agency of competent jurisdiction that is not appealable or has not been appealed within the time allowed for appeal, and (ii) has not been abandoned, disclaimed, denied or admitted to be invalid or unenforceable through reissue, re-examination or disclaimer or otherwise, or (b) a claim of a pending patent application that has been pending less than [*] from the earliest date on which such patent application claims priority and which claim was filed and is being prosecuted in good faith and has not been cancelled, withdrawn or abandoned or finally rejected by an administrative agency action from which no appeal can be taken.

1.21 "**ZFN**" means a zinc finger nuclease polypeptide.

1.22 "[*]" means [*].

1.23 "**ZFN Design IP**" mean any Know-How or Patent Rights to the extent related to the design, screening or optimization of ZFNs, [*].

1.24 Interpretation. In this Agreement, unless otherwise specified:

(a) The words "include", "includes" and "including" shall be deemed to be followed by the phrase "without limitation".

(b) words denoting the singular shall include the plural and vice versa and words denoting any gender shall include all genders;

(c) the words “shall” and “will” have the same meaning;

(d) references to any specific law, rule or regulation, or article, section or other division thereof, will be deemed to include the then-current amendments thereto or any replacement or successor law, rule or regulation thereof;

(e) references to “days” will mean calendar days, unless otherwise specified;

(f) any definition of or reference to any agreement, instrument or other document herein will 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);

(g) words such as “herein”, “hereof”, and “hereunder” refer to this Agreement as a whole and not merely to the particular provision in which such words appear; and

(h) the Exhibits and other attachments form part of the operative provision of this Agreement and references to “this Agreement” shall include references to the Exhibits and attachments.

1.25 Additional Definitions. The following table identifies the location of definitions set forth in various Sections of the Agreement:

Definition	**Section**
Abandoning Party	**10.2(c)(ii)(2)**
[*]	**[*]**
Base Abandonment	**10.2(c)(ii)**
Base Patent Jurisdictions	**10.2(c)(i)**
[*]	**[*]**
Competing Program	**2.4(c)(i)(1)**
Confidentiality Agreement	**16.8**
Continuing Party	**10.2(c)(ii)(2)**
CREATE Act	**10.1(a)(iv)**
Development Plan	**5.2**
Disclosing Party	**11.1(a)**
Dispute	**16.5**
[*]	**[*]**
Indemnified Party	**15.3(a)**
Indemnifying Party	**15.3(a)**
Infringer	**10.3(b)**
Infringing Product	**10.3(a)**
iPSCs	**1.92**
Joint Inventions	**10.1(a)(iii)**

Definition	Section
Joint Patents	**10.1(a)(iii)**
Joint Steering Committee or JSC	**3.1**
Joint Territories	**10.2(c)(i)**
[*]	**[*]**
Kite Indemnitees	**15.1**
Kite Withholding Tax Action	**9.11**
Liabilities	**15.1**
Materials	**4.11(a)**
[*]	**[*]**
Negotiation Period	**2.6**
Non-Base Abandonment	**10.2(c)(ii)**
Other Joint Patents	**10.2(c)(i)**
Product Infringement	**10.3(a)**
Product Marks	**10.7**
Project Team	**3.2**
Receiving Party	**11.1(a)**
Research Plan	**4.1**
Research Program	**4.1**
Research Term	**4.2**
Royalty Floor	**9.6(c)(iii)**
Royalty Term	**9.6(b)**
[*]	**[*]**
Sangamo Indemnitees	**15.2**
Sangamo Party	**6.3**
[*]	**[*]**
SEC	**11.5(b)**
[*]	**[*]**
Third Party Infringement	**10.4**
Term	**13.1**
[*]	**[*]**
[*]	**[*]**
ZFN License	**2.6**

ARTICLE 2
LICENSES

2.1 Licenses to Kite.

(a) Research License. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Kite a royalty-free, non-exclusive license, with the right to grant sublicenses only to its Affiliates and subcontractors, under the Sangamo Technology, Joint Patents,

Joint Inventions and [*], solely to conduct those research activities allocated to Kite in the Research Plans.

(b) Product License. Subject to the terms and conditions of this Agreement, Sangamo hereby grants to Kite an exclusive (even as to Sangamo), royalty-bearing license, with the right to grant sublicenses solely as provided in Section 2.1(c), under:

(i) the Sangamo Genome Technology and Sangamo's interest in Joint Inventions and Joint Patents, to:

(A) make and have made Final ZFNs and Final Vectors solely for the purposes set forth in (i)(B) below,

(B) use [*] *ex vivo* (1) on or in Immune Cells to generate Modified Cells solely for use in Licensed Products in accordance with (ii) below or (2) on or in Stem Cells to generate Universal Cell Lines solely for use to generate Modified Cells for use in Licensed Products in accordance with (ii) below, and

(C) make and have made, from the Modified Cells generated pursuant to (i)(B), additional quantities of such Modified Cells solely for use in Licensed Products in accordance with (ii) below; and

(ii) the Sangamo Product Technology and Sangamo's interest in Joint Inventions and Joint Patents, to:

(A) make and have made Licensed Products using the Modified Cells made through (i)(B) or (i)(C) above solely for the purposes set forth in (ii)(B) below and

(B) research, develop, use, sell, offer for sale, import, or otherwise commercialize such Licensed Products in the Field in the Territory.

In addition, subject to the terms and conditions of this Agreement, Sangamo hereby grants to Kite a non-exclusive license, with the right to grant sublicenses solely as provided in Section 2.1(c), under [*], solely to the extent necessary [*].

For clarity, (x) the license grant in this Section 2.1(b) to Sangamo Technology, [*] and Sangamo's interest in Joint Inventions and Joint Patents does not include the rights to make, have made, use, sell, offer for sale, import or otherwise commercialize any pharmaceutically or therapeutically active ingredient other than (a) a CAR, TCR, or NKR in a Modified Cell where [*] is either (A) [*] or (B) [*], and (b) [*], and (y) this Agreement does not [*]; provided, that (i) without limiting the license under this Section 2.1(b) with respect to [*] applicable to [*], [*] granted from Sangamo to Kite under this Agreement with respect to [*], and (ii) Kite shall not, and shall not permit any of its Affiliates or sublicensees to, practice any Patent Rights or Know-How owned or otherwise controlled by Sangamo or its Affiliates in the conduct of [*].

(c) Sublicenses.

(i) Subject to the terms and conditions of this Agreement and the applicable Third Party Licenses, Kite may grant to one or more Affiliates or Third Parties (through one or more tiers) a sublicense under the licenses granted by Sangamo to Kite hereunder. Kite shall remain responsible for the performance of all of its Affiliates and Sublicensees to the same extent as if such activities were conducted by Kite, and shall remain responsible for any payments due hereunder with respect to activities of any of its Affiliates or Sublicensees.

(ii) Kite shall provide Sangamo with a copy of each executed agreement under which Kite grants a sublicense under the license granted in Section 2.1(b) to any Affiliates [*] or Sublicensee within thirty (30) days after execution thereof, which shall be treated by Sangamo as Kite's Confidential Information. With respect to those Existing Third Party Licenses identified on **Exhibit D** or any additional Third Party License added under Section 2.5(b) that require Sangamo to provide the applicable Third Party licensor a copy of any agreement with a Sublicensee or Affiliate of Kite that includes a sublicense under such Third Party License [*] or a summary of the terms of such agreement, [*]. Prior to providing a copy of such Sublicensee (or, if applicable, Affiliate) agreement to Sangamo, Kite may, [*], redact certain terms of any such agreement to the extent not pertinent to an understanding of a Party's obligations or benefits under this Agreement or a verification of compliance with the requirements of this Agreement; provided further, that [*].

(iii) Each agreement in which Kite grants a sublicense hereunder shall be subject to the applicable terms and conditions of this Agreement and any Third Party Licenses sublicensed to such Sublicensee or Affiliate, and shall expressly include (A) the terms set forth in **Exhibits D and D-1** with respect to each Existing Third Party License sublicensed to a Sublicensee or Affiliate and (B) a requirement to provide a copy of any agreement granting a sublicense thereunder to Kite for provision to the applicable Third Party licensor, in the case of each of (A) and (B), solely to the extent Kite is obligated to provide a copy of a written agreement with any Affiliate or Sublicensee pursuant to Section 2.1(c)(ii).

(iv) If Kite, its Affiliate, or a Sublicensee cannot grant further sublicenses under a particular Third Party License, then at Kite's request in conjunction with Kite's granting of a sublicense under this Section 2.1(c), or its Affiliate's or Sublicensee's granting of a further sublicense, Sangamo shall grant a sublicense under such Third Party License to such Affiliate or Sublicensee (or further Sublicensee) for no additional consideration to Sangamo (but subject to Section 2.1(c)(v)) and otherwise on terms that are consistent with the Third Party License, the sublicense granted by Kite to its Affiliate or such Sublicensee, and the terms of this Agreement.

(v) [*].

(d) Retained Rights. Notwithstanding the exclusive license granted by Sangamo to Kite, Sangamo retains the rights under the Sangamo Technology, Joint Inventions and Joint Patents solely to the extent necessary to exercise its rights and perform its obligations under this Agreement, whether directly or through one or more licensees or subcontractors.

2.2 License to Sangamo. Subject to the terms and conditions of this Agreement, Kite hereby grants to Sangamo a royalty-free, non-exclusive license, with the right to grant sublicenses only to its Affiliates and subcontractors, under the Kite Technology, Joint Patents and Joint Inventions, solely to conduct those activities allocated to Sangamo in the Research Plans or those activities performed by Sangamo at Kite's request in Sections 5.1(b), 6.1, 6.2 and 7.3.

2.3 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 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 license granted to it under this Agreement; provided that, notwithstanding anything to the contrary in this Agreement, nothing in this Agreement shall be deemed to prevent or restrict in any way the ability of those employees of a Party or its Affiliates or other sublicensees, in each case, without use of Confidential Information of the other Party, to conduct any activities in the Territory, which activities would be allowed under any safe harbor, research exemption, government or executive declaration of urgent public health need, or similar right available in law or equity if conducted by a Third Party.

2.4 Exclusivity.

(a) During the Research Term. Subject to Sections 2.4(c), 2.4(d) and 2.4(e), during the Research Term, except for activities conducted under this Agreement, neither Party nor its Affiliates shall, whether for itself or any Third Party and including the grant or receipt of any license to or from any Third Party, research, develop, manufacture or commercialize in the Field, any product containing an engineered Immune Cell that has been engineered by *ex vivo* Genome Editing and that, as a result of *ex vivo* insertion of a transgene into genomic DNA [*], expresses or is capable of expressing on its cell surface a CAR, NKR, or TCR that is directed to any Target; provided, however, that [*].

(b) After the Research Term. Subject to Sections 2.4(c), 2.4(d) and 2.4(e), during the remainder of the Term after the end of the Research Term, except for activities conducted under this Agreement, neither Party nor its Affiliates shall, whether for itself or any Third Party and including the grant or receipt of any license to or from any Third Party, develop, manufacture or commercialize in the Field, any product containing an engineered Immune Cell that has been engineered by *ex vivo* Genome Editing and that, as a result of *ex vivo* insertion of a transgene into genomic DNA [*], expresses or is capable of expressing on its cell surface a CAR, NKR, or TCR that is directed to any Candidate Target.

(c) Exceptions for Acquired Competing Program, Collaboration, or Change of Control.

(i) By Sangamo.

(1) Acquired Competing Programs. Notwithstanding Sections 2.4(a) and 2.4(b), in the event that Sangamo or its Affiliate acquires a Third Party or a portion of

the business of a Third Party (whether by merger, stock purchase or purchase of assets) that is, prior to such acquisition, conducting a research, development, manufacturing or commercialization program with respect to a Target or Candidate Target, which program, if conducted by a Party or its Affiliate at such time, would be a breach of such Party's exclusivity obligations set forth above (a "**Competing Program**"), Sangamo shall either (A) wind-down such Competing Program promptly following the closing of such acquisition, or (B) use Commercially Reasonable Efforts to divest such Competing Program promptly following the closing of such acquisition and in any event within [*] after the closing of such acquisition; provided that if Sangamo elects option (B), (I) such time period shall be extended, and Sangamo shall not be in breach of Section 2.4(a) or 2.4(b), if at the expiration of such time period (and any extensions thereto), Sangamo provides competent evidence of reasonable ongoing efforts to divest such Competing Program; and (II) Sangamo shall cease all research (solely during the Research Term), development and commercialization activities with respect to such Competing Program if Sangamo has not completed such divestment within [*] after the closing of such acquisition (it being understood that Sangamo may thereafter continue its efforts to divest such asset). For clarity, if Sangamo elects option (B), the continued conduct of such Competing Program during such [*] period shall not be deemed a breach of Sangamo's exclusivity obligations set forth herein, provided that such Competing Program is conducted independently of Sangamo's activities under this Agreement and [*].

(2) Change of Control. In the event of a Change of Control of Sangamo, Sections 2.4(a) and 2.4(b), as applicable, shall not apply to the subject matter of any Competing Program that (A) is owned or controlled by a Third Party described in the definition of "Change of Control" or its Affiliates prior to or as of the closing of such Change of Control, or (B) becomes owned or controlled by such Third Party or its Affiliates after the closing of such Change of Control, in each case if such Competing Program is conducted independently of Sangamo's activities under this Agreement and [*]; provided further that, [*] following consummation of such Change of Control, [*].

(ii) By Kite.

(1) Acquired Competing Products. Notwithstanding Sections 2.4(a) and 2.4(b),

(a) if Kite or its Affiliate enters into either a Competing Collaboration with one or more Directly Competing Product(s) or a Competing Acquisition where the primary purpose of such Competing Acquisition was to obtain Directly Competing Products, then Kite shall have [*] following the effective date of the closing of such transaction to elect one of the following actions with respect to such Acquired Competing Product(s) upon written notice to Sangamo: [*]; and

(b) if Kite or its Affiliate acquires one or more Directly Competing Product(s) in a Competing Acquisition where acquisition of such Directly Competing Product(s) was not the primary purpose of such Competing Acquisition, then Kite shall have [*] following the effective date of the closing of such Competing Acquisition to elect one of the following actions with respect to each such Acquired Competing Product upon written notice to Sangamo: [*].

(2) [*]. Notwithstanding Sections 2.4(a) and 2.4(b), if Kite or its Affiliates enters into a Competing Collaboration or a Competing Acquisition that contains an Acquired Non-Competing Product, then with respect to such Acquired Non-Competing Product: (a) Kite and its Affiliates shall [*]; (b) Kite shall [*]; (c) Sangamo and its Affiliates shall [*]; and (d) Sections 2.4(a) and 2.4(b) shall otherwise continue to apply with respect to [*]. For the avoidance of doubt, [*] on account of acquisition of any Acquired Non-Competing Products.

(3) [*]. Notwithstanding Section 2.4(a), during the Research Term, in the event that Kite or its Affiliate (a) acquires a Competing Program involving a Target, whether by [*].

(4) [*]. If Kite elects to terminate this Agreement with respect to Licensed Product(s) corresponding to the Acquired Competing Product(s), then (a) Sections 2.4(a) and 2.4(b) will terminate [*] with respect to the [*]; (b) Kite will [*]; (c) Kite and its Affiliates shall [*]; and (d) Sangamo and its Affiliates shall [*]. Kite's election to terminate this Agreement with respect to the Licensed Product corresponding to the Acquired Competing Product will [*] or [*].

For example, consider the following hypothetical situation: the Parties are developing [*], and [*]. If Kite acquires from a Third Party, [*], such product shall be deemed [*]. If Kite elects to terminate this Agreement with respect to [*], then: (i) this Agreement would terminate with respect to [*], (ii) Sections 2.4(a) and 2.4(b) would terminate with respect to [*], (iii) the Agreement would remain in effect with respect to [*], (iv) Kite and its Affiliates would [*], (v) Sangamo and its Affiliates would [*], (vi) Sections 2.4(a) and 2.4(b) would otherwise continue to apply [*] with respect to [*], and (vii) Kite would [*].

(5) [*].

(6) [*].

(7) Consequences of Divestment. If Kite elects to divest a Directly Competing Product above, Kite shall use Commercially Reasonable Efforts to complete such divestment within [*] after the effective date of closing of such transaction; provided that such [*] period shall be extended, and Kite shall not be in breach of Section 2.4(a) or 2.4(b), if (a) at the expiration of such time period (and any extensions thereto), Kite provides competent evidence of reasonable ongoing efforts to divest such Directly Competing Product, and Kite ceases all research (solely during the Research Term), development and commercialization activities with respect to such Directly Competing Product within [*] after the closing of such transaction (it being understood that Kite may thereafter continue its efforts to divest such asset) and (b) such Directly Competing Product is conducted independently of Kite's activities under this Agreement and [*].

(8) Change of Control. In the event of a Change of Control of Kite, Sections 2.4(a) and 2.4(b), as applicable, shall not apply to the subject matter of any Competing Program that (A) is owned or controlled by a Third Party described in the definition of "Change of Control" or its Affiliates prior to or as of the closing of such Change of Control, or (B) becomes owned or controlled by such Third Party or its Affiliates after the closing of such Change of Control, in each case if such Competing Program is conducted independently of Kite's activities under this

Agreement and [*]; provided further that, [*] following consummation of such Change of Control, [*].

(d) Sangamo Exception. Kite acknowledges that Sangamo, prior to the Execution Date, entered into agreements pursuant to which it granted licenses to Third Parties with respect to [*], and that such licenses are not prohibited by this Section 2.4. Kite also acknowledges that Sangamo, prior to the Execution Date, entered into material transfer agreements with [*], and that the performance of such material transfer agreements are not prohibited by this Section 2.4.

(e) Kite Exceptions.

(i) [*]. Sangamo acknowledges that Kite, prior to the Execution Date, entered into an agreement with [*] with respect to the [*], and that such continued activities are not prohibited by this Section 2.4; provided that (a) [*]; and (b) [*].

(ii) [*]. At Kite's election, provided by written notice to Sangamo, the exclusivity obligations of each Party set forth in Section 2.4(a) during the Research Term shall not apply with respect to (a) any Target for which [*]; (b) any Candidate Target for which [*]; or (c) any Target that [*].

(iii) [*]. In addition, at Kite's election, provided by written notice to Sangamo, the exclusivity obligations of Kite set forth in Section 2.4(b) after the Research Term shall not apply with respect to any Licensed Product for which (a) [*]; and (b) [*]. For clarity, during the period of exclusivity with respect to such Licensed Product, Kite and its Affiliates shall [*].

(iv) [*]. Notwithstanding Sections 2.4(a) and 2.4(b), Kite and its Affiliates may [*] and [*] shall not be deemed a breach of its exclusivity obligations set forth in such sections if [*] and [*].

2.5 Third Party Licenses.

(a) Terms of Third Party Licenses. Kite acknowledges that the licenses granted to Kite in Section 2.1 include sublicenses under certain Sangamo Technology that is licensed to Sangamo pursuant to Third Party Licenses and that such sublicenses are subject to those terms and conditions of such Third Party Licenses, which are (i) set forth on **Exhibits D and D-1**, in the case of Existing Third Party Licenses, or (ii) disclosed to Kite in accordance with Section 2.5(b) in the case of other Third Party Licenses.

(b) Additional Third Party License. If Sangamo or any of its Affiliates desires to enter into any agreement with a Third Party after the Execution Date to obtain a license from such Third Party to any Know-How or Patent Rights that are necessary or useful to manufacture, use, or commercialize any Licensed Product (including related Final ZFNs and [*]) in the Field, other than licenses for [*].

(c) In the event that Sangamo receives written notice of an alleged material breach by Sangamo or its Affiliates under any Third Party License, where termination of such Third

Party License or any diminishment of the licenses granted to Kite under the Sangamo Technology is being or could be sought by the Third Party licensor, then Sangamo will promptly, but in no event less than [*] days thereafter, provide written notice thereof to Kite and grant Kite the right (but not the obligation) to cure such alleged breach, and if Kite elects to and does cure such breach, then Kite may offset any such reasonable out-of-pocket costs and expenses incurred by or on behalf of Kite or any of its Affiliates or Sublicensees in connection with curing such breach against Kite's future payment obligations to Sangamo under this Agreement. Each Party shall notify the other Party if it intends to cure such breach and again promptly after curing such breach.

(d) In the event that the Third Party License is terminated by the applicable Third Party licensor, and such Third Party license permits the sublicense to survive, Kite will have the right, at Kite's election, to convert the sublicenses granted under this Agreement by Sangamo to a direct license from the applicable Third Party licensor to Kite on the terms and conditions contained in such Third Party License, or such other terms and conditions as may be negotiated by Kite and the applicable Third Party licensor, and Sangamo will cooperate with Kite and its Affiliates to effectuate such direct license. In the event Kite enters into any such direct license with a Third Party licensor, Kite may offset any such reasonable out-of-pocket costs and expenses incurred by or on behalf of Kite or any of its Affiliates or Sublicensees in connection with entering into and exercising its rights or performing under such direct license to the extent that Sangamo would have borne such costs if the applicable Third Party License had not been terminated, against Kite's future payment obligations to Sangamo under this Agreement.

2.6 Right of First Negotiation. Sangamo hereby grants to Kite a right of first negotiation to obtain from Sangamo a license to [*] (a "**ZFN License**") as follows. If, at any time during [*], Sangamo or any Affiliate wishes to grant to a Third Party a ZFN License with respect to [*], Sangamo shall notify Kite in writing. If Kite desires to obtain such a ZFN License, Kite shall promptly notify Sangamo and, during the [*] period after the receipt of the notice from Sangamo regarding such ZFN License (the "**Negotiation Period**"), Kite and Sangamo shall negotiate exclusively and in good faith to agree upon the terms and conditions of and enter into a definitive agreement pursuant to which Sangamo will grant such a ZFN License to Kite. If Kite does not wish to obtain such a ZFN License, or if the Parties do not enter into a definitive agreement for such a ZFN License before the expiration of the Negotiation Period, then Sangamo shall be free to negotiate with any Third Party with respect to such a ZFN License and to grant such a ZFN License to any Third Party, without any further obligations to Kite. For clarity, the foregoing right of first negotiation shall expire and shall no longer apply [*] after the expiration of [*].

2.7 Right of First Notice. Sangamo hereby grants to Kite a right of first notice with respect to commercial licensing to and collaboration with Third Parties regarding certain products [*] as follows. If Sangamo wishes to grant a Third Party a license under Sangamo Technology to, or otherwise collaborate with a Third Party to, develop and commercialize any product that [*], Sangamo shall, with respect to [*], (a) notify Kite in writing, (b) not enter into, or allow any of its Affiliates to enter into, any agreement with a Third Party for such a license or collaboration during the [*] period after such notice, and (c) have no further obligation to Kite after the expiration of such [*] period. The foregoing right of first notice shall expire and no longer apply after the earlier of (i) [*]; and (ii) the date of [*], as applicable.

ARTICLE 3
GOVERNANCE

3.1 Joint Steering Committee. Within thirty (30) days after the Effective Date, the Parties shall establish a joint steering committee (the "**Joint Steering Committee**" or the "**JSC**"), composed of three (3) senior officers of each Party or its Affiliate, to manage the overall collaboration of the Parties under this Agreement. The JSC shall in particular:

(a) coordinate the activities of the Parties under this Agreement, including facilitating communications between the Parties with respect to the research, development, manufacture and commercialization of Licensed Products;

(b) provide a forum for the discussion of the development, manufacture and commercialization of Licensed Products;

(c) review and approve each Research Plan and amendment thereto, and supervise the execution of the Research Plans in multiple functional areas, such as research, CMC and regulatory strategy (it being understood that such review, approval, and supervision [*]);

(d) review and approve, as a [*] or Final ZFN, as appropriate, each [*] or ZFN that is nominated as such by a Party and meets the criteria therefor set forth in the applicable Research Plan;

(a) review and consider, [*] that is [*] and [*]; provided, that, for clarity, [*] with respect to [*], which [*];

(b) direct and oversee the operation of the Project Team and any other joint subcommittee established by the JSC, including resolving any disputed matter of such Committees;

(c) determine the strategy and review procedure for scientific publications and presentations pertaining to the Licensed Products in accordance with Section 11.4;

(d) establish additional joint subcommittees as it deems necessary or advisable to further the purpose of this Agreement; and

(e) 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.

3.2 Project Team. Within thirty (30) days after the Effective Date, the Parties shall establish a joint project team (the "**Project Team**") composed of at least two (2) representatives of each Party, to monitor and coordinate the conduct of the Research Program under all Research Plans. Each Project Team representative shall have knowledge and expertise in the research and development of products similar to the Licensed Products and the Project Team shall include a project manager from each Party. The Project Team shall in particular:

(a) coordinate the activities of the Parties under the Research Plans and oversee the implementation of the Research Plans;

(b) prepare updates and amendments to existing Research Plans and new Research Plans for additional Licensed Products, and submit such revised or new Research Plans to the JSC for review and approval;

(c) provide a forum for and facilitate communications between the Parties with respect to the research projects conducted under the Research Plans; and

(d) perform such other functions as may be appropriate to further the purposes of this Agreement with respect to the research and development of the Licensed Products, as directed by the JSC.

3.3 Committee Membership and Meetings.

(a) Committee Members. Each Committee representative shall have appropriate knowledge and expertise and sufficient seniority (including budgetary authority, as applicable) within the applicable Party to make decisions (if any) arising within the scope of the applicable Committee's responsibilities. 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 or project managers shall jointly prepare and circulate agendas to Committee members 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 thirty (30) days of such meeting.

(b) Meetings. Each Committee shall hold meetings at such times as it elects to do so, but at least once every three (3) months. Meetings of any Committee may be held in person, by audio or video teleconference; provided that unless otherwise agreed by both Parties, at least one (1) meeting per year for each Committee shall be held in person, and all in-person Committees shall be held at locations in the U.S. to be selected by the Parties. Each Party shall be responsible for all of its own expenses of participating in any Committee meetings. No action taken at any meeting of a Committee shall be effective unless at least one representative of each Party is participating.

(c) 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, such Party shall provide 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 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.

3.4 Decision-Making. All decisions of each Committee shall be made by unanimous vote, with each Party's representatives collectively having one (1) vote. If after reasonable discussion and good faith consideration of each Party's view on a particular matter before the Project Team or a subcommittee of the JSC and within the scope of its authority, the representatives of the Parties cannot reach an agreement as to such matter within five (5) Business Days after such matter was brought to such Committee for resolution, such disagreement shall be referred to the JSC for resolution. If after reasonable discussion and good faith consideration of each Party's view on a particular matter before the JSC and within the scope of its authority, the representatives of the Parties on the JSC cannot reach an agreement as to such matter within [*] Business Days after such matter was brought to the JSC for resolution or after such matter has been referred to the JSC, such disagreement shall be referred to the Executive Officers for resolution. If the Executive Officers cannot resolve such matter within [*] Business Days after such matter has been referred to them, then, except with respect to [*], which must be mutually agreed upon by the Parties, Kite shall have the final decision-making authority, which includes for the avoidance of doubt, [*]; provided, however, that (a) such decision by Kite shall be consistent with the terms of this Agreement, and (b) Kite shall not exercise such final decision-making authority beyond the scope of authority delegated to the JSC under this Agreement. For clarity, Kite shall not have the final decision-making authority to: [*].

3.5 General Committee Authority. Each Committee shall have solely the powers expressly assigned to it in this Article 3 and elsewhere in this Agreement. No Committee shall have any power to interpret, amend, modify, or determine or waive compliance with, this Agreement.

3.6 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 Kite, at any time after [*], of Sangamo's intention to disband and no longer participate in such Committee; or (c) Kite providing written notice to Sangamo, at any time after [*], of Kite's intention to disband and no longer participate in such Committee. Once a Committee is disbanded, such Committee shall have no further obligations under this Agreement and, thereafter, each Party shall designate a contact person, who may be the project manager, for the exchange of information under this Agreement and decisions of such Committee shall be decisions as between the Parties (and failure to agree shall be resolved in accordance with Section 3.4 as if such decision were a JSC decision), subject to the other terms and conditions of this Agreement.

ARTICLE 4
RESEARCH PROGRAM

4.1 General. Subject to the terms and conditions of this Agreement, the Parties desire to establish a research and preclinical development program (the "**Research Program**") under which the Parties will collaborate to conduct research and preclinical development activities pursuant to one or more mutually agreed research plans (each, a "**Research Plan**"), with each Research Plan directed to the research and early development of one Licensed Product through IND Acceptance for such Licensed Product.

4.2 Research Term. The initial term of the Research Program (the "**Research Term**") shall be the [*] period after the Effective Date. Kite shall have the option to extend the Research Term for up to [*] additional periods of [*] each. Kite may exercise the extension option by providing written notice to Sangamo no later than [*] before the expiration of the then-current Research Term, which notice shall be accompanied by a non-refundable, non-creditable extension payment of [*] for each extension. All research activities assigned to Sangamo under the Research Plans will need to be completed before the end of the Research Term; provided, however, that if any such activity is delayed beyond the end of the Research Term due primarily to factors within Sangamo's reasonable control, then Sangamo shall use Commercially Reasonable Efforts to complete such research activities promptly after the end of the Research Term, without any extension payment by Kite.

4.3 Research Plans.

(a) The JSC shall use Commercially Reasonable Efforts to agree on and approve a Research Plan for each Licensed Product to be developed hereunder, and all Research Program activities shall be conducted pursuant to the agreed upon Research Plans. The Research Plan for a particular Licensed Product shall set forth the timeline and details of all research activities to be conducted by the Parties [*] used to make such Licensed Product [*], and go/no-go success criteria for such Licensed Product. Each Research Plan shall identify [*]. Each Research Plan shall specify, for each CAR, NKR or TCR for a Licensed Product, [*]. For clarity, under the Research Program, a CAR, TCR or NKR may not be directed toward (i) [*] or (ii) [*]. Each Research Plan shall also include activities to [*].

(b) Each Research Plan shall be developed by the Parties through the Project Team and subject to approval by the JSC. As of the Amendment Date, the Parties have agreed upon an amended version of the initial Research Plan that was attached to the Prior Agreement [*]. Such amended Research Plan and the initial Research Plan [*] are attached hereto as **Exhibit E**. From time to time, and on at least an annual basis, the Project Team shall prepare appropriate amendments to the then-current Research Plans, including updated budgets, and shall prepare new Research Plans for additional Licensed Products. In addition, if at any time Sangamo anticipates exceeding the budget under a Research Plan, or believes that amendments to any Research Plan are appropriate based on results of activities conducted under such Research Plan, Sangamo may prepare an amendment to the Research Plan for the Project Team's review and approval. If Kite desires that Sangamo modify any Final ZFN or [*], Kite may propose that the Project Team prepare a new Research Plan or amendment to a Research Plan to include the relevant activities by Sangamo. The Project Team shall submit such amendments and new Research Plans to the JSC for review and approval. Each Party's Committee members shall consider in good faith all such amendments proposed by the other Party. Each such amended or new Research Plan shall become effective only upon approval by the JSC. Each Research Plan shall be consistent with the terms of this Agreement and shall form a part of this Agreement. In the event of an inconsistency between a Research Plan and this Agreement, the terms of this Agreement will prevail.

4.4 Selection of Candidate Targets.

(a) Kite will have the right to nominate one or more Other Targets by written notice to Sangamo to include in the Research Program under the Agreement. Promptly following

such written nomination by Kite, the Project Team shall prepare a Research Plan to research and pre-clinically develop a Licensed Product directed to one or more such Other Targets, and the Project Team shall submit such Research Plan to the JSC for review and approval. Once the JSC approves a Research Plan for a Licensed Product directed to such Other Target(s), such Other Target(s) shall become Candidate Target(s) under this Agreement. Notwithstanding the foregoing, the JSC shall not be permitted to approve a Research Plan for any Other Target during the last [*] of the Research Term or after the expiration or termination of the Research Term.

(b) If Sangamo believes at any time that [*]. If all Research Plans for all Licensed Products directed to a Candidate Target are terminated (and none have been completed), then at such time, such Candidate Target shall no longer be considered a Candidate Target under this Agreement. After the completion (but not early termination) of a Research Plan for a Candidate Target, such Candidate Target shall remain a Candidate Target unless terminated (or deemed terminated) by Kite pursuant to Section 13.2(a).

4.5 Allocation of Research Responsibilities. Each Research Plan shall reasonably allocate research activities between the Parties in order to best utilize each Party's expertise and resources, and are currently anticipated to be allocated as follows:

(a) Sangamo shall be responsible for: [*], except that Sangamo shall not have any obligation to [*]; and

(b) Kite shall be responsible for all other activities necessary or useful for the research and early development of the applicable Licensed Product [*].

4.6 Substitute Genes. The JSC may amend the Research Plans to include additional genes or substitute genes to be edited using *ex vivo* use of Final ZFNs.

4.7 Research Cost. Kite shall reimburse Sangamo, in accordance with Section 9.2, for those documented costs and expenses that Sangamo incurs with respect to activities assigned to it under the JSC-approved Research Plans.

4.8 Conduct of Research. Each Party shall use Commercially Reasonable Efforts to carry out the activities assigned to it under the Research Plans in accordance with the timeline therefor contemplated by the applicable Research Plan and shall conduct such activities in good scientific manner, in compliance with all applicable Laws in all material respects, including where applicable, cGMP, GLP and GCP.

4.9 Research Records. Each Party shall maintain, and cause its Affiliates and their respective employees and subcontractors to maintain, records and laboratory notebooks of its activities under the Research Plans in sufficient detail and in a good scientific manner appropriate for regulatory and intellectual property protection purposes, which records and laboratory notebooks shall be segregated from other research activities not performed under this Agreement. Such records and laboratory notebooks 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.

4.10 Research Reports. Each Party shall keep the other Party reasonably informed on the status, progress and results of its activities under the Research Plans through the regularly scheduled Project Team meetings. At least two (2) Business Days before each Project Team meeting, each Party shall submit to the Project Team a written summary of such activities since its prior report. The Project Team shall review and discuss the results, status and progress of the Research Program. Without limiting the foregoing, Sangamo shall provide Kite with a final written report within [*] of the completion or earlier termination of such Research Plan, which report will summarize the research activities undertaken and all accomplishments achieved under such Research Plan and contain a copy of all results generated by Sangamo in the performance of such Research Plan (other than [*]). All such reports shall be deemed Kite's Confidential Information.

4.11 Materials.

(a) To facilitate the conduct of the Research Program 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 to conduct its obligations pursuant to one or more Research Plans including those materials to be provided by Sangamo to Kite as part of the technology transfer and process development assistance (such materials or compounds and any progeny and derivatives thereof, collectively, "**Materials**"). All such Materials shall remain the sole property of the supplying Party, but be subject to the licenses granted herein, shall be used only in the fulfillment of obligations or exercise of its rights under this Agreement, shall not be used or delivered to or for the benefit of any Third Party without the prior written consent of the supplying Party (except as permitted by Section 2.1(c) or 4.12), and except as provided under Section 4.11(b), shall not be used in research or testing involving human subjects, unless expressly agreed in writing by the supplying Party. Except as provided under Section 4.11(b), the Materials are supplied "as is" and must be used with prudence and appropriate caution in any experimental work, since not all of their characteristics may be known.

(b) As and to the extent set forth in the Research Plan [*] that is attached hereto as **Exhibit E** or any amendment to any such Research Plan, Sangamo will supply to Kite GMP-grade Final ZFNs [*] in accordance with the terms set forth on **Exhibit F**.

4.12 Subcontractors. Each Party may engage subcontractors to perform any activities assigned to it under the Research Plans. Each contract between a Party and a subcontractor shall be consistent with the provisions of this Agreement and shall include provisions, including intellectual property provisions, adequate for the other Party to enjoy the licenses and rights granted hereunder as though such Party had performed the contracted work itself. Each Party shall be responsible for the management of its subcontractors and shall remain directly responsible for its obligations to conduct the activities assigned to it under the Research Plans that have been delegated or subcontracted to any subcontractor, and shall be directly responsible for the performance of its subcontractors.

ARTICLE 5
DEVELOPMENT

[*] = 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.

5.1 General.

(a) Subject to the terms and conditions of this Agreement, as between the Parties, Kite will be solely responsible for the development of each Licensed Product in the Field after the completion of the applicable Research Plan, at Kite's sole cost and expense.

(b) Upon Kite's request, Sangamo shall provide reasonable assistance to Kite in connection with assay development and preclinical development conducted as part of Kite's development of Licensed Products in the Field pursuant to Section 5.1(a), including by making its technical personnel reasonably available to Kite for consultation. [*].

5.2 Development Plans. The development of each Licensed Product under this Agreement after the completion of the applicable Research Plan shall be conducted pursuant to a development plan (each, a "**Development Plan**"). The Development Plan for a particular Licensed Product shall set forth a general timeline and all material development activities to be conducted in the Field [*].

5.3 Development Diligence. Kite shall (either directly or through one or more Affiliates or Sublicensees) use Commercially Reasonable Efforts [*].

5.4 Development Costs. Kite shall be solely responsible for all costs and expenses incurred in the development of the Licensed Products under this Agreement.

5.5 Development Reports. The Parties have agreed on the format and required content of the written reports that Kite will provide for the development of the Licensed Products, which is set forth in **Exhibit G** attached hereto. Kite shall provide the JSC (or Sangamo, if the JSC has been disbanded) with [*] written report in accordance with **Exhibit G**. Upon Sangamo's reasonable request, Kite shall discuss the information in such report with Sangamo and Kite shall timely respond to Sangamo's reasonable questions or requests for additional information relating to the development of the Licensed Products in the Field.

ARTICLE 6
REGULATORY

6.1 Regulatory Strategies and Responsibilities.

(a) Except as provided under Section 6.1(c) herein, as between the Parties, Kite shall be responsible for all regulatory affairs for the Licensed Products in the Field, including the preparation and filing of the IND, BLA, MAA and other Regulatory Materials for the Licensed Products in the Field, at its sole expense.

(b) Kite shall provide Sangamo with notice of each IND Acceptance, BLA Filing or approval, and MAA Filing or approval, in each case, with respect a Regulatory Authority in any Major Market Country (including the EMA) for a Licensed Product in a timely manner after the submission or receipt thereof.

(c) Upon Kite's request, Sangamo shall provide reasonable assistance to Kite in connection with the regulatory activities for the Licensed Products in the Field, including the preparation of the relevant Regulatory Materials. [*].

6.2 Meetings with Regulatory Authorities. At Kite's request, Sangamo shall provide input to Kite in preparation for any in-person meeting or teleconference with a Regulatory Authority (or related advisory committees), and shall provide assistance to Kite in responding to any request of a Regulatory Authority that relates to any Licensed Product, [*].

6.3 Notice for Certain Regulatory Actions. In the event that Kite issues a recall, market withdrawal, or takes any other similar action in connection with any Licensed Product in the Field, and Kite in its reasonable judgment determines that such action is reasonably related to the Final ZFN used to manufacture such Licensed Product, then [*]. For clarity, Kite shall have the sole right to decide and control such action at its own cost and expense. In the event that Sangamo, its Affiliates, or any of its licensees or sublicensees (a "**Sangamo Party**") issues a recall, market withdrawal, or takes any other similar action in connection with any product using a Final ZFN, and the applicable Sangamo Party in its reasonable judgment determines that such action is reasonably related to the Final ZFN used to manufacture such product, then [*].

ARTICLE 7
MANUFACTURING AND SUPPLY

7.1 General. [*], as between the Parties, Kite shall be solely responsible for the manufacture and supply of all Licensed Products for use in the Field, including the mRNA encoding the Final ZFNs, [*], and all other components of such Licensed Products, at Kite's sole cost and expense.

7.2 Technology Transfer. At Kite's request, Sangamo shall provide to Kite or its designee [*] information in Sangamo's possession and Control (but excluding any information licensed by Sangamo under Excluded Third Party Licenses) to the extent necessary for or used by or on behalf of Sangamo in the (i) non-GMP manufacture of the [*] Final ZFNs for use in the Licensed Product and (ii) the manufacture of the GMP-grade [*] Final ZFNs provided by Sangamo pursuant to Section 4.11(b). Sangamo shall cooperate with Kite in good faith to enable a smooth transfer of such materials. Kite acknowledges that [*]. Sangamo shall not be under any obligation to [*], provided however, that Sangamo shall [*], and Kite shall [*].

7.3 Process Development and Technology Transfer.

(a) Except for the assistance to be provided by Sangamo pursuant to Section 7.3(b), Kite shall (either by itself or through its Affiliates or a Third Party contractor manufacturer) be responsible for process development for manufacturing of Licensed Products for use in the Field, as part of a Research Plan or thereafter, at Kite's sole cost and expense.

(b) Upon Kite's request, Sangamo shall provide reasonable assistance to Kite in connection with the technology transfer set forth in Section 7.2 and the manufacture process development for the mRNAs encoding the Final ZFNs and [*], including by making its technical

personnel reasonably available to Kite for consultation and introducing Kite to Sangamo's existing contract manufacturer(s) for [*] manufacturing. [*].

ARTICLE 8
COMMERCIALIZATION

8.1 General. Subject to the terms and conditions of this Agreement, as between the Parties, Kite shall be solely responsible, at its sole cost and expense, for commercialization of Licensed Products in the Field in the Territory.

8.2 Commercial Diligence. Kite shall (either directly or through one or more Affiliates or Sublicensees) use Commercially Reasonable Efforts to [*].

8.3 Commercialization Reports. The Parties have agreed on the format and required content of the written reports that Kite will provide for the commercialization of the Licensed Products, which is set forth in **Exhibit H** attached hereto. Kite shall provide the JSC (or Sangamo, if the JSC has been disbanded) with [*] written reports in accordance with **Exhibit H**.

ARTICLE 9
FINANCIAL PROVISIONS

9.1 Upfront Payment. Within [*] Business Days of the Effective Date, Kite shall pay to Sangamo a one-time, non-refundable, non-creditable upfront payment of one hundred fifty million Dollars ($150,000,000).

9.2 Reimbursement of Research and Other Costs. Kite shall reimburse Sangamo for the cost and expenses incurred by Sangamo under any Research Plan [*], as follows:

(a) Within [*] days after the end of each Calendar Quarter during which Sangamo has performed activities under any Research Plan [*], Sangamo shall submit to Kite a reasonably detailed invoice setting forth the total costs and expenses incurred by Sangamo during such Calendar Quarter in the course of conducting its activities under the applicable Research Plan or providing such other requested Kite assistance, including both internal costs (at the then-current FTE Rate) and out-of-pocket costs with no mark-up.

(b) For FTEs performing Sangamo's activities under a Research Plan, Kite shall only be obligated to reimburse Sangamo for the costs of such FTEs at the FTE Rate to the extent that such costs do not exceed [*] of the budget set forth in such Research Plan. If Sangamo anticipates that its FTE costs for any particular Research Plan will exceed [*] of the approved budget therefor, Sangamo shall promptly notify the JSC, and the JSC shall discuss in good faith and decide whether to increase such budget.

(c) For out-of-pocket costs incurred by Sangamo under a Research Plan, Kite shall reimburse Sangamo for all such out-of-pocket costs, provided however, that if any actual out-of-pocket cost exceeds the budget therefor set forth in such Research Plan, Sangamo shall notify the JSC, and obtain the JSC's approval, before incurring such out-of-pocket cost. The JSC may

also agree on an alternative vendor to provide the requisite goods or services at a cost that does not exceed the budget therefor. If the JSC does not approve such excess cost or agree on such an alternative vendor, Sangamo shall have no obligation to incur such out-of-pocket costs that exceed the budget therefor.

(d) [*].

(e) Subject to the limitations set forth in Sections 9.2(b), (c) and (d), Kite shall pay to Sangamo the undisputed amount set forth in Sangamo's invoice within [*] days after Kite's receipt of each such invoice.

9.3 [*] Milestone Payments.

(a) Subject to the remainder of this Section 9.3, Kite shall pay to Sangamo [*] upon the first time that [*] and [*].

(b) Subject to the remainder of this Section 9.3, Kite shall pay to Sangamo [*] upon the first time that [*] and [*]. If [*] such milestone event [*], and such milestone event [*], then [*] and [*] and [*] such milestone event [*].

(c) Kite will notify Sangamo within [*] days after achievement of each [*] milestone event set forth above. After receipt of each such notice, Sangamo shall submit an invoice for [*] to Kite. Kite will pay to Sangamo such amount within [*] days of its receipt of such invoice.

(a) Each [*] milestone payment in this Section 9.3 will be non-refundable, non-creditable and payable only once. For clarity, in no event shall Kite pay Sangamo more than [*] under this Section 9.3, regardless of the number of [*] achieved.

9.4 Development Milestone Payments. Subject to the remainder of this Section 9.4, Kite shall pay to Sangamo the milestone payments set forth in the table below within [*] days after the first achievement of the applicable milestone event with respect to each Licensed Product in the Field (whether by Kite, its Affiliates or Sublicensees):

Milestone Event with respect to each Licensed Product	**Milestone Payments**
[*]	[*]
Total Development Milestone Payments per Licensed Product	$125,000,000

(a) Each development milestone payment in this Section 9.4 will be non-refundable, non-creditable, and payable (i) only once for each Licensed Product, regardless of the number of times that such milestone event is achieved by such Licensed Product, and (ii) only for the first ten (10) times such milestone event is achieved, regardless of the number of Licensed Products that achieve such milestone event. For clarity, in no event shall Kite pay Sangamo more than one billion two hundred and fifty million Dollars ($1,250,000,000) pursuant to this Section 9.4, regardless of the number of Licensed Products that achieve any development milestone event.

(b) If [*], then milestone event [*], if not previously achieved with respect to such Licensed Product, shall be achieved upon [*].

(c) In the event that milestone event [*] is achieved with respect to a Licensed Product and, at such time, milestone event [*] has not been achieved with respect to such Licensed Product, then milestone event [*] for such Licensed Product shall be deemed achieved at the time of achievement of such milestone event [*].

(d) In the event that any of milestone events [*] is achieved with respect to a Licensed Product and, at such time, milestone event [*] has not been achieved with respect to such Licensed Product, then milestone event [*] for such Licensed Product, as applicable, to the extent not previously achieved, shall be deemed achieved at the time of achievement of such milestone event [*].

(e) For the purpose of Sections 9.4, 9.5 and 9.6, a Licensed Product shall be considered a separate Licensed Product from another Licensed Product if such Licensed Product is [*], in which case such Licensed Product shall, subject to the limitations set forth in such Sections, be eligible for a separate set of development milestone payments and sales milestone payments.

(f) Kite will notify Sangamo within [*] days after achievement of each development milestone event. After receipt of notice of achievement of such development milestone event, Sangamo shall submit an invoice to Kite for the corresponding development milestone payment. Kite will pay to Sangamo the corresponding milestone payment set forth in the table above within [*] days of its receipt of such invoice.

9.5 Sales Milestone Payments. Subject to the remainder of this Section 9.5, Kite shall pay to Sangamo the milestone payments set forth in the table below when the annual aggregate Net Sales of each Licensed Product first reach the values indicated below.

Annual Net Sales of each Licensed Product in the Territory per Calendar Year	**Milestone Payments**
1. Exceed [*]	[*]
2. Exceed [*]	[*]
3. Exceed [*]	[*]
Total Sales Milestone Payments (per Licensed Product)	$175,000,000

(a) Each sales milestone payment in this Section 9.5 will be non-refundable, non-creditable and payable (i) only once for each Licensed Product, regardless of number of times such milestone event is achieved by such Licensed Product; and (ii) only for the first ten (10) times such milestone event is achieved, regardless of the number of Licensed Products that achieve such milestone event. For clarity, in no event shall Kite pay Sangamo more than one billion seven hundred and fifty million Dollars ($1,750,000,000) pursuant to this Section 9.5, regardless of the number of Licensed Products that achieve any sales milestone event.

(b) The milestone payments in this Section 9.5 shall be additive, such that if more than one milestone event specified above is achieved in the same Calendar Year, then the milestone payments for all such milestone events so achieved shall be payable in the same Calendar Year in accordance with Section 9.5(c).

(c) As part of the Calendar Quarterly royalty report in Section 9.6(d), Kite shall notify Sangamo if the aggregate annual Net Sales of any Licensed Product first reached a value set forth above during the Calendar Quarter to which such report pertains. Kite shall pay to Sangamo the applicable sales milestone payment(s) concurrent with the delivery of such report.

9.6 Royalty Payments.

(a) Royalty Rates. Subject to the remainder of this Section 9.6, Kite shall make non-refundable and non-creditable (except as otherwise provided in this Agreement) royalty payments to Sangamo on the incremental annual Net Sales of each Licensed Product at the applicable royalty rates set forth below.

For that portion of annual Net Sales of each Licensed Product in the Territory	**Royalty Rate**
1. Less than or equal to [*]	[*]
2. Greater than [*] but less than or equal to [*]	[*]
3. Greater than [*]	[*]

By way of example only, if Kite, its Affiliates and Sublicensees sell two Licensed Products in the Territory in a given Calendar Year and the Net Sales in the Territory of the first Licensed Product in such year are [*] and the Net Sales in the Territory of the second Licensed Product in such year are [*], then the royalties payable by Kite under this Section 9.6(a) during such year would be calculated as follows:

Royalty for the first Licensed Product:
[*]

Royalty for the second Licensed Product:
[*]

(b) Royalty Term. Kite's royalty payment obligations under Section 9.6(a) shall, on a Licensed Product-by-Licensed Product and country-by-country basis, commence on the First Commercial Sale of such Licensed Product in such country and expire upon the latest of: (i) the expiration of the last to expire Valid Claim [*] in such country that Covers the manufacture, use or sale of (A) such Licensed Product (including the Modified Cell contained therein) or (B) any Final ZFN or [*] used to generate (1) the Modified Cell in such Licensed Product or (2) the Universal Cell Line from which the Modified Cell in such Licensed Product was differentiated; (ii) the expiration of all applicable Regulatory Exclusivity, if any, for such Licensed Product in such country; and (iii) [*] years after the First Commercial Sale of such Licensed Product in such country (the

"**Royalty Term**"). Upon expiration of a Royalty Term for a Licensed Product in a given country, the product license granted to Kite in Section 2.1(b) will automatically become fully paid-up, perpetual, irrevocable, and royalty-free with respect to such Licensed Product in such country, except that expiration of such Royalty Term shall not affect Kite's obligation to pay royalties or sales milestone payments on Net Sales of such Licensed Product sold prior to such expiration.

(c) Royalty Reductions.

(i) Subject to Section 9.6(c)(iii) below, on a Licensed Product-by-Licensed Product and country-by-country basis, royalties on Net Sales of a Licensed Product in a country shall be reduced by:

(1) [*], at any time when there is no Valid Claim [*] in such country that Covers the manufacture, use or sale of (A) such Licensed Product (including the Modified Cell contained therein) or (B) any Final ZFN or [*] used to generate (1) the Modified Cell in such Licensed Product or (2) the Universal Cell Line from which the Modified Cell in such Licensed Product was differentiated; and

(2) [*], if there is a Biosimilar Product of such Licensed Product being sold in such country and the unit volume of such Biosimilar Product exceeds [*] of the combined unit volume of such Licensed Product and such Biosimilar Product sold in such country during such Calendar Quarter (which determinations of unit volume shall be based on a mutually acceptable calculation method and using market share data provided by a reputable and mutually agreed upon provider, such as IQVIA (f/k/a Quintiles IMS Health)).

(ii) If it is necessary or useful for Kite to obtain a license or assignment from a Third Party [*] in a particular country in order to develop, use, manufacture, import, sell or otherwise commercialize a Licensed Product [*] in the Field in a particular country in the Territory and Kite obtains such a license or assignment, then, subject to Section 9.6(c)(iii) below, Kite may deduct, from the royalty payment that would otherwise have been due pursuant to Section 9.6(a) with respect to Net Sales of such Licensed Product in such country in a particular Calendar Quarter, an amount equal to [*] paid by Kite to such Third Party pursuant to such license or assignment on account of the sale of such Licensed Product in such country during such Calendar Quarter.

(iii) Notwithstanding the foregoing, during any Calendar Quarter in the Royalty Term for any Licensed Product in any country in the Territory, the operation of Sections 9.6(c)(i)(1), 9.6(c)(i)(2) and 9.6(c)(ii) individually or in combination shall not reduce the royalties due to Sangamo with respect to Net Sales of such Licensed Product in such country during such Calendar Quarter to less than the greater of (1) [*] of the royalties that would otherwise have been due under Section 9.6(a) with respect to such Net Sales without any such reduction or deduction; or (2) the sum of (A) the total royalties owed by Sangamo to Third Parties with respect to such Net Sales [*], plus (B) [*] of such Net Sales; provided, however, that [*] with respect to such Net Sales [*] (the "**Royalty Floor**"). Any amount of royalty reduction that Kite is entitled to take with respect to a particular Licensed Product in a particular country but that is limited by the foregoing Royalty Floor shall be carried forward and Kite may reduce subsequent royalty payment amounts due to

Sangamo hereunder in accordance with this Section 9.6(c)(iii) by such amount, until the full amount that Kite was entitled to reduce royalty payments has been applied.

(d) Reports and Payment. Within [*] days after the end of each Calendar Quarter during the applicable Royalty Term, Kite shall (i) provide Sangamo with a report that contains the following information for the applicable Calendar Quarter, on a Licensed Product-by-Licensed Product and country-by-country basis: (A) the amount of gross sales of the each Licensed Product, (B) an itemized calculation of Net Sales showing deductions provided for in the definition of "Net Sales," (C) a calculation of the royalty due on such sales, including any reductions or deductions made in accordance with Section 9.6(c), (D) the exchange rate for such country, and (E) whether any sales milestone event has been achieved during such Calendar Quarter; and (ii) pay in Dollars all royalty and sales milestone payments due to Sangamo for such Calendar Quarter.

9.7 Payments for Third Party IP Rights. Sangamo shall remain responsible for all obligations to and payments of royalty, milestone and other payments under (a) Existing Third Party Licenses; (b) Third Party licenses [*]; and (c) [*] Third Party Licenses entered into after the Execution Date; provided however that Kite shall be responsible for paying (i) those payments under Existing Third Party Licenses for which [*]; and (ii) those payments under Third Party licenses entered into by Sangamo after the Effective Date that are deemed Third Party Licenses pursuant to Section 2.5(b) and in accordance with the terms set forth in such Section 2.5(b). Sangamo shall provide Kite with (x) written notice describing any royalty and other reports required from Kite to permit Sangamo to comply with its reporting and payment obligations under such Third Party Licenses, which reports Kite shall provide within [*] days after receipt of such notice, and (y) an invoice for any payments owed by Kite pursuant to this Section 9.7, including those based on reports provided by Kite pursuant to the preceding clause (x), and Kite shall pay the undisputed portion of such invoice within [*] days of its receipt of such invoice. Sangamo shall pay such amounts, to the extent that Sangamo has timely received the necessary information from Kite, to the applicable Third Party on or before the applicable due date.

9.8 Currency; Exchange Rate. All payments to be made by Kite to Sangamo under this Agreement shall be computed and paid in Dollars by bank wire transfer in immediately available funds to a bank account designated by Sangamo by written notice. With respect to sales of a Licensed Product and other amounts received that are invoiced in a currency other than U.S. dollars, such amounts and amounts payable will be converted to U.S. dollars using the exchange rate mechanism generally applied by Kite or its Affiliates in preparing its financial statements for the applicable Calendar Quarter, provided that such mechanism is in compliance with GAAP.

9.9 Late Payments. If Sangamo does not receive payment of any undisputed sum due to it on or before the due date therefor, simple interest shall thereafter accrue on the sum due from the due date until the date of payment at a per-annum rate of [*] over the then-current one month USD-LIBOR as quoted on Bloomberg (or if it no longer exists, similarly authoritative source) or the maximum rate allowable by applicable Law, whichever is less.

9.10 Disputed Payments. If Kite disputes in good faith the amount of any invoice provided by Sangamo pursuant to this Agreement or the obligation to make any payment alleged by Sangamo to be due hereunder, Kite shall notify Sangamo in writing within [*] days of Kite's

receipt of such invoice or allegation, and the Parties shall use good faith efforts to promptly resolve such dispute; provided, that any failure to provide such notice shall not limit or restrict Kite to dispute the amount or basis for such payment in the future.

9.11 Withholding Taxes.

(a) Taxes on Income. Each Party shall be solely responsible for the payment of all taxes imposed on its share of income arising directly or indirectly from the activities of the Parties under this Agreement.

(b) Tax Cooperation. The Parties agree to cooperate with one another and use reasonable efforts to avoid or reduce tax withholding or similar obligations in respect of the milestone payments, royalties and other payments made by Kite to Sangamo under this Agreement. To the extent Kite is required to deduct and withhold taxes on any payment to Sangamo, Kite 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 payment sufficient to enable Sangamo to claim such payment of taxes. Sangamo shall provide Kite any tax forms that may be reasonably necessary in order for Kite to not withhold tax or to withhold tax at a reduced rate under an applicable bilateral income tax treaty, to the extent legally able to do so. Sangamo shall use reasonable efforts to provide any such tax forms to Kite in advance of the due date. Each Party shall also provide the other Party with reasonable assistance to enable the recovery, as permitted by Law, of withholding taxes or similar obligations resulting from payments made under this Agreement, such recovery to be for the benefit of Sangamo.

(c) Taxes Resulting From Kite's Action. If a withholding or deduction obligation arises as a result of any action by Kite, including any assignment, sublicense, change of place of incorporation, or failure to comply with applicable Laws or filing or record retention requirements (an "**Kite Withholding Tax Action**"), then the sum payable by Kite (in respect of 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 which it would have received had no such Kite Withholding Tax Action occurred.

9.12 Records and Audit Rights. Each Party shall maintain complete and accurate records in sufficient detail to permit the other Party to confirm the accuracy of the amount of research and other costs to be reimbursed, achievement of milestones, royalties and other amounts payable under this Agreement for the then current Calendar Year, and during the preceding [*] Calendar Years. Upon reasonable prior notice, which shall be no less than upon [*] days prior written notice, such records shall be open during regular business hours for a period of [*] years from the creation of individual records for examination by an independent certified public accountant selected by the auditing Party and reasonably acceptable to the audited Party for the sole purpose of verifying for the auditing Party the basis and accuracy of the financial reports furnished by the audited Party pursuant to this Agreement or of any payments made, or required to be made, by or to the audited Party pursuant to this Agreement; provided however, that records for a particular period may only be audited once. Such audits may occur no more often than [*]. Such auditor shall enter into a confidentiality agreement between the auditor and the auditing Party and not disclose the audited Party's Confidential Information to the auditing Party. Any undisputed amounts shown to be owed

but unpaid, or overpaid and in need of refund, shall be paid or refunded (as the case may be) within [*] days after the accountant's report, plus interest (as set forth in Section 9.9) from the original due date. The auditing Party shall bear the full cost of such audit unless such audit reveals an underpayment by more than [*] of the amount due for the entire period being audited, in which case the audited Party shall reimburse the auditing Party for the reasonable costs for such audit.

9.13 Payments. Notwithstanding the non-refundable or non-creditable nature of any payments hereunder, but subject to the limitations set forth in Section 15.5, 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

10.1 Inventions.

(a) Ownership.

(i) Excluding [*], and subject to Section 10.1(a)(v), ownership of all Inventions shall be based on inventorship, as determined in accordance with the rules of inventorship under United States patent laws, and each Party shall solely own any Inventions made solely by its and its Affiliates' and sublicensees' employees, agents, or independent contractors, and 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.

(ii) To the extent any Invention within [*] is made by or on behalf of [*] or its Affiliates, whether solely or jointly with [*], [*] shall and hereby does assign to [*] all of [*] and its Affiliates' and subcontractors' interest in such Invention, including damages for past infringement. Upon [*] request, [*] shall execute and take such further actions reasonably necessary to effectuate [*] ownership in and to such Inventions included within [*]. [*] shall not, without [*] prior written consent, file any patent application claiming an Invention that [*].

(iii) All Inventions jointly owned by the Parties as set forth above shall be referred to as "**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 (A) the licenses granted to the other Party or (B) the covenants provided by a Party under this Agreement, each Party shall be entitled to practice, license (through multiple tiers), assign (their respective interest only) 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.

(iv) Notwithstanding anything to the contrary in this Agreement, neither Party will have the right to invoke the Cooperative Research and Technology Enhancement Act of 2004, 35 U.S.C. § 103(c)(2)-(c)(3) (the "**CREATE Act**") when exercising its rights under this Agreement without the prior written consent of the other Party. In the event that a Party is permitted to invoke the CREATE Act as required by the preceding sentence, the Parties will cooperate and

coordinate their activities with respect to any submissions, filings or other activities in support thereof. The Parties acknowledge and agree that this Agreement is a "joint research agreement" as defined in the CREATE Act.

(v) Kite shall not, and shall not permit its Affiliates or Sublicensees to, (A) [*] or (B) [*]. [*]. Sangamo shall not, and shall not permit its Affiliates, licensees, or sublicensees to, (1) [*]; or (2) [*]. [*].

(b) Non-Exclusive Licenses.

(i) Kite hereby grants to Sangamo, subject to the licenses and covenants in this Agreement, a worldwide, non-exclusive, fully-paid, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses only in connection with a license under other Patent Rights and Know-How Controlled by Sangamo, under the [*].

(i) Kite hereby grants to Sangamo, subject to the licenses and covenants in this Agreement, a worldwide, non-exclusive, fully-paid, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses only in connection with a license under other Patent Rights and Know-How Controlled by Sangamo, under the [*].

(ii) Sangamo hereby grants to Kite, subject to the licenses and covenants in this Agreement, a worldwide, non-exclusive, fully-paid, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses only in connection with a license under other Patent Rights and Know-How Controlled by Kite, under the [*].

(i) Sangamo hereby grants to Kite, subject to the licenses and covenants in this Agreement, a worldwide, non-exclusive, fully-paid, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses only in connection with a license under other Patent Rights and Know-How Controlled by Kite, under the [*].

(c) Disclosure. Each Party shall promptly disclose to the other Party all Inventions made by or on behalf of such Party and its Affiliates and sublicensees, 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 other Party for additional information relating to such Inventions.

(d) 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; (ii) presently assigning to the applicable Party all of his or her right, title and interest in and to any invention, discovery, process or other intellectual property (excluding any agreements with academic universities and/or other governmental entities, for which a non-exclusive license, or an option for an exclusive license may be obtained); (iii) cooperating in the preparation, filing, prosecution, maintenance, defense, and enforcement of any patent and patent application; 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 such invention assignment agreement need not reference or be specific to this Agreement.

10.2 Patent Prosecution.

(a) [*] Patents.

(i) As between the Parties, [*] shall have the first right, but not the obligation, to file, prosecute and maintain [*] Patents throughout the world, at its sole cost and expense. [*] shall keep [*] reasonably informed of the status of [*] Patents and shall promptly provide [*] with material correspondence received from any patent authorities in connection therewith. In addition, [*] shall promptly provide [*] with drafts of all proposed material filings and correspondence to any patent authorities with respect to [*] Patents for [*] review and comment prior to the submission of such proposed filing or correspondence. [*] shall confer with [*] and take into consideration [*] reasonable comments prior to submitting such filing or correspondence, provided that [*] provides such comments within [*] Business Days of receiving the draft filing or correspondence from [*]. If [*] does not provide comments within such period of time, then [*] shall be deemed to have no comment to such proposed filing or correspondence. In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of [*] Patents, the final decision shall be made by [*], provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*].

(ii) [*] shall notify [*] of any decision to cease prosecution and/or maintenance of any [*] Patent in any country. [*] shall provide such notice sufficiently in advance of 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 [*] Patent. In such event, [*] shall permit [*], at its discretion and expense, to continue prosecution or maintenance of such [*] Patent in such country; subject to keeping [*] reasonably informed of the status of [*] Patents and promptly providing [*] with material correspondence received from any patent authorities in connection therewith. [*] prosecution or maintenance of such [*] Patent shall not change the Parties' respective rights and obligations under this Agreement with respect to such [*] Patent other than with respect to those prosecution and maintenance activities expressly set forth in this Section 10.2(a). In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of [*] Patents following [*] election to continue such prosecution and maintenance, the final decision shall be made by [*]; provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*].

(iii) For the purpose of this Article 10, "prosecution" shall include any post-grant proceeding, including supplemental examination, post grant review proceeding, patent interference proceeding, opposition proceeding, reissue and reexamination, but excluding inter parties reviews, which shall be governed by Section 10.3.

(b) [*] Patents.

(i) As between the Parties, [*] shall have (A) the sole right, but not the obligation, to file, prosecute and maintain those [*] Patents other than [*] Patents throughout the world, at its sole cost and expense, and (B) the first right, but not the obligation, to file, prosecute and maintain those [*] Patents. [*] shall keep [*] reasonably informed of the status of all such [*] Patents and shall promptly provide [*] with material correspondence received from any patent authorities in connection therewith.

(ii) In addition, with respect to those [*] Patents (A) that [*] or (B) that are [*] ((A) and (B), collectively, the "[*] **Patents**"), [*] shall promptly provide [*] with drafts of all proposed material filings and correspondence to any patent authorities with respect to such [*] Patents for [*] review and comment prior to the submission of such proposed filing or correspondence. [*] shall confer with [*] and take into consideration [*] reasonable comments prior to submitting such filing or correspondence, provided that [*] provides such comments within [*] Business Days of receiving the draft filing or correspondence from Sangamo. If [*] does not provide comments within such period of time, then [*] shall be deemed to have no comment to such proposed filing or correspondence. In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of such [*] Patents, the final decision shall be made by [*], provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*].

(iii) [*] shall notify [*] of any decision to cease prosecution and/or maintenance (a "[*] **Abandonment**") of any [*] Patents in any country. [*] shall provide such notice of a [*] Abandonment sufficiently in advance of 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 [*] Patent.

(1) In the event of a [*] Abandonment with respect to any [*] Patents other than those that [*], if requested by [*], [*] shall, at [*] election, acting reasonably, either (a) permit [*], at its discretion and expense (provided that [*]), to continue prosecution or maintenance of such [*] Patent in such country, subject to keeping [*] reasonably informed of the status of such [*] Patent and promptly providing [*] with material correspondence received from any patent authorities in connection therewith, or (b) itself continue prosecution or maintenance of such [*] Patent in such country, at [*] expense (provided that [*]), in which case [*] shall continue to have the review and comment rights provided for in Section 10.2(b)(ii) above. [*] prosecution or maintenance of any such [*] Patent shall not change the Parties' respective rights and obligations under this Agreement with respect to such [*] Patent other than with respect to those prosecution and maintenance activities expressly set forth in this Section 10.2(b). In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of any such [*] Patents following [*] request and [*] election to continue such prosecution and maintenance, whether by [*] or by [*], the final decision shall be made by [*], provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*].

(2) In the event of a [*] Abandonment with respect to any [*] Patents that [*], at [*] election, acting reasonably, [*] shall and hereby does assign to [*] its right,

title and interest in and to such [*] Patent in such country, including damages for past infringement, and [*] itself shall continue prosecution or maintenance of such Patent Right in such country, at its sole cost and expense. [*] shall execute all documents and instruments and cooperate with [*] and its representatives to effectuate such assignment at [*] sole cost. [*] will and hereby does grant [*], subject to the licenses and covenants contained in this Agreement, a worldwide, non-exclusive, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses, under any such assigned [*] Patent to research, develop, manufacture, commercialize and otherwise exploit any and all products; provided however, that the right to grant sublicenses shall [*].

(3) For the avoidance of doubt, [*] shall have no rights to conduct prosecution and/or maintenance of any Patent Rights contained within [*], except for those Patent Rights that are [*] Patents.

(c) Joint Patents.

(i) As between the Parties, (A) Sangamo shall have the first right, but not the obligation, to file, prosecute and maintain [*] Joint Patents throughout the world, at the Parties' joint cost and expense with respect to those jurisdictions set forth on **Exhibit J** (the "**Base Patent Jurisdictions**"), and (B) Kite shall have the first right, but not the obligation, to file, prosecute and maintain the Joint Patents that are not [*] Joint Patents (the "**Other Joint Patents**") throughout the world, at the Parties' joint cost and expense with respect to the Base Patent Jurisdictions. The Parties shall jointly share all costs and expenses to file, prosecute and maintain Joint Patents in jurisdictions other than the Base Patent Jurisdictions; provided however, that if the Party with the first right to file a particular Joint Patent elects to file, prosecute, and maintain such Joint Patent in any jurisdiction other than the Base Patent Jurisdictions, and the other Party does not wish to pay its 50% share of such costs and expenses in such jurisdiction, then such other Party shall have the right to elect not to pay its 50% share, which election shall be deemed a Non-Base Abandonment with respect to such Joint Patent in such jurisdiction. Each prosecuting Party shall keep the other Party reasonably informed of the status of each Joint Patent prosecuted by such Party in the Base Patent Jurisdictions and those other jurisdictions where the Parties jointly share the costs and expenses for such Joint Patent (collectively, the "**Joint Territories**" with respect to such Joint Patent) and shall promptly provide the other Party with material correspondence received from any patent authorities in connection therewith. In addition, each prosecuting Party shall (x) promptly provide the other Party with drafts of all proposed material filings and correspondence to any patent authorities with respect to such Joint Patents in the Joint Territories for the other Party's review and comment prior to the submission of such proposed filing or correspondence; and (y) confer with the other Party and take into consideration the other Party's comments prior to submitting such filing or correspondence, provided that the other Party provides such comments within [*] Business Days of receiving the draft filing or correspondence from the prosecuting Party. If a Party does not provide comments within such period of time, then such Party shall be deemed to have no comment to such proposed filing or correspondence. In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of any [*] Joint Patents in the Joint Territories, the final decision shall be made by [*], provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*]. In case of a disagreement between the Parties with respect to the filing, prosecution or maintenance of any [*]

Patents in the Joint Territories, the final decision shall be made [*], provided however, that such final decision is not reasonably expected to be detrimental to the prosecution or enforcement of any Patent Right [*].

(ii) The Party with the first right to file, prosecute, and maintain a particular Joint Patent shall notify the other Party of any decision (A) not to file such Joint Patent in a Base Patent Jurisdiction or (B) to cease prosecution and/or maintenance of such Joint Patent in any Joint Territory (each of (A) and (B), a "**Base Abandonment**") or not to file any Joint Patent in any country outside the Base Patent Jurisdictions (each a "**Non-Base Abandonment**"), and shall provide such notice of a Base Abandonment or Non-Base Abandonment sufficiently in advance of 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 country.

(1) In the event of a Base Abandonment, the Party with the first right to prosecute such Joint Patent shall permit the other Party, at the other Party's discretion and the Parties' joint expense, to continue prosecution or maintenance of such Joint Patent in such country. The other Party's prosecution or maintenance of such Joint Patent shall not change the Parties' respective rights and obligations under this Agreement with respect to such Joint Patent other than those expressly set forth in this Section 10.2(c), and the Party electing not to file, prosecute, or maintain such Joint Patent will continue to have the same review, comment, and decision-making provided for in Section 10.2(c)(i).

(2) In the event of a Non-Base Abandonment, or in the event of a Base Abandonment where the Party electing such Base Abandonment does not wish to pay its 50% share of such costs and expenses, then the Party electing such Non-Base Abandonment or Base Abandonment (the "**Abandoning Party**") shall and hereby does assign to the Party electing to continue prosecution of such Joint Patent (the "**Continuing Party**") its right, title and interest in and to such Patent Right in such country, including damages for past infringement, and the Continuing Party itself shall continue prosecution or maintenance of such Patent Right in such country, at its sole cost and expense. The Abandoning Party shall execute all documents and instruments and cooperate with the Continuing Party and its representatives to effectuate such assignment at the Continuing Party's sole cost. The Continuing Party will and hereby does grant the Abandoning Party, subject to the licenses and covenants contained in this Agreement, a worldwide, non-exclusive, royalty-free, perpetual, irrevocable license, with the right to grant sublicenses, under any such assigned Joint Patent to research, develop, manufacture, commercialize and otherwise exploit any and all products; provided however, that the right to grant sublicenses shall [*].

(d) 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, or assignment, as applicable. Without limiting the foregoing, (i) each Party's internal and/or external patent counsel(s) will meet regularly to provide an update and discuss the status of all Sangamo Patents and Joint Patents being prosecuted and maintained under this Agreement, as applicable to such Party, along with any material updates

regarding the prosecution and maintenance of such Patent Rights, including the strategy for the preparation, filing, prosecution, and maintenance of such Patent Rights (including national stage filings); (ii) each Party will take into consideration the other Party's comments in good faith; and (iii) the Parties will cooperate and implement reasonable filing and prosecution strategies (including filing divisionals, continuations, or otherwise) so that, to the extent reasonably feasible, Patent Rights for distinct Inventions are pursued in distinct Patent Rights, [*] Patents are pursued in addition to [*] Patents, and [*] Patents are pursued in addition to [*] Patents.

10.3 Patent Enforcement.

(a) Notice. If either Party becomes aware of any (i) infringement, anywhere in the world, of any issued Patent Right within the [*] Patents or [*] Patents on account of a Third Party's manufacture, use, importation, offer for sale or sale in the Field (whether or not such use is on-label) of any product [*] (an "**Infringing Product**"), including any BLA or MAA filed by a Third Party for an Infringing Product that names a Licensed Product as a reference product (or similar filing in a country other than the U.S.) or (ii) declaratory judgment action or inter partes review action by a Third Party that is developing, manufacturing, or commercializing an Infringing Product in the Field (whether or not such use is an approved use) alleging the invalidity, unenforceability or non-infringement of any of the [*] Patents or [*] Patents (collectively, (i) and (ii), a "**Product Infringement**"), such Party will promptly notify the other Party in writing to that effect. In addition, each Party shall promptly notify the other of any infringement of any issued [*] Patent that is not a Product Infringement.

(b) Enforcement by [*]. [*] shall have the first right, but not the obligation, to take action, control and obtain a discontinuance of the Product Infringement or bring suit against the applicable Third Party (such Third Party, the "**Infringer**") under any [*] Patent or any [*] Patent other than [*]. If [*] has not taken steps to obtain a discontinuance of Product Infringement of such [*] Patent or [*] Patent or filed suit against any such Infringer of such [*] Patent or [*] Patent within [*] from the date of receipt of written notice of Product Infringement, then upon [*] written consent (not to be unreasonably withheld), [*] shall have the right, but not the obligation, to bring suit under the applicable [*] Patent or [*] Patent against such Infringer.

(c) Enforcement by [*]. [*] shall have the sole right, but not the obligation, to take action, control and obtain a discontinuance of the Product Infringement or bring suit against the applicable Infringer under any [*] Patent within [*].

(d) [*] Patents. In the case of any other infringement of a [*] Patent, the Parties will discuss in good faith to determine a course of action, and neither Party shall have the right to enforce such [*] Patent without the other Party's prior written consent, which shall not be unreasonably withheld. Unless agreed otherwise by the Parties in writing, a Party enforcing a [*] Patent (as consented by the other Party pursuant to the preceding sentence) shall bear all costs and expenses and retain all recoveries associated with such enforcement.

(e) Cooperation. The enforcing Party under this Section 10.3 shall keep the other Party reasonably informed of all material developments in connection with any such suit. The non-enforcing Party shall reasonably cooperate with the enforcing Party in any such suit (including

joining as a party plaintiff) as reasonably requested by the enforcing Party and at the enforcing Party's cost and expense. The non-enforcing Party shall have the right to consult with the enforcing Party and to participate in and, if appropriate, be represented by independent but mutually agreed upon counsel in such litigation at the non-enforcing Party's own cost and expense. Neither Party shall, without the other Party's prior written consent, enter into any settlement or consent decree that requires any payment by or admits or imparts any other liability to the other Party or admits the invalidity or unenforceability of or adversely affects the scope of any such Sangamo Patent or Joint Patent, which consent shall not be unreasonably withheld or conditioned.

(f) Cost and Expense; Recovery. The enforcing Party shall bear all the costs and expenses of any action brought by it under this Section 10.3 against Product Infringement of any [*] Patent or any [*] Patent. Any recoveries obtained by either Party as a result of any proceeding against a Product Infringement under this Section 10.3 shall first be used to reimburse the costs and expenses incurred by the Parties in connection with such enforcement action. Any recoveries in excess of such costs and expenses shall be retained by the enforcing Party; provided that if Kite is the enforcing Party [*], such excess recoveries [*] shall be deemed Net Sales and subject to royalty payment under Section 9.6.

(g) Other Infringements. [*] 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 any infringement of any [*] Patents (excluding [*] Patents) that is not a Product Infringement, and retain all recoveries from such action. [*] 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 any infringement of any Patent Rights [*] (excluding [*] Patents), and retain all recoveries from such action.

10.4 Defense. If a Party becomes aware of any actual or potential claim alleging that the research, development, manufacture, or commercialization of any ZFNs, [*] or AAVs under this Agreement or Licensed Product infringes, misappropriates, or otherwise violates any intellectual property rights of a Third Party (or would if carried out) ("**Third Party Infringement**"), then such Party will notify the other Party as promptly as possible following the receipt of service of process in such action, suit, or proceeding, or the date on which such Party becomes aware that such action, suit, or proceeding has been instituted, and the Parties will meet as soon as possible to discuss the overall strategy for defense of such matter. If either Party has an obligation under Article 15 to indemnify the other Party with respect to such claim, then the provisions of Article 15 will apply with respect thereto. Nothing in this Section 10.4 will limit a Party's rights to defend such claim.

10.5 Patent Extensions. The Parties shall cooperate in obtaining patent term restoration (under but not limited to the U.S. Drug Price Competition and Patent Term Restoration Act), supplemental protection certificates or their equivalents, and patent term extensions with respect to the [*] Patents or [*] Patents in any country and/or region where applicable; provided that if the Parties fail to agree, [*] shall have the final decision-making authority over whether to extend (or apply for any equivalent with respect to) any (a) [*] Patent, unless such [*] Patent is a [*] Patent, and (b) [*] Patent, and [*] shall have the final decision-making authority with respect to any [*] Patent or any [*] Patent. [*] shall file for such extensions at [*] sole cost and expense, and [*] shall file for its permitted extensions at [*] sole cost and expense.

10.6 Patents Licensed From Third Parties. Each Party's rights under this Article 10 with respect to the prosecution and enforcement of any Sangamo Patent that is licensed by Sangamo from a Third Party shall be subject to the rights retained by such Third Party to prosecute and enforce such Patent Rights.

10.7 Trademarks. Kite shall have the right to brand Licensed Products using Kite related trademarks and any other trademarks and trade names it determines appropriate, which may vary by country or within a country ("**Product Marks**"). Kite shall own all rights in the Product Marks and shall have the right to register and maintain the Product Marks in the countries and regions that it determines reasonably necessary, at Kite's cost and expense.

ARTICLE 11
CONFIDENTIALITY; PUBLICATION

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

(a) all Confidential Information of a Party (the "**Disclosing Party**") shall be maintained in confidence and otherwise safeguarded by the other Party (the "**Receiving Party**") and its Affiliates, 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;

(b) the Receiving Party may only use any such Confidential Information for the purposes of performing its obligations or exercising its rights under this Agreement; and

(c) the Receiving Party may only disclose Confidential Information of the other Party to: (i) its Affiliates, licensees, sublicensees and permitted assignees; and (ii) employees, directors, agents, contractors, consultants and advisers of the Receiving Party and its Affiliates, licensees, sublicensees and permitted assignees, in each case of (i) and (ii) to the extent reasonably necessary for the purposes of, and for those matters undertaken pursuant to, this Agreement; provided that such Persons are bound by legally enforceable obligations to maintain the confidentiality of the Confidential Information in a manner consistent with the confidentiality provisions of this Agreement.

11.2 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:

(a) 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;

(b) 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;

(c) 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

[*] = 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.

(d) is 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.

11.3 Authorized Disclosures. Notwithstanding the obligations set forth in Sections 11.1 and 11.5, a Party may disclose the other Party's Confidential Information (including this Agreement and the terms herein) to the extent:

(a) such disclosure is reasonably necessary: (i) to such Party's or its Affiliates' directors, attorneys, independent accountants, financial advisors or other representatives for the sole purpose of enabling such directors, attorneys, independent accountants financial advisors or other representatives to provide advice to such Party or Affiliate, provided that in each such case such recipients are bound by confidentiality and non-use obligations substantially consistent with those contained in this Agreement; or (ii) to actual or potential investors, acquirors, licensees and other financial or commercial partners solely for the purpose of evaluating or carrying out an actual or potential investment, acquisition or collaboration, provided that in each such case such recipients are bound by confidentiality and non-use obligations substantially consistent with those contained in the Agreement (except that the term of such obligations may be shorter, but at least [*] years);

(b) such disclosure is required by Law, or judicial or administrative process, provided that 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. Confidential Information that is disclosed pursuant to this Section 11.3(b) shall remain otherwise subject to the confidentiality and non-use provisions of this Article 11, and the Party disclosing Confidential Information pursuant to Law or court order shall (i) cooperate with and reasonably assist the other Party (at the other Party's expense) if the other Party seeks a protective order or other remedy in respect of any such disclosure and (ii) furnish only that portion of the Confidential Information which, in the opinion of such Party's legal counsel, is responsive to such requirement; or

(c) [*].

11.4 Scientific Publication. Scientific publication strategy shall be managed by the JSC, which shall consider Sangamo's and Kite's interest in publishing the results of its research in order to obtain recognition within the scientific community and to advance the state of scientific knowledge, the need to protect Confidential Information and the Parties' mutual interest in obtaining valid patent protection, protecting reasonable business interests and trade secret information and having an integrated approach to permit Kite to develop one or more Licensed Products in the Field. Each Party shall have the right to make publications in accordance with this Section 11.4; provided that any publication by [*] of any results obtained under this Agreement shall be subject to [*] prior written consent, such consent not to be unreasonably withheld. Either Party or its Affiliates shall

deliver to the other Party for review and comment a copy of any scientific proposed publication or presentation that pertains to the Licensed Product(s), pursuant to a procedure to be established by the JSC; provided further that [*] obligation to deliver, and [*] right to review and comment on, such publication or presentation, [*]. The reviewing Party shall have the right to require modifications of the publication or presentation: (a) to protect the Parties' Confidential Information; (b) for trade secret reasons or reasonable business reasons; and/or (c) to delay such submission for an additional period up to [*] days as may be reasonably necessary to seek patent protection for the information disclosed in such proposed submission. The Parties shall comply with traditional standards of authorship with respect to scientific publications.

11.5 Publicity; Use of Names.

(a) The Parties will mutually agree on language of a joint press release announcing this Agreement to be issued by the Parties promptly after the Execution Date. Subject to Section 11.3 above, no other public disclosure of the existence or the terms of this Agreement may be made by either Party or its Affiliates except as provided in this Section 11.5, and no Party shall use the name, trademark, trade name or logo of the other Party, its Affiliates or their respective employees in any publicity, promotion, news release or disclosure relating to this Agreement or its subject matter, except as provided in this Section 11.5, as may be required by applicable Law, or with the prior express written permission of the other Party.

(b) A Party may disclose this Agreement and its terms, in securities filings with the Securities Exchange Commission (the "**SEC**") or equivalent foreign agency to the extent required by applicable Law after complying with the procedure set forth in this Section 11.5(b). In such event, the Party seeking such disclosure shall prepare a draft confidential treatment request and proposed redacted version of this Agreement to request confidential treatment for the redacted portions of this Agreement, and the other Party agrees to promptly (and in any event, within [*] Business Days after receipt of such confidential treatment request and proposed redactions) give its input in a reasonable manner in order to allow the Party seeking disclosure to file its request within the time lines proscribed by applicable Law. The Party seeking such disclosure shall reasonably consider any comments thereto provided by the other Party within such [*] Business Day period, and shall use reasonable efforts to obtain confidential treatment of this Agreement from the SEC (or equivalent foreign agency) as represented by the redacted version revised by the other Party.

(c) Each Party acknowledges that the other Party may be legally required to make public disclosures (including in filings with the Governmental Authorities) of certain terms of or material developments or material information generated under this Agreement and agrees that each Party may make such disclosures as required by Law, provided that the Party seeking such disclosure first provides the other Party a copy of the proposed disclosure, and shall reasonably consider any comments thereto provided by the other Party within [*] Business Days after the receipt of such proposed disclosure or such shorter period required to comply with applicable Law.

(d) Other than the press release set forth in **Exhibit J**, the Parties agree that the portions of any other news release or other public announcement relating to this Agreement or the performance hereunder that would disclose information other than that already in the public domain,

shall first be reviewed and approved by both Parties within [*] Business Days after the receipt of such proposed disclosure, except as otherwise provided in Section 11.5(c). Notwithstanding the foregoing, (i) Kite and its Affiliates shall have the right to disclose publicly any information relating to the development, manufacture or commercialization of any Licensed Products hereunder that doesn't include Confidential Information of Sangamo; and (ii) Sangamo shall have the right to disclose publicly: (A) the receipt of any milestone payments under this Agreement (but not the amount); (B) the grant of Marketing Approval of any Licensed Product; (C) the First Commercial Sale of any Licensed Product; and (D) that royalties were received from Kite (without disclosing the amount, rate or Net Sales reported). For each such disclosure, Sangamo shall first provide Kite with a draft of such disclosure at least [*] Business Days prior to its intended release for review and comment, and shall consider Kite's comments in good faith. If Sangamo does not receive comments from Kite within [*] Business Days from Kite's receipt thereof, Sangamo shall have the right to make such disclosure without further delay.

(e) The Parties agree that after a disclosure pursuant to Section 11.5(a), (b), (c), or (d) has been reviewed and approved by the other Party, the disclosing Party may make subsequent public disclosures reiterating such information without having to obtain the other Party's prior consent and approval.

ARTICLE 12
[INTENTIONALLY OMITTED]

ARTICLE 13
TERM AND TERMINATION

13.1 Term. Except for the Parties' obligations under Article 11 and Article 14 of the Original Agreement (which commenced on the Execution Date), the Original Agreement commenced on the Effective Date, and the term of this Amendment and Restatement shall commence upon the Amendment Date and continue in full force and effect, on a Licensed Product-by-Licensed Product and country-by-country basis, until such time as the Royalty Term with respect to such Licensed Product expires in such country (the "**Term**"). In the event that there are no Candidate Targets remaining at the end of the Research Term, this Agreement shall expire in its entirety at the end of the Research Term.

13.2 Termination.

(a) Termination by Kite for Convenience. Kite may terminate this Agreement in its entirety or on a Candidate Target-by-Candidate Target basis (with respect to all Licensed Products for the applicable Candidate Target) or Licensed Product-by-Licensed Product basis by providing written notice of termination to Sangamo, which notice specifies the scope of the termination and includes an effective date of termination at least (i) [*] after the date of the notice if such notice is provided [*] or (ii) [*] after the date of the notice if such notice is provided [*]. If Kite terminates this Agreement pursuant to this Section 13.2(a) with respect to particular Candidate Targets or Licensed Products and subsequently terminates this Agreement pursuant to this Section 13.2(a) with respect to all remaining Candidate Targets or Licensed Products at any time after the end of the Research Term, then the Agreement shall terminate in its entirety upon the effective date

of such subsequent termination. If Kite terminates this Agreement pursuant to this Section 13.2(a) with respect to particular Licensed Products and subsequently terminates this Agreement pursuant to this Section 13.2(a) with respect to all remaining Licensed Products directed to the same Candidate Target(s) at any time after the end of the Research Term, then the Agreement shall terminate with respect to such Candidate Target(s) upon the effective date of such subsequent termination.

(b) Termination for Material Breach. If either Party believes that the other is in material breach of this Agreement, then the non-breaching Party may deliver notice of such breach to the other Party. For all material breaches other than a failure to make an undisputed payment as set forth in this Agreement by the applicable due date, the allegedly breaching Party shall have [*] from such notice to cure such breach. For any breach arising from a failure to make an undisputed payment set forth in this Agreement by the applicable due date, the allegedly breaching Party shall have [*] from the receipt of the notice to cure such breach. If the Party receiving notice of breach fails to cure such material breach within the applicable period set forth above, then the Party originally delivering the notice of breach may terminate this Agreement effective on written notice of termination to the other Party. During the pendency of any good faith dispute with respect to the existence or materiality of an alleged breach of this Agreement, all of the terms and conditions of this Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder and to use good faith efforts to promptly resolve such dispute in accordance with Sections 16.5 and 16.7.

(c) Termination for Bankruptcy. This Agreement may be terminated at any time during the Term by either Party upon the other Party's filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or upon an assignment of a substantial portion of the assets for the benefit of creditors by the other Party; *provided, however*, that in the case of any involuntary bankruptcy proceeding such right to terminate shall only become effective if the Party consents to the involuntary bankruptcy or such proceeding is not dismissed within ninety (90) days after the filing thereof.

13.3 Effect of Termination.

(a) Upon the termination of this Agreement for any reason, all rights and obligations of each Party hereunder will cease, except as otherwise expressly provided herein, including Section 13.3(b) below; provided that if such termination is by Kite pursuant to Section 13.2(a) with respect to one or more specified Candidate Targets or Licensed Products, then such rights and obligations shall cease solely with respect to such terminated Candidate Targets (and their applicable [*], Modified Cells, Universal Cell Lines and Licensed Product(s)) or such Licensed Products, as applicable, and, in the case of termination by Kite pursuant to Section 13.2(a) with respect to one or more specified Candidate Targets, with respect to activities occurring during the remainder of the Term of this Agreement, (i) each such terminated Candidate Target shall no longer be considered a Candidate Target or a Target, (ii) the Parties' exclusivity obligations under Section 2.4 shall no longer apply to such former Candidate Target, (iii) each Modified Cell or Universal Cell Line that recognizes such terminated Candidate Target shall no longer be considered a Modified Cell or Universal Cell Line, respectively, and (iv) products incorporating, using or administering such former Modified Cell shall no longer be considered Licensed Products.

(b) In the event Sangamo terminates this Agreement pursuant to Section 13.2(b) or 13.2(c), any sublicenses granted by Kite or its Affiliates to a Sublicensee shall, at the Sublicensee's request and subject to Sangamo's written consent (not to be unreasonably withheld), survive such termination, provided that the Sublicensee is not in material breach of any of its obligations under such sublicense. In order to effect this provision, at the request of the Sublicensee, Sangamo shall enter into a direct license with the Sublicensee on substantially the same terms as the sublicense, provided that Sangamo shall not be required to undertake obligations in addition to those required by this Agreement, and that Sangamo's rights under such direct license shall be consistent with its rights under this Agreement, taking into account the scope of the license granted under such direct license.

(c) Upon termination of this Agreement for any reason, each Party shall promptly return to the other Party or destroy, at the other Party's request, all Confidential Information of such other Party, except for any such Confidential Information to which such Party still has a license under this Agreement.

(d) Upon notice of any termination of a Research Plan, Sangamo shall wind-down any activities promptly and use all reasonable efforts to minimize costs and expenses. Kite shall reimburse Sangamo for those amounts incurred by Sangamo after the effective date of termination on account of those reasonable and documented non-cancelable commitments made by Sangamo prior to receipt of notice of termination pursuant to any JSC approved Research Plan for a Licensed Product for which this Agreement is terminated (or all Research Plans, if this Agreement is terminated in its entirety), provided that (i) Sangamo has used all reasonable efforts to minimize such amounts; and (ii) any such termination is not due to material breach of this Agreement by, or bankruptcy of, Sangamo.

13.4 Survival. Expiration or termination of this Agreement shall not relieve the Parties of any obligation accruing prior to such expiration or termination. Without limiting the foregoing, the provisions of Sections 2.3, 4.11(a), 6.3, 9.9, 9.10, 9.11, 9.12, 9.13, 10.1(a), 10.1(b), 10.2(b)(iii)(2) (solely with respect to the non-exclusive license), 10.2(c), 10.3(d), 10.3(e) (solely as it relates to Joint Patents), 10.4, 13.3, 13.4, 13.5, and 14.6 and Articles 11, 15, and 16 (but excluding Sections 16.16 and 16.19) shall survive the expiration or termination of this Agreement.

13.5 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 14
REPRESENTATIONS AND WARRANTIES

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

(a) Organization. Such Party is duly organized, validly existing and in good standing under the laws of the jurisdiction in which it is organized.

[*] = 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.

(b) Authorization and Enforcement of Obligations. 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 action on its part to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder. This Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, binding obligation, enforceable against such Party in accordance with its terms.

(c) Consents. Subject to compliance with the HSR Act, 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 have been obtained.

(d) No Conflict. 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 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.

14.2 Representations and Warranties by Sangamo. Sangamo represents and warrants to Kite as of the Execution Date that:

(a) it has the right to grant the licenses granted to Kite under Section 2.1;

(b) it (i) has not received any written notice from any Third Party asserting or alleging that the development of Sangamo Technology infringes or misappropriates the intellectual property rights of such Third Party; and (ii) to Sangamo's knowledge, it has not received any other notice from any Third Party asserting or alleging that the development of Sangamo Technology infringes or misappropriates the intellectual property rights of such Third Party;

(c) except [*], to Sangamo's knowledge as of the Execution Date, (i) [*] and [*], in each case, [*] as of the Execution Date, and (ii) [*], in each of (i) and (ii), will not infringe or misappropriate any intellectual property rights of any Third Party;

(d) except as set forth on Schedule 14.2(d), there are no judgments, orders, decrees, or settlements against or owed by Sangamo or any of its Affiliates, and, there is no written claim, written demand, suit, proceeding, arbitration, and to Sangamo's knowledge as of the Execution Date, other claim, demand, inquiry, investigation or other legal action of any nature, civil, criminal, regulatory or otherwise, pending or, to the knowledge of Sangamo, threatened against Sangamo or any of its Affiliates, in each case relating to the Sangamo Technology or the transactions contemplated by this Agreement;

(e) Sangamo is the sole and exclusive owner of the Sangamo Patents identified on **Exhibit C** as solely owned by Sangamo, all of which are free and clear of any claims, liens, charges or encumbrances other than licenses granted by Sangamo, which licenses do not conflict with the licenses granted to Kite under this Agreement;

[*] = 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.

(f) (i) **Exhibit C** sets forth a true and complete list of all Sangamo Patents Controlled by Sangamo or its Affiliates as of the Execution Date that constitute Sangamo Technology, (ii) except for expired provisional patent applications and PCT patent applications that have entered the national phase, each such Patent Right identified as owned by Sangamo (and, to Sangamo's knowledge as of the Execution Date, each such Patent Right that is otherwise Controlled by Sangamo), is in full force and effect, (iii) Sangamo or its Affiliates (or to Sangamo's knowledge as of the Execution Date, Existing Third Party Licensors) have timely paid, or caused the appropriate Third Parties to pay, all filing and renewal fees due prior to the Execution Date with respect to such Patent Rights; and (iv) Sangamo has complied with the duty of candor and duty of disclosure obligations in each jurisdiction with respect to the Sangamo Patents owned by Sangamo;

(g) to Sangamo's knowledge as of the Execution Date, (i) no Third Party is infringing any Sangamo Patents; or (ii) except as set forth on Schedule 14.2(g), no Third Party has challenged or threatened to challenge the inventorship, ownership, Sangamo's right to use, scope, validity or enforceability of, or Sangamo's or any Existing Third Party Licensor's rights in or to, any Sangamo Patents (including, by way of example, through the institution or written threat of institution of interference, derivation, post-grant review, opposition, nullity or similar invalidity proceedings before the United States Patent and Trademark Office or any analogous foreign Governmental Authority);

(h) Sangamo (i) (or, with respect to Sangamo Patents licensed under Existing Third Party Licenses, to Sangamo's knowledge as of the Execution Date, the applicable Existing Third Party Licensor), has obtained from each inventor of a Sangamo Patent, a valid and enforceable agreement assigning to Sangamo or such licensor such inventor's entire right, title and interest in and to all such Sangamo Patent; and (ii) has no knowledge as of the Execution Date of any Person who claims to be an inventor of an invention claimed in a Sangamo Patent and is not identified as an inventor of such invention in the filed patent documents for such Sangamo Patent that specify the identity of the inventors of such invention; and

(i) (i) there are no Existing Third Party Licenses other than those set forth on **Exhibit B**, and except to the extent set forth on **Exhibit D** or **D-1**, none of the Existing Third Party Licenses include any obligations that restrict or conflict with the practice of the licenses granted by Sangamo hereunder, (ii) true, correct and complete copies of each Existing Third Party License set forth on **Exhibit B** have been provided to Kite, except that certain financial terms or terms related to the issuance of Sangamo's securities, in each case which do not affect the rights or obligations of Kite, its Affiliates or Sublicensees under this Agreement, have been redacted, (iii) no Third Party has any right, title or interest in or to, or any license under, any Sangamo Technology owned by Sangamo or its Affiliates (solely, or with respect to Sangamo's or its Affiliate's interest in any jointly owned Patent Rights or Know-How) that conflicts with the rights granted to Kite hereunder, (iv) no rights granted by or to Sangamo or its Affiliates under any rights to Sangamo Technology obtained by Sangamo pursuant to an Existing Third Party License conflict with any right or license granted to Kite hereunder and (v) Sangamo and its Affiliates are, and to Sangamo's knowledge, each Existing Third Party Licensor is, in compliance in all material respects with all Existing Third Party Licenses.

[*] = 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.

14.3 Sangamo Covenants. Sangamo hereby covenants to Kite that, from the Execution Date until expiration or termination of this Agreement:

(a) Sangamo will not, and will cause its Affiliates not to (i) license, sell, or assign (other than in a connection with a permitted assignment of this Agreement by Sangamo pursuant to Section 16.2) or otherwise transfer to any Person (other than Kite, its Affiliates or Sublicensees pursuant to the terms of this Agreement) any Sangamo Technology, Joint Inventions, or Joint Patents (or agree to do any of the foregoing) in each case in a manner that is inconsistent with the licenses and other rights granted to Kite under this Agreement; or (ii) incur or permit to exist, with respect to any Sangamo Technology, Joint Patents, or Joint Inventions, any lien, encumbrance, charge, security interest, mortgage, liability, assignment, grant of license or other binding obligation in each case that is inconsistent with the licenses and other rights granted to Kite under this Agreement;

(b) Sangamo will not, without the consent of Kite (i) take any action with respect to any Third Party License (including amending, terminating or otherwise modifying) that diminishes the rights under the Sangamo Technology granted to Kite under this Agreement; or (b) fail to take any action with respect to a Third Party License that is reasonably necessary to avoid diminishing the rights under the Sangamo Technology granted to Kite under this Agreement;

(c) Sangamo (i) will not enter into any agreement with a Third Party that conflicts with (A) the rights granted to Kite, Kite's Affiliates, or Sublicensees hereunder, (B) Sangamo's ability to fully perform its obligations hereunder; (ii) will not enter into any agreements that impose additional obligations or liabilities on Kite, Kite's Affiliates, or Sublicensees except as permitted under Section 2.5(b); and (iii) will promptly furnish Kite with true, complete and correct copies of all (A) amendments to the Existing Third Party Licenses and (B) Third Party Licenses, in each case of (A) and (B), executed following the Execution Date which, in each case, may redact financial terms which do not affect the rights or obligations of Kite, its Affiliates or Sublicenses under this Agreement; and

(d) Sangamo will, upon Kite's reasonable request, (i) update the list of Sangamo Patents on **Exhibit C** to reflect any additional Patent Rights included within Sangamo Technology; and (ii) update the list of those Select Other Sangamo Patents on **Exhibit I**, to include any additional Other Sangamo Patents for which the Parties mutually agree Kite should have prosecution and maintenance rights.

14.4 Representation and Warranty by Kite. Kite represents and warrants to Sangamo as of the Execution Date that, to Kite's knowledge as of the Execution Date, [*].

14.5 Mutual Covenants.

(a) No Debarment. In the course of the research, development, manufacture and commercialization of the Licensed Products, neither Party nor 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 Affiliate's 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

[*] = 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.

or its Affiliates' or sublicensees' employees or consultants has been debarred or is the subject of debarment proceedings by any Regulatory Authority.

(b) Compliance. Each Party and its Affiliates shall comply in all material respects with all applicable Laws (including all anti-bribery laws) in the research, development, manufacture and commercialization of the Licensed Products and performance of its obligations under this Agreement.

14.6 No Other Warranties. EXCEPT AS EXPRESSLY STATED IN THIS AGREEMENT, (A) NO REPRESENTATION, CONDITION OR WARRANTY WHATSOEVER IS MADE OR GIVEN BY OR ON BEHALF OF KITE 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. WITHOUT EXCUSING EITHER PARTY'S PERFORMANCE OF ITS OBLIGATIONS UNDER THIS AGREEMENT, EACH PARTY HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY THAT THE RESEARCH, DEVELOPMENT, MANUFACTURE OR COMMERCIALIZATION OF ANY MODIFIED CELL OR LICENSED PRODUCT PURSUANT TO THIS AGREEMENT WILL BE SUCCESSFUL.

ARTICLE 15
INDEMNIFICATION; LIABILITY; INSURANCE

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

(a) the breach of any representation, warranty or covenant by Sangamo under this Agreement;

(b) the recklessness, negligence or intentional misconduct of any Sangamo Indemnitees or subcontractors; or

(c) any activities by or on behalf of Sangamo or its Affiliates under or in connection with the Research Program;

except, in each case, to the extent arising out of any activities set forth in Section 15.2 for which Kite is obligated to indemnify the Sangamo Indemnitees.

15.2 Indemnification by Kite. Kite shall indemnify, defend and hold harmless Sangamo and its Affiliates, 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:

(a) the breach of any representation, warranty or covenant by Kite under this Agreement;

(b) the recklessness, negligence or intentional misconduct of any Kite Indemnitees or subcontractors;

(c) any activities by or on behalf of Kite or its Affiliates under or in connection with the Research Program; or

(d) the development, manufacture, sale, or other commercialization of any Licensed Products by or on behalf of Kite, its Affiliates or Sublicensees;

except, in each case, to the extent arising out of any activities set forth in Section 15.1 for which Sangamo is obligated to indemnify the Kite Indemnitees.

15.3 Indemnification Procedure.

(a) Notification. If either Party is seeking indemnification under Section 15.1 or 15.2 (the **"Indemnified Party"**), it shall 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 will relieve the Indemnifying Party from any obligation hereunder unless (and then only to the extent that) the Indemnifying Party is prejudiced thereby.

(b) Control. The Indemnifying Party shall have the right, exercisable by notice to the Indemnified Party within thirty (30) 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. 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 thirty (30) days after notice thereof, the Indemnified Party may (with notice to the Indemnifying Party) undertake 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.

(c) Settlement. Neither Party shall have the obligation to indemnify the other Party in connection with any settlement made without the Indemnifying Party's written consent, which consent shall not be unreasonably withheld or delayed. If the Parties cannot agree as to the

application of Section 15.1 or 15.2 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 15.1 or 15.2 upon resolution of the underlying claim.

15.4 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 15. 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.

15.5 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 15.5 IS INTENDED TO OR SHALL LIMIT OR RESTRICT THE (A) INDEMNIFICATION RIGHTS OR OBLIGATIONS OF ANY PARTY UNDER SECTION 15.1 OR 15.2, OR (B) DAMAGES AVAILABLE FOR A PARTY'S BREACH OF ITS CONFIDENTIALITY OBLIGATIONS IN ARTICLE 11 OR INTELLECTUAL PROPERTY OBLIGATIONS IN ARTICLE 10; OR (C) DAMAGES AVAILABLE FOR A PARTY'S GROSS NEGLIGENCE, INTENTIONAL MISCONDUCT OR FRAUD.

15.6 Insurance. Each Party shall procure and maintain, during the Term, (a) commercial general liability insurance, with limits of not less than [*]; (b) workers' compensation insurance in compliance with local state/jurisdiction requirements in which the work is to be performed; (c) employer's liability insurance in amounts not less than [*]; and (d) automobile liability insurance for bodily injury, property damage and automobile contractual liability covering all hired autos with a combined single limit of liability for each accident of not less than [*]. Carriers shall be rated by AM Best A-VII (or equivalent) or better. All general liability policies shall name the other Party, its officers, directors, employees and volunteers, as additional insureds (it being understood that a blanket additional insured endorsement will meet this obligation). Each Party shall provide the other Party with evidence of such insurance by furnishing a certificate of insurance upon request and shall provide the other Party with written notice in accordance with the applicable policy provisions of any cancellation, non-renewal or material changes in such insurance. Insurance coverage shall be on an occurrence form, and if any such coverage is on a claims made form, then coverage must be maintained for at least [*] years following the expiration or earlier termination of the Agreement. Where permitted by law, workers' compensation insurance shall contain a waiver of the insurer's subrogation rights against the other Party. Neither Party's insurance will be construed to create a limit of liability with respect to its indemnification obligations under this Article 15.

ARTICLE 16
GENERAL PROVISIONS

16.1 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

[*] = 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.

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, 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, or unavailability of materials related to the manufacture of the Licensed Products or components thereof. 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 cure such force majeure circumstances or to perform its obligations in spite of the ongoing circumstances.

16.2 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, either Party may, without consent of the other Party, assign this Agreement and its rights and obligations hereunder in whole or in part to an Affiliate of such Party, or in whole to its successor in interest in connection with the sale of all or substantially all of its stock or its assets to which this Agreement relates, or in connection with a merger, acquisition or similar transaction. In addition, Kite may, without the consent of Sangamo, assign its rights and obligations under this Agreement to a Third Party, where Kite or its Affiliate is required, or makes a good faith determination based on advice of counsel, to divest a Licensed Product in order to comply with Law or the order of any Governmental Authority as a result of a merger or acquisition or similar transaction. Any attempted assignment not in accordance with this Section 16.2 shall be null and void and of no legal effect. Any permitted assignee shall assume all assigned obligations of its assignor under this Agreement. 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.

16.3 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 all 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.

16.4 Notices. All notices which are required or permitted hereunder shall be in writing and sufficient if delivered personally, sent by facsimile (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.
501 Canal Blvd.
Richmond, CA 94804
Attn: General Counsel
Fax: (510) 236-8951

with copies to:

Sangamo Therapeutics, Inc.
501 Canal Blvd.
Richmond, CA 94804
Attn: Chief Financial Officer
Fax: (510) 236-8951

Cooley LLP
3175 Hanover Street
Palo Alto, CA 94304
Attn: Marya Postner, Ph.D.
Fax: (650) 849-7400

If to Kite:

Kite Pharma, Inc.
2400 Broadway
Santa Monica, CA 90404
Attn: Head of Legal
Fax: [*]

with a copy to:

Gilead Sciences, Inc.
333 Lakeside Drive
Foster City, CA 94404
Attn: General Counsel
Fax: [*]

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) on the Business Day when delivered if personally delivered or sent by facsimile 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; or (c) on the fifth (5th) Business Day following the date of mailing, if sent by mail.

16.5 Dispute Resolution. The Parties recognize that disputes as to certain matters may from time to time arise that relate to either Party's rights and/or obligations hereunder, including the interpretation, alleged breach, enforcement, termination or validity of this Agreement (a "**Dispute**"). For clarity, Dispute shall not include matters within the JSC's authority, which are

resolved under Section 3.4. 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 thirty (30) days after such Dispute is first identified by either Party in writing to the other, the Parties shall refer such Dispute to the Executive Officers of the Parties for attempted resolution by good faith negotiations within thirty (30) days after such notice is received. If the Executive Officers are not able to resolve such Dispute within thirty (30) days, then either Party shall be entitled to all available remedies, subject to Section 16.7. Notwithstanding the foregoing, and without waiting for the expiration of the time periods set forth above, each Party have the right to apply to any court of competent jurisdiction for appropriate interim or provisional relief, as necessary to protect its rights or property.

16.6 Governing Law. This Agreement shall be governed by and construed in accordance with the laws of [*], 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.

16.7 Jurisdiction. The Parties hereby irrevocably submit to the exclusive jurisdiction of the courts of [*] and [*], in respect of the interpretation and enforcement of the provisions of this Agreement and of the documents referred to herein, and in respect of the transactions hereby, and hereby waive, and agree not to assert, as a defense in any action, suit or proceeding for the interpretation or enforcement hereof or thereof, that it is not subject thereto or that such action, suit or proceeding may not be brought or is not maintainable in said courts or that the venue thereof may not be appropriate or that this Agreement or any such document may not be enforced in or by such courts, and the Parties irrevocably agree that all claims with respect to such action or proceeding shall be heard and determined in such a [*] court. The Parties hereby consent to and grant any such court jurisdiction over the person of such parties and over the subject matter of such dispute and agree that mailing of process or other papers in connection with any such action or proceeding in the manner provided in Section 16.4 or in such other manner as may be permitted by applicable Law, shall be valid and sufficient service thereof. With respect to any particular action, suit or proceeding, venue shall lie solely in [*]. A Party hereto may apply either to a court of competent jurisdiction or to an arbitrator, if one has been appointed, for prejudgment remedies and emergency relief pending final determination of a claim pursuant to this Section 16.7.

16.8 Entire Agreement; Amendments. This Agreement, together with the Exhibits hereto, contains the entire understanding of the Parties with respect to the subject matter hereof, and 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; provided, that, for clarity, the Original Agreement shall govern the Parties' respective rights and obligations with respect to the subject matter of this Agreement prior to the Amendment Date and this Amendment and Restatement shall govern the Parties' respective rights and obligations with respect to the subject matter of this Agreement from and after the Amendment Date. The Exhibits 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, effective as of the Execution Date, that certain Mutual Confidentiality Agreement

between the Parties dated as of [*] and that certain Mutual Confidential Disclosure Agreement between Kite's Affiliate, Gilead Sciences, Inc., and Sangamo, dated as of [*] (collectively, the "**Confidentiality Agreement**") were terminated by the Original Agreement, and that disclosures made prior to the Execution Date pursuant to the Confidentiality Agreements shall be deemed to be Confidential Information and shall be subject to the confidentiality and non-use provisions of this Agreement.

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

16.10 Independent Contractors. It is expressly agreed that Sangamo and Kite shall be independent contractors and that the relationship between the two Parties shall not constitute a partnership, joint venture or agency. Neither Sangamo nor Kite 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.

16.11 Waiver. No provision of this Agreement will be waived by any act, omission or knowledge of a Party, its Affiliates or their respective 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 hereto 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.

16.12 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.

16.13 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.

16.14 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.

16.15 Translations. This Agreement is in the English language only, which language shall be controlling in all respects, and all versions hereof in any other language shall be for accommodation only and shall not be binding upon the Parties. All communications and notices to be made or given pursuant to this Agreement, and any dispute proceeding related to or arising hereunder, shall be in the English language. If there is a discrepancy between any translation of this Agreement and this Agreement, this Agreement shall prevail.

[*] = 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.

16.16 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.

16.17 Counterparts. This Agreement may be executed in two or more counterparts by original signature, facsimile or PDF files, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

16.18 Guarantee by Gilead. In consideration of the rights granted to Kite hereunder, Gilead hereby unconditionally and irrevocably guarantees to Sangamo the full payment and performance, as and when due hereunder, of all obligations of Kite under this Agreement. This guarantee shall be enforceable upon the failure by Kite to pay or perform any obligation it may have under this Agreement in accordance with its terms, and shall be effective regardless of the solvency or insolvency of Kite at any time, or the subsequent reorganization, merger, consolidation or other restructuring of Kite. Gilead hereby expressly waives any requirement that Sangamo exhaust any right, power or remedy under this Agreement, or proceed against Kite under this Agreement, for any obligation or performance hereunder prior to proceeding directly against Gilead under this Section 16.18. For clarity, this provision shall apply for so long as Kite is a Party to this Agreement, and shall otherwise terminate upon any permitted assignment under Section 16.2 to a Third Party.

16.19 Bankruptcy. All rights and licenses granted under or pursuant to this Agreement by a Party are, and shall otherwise be deemed to be, for purposes of Section 365(n) of the U.S. Bankruptcy Code, licenses of rights to "intellectual property" as defined under Section 101 of the U.S. Bankruptcy Code. The Parties agree that each Party, as licensee of intellectual property under this Agreement, shall retain and may fully exercise all of its rights and elections under the U.S. Bankruptcy Code. The Parties further agree that in the event of a rejection of this Agreement by a Party in any bankruptcy proceeding by or against such Party under the U.S. Bankruptcy Code, (i) the other Party shall be entitled to a complete duplicate of (or complete access to, as appropriate) any such intellectual property and all embodiments of such intellectual property that are necessary for the other Party to practice its license to such intellectual property, which, if not already in such other Party's possession, shall be promptly delivered to it upon its written request therefor, and (ii) such Party shall not interfere with the other Party's rights to such intellectual property, and shall assist and not interfere with such other Party in obtaining such intellectual property and such embodiments of such intellectual property from another entity. The term "embodiments" of intellectual property means all tangible embodiments of the intellectual property licensed hereunder to the extent of the license scope, and shall exclude, without limitation, all inventory of Licensed Products and filings with Regulatory Authorities. All rights, powers and remedies provided in this Section 16.19 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 the Bankruptcy Code) in the event of the commencement of a case under the U.S. Bankruptcy Code.

<REMAINDER OF PAGE INTENTIONALLY LEFT BLANK>

[*] = 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 Parties and Gilead intending to be bound have caused this Amended and Restated Collaboration and License Agreement to be executed by their duly authorized representatives as of the Amendment Date.

Sangamo Therapeutics, Inc.	**Kite Pharma, Inc.**
By:__	By:__
Name:__	Name:__
Title:__	Title:__

Solely for purposes of Section 16.18:

Gilead Sciences, Inc.

By:__

Name:__

Title:__

[*] = 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.

LIST OF EXHIBITS

Schedules

Exhibit A

Excluded Third Party Licenses

[*]

[*] = 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 B

Existing Third Party Licenses

[*]

[*] = 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 C

Sangamo Patents as of the Effective Date

Ref. number	Assignee(s)	Country	Status	Title	Application	Filing Date	Publication number	Patent number
[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]
(19 pages omitted)								

[*] = 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 D

Certain Terms of Third Party Licenses

Capitalized terms used in this Exhibit D but not defined herein or elsewhere in the Agreement shall have the meanings ascribed to them in the applicable Third Party License.

[*] (6 pages omitted)

[*] = 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 D-1

Copy of Provisions from [*] (2 pages omitted)

[*] = 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 E

Research Plans

[*] (18 pages omitted)

Exhibit F

Material GMP Supply Terms

[*]

[*] = 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 G

Form of Development Report

In accordance with Section 5.5 of the Amended and Restated Collaboration and License Agreement between Kite Pharma, Inc. and Sangamo Therapeutics, Inc., dated [__], 2019, we are hereby providing you with the [*] Development Report detailing the progress and results of the clinical development activities undertaken by or on behalf of Kite, its Affiliates and Sublicensees to further the development of Licensed Products.

LICENSED PRODUCT 1 [INSERT CANDIDATE TARGET AND PRODUCT TYPE, e.g. "[*] LICENSED PRODUCT"]

Overall

- Summary of development activities

Clinical

- Material safety-related development results
- To the extent published: clinical outcomes, safety/toxicities, and clinical pharmacokinetics.
- Additional studies for which there are approved budgets and which are planned for initiation in the next year: summary of study designs, primary and secondary endpoints, duration and other relevant study considerations if these are available.

Regulatory

- Summary of regulatory authority submissions

LICENSED PRODUCT 2 [INSERT CANDIDATE TARGET AND PRODUCT TYPE]

Exhibit H

Form of Commercialization Report

In accordance with Section 8.3 of the Amended and Restated Collaboration and License Agreement between Kite Pharma, Inc. and Sangamo Therapeutics, Inc., dated [__], 2019, we are hereby providing you with the [*] Commercialization Report detailing the progress and results of the activities undertaken by or on behalf of Kite, its Affiliates and Sublicensees to support the commercialization of Licensed Products.

LICENSED PRODUCT 1 [INSERT CANDIDATE TARGET AND PRODUCT TYPE, e.g. "[*] LICENSED PRODUCT"]

Overall

- Summary of commercialization activities
- High-level description of commercialization strategy and key objectives

Pre-Launch (for Major Market Countries)

- List of countries anticipated for commercial activity in the Major Market Countries
- Target Population
  - Anticipated on-label indication(s)
- Timing
  - Anticipated date of approval

Post-Launch for Major Market Countries)

- High level commercialization timeline.
- Launch status for Major Market Countries

LICENSED PRODUCT 2 [INSERT CANDIDATE TARGET AND PRODUCT TYPE]

Exhibit I

Select Other Sangamo Patents as of the Effective Date

Ref. number	Assignee(s)	Country	Status	Title	Application	Filing Date	Publication number	Patent number
[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]

Exhibit J

Base Patent Jurisdictions

[*]

[*] = 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.

Disclosures

Schedule 14.2(d)

[*]

Schedule 14.2(g)

[*]

[*] = 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 31.1

CERTIFICATION

I, Alexander D. Macrae, 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 6, 2019

/s/ ALEXANDER D. MACRAE

Alexander D. Macrae

President and Chief Executive Officer

(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Sung 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 6, 2019

/s/ SUNG LEE

Sung 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, 2019, 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

President and Chief Executive Officer

(Principal Executive Officer)

Date: November 6, 2019

/s/ SUNG LEE

Sung Lee

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

Date: November 6, 2019

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.