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

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**FORM 10-Q**

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(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, 2018

OR

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

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission File Number: 001-38052

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**TOCAGEN INC.**

(Exact name of registrant as specified in its charter)

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**Delaware**  
(State or other jurisdiction of  
incorporation or organization)

**4242 Campus Point Court, Suite 500, San Diego, CA**  
(Address of principal executive offices)

**26 - 1243872**  
(I.R.S. Employer  
Identification Number)

**92121**  
(Zip Code)

**Registrant's telephone number, including area code: (858) 412-8400**

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company filer	<input checked="" type="checkbox"/>
Emerging growth company	<input checked="" type="checkbox"/>		

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

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

As of November 2, 2018, the registrant had 19,953,281 shares of common stock, par value \$0.001 per share, outstanding.

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PART I - FINANCIAL INFORMATION

Item 1. Financial Statements.

TOCAGEN INC.  
CONDENSED BALANCE SHEETS  
(in thousands, except share and par value data)

	September 30, 2018 (unaudited)	December 31, 2017
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 23,482	\$ 35,933
Marketable securities	56,367	52,792
Prepaid expenses and other current assets	5,234	1,904
Total current assets	85,083	90,629
Property and equipment, net	4,033	1,217
Other assets	1,237	227
Total assets	<u>\$ 90,353</u>	<u>\$ 92,073</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 4,555	\$ 1,951
Accrued liabilities	10,003	8,120
Notes payable, current portion	—	7,200
Deferred license revenue	36	36
Deferred grant funding	—	23
Total current liabilities	14,594	17,330
Notes payable, net of current portion	26,056	3,625
Deferred license revenue, net of current portion	9	36
Deferred rent, net of current portion	2,027	—
Total liabilities	<u>42,686</u>	<u>20,991</u>
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, \$0.001 par value; 10,000,000 shares authorized at September 30, 2018 and December 31, 2017; no shares issued or outstanding at September 30, 2018 and December 31, 2017	—	—
Common stock, \$0.001 par value; 200,000,000 shares authorized at September 30, 2018 and December 31, 2017; 19,953,009 and 19,882,551 shares issued and outstanding at September 30, 2018 and December 31, 2017, respectively	20	20
Additional paid-in capital	243,951	238,025
Accumulated deficit	(196,281)	(166,929)
Accumulated other comprehensive loss	(23)	(34)
Total stockholders' equity	<u>47,667</u>	<u>71,082</u>
Total liabilities and stockholders' equity	<u>\$ 90,353</u>	<u>\$ 92,073</u>

See accompanying notes to these unaudited condensed financial statements.

**TOCAGEN INC.**  
**CONDENSED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS**  
(in thousands, except share and per share data)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
	(unaudited)		(unaudited)	
License revenue	\$ 18,009	\$ 10	\$ 18,027	\$ 31
Operating expenses				
Research and development	12,262	7,563	35,461	20,819
General and administrative	4,320	2,184	9,311	6,153
Total operating expenses	16,582	9,747	44,772	26,972
Income (loss) from operations	1,427	(9,737)	(26,745)	(26,941)
Other income (expense), net				
Interest income	441	214	1,087	354
Interest expense	(742)	(430)	(2,184)	(1,541)
Change in fair value of preferred stock warrants	—	—	—	37
Income (loss) before income taxes	1,126	(9,953)	(27,842)	(28,091)
Income tax expense	(1,509)	—	(1,510)	(1)
Net loss	\$ (383)	\$ (9,953)	\$ (29,352)	\$ (28,092)
Other comprehensive loss:				
Net unrealized gain (loss) on investments	31	4	11	(3)
Comprehensive loss	\$ (352)	\$ (9,949)	\$ (29,341)	\$ (28,095)
Net loss per common share, basic and diluted	\$ (0.02)	\$ (0.50)	\$ (1.47)	\$ (2.19)
Weighted-average number of common shares outstanding, basic and diluted	19,951,262	19,809,449	19,926,662	12,847,206

See accompanying notes to these unaudited condensed financial statements.

**TOCAGEN INC.**  
**CONDENSED STATEMENTS OF CASH FLOWS**  
(in thousands)

	Nine Months Ended September 30,	
	2018	2017
	(unaudited)	
<b>OPERATING ACTIVITIES</b>		
Net loss	\$ (29,352)	\$ (28,092)
Adjustments to reconcile net loss to net cash used in operating activities		
Stock-based compensation	5,120	3,076
Depreciation	421	196
Noncash interest expense	1,016	441
Change in fair value of preferred stock warrants	—	(37)
Amortization of discount on investments, net	(114)	(6)
Changes in operating assets and liabilities:		
Prepaid expenses and other assets	(3,780)	(100)
Accounts payable	2,367	(500)
Accrued liabilities	1,062	3,103
Deferred license revenue	(27)	(31)
Deferred rent	784	—
Deferred grant funding	(23)	(11)
Net cash used in operating activities	<u>(22,526)</u>	<u>(21,961)</u>
<b>INVESTING ACTIVITIES</b>		
Proceeds from the sale/maturity of marketable securities	49,186	32,651
Purchases of marketable securities	(52,636)	(31,644)
Purchases of property and equipment	(1,496)	(337)
Proceeds from sale of property and equipment	—	20
Net cash used in (provided by) investing activities	<u>(4,946)</u>	<u>690</u>
<b>FINANCING ACTIVITIES</b>		
Proceeds from issuance of notes payable, net of issuance costs	26,325	—
Cash paid on extinguishment of debt	(8,631)	—
Principal payments on notes payable	(3,000)	(5,400)
Proceeds from issuance of common stock	327	47
Proceeds from offering of common stock, net of issuance costs	—	88,618
Proceeds from issuance of convertible promissory notes, net of issuance costs	—	7,338
Net cash provided by financing activities	<u>15,021</u>	<u>90,603</u>
Net (decrease) increase in cash and cash equivalents	<u>(12,451)</u>	<u>69,332</u>
Cash and cash equivalents, beginning of period	35,933	5,510
Cash and cash equivalents, end of period	<u>\$ 23,482</u>	<u>\$ 74,842</u>
<b>NONCASH INVESTING AND FINANCING ACTIVITIES</b>		
Allowance for tenant improvements included in deferred rent	\$ 1,243	\$ —
Property and equipment purchases included in accounts payable and accrued liabilities	\$ 506	\$ 161
Fair value of common stock warrants issued in connection with notes payable	\$ 479	\$ —
Convertible preferred stock converted into shares of common stock	\$ —	\$ 131,410
Convertible promissory notes principal and accrued interest converted into shares of common stock	\$ —	\$ 11,092
Preferred stock warrant liabilities converted into warrants to purchase shares of common stock	\$ —	\$ 89
Deferred equity issuance costs paid in previous periods reclassified to equity on effective date of initial public offering	\$ —	\$ 1,574
Deferred debt and equity issuance costs in accounts payable and accrued liabilities	\$ —	\$ 96

See accompanying notes to these unaudited condensed financial statements.

**TOCAGEN INC.**  
**NOTES TO UNAUDITED CONDENSED FINANCIAL STATEMENTS**

**1. Organization and Basis of Presentation**

Tocagen Inc. (Tocagen or the Company) is a clinical-stage, cancer-selective gene therapy company focused on developing first-in-class, broadly-applicable product candidates designed to activate a patient's immune system against their own cancer. The Company's cancer-selective gene therapy platform is built on retroviral replicating vectors which are designed to selectively deliver therapeutic genes into the DNA of cancer cells. Tocagen's gene therapy approach is designed to fight cancer through immunotherapeutic mechanisms of action without the autoimmune toxicities commonly experienced with other immunotherapies. The Company views its operations and manages its business in one operating segment.

From inception through September 30, 2018, the Company has devoted substantially all of its efforts to developing its gene therapy platform and its lead product candidate, Toca 511 & Toca FC, as well as raising capital and building its infrastructure. The Company has not generated revenues from its principal operations.

The accompanying unaudited condensed financial statements have been prepared in accordance with U.S. generally accepted accounting principles (GAAP) for interim financial information and the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, these financial statements do not include all of the information and footnotes required by GAAP for complete financial statements. In management's opinion, the accompanying financial statements reflect all adjustments, consisting of normal recurring adjustments, considered necessary for a fair presentation of the results for the interim periods presented. Interim financial results are not necessarily indicative of results anticipated for the full year. These unaudited financial statements should be read in conjunction with the audited financial statements and footnotes included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017, from which the balance sheet information herein was derived.

***Initial Public Offering***

On April 19, 2017, the Company completed its initial public offering (IPO), whereby the Company sold an aggregate of 9,775,000 shares of its common stock, at \$10.00 per share, resulting in net proceeds of \$86.9 million after underwriting discounts, commissions and offering costs of \$10.8 million, of which \$9.1 million of the costs were paid during the nine months ended September 30, 2017.

In addition, in connection with the IPO, all of the Company's outstanding shares of convertible preferred stock were converted into an aggregate of 6,690,066 shares of the Company's common stock, warrants to purchase up to 68,572 shares of the Company's Series H convertible preferred stock were converted into warrants to purchase up to 9,936 shares of the Company's common stock, each at an exercise price of \$36.23 per share, and \$11.1 million of aggregate principal and accrued interest underlying convertible promissory notes were automatically converted into an aggregate of 1,109,176 shares of the Company's common stock at the IPO price of \$10.00 per share.

***Liquidity***

The Company has a limited operating history and the sales and income potential of the Company's business and patient markets are unproven. The Company has experienced net losses and negative cash flows from operating activities since its inception. As of September 30, 2018, the Company had an accumulated deficit of \$196.3 million and working capital of \$70.5 million available to fund future operations. As the Company continues to incur net losses, its transition to profitability is dependent upon the successful development, approval, and commercialization of its product candidates and achieving a level of revenues adequate to support the Company's cost structure. The Company may never achieve profitability, and unless and until it does, the Company will continue to need to raise additional capital. The Company plans to continue to fund its losses from operations and capital funding needs through debt and equity financing, or through collaborations or partnerships with other entities. Debt or equity financing, or collaborations and partnerships with other entities may not be available on a timely basis on terms acceptable to the Company, or at all.

As of September 30, 2018, the Company had cash, cash equivalents and marketable securities of \$79.8 million. The Company has evaluated and concluded that there are no conditions or events, considered individually or in the aggregate, that raises substantial doubt about its ability to continue as a going concern for a period of one year following the date that these financial statements are issued.

***Use of Estimates***

The Company's financial statements are prepared in accordance with GAAP, which requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses and the disclosure of contingent assets and

liabilities in the financial statements and accompanying notes. Significant estimates in the Company's financial statements relate to clinical trial accruals, the valuation of equity awards, and the development period used for license revenue recognition. Estimates are periodically reviewed in light of changes in circumstances, facts and experience. Actual results may differ from these estimates under different assumptions or conditions.

## 2. Summary of Significant Accounting Policies

### *Clinical Trial Accruals*

Expenses related to clinical studies are based on estimates of the services received and efforts expended pursuant to the Company's contract arrangements. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to the Company's service providers will temporarily exceed the level of services provided and result in a prepayment of the clinical expense. Payments under some of these contracts depend on factors such as the successful enrollment of patients, site initiation and the completion of clinical milestones. The Company makes estimates of its accrued expenses as of each balance sheet date in its financial statements based on facts and circumstances known at that time. In accruing service fees, the Company estimates the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from its estimate, the Company adjusts the accrual or prepaid expense balance accordingly. Historically, the Company's estimated accrued liabilities have materially approximated actual expense incurred.

### *Revenue Recognition*

On January 1, 2018, the Company adopted Accounting Standards Update (ASU) 2014-09, *Revenue from Contract with Customers (Topic 606)*, using the modified retrospective transition method. There was no impact to opening retained earnings or revenue as of January 1, 2018 related to the adoption of Topic 606. Revenue generally consists of license revenue with upfront payments and development milestones considered probable of achievement.

Revenue is recognized when control of the promised goods or services is transferred to the Company's customers in an amount that reflects the consideration the Company expects to receive from its customers in exchange for those goods and services. This process involves identifying the contract with a customer, determining the performance obligations in the contract, determining the transaction price, allocating the contract price to the distinct performance obligations in the contract, and recognizing revenue when or as the Company satisfies the performance obligation(s).

At contract inception, the Company assesses the goods and services promised within each contract and assesses whether each promised good or service is distinct and determines that those are performance obligations. A performance obligation is considered distinct from other obligations in a contract when it provides a benefit to the customer either on its own or together with other resources that are readily available to the customer and is separately identified in the contract. The Company considers factors such as the research, manufacturing and commercialization capabilities of the collaboration partner and the availability of the associated expertise in the general marketplace. The Company considers a performance obligation satisfied once the Company has transferred control of a good or service to the customer, meaning the customer has the ability to use and obtain the benefit of the good or service. The Company recognizes revenue for satisfied performance obligations only when the Company determines there are no uncertainties regarding payment terms or transfer of control.

### *Collaborative Arrangements*

The Company enters into collaborative arrangements with partners that may include payment to the Company of one or more of the following: (i) license fees; (ii) payments related to the achievement of developmental, regulatory, or commercial milestones; and (iii) royalties on net sales of licensed products. Where a portion of non-refundable upfront fees or other payments received are allocated to continuing performance obligations under the terms of a collaborative arrangement, they are recorded as contract liabilities and recognized as revenue when (or as) the underlying performance obligation is satisfied.

As part of the accounting for these arrangements, the Company must develop estimates and assumptions that require judgment to determine the underlying stand-alone selling price for each performance obligation which determines how the transaction price is allocated among the performance obligation(s). The stand-alone selling price may include items such as forecasted revenues, development timelines, discount rates, and probabilities of technical and regulatory success. The Company evaluates each performance obligation to determine if it can be satisfied at a point in time or over time. In addition, variable consideration must be evaluated to determine if it is constrained and, therefore, excluded from the transaction price.

### *License Fees*

If a license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenues from non-refundable, upfront fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license. For licenses that are bundled with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license, collaboration or other revenues and earnings in the period of adjustment.

### *Milestone Payments*

At the inception of each arrangement that includes milestone payments (variable consideration), the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price. If it is probable that a milestone event would occur at the inception of the arrangement, the associated milestone value is included in the transaction price. Milestone payments that are not within the Company's control, such as regulatory approvals, are generally not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each reporting period, the Company evaluates the probability of achievement of such milestones and any related constraint(s), and if necessary, may adjust the Company's estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license, collaboration or other revenues and earnings in the period of adjustment.

### *Royalties*

For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and for which the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from its collaborative arrangements.

### ***Stock-Based Compensation***

Stock-based compensation expense represents the cost of the grant date fair value of stock awards, including stock options and stock purchase rights, granted to employees and members of the Company's board of directors. For awards with time-based vesting provisions, the Company estimates the fair value of stock options on the date of grant using the Black-Scholes option pricing model and recognizes the expense over the requisite service period of the awards, which is generally the vesting period, on a straight-line basis. For awards with performance-based vesting provisions, the Company estimates the fair value of stock option grants on the date of grant, or the date when all of the terms of the grant have been agreed to, if later, and recognizes the expense based on the probability of the occurrence of the individual milestones at each reporting period. The expense is recognized over the implicit service period that commences once management believes the performance criteria are probable of being met. For purchase rights, the Company estimates the fair value of the purchase as of the plan enrollment date and recognizes expense on a straight-line basis over the applicable offering period. The Company accounts for forfeitures when they occur, and reverses any compensation cost previously recognized for awards for which the requisite service has not been completed, in the period that the award is forfeited.

The Company accounts for stock options granted to non-employees using the Black-Scholes option pricing model with assumptions generally consistent with those used for employee stock options, with the exception of expected term, which is over the contractual life. These option grants are subject to periodic revaluation over their vesting term.

### ***Net Loss Per Share***

Basic and diluted net loss per common share for the periods presented is computed by dividing net loss by the weighted-average number of common shares outstanding during the respective periods, without consideration of common stock equivalents as they are anti-dilutive. Common stock equivalents that could potentially dilute earnings in the future are comprised of options to purchase shares of common stock outstanding under the Company's equity incentive plan and warrants for the purchase of shares of common stock. For all periods presented, there is no difference in the number of shares used to calculate basic and diluted shares outstanding due to the Company's net loss position.



Common stock equivalents from potentially dilutive securities that are not included in the calculation of diluted net loss per share, because to do so would be anti-dilutive, are as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Common stock options	3,637,502	2,636,060	3,637,502	2,636,060
Common stock warrants	67,238	10,660	67,238	10,660
Total	3,704,740	2,646,720	3,704,740	2,646,720

### Recently Issued Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board (FASB) issued ASU 2016-02, *Leases (Topic 842)*. The new standard amends the existing accounting standards for leases. Under the new standard, lessees will be required to recognize for all leases, with the exception of short-term leases, a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis and a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. The new standard is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company is still in the process of evaluating the effect of adoption on its financial statements and expects to adopt the standard on January 1, 2019. The adoption will lead to an increase in the assets and liabilities recorded on the balance sheets primarily due to the lease agreement attributable to leased laboratory and office space.

In June 2018, the FASB issued ASU 2018-07, *Compensation- Stock Compensation (Topic 718), Improvements to Nonemployee Share-Based Payment Accounting*. This new standard is intended to simplify aspects of share-based compensation issued to non-employees by aligning the accounting for share-based payment awards issued to employees and non-employees as it relates to the measurement date and impact of performance conditions. The new standard will become effective January 1, 2019 and is not expected to have a material impact to the overall financial statements of the Company.

### 3. Fair Value of Financial Instruments

#### Fair Values of Assets Measured on a Recurring Basis

The following tables summarize the Company's assets that require fair value measurements on a recurring basis and their respective input levels based on the fair value hierarchy (in thousands):

	Total	Fair Value Measurements at End of Period Using:		
		Quoted Market Prices for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
<b>September 30, 2018</b>				
Cash equivalents:				
Commercial paper	\$ 999	\$ —	\$ 999	\$ —
Asset-backed securities	1,200	—	1,200	—
Corporate debt securities	1,250	—	1,250	—
	<u>\$ 3,449</u>	<u>\$ —</u>	<u>\$ 3,449</u>	<u>\$ —</u>
Marketable securities:				
Corporate debt securities	\$ 18,218	\$ —	\$ 18,218	\$ —
Commercial paper	24,893	—	24,893	—
Asset-backed securities	11,263	—	11,263	—
U.S. treasury securities	1,993	1,993	—	—
	<u>\$ 56,367</u>	<u>\$ 1,993</u>	<u>\$ 54,374</u>	<u>\$ —</u>

	Total	Fair Value Measurements at End of Period Using:		
		Quoted Market Prices for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
<b>December 31, 2017</b>				
Cash equivalents:				
Corporate debt securities	\$ 8,274	\$ —	\$ 8,274	\$ —
Repurchase agreements	5,000	—	5,000	—
	<u>\$ 13,274</u>	<u>\$ —</u>	<u>\$ 13,274</u>	<u>\$ —</u>
Marketable securities:				
Corporate debt securities	\$ 24,713	\$ —	\$ 24,713	\$ —
Certificates of deposit	13,651	—	13,651	—
Commercial paper	12,329	—	12,329	—
Asset-backed securities	2,099	—	2,099	—
	<u>\$ 52,792</u>	<u>\$ —</u>	<u>\$ 52,792</u>	<u>\$ —</u>

Fair values determined by Level 2 inputs, which utilize data points that are observable such as quoted prices, interest rates and yield curves, require the exercise of judgment and use of estimates, that if changed, could significantly affect the Company's financial position and results of operations. Investments in corporate debt securities, certificates of deposit, commercial paper, repurchase agreements and asset-backed securities are valued using Level 2 inputs. Level 2 securities are initially valued at the transaction price and subsequently valued and reported utilizing inputs other than quoted prices that are observable either directly or indirectly, such as quotes from third-party pricing vendors.

There were no transfers in or out of Level 1 and Level 2 fair value measurements during the nine months ended September 30, 2018 or 2017.

At September 30, 2018 and December 31, 2017, the Company had investments in money market funds of \$14.2 million and \$20.2 million, respectively, that were measured at fair value using the net asset value per share (or its equivalent) that have not been classified in the fair value hierarchy. The funds invest primarily in U.S. government securities. Refer to Note 4 for information regarding the Company's investments.

#### ***Fair Values of Other Financial Instruments***

The carrying amounts of certain of the Company's financial instruments, including cash and accounts payable, approximate their respective fair values due to their short-term nature. The carrying amount of the Company's notes payable of \$26.1 million at September 30, 2018 approximated their fair value as the terms of the notes are consistent with the market terms of transactions with similar profiles (Level 2 inputs).

#### 4. Certain Financial Statement Caption Information

##### Marketable Securities

The following tables summarize the Company's marketable securities (in thousands):

	Maturity (in years)	Amortized Cost	Unrealized Gain	Unrealized Loss	Fair Value
<b>September 30, 2018</b>					
Corporate debt securities	1 or less	\$ 13,354	\$ 1	\$ (7)	\$ 13,348
Corporate debt securities	>1 and <5	4,880	—	(10)	4,870
Commercial paper	1 or less	24,895	—	(2)	24,893
U.S. treasury securities	1 or less	1,994	—	(1)	1,993
Asset-backed securities	1 or less	9,473	—	(3)	9,470
Asset-backed securities	>1 and <5	1,794	—	(1)	1,793
		<u>\$ 56,390</u>	<u>\$ 1</u>	<u>\$ (24)</u>	<u>\$ 56,367</u>
<b>December 31, 2017:</b>					
Corporate debt securities	1 or less	\$ 21,097	\$ —	\$ (16)	\$ 21,081
Corporate debt securities	>1 and <5	3,636	—	(4)	3,632
Certificates of deposit	1 or less	13,658	—	(7)	13,651
Commercial paper	1 or less	12,333	—	(4)	12,329
Asset-backed securities	1 or less	2,099	—	—	2,099
		<u>\$ 52,823</u>	<u>\$ -</u>	<u>\$ (31)</u>	<u>\$ 52,792</u>

The Company has classified all of its available-for-sale investment securities, including those with maturity greater than one year, as current assets on the balance sheet based on the highly liquid nature of these investment securities and because these investment securities are considered available for use in current operations.

There were no impairments considered other-than-temporary during the periods presented, as it is management's intention and ability to hold the securities until a recovery of the cost basis or recovery of fair value. Gross realized gains and losses on sales of marketable securities were immaterial for all periods presented.

##### Accrued Liabilities

Accrued liabilities are comprised of (in thousands):

	September 30, 2018	December 31, 2017
Clinical trial expenses	\$ 4,293	\$ 2,809
Contract manufacturing services	1,371	1,536
Payroll and other employee-related expenses	2,665	2,489
Interest payable	193	77
Professional fees	230	276
Other	1,251	933
Total accrued liabilities	<u>\$ 10,003</u>	<u>\$ 8,120</u>

#### 5. Notes Payable

##### Loan Agreement

On October 30, 2015, the Company entered into a Loan and Security Agreement (Prior Agreement) with two lenders whereby it borrowed \$18.0 million (the Initial Loans). Balances under the Prior Agreement were due in monthly principal and interest payments, with final maturity of the Initial Loans in May 2019. Each Initial Loan included a final payment fee of 7.95% of the original principal amount due upon maturity.

On May 18, 2018, the Company entered into an Amended and Restated Loan and Security Agreement with the two lenders, which was amended on August 3, 2018 (the Loan Agreement), pursuant to which the lenders agreed to lend the Company \$26.5

million as term loans ( the Term Loans ) . Of the total proceeds, \$8.6 million was applied to the repayment of outstanding principal, interest and final payment owed pursuant to the Initial Loans .

The Company evaluated the amendment in accordance with ASC Topic 470, which requires assessment of whether the modification is considered a substantial modification, in which case the modification would be accounted for as a debt extinguishment. Based on the Company's evaluation, the modification was considered substantial and therefore the unamortized discount associated with the Prior Agreement was written off through interest expense and the principal balance of the Prior Agreement was written off.

The Term Loans will mature on December 1, 2022 (the Maturity Date) and the Company will have interest-only payments through January 1, 2020, followed by 36 equal monthly payments of principal and interest; *provided* that the Term Loans will be interest-only (and the number of principal and interest payments will be correspondingly reduced) through (i) July 1, 2020 if the Company submits a Biologics License Application (BLA) for the Company's product candidate, Toca 511 & Toca FC, to the United States Food and Drug Administration (FDA) prior to January 1, 2020, but not yet received FDA approval of such BLA prior to July 1, 2020 and (ii) January 1, 2021 if following such BLA submission to the FDA prior to January 1, 2020, the Company receives FDA approval of such BLA prior to July 1, 2020.

The Term Loans bear interest at a floating per annum rate equal to the greater of (i) 8.50% and (ii) the sum of (a) the prime rate reported in the Wall Street Journal on the last business day of the month that immediately precedes the month in which the interest will accrue, plus (b) 3.75%. The Company will be required to make a final payment of 7.95% of the principal amount of the Term Loans payable on the earlier of (i) the Maturity Date, (ii) the acceleration of any Term Loans, or (iii) the prepayment of the Term Loans. The Company may prepay all, but not less than all, of the Term Loans upon 10 days written notice provided the Company will be obligated to pay a prepayment fee equal to (i) 3.00% of the principal amount of the applicable Term Loan prepaid on or before the first anniversary of the effective date of the Loan Agreement, (ii) 2.00% of the principal amount of the applicable Term Loan prepaid on or before the second anniversary of the effective date of the Loan Agreement, and (iii) 1.00% of the principal amount of the applicable Term Loan prepaid thereafter, but prior to the Maturity Date.

In conjunction with the Loan Agreement, the Company issued the lenders warrants exercisable for 56,578 shares of common stock (the Warrants). The Warrants are exercisable in whole or in part, immediately, and have a per share exercise price of \$9.35. The Warrants will terminate on the earlier of May 18, 2028 or the closing of a certain merger or consolidation transaction. The Company recorded the Warrants as a debt discount, which is a contra-liability against debt, and is amortizing the balance over the life of the underlying debt. The offset to the contra-liability is recorded as additional paid in capital in the Company's balance sheet as the Warrants were determined to be an equity instrument. The Company determined the fair value of the Warrants at the date of issuance was \$0.5 million using the Black-Scholes option pricing model based on significant unobservable inputs (Level 3) with an expected term of 10 years, volatility of 85.6%, risk free rate of 3.1% and expected dividend of 0%.

The costs incurred to issue the Term Loans of \$0.1 million were deferred and are included in the discount to the carrying value of the Term Loans in the accompanying balance sheet. The deferred costs and the final payment fee are amortized to interest expense over the expected term of the Term Loans using the effective interest method with an effective interest rate of 10.7%.

The aggregate carrying amounts of the Term Loans and Initial Loans are comprised of the following, as applicable (in thousands):

	September 30, 2018	December 31, 2017
Principal	\$ 26,450	\$ 10,200
Add: accreted liability for final payment fee	163	869
Less: unamortized discount	(557)	(244)
	<u>\$ 26,056</u>	<u>\$ 10,825</u>

The Term Loans are secured by substantially all of the Company's assets other than its intellectual property, except rights to payment from the sale, licensing or disposition of such intellectual property. The Company is also required to maintain its primary operating accounts at all times with one of the lenders. The Loan Agreement contains customary conditions of borrowing, events of default and covenants, including covenants that restrict the Company's ability to dispose of assets, merge with or acquire other entities, incur indebtedness and make distributions to holders of its capital stock. Should an event of default occur, including the occurrence of a material adverse change, the Company could be liable for immediate repayment of all obligations under the Loan Agreement. At September 30, 2018, the Company was in compliance with the covenants contained in the Loan Agreement.

Future maturities of the Term Loans, including the final payment fee, as of September 30, 2018 are as follows (in thousands):

	September 30, 2018
Year ending December 31, 2018	\$ —
Year ending December 31, 2019	—
Year ending December 31, 2020	8,817
Year ending December 31, 2021	8,817
Year ending December 31, 2022	10,919
	28,553
Unaccreted balance for final payment fee on Term Loans	(1,940)
Unamortized discounts	(557)
	26,056
Less current portion	—
Noncurrent portion	\$ 26,056

## 6. Stockholders' Equity

Upon completion of the Company's IPO, all of the Company's outstanding shares of convertible preferred stock were converted into an aggregate of 6,690,066 shares of the Company's common stock. As of September 30, 2018, the Company's authorized capital stock consists of 200,000,000 shares of common stock, par value \$0.001 per share, and 10,000,000 shares of preferred stock, par value \$0.001 per share.

### *Common Stock Reserved for Future Issuance*

Common stock reserved for future issuance as of September 30, 2018 is as follows:

<b>Issued and Outstanding:</b>	
Stock options	3,637,502
Warrants for common stock	67,238
Shares reserved for issuance under the ESPP	363,340
Shares reserved for future award grants	300,388
Total	4,368,468

### *Stock-Based Compensation*

The Company has not recognized non-cash stock-based compensation expense for outstanding options to purchase 188,651 shares of common stock with performance-based vesting provisions after its evaluation that the occurrence of the individual milestones is not probable as of September 30, 2018.

The following table summarizes the allocation of the Company's non-cash stock-based compensation expense for all stock awards during the periods presented (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Research and development	\$ 842	\$ 657	\$ 2,377	\$ 1,229
General and administrative	1,085	834	2,743	1,847
Total	\$ 1,927	\$ 1,491	\$ 5,120	\$ 3,076

## 7. Collaborative Arrangements

On April 18, 2018, the Company entered into a License Agreement (the License Agreement) with Beijing Apollo Venus Biomedical Technology Limited and ApolloBio Corp. (collectively, ApolloBio), which became effective in July 2018, pursuant to which the Company granted to ApolloBio an exclusive license to develop and commercialize Toca 511 & Toca FC within the greater China region, including mainland China, Hong Kong, Macao and Taiwan (the Licensed Territory).

Under the License Agreement, the Company received net proceeds of \$13.5 million which were comprised of a \$16.0 million up-front payment (the Upfront Payment) less \$1.5 million in foreign income taxes and \$1.0 million in certain foreign non-income taxes. The foreign income taxes were recorded as income tax expense and the foreign non-income taxes were recorded as a general and administrative expense, on the condensed statement of operations during the three months ended September 30, 2018.

In addition to the upfront payment, the Company is eligible to receive up to an aggregate \$111.0 million, less withholding and other taxes, upon the achievement of specified development and commercial milestones. In September 2018, the Company completed its planned enrollment of 380 patients in the Toca 5 clinical trial and earned a \$2.0 million milestone payment. The Company is also eligible for low double-digit tiered royalty payments based on annual net sales of licensed products in the Licensed Territory, subject to reduction under specified circumstances. ApolloBio will be responsible for all development and commercialization costs in the Licensed Territory. Future payments by ApolloBio are subject to the People's Republic of China (PRC) currency exchange approval and may be subject to other approvals by PRC authorities.

Unless earlier terminated, the License Agreement will expire upon the expiration of the last-to-expire royalty term for any and all licensed products, which royalty term is, with respect to a licensed product in a particular region (*i.e.*, mainland China, Hong Kong, Macao and Taiwan) of the Licensed Territory (each, a Region), the latest of (i) 10 years after the first commercial sale of such licensed product in such Region, (ii) the expiration of all regulatory exclusivity as to such licensed product in such Region and (iii) the date of expiration of the last valid patent claim covering such licensed product in such Region. Either party may terminate the License Agreement upon a material breach by the other party that remains uncured following 60 days (or, with respect to any payment breach, 10 days) after the date of written notice of such breach. ApolloBio may terminate the License Agreement at any time by providing 90 days' prior written notice to the Company. In addition, the Company may terminate the License Agreement upon written notice to ApolloBio under specified circumstances if ApolloBio challenges the licensed patent rights.

Under Topic 606, the Company evaluated the terms of the License Agreement and the transfer of intellectual property rights (the "license") was identified as the only performance obligation as of the inception of the agreement. The Company determined that the transaction price under the License Agreement was comprised of the \$16.0 million upfront payment. The future potential development and commercial milestone payments were not included in the transaction price as they were determined to be fully constrained. As part of the evaluation of the development and commercial milestone constraint, the Company determined that the achievement of such milestones is contingent upon success in future clinical trials and regulatory approvals, each of which was uncertain at the inception of the License Agreement. The Company will re-evaluate the transaction price each quarter or as uncertain events are resolved or other changes in circumstances occur. Future potential development and commercial milestone amounts would be recognized as revenue, if unconstrained. Any reimbursable program costs are recognized proportionately with the performance of the underlying services and are accounted for as a reduction to R&D expense and are excluded from the transaction price.

The entire transaction price of \$16.0 million was allocated to the license performance obligation. The license was delivered in connection with the execution of the agreement and the performance obligation was fully satisfied (transfer of intellectual property). As a result, \$16.0 million was recognized as revenue in the condensed statement of operations for the three and nine months ended September 30, 2018. Additionally, in September 2018, the Company earned a \$2.0 million development milestone payment upon completion of our planned enrollment of 380 patients in the Toca 5 clinical trial. This milestone payment was recorded as revenue with a corresponding receivable in the accompanying condensed financial statements.

## Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations

*The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our unaudited condensed financial statements and related notes included in this Quarterly Report on Form 10-Q and the audited financial statements and notes thereto as of and for the year ended December 31, 2017 and the related Management’s Discussion and Analysis of Financial Condition and Results of Operations contained in our Annual Report on Form 10-K filed with the Securities and Exchange Commission, or SEC, on March 9, 2018, or Annual Report on Form 10-K. Unless the context requires otherwise, references in this Quarterly Report on Form 10-Q to “we,” “us,” and “our” refer to Tocagen Inc.*

### Forward-Looking Statements

*The information in this discussion contains forward-looking statements and information within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, which are subject to the “safe harbor” created by those sections. These forward-looking statements include, but are not limited to, statements concerning our strategy, future operations, future financial position, future revenues, projected costs, prospects and plans and objectives of management. The words “anticipates,” “believes,” “estimates,” “expects,” “intends,” “may,” “plans,” “projects,” “will,” “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We may not actually achieve the plans, intentions, or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements that we make. These forward-looking statements involve risks and uncertainties that could cause our actual results to differ materially from those in the forward-looking statements, including, without limitation, the risks set forth in Part II, Item 1A, “Risk Factors” in this Quarterly Report on Form 10-Q and in our other filings with the SEC. The forward-looking statements are applicable only as of the date on which they are made, and we do not assume any obligation to update any forward-looking statements.*

### Overview

We are a clinical-stage, cancer-selective gene therapy company focused on developing first-in-class, broadly-applicable product candidates designed to activate a patient’s immune system against their own cancer. Our cancer-selective gene therapy platform is built on retroviral replicating vectors, or RRVs, which are designed to selectively deliver therapeutic genes into the DNA of cancer cells. Our gene therapy approach is designed to fight cancer through immunotherapeutic mechanisms of action without the autoimmune toxicities commonly experienced with other immunotherapies.

We are developing our lead product candidate, Toca 511 (vocimagene amiretrorepvec) & Toca FC (extended-release fluorocytosine), initially for the treatment of recurrent high grade glioma, or HGG, a brain cancer with limited treatment options, low survival rates and, therefore, a significant unmet medical need. We are conducting a randomized, controlled Phase 3 clinical trial of Toca 511 & Toca FC in patients with recurrent HGG, which is designed to serve as a registrational trial. In February 2017, the U.S. Food and Drug Administration, or FDA, granted Toca 511 & Toca FC Breakthrough Therapy Designation for the treatment of patients with recurrent HGG and in June 2017 the European Medicines Agency, or EMA, granted Toca 511 Priority Medicines, or PRIME, Designation for the treatment of patients with glioma. Breakthrough Therapy Designation indicates that preliminary clinical evidence demonstrates the drug may have substantial improvement on one or more clinically significant endpoints over available therapy. PRIME Designation indicates that there is a potential to benefit patients with unmet medical needs based on early clinical data. We also have Fast Track Designation (which may lead to expedited regulatory review of new products that treat serious diseases or conditions and demonstrate the potential to address an unmet medical need) from the FDA for Toca 511 & Toca FC for the treatment of recurrent HGG. We also received Orphan-Drug Designation from the FDA for the treatment of HGG. Orphan-Drug Designation is a designation for a product that treats a rare disease or condition and which, if the product receives the first FDA approval for that disease or condition, may result in a period of regulatory exclusivity, subject to some exceptions. The Committee for Orphan Medicinal Products of the EMA has designated both fluorocytosine and vocimagene amiretrorepvec as orphan medicinal products indicated for the treatment of glioma. The EMA provides several benefits to drug developers for developing drugs for orphan diseases. In September 2018, we completed the planned enrollment of 380 patients in our Toca 5 clinical trial.

In April 2018, we entered into a license agreement, or License Agreement, with Beijing Apollo Venus Biomedical Technology Limited and ApolloBio Corp., or collectively ApolloBio, which became effective in July 2018, pursuant to which we granted to ApolloBio an exclusive license to develop and commercialize Toca 511 & Toca FC within the greater China region, including mainland China, Hong Kong, Macao and Taiwan, or the Licensed Territory. Under the License Agreement, we received an aggregate upfront payment of \$16.0 million and we are eligible to receive up to a total of \$111.0 million upon achievement of specified development and commercial milestones. In addition, we are also eligible for low double-digit tiered royalty payments based on annual net sales of licensed products in the Licensed Territory, subject to reduction under specified circumstances. In September 2018,

we earned a \$2.0 million development milestone payment upon completion of the planned enrollment of 380 patients in the Toca 5 clinical trial which was received in October 2018.

We do not have any products approved for sale and have not generated any revenue from product sales. We have funded our operations primarily through the private placement of our convertible preferred stock, from which we received net proceeds of \$131.4 million and our initial public offering in April 2017, from which we received net proceeds of \$86.9 million. We have also received \$44.0 million in net proceeds from term loans, net proceeds of \$15.2 million from upfront and milestone payments under our license and collaboration agreements, including net proceeds of \$1.7 million received in October 2018, \$10.9 million from the issuance of our convertible promissory notes payable and \$2.1 million from private and federal grants.

Since our inception in August 2007, we have devoted substantially all of our efforts to developing our gene therapy platform and our lead product candidate, Toca 511 & Toca FC. We have never been profitable and have incurred significant operating losses in each year since our inception. We had an accumulated deficit of \$196.3 million as of September 30, 2018. Substantially all of our net losses resulted from costs incurred in connection with our research, preclinical, clinical, product, regulatory and business development activities, as well as raising capital and building our infrastructure.

We expect to continue to incur significant expenses and increasing net operating losses for at least the next several years. We expect our expenses will increase substantially in connection with our ongoing activities as we continue to develop and seek regulatory approval of our product candidates and operate as a public company. To fund further operations, we will need to raise additional capital.

Accordingly, we will seek to fund our operations through equity and/or debt financings. We may also consider new collaborations or selectively partnering our technology or programs. However, we may be unable to raise additional funds or enter into such other arrangements when needed on favorable terms or at all. In addition, subject to limited exceptions, our Loan Agreement (as defined below) also prohibits us from incurring indebtedness without the prior written consent of the lenders. Our failure to raise capital or enter into such other arrangements as and when needed would have a negative impact on our financial condition and our ability to develop our product candidates.

## **Financial Operations Overview**

### ***Revenue***

We currently have no products approved for sale, and have not generated any revenues from the sale of products. We have not submitted any product candidate for regulatory approval. Our revenue has been derived from our license and collaboration arrangement we entered into with Siemens Healthcare Diagnostics Inc., or Siemens in 2011, under which we received a nonrefundable, non-creditable, lump-sum, upfront license payment of \$0.5 million for our sublicense to Siemens of certain diagnostic assay technology and the License Agreement, under which we received proceeds of \$13.5 million which were comprised of a \$16.0 million up-front payment less \$1.5 million in foreign income taxes and \$1.0 million in certain foreign non-income taxes. We also earned a \$2.0 million development milestone payment in September 2018. As of September 30, 2018, \$18.0 million in revenue was recognized related to the License Agreement.

In the future, we may generate revenue from a combination of product sales, royalties and milestones in connection with our Siemens agreement, the License Agreement and any future marketing and distribution arrangements and other collaborations, strategic alliances and license arrangements, or a combination of these approaches. However, we do not expect to receive additional revenues unless and until we receive regulatory approval for product candidates or potentially enter into other collaboration agreements. We expect that any revenue we generate will fluctuate from quarter to quarter and year to year as a result of the timing and amount of license fees, milestone and other payments, and the amount and timing of payments that we receive upon the sale of our products, to the extent any are successfully commercialized. If we fail to complete the development of our product candidates in a timely manner or obtain regulatory approval of them, our ability to generate future revenue, and our results of operations and financial position, would be materially adversely affected.

### ***Research and Development Expenses***

Research and development expenses consist primarily of salaries and related expenses for personnel, including non-cash stock-based compensation costs, preclinical costs, clinical trial costs, costs related to acquiring and manufacturing clinical trial materials, contract services, facilities costs, overhead costs and depreciation. These activities also include research and development related to our gene therapy platform development. All research and development costs are expensed as incurred.

We cannot determine with certainty the duration and completion costs of the current or future clinical trials of our product candidates, or if, when or to what extent we will generate revenues from the commercialization and sale of any of our product



candidates that obtain regulatory approval. We may never succeed in achieving regulatory approval for any of our product candidates. The duration, costs and timing of clinical trials and development of our product candidates will depend on a variety of factors, including:

- per patient trial costs;
- the number of patients that participate in the trials;
- the number of sites included in the trials;
- the countries in which the trials are conducted;
- the length of time required to enroll eligible patients;
- the drop-out or discontinuation rates of patients;
- the potential for additional safety monitoring or other clinical trials requested by regulatory agencies;
- significant and changing government regulation; and
- the timing and receipt of any regulatory approvals.

A change in the outcome of any of these variables with respect to the development of a product candidate could mean a significant change in the costs and timing associated with the development of that product candidate. For example, if the FDA or another regulatory authority were to require us to conduct clinical trials beyond those that we currently anticipate will be required for the completion of clinical development of a product candidate or if we experience significant delays in enrollment in any of our clinical trials, we could be required to expend significant additional financial resources and time on the completion of clinical development. In addition, the probability of success for each product candidate will depend on numerous factors, including competition, manufacturing capability and commercial viability. We will determine which programs to pursue and how much to fund each program in response to the scientific and clinical success of each product candidate, as well as an assessment of each product candidate's commercial potential.

The following table sets forth our research and development expense by project (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Toca 511 & Toca FC	\$ 10,947	\$ 7,055	\$ 32,343	\$ 19,781
Vector technology	1,315	508	3,118	1,038
Total	\$ 12,262	\$ 7,563	\$ 35,461	\$ 20,819

We expect our research and development expenses to increase for the foreseeable future as we scale up our clinical trial and manufacturing activities and seek regulatory approval of our product candidates.

#### ***General and Administrative Expenses***

General and administrative expenses consist primarily of salaries and related expenses for personnel, including non-cash stock-based compensation costs and travel expenses for our employees in executive, operational, finance and business development functions. Other general and administrative expenses include facility-related costs, consulting fees, information technology, insurance, professional fees for accounting and legal services, expenses associated with obtaining and maintaining patents and costs associated with being a public company.

We anticipate that our general and administrative expenses will increase in the future as we increase our headcount to support our expanding research and development and potential commercialization of our product candidates. We also anticipate continued increases in expenses related to audit, legal, regulatory and tax-related services associated with maintaining compliance with exchange listing and SEC requirements, director and officer insurance premiums and investor relations costs associated with being a public company. Additionally, if we believe a regulatory approval of our lead product candidate appears likely, we anticipate an increase in payroll and related expenses as a result of our preparation for commercial operations, especially as it relates to establishing a sales force and other expenses related to the sale and marketing of our product candidates.

### Interest Income

Interest income consists primarily of interest income earned on cash, cash equivalents and marketable securities.

### Interest Expense

Interest expense consists primarily of stated interest and the amortization of related debt issuance costs incurred on the outstanding principal amount of our borrowings under our notes payable and convertible promissory notes payable.

### Critical Accounting Policies and Significant Judgments and Estimates

There have been no significant changes to our critical accounting policies since December 31, 2017 besides the adoption of ASU No. 2014-09, *Revenue from Contracts with Customers* (“Topic 606”), which amended the existing accounting standards for revenue recognition. For a description of critical accounting policies that affect our significant judgments and estimates used in the preparation of our unaudited condensed financial statements, refer to Item 7 in Management’s Discussion and Analysis of Financial Condition and Results of Operations and Note 2 to our financial statements contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017 and Note 2 to our unaudited condensed financial statements contained in this Quarterly Report on Form 10-Q.

### Recent Accounting Pronouncements

We have reviewed all recently issued standards and have determined that other than as disclosed in Note 2 to our unaudited condensed financial statements included herein, such standards will not have a material impact on our financial statements or do not otherwise apply to our operations.

### Results of Operations

#### Comparison of the Three and Nine Months Ended September 30, 2018 and 2017

The following table summarizes our results of operations for the three and nine months ended September 30, 2018 and 2017 (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
License revenue	\$ 18,009	\$ 10	\$ 18,027	\$ 31
Research and development expenses	12,262	7,563	35,461	20,819
General and administrative expenses	4,320	2,184	9,311	6,153
Interest income	441	214	1,087	354
Interest expense	(742)	(430)	(2,184)	(1,541)
Income tax expense	(1,509)	—	(1,510)	(1)

*License revenue* . License revenue was \$18.0 million for each of the three and nine months ended September 30, 2018 compared to less than \$0.1 million for each of the three and nine months ended September 30, 2017 due to recognition of a \$16.0 million upfront payment and a \$2.0 million development milestone payment earned under the License Agreement.

*Research and development expenses* . Research and development expenses were \$12.3 million and \$35.5 million for the three and nine months ended September 30, 2018, respectively, compared to \$7.6 million and \$20.8 million for the three and nine months ended September 30, 2017, respectively. The increase of \$4.7 million for the three months ended September 30, 2018 compared to the same period in 2017 was primarily related to a \$2.5 million increase in clinical development costs due to completing our planned enrollment in the Toca 5 clinical trial in September 2018, a \$1.1 million increase in product development activities and an increase in allocable expenses such as rent related to our laboratory and office space due to the new lease we signed in January 2018. The increase of \$14.7 million for the nine months ended September 30, 2018 compared to the same period in 2017 was primarily due to a \$2.6 million increase in personnel related costs, including non-cash stock-based compensation due to increased headcount, a \$5.2 million increase in clinical development costs, a \$4.3 million increase in product development activities, including manufacturing and an increase in allocable expenses such as rent related to our laboratory and office space due to the new lease we signed in January 2018. We anticipate our research and development expenses will continue to increase in future quarters.

*General and administrative expenses.* General and administrative expenses were \$ 4.3 million and \$ 9.3 million for the three and nine months ended September 30, 2018, respectively, compared to \$ 2.2 million and \$ 6.2 million for the three and nine months ended September 30, 2017, respectively. The increase of \$ 2.1 million and \$ 3.1 million for the three and nine months ended September 30, 2018, respectively compared to the same periods in 2017 was primarily due to increased personnel related costs, including non-cash stock-based compensation expense of \$1.1 million and \$0.7 million for the three and nine months ended September 30, 2018, respectively and continued increase in external services associated with being a public company. Additionally, as part of the \$16.0 million upfront payment received from ApolloBio, we paid foreign non-income tax related expenses of \$1.0 million in the three months ended September 30, 2018.

*Interest income.* Interest income was \$0.4 million and \$1.1 million for the three and nine months ended September 30, 2018, respectively, compared to \$0.2 million and \$0.4 million for the three and nine months ended September 30, 2017, respectively. The increase of \$0.2 million and \$0.7 million, respectively, was primarily due to earning interest at higher rates during 2018 compared to 2017.

*Interest expense.* Interest expense was \$0.7 million and \$2.2 million for the three and nine months ended September 30, 2018, respectively, compared to \$0.4 million and \$1.5 million for the three and nine months ended September 30, 2017, respectively. The increase represents charges incurred in connection with our Loan Agreement in May 2018 in which the termination of our prior loan and security agreement was treated as a debt extinguishment.

*Income tax expense.* Income tax expense of \$1.5 million for the three and nine months ended September 30, 2018 was related to foreign income taxes on the upfront payment received from ApolloBio in July 2018.

## **Liquidity and Capital Resources**

We have incurred significant losses and cumulative negative cash flows from operations since our inception. As of September 30, 2018, we had an accumulated deficit of \$196.3 million and we anticipate that we will continue to incur losses for at least the next several years. We expect that our research and development and general and administrative expenses will continue to increase and, as a result, we will need additional capital to fund our operations, which we may raise through equity and/or debt financings. We may also consider new collaborations or selectively partnering our technology or programs.

Since inception through September 30, 2018, we have funded our operations primarily through the private placement of our convertible preferred stock from which we received net proceeds of \$131.4 million and our initial public offering from which we received net proceeds of \$86.9 million. In addition, we have also received \$44.0 million in net proceeds from term loans, \$10.9 million from the issuance of our convertible promissory notes payable, \$2.1 million from private and federal grants, and net proceeds of \$15.2 million from upfront and milestone payments under our license and collaboration agreements, including net proceeds of \$1.7 million received in October 2018.

The loans under our amended and restated loan and security agreement with two lenders, dated May 18, 2018, as amended, or the Loan Agreement, are secured by substantially all of our assets other than our intellectual property (except rights to payment from the sale, licensing or disposition of such intellectual property). As of September 30, 2018, there was \$26.1 million outstanding under the Loan Agreement. Balances under the Loan Agreement accrue interest at the prime rate plus 3.75%, subject to a floor of 8.50%. The interest rate as of September 30, 2018 was 8.75%. The loans under the Loan Agreement mature in December 2022 with interest only payments through January 1, 2020 followed by 36 monthly payments of principal and interest, *provided* that the interest only period may be extended (and the number of principal and interest payments will be correspondingly reduced) in certain circumstances. The Loan Agreement contains customary conditions of borrowing, events of default and covenants, including covenants that restrict our ability to dispose of assets, merge with or acquire other entities, incur indebtedness and make distributions to holders of our capital stock. Should an event of default occur, including the occurrence of a material adverse change, we could be liable for immediate repayment of all obligations under the Loan Agreement.

As of September 30, 2018, we had \$79.8 million in cash, cash equivalents and marketable securities. Our available cash and marketable securities are invested in accordance with our investment policy, primarily with a view to preserve principal and maintain liquidity. Currently, our funds are held in FDIC insured cash accounts, certificates of deposits, money market funds and investment-grade fixed income securities.

## Cash Flows

The following table sets forth the primary sources and uses of cash for each of the periods set forth below (in thousands):

	Nine Months Ended September 30,	
	2018	2017
Net cash (used in) provided by:		
Operating activities	\$ (22,526)	\$ (21,961)
Investing activities	(4,946)	690
Financing activities	15,021	90,603
Net (decrease) increase in cash and cash equivalents	<u>\$ (12,451)</u>	<u>\$ 69,332</u>

*Operating Activities* . Net cash used in operating activities was \$22.5 million and \$22.0 million for the nine months ended September 30, 2018 and 2017, respectively. The increase in net cash used in operating activities was primarily attributable to an increase in net loss of \$1.3 million offset by changes in working capital and non-cash adjustments.

*Investing Activities* . Net cash used in investing activities was \$4.9 million for the nine months ended September 30, 2018 and net cash provided by investing activities was \$0.7 million for the nine months ended September 30, 2017. The change in investing activities in the periods presented primarily relate to the net of purchases, sales and maturities of marketable securities used to fund our operations and purchases of property and equipment related to our corporate offices in which we signed a new lease January 2018. We invest cash in excess of our immediate operating requirements in a way that maturity is staggered and designed to optimize our return on investments, while satisfying our liquidity needs.

*Financing activities* . Net cash provided by financing activities was \$15.0 million and \$90.6 million for the nine months ended September 30, 2018 and 2017, respectively. The decrease in cash provided by financing activities for the nine months ended September 30, 2018 was primarily related to net proceeds from our Loan Agreement of \$26.3 million offset by cash paid on extinguishment of our prior loan and security agreement of \$8.6 million in May 2018 compared to net proceeds from our initial public offering of \$86.9 million in 2017.

## Funding Requirements

Our primary uses of capital are, and we expect will continue to be, compensation and related expenses, third-party clinical research and development services, laboratory expenses, regulatory expenses, marketing, and general and administrative expenses. Based on our research and development plans and our timing expectations related to the progress of our programs, we expect that our existing cash, cash equivalents and marketable securities as of September 30, 2018 will enable us to fund our operations for at least the next 12 months. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Furthermore, our operating plan may change and we may need additional funds sooner than planned.

The successful development of any product candidate is highly uncertain. As such, at this time, we cannot reasonably estimate or know the nature, timing and costs of the efforts that will be necessary to complete the development of Toca 511 & Toca FC or our other current and future product candidates. We are also unable to predict when, if ever, material net cash inflows will commence from the sale of product candidates. This is due to the numerous risks and uncertainties associated with developing immunotherapies, including the uncertainty of:

- the progress, timing, costs and results of our ongoing Phase 3 clinical trial of Toca 511 & Toca FC;
- the progress, timing, costs and results of our Phase 1 dose escalation clinical trials that include our intratumoral study, resection study, and intravenous study;
- the progress, timing, costs and results of development for Toca 511 & Toca FC for the treatment of metastatic solid tumors;
- the progress, timing, costs and results of development for our other future product candidates;
- the outcome, timing and cost of regulatory approvals by the FDA and comparable foreign regulatory authorities, including the potential for the FDA or comparable foreign regulatory authorities to require that we perform more studies than those that we currently expect;
- the ability of our product candidates to progress through clinical development successfully;
- the cost of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights;

- arrangements with third-party service providers and manufacturers;
- our need and ability to hire additional personnel;
- our need to implement additional infrastructure and internal systems;
- the effect of competing technological and market developments; and
- the cost of establishing sales, marketing and distribution capabilities for any products for which we may receive regulatory approval.

A change in the outcome of any of these variables with respect to the development of any of our product candidates would significantly change the costs and timing associated with the development of that product candidate.

Until we can generate a sufficient amount of revenue from our products, if ever, we expect to finance future cash needs through equity and/or debt financings. We may also consider new collaborations or selectively partnering our technology or programs. We do not have any committed external source of funds. Additional capital may not be available on reasonable terms, if at all. Subject to limited exceptions, our Loan Agreement also prohibits us from incurring indebtedness without the prior written consent of the lenders. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or commercialization of one or more of our product candidates. If we raise additional funds through the issuance of additional equity or debt securities, it could result in dilution to our existing stockholders and increased fixed payment obligations, and these securities may have rights senior to those of our common stock. If we incur indebtedness, we could become subject to covenants that would restrict our operations and potentially impair our competitiveness, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. Any of these events could significantly harm our business, financial condition and prospects.

#### ***Off-Balance Sheet Arrangements***

As of September 30, 2018, we did not have any off-balance sheet arrangements.

#### **Item 3. Quantitative and Qualitative Disclosures About Market Risk.**

The primary objective of our investment activities is to preserve our capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. To achieve our objectives, we maintain a portfolio of cash equivalents and investments in securities of high credit quality. As of September 30, 2018, we had cash, cash equivalents and marketable securities of \$79.8 million consisting of cash and investments in certificates of deposit and money market funds, and investment-grade fixed income securities. A significant portion of our investments may be subject to interest rate risk and could fall in value if market interest rates increase. However, because our investments are primarily short-term in duration, we believe that our exposure to interest rate risk is not significant and a 1% movement in market interest rates would not have a significant impact on the total value of our portfolio. We actively monitor changes in interest rates.

#### **Item 4. Controls and Procedures.**

##### **Disclosure Controls and Procedures**

In evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on that evaluation, our Chief Executive Officer and our Chief Financial Officer concluded that our disclosure controls and procedures were effective, at the reasonable assurance level, as of the end of the period covered by this Quarterly Report on Form 10-Q to ensure that information we are required to disclose in reports that we file or submit under the Exchange Act (1) is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and (2) is accumulated and communicated to management, including our Chief Executive Officer and our Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

##### **Changes in Internal Control Over Financial Reporting**

There have been no changes in our internal control over financial reporting during our most recent fiscal quarter ended September 30, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

## PART II – OTHER INFORMATION

### Item 1. Legal Proceedings

None.

### Item 1A. Risk Factors

*You should carefully consider the following risk factors, as well as the other information in this report, before deciding whether to purchase, hold or sell shares of our common stock. The occurrence of any of the following risks could harm our business, financial condition, results of operations and/or growth prospects or cause our actual results to differ materially from those contained in forward-looking statements we have made in this report and those we may make from time to time. You should consider all of the factors described in this section as well as the other information in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017 including our financial statements and the related notes and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” when evaluating our business. The risk factors set forth below that are marked with an asterisk (\*) contain changes to the similarly titled risk factors included in Item 1A of our Annual Report on Form 10-K. If any of the following risks actually occurs, our business, financial condition, results of operations and future growth prospects would likely be materially and adversely affected. In these circumstances, the market price of our common stock would likely decline and you may lose all or part of your investments. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations.*

#### **Risks related to our business and industry**

***We have incurred significant losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future.\****

We are a clinical-stage company with a limited operating history. We are not profitable and have incurred net losses in each year since our inception in 2007, including net losses of \$38.9 million for the year ended December 31, 2017 and \$29.4 million for the nine months ended September 30, 2018. As of September 30, 2018, we had an accumulated deficit of \$196.3 million.

We have devoted most of our financial resources to research and development, including our clinical, preclinical and platform development activities. To date, we have financed our operations primarily through the private placement of our convertible preferred stock, our initial public offering of our common stock, term loans, the issuance of convertible promissory notes and upfront payments under our license and collaboration agreements. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to generate revenue. We have not completed late-stage clinical trials for any product candidate and it will be several years, if ever, before we have a product candidate ready for regulatory approval and commercialization. Even if we or our strategic partners succeed in obtaining regulatory approval and commercializing one or more of our product candidates, we will continue to incur substantial research and development and other expenditures to develop and market additional product candidates. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue. Our prior losses and expected future losses have had and will continue to have an adverse effect on our stockholders’ equity and working capital.

***We will require substantial additional financing to achieve our goals, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit or terminate our product development efforts or other operations.\****

We are currently advancing our lead product candidate, Toca 511 & Toca FC, through clinical development and other product candidates through preclinical development. Developing gene therapy products is expensive, and we expect our research and development expenses to continue to increase in connection with our ongoing activities, particularly as we continue to advance our product candidates in clinical trials.

As of September 30, 2018, our cash, cash equivalents and marketable securities were \$79.8 million. We expect that our existing cash, cash equivalents and marketable securities as of September 30, 2018 will be sufficient to fund our current operations through at least the next 12 months. However, our operating plan may change as a result of many factors currently unknown to us, and we may need to seek additional funds sooner than planned, through equity and/or debt financings. We do not have any committed external source of funds. We may also consider new collaborations or selectively partner our technology or programs. In any event, we will require additional capital to obtain regulatory approval for, and to commercialize, our product candidates. Raising funds in the current

economic environment may present additional challenges. Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or if we have specific strategic considerations.

Any additional fundraising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to develop and commercialize our product candidates. In addition, we cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. Subject to limited exceptions, our amended and restated loan and security agreement, or Loan Agreement, also prohibits us from incurring indebtedness without the prior written consent of the lenders. Moreover, the terms of any financing may adversely affect the holdings or the rights of our stockholders and the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our shares to decline. The sale of additional equity or convertible securities would dilute all of our stockholders. The incurrence of indebtedness would result in increased fixed payment obligations and we may be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. We could also be required to seek funds through arrangements with collaborative partners or otherwise at an earlier stage than otherwise would be desirable and we may be required to relinquish rights to some of our technologies or product candidates or otherwise agree to terms unfavorable to us, any of which may have a material adverse effect on our business, operating results and prospects.

If we are unable to obtain funding on a timely basis, we may be required to significantly curtail, delay or discontinue one or more of our research or development programs or the commercialization of any product candidates or be unable to expand our operations or otherwise capitalize on our business opportunities, as desired, which could materially affect our business, financial condition and results of operations.

***Immunotherapy, gene therapy and biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of uncertainty. We have never generated any revenue from product sales and may never be profitable.\****

Since our inception in August 2007, we have devoted most of our efforts to developing our gene therapy platform and our lead product candidate, Toca 511 & Toca FC. We are still developing our product candidates, and we have not completed development of any products. Our ability to generate revenue and achieve profitability depends in large part on our ability, alone or with partners, to successfully complete the development of, obtain the necessary regulatory approvals for, and commercialize product candidates. We do not anticipate generating revenues from sales of products for the foreseeable future. Our ability to generate future revenues from product sales depends heavily on our success in:

- completing clinical trials through all phases of clinical development of our current and future product candidates;
- seeking and obtaining marketing approvals for product candidates that successfully complete clinical trials;
- launching and commercializing product candidates for which we obtain marketing approval with a partner or, if launched independently, successfully establishing a sales force, marketing and distribution infrastructure;
- identifying and developing new product candidates;
- progressing our preclinical programs into human clinical trials;
- establishing and maintaining supply and manufacturing relationships with third parties;
- maintaining, protecting, expanding and enforcing our intellectual property; and
- attracting, hiring and retaining qualified personnel.

Because of the numerous risks and uncertainties associated with gene therapy product development, we are unable to predict the timing or amount of increased expenses or when we will be able to achieve or maintain profitability, if ever. In addition, our expenses could increase beyond expectations if we are required by the U.S. Food and Drug Administration, or FDA, or foreign regulatory agencies, to perform studies and clinical trials in addition to those that we currently anticipate or if there are any delays in the development of any of our product candidates. If one or more of the product candidates that we develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing such product candidates. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations, which may not be available to us on favorable terms, if at all. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would depress the value of our company and could impair our ability to raise capital, expand our business, maintain our research and development efforts, diversify our product offerings or even continue our operations. A decline in the value of our company could also cause stockholders to lose all or part of their investment.

***Our gene therapy product candidates are based on novel technology, which makes it difficult to predict the time and cost of product candidate development. \****

We have concentrated our product research and development efforts on our gene therapy platform, and our future success depends on the successful development of this therapeutic approach. There can be no assurance that any development problems we experience in the future related to our gene therapy platform will not cause significant delays or unanticipated costs, or that such development problems can be solved. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process or transferring that process to commercial partners, or developing or validating product release assays in a timely manner, which may prevent us from completing our clinical trials or commercializing our products on a timely or profitable basis, if at all.

In addition, the clinical trial requirements of the FDA, the European Medicines Agency, or EMA, and other regulatory agencies and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the potential products. The regulatory approval process for novel product candidates such as ours can be more expensive and take longer than for other, better known or extensively studied pharmaceutical or other product candidates. The limited precedent for gene therapy approvals makes it difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for our product candidates in the United States, Europe or other territories.

Regulatory requirements governing gene therapy products have changed frequently and may continue to change in the future. For example, in January 2017, the FDA Oncology Center of Excellence, or the Center of Excellence, was created to leverage the combined skills of regulatory scientists and reviewers with expertise in drugs, biologics, and devices (including diagnostics). While the Center of Excellence is designed to help expedite the development of oncology and malignant hematology-related medical products and support an integrated approach in the clinical evaluation of drugs, biologics and devices for the treatment of cancer, the new Center of Excellence may initially create confusion within the FDA and especially in the Center of Biologics and Research that is the primary review division for our initial product candidate. Gene therapy clinical trials conducted at institutions that receive funding for recombinant DNA research from the U.S. National Institutes of Health, or the NIH, are also subject to review by the institution's Institutional Biosafety Committees (IBC), in addition to the institution's institutional review board (IRB), to assess the safety of the study before a clinical trial can begin. We have received from time to time questions from the FDA regarding investigational new drug application, or IND, submissions and clinical protocols for Toca 511 & Toca FC. We believe that we have adequately addressed these questions, some of which have caused, in the past, some delays in our clinical trials. Although the FDA decides whether individual gene therapy protocols may proceed, the IRB and IBC review process can impede the initiation of a clinical trial, even if the FDA has reviewed the study and approved its initiation. Conversely, the FDA can put an IND on a partial or complete clinical hold even if the IRB and IBC have provided a favorable review. Our trials have, in the past, been put on hold for reasons including suspected serious adverse events, which resulted in delays of our trials. In addition, adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other regulatory bodies to change the requirements for performing studies or for obtaining approval of any of our product candidates.

These regulatory review committees and advisory groups, and the new guidelines they promulgate, may lengthen the regulatory review process, require us to perform additional studies, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post-approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. 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 revenue to maintain our business.

***Failure to successfully develop and obtain approval of our lead product candidate, Toca 511 & Toca FC, or our other future product candidates could adversely affect our future success.***

Our business and future success is substantially dependent on our ability to obtain regulatory approval of and then successfully commercialize our lead product candidate, Toca 511 & Toca FC which is in clinical development. All of our product candidates, including Toca 511 & Toca FC, will require additional clinical and nonclinical development, regulatory review and approval in one or more jurisdictions, substantial investment, access to sufficient pre-commercial and commercial manufacturing capacity and significant marketing efforts before we can generate any revenue from product sales. In addition, because Toca 511 & Toca FC is our most advanced product candidate, and because all of our other future product candidates will likely be based on similar technology, if Toca 511 & Toca FC encounters safety or efficacy problems, developmental delays, regulatory issues or other problems, our development plans and business for our other product candidates would be significantly harmed.

***We may have difficulty enrolling patients in our clinical trials, which could delay or prevent development 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 the speed at which we can recruit patients to participate in testing our product candidates. We have



experienced delays in some of our clinical trials in the past due to difficulties with enrollment and we may experience similar delays in the future. If patients are unwilling to participate in our clinical trials because of negative publicity from adverse events in the industry or in the trials for other third party product candidates, or for other reasons, including competitive clinical trials for similar patient populations, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of potential products may be delayed. These delays could result in increased costs, delays in advancing our product development, delays in testing the effectiveness of our technology or termination of the clinical trials altogether.

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

- severity of the disease under investigation;
- design of the clinical trial protocol, including the fact that certain of our clinical trials are randomized to current treatments;
- size of the patient population;
- eligibility criteria for the clinical trial in question;
- perceived risks and benefits of the product candidate under study;
- general level of excitement for the treatment approach;
- comments on social media;
- proximity and availability of clinical trial sites for prospective patients;
- availability of competing therapies and clinical trials;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians; and
- ability to monitor patients adequately during and after treatment.

The eligibility criteria of our clinical trials will limit the pool of available trial participants. Additionally, the process of finding and diagnosing patients may prove costly. Finally, our treatment necessitates that the patient be near one of our clinical trial sites, since periodic follow-up visits at the clinical trial site are contemplated in the protocols.

We currently plan to seek initial marketing approval in the United States and subsequently other pharmaceutical markets. We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by the FDA, the EMA or other regulatory agencies. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including:

- difficulty in establishing or managing relationships with contract research organizations, or CROs, and physicians;
- different standards for the conduct of clinical trials;
- our inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatments.

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, any of which would have an adverse effect on our business.

***The FDA regulatory approval process is lengthy and time-consuming, and we may experience significant delays in the clinical development and regulatory approval of our product candidates. If we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.\****

The time required to obtain approval by the FDA and comparable foreign authorities is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. We have not obtained

regulatory approval for any product candidate and it is possible that none of our existing product candidates or any product candidates we may seek to develop in the future will ever obtain regulatory approval.

We have not previously submitted a biologics license application, or BLA, to the FDA, or similar approval filings to comparable foreign authorities. A BLA must include extensive preclinical and clinical data and supporting information to establish the product candidate's safety, purity and potency for each desired indication. The BLA must also include significant information regarding the chemistry, manufacturing and controls for the product. Clinical testing is expensive, time-consuming and uncertain as to outcome. We have experienced in the past delays in the commencement and completion of our clinical trials. 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. In addition to challenges related to patient enrollment, other events that may prevent successful or timely completion of clinical development include:

- the availability of financial resources to commence and complete our planned clinical trials;
- delays in reaching a consensus with clinical investigators on study design;
- delays in reaching a consensus with regulatory agencies on study design or approval from regulatory authorities to commence a trial;
- reaching agreement on acceptable terms with prospective clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different clinical trial sites;
- delays in obtaining required IRB and/or biologic safety committee approval at each clinical trial site;
- imposition of a clinical hold by regulatory agencies, after an inspection of our clinical trial operations or study sites, or otherwise;
- failure by our CROs, other third parties or us to adhere to clinical trial requirements;
- failure to perform in accordance with the FDA's good clinical practices, or GCP, or applicable regulatory guidelines in other countries;
- failure to adequately acquire, preserve and quality assure clinical trial data;
- delays in the testing, validation, manufacturing and delivery of our product candidates to the clinical sites;
- inadequate shipping or storage of our products, resulting in loss of activity;
- delays in having patients complete participation in a study or return for post-treatment follow-up;
- clinical trial sites dropping out of a study;
- changes in legislation or regulatory requirements and guidance that require amending or submitting new clinical protocols; and
- technical equipment and/or operating room supply limitations at a clinical trial site.

We could also encounter delays if physicians encounter unresolved ethical issues associated with enrolling patients in clinical trials of our product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles. Further, a clinical trial may be suspended or terminated by us, the IRBs for the institutions in which such clinical trials are being conducted, the Data Safety Monitoring Committee for such clinical trial, the FDA or other regulatory authorities due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or clinical trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product candidate, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. If we experience termination of, or delays in the completion of, any clinical trial of our product candidates, the commercial prospects for our product candidates will be harmed, and our ability to generate product revenue will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow down our product development and approval process and jeopardize our ability to commence product sales and generate revenue.

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 could also shorten any periods during which we may have patent protection rights to commercialize our product candidates or allow our competitors to bring products into clinical trials or to market before we

do, which could impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

***Our clinical trials may fail to demonstrate safety and efficacy and any of our product candidates could be associated with undesirable side effects or other properties, which would prevent or delay regulatory approval and commercialization.\****

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we or our strategic partner must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates in humans. Failure can occur at any time during a clinical trial process. The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials. There is typically an extremely high rate of attrition from the failure of product candidates proceeding through clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy profile despite having progressed through preclinical testing and initial clinical trials. Most product candidates that commence clinical trials are never approved as products.

In addition, from time to time, we may publish interim, “top-line,” initial, or preliminary data from our clinical studies. Interim data from clinical trials are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data becomes available. Preliminary, initial, or “top-line” data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim, “top-line,” initial, and preliminary data should be viewed with caution until the final data are available. Adverse changes between preliminary, initial, “top-line” or interim data and final data could significantly harm our business prospects. In the 127 patients who received Toca 511 and Toca FC in our Phase 1 clinical trials, treatment-related adverse events were reported in 57.5% of patients and these events were predominantly low grade (48.8%). The most common treatment-related adverse events were fatigue (29.9%), diarrhea (14.2%), nausea (11.0%), headache (7.1%), and decreased appetite (5.5%). Treatment-related serious adverse events were reported in 7.1% of patients treated with Toca 511 and Toca FC. In patients that received both Toca 511 and Toca FC, hematologic toxicity was infrequent and also low grade. Patients treated with our product candidates may also be undergoing surgical, radiation and chemotherapy treatments, which can cause side effects or adverse events that are unrelated to our product candidate, but may still impact the success of our clinical trials. Additionally, our product candidates could potentially cause other adverse events that have not yet been predicted. The inclusion of critically ill patients in our or our partner’s clinical trials may result in deaths or other adverse medical events due to other therapies or medications that such patients may be using or due to the gravity of such patients’ illnesses. Patients who will be administered Toca 511 & Toca FC in the high grade glioma, or HGG, clinical trials are seriously or terminally ill and some of them may have immune impairment related to their treatment with temozolomide and dexamethasone. It is expected that some of the patients will die or experience major clinical events such as strokes, hydrocephalus, infections, brain swelling and pulmonary emboli either during the course of our or our partner’s clinical trials or after such trials, which has occurred in the past. In some patients with evidence of drug activity from Toca 511 & Toca FC, new lesions have been observed, some of which continue to grow even with continued Toca FC treatment.

Further, the design of our ongoing Phase 3 clinical trial of Toca 511 & Toca FC was based in part on survival data from similar patients in published trials. The prognosis, unrelated to our treatment, for our patients could be better than for patients in these prior trials, due to improvements in clinical practice, other experimental trials or underappreciated differences in entry criteria. In addition, the clinical or regulatory opinion on what constitutes the standard of care that we have used as the basis for the control arm in this clinical trial may change before we submit the BLA for Toca 511 & Toca FC, if the clinical trial is successful.

It is possible that our retroviral replicating vector, or RRV, product candidates will spread to healthy tissues and result in unknown side effects, and that any anticipated or unanticipated side effects may occur at doses required to achieve clinically relevant efficacy, which could prohibit or delay commercialization of our product candidates. Alternatively, our RRV product candidates might not spread rapidly enough through the tumor or transfer sufficient genetic material to the tumor to demonstrate efficacy sufficient for regulatory approval. In preclinical studies in rodent models, we observed that our vectors do not initially infect tumors in some locations as well as they infect tumors in other locations, which may limit treatment with our future product candidates to a limited number of cancer locations. Further, it is possible that the RRV might not spread fast enough through the brain cancer to have a beneficial effect or that the virus might not be able to reach certain parts of the tumor due to prior surgical removal of contiguous cancer tissue or from scarring resulting from surgery, chemotherapy, radiation or spontaneous tumor necrosis (cell death) or due to mechanical limitations such as the inability to insert the needle accurately into tissue bearing the tumor; the inability to push enough RRV volume into a tumor with a high pressure; the rapid diffusion of RRV from the injection site due to high intratumor pressure or due to the communication with the ventricular space, external cerebral spinal fluid or the entry into veins; or the inability to insert the needle into the tumor without damaging vital brain structures. It is possible that the cancers which we seek to treat with our product candidates will be or become resistant to infection with the virus or become resistant to the 5-FU (5-fluorouracil) produced from Toca FC, due to mutation within the cancer cells genes or due to mutation of Toca 511, including loss of the therapeutic gene, cytosine deaminase.

If the results of our or our partner's clinical trials are inconclusive or if there are safety concerns or 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 with 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 their approval of the product or impose restrictions on its distribution in the form of a modified Risk Evaluation and Mitigation Strategy, or REMS;
- be subject to product liability or other litigation claims; or
- experience damage to our reputation.

***In third-party clinical trials involving other viral vectors for gene therapy, some patients experienced serious adverse events, including the development of leukemia due to vector-related insertional oncogenesis and death. If our vectors demonstrate a similar effect, we may be required to halt or delay clinical development of our product candidates.\****

Existing data on the safety and efficacy of gene therapy is very limited and sometimes include historically poor clinical efficacy of previous non-replicating gene therapy products. In addition, there have been publicized safety issues associated with previous gene therapy products in third-party clinical trials, including patient deaths. The results of preclinical and clinical trials performed for our product candidates do not definitively predict safety or efficacy in humans. Possible serious side effects of other viral vector-based gene therapy therapies in general include uncontrolled viral infections and the development of cancer, particularly lymphoma or leukemia.

A significant risk in any gene therapy product based on viral vectors that integrate into the host genome at measurable frequencies is that the vector will insert near cancer-linked oncogenes leading to uncontrolled clonal proliferation of mature cancer cells in the patient. For example, in 2003, 20 patients treated for X-linked severe combined immunodeficiency in two gene therapy studies conducted by third parties using a murine gamma-retroviral vector showed correction of the disease, but the studies were terminated after five patients developed leukemia. The cause of these adverse events was believed to be related to insertional oncogenesis, which is the process whereby the corrected gene inserts near a gene that is important in a critical cellular process like growth or division, and this insertion results in the development of a cancer (often leukemia). A potential clinical concern for gene therapy using retroviral vectors has been the possibility of insertional mutagenesis by the vectors, leading to malignant transformation of transduced cells (i.e., cancer). Because our replicating retroviruses produce viral antigens, these foreign proteins could serve as a target for immune activation against virally-infected cells and inflammation, which is not a feature of non-replicating retroviral vectors. In addition, we have not, and do not plan to, treat patients with severe immunodeficiency with our product candidates. Further, with our lead product candidate, Toca FC kills the virally-infected cells and presents the antigens. We believe that we have not observed oncogenesis in the patients treated in our clinical trials to date for these reasons. Our future product candidates are also designed to activate the immune system against virally-infected cells.

It is possible Toca 511 may spread to non-tumor tissue. We have detected transient and low levels of viral sequences in the saliva of several patients. The risk of insertional mutagenesis or oncogenesis remains a significant concern for gene therapy, and we cannot provide any assurance that it will not occur in any of our current, planned or future clinical trials. There is also the potential risk of delayed adverse events following exposure to gene therapy products due to persistent biological activity of the genetic material or other components of products used to carry the genetic material. If any such adverse events occur, further advancement of our clinical trials could be halted or delayed, which would have a material adverse effect on our business and operations.

***We may not be successful in our efforts to identify or discover additional product candidates from our gene therapy platform.***

The success of our business depends primarily upon our ability to identify, develop and commercialize products based on our gene therapy platform. Although our Toca 511 & Toca FC product candidate is currently in clinical development, our research programs may fail to identify other potential product candidates for clinical development. Our research methodology may be unsuccessful in identifying potential product candidates, or our potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval. If any of

these events occur, we may be forced to abandon our development efforts for a program or programs, which would have a material adverse effect on our business and could potentially cause us to cease operations.

***We rely, and expect to continue to rely, on third parties to conduct, supervise and monitor our clinical trials, and if these third parties perform in an unsatisfactory manner, it may harm our business.***

We rely on CROs and clinical trial sites to ensure our clinical trials are conducted properly and on time. While we have agreements governing their activities, we may have limited influence over their actual performance. We control only certain aspects of our CROs' activities. Nevertheless, we are responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

We and our CROs are required to comply with the GCPs for conducting, recording, auditing and reporting the results of clinical trials to assure that the data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. The FDA enforces these GCPs through periodic inspections of study sponsors, principal investigators and clinical trial sites. If we or our CROs fail to comply with applicable GCPs, the clinical data generated in our future clinical trials may be deemed unreliable, and the FDA may require us to perform additional clinical trials before approving any marketing applications. Upon inspection, the FDA may determine that our clinical trials did not comply with GCPs. In addition, our ongoing and future clinical trials will require a sufficient number of test subjects to evaluate the safety and effectiveness of our product candidates. Accordingly, if our CROs fail to comply with these regulations or fail to recruit a sufficient number of patients, we may be required to repeat such clinical trials, which would delay the regulatory approval process.

Our CROs are not our employees, and we are not able to directly monitor whether or not they devote sufficient time and resources to our clinical and nonclinical programs. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other drug development activities that could harm our competitive position. If our CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to their failure to adhere to our clinical protocols or regulatory requirements, or for any other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize our product candidates. As a result, our financial results and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenues could be delayed.

***We expect to continue to rely on third parties to distribute, manufacture and perform release testing for our vectors, product candidates and other key materials and if such third parties do not carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approvals for our product candidates.\****

We intend to continue to rely on third-party contract manufacturing organizations, or CMOs, to produce our vectors, product candidates and other key materials and on third-party contract testing organizations, or CTOs, for the establishment and performance of validated product release assays, but we have not entered into commercial supply agreements with any such CMOs or CTOs. Additionally, any CMO may not have experience or availability to produce adequate product candidates at commercial levels and may not achieve the necessary regulatory approvals or produce our vectors and products at the quality, quantities, locations and timing needed to support commercialization. We may change our manufacturing process from the current defined media process to a different defined media process, or from its current equipment to different equipment, or our cell line or vector and there can be no guarantee that the regulatory authorities will approve this new process in a timely manner, or ever. Also, as a consequence of the manufacturing change, there may be a requirement to do more preclinical safety or efficacy studies, develop new manufacturing and release assays and/or repeat all or part of the ascending dose safety study in animals or humans. Regulatory requirements ultimately imposed could adversely affect our ability to test, manufacture or market products.

We have not yet secured manufacturing capabilities for commercial quantities of our viral vector. Although we intend to rely on third-party manufacturers for commercialization, we currently utilize a sole-source manufacturer to support our clinical trials. We may be unable to negotiate binding agreements with this manufacturer or additional manufacturers to support our commercialization activities at commercially reasonable terms.

No manufacturer we know of currently has the direct experience or the demonstrated ability to produce our vectors and product candidates at reasonable commercial levels or under full commercial requirements. We have developed in-house, a more scalable manufacturing process for Toca 511, which we have transferred to one or more CMOs. We may run into technical or scientific issues related to manufacturing or development that we may be unable to resolve in a timely manner or with available funds. Further, we have not completed the characterization and validation activities necessary for commercial and regulatory approvals. If our manufacturing and testing partners do not satisfy such regulatory requirements, our commercialization efforts may be harmed.

Similarly, we currently have a single manufacturer of the active pharmaceutical ingredient for Toca FC and another single manufacturer of the final drug product. We also rely on outside contractors to perform validated release testing for Toca FC. Currently we have not fully validated production of the drug product, Toca FC.

Even if we have developed manufacturing processes for Toca 511 and Toca FC and successfully implement them at third-party manufacturers, if such third-party manufacturers are unable to produce viral vectors and our product candidates in the necessary quantities, or in compliance with current good manufacturing practices, or cGMP, or in compliance with pertinent regulatory requirements, and within our planned time frame and cost parameters, the development and sales of our products, if approved, may be materially harmed. The facilities used by our contract manufacturers to manufacture our product candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit our BLA to the FDA. We do not directly control the manufacturing process of, and are completely dependent on, our contract manufacturing partners for compliance with cGMPs for the manufacture of our product candidates. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved. In addition, any failure to achieve and maintain compliance with these laws, regulations and standards could subject us to the risk that we may have to suspend the manufacturing of our product candidates or that obtained approvals could be revoked, which would adversely affect our business and reputation.

In addition, any significant disruption in our supplier relationships could harm our business. We source key materials, devices and equipment from third parties, either directly through agreements with suppliers or indirectly through our manufacturers who have agreements with suppliers. There are a small number of suppliers for certain key materials, equipment, software and components that are used to manufacture our product candidates. Such suppliers may not sell these key materials to our manufacturers at the times or quantities we need them or on commercially reasonable terms. We may not have any control over the process, quality or timing of the acquisition of these key materials by our manufacturers.

We also expect to rely on other third parties to store and distribute our vectors and products for our clinical trials. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our product candidates or commercialization of our products, if approved, producing additional losses and depriving us of potential product revenue.

***Our reliance on third parties may require us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.***

Because we rely on third parties to manufacture our vectors and our product candidates, and because we collaborate with various organizations and academic institutions on the advancement of our gene therapy platform, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our manufacturers, collaborators, advisors, employees and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, are used inappropriately to create new inventions or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

In addition, these agreements typically restrict the ability of our collaborators, advisors, employees and consultants to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data, provided that we are notified in advance and may delay publication for a specified time in order to secure our intellectual property rights arising from the collaboration. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development partnerships or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets through breach of these agreements, independent development or publication of information including our trade secrets in cases where we do not have proprietary or otherwise protected rights at the time of publication. A competitor's discovery of our trade secrets may impair our competitive position and have an adverse impact on our business.

***We are dependent on ApolloBio to develop and commercialize Toca 511 & Toca FC within the greater China region, including mainland China, Hong Kong, Macao and Taiwan. Failure of ApolloBio or any other third parties to successfully develop and commercialize Toca 511 & Toca FC in the applicable jurisdictions could have a material adverse effect on our business.\****

We have granted ApolloBio an exclusive license to develop and commercialize Toca 511 & Toca FC within the greater China region, including mainland China, Hong Kong, Macao and Taiwan. We have limited contractual rights to force ApolloBio to invest significantly in the development and commercialization of Toca 511 & Toca FC.

In the event that ApolloBio or any other third party with any future development and commercialization rights to any of our product candidates fails to adequately develop and commercialize those product candidates because they lack adequate financial or other resources, decide to focus on other initiatives or otherwise, our ability to successfully develop and commercialize our product candidates in the applicable jurisdictions would be limited, which would adversely affect our business, financial condition, results of operations and prospects. In addition, our license agreement with ApolloBio may be terminated by either party upon a material breach by the other party that remains uncured following 60 days (or, with respect to any payment breach, 10 days) after the date of written notice of such breach, may be terminated by ApolloBio at any time by providing us 90 days' prior written notice and may be terminated by us upon written notice to ApolloBio under specified circumstances if ApolloBio challenges the licensed patent rights. If we or ApolloBio terminate our license agreement, our ability to develop and commercialize Toca 511 & Toca FC within the greater China region, including mainland China, Hong Kong, Macao and Taiwan, would be materially harmed.

***Any adverse developments that occur during any clinical trials conducted by ApolloBio may affect our ability to obtain regulatory approval or commercialize Toca 511 & Toca FC.\****

ApolloBio retains the rights to develop and commercialize Toca 511 & Toca FC in the greater China region, including mainland China, Hong Kong, Macao and Taiwan. If serious adverse events occur during any clinical trials ApolloBio decides to conduct with respect to Toca 511 & Toca FC, the FDA and other regulatory authorities may delay, limit or deny approval of Toca 511 & Toca FC or require us to conduct additional clinical trials as a condition to marketing approval, which would increase our costs. If we receive FDA approval for Toca 511 & Toca FC and a new and serious safety issue is identified in connection with clinical trials conducted by ApolloBio, the FDA and other regulatory authorities may withdraw their approval of the product or otherwise restrict our ability to market and sell our product. In addition, treating physicians may be less willing to administer our product due to concerns over such adverse events, which would limit our ability to commercialize Toca 511 & Toca FC. ApolloBio is not currently conducting any clinical trials of Toca 511 & Toca FC.

***We face intense competition and rapid technological change and the possibility that our competitors may develop therapies that are more advanced or effective than ours, which may adversely affect our financial condition and our ability to successfully commercialize our product candidates.***

We are engaged in developing gene therapies and cancer immunotherapies, which are rapidly evolving and fiercely competitive fields. A wide variety of institutions in the United States and internationally, including major multinational pharmaceutical companies, specialty biotechnology companies, academic research departments and public and private institutions, are actively developing potentially competitive technology and products. We face substantial competition from biotechnology and pharmaceutical companies developing products in immunotherapy and our initial proposed indication. Our competitors generally fall into the following categories: companies developing checkpoint inhibitors; companies developing immunotherapies; companies aimed at stimulating immune responses; companies developing CAR and TCR T cells; companies developing oncolytic virus-based technology; and companies with a focus on HGG.

Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations. Accordingly, our competitors may be more successful than us in obtaining approval for treatments and achieving widespread market acceptance, rendering our treatments obsolete or non-competitive. These companies also compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials and acquiring technologies complementary to, or necessary for, our programs. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

If these competitors develop and commercialize more effective, safer or less toxic products than us or if they obtain regulatory approval before us in key geographies, our commercial opportunities could be substantially limited. In addition, adverse clinical outcomes or similar events at gene therapy companies in the past have adversely affected other companies in this field and could also do so in the future at our company.

***Even if we obtain regulatory approval of our product candidates, the products may not gain market acceptance among physicians, patients, hospitals, cancer treatment centers, third-party payors and others in the medical community.\****

Ethical, social and legal concerns about gene therapy and genetic research could result in additional regulations restricting or prohibiting the products and processes we may use. Even with the requisite approvals, the commercial success of our product candidates will depend in part on the medical community, patients, and third-party payors accepting gene therapy products in general, and our product candidates in particular, as medically useful, cost-effective and safe. Any product that we bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable. The degree of market acceptance of these product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the clinical indications for which our product candidates are approved;
- physicians, hospitals, cancer treatment centers and patients considering our product candidates as a safe and effective treatment;
- the potential and perceived advantages of our product candidates over alternative treatments;
- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA;
- the timing of market introduction of our product candidates as well as competitive products;
- the pricing and cost-effectiveness of our product candidates as well as the cost of treatment in relation to alternative treatments;
- the availability of favorable coverage and adequate reimbursement by third-party payors and government authorities;
- the willingness of patients to pay out-of-pocket in the absence of coverage or adequate reimbursement by third-party payors, including government authorities;
- the willingness, ability and availability of healthcare providers that can comply with the transportation, handling, and temperature-controlled storage requirements associated with our product candidates;
- relative convenience and ease of administration, including as compared to alternative treatments and competitive therapies; and
- the effectiveness of our sales and marketing efforts.

Even if a potential product displays a favorable efficacy and safety profile in preclinical and clinical trials, market acceptance of the product will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of the product candidates may require significant resources and may never be successful. Such efforts to educate the marketplace may require more resources than are required by the conventional technologies marketed by our competitors and may be restricted by the allowed label.

***We are highly dependent on our key personnel, and if we are not successful in attracting and retaining highly qualified personnel, we may not be able to successfully implement our business strategy.***

Our ability to compete in the highly competitive biotechnology and pharmaceutical industries depends upon our ability to attract and retain highly qualified managerial, scientific and medical personnel. We are highly dependent on our management, scientific and medical personnel. The loss of the services of any of our executive officers, other key employees and other scientific and medical advisors, and our inability to find suitable replacements, could result in delays in product development and harm our business.

To induce valuable employees to remain at our company, in addition to salary and cash incentives, we have provided stock options that vest over time. The value to employees of stock options that vest over time may be significantly affected by movements in our stock price that are beyond our control and may at any time be insufficient to counteract more lucrative offers from other companies. Despite our efforts to retain them, valuable employees and members of our management, scientific and development teams may terminate their employment with us at any time, with or without notice. We do not maintain “key man” insurance policies on the lives of any of our executive officers or other employees. Our success also depends on our ability to continue to attract, retain and motivate highly skilled scientific and medical personnel.



***We will need to expand our organization and we may experience difficulties in managing this growth, which could disrupt our operations.\****

As of September 30, 2018, we had 75 full-time employees. As our development and commercialization plans and strategies develop, and as we continue operating as a public company, we expect to need additional managerial, operational, sales, marketing, financial and other personnel. Future growth would impose significant added responsibilities on members of management. There are a small number of individuals with experience in gene therapy and clinicians who have successfully developed drugs and the competition for such individuals is high. Our future financial performance and our ability to commercialize our product candidates will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities. We currently rely, and for the foreseeable future will continue to rely on certain independent organizations, advisors and consultants to provide certain services, including substantially all aspects of regulatory approval, clinical management and manufacturing. There can be no assurance that the services of independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval of our product candidates or otherwise advance our business. There can be no assurance that we will be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, or at all.

If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, we may not be able to successfully implement the tasks necessary to further develop and commercialize our product candidates and, accordingly, may not achieve our research, development and commercialization goals.

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

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

***We currently have a very limited marketing and sales organization. If we are unable to expand our marketing and sales capabilities or enter into agreements with third parties to market and sell our product candidates, we may not be able to generate product revenue.\****

We currently have very limited sales, marketing and distribution capabilities. At the appropriate time, we plan to build a commercial infrastructure targeting oncologists, neuro-oncologists and neurosurgeons and related clinicians and health care workers in leading and regional cancer centers in the United States, which will require significant capital expenditures, management resources and time. ApolloBio retains the rights to develop and commercialize Toca 511 & Toca FC in the greater China region, including mainland China, Hong Kong, Macao and Taiwan. We may build our own commercial infrastructure in other territories or consider additional opportunities to enter into out-licensing or co-promotion agreements with other pharmaceutical or biotechnology companies to develop and/or commercialize our product candidates outside the United States. We will have to compete with other pharmaceutical and biotechnology companies to recruit, hire, train and retain marketing and sales personnel.

If we are unable or decide not to establish internal sales, marketing and distribution capabilities, we will pursue collaborative arrangements regarding the sales and marketing of our products, however, there can be no assurance that we will be able to establish or maintain such collaborative arrangements, or if we are able to do so, that they will have effective sales forces. Any revenue we receive will depend upon the efforts of such third parties, which may not be successful. We may have little or no control over the marketing and sales efforts of such third parties, and our revenue from product sales may be lower than if we had commercialized our product candidates ourselves. We also face competition in our search for third parties to assist us with the sales and marketing efforts of our product candidates.

There can be no assurance that we will be able to develop in-house sales and distribution capabilities or establish or maintain relationships with third-party collaborators to commercialize any product in the United States or elsewhere.

***A variety of risks associated with marketing our product candidates internationally could materially adversely affect our business.***

We plan to seek regulatory approval of our product candidates outside of the United States and, accordingly, we expect that we will be subject to additional risks related to operating in foreign countries if we obtain the necessary approvals, including:

- differing regulatory requirements and reimbursement regimes in foreign countries;
- unexpected changes in tariffs, trade barriers, price and exchange controls and other regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenue, and other obligations incident to doing business in another country;
- difficulties staffing and managing foreign operations;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- potential liability under the Foreign Corrupt Practices Act of 1977 or comparable foreign regulations;
- challenges enforcing our contractual and intellectual property rights, especially in those foreign countries that do not respect and protect intellectual property rights to the same extent as the United States;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geo-political actions, including war and terrorism.

These and other risks associated with our international operations may materially adversely affect our ability to attain or maintain profitable operations.

***The terms of our Loan Agreement place restrictions on our operating and financial flexibility.\****

In May 2018, we entered into a Loan Agreement with Oxford Finance LLC and Silicon Valley Bank, as amended in August 2018, which is secured by substantially all of our assets other than our intellectual property (except rights to payment from the sale, licensing or disposition of such intellectual property). We borrowed \$26.5 million upon execution of the Loan Agreement. Approximately \$8.6 million of the proceeds received was used to repay the outstanding principal, interest and final payment fees owed under our prior loan and security agreement.

The Loan Agreement includes affirmative and negative covenants applicable to us and any subsidiaries we create in the future. The affirmative covenants include, among others, covenants requiring us to maintain our legal existence and governmental approvals, deliver certain financial reports, maintain insurance coverage, and subject all of our deposit accounts, securities accounts, commodity accounts or any other bank accounts, to a control agreement in favor of Oxford Finance LLC. The negative covenants include, among others, restrictions on us transferring collateral, incurring additional indebtedness, engaging in mergers or acquisitions, paying dividends in cash or making other distributions, making investments, creating liens, selling assets, and suffering a change in control, in each case subject to certain exceptions.

The Loan Agreement also includes events of default, the occurrence and continuation of which provide Oxford Finance LLC, as collateral agent, with the right to exercise remedies against us and the collateral securing the loans under the Loan Agreement, including foreclosure against our properties securing the Loan Agreement, including our cash, potentially requiring us to renegotiate our agreement on terms less favorable to us or to immediately cease operations. These events of default include, among other things, our failure to pay any amounts due under the Loan Agreement, a breach of covenants under the loan and security agreement, our insolvency, impairment in the perfection or priority of each lender's security interest in the collateral, the occurrence of any default under certain other indebtedness in an amount greater than \$250,000, our failure to obtain or maintain material governmental approvals, and a final judgment against us of at least \$250,000. Further, if we are liquidated, the lender's right to repayment would be senior to the rights of the holders of our common stock to receive any proceeds from the liquidation. The lenders could declare a default upon the occurrence of any event that they interpret as a material adverse change as defined under the Loan Agreement, thereby requiring us to repay the loan immediately or to attempt to reverse the declaration of default through negotiation or litigation. Any declaration by the lenders of an event of default could significantly harm our business and prospects and could cause the price of our common stock to decline.

***If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.***

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. For example, we may be sued if our product candidates cause or are perceived to cause injury or are found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our product candidates;
- injury to our reputation;
- withdrawal of clinical trial participants;
- initiation of investigations by regulators;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to clinical trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- exhaustion of any available insurance and our capital resources;
- loss of revenue;
- the inability to commercialize any product candidate; and
- a decline in our share price.

Our inability to obtain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of any products we develop, alone or with corporate collaborators. We currently carry \$5 million of product liability insurance covering our clinical trials. Although we maintain such insurance, our insurance policies may have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We may have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts. Even if our agreements with any future corporate collaborators entitle us to indemnification against losses, such indemnification may not be available or adequate should any claim arise.

***Negative public opinion and increased regulatory scrutiny of gene therapy and genetic research may damage public perception of our product candidates or adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.***

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 specializing in the treatment of those diseases that our product candidates target prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments with which they are already familiar with and for which greater clinical data may be available. More restrictive government regulations or negative public opinion would have a negative effect on our business or financial condition and may delay or impair the development and commercialization of our product candidates or demand for any products we may develop. Adverse events in our clinical trials, even if not ultimately attributable to our product candidates, and the resulting publicity could lead to increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our potential product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates. Concern about environmental spread of our product, whether real or anticipated, may hinder the commercialization of our products.

***Our internal computer systems, or those used by our CROs, SaaS providers, contractors or consultants, may fail or suffer security breaches.***

Despite the implementation of security measures, our internal computer systems and those of our CROs, SaaS providers, contractors and consultants are vulnerable to damage from computer viruses and unauthorized access. While we have not experienced any such material system failure or security breach to date, if such an event were to occur and cause interruptions in our operations, it 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. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, and the further development and commercialization of our product candidates could be delayed.

***Our business could be negatively impacted by cyber security threats. \****

In the ordinary course of our business, we use our data centers and our networks to store and access our proprietary business information. We face various cyber security threats, including cyber security attacks to our information technology infrastructure and attempts by others to gain access to our proprietary or sensitive information. The procedures and controls we use to monitor these threats and mitigate our exposure may not be sufficient to prevent cyber security incidents. The result of these incidents could include disrupted operations, lost opportunities, misstated financial data, liability for stolen assets or information, increased costs arising from the implementation of additional security protective measures, litigation and reputational damage. Any remedial costs or other liabilities related to cyber security incidents may not be fully insured or indemnified by other means.

***Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.***

Our operations, and those of our CROs, contractors and consultants, could be subject to power shortages, telecommunications failures, wildfires, water shortages, floods, earthquakes, hurricanes, typhoons, fires, extreme weather conditions, medical epidemics and other natural or man-made disasters or business interruptions for which we are predominantly self-insured. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses. Our ability to obtain clinical supplies of our product candidates could be disrupted if the operations of our contract manufacturers or cell line storage facilities are affected by a man-made or natural disaster or other business interruption.

**Risks related to government regulation**

***The FDA may disagree with our regulatory plans, and we may fail to obtain regulatory approval of our product candidates. \****

Following receipt of Breakthrough Therapy Designation from the FDA, we redesigned our Phase 2/3 clinical trial of Toca 511 & Toca FC for the treatment of recurrent HGG to a single Phase 3 trial design and have included the 187 patients that were previously enrolled in the Phase 2/3 trial in the total of approximately 380 patients expected to enroll in the redesigned trial. The interim or final analyses of this trial alone could support approval of a BLA for Toca 511 & Toca FC in the indication of recurrent HGG. However, the general approach for FDA approval of a new biologic or drug is to require dispositive data from two adequate and well-controlled Phase 3 clinical trials of the biologic or drug in the relevant patient population.

In addition, we believe that it is likely that there may be a regulatory requirement for one or more diagnostic assays to monitor treatment, especially for the presence of Toca 511 & Toca FC or their components or derivatives. We plan to meet with the FDA to discuss the development of such assays, and it is possible that the FDA may require a separate regulatory approval for such assays contemporaneously with the approval of Toca 511 & Toca FC.

Our clinical trials results may not support approval. In addition, Toca 511 & Toca FC and our other product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials, including clinical endpoints;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- we may be unable to demonstrate that our product candidates' clinical and other benefits outweigh their safety risks or are better than recently produced safety or efficacy data for other products;
- we may encounter serious and unexpected adverse events during clinical trials that render our products unsafe for use in humans;

- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to the satisfaction of the FDA or comparable foreign regulatory authorities to support the submission of a BLA or other comparable submission in foreign jurisdictions or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve our manufacturing processes and/or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

***Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of our product candidates in other jurisdictions.\****

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction, while a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. For example, even if the FDA grants marketing approval of a product candidate, comparable regulatory authorities in foreign jurisdictions must also approve the manufacturing, marketing and promotion of the product candidate in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and greater than, those in the United States, including additional preclinical studies or clinical trials. Studies and clinical trials conducted in one jurisdiction or study group may not be accepted by regulatory authorities in other jurisdictions. In many jurisdictions outside the United States, a product candidate must be approved for reimbursement before it can be approved for sale in that jurisdiction. In some cases, the price that we intend to charge for our products is also subject to approval.

We may also submit marketing applications in other countries. Regulatory authorities in jurisdictions outside of the United States have requirements for approval of product candidates with which we must comply prior to marketing in those jurisdictions. Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our products in certain countries. If we fail to comply with the regulatory requirements in international markets and/or receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed.

***Additional time may be required to obtain regulatory approval for Toca 511 & Toca FC because it is a combination product.***

We believe our Toca 511 & Toca FC product candidate is regulated as a drug/biologic combination product, which will require coordination within the FDA and similar foreign regulatory agencies for review of their biologic and drug components and potentially one or more diagnostic assays to monitor treatment. Although the FDA and similar foreign regulatory agencies have systems in place for the review and approval of combination products such as ours, we may experience delays in the development and commercialization of our product candidates due to regulatory timing constraints and uncertainties in the product development and approval process.

***Even if we receive regulatory approval of our product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense, and we may be subject to penalties and/or withdrawal of product approval if we fail to comply with regulatory requirements or experience unanticipated problems with our product candidates.***

Any regulatory approvals that we receive for our product candidates will require surveillance to monitor the safety and efficacy of the product candidate. Specifically, we believe that it is likely that there may be a regulatory requirement for one or more diagnostic assays to monitor treatment, especially for the presence of Toca 511 or Toca FC or their components or derivatives. We plan to meet with the FDA to discuss the development of such assays, and it is possible that the FDA may require a separate regulatory approval for such assays. Further, each vector containing a particular gene could be regulated as a separate biologic depending on its intended use and FDA policy. The FDA may also require a REMS, in order to approve our product candidates, which could entail requirements for a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. In addition, if the FDA or a comparable foreign regulatory authority approves our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion, import, export and record keeping for our product candidates will be subject to extensive and ongoing regulatory requirements. These requirements include, among other things, submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGMPs for manufacturing and GCPs for any clinical trials that we conduct post-approval. Later discovery of previously unknown problems with our product candidates, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of our product candidates, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- fines, warning letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or suspension or revocation of license approvals;
- suspension or termination of manufacturing at one or more manufacturing facilities;
- product seizure or detention, or refusal to permit the import or export of our product candidates; and
- injunctions or the imposition of civil or criminal penalties.

The FDA's and other regulatory authorities' policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad.

***We have Orphan-Drug Designation for Toca 511 & Toca FC for the treatment of malignant glioma in addition to glioblastoma multiforme, or GBM, but we may be unable to maintain the benefits associated with Orphan-Drug Designation, including potential eligibility for any future market exclusivity.***

Under the Orphan-Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, which is defined as one occurring in a patient population of fewer than 200,000 in the United States, or a patient population greater than 200,000 in the United States for which there is no reasonable expectation that the cost of developing and making available in the United States a drug or biologic for a disease or condition will be recovered from sales in the United States for that drug or biologic. In the United States, Orphan-Drug Designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product that has Orphan-Drug Designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications to market the same biologic for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or where the manufacturer is unable to assure sufficient product quantity.

Toca 511 & Toca FC has Orphan-Drug Designation in the United States for the treatment of malignant glioma in addition to GBM. However, we are currently developing this product candidate for the treatment of recurrent HGG, of which GBM is a subset. Exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan designated indication and may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different products with different active moieties can be approved for the same condition. Even after an orphan product is approved, the FDA can subsequently approve the same product with the same active moiety for the same condition if the FDA concludes that the later product is safer, more effective or makes a major contribution to patient care. Orphan-Drug Designation neither shortens the development time or regulatory review time of a drug or biologic nor gives the drug or biologic any advantage in the regulatory review or approval process. In addition, while we may seek orphan designation for other product candidates, we may never receive such designations.

***A Fast Track Designation or Breakthrough Therapy Designation by the FDA or PRIME Designation by the EMA, may not actually lead to a faster development or regulatory review or approval process.***

If a product candidate is intended for the treatment of a serious or life-threatening condition and demonstrates the potential to address unmet medical needs for this condition, the drug sponsor may apply for FDA Fast Track Designation. Similarly, Breakthrough Therapy Designation may be granted by the FDA, or PRIME Designation may be granted by the EMA, to product candidates for serious conditions that have preliminary clinical evidence indicating the product candidate may offer substantial improvement over available therapy. The FDA and EMA have broad discretion whether or not to grant these designations, and even if we believe a particular product candidate is eligible for these designations, we cannot assure you that the FDA or EMA would decide to grant them. We have been granted Fast Track Designation and Breakthrough Therapy Designation for our Toca 511 & Toca FC product candidate for the treatment of recurrent HGG and PRIME designation for Toca 511 in glioma, but this is no assurance we will receive these designations for any future product candidates. Further, even though we have received these designations for Toca 511 & Toca FC, we may not experience a faster development process, review or approval compared to conventional FDA or EMA procedures. The FDA or EMA may withdraw these designations if it believes that they are no longer supported by data from our clinical development program.

***Our Toca 511 & Toca FC product may face competition sooner than anticipated, if approved.***

The Biologics Price Competition and Innovation Act, or BPCIA, created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product.

We believe that any of our product candidates approved as a biological product under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to congressional action or otherwise, or that the FDA will not consider our product candidates to be reference products for competing products, potentially creating the opportunity for competition sooner than anticipated. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing.

***We may be subject, directly or indirectly, to federal, state, local and foreign healthcare fraud and abuse laws, false claims laws, privacy laws and other applicable healthcare laws, and the failure to comply with such laws could result in substantial penalties. Our employees, independent contractors, consultants, principal investigators, CROs, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.\****

We are exposed to the risk of fraud, misconduct or other illegal activity by our employees, independent contractors, consultants, principal investigators, CROs, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to: comply with the laws of the FDA and other similar foreign regulatory bodies; provide true, complete and accurate information to the FDA and other similar foreign regulatory bodies; comply with manufacturing standards we have established; comply with federal and state data privacy, security, fraud and abuse and other healthcare laws and regulations in the United States and similar foreign fraudulent misconduct laws; or report financial information or data accurately or to disclose unauthorized activities to us.

In addition, our current and future operations are subject to regulation under such laws, and if we obtain FDA approval for any of our product candidates and begin commercializing those products in the United States, our potential exposure under such laws would increase significantly, along with our costs associated with compliance with such laws. These laws may impact, among other things, our current activities with principal investigators and research patients, as well as proposed and future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain business arrangements in the healthcare industry, are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, including off-label promotion of our products, structuring of commission(s), certain customer incentive programs and other business arrangements generally. Activities subject to these laws also involve the improper use or misrepresentation of information obtained in the course of patient recruitment for clinical trials, creating fraudulent data in our preclinical studies or clinical trials or illegal misappropriation of drug product, which could result in regulatory sanctions and cause serious harm to our reputation. The laws that may affect our ability to operate include, but are not limited to:

- the Federal Anti-Kickback Statute, which prohibits, among other things, individuals and entities from knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the civil False Claims Act, which impose criminal and civil penalties, through government, civil whistleblower or qui tam actions, on individuals and entities for, among other things, knowingly presenting, or causing to be presented, claims for payment or approval from Medicare, Medicaid, or other federal healthcare programs that are false, fictitious or fraudulent, or knowingly making, using or causing to be made or used, a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the Federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;
- the Federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private), willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false, fictitious or fraudulent statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters. Similar to the Federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses, as well as their respective business associates that perform services for them that involve the creation, use, maintenance or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization;
- the federal physician payment transparency requirements, sometimes referred to as the “Physician Payments Sunshine Act,” created under the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the Affordable Care Act, and its implementing regulations, which require certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children’s Health Insurance Program (with certain exceptions) to report annually to the Centers for Medicare and Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;
- the U.S. Federal Food, Drug and Cosmetic Act, or FD&C Act, which prohibits, among other things, the adulteration or misbranding of drugs and medical devices; and
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers.

Additionally, we are subject to state, local and foreign equivalents of each of the healthcare fraud and abuse laws described above, among others, some of which may be broader in scope and may apply regardless of the payor. We may also be subject to state,



local and foreign laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers; to report information related to payments and other transfers of value to healthcare providers or entities, or marketing expenditures; and require registration of pharmaceutical sales representatives. We may also be subject to state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts. In the European Union, the General Data Protection Regulation (2016/679), or GDPR applies to any organization established in the European Union, as well as to those outside of the European Union if they collect and use "personal data", or any information relating to an identified or identifiable natural person, in connection with the offering of goods or services to individuals in the European Union or the monitoring of their behavior. Under the GDPR, fines of up to 20 million Euros or up to 4% of the annual global turnover of the infringer, whichever is greater, could be imposed for significant non-compliance.

It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent inappropriate conduct 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. We are also subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. Efforts to ensure that our business arrangements will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and 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, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, individual imprisonment, additional reporting obligations and oversight if we become subject to a corporate integrity agreement or other agreement to resolve allegations of non-compliance with these laws, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. In addition, the approval and commercialization of any of our product candidates outside the United States will also likely subject us to foreign equivalents of the healthcare laws mentioned above, among other foreign laws.

***Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, if approved, which could make it difficult for us to sell our product candidates profitably.\****

Successful sales of our product candidates, if approved, depend on the availability of coverage and adequate reimbursement from third-party payors such as government authorities, including Medicare and Medicaid, private health insurers, and health maintenance organizations. Because our product candidates represent new approaches to the treatment of cancer, we cannot be sure that coverage and reimbursement will be available for, or accurately estimate the potential revenue from, our product candidates.

Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Coverage and adequate reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors are critical to new product acceptance.

Third-party payors decide which drugs and treatments they will cover and the amount of reimbursement. Coverage and reimbursement by a third-party payor may depend upon a number of factors, including, but not limited to, the third-party payor's determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors, and coverage and reimbursement for products can differ significantly from payor to payor. As a result, obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to each payor supporting scientific, clinical and cost-effectiveness data for the use of our products and to justify the level of coverage and reimbursement relative to other therapies, with no assurance that coverage and adequate reimbursement will be obtained. Third party payors may also have difficulty in determining the appropriate coverage of our product candidates, if approved, due to the fact that they are combination products that include a small molecule drug. To the extent there are any delays in

determining such coverage or inadequate coverage and reimbursement for all aspects of our combination therapies, it would adversely affect the market acceptance, demand and use of our product candidates.

A number of gene therapy products have been approved recently by the FDA. Although CMS subsequently approved a method of coverage and reimbursement for certain gene therapy products, it is difficult to predict how CMS may decide to cover and reimburse our product candidates, if approved. Often private payors follow the coverage and reimbursement decisions of the Medicare program, but also have their own methods and approval process. Therefore, coverage and reimbursement for can differ significantly from payor to payor and approval by one payor does not guarantee approval by another. Further, third-party payors' coverage and reimbursement determinations are subject to change. Any denial in coverage or reduction in reimbursement from Medicare or other government programs may result in a similar denial or reduction in payments from private payors, which may adversely affect our future profitability.

We intend to seek approval to market our product candidates in both the United States and in selected foreign jurisdictions. If we obtain approval in one or more foreign jurisdictions for our product candidates, we will be subject to rules and regulations in those jurisdictions. In some foreign countries, particularly those in the European Union, the pricing of biologics is subject to governmental control and other market regulations which could put pressure on the pricing and usage of our product candidates. In these countries, pricing negotiations with governmental authorities can take considerable time after obtaining marketing approval of a product candidate. In addition, market acceptance and sales of our product candidates will depend significantly on the availability of coverage and adequate reimbursement from third-party payors for our product candidates and may be affected by existing and future health care reform measures.

***Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.\****

Third-party payors, whether domestic or foreign, or governmental or commercial, are developing increasingly sophisticated methods of controlling healthcare costs. In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the health care system that could impact our ability to sell our products profitably. In particular, in 2010, the Affordable Care Act was enacted in the United States. The Affordable Care Act and its implementing regulations, among other things, subjected biological products to potential competition by lower-cost biosimilars, revised the methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics, including our product candidates, that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by most 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, and provided incentives to programs that increase the federal government's comparative effectiveness research.

Since its enactment, there have been judicial, Congressional and political challenges to certain aspects of the Affordable Care Act, as well as recent efforts by the Trump administration to repeal or replace certain aspects of the Affordable Care Act. Since January 2017, President Trump has signed two Executive Orders and other directives designed to delay the implementation of certain provisions of the Affordable Care Act or otherwise circumvent some of the requirements for health insurance mandated by the Affordable Care Act. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the Affordable Care Act have been signed into law. On December 22, 2017, President Trump signed into law new federal tax legislation which includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the Affordable Care Act on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate". Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain Affordable Care Act-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amends the Affordable Care Act, effective January 1, 2019, to close the coverage gap in most Medicare Part D drug plans, commonly referred to as the "donut hole". More recently, in July 2018, CMS published a final rule permitting further collections and payments to and from certain Affordable Care Act qualified health plans and health insurance issuers under the Affordable Care Act risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. Congress will likely consider other legislation to repeal or repeal and replace other elements of the Affordable Care Act. We continue to evaluate the effect that the Affordable Care Act and its possible repeal and replacement has on our business.

In addition, other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several

government programs. This includes aggregate reductions of Medicare payments to providers up to 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislation, including the BBA, will stay in effect through 2027 unless Congressional action is taken. In January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Moreover, payment methodologies including payment for any companion diagnostics may be subject to changes in healthcare legislation and regulatory initiatives. For example, CMS began bundling the Medicare payments for certain laboratory tests ordered while a patient received services in a hospital outpatient setting and, beginning in 2018, CMS has begun paying for clinical laboratory services based on a weighted-average of reported prices that private payors, Medicare Advantage plans and Medicaid Managed Care plans pay for laboratory services.

Further recently, there has been heightened governmental scrutiny over the manner in which drug manufacturers set prices for their marketed products, which has resulted in several 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 drug products. At the federal level, the Trump administration's budget proposal for fiscal year 2019 contains further product price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain products under Medicare Part B, to allow some states to negotiate product prices under Medicaid, and to eliminate cost sharing for generic products for low-income patients. Further, the Trump administration released a "Blueprint", or plan, to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase drug 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 United States Department of Health and Human Services has already started the process of soliciting feedback on some of these measures and, at the same, is immediately implementing others under its existing authority. For example, in September 2018, CMS announced that it will allow Medicare Advantage Plans the option to use step therapy for Part B drugs beginning January 1, 2019, and in October 2018, CMS proposed a new rule that would require direct-to-consumer television advertisements of prescription drugs and biological products, for which payment is available through or under Medicare or Medicaid, to include in the advertisement the Wholesale Acquisition Cost, or list price, of that drug or biological product. While some proposed measures will require authorization through additional legislation to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Further, on May 30, 2018, the Trickett Wendler, Frank Mongiello, Jordan McLinn, and Matthew Bellina Right to Try Act of 2017, or Right to Try Act, was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational new drug products that have completed a Phase I clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a drug manufacturer to make its drug products available to eligible patients as a result of the Right to Try Act.

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.

***Due to the novel nature of our technology and the small size of our initial target patient populations, we face uncertainty related to pricing and reimbursement for these product candidates.***

Our initial target patient populations are relatively small. As a result, the pricing and reimbursement of our product candidates, if approved, must be adequate to support commercial infrastructure. If we are unable to obtain adequate levels of reimbursement, our

ability to successfully market and sell our product candidates will be adversely affected. The manner and level at which reimbursement is provided for services related to our product candidates (e.g., for administration of our product to patients) is also important. Inadequate reimbursement for such services may lead to physician resistance and adversely affect our ability to market or sell our products.

***We and our contract manufacturers are subject to significant regulation with respect to manufacturing our products. The manufacturing facilities on which we rely may not continue to meet regulatory requirements and have limited capacity.\****

We currently have relationships with a limited number of suppliers for the manufacturing of our viral vectors and product candidates. Each supplier may require licenses to manufacture such components if such processes are not owned by the supplier or in the public domain and we may be unable to transfer or sublicense the intellectual property rights we may have or later obtain with respect to such activities.

All entities involved in the preparation of therapeutics for clinical trials or commercial sale, including our existing contract manufacturers for our product candidates, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or used in late-stage clinical trials must be manufactured in accordance with cGMP. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of adventitious agents or other contaminants, or to inadvertent changes in the properties or stability of our product candidates that may not be detectable in final product testing. We or our contract manufacturers must supply all necessary documentation in support of a BLA on a timely basis and must adhere to the FDA's good laboratory practices and cGMP regulations enforced by the FDA through its facilities inspection program. Some of our contract manufacturers have limited experience in production of commercially-approved products and therefore may have not obtained the requisite FDA approvals to do so. Our facilities and quality systems and the facilities and quality systems of some or all of our third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of our product candidates or any of our other potential products. In addition, the regulatory authorities may, at any time, audit or inspect a manufacturing facility involved with the preparation of our product candidates or our other potential products or the associated quality systems for compliance with the regulations applicable to the activities being conducted. If these facilities do not pass a pre-approval plant inspection, FDA approval of the products may not be granted.

The regulatory authorities also may, at any time following approval of a product for sale, audit our manufacturing facilities or those of our third-party contractors. If any such inspection or audit identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independent of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly and/or time-consuming for us or a third party to implement and that may include the temporary or permanent suspension of a clinical trial or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

If we or any of our third-party manufacturers fail to maintain regulatory compliance, the FDA can impose regulatory sanctions including, among other things, refusal to approve a pending application for a new drug product or biologic product or revocation of a pre-existing approval. As a result, our business, financial condition and results of operations may be materially harmed.

Additionally, if supply from one approved manufacturer is interrupted, there could be a significant disruption in commercial supply. An alternative manufacturer would need to be qualified through a BLA supplement which could result in further delay. The regulatory agencies may also require additional studies if a new manufacturer is relied upon for commercial production. Switching manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines.

These factors could cause the delay of clinical trials, regulatory submissions, required approvals or commercialization of our product candidates, cause us to incur higher costs and prevent us from commercializing our products successfully. Furthermore, if our suppliers fail to meet contractual requirements, and we are unable to secure one or more replacement suppliers capable of production at a substantially equivalent cost, our clinical trials may be delayed or we could lose potential revenue.

***If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.***

Our research and development, manufacturing processes, clinical trials and products may involve the controlled use of hazardous materials, chemicals, viruses and various radioactive compounds. Specifically, if our products or product candidates spread from human or companion pet patients to other people or pets, these other individuals or pets (such as the immune suppressed or the very young), might be more sensitive to the product or product candidate than the patient and may experience an adverse reaction. We

are subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of such materials and certain waste products, including numerous environmental, health and safety laws and regulations, such as those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials or other work-related injuries, this insurance may not provide adequate coverage against potential liabilities. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

### **Risks related to our intellectual property**

*If we are unable to protect our intellectual property rights or if our intellectual property rights are inadequate for our technology and product candidates, our competitive position could be harmed.*

Our commercial success will depend in part on our ability to obtain and maintain patent and other intellectual property protection in the United States and other countries with respect to our proprietary technology and products. We rely on trade secret, patent, copyright and trademark laws, and confidentiality, licensing and other agreements with employees and third parties, all of which offer only limited protection. We seek to protect our proprietary position by filing and prosecuting patent applications in the United States and abroad related to our novel technologies and products that are important to our business.

The patent positions of biotechnology and pharmaceutical companies generally are highly uncertain, involve complex legal and factual questions and have in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patents, including those patent rights licensed to us by third parties, are highly uncertain. The steps we or our licensors have taken to protect our proprietary rights may not be adequate to preclude misappropriation of our proprietary information or infringement of our intellectual property rights, both inside and outside of the United States. Further, the examination process may require us or our licensors to narrow the claims for our pending patent applications, which may limit the scope of patent protection that may be obtained if these applications issue. The rights already granted under any of our currently issued patents or those licensed to us and those that may be granted under future issued patents may not provide us with the proprietary protection or competitive advantages we are seeking. If we or our licensors are unable to obtain and maintain patent protection for our technology and products, or if the scope of the patent protection obtained is not sufficient, our competitors could develop and commercialize technology and products similar or superior to ours, and our ability to successfully commercialize our technology and products may be adversely affected. It is also possible that we or our licensors will fail to identify patentable aspects of inventions made in the course of our development and commercialization activities before it is too late to obtain patent protection on them. It is also possible that as research and development progresses, the direction of our intellectual property strategy and patent portfolio will change, resulting in strategic business decisions to allow certain patents or patent applications to be abandoned or lapse.

With respect to patent rights, we do not know whether any of the pending patent applications for any of our compounds or biologic products will result in the issuance of patents that effectively protect our technology or products, or if any of our issued patents or if any of our or our licensors' issued patents will effectively prevent others from commercializing competitive technologies and products. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing or in some cases not at all, until they are issued as a patent. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions.

Our pending applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications. Because the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, issued patents that we own or have licensed from third parties may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in the loss of patent protection, the narrowing of claims in such patents or the invalidity or unenforceability of such patents, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection for our technology and products. Protecting against the unauthorized use of our or our licensor's patented technology, trademarks and other intellectual property rights is

expensive, difficult and may in some cases not be possible. In some cases, it may be difficult or impossible to detect third-party infringement or misappropriation of our intellectual property rights, even in relation to issued patent claims, and proving any such infringement may be even more difficult.

***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 and inter partes reexamination 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 have asserted, and in the future may assert, that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. 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. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of any of our product candidates, 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 patent expires. In either case, such a license may not be available on commercially reasonable terms or at all.

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

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

Presently we believe that we have rights to the intellectual property, through licenses from third parties and under patents that we own, to develop our gene therapy product candidates. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business may 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. 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.

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 agreement under which we license intellectual property rights from the University of Southern California, or USC, or otherwise experience disruptions to our business relationships with USC or other future licensors, we could lose license rights that are important to our business.***

In October 2007, we entered into a license agreement with USC pursuant to which we received a worldwide, exclusive license to, among other things, manufacture and market products utilizing certain inventions that are critical to our business. We expect to

enter into additional license agreements in the future. Our existing license agreement imposes, and we expect that future license agreements will impose, various diligence, milestone payment, 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 which 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 certain cases, patent prosecution of our licensed technology may be 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.

***We may be involved in lawsuits 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 and/or is not infringed, 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 or interpreted narrowly and could put our patent applications at risk of not issuing.

Interference or derivation proceedings provoked by third parties or brought by us may be necessary to determine the priority of inventions 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. Our defense of litigation, interference or derivation 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.

***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 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 reputable law firms and other 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.

***Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court.***

If we, USC or one of our future 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 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 candidates. 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 would have a material adverse impact on our business.

***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 be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. We may have potential ownership disputes arising, for example, from conflicting obligations of consultants, collaborators or others who are involved in developing our product candidates. 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.

***Changes in U.S. 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 therefore



obtaining and enforcing biotechnology patents is costly, time-consuming and inherently uncertain. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. 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 and the U.S. PTO, 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 have not yet registered trademarks for a commercial trade name for Toca 511 & Toca FC, and failure to secure such registrations could adversely affect our business.***

We have not yet developed a proprietary name for our products nor registered trademarks for a commercial trade name for Toca 511 & Toca FC. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the U.S. PTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. Moreover, any name we propose to use with our product candidates in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed proprietary product names, we may be required to expend significant additional resources in an effort to identify a suitable substitute name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

***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.

#### **Risks related to ownership of our common stock**

***The market price of our common stock may be highly volatile, and you could lose all or part of your investment.***

The market price of our common stock is likely to be volatile. Our stock price could be subject to wide fluctuations in response to a variety of factors, including the following:

- adverse results or delays in preclinical or clinical trials;
- reports of adverse events in other gene therapy products or clinical trials of such products;
- inability to obtain additional funding;
- any delay in filing an IND or BLA for any of our product candidates and any adverse development or perceived adverse development with respect to the FDA's review of that IND or BLA;

- failure to develop successfully and commercialize our product candidates;
- failure to maintain our existing strategic collaboration or enter into new collaborations;
- failure by us or our licensors and strategic collaboration partners to prosecute, maintain or enforce our intellectual property rights;
- changes in laws or regulations applicable to future products;
- inability to obtain adequate product supply for our product candidates or the inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services or technologies by our competitors;
- failure to meet or exceed financial projections we may provide to the public;
- failure to meet or exceed the financial projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us, our strategic collaboration partners or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;
- changes in the market valuations of similar companies;
- sales of our common stock by us or our stockholders in the future; and
- trading volume of our common stock.

In addition, companies trading in the stock market in general, and The Nasdaq Global Select Market in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance.

***Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.\****

From time to time, global credit and financial markets have experienced extreme volatility and disruptions, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment and continued unpredictable and unstable market conditions. If the equity and credit markets deteriorate it may make any necessary debt or equity financing more difficult to complete, more costly, and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers and other partners may not survive an economic down-turn, which could directly affect our ability to attain our operating goals on schedule and on budget.

***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, including due to limitations that are currently imposed by our Loan Agreement. Any return to stockholders will therefore be limited to the appreciation of their stock.

***We are an emerging growth company, and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies will make our common stock less attractive to investors. \****

We are an emerging growth company, as defined in the Jumpstart Our Business Startups Act, or JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended, or the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years following the year in which we completed our initial public offering, although circumstances could cause us to lose that status earlier. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of our initial public offering (i.e. December 31, 2022), (b) in which we have total annual gross revenue of at least \$1.07 billion or (c) in which we are deemed to be a large accelerated filer, which requires the market value of our common stock that is held by non-affiliates to exceed \$700 million as of the prior June 30th, and (2) the date on which we have issued more than \$1 billion in non-convertible debt during the prior three-year period.

Even after we no longer qualify as an emerging growth company, we may still qualify as a “smaller reporting company” which would allow us to take advantage of many of the same exemptions from disclosure requirements including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, changes in rules of U.S. generally accepted accounting principles or their interpretation, the adoption of new guidance or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

***We will incur significant increased costs as a result of operating as a public company, and our management will be required to devote substantial time to existing and new compliance initiatives. \****

As a public company, we incur significant legal, accounting and other expenses that we did not incur as a private company. We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, which require, among other things, that we file with the SEC annual, quarterly and current reports with respect to our business and financial condition. In addition, the Sarbanes-Oxley Act, as well as rules subsequently adopted by the SEC and The NASDAQ Global Select Market to implement provisions of the Sarbanes-Oxley Act, impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas such as “say on pay” and proxy access. Recent legislation permits emerging growth companies to implement many of these requirements over a longer period and up to five years from the pricing of our initial public offering. We intend to take advantage of this legislation but cannot guarantee that we will not be required to implement these requirements sooner than budgeted or planned and thereby incur unexpected expenses. Stockholder activism, the current political environment and the current level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

We expect the rules and regulations applicable to public companies to continue to result in substantial legal and financial compliance costs and to make some activities more time-consuming and costly. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition and results of operations. These costs could decrease our net income or increase our net loss, and may require us to reduce costs in other areas of our business or increase the prices of our products or services. For example, these rules and regulations could make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain the same or similar coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers.

***Sales of a substantial number of shares of our common stock in the public market could cause our stock price to fall.\****

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market, the market price of our common stock could decline. We had 19,953,009 shares of common stock outstanding as of November 2, 2018. We are unable to predict the effect that sales may have on the prevailing market price of our common stock.

Sales of our common stock by current stockholders may make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem reasonable or appropriate, and make it more difficult for other stockholders to sell shares of our common stock. In addition, as of September 30, 2018, 4,005,128 shares of common stock that are either subject to outstanding options, reserved for future issuance under our equity incentive plans or subject to outstanding warrants will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules and Rule 144 and Rule 701 under the Securities Act. If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline.

***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.

Pursuant to our 2017 Equity Incentive Plan, or 2017 Plan, our management is authorized to grant stock options to our employees, directors and consultants. The number of shares of our common stock reserved for issuance under our 2017 Plan will automatically increase on January 1 of each year through and including January 1, 2027, by 4% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. Additionally, the number of shares of our common stock reserved for issuance under our 2017 Employee Stock Purchase Plan, or the ESPP, will automatically increase on January 1 of each year through and including January 1, 2027, by the lesser of 1% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, 300,000 shares or a lesser number of shares determined by our board of directors. Unless our board of directors elects not to increase the number of shares available for future grant each year under the 2017 Plan and the ESPP, our stockholders may experience additional dilution, which could cause our stock price to fall.

***We have broad discretion in the use of working capital and may not use it effectively.\****

Our management will have broad discretion in the application of working capital, and stockholders do not have the opportunity to assess whether working capital is being used appropriately. Because of the number and variability of factors that will determine our use of our working capital, its ultimate use may vary substantially from its currently intended use. Management might not apply working capital in ways that ultimately increase stockholder value. We intend to use our working capital to fund our Phase 3 clinical trial of Toca 511 & Toca FC in recurrent HGG, manufacturing scale-up and validation for Toca 511 & Toca FC, the other ongoing and planned clinical development and regulatory activities for Toca 511 & Toca FC and for other general corporate purposes. Failure by us to apply working capital effectively could harm our business. Pending its use, we may invest our working capital in short-term, investment-grade, interest-bearing securities. These investments may not yield a favorable return to our stockholders. If we do not invest or apply our working capital in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause our stock price to decline.

***The recently passed comprehensive tax reform bill could adversely affect our business and financial condition.***

On December 22, 2017, President Trump signed into law new legislation that significantly revises the Internal Revenue Code of 1986, as amended, or IRC. The newly enacted federal income tax law, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reducing the business tax credit for certain clinical testing expenses incurred in the testing of certain drugs for rare diseases or conditions). Notwithstanding the reduction in the corporate

income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is unknown if and to what extent various states will conform to the newly enacted federal tax law. The impact of this tax reform on holders of our common stock is likewise uncertain and could be adverse. We urge our stockholders to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

***Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.\****

As of December 31, 2017, we had federal and state net operating loss carryforwards of \$137.8 million and \$41.5 million, respectively. Our federal and state net operating loss carryforwards will begin to expire, if not utilized, in 2028. If these net operating loss carryforwards expire unused, they will be unavailable to offset future income and reduce future income tax liabilities. In addition, under the newly enacted federal income tax law, federal net operating losses incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such federal net operating losses is limited. It is uncertain if and to what extent various states will conform to the newly enacted federal tax law. Under Sections 382 and 383 of the IRC, if a corporation undergoes an “ownership change,” generally defined as a cumulative change in its equity ownership by “5-percent shareholders” of greater than 50 percentage points (by value) over a three-year period, the corporation’s ability to use its pre-change net operating loss carryforwards, or NOLs, and certain other pre-change tax attributes (such as research tax credits) to offset its post-change taxable income and taxes, as applicable, may be limited. We have completed an initial public offering and multiple rounds of financing since our inception which may have resulted in an ownership change or could result in an ownership change in the future. As of September 30, 2018, we have not completed a Section 382 and 383 analysis regarding any limitations on our NOLs and research and development credit carryforwards and such limitations could be significant. We may also experience ownership changes in the future as a result of subsequent shifts in our stock ownership. As a result, our ability to use our NOLs and research and development credit carryforwards to offset our U.S. federal taxable income and taxes, as applicable, may be subject to limitations, which could potentially result in increased future tax liability to us. In addition, at the state level, similar rules may apply and there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

***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. If one or more of the analysts who covers us downgrades our stock or publishes inaccurate or unfavorable research about our business, our stock price may decline. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

***Provisions in our amended and restated certificate of incorporation and amended and restated bylaws, as well as provisions of Delaware law, could make it more difficult for a third party to acquire us or increase the cost of acquiring us, even if doing so would benefit our stockholders or remove our current management.***

Our amended and restated certificate of incorporation, amended and restated bylaws and Delaware law contain provisions that may have the effect of delaying or preventing a change in control of us or changes in our management. Our amended and restated certificate of incorporation and amended and restated bylaws, include provisions that:

- permit our board of directors to issue up to 10,000,000 shares of preferred stock, with any rights, preferences and privileges as they may designate (including the right to approve an acquisition or other change in our control);
- provide that the authorized number of directors may be changed only by resolution of the board of directors;
- provide that the board of directors or any individual director may only be removed with cause and the affirmative vote of the holders of at least 66-2/3% of the voting power of all of our then outstanding common stock;
- provide that all vacancies, including newly created directorships, may, except as otherwise required by law, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- divide our board of directors into three classes;
- require that any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and not be taken by written consent;
- provide that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide notice in writing in a timely manner and also specify requirements as to the form and content of a stockholder’s notice;
- do not provide for cumulative voting rights (therefore allowing the holders of a majority of the shares of common stock entitled to vote in any election of directors to elect all of the directors standing for election, if they should so choose);

- provide that special meetings of our stockholders may be called only by the chairman of the board, our Chief Executive Officer or by the board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors; and
- provide that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors or officers to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law or our certificate of incorporation or bylaws, or (iv) any action asserting a claim against us governed by the internal affairs doctrine.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us.

Any provision of our amended and restated certificate of incorporation or amended and restated bylaws or Delaware law that has the effect of delaying or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our common stock, and could also affect the price that some investors are willing to pay for our common stock.

***Our amended and restated certificate of incorporation and amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the sole and exclusive forum for substantially all disputes between us and our stockholders, 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 certificate of incorporation and amended and restated bylaws provide that the Court of Chancery of the State of Delaware is the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a breach of fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders; (iii) any action asserting a claim against us or any of our directors, officers or other employees arising pursuant to the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws; or (iv) any action asserting a claim against us or any of our directors, officers or other employees that is governed by the internal affairs doctrine. The choice of forum provision may 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 such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation and amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business and financial condition.

***Because we have an even number of members of our board of directors, deadlocks may occur in our board of directors' decision-making process, which may delay or prevent critical decisions from being made.***

Since we have an even number of directors, deadlocks may occur when such directors disagree on a particular decision or course of action. Our amended and restated certificate of incorporation and amended and restated bylaws do not contain any mechanisms for resolving potential deadlocks. While our directors are under a duty to act in the best interest of our company, any deadlocks may impede the further development of our business in that such deadlocks may delay or prevent critical decisions regarding our business.

## **Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.**

### ***Use of Proceeds***

On April 12, 2017, our Registration Statement on Form S-1 (file No. 333-216574) was declared effective by the SEC for our initial public offering of common stock. We issued 9,775,000 shares of common stock at an offering price of \$10.00 per share for gross proceeds of \$97.8 million. After deducting underwriting discounts, commissions and offering costs incurred by us of \$10.8 million, the net proceeds from the offering were \$86.9 million. The offering was completed on April 19, 2017. The joint bookrunning managers for the offering were Leerink Partners LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated. No offering costs were paid or are payable, directly or indirectly, to our directors or officers, to persons owning 10% or more of any class of our equity securities, or to any of our affiliates.

There has been no material change in the expected use of the net proceeds from our initial public offering as described in our final prospectus filed with the SEC on April 13, 2017. Through the date hereof, we have used \$39.7 million of the net proceeds from the offering. Pending such uses, we plan to continue investing the unused proceeds from this offering in fixed, non-speculative income instruments.

**Item 6. Exhibits**

The following exhibits are filed as part of this Quarterly Report on Form 10-Q.

Exhibit Number	Description of Exhibit
3.1	<a href="#"><u>Amended and Restated Certificate of Incorporation of the Registrant, incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed on April 19, 2017.</u></a>
3.2	<a href="#"><u>Amended and Restated Bylaws of the Registrant, incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed on April 19, 2017.</u></a>
4.1	<a href="#"><u>Form of Common Stock Certificate of the Registrant, incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-1 (File No. 333-216574), as amended, originally filed with the Securities and Exchange Commission on March 9, 2017.</u></a>
4.2	<a href="#"><u>Warrant to Purchase Common Stock, dated June 5, 2013, issued to Voices Against Brain Cancer, incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-1 (File No. 333-216574), as amended, originally filed with the Securities and Exchange Commission on March 9, 2017.</u></a>
4.3†	<a href="#"><u>Research and Development Grant Agreement, dated June 5, 2013, by and between the Registrant and Voices Against Brain Cancer, incorporated by reference to Exhibit 4.3 of the Registrant's Registration Statement on Form S-1 (File No. 333-216574), as amended, originally filed with the Securities and Exchange Commission on March 9, 2017.</u></a>
4.4	<a href="#"><u>Warrant to Purchase Stock, dated October 30, 2015, issued to Oxford Finance LLC, incorporated by reference to Exhibit 4.4 of the Registrant's Registration Statement on Form S-1 (File No. 333-216574), as amended, originally filed with the Securities and Exchange Commission on March 9, 2017.</u></a>
4.5	<a href="#"><u>Warrant to Purchase Stock, dated October 30, 2015, issued to Silicon Valley Bank, incorporated by reference to Exhibit 4.5 of the Registrant's Registration Statement on Form S-1 (File No. 333-216574), as amended, originally filed with the Securities and Exchange Commission on March 9, 2017.</u></a>
4.6	<a href="#"><u>Warrant to Purchase Stock, dated May 18, 2018, issued to Oxford Finance LLC, incorporated by reference to Exhibit 4.6 of the Registrant's Quarterly Report on Form 10-Q filed on August 9, 2018.</u></a>
4.7	<a href="#"><u>Warrant to Purchase Stock, dated May 18, 2018, issued to Oxford Finance LLC, incorporated by reference to Exhibit 4.7 of the Registrant's Quarterly Report on Form 10-Q filed on August 9, 2018.</u></a>
4.8	<a href="#"><u>Warrant to Purchase Stock, dated May 18, 2018, issued to Oxford Finance LLC, incorporated by reference to Exhibit 4.8 of the Registrant's Quarterly Report on Form 10-Q filed on August 9, 2018.</u></a>
4.9	<a href="#"><u>Warrant to Purchase Stock, dated May 18, 2018, issued to Silicon Valley Bank, incorporated by reference to Exhibit 4.9 of the Registrant's Quarterly Report on Form 10-Q filed on August 9, 2018.</u></a>
10.1	<a href="#"><u>First Amendment to Amended and Restated Loan and Security Agreement, dated August 3, 2018, by and among the Registrant, Oxford Finance LLC and Silicon Valley Bank, incorporated by reference to Exhibit 10.3 of the Registrant's Quarterly Report on Form 10-Q filed on August 9, 2018.</u></a>
10.2+*	<a href="#"><u>Tocagen Inc. 2017 Equity Incentive Plan, as amended, and Forms of Stock Option Grant Notice, Option Agreement and Notice of Exercise thereunder.</u></a>
31.1*	<a href="#"><u>Certification of Principal Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act, as amended.</u></a>
31.2*	<a href="#"><u>Certification of Principal Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act, as amended.</u></a>
32.1*	<a href="#"><u>Certification of Principal Executive Officer and Principal Financial Officer pursuant to Rule 13a-14(b) or 15d-14(b) of the Securities Exchange Act, as amended, and 18 U.S.C. Section 1350.</u></a>
101.INS*	XBRL Instance Document.
101.SCH*	XBRL Taxonomy Extension Schema Document.
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document.
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document.

\* Filed herewith.

+ Indicates management contract or compensatory plan.

† Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

**SIGNATURES**

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

Date: November 8, 2018

**TOCAGEN INC.**

By: /s/ MARTIN J. DUVALL

Martin J. Duvall  
Chief Executive Officer  
(Principal Executive Officer)

By: /s/ MARK FOLETTA

Mark Foletta  
Chief Financial Officer  
(Principal Financial Officer)



## TOCAGEN INC.

## 2017 EQUITY INCENTIVE PLAN

ADOPTED BY THE BOARD OF DIRECTORS: MARCH 31, 2017

APPROVED BY THE STOCKHOLDERS: MARCH 31, 2017

AMENDED BY THE COMPENSATION COMMITTEE: SEPTEMBER 30, 2018

IPO DATE: APRIL 12, 2017

## 1. GENERAL.

**(a) Successor to and Continuation of Prior Plan.** The Plan is intended as the successor to and continuation of the Tocagen Inc. 2009 Equity Incentive Plan, as amended (the “*Prior Plan*”). From and after 12:01 a.m. Pacific time on the IPO Date, no additional stock awards will be granted under the Prior Plan. All Awards granted on or after 12:01 a.m. Pacific Time on the IPO Date will be granted under this Plan. All stock awards granted under the Prior Plan will remain subject to the terms of the Prior Plan.

**(i)** Any shares that would otherwise remain available for future grants under the Prior Plan as of 12:01 a.m. Pacific Time on the IPO Date (the “*Prior Plan’s Available Reserve*”) will cease to be available under the Prior Plan at such time. Instead, that number of shares of Common Stock equal to the Prior Plan’s Available Reserve will be added to the Share Reserve (as further described in Section 3(a) below) and will be immediately available for grants and issuance pursuant to Stock Awards hereunder, up to the maximum number set forth in Section 3(a) below.

**(ii)** In addition, from and after 12:01 a.m. Pacific time on the IPO Date, any shares subject, at such time, to outstanding stock awards granted under the Prior Plan that (i) expire or terminate for any reason prior to exercise or settlement; (ii) are forfeited because of the failure to meet a contingency or condition required to vest such shares or otherwise return to the Company; or (iii) are reacquired, withheld (or not issued) to satisfy a tax withholding obligation in connection with an award or to satisfy the purchase price or exercise price of a stock award (such shares the “*Returning Shares*”) will immediately be added to the Share Reserve (as further described in Section 3(a) below) as and when such shares become Returning Shares, up to the maximum number set forth in Section 3(a) below.

**(b) Eligible Award Recipients.** Employees, Directors and Consultants are eligible to receive Awards.

**(c) Available Awards.** The Plan provides for the grant of the following Awards: (i) Incentive Stock Options, (ii) Nonstatutory Stock Options, (iii) Stock Appreciation Rights, (iv) Restricted Stock Awards, (v) Restricted Stock Unit Awards, (vi) Performance Stock Awards, (vii) Performance Cash Awards, and (viii) Other Stock Awards.

**(d) Purpose.** The Plan, through the grant of Awards, is intended to help the Company secure and retain the services of eligible award recipients, provide incentives for such persons to exert maximum efforts for the success of the Company and any Affiliate, and provide a means by which the eligible recipients may benefit from increases in value of the Common Stock.

## 2. ADMINISTRATION.

**(a) Administration by Board.** The Board will administer the Plan. The Board may delegate administration of the Plan to a Committee or Committees, as provided in Section 2(c).

**(b) Powers of Board.** The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

**(i)** To determine: (A) who will be granted Awards; (B) when and how each Award will be granted; (C) what type of Award will be granted; (D) the provisions of each Award (which need not be identical), including when a person will be permitted to exercise or otherwise receive cash or Common Stock under the Award; (E) the number of shares of Common Stock subject to, or the cash value of, an Award; and (F) the Fair Market Value applicable to a Stock Award.

**(ii)** To construe and interpret the Plan and Awards granted under it, and to establish, amend and revoke rules and regulations for administration of the Plan and Awards. The Board, in the exercise of these powers, may correct any defect, omission

or inconsistency in the Plan or in any Award Agreement or in the written terms of a Performance Cash Award, in a manner and to the extent it will deem necessary or expedient to make the Plan or Award fully effective.

(iii) To settle all controversies regarding the Plan and Awards granted under it.

(iv) To accelerate, in whole or in part, the time at which an Award may be exercised or vest (or the time at which cash or shares of Common Stock may be issued in settlement thereof).

(v) To suspend or terminate the Plan at any time. Except as otherwise provided in the Plan or an Award Agreement, suspension or termination of the Plan will not materially impair a Participant's rights under the Participant's then-outstanding Award without the Participant's written consent, except as provided in subsection (viii) below.

(vi) To amend the Plan in any respect the Board deems necessary or advisable, including, without limitation, by adopting amendments relating to Incentive Stock Options and certain nonqualified deferred compensation under Section 409A of the Code and/or bringing the Plan or Awards granted under the Plan into compliance with the requirements for Incentive Stock Options or ensuring that they are exempt from , or compliant with , the requirements for nonqualified deferred compensation under Section 409A of the Code , subject to the limitations, if any, of applicable law. If required by applicable law or listing requirements, and except as provided in Section 9(a) relating to Capitalization Adjustments, the Company will seek stockholder approval of any amendment of the Plan that (A) materially increases the number of shares of Common Stock available for issuance under the Plan, (B) materially expands the class of individuals eligible to receive Awards under the Plan, (C) materially increases the benefits accruing to Participants under the Plan, (D) materially reduces the price at which shares of Common Stock may be issued or purchased under the Plan, (E) materially extends the term of the Plan, or (F) materially expands the types of Awards available for issuance under the Plan. Except as otherwise provided in the Plan or an Award Agreement, no amendment of the Plan will materially impair a Participant's rights under an outstanding Award without the Participant's written consent.

(vii) To submit any amendment to the Plan for stockholder approval, including, but not limited to, amendments to the Plan intended to satisfy the requirements of (A) Section 162(m) of the Code regarding the exclusion of performance-based compensation from the limit on corporate deductibility of compensation paid to Covered Employees, (B) Section 422 of the Code regarding "incentive stock options" or (C) Rule 16b-3.

(viii) To approve forms of Award Agreements for use under the Plan and to amend the terms of any one or more Awards, including, but not limited to, amendments to provide terms more favorable to the Participant than previously provided in the Award Agreement, subject to any specified limits in the Plan that are not subject to Board discretion; *provided, however*, that a Participant's rights under any Award will not be impaired by any such amendment unless (A) the Company requests the consent of the affected Participant, and (B) such Participant consents in writing. Notwithstanding the foregoing, (1) a Participant's rights will not be deemed to have been impaired by any such amendment if the Board, in its sole discretion, determines that the amendment, taken as a whole, does not materially impair the Participant's rights, and (2) subject to the limitations of applicable law, if any, the Board may amend the terms of any one or more Awards without the affected Participant's consent (A) to maintain the qualified status of the Award as an Incentive Stock Option under Section 422 of the Code; (B) to change the terms of an Incentive Stock Option, if such change results in impairment of the Award solely because it impairs the qualified status of the Award as an Incentive Stock Option under Section 422 of the Code; (C) to clarify the manner of exemption from, or to bring the Award into compliance with, Section 409A of the Code; or (D) to comply with other applicable laws or listing requirements.

(ix) Generally, to exercise such powers and to perform such acts as the Board deems necessary or expedient to promote the best interests of the Company and that are not in conflict with the provisions of the Plan or Awards.

(x) To adopt such procedures and sub-plans as are necessary or appropriate to permit participation in the Plan by Employees, Directors or Consultants who are foreign nationals or employed outside the United States (provided that Board approval will not be necessary for immaterial modifications to the Plan or any Award Agreement that are required for compliance with the laws of the relevant foreign jurisdiction).

(xi) To effect, with the consent of any adversely affected Participant, (A) the reduction of the exercise, purchase or strike price of any outstanding Stock Award; (B) the cancellation of any outstanding Stock Award and the grant in substitution therefor of a new (1) Option or SAR, (2) Restricted Stock Award, (3) Restricted Stock Unit Award, (4) Other Stock Award, (5) cash and/or (6) other valuable consideration determined by the Board, in its sole discretion, with any such substituted award (x) covering the same or a different number of shares of Common Stock as the cancelled Stock Award and (y) granted under the Plan or another equity or compensatory plan of the Company; or (C) any other action that is treated as a repricing under generally accepted accounting principles.

**(c) Delegation to Committee.**

**(i) General.** The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration of the Plan is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee of the Committee any of the administrative powers the Committee is authorized to exercise (and references in this Plan to the Board will thereafter be to the Committee or subcommittee, as applicable). Any delegation of administrative powers will be reflected in resolutions, not inconsistent with the provisions of the Plan, adopted from time to time by the Board or Committee (as applicable). The Board may retain the authority to concurrently administer the Plan with the Committee and may, at any time, revert in the Board some or all of the powers previously delegated.

**(ii) Section 162(m) and Rule 16b-3 Compliance.** The Committee may consist solely of two or more Outside Directors, in accordance with Section 162(m) of the Code, or solely of two or more Non-Employee Directors, in accordance with Rule 16b-3.

**(d) Delegation to an Officer.** The Board may delegate to one (1) or more Officers the authority to do one or both of the following (i) designate Employees who are not Officers to be recipients of Options and SARs (and, to the extent permitted by applicable law, other Stock Awards) and, to the extent permitted by applicable law, the terms of such Awards, and (ii) determine the number of shares of Common Stock to be subject to such Stock Awards granted to such Employees; *provided, however*, that the Board resolutions regarding such delegation will specify the total number of shares of Common Stock that may be subject to the Stock Awards granted by such Officer and that such Officer may not grant a Stock Award to himself or herself. Any such Stock Awards will be granted on the form of Stock Award Agreement most recently approved for use by the Committee or the Board, unless otherwise provided in the resolutions approving the delegation authority. The Board may not delegate authority to an Officer who is acting solely in the capacity of an Officer (and not also as a Director) to determine the Fair Market Value pursuant to Section 13(x)(iii) below.

**(e) Effect of Board's Decision.** All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

**3. SHARES SUBJECT TO THE PLAN.**

**(a) Share Reserve.** Subject to Section 9(a) relating to Capitalization Adjustments, and the following sentence regarding the annual increase, the aggregate number of shares of Common Stock that may be issued pursuant to Stock Awards will not exceed 3,133,702 shares (the “*Share Reserve*”), which number is the sum of (i) 1,600,000 new shares, *plus* (ii) the number of shares subject to the Prior Plan's Available Reserve, *plus* (iii) the number of shares that are Returning Shares, as such shares become available from time to time.

In addition, the Share Reserve will automatically increase on January 1<sup>st</sup> of each year, for a period of not more than ten years, commencing on January 1<sup>st</sup> of the year following the year in which the IPO Date occurs and ending on (and including) January 1, 2027, in an amount equal to 4% of the total number of shares of Capital Stock outstanding on December 31<sup>st</sup> of the preceding calendar year. Notwithstanding the foregoing, the Board may act prior to January 1<sup>st</sup> of a given year to provide that there will be no January 1<sup>st</sup> increase in the Share Reserve for such year or that the increase in the Share Reserve for such year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence.

For clarity, the Share Reserve in this Section 3(a) is a limitation on the number of shares of Common Stock that may be issued pursuant to the Plan. Accordingly, this Section 3(a) does not limit the granting of Stock Awards except as provided in Section 7(a). Shares may be issued in connection with a merger or acquisition as permitted by NASDAQ Listing Rule 5635(c) or, if applicable, NYSE Listed Company Manual Section 303A.08, AMEX Company Guide Section 711 or other applicable rule, and such issuance will not reduce the number of shares available for issuance under the Plan.

**(b) Reversion of Shares to the Share Reserve.** If a Stock Award or any portion thereof (i) expires or otherwise terminates without all of the shares covered by such Stock Award having been issued or (ii) is settled in cash ( *i.e.* , the Participant receives cash rather than stock), such expiration, termination or settlement will not reduce (or otherwise offset) the number of shares of Common Stock that may be available for issuance under the Plan. If any shares of Common Stock issued pursuant to a Stock Award are forfeited back to or repurchased by the Company because of the failure to meet a contingency or condition required to vest such shares in the Participant, then the shares that are forfeited or repurchased will revert to and again become available for issuance under the Plan. Any shares reacquired by the Company in satisfaction of tax withholding obligations on a Stock Award or as consideration for the exercise or purchase price of a Stock Award will again become available for issuance under the Plan.

**(c) Incentive Stock Option Limit.** Subject to the provisions of Section 9(a) relating to Capitalization Adjustments, the aggregate maximum number of shares of Common Stock that may be issued pursuant to the exercise of Incentive Stock Options will be 6,267,404 shares of Common Stock.

**(d) Section 162(m) Limitations .** Subject to the provisions of Section 9(a) relating to Capitalization Adjustments, at such time as the Company may be subject to the applicable provisions of Section 162(m) of the Code, the following limitations shall apply.

**(i)** A maximum of 1,000,000 shares of Common Stock subject to Options, SARs and Other Stock Awards whose value is determined by reference to an increase over an exercise or strike price of at least 100% of the Fair Market Value on the date the Stock Award is granted may be granted to any one Participant during any one calendar year. Notwithstanding the foregoing, if any additional Options, SARs or Other Stock Awards whose value is determined by reference to an increase over an exercise or strike price of at least 100% of the Fair Market Value on the date the Stock Award are granted to any Participant during any calendar year, compensation attributable to the exercise of such additional Stock Awards will not satisfy the requirements to be considered “qualified performance-based compensation” under Section 162(m) of the Code unless such additional Stock Award is approved by the Company’s stockholders.

**(ii)** A maximum of 1,000,000 shares of Common Stock subject to Performance Stock Awards may be granted to any one Participant during any one calendar year (whether the grant, vesting or exercise is contingent upon the attainment during the Performance Period of the Performance Goals).

**(iii)** A maximum of \$ 3,000,000 may be granted as a Performance Cash Award to any one Participant during any one calendar year.

**(e) Limitation on Grants to Non-Employee Directors.** The maximum number of shares of Common Stock subject to Stock Awards granted under the Plan or otherwise with respect to any period commencing on the date of the Company’s Annual Meeting of Stockholders for a particular year and ending on the day immediately prior to the date of the Company’s Annual Meeting of Stockholders for the next subsequent year to any Non-Employee Director, taken together with any cash fees paid by the Company to such Non-Employee Director during such period for service on the Board, will not exceed \$400,000 in total value (calculating the value of any such Stock Awards based on the grant date fair value of such Stock Awards for financial reporting purposes), or, with respect to such period in which a Non-Employee Director is first appointed or elected to the Board, \$500,000. The Board may make exceptions to the applicable limit in this Section 3(e) for individual Non-Employee Directors in extraordinary circumstances, as Board may determine in its discretion, provided that the Non-Employee Director receiving such additional compensation may not participate in the decision to award such compensation.

**(f) Inducement Share Pool and Inducement Award Rules .** This Section 3(f) will apply with respect to an additional 75,000 shares of Common Stock reserved under this Plan by action of the Board (or a committee thereof) to be used exclusively for the grant of Inducement Awards in compliance with Nasdaq Listing Rule 5635(c)(4) (the “ *Inducement Shares* ”). The Inducement Shares that may be awarded under this Section 3(f) shall be in addition to and shall not reduce the Share Reserve.

In addition, the following rules and restrictions shall apply to any Inducement Award granted pursuant to the Plan:

**(i) Eligible Inducement Award Recipients .** An Inducement Award may be granted only to an Employee who has not previously been an Employee or a Non-Employee Director of the Company or an Affiliate, or following a bona fide period of non-employment, as an inducement material to the individual’s entering into employment with the Company within the meaning of Rule 5635(c)(4) of the Nasdaq Listing Rules.

**(ii) No Incentive Stock Options .** No Inducement Award may be designated as an Incentive Stock Option.

**(iii) Approval of Inducement Awards .** All Inducement Awards must be granted by a Committee consisting of the majority of the Company’s independent directors or the Company’s independent compensation committee, in each case in accordance with Nasdaq Listing Rule 5635(c)(4).

**(iv) Limitation on Share Recycling .** The shares of Common Stock underlying any Inducement Awards that are forfeited, canceled, held back upon exercise of an Inducement Award or settlement of an Inducement Award to cover the exercise price or tax withholding, reacquired or repurchased by the Company, satisfied without the issuance of Common Stock or otherwise terminated (other than by exercise) shall be added back to the Inducement Shares available for grant under this Section 3(f), but shall not be added back to the Share Reserve.

(v) The limits in Section 3(d) will not apply to Inducement Awards .

**(g) Source of Shares.** The stock issuable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market or otherwise.

#### 4. ELIGIBILITY.

**(a) Eligibility for Specific Stock Awards .** Incentive Stock Options may be granted only to employees of the Company or a “parent corporation” or “subsidiary corporation” thereof (as such terms are defined in Sections 424(e) and 424(f) of the Code). Stock Awards other than Incentive Stock Options may be granted to Employees, Directors and Consultants; *provided, however* , that Stock Awards may not be granted to Employees, Directors and Consultants who are providing Continuous Service only to any “parent” of the Company, as such term is defined in Rule 405 of the Securities Act, unless (i) the stock underlying such Stock Awards is treated as “service recipient stock” under Section 409A of the Code (for example, because the Stock Awards are granted pursuant to a corporate transaction such as a spin off transaction), (ii) the Company, in consultation with its legal counsel, has determined that such Stock Awards are otherwise exempt from Section 409A of the Code, or (iii) the Company, in consultation with its legal counsel, has determined that such Stock Awards comply with the distribution requirements of Section 409A of the Code.

**(b) Ten Percent Stockholders.** A Ten Percent Stockholder will not be granted an Incentive Stock Option unless the exercise price of such Option is at least 110% of the Fair Market Value on the date of grant and the Option is not exercisable after the expiration of five years from the date of grant.

#### 5. PROVISIONS RELATING TO OPTIONS AND STOCK APPRECIATION RIGHTS.

Each Option or SAR will be in such form and will contain such terms and conditions as the Board deems appropriate. All Options will be separately designated Incentive Stock Options or Nonstatutory Stock Options at the time of grant, and, if certificates are issued, a separate certificate or certificates will be issued for shares of Common Stock purchased on exercise of each type of Option. If an Option is not specifically designated as an Incentive Stock Option, or if an Option is designated as an Incentive Stock Option but some portion or all of the Option fails to qualify as an Incentive Stock Option under the applicable rules, then the Option (or portion thereof) will be a Nonstatutory Stock Option. The provisions of separate Options or SARs need not be identical; *provided, however* , that each Award Agreement will conform to (through incorporation of provisions hereof by reference in the applicable Award Agreement or otherwise) the substance of each of the following provisions:

**(a) Term.** Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, no Option or SAR will be exercisable after the expiration of ten years from the date of its grant or such shorter period specified in the Award Agreement.

**(b) Exercise Price.** Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, the exercise or strike price of each Option or SAR will be not less than 100% of the Fair Market Value of the Common Stock subject to the Option or SAR on the date the Award is granted. Notwithstanding the foregoing, an Option or SAR may be granted with an exercise or strike price lower than 100% of the Fair Market Value of the Common Stock subject to the Award if such Award is granted pursuant to an assumption of or substitution for another option or stock appreciation right pursuant to a Corporate Transaction and in a manner consistent with the provisions of Section 409A of the Code and, if applicable, Section 424(a) of the Code. Each SAR will be denominated in shares of Common Stock equivalents.

**(c) Purchase Price for Options.** The purchase price of Common Stock acquired pursuant to the exercise of an Option may be paid, to the extent permitted by applicable law and as determined by the Board in its sole discretion, by any combination of the methods of payment set forth below. The Board will have the authority to grant Options that do not permit all of the following methods of payment (or otherwise restrict the ability to use certain methods) and to grant Options that require the consent of the Company to use a particular method of payment. The permitted methods of payment are as follows:

(i) by cash, check, bank draft or money order payable to the Company;

(ii) pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of the stock subject to the Option, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds;

(iii) by delivery to the Company (either by actual delivery or attestation) of shares of Common Stock;

(iv) if an Option is a Nonstatutory Stock Option, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Common Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; *provided, however*, that the Company will accept a cash or other payment from the Participant to the extent of any remaining balance of the aggregate exercise price not satisfied by such reduction in the number of whole shares to be issued. Shares of Common Stock will no longer be subject to an Option and will not be exercisable thereafter to the extent that (A) shares issuable upon exercise are used to pay the exercise price pursuant to the “net exercise,” (B) shares are delivered to the Participant as a result of such exercise, and (C) shares are withheld to satisfy tax withholding obligations; or

(v) in any other form of legal consideration that may be acceptable to the Board and specified in the applicable Award Agreement.

**(d) Exercise and Payment of a SAR.** To exercise any outstanding SAR, the Participant must provide written notice of exercise to the Company in compliance with the provisions of the Stock Appreciation Right Agreement evidencing such SAR. The appreciation distribution payable on the exercise of a SAR will be not greater than an amount equal to the excess of (A) the aggregate Fair Market Value (on the date of the exercise of the SAR) of a number of shares of Common Stock equal to the number of Common Stock equivalents in which the Participant is vested under such SAR, and with respect to which the Participant is exercising the SAR on such date, over (B) the aggregate strike price of the number of Common Stock equivalents with respect to which the Participant is exercising the SAR on such date. The appreciation distribution may be paid in Common Stock, in cash, in any combination of the two or in any other form of consideration, as determined by the Board and contained in the Award Agreement evidencing such SAR.

**(e) Transferability of Options and SARs.** The Board may, in its sole discretion, impose such limitations on the transferability of Options and SARs as the Board will determine. In the absence of such a determination by the Board to the contrary, the following restrictions on the transferability of Options and SARs will apply:

**(i) Restrictions on Transfer.** An Option or SAR will not be transferable except by will or by the laws of descent and distribution (or pursuant to subsections (ii) and (iii) below), and will be exercisable during the lifetime of the Participant only by the Participant. The Board may permit transfer of the Option or SAR in a manner that is not prohibited by applicable tax and securities laws. Except as explicitly provided in the Plan, neither an Option nor a SAR may be transferred for consideration.

**(ii) Domestic Relations Orders.** Subject to the approval of the Board or a duly authorized Officer, an Option or SAR may be transferred pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulations Section 1.421-1(b)(2). If an Option is an Incentive Stock Option, such Option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

**(iii) Beneficiary Designation.** Subject to the approval of the Board or a duly authorized Officer, a Participant may, by delivering written notice to the Company, in a form approved by the Company (or the designated broker), designate a third party who, on the death of the Participant, will thereafter be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, upon the death of the Participant, the executor or administrator of the Participant’s estate will be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. However, the Company may prohibit designation of a beneficiary at any time, including due to any conclusion by the Company that such designation would be inconsistent with the provisions of applicable laws.

**(f) Vesting Generally.** The total number of shares of Common Stock subject to an Option or SAR may vest and become exercisable in periodic installments that may or may not be equal. The Option or SAR may be subject to such other terms and conditions on the time or times when it may or may not be exercised (which may be based on the satisfaction of Performance Goals or other criteria) as the Board may deem appropriate. The vesting provisions of individual Options or SARs may vary. The provisions of this Section 5(f) are subject to any Option or SAR provisions governing the minimum number of shares of Common Stock as to which an Option or SAR may be exercised.

**(g) Termination of Continuous Service.** Except as otherwise provided in the applicable Award Agreement or other agreement between the Participant and the Company, if a Participant’s Continuous Service terminates (other than for Cause and other than upon the Participant’s death or Disability), the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Award as of the date of termination of Continuous Service) within the period of time ending on the earlier of (i) the date three months following the termination of the Participant’s Continuous Service (or such longer or shorter period specified in the applicable Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Award Agreement. If, after termination of Continuous Service, the Participant does not exercise his or her Option or SAR (as applicable) within the applicable time frame, the Option or SAR will terminate.

**(h) Extension of Termination Date.** If the exercise of an Option or SAR following the termination of the Participant's Continuous Service (other than for Cause and other than upon the Participant's death or Disability) would be prohibited at any time solely because the issuance of shares of Common Stock would violate the registration requirements under the Securities Act, then the Option or SAR will terminate on the earlier of (i) the expiration of a total period of time (that need not be consecutive) equal to the applicable post termination exercise period after the termination of the Participant's Continuous Service during which the exercise of the Option or SAR would not be in violation of such registration requirements, and (ii) the expiration of the term of the Option or SAR as set forth in the applicable Award Agreement. In addition, unless otherwise provided in a Participant's Award Agreement, if the sale of any Common Stock received on exercise of an Option or SAR following the termination of the Participant's Continuous Service (other than for Cause) would violate the Company's insider trading policy, then the Option or SAR will terminate on the earlier of (i) the expiration of a period of months (that need not be consecutive) equal to the applicable post-termination exercise period after the termination of the Participant's Continuous Service during which the sale of the Common Stock received upon exercise of the Option or SAR would not be in violation of the Company's insider trading policy, or (ii) the expiration of the term of the Option or SAR as set forth in the applicable Award Agreement.

**(i) Disability of Participant.** Except as otherwise provided in the applicable Award Agreement or other agreement between the Participant and the Company, if a Participant's Continuous Service terminates as a result of the Participant's Disability, the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Option or SAR as of the date of termination of Continuous Service), but only within such period of time ending on the earlier of (i) the date 12 months following such termination of Continuous Service (or such longer or shorter period specified in the Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Award Agreement. If, after termination of Continuous Service, the Participant does not exercise his or her Option or SAR within the applicable time frame, the Option or SAR (as applicable) will terminate.

**(j) Death of Participant.** Except as otherwise provided in the applicable Award Agreement or other agreement between the Participant and the Company, if (i) a Participant's Continuous Service terminates as a result of the Participant's death, or (ii) the Participant dies within the period (if any) specified in the Award Agreement for exercisability after the termination of the Participant's Continuous Service for a reason other than death, then the Option or SAR may be exercised (to the extent the Participant was entitled to exercise such Option or SAR as of the date of death) by the Participant's estate, by a person who acquired the right to exercise the Option or SAR by bequest or inheritance or by a person designated to exercise the Option or SAR upon the Participant's death, but only within the period ending on the earlier of (i) the date 18 months following the date of death (or such longer or shorter period specified in the Award Agreement), and (ii) the expiration of the term of such Option or SAR as set forth in the Award Agreement. If, after the Participant's death, the Option or SAR is not exercised within the applicable time frame, the Option or SAR (as applicable) will terminate.

**(k) Termination for Cause.** Except as explicitly provided otherwise in a Participant's Award Agreement or other individual written agreement between the Company or any Affiliate and the Participant, if a Participant's Continuous Service is terminated for Cause, the Option or SAR will terminate immediately upon such Participant's termination of Continuous Service, and the Participant will be prohibited from exercising his or her Option or SAR from and after the time of such termination of Continuous Service.

**(l) Non-Exempt Employees.** If an Option or SAR is granted to an Employee who is a non-exempt employee for purposes of the Fair Labor Standards Act of 1938, as amended, the Option or SAR will not be first exercisable for any shares of Common Stock until at least six months following the date of grant of the Option or SAR (although the Award may vest prior to such date). Consistent with the provisions of the Worker Economic Opportunity Act, (i) if such non-exempt Employee dies or suffers a Disability, (ii) upon a Corporate Transaction in which such Option or SAR is not assumed, continued, or substituted, (iii) upon a Change in Control, or (iv) upon the Participant's retirement (as such term may be defined in the Participant's Award Agreement in another agreement between the Participant and the Company, or, if no such definition, in accordance with the Company's then current employment policies and guidelines), the vested portion of any Options and SARs may be exercised earlier than six months following the date of grant. The foregoing provision is intended to operate so that any income derived by a non-exempt employee in connection with the exercise or vesting of an Option or SAR will be exempt from his or her regular rate of pay. To the extent permitted and/or required for compliance with the Worker Economic Opportunity Act to ensure that any income derived by a non-exempt employee in connection with the exercise, vesting or issuance of any shares under any other Stock Award will be exempt from the employee's regular rate of pay, the provisions of this Section 5(l) will apply to all Stock Awards and are hereby incorporated by reference into such Stock Award Agreements.

## 6. PROVISIONS OF STOCK AWARDS OTHER THAN OPTIONS AND SARs.

**(a) Restricted Stock Awards.** Each Restricted Stock Award Agreement will be in such form and will contain such terms and conditions as the Board will deem appropriate. To the extent consistent with the Company's bylaws, at the Board's election, shares of Common Stock may be (x) held in book entry form subject to the Company's instructions until any restrictions relating to the Restricted Stock Award lapse; or (y) evidenced by a certificate, which certificate will be held in such form and manner as determined by the Board. The terms and conditions of Restricted Stock Award Agreements may change from time to time, and the terms and conditions of separate Restricted Stock Award Agreements need not be identical. Each Restricted Stock Award Agreement will conform to (through incorporation of the provisions hereof by reference in the agreement or otherwise) the substance of each of the following provisions:

**(i) Consideration.** A Restricted Stock Award may be awarded in consideration for (A) cash, check, bank draft or money order payable to the Company, (B) past or future services to the Company or an Affiliate, or (C) any other form of legal consideration that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

**(ii) Vesting.** Shares of Common Stock awarded under the Restricted Stock Award Agreement may be subject to forfeiture to the Company in accordance with a vesting schedule to be determined by the Board.

**(iii) Termination of Participant's Continuous Service.** If a Participant's Continuous Service terminates, the Company may receive through a forfeiture condition or a repurchase right any or all of the shares of Common Stock held by the Participant that have not vested as of the date of termination of Continuous Service under the terms of the Restricted Stock Award Agreement.

**(iv) Transferability.** Rights to acquire shares of Common Stock under the Restricted Stock Award Agreement will be transferable by the Participant only upon such terms and conditions as are set forth in the Restricted Stock Award Agreement, as the Board will determine in its sole discretion, so long as Common Stock awarded under the Restricted Stock Award Agreement remains subject to the terms of the Restricted Stock Award Agreement.

**(v) Dividends.** A Restricted Stock Award Agreement may provide that any dividends paid on Restricted Stock will be subject to the same vesting and forfeiture restrictions as apply to the shares subject to the Restricted Stock Award to which they relate.

**(b) Restricted Stock Unit Awards.** Each Restricted Stock Unit Award Agreement will be in such form and will contain such terms and conditions as the Board will deem appropriate. The terms and conditions of Restricted Stock Unit Award Agreements may change from time to time, and the terms and conditions of separate Restricted Stock Unit Award Agreements need not be identical. Each Restricted Stock Unit Award Agreement will conform to (through incorporation of the provisions hereof by reference in the Agreement or otherwise) the substance of each of the following provisions:

**(i) Consideration.** At the time of grant of a Restricted Stock Unit Award, the Board will determine the consideration, if any, to be paid by the Participant upon delivery of each share of Common Stock subject to the Restricted Stock Unit Award. The consideration to be paid (if any) by the Participant for each share of Common Stock subject to a Restricted Stock Unit Award may be paid in any form of legal consideration that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

**(ii) Vesting.** At the time of the grant of a Restricted Stock Unit Award, the Board may impose such restrictions on or conditions to the vesting of the Restricted Stock Unit Award as it, in its sole discretion, deems appropriate.

**(iii) Payment.** A Restricted Stock Unit Award may be settled by the delivery of shares of Common Stock, their cash equivalent, any combination thereof or in any other form of consideration, as determined by the Board and contained in the Restricted Stock Unit Award Agreement.

**(iv) Additional Restrictions.** At the time of the grant of a Restricted Stock Unit Award, the Board, as it deems appropriate, may impose such restrictions or conditions that delay the delivery of the shares of Common Stock (or their cash equivalent) subject to a Restricted Stock Unit Award to a time after the vesting of such Restricted Stock Unit Award.

**(v) Dividend Equivalents.** Dividend equivalents may be credited in respect of shares of Common Stock covered by a Restricted Stock Unit Award, as determined by the Board and contained in the Restricted Stock Unit Award Agreement. At the sole discretion of the Board, such dividend equivalents may be converted into additional shares of Common Stock covered by the Restricted Stock Unit Award in such manner as determined by the Board. Any additional shares covered by the Restricted Stock Unit



Award credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying Restricted Stock Unit Award Agreement to which they relate.

**(vi) Termination of Participant's Continuous Service.** Except as otherwise provided in the applicable Restricted Stock Unit Award Agreement, such portion of the Restricted Stock Unit Award that has not vested will be forfeited upon the Participant's termination of Continuous Service.

**(c) Performance Awards .**

**(i) Performance Stock Awards .** A Performance Stock Award is a Stock Award (covering a number of shares not in excess of that set forth in Section 3(d) above) that is payable (including that may be granted, may vest or may be exercised) contingent upon the attainment during a Performance Period of certain Performance Goals. A Performance Stock Award may, but need not, require the Participant's completion of a specified period of Continuous Service. The length of any Performance Period, the Performance Goals to be achieved during the Performance Period, and the measure of whether and to what degree such Performance Goals have been attained will be conclusively determined by the Committee (or, if not required for compliance with Section 162(m) of the Code, the Board), in its sole discretion. In addition, to the extent permitted by applicable law and the applicable Award Agreement, the Board may determine that cash may be used in payment of Performance Stock Awards.

**(ii) Performance Cash Awards .** A Performance Cash Award is a cash award (for a dollar value not in excess of that set forth in Section 3(d) above) that is payable contingent upon the attainment during a Performance Period of certain Performance Goals. A Performance Cash Award may also require the completion of a specified period of Continuous Service. At the time of grant of a Performance Cash Award, the length of any Performance Period, the Performance Goals to be achieved during the Performance Period, and the measure of whether and to what degree such Performance Goals have been attained will be conclusively determined by the Committee (or, if not required for compliance with Section 162(m) of the Code, the Board), in its sole discretion. The Board may specify the form of payment of Performance Cash Awards, which may be cash or other property, or may provide for a Participant to have the option for his or her Performance Cash Award, or such portion thereof as the Board may specify, to be paid in whole or in part in cash or other property.

**(iii) Board Discretion .** The Board retains the discretion to reduce or eliminate the compensation or economic benefit due upon attainment of Performance Goals and to define the manner of calculating the Performance Criteria it selects to use for a Performance Period. Partial achievement of the specified criteria may result in the payment or vesting corresponding to the degree of achievement as specified in the Stock Award Agreement or the written terms of a Performance Cash Award.

**(iv) Section 162(m) Compliance .** Unless otherwise permitted in compliance with the requirements of Section 162(m) of the Code with respect to an Award intended to qualify as "performance-based compensation" thereunder, the Committee will establish the Performance Goals applicable to, and the formula for calculating the amount payable under, the Award no later than the earlier of (a) the date 90 days after the commencement of the applicable Performance Period, and (b) the date on which 25% of the Performance Period has elapsed, and in any event at a time when the achievement of the applicable Performance Goals remains substantially uncertain. Prior to the payment of any compensation under an Award intended to qualify as "performance-based compensation" under Section 162(m) of the Code, the Committee will certify the extent to which any Performance Goals and any other material terms under such Award have been satisfied (other than in cases where such Performance Goals relate solely to the increase in the value of the Common Stock). Notwithstanding satisfaction of, or completion of any Performance Goals, the number of shares of Common Stock, Options, cash or other benefits granted, issued, retainable and/or vested under an Award on account of satisfaction of such Performance Goals may be reduced by the Committee on the basis of such further considerations as the Committee, in its sole discretion, will determine.

**(d) Other Stock Awards .** Other forms of Stock Awards valued in whole or in part by reference to, or otherwise based on, Common Stock, including the appreciation in value thereof (e.g., options or stock rights with an exercise price or strike price less than 100% of the Fair Market Value of the Common Stock at the time of grant) may be granted either alone or in addition to Stock Awards provided for under Section 5 and the preceding provisions of this Section 6. Subject to the provisions of the Plan, the Board will have sole and complete authority to determine the persons to whom and the time or times at which such Other Stock Awards will be granted, the number of shares of Common Stock (or the cash equivalent thereof) to be granted pursuant to such Other Stock Awards and all other terms and conditions of such Other Stock Awards.

**7. COVENANTS OF THE COMPANY.**

**(a) Availability of Shares.** The Company will keep available at all times the number of shares of Common Stock reasonably required to satisfy then-outstanding Awards.

**(b) Securities Law Compliance.** The Company will seek to obtain from each regulatory commission or agency having jurisdiction over the Plan such authority as may be required to grant Stock Awards and to issue and sell shares of Common Stock upon exercise of the Stock Awards; *provided, however*, that this undertaking will not require the Company to register under the Securities Act the Plan, any Stock Award or any Common Stock issued or issuable pursuant to any such Stock Award. If, after reasonable efforts and at a reasonable cost, the Company is unable to obtain from any such regulatory commission or agency the authority that counsel for the Company deems necessary for the lawful issuance and sale of Common Stock under the Plan, the Company will be relieved from any liability for failure to issue and sell Common Stock upon exercise of such Stock Awards unless and until such authority is obtained. A Participant will not be eligible for the grant of an Award or the subsequent issuance of cash or Common Stock pursuant to the Award if such grant or issuance would be in violation of any applicable securities law.

**(c) No Obligation to Notify or Minimize Taxes.** The Company will have no duty or obligation to any Participant to advise such holder as to the time or manner of exercising such Stock Award. Furthermore, the Company will have no duty or obligation to warn or otherwise advise such holder of a pending termination or expiration of an Award or a possible period in which the Award may not be exercised. The Company has no duty or obligation to minimize the tax consequences of an Award to the holder of such Award.

## **8. MISCELLANEOUS.**

**(a) Use of Proceeds from Sales of Common Stock.** Proceeds from the sale of shares of Common Stock pursuant to Awards will constitute general funds of the Company.

**(b) Corporate Action Constituting Grant of Awards.** Corporate action constituting a grant by the Company of an Award to any Participant will be deemed completed as of the date of such corporate action, unless otherwise determined by the Board, regardless of when the instrument, certificate, or letter evidencing the Award is communicated to, or actually received or accepted by, the Participant. In the event that the corporate records (e.g., Board consents, resolutions or minutes) documenting the corporate action constituting the grant contain terms (e.g., exercise price, vesting schedule or number of shares) that are inconsistent with those in the Award Agreement or related grant documents as a result of a clerical error in the papering of the Award Agreement or related grant documents, the corporate records will control and the Participant will have no legally binding right to the incorrect term in the Award Agreement or related grant documents.

**(c) Stockholder Rights.** No Participant will be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Common Stock subject to an Award unless and until (i) such Participant has satisfied all requirements for exercise of, or the issuance of shares of Common Stock under, the Award pursuant to its terms, and (ii) the issuance of the Common Stock subject to such Award has been entered into the books and records of the Company.

**(d) No Employment or Other Service Rights.** Nothing in the Plan, any Award Agreement or any other instrument executed thereunder or in connection with any Award granted pursuant thereto will confer upon any Participant any right to continue to serve the Company or an Affiliate in the capacity in effect at the time the Award was granted or will affect the right of the Company or an Affiliate to terminate (i) the employment of an Employee with or without notice and with or without cause, (ii) the service of a Consultant pursuant to the terms of such Consultant's agreement with the Company or an Affiliate, or (iii) the service of a Director pursuant to the bylaws of the Company or an Affiliate, and any applicable provisions of the corporate law of the state in which the Company or the Affiliate is incorporated, as the case may be.

**(e) Change in Time Commitment.** In the event a Participant's regular level of time commitment in the performance of his or her services for the Company and any Affiliates is reduced (for example, and without limitation, if the Participant is an Employee of the Company and the Employee has a change in status from a full-time Employee to a part-time Employee or takes an extended leave of absence) after the date of grant of any Award to the Participant, the Board has the right in its sole discretion to (x) make a corresponding reduction in the number of shares or cash amount subject to any portion of such Award that is scheduled to vest or become payable after the date of such change in time commitment, and (y) in lieu of or in combination with such a reduction, extend the vesting or payment schedule applicable to such Award. In the event of any such reduction, the Participant will have no right with respect to any portion of the Award that is so reduced or extended.

**(f) Incentive Stock Option Limitations.** To the extent that the aggregate Fair Market Value (determined at the time of grant) of Common Stock with respect to which Incentive Stock Options are exercisable for the first time by any Optionholder during any calendar year (under all plans of the Company and any Affiliates) exceeds \$100,000 (or such other limit established in the Code) or otherwise does not comply with the rules governing Incentive Stock Options, the Options or portions thereof that exceed such limit (according to the order in which they were granted) or otherwise do not comply with such rules will be treated as Nonstatutory Stock Options, notwithstanding any contrary provision of the applicable Option Agreement(s).

**(g) Investment Assurances.** The Company may require a Participant, as a condition of exercising or acquiring Common Stock under any Award, (i) to give written assurances satisfactory to the Company as to the Participant's knowledge and experience in financial and business matters and/or to employ a purchaser representative reasonably satisfactory to the Company who is knowledgeable and experienced in financial and business matters and that such Participant is capable of evaluating, alone or together with the purchaser representative, the merits and risks of exercising the Award; and (ii) to give written assurances satisfactory to the Company stating that the Participant is acquiring Common Stock subject to the Award for the Participant's own account and not with any present intention of selling or otherwise distributing the Common Stock. The foregoing requirements, and any assurances given pursuant to such requirements, will be inoperative if (A) the issuance of the shares upon the exercise or acquisition of Common Stock under the Award has been registered under a then currently effective registration statement under the Securities Act, or (B) as to any particular requirement, a determination is made by counsel for the Company that such requirement need not be met in the circumstances under the then applicable securities laws. The Company may, upon advice of counsel to the Company, place legends on stock certificates issued under the Plan as such counsel deems necessary or appropriate in order to comply with applicable securities laws, including, but not limited to, legends restricting the transfer of the Common Stock.

**(h) Withholding Obligations.** Unless prohibited by the terms of an Award Agreement, the Company may, in its sole discretion, satisfy any federal, state or local tax withholding obligation relating to an Award by any of the following means or by a combination of such means: (i) causing the Participant to tender a cash payment; (ii) withholding shares of Common Stock from the shares of Common Stock issued or otherwise issuable to the Participant in connection with the Award; *provided, however*, that no shares of Common Stock are withheld with a value exceeding the minimum amount of tax required to be withheld by law (or such lesser amount as may be necessary to avoid classification of the Stock Award as a liability for financial accounting purposes); (iii) withholding cash from an Award settled in cash; (iv) withholding payment from any amounts otherwise payable to the Participant; or (v) by such other method as may be set forth in the Award Agreement.

**(i) Electronic Delivery.** Any reference herein to a "written" agreement or document will include any agreement or document delivered electronically, filed publicly at [www.sec.gov](http://www.sec.gov) (or any successor website thereto) or posted on the Company's intranet (or other shared electronic medium controlled by the Company to which the Participant has access).

**(j) Deferrals.** To the extent permitted by applicable law, the Board, in its sole discretion, may determine that the delivery of Common Stock or the payment of cash, upon the exercise, vesting or settlement of all or a portion of any Award may be deferred and may establish programs and procedures for deferral elections to be made by Participants. Deferrals by Participants will be made in accordance with Section 409A of the Code. Consistent with Section 409A of the Code, the Board may provide for distributions while a Participant is still an employee or otherwise providing services to the Company. The Board is authorized to make deferrals of Awards and determine when, and in what annual percentages, Participants may receive payments, including lump sum payments, following the Participant's termination of Continuous Service, and implement such other terms and conditions consistent with the provisions of the Plan and in accordance with applicable law.

**(k) Compliance with Section 409A of the Code.** Unless otherwise expressly provided for in an Award Agreement, the Plan and Award Agreements will be interpreted to the greatest extent possible in a manner that makes the Plan and the Awards granted hereunder exempt from Section 409A of the Code, and, to the extent not so exempt, in compliance with Section 409A of the Code. If the Board determines that any Award granted hereunder is not exempt from and is therefore subject to Section 409A of the Code, the Award Agreement evidencing such Award will incorporate the terms and conditions necessary to avoid the consequences specified in Section 409A(a)(1) of the Code, and to the extent an Award Agreement is silent on terms necessary for compliance, such terms are hereby incorporated by reference into the Award Agreement. Notwithstanding anything to the contrary in this Plan (and unless the Award Agreement specifically provides otherwise), if the shares of Common Stock are publicly traded, and if a Participant holding an Award that constitutes "deferred compensation" under Section 409A of the Code is a "specified employee" for purposes of Section 409A of the Code, no distribution or payment of any amount that is due because of a "separation from service" (as defined in Section 409A of the Code without regard to alternative definitions thereunder) will be issued or paid before the date that is six months following the date of such Participant's "separation from service" (as defined in Section 409A of the Code without regard to alternative definitions thereunder) or, if earlier, the date of the Participant's death, unless such distribution or payment can be made in a manner that complies with Section 409A of the Code, and any amounts so deferred will be paid in a lump sum on the day after such six month period elapses, with the balance paid thereafter on the original schedule.

**(l) Clawback/Recovery.** All Awards granted under the Plan will be subject to recoupment in accordance with any clawback policy that the Company is required to adopt pursuant to the listing standards of any national securities exchange or association on which the Company's securities are listed or as is otherwise required by the Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Board may impose such other clawback, recovery or recoupment provisions in an Award Agreement as the Board determines necessary or appropriate, including but not limited to a reacquisition right in respect of previously acquired shares of Common Stock or other cash or property upon the occurrence of an event constituting Cause. No recovery of

compensation under such a clawback policy will be an event giving rise to a right to resign for “good reason” or “constructive termination” (or similar term) under any agreement with the Company.

#### **9. ADJUSTMENTS UPON CHANGES IN COMMON STOCK; OTHER CORPORATE EVENTS.**

**(a) Capitalization Adjustments .** In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a) and Section 3(f), (ii) the class(es) and maximum number of securities by which the share reserve is to increase automatically each year pursuant to Section 3(a), (iii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of Incentive Stock Options pursuant to Section 3(c), (iv) the class(es) and maximum number of securities that may be awarded to any person pursuant to Sections 3(d), and (v) the class(es) and number of securities and price per share of stock subject to outstanding Stock Awards. The Board will make such adjustments, and its determination will be final, binding and conclusive.

**(b) Dissolution .** Except as otherwise provided in the Stock Award Agreement, in the event of a Dissolution of the Company, all outstanding Stock Awards (other than Stock Awards consisting of vested and outstanding shares of Common Stock not subject to a forfeiture condition or the Company’s right of repurchase) will terminate immediately prior to the completion of such Dissolution, and the shares of Common Stock subject to the Company’s repurchase rights or subject to a forfeiture condition may be repurchased or reacquired by the Company notwithstanding the fact that the holder of such Stock Award is providing Continuous Service; *provided, however*, that the Board may, in its sole discretion, cause some or all Stock Awards to become fully vested, exercisable and/or no longer subject to repurchase or forfeiture (to the extent such Stock Awards have not previously expired or terminated) before the Dissolution is completed but contingent on its completion.

**(c) Transaction.** The following provisions shall apply to Stock Awards in the event of a Transaction unless otherwise provided in the instrument evidencing the Stock Award or any other written agreement between the Company or any Affiliate and the Participant or unless otherwise expressly provided by the Board at the time of grant of a Stock Award. In the event of a Transaction, then, notwithstanding any other provision of the Plan, the Board shall take one or more of the following actions with respect to Stock Awards, contingent upon the closing or completion of the Transaction:

**(i)** arrange for the surviving corporation or acquiring corporation (or the surviving or acquiring corporation’s parent company) to assume or continue the Stock Award or to substitute a similar stock award for the Stock Award (including, but not limited to, an award to acquire the same consideration paid to the stockholders of the Company pursuant to the Transaction);

**(ii)** arrange for the assignment of any reacquisition or repurchase rights held by the Company in respect of Common Stock issued pursuant to the Stock Award to the surviving corporation or acquiring corporation (or the surviving or acquiring corporation’s parent company);

**(iii)** accelerate the vesting, in whole or in part, of the Stock Award (and, if applicable, the time at which the Stock Award may be exercised) to a date prior to the effective time of such Transaction as the Board shall determine (or, if the Board shall not determine such a date, to the date that is five days prior to the effective date of the Transaction), with such Stock Award terminating if not exercised (if applicable) at or prior to the effective time of the Transaction;

**(iv)** arrange for the lapse, in whole or in part, of any reacquisition or repurchase rights held by the Company with respect to the Stock Award;

**(v)** cancel or arrange for the cancellation of the Stock Award, to the extent not vested or not exercised prior to the effective time of the Transaction, in exchange for such cash consideration, if any, as the Board, in its sole discretion, may consider appropriate; and

**(vi)** make a payment, in such form as may be determined by the Board equal to the excess, if any, of (A) the value of the property the Participant would have received upon the exercise of the Stock Award immediately prior to the effective time of the Transaction, over (B) any exercise price payable by such holder in connection with such exercise. For clarity, this payment may be zero (\$0) if the value of the property is equal to or less than the exercise price. Payments under this provision may be delayed to the same extent that payment of consideration to the holders of Common Stock in connection with the Transaction is delayed as a result of escrows, earn outs, holdbacks or other contingencies.

The Board need not take the same action or actions with respect to all Stock Awards or portions thereof or with respect to all Participants. The Board may take different actions with respect to the vested and unvested portions of a Stock Award.

**(d) Change in Control.** A Stock Award may be subject to additional acceleration of vesting and exercisability upon or after a Change in Control as may be provided in the Stock Award Agreement for such Stock Award or as may be provided in any other written agreement between the Company or any Affiliate and the Participant, but in the absence of such provision, no such acceleration will occur.

**10. PLAN TERM; EARLIER TERMINATION OR SUSPENSION OF THE PLAN.**

The Board may suspend or terminate the Plan at any time. No Incentive Stock Options may be granted after the tenth anniversary of the earlier of (i) the date the Plan is adopted by the Board (the “*Adoption Date*”), or (ii) the date the Plan is approved by the stockholders of the Company. No Awards may be granted under the Plan while the Plan is suspended or after it is terminated. Suspension or termination of the Plan will not materially impair rights and obligations under any Award granted while the Plan is in effect except with the written consent of the affected Participant or as otherwise permitted in the Plan.

**11. EXISTENCE OF THE PLAN; TIMING OF FIRST GRANT OR EXERCISE.**

The Plan will come into existence on the Adoption Date; *provided, however*, that no Stock Award may be granted prior to the IPO Date. In addition, no Stock Award will be exercised (or, in the case of a Restricted Stock Award, Restricted Stock Unit Award, Performance Stock Award, or Other Stock Award, no Stock Award will be granted) and no Performance Cash Award will be settled unless and until the Plan has been approved by the stockholders of the Company, which approval will be within 12 months after the date the Plan is adopted by the Board.

**12. CHOICE OF LAW.**

The law of the State of California will govern all questions concerning the construction, validity and interpretation of this Plan, without regard to that state’s conflict of laws rules.

**13. DEFINITIONS.** As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

**(a)** “*Affiliate*” means, at the time of determination, any “parent” or “subsidiary” of the Company as such terms are defined in Rule 405 of the Securities Act. The Board will have the authority to determine the time or times at which “parent” or “subsidiary” status is determined within the foregoing definition.

**(b)** “*Award*” means a Stock Award or a Performance Cash Award.

**(c)** “*Award Agreement*” means a written agreement between the Company and a Participant evidencing the terms and conditions of an Award.

**(d)** “*Board*” means the Board of Directors of the Company.

**(e)** “*Capital Stock*” means each and every class of common stock of the Company, regardless of the number of votes per share.

**(f)** “*Capitalization Adjustment*” means any change that is made in, or other events that occur with respect to, the Common Stock subject to the Plan or subject to any Stock Award after the Adoption Date without the receipt of consideration by the Company through merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, stock split, reverse stock split, liquidating dividend, combination of shares, exchange of shares, change in corporate structure or any similar equity restructuring transaction, as that term is used in Statement of Financial Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto). Notwithstanding the foregoing, the conversion of any convertible securities of the Company will not be treated as a Capitalization Adjustment.

**(g)** “*Cause*” shall have the meaning ascribed to such term in any written agreement between the Participant and the Company defining such term and, in the absence of such agreement, such term means, with respect to a Participant, the occurrence of any of the following events: (i) such Participant’s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) such Participant’s attempted commission of, or participation in, a fraud or act of dishonesty against the Company; (iii) such Participant’s intentional, material violation of any contract or agreement between the Participant and the Company or of any statutory duty owed to the Company; (iv) such Participant’s unauthorized use or disclosure of the Company’s confidential information or trade secrets; or (v) such Participant’s gross misconduct. The determination that a termination of the Participant’s Continuous Service is either for Cause or without Cause shall be made by the Company, in its sole discretion. Any determination by the Company that the Continuous Service of a Participant was terminated with or without Cause for

the purposes of outstanding Awards held by such Participant shall have no effect upon any determination of the rights or obligations of the Company or such Participant for any other purpose.

(h) “**Change in Control**” means the occurrence, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) any Exchange Act Person becomes the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined voting power of the Company’s then outstanding securities other than by virtue of a merger, consolidation or similar transaction. Notwithstanding the foregoing, a Change in Control will not be deemed to occur (A) on account of the acquisition of securities of the Company directly from the Company, (B) on account of the acquisition of securities of the Company by an investor, any affiliate thereof or any other Exchange Act Person that acquires the Company’s securities in a transaction or series of related transactions the primary purpose of which is to obtain financing for the Company through the issuance of equity securities, (C) on account of the acquisition of securities of the Company by any individual who is, on the IPO Date, either an executive officer or a Director (either, an “**IPO Investor**”) and/or any entity in which an IPO Investor has a direct or indirect interest (whether in the form of voting rights or participation in profits or capital contributions) of more than 50% (collectively, the “**IPO Entities**”) or on account of the IPO Entities continuing to hold shares that come to represent more than 50% of the combined voting power of the Company’s then outstanding securities as a result of the conversion of any class of the Company’s securities into another class of the Company’s securities having a different number of votes per share pursuant to the conversion provisions set forth in the Company’s Amended and Restated Certificate of Incorporation; or (D) solely because the level of Ownership held by any Exchange Act Person (the “**Subject Person**”) exceeds the designated percentage threshold of the outstanding voting securities as a result of a repurchase or other acquisition of voting securities by the Company reducing the number of shares outstanding, provided that if a Change in Control would occur (but for the operation of this sentence) as a result of the acquisition of voting securities by the Company, and after such share acquisition, the Subject Person becomes the Owner of any additional voting securities that, assuming the repurchase or other acquisition had not occurred, increases the percentage of the then outstanding voting securities Owned by the Subject Person over the designated percentage threshold, then a Change in Control will be deemed to occur;

(ii) there is consummated a merger, consolidation or similar transaction involving (directly or indirectly) the Company and, immediately after the consummation of such merger, consolidation or similar transaction, the stockholders of the Company immediately prior thereto do not Own, directly or indirectly, either (A) outstanding voting securities representing more than 50% of the combined outstanding voting power of the surviving Entity in such merger, consolidation or similar transaction or (B) more than 50% of the combined outstanding voting power of the parent of the surviving Entity in such merger, consolidation or similar transaction, in each case in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such transaction; *provided, however*, that a merger, consolidation or similar transaction will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the surviving Entity or its parent are owned by the IPO Entities;

(iii) there is consummated a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries, other than a sale, lease, license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries to an Entity, more than 50% of the combined voting power of the voting securities of which are Owned by stockholders of the Company in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such sale, lease, license or other disposition; *provided, however*, that a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the acquiring Entity or its parent are owned by the IPO Entities;

(iv) the stockholders of the Company approve or the Board approves a plan of complete dissolution or liquidation of the Company, or a complete dissolution or liquidation of the Company will otherwise occur, except for a liquidation into a parent corporation; or

(v) individuals who, on the date the Plan is adopted by the Board, are members of the Board (the “**Incumbent Board**”) cease for any reason to constitute at least a majority of the members of the Board; *provided, however*, that if the appointment or election (or nomination for election) of any new Board member was approved or recommended by a majority vote of the members of the Incumbent Board then still in office, such new member will, for purposes of this Plan, be considered as a member of the Incumbent Board.

Notwithstanding the foregoing definition or any other provision of the Plan, the term Change in Control will not include a sale of assets, merger or other transaction effected exclusively for the purpose of changing the domicile of the Company and the definition of Change in Control (or any analogous term) in an individual written agreement between the Company or any Affiliate and the

Participant will supersede the foregoing definition with respect to Awards subject to such agreement; *provided, however*, that if no definition of Change in Control or any analogous term is set forth in such an individual written agreement, the foregoing definition will apply.

(i) “ **Code** ” means the Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.

(j) “ **Committee** ” means a committee of one or more Directors to whom authority has been delegated by the Board in accordance with Section 2(c).

(k) “ **Common Stock** ” means, as of the IPO Date, the common stock of the Company, having one vote per share.

(l) “ **Company** ” means Tocagen Inc., a Delaware corporation.

(m) “ **Consultant** ” means any person, including an advisor, who is (i) engaged by the Company or an Affiliate to render consulting or advisory services and is compensated for such services, or (ii) serving as a member of the board of directors of an Affiliate and is compensated for such services. However, service solely as a Director, or payment of a fee for such service, will not cause a Director to be considered a “Consultant” for purposes of the Plan. Notwithstanding the foregoing, a person is treated as a Consultant under this Plan only if a Form S-8 Registration Statement under the Securities Act is available to register either the offer or the sale of the Company’s securities to such person.

(n) “ **Continuous Service** ” means that the Participant’s service with the Company or an Affiliate, whether as an Employee, Director or Consultant, is not interrupted or terminated. A change in the capacity in which the Participant renders service to the Company or an Affiliate as an Employee, Consultant or Director or a change in the entity for which the Participant renders such service, provided that there is no interruption or termination of the Participant’s service with the Company or an Affiliate, will not terminate a Participant’s Continuous Service; *provided, however*, that if the Entity for which a Participant is rendering services ceases to qualify as an Affiliate, as determined by the Board, in its sole discretion, such Participant’s Continuous Service will be considered to have terminated on the date such Entity ceases to qualify as an Affiliate. To the extent permitted by law, the Board or the chief executive officer of the Company, in that party’s sole discretion, may determine whether Continuous Service will be considered interrupted in the case of (i) any leave of absence approved by the Board or chief executive officer, including sick leave, military leave or any other personal leave, or (ii) transfers between the Company, an Affiliate, or their successors. Notwithstanding the foregoing, a leave of absence will be treated as Continuous Service for purposes of vesting in an Award only to such extent as may be provided in the Company’s leave of absence policy, in the written terms of any leave of absence agreement or policy applicable to the Participant, or as otherwise required by law.

(o) “ **Corporate Transaction** ” means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) a sale or other disposition of all or substantially all, as determined by the Board, in its sole discretion, of the consolidated assets of the Company and its Subsidiaries;

(ii) a sale or other disposition of more than 50% of the outstanding securities of the Company;

(iii) a merger, consolidation or similar transaction following which the Company is not the surviving corporation; or

(iv) a merger, consolidation or similar transaction following which the Company is the surviving corporation but the shares of Common Stock outstanding immediately preceding the merger, consolidation or similar transaction are converted or exchanged by virtue of the merger, consolidation or similar transaction into other property, whether in the form of securities, cash or otherwise.

(p) “ **Covered Employee** ” will have the meaning provided in Section 162(m)(3) of the Code.

(q) “ **Director** ” means a member of the Board.

(r) “ **Disability** ” means, with respect to a Participant, the inability of such Participant to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months, as provided in Sections 22(e)(3) and 409A(a)(2)(c)(i) of the

Code, and will be determined by the Board on the basis of such medical evidence as the Board deems warranted under the circumstances.

(s) “**Dissolution**” means when the Company, after having executed a certificate of dissolution with the State of Delaware (or other applicable state), has completely wound up its affairs. Conversion of the Company into a Limited Liability Company (or any other pass-through entity) will not be considered a “Dissolution” for purposes of the Plan.

(t) “**Employee**” means any person employed by the Company or an Affiliate. However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an “Employee” for purposes of the Plan.

(u) “**Entity**” means a corporation, partnership, limited liability company or other entity.

(v) “**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(w) “**Exchange Act Person**” means any natural person, Entity or “group” (within the meaning of Section 13(d) or 14(d) of the Exchange Act), except that “Exchange Act Person” will not include (i) the Company or any Subsidiary of the Company, (ii) any employee benefit plan of the Company or any Subsidiary of the Company or any trustee or other fiduciary holding securities under an employee benefit plan of the Company or any Subsidiary of the Company, (iii) an underwriter temporarily holding securities pursuant to a registered public offering of such securities, (iv) an Entity Owned, directly or indirectly, by the stockholders of the Company in substantially the same proportions as their Ownership of stock of the Company; or (v) any natural person, Entity or “group” (within the meaning of Section 13(d) or 14(d) of the Exchange Act) that, as of the IPO Date, is the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined voting power of the Company’s then outstanding securities.

(x) “**Fair Market Value**” means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or traded on any established market, the Fair Market Value of a share of Common Stock will be, unless otherwise determined by the Board, the closing sales price for such stock as quoted on such exchange or market (or the exchange or market with the greatest volume of trading in the Common Stock) on the date of determination, as reported in a source the Board deems reliable.

(ii) Unless otherwise provided by the Board, if there is no closing sales price for the Common Stock on the date of determination, then the Fair Market Value will be the closing selling price on the last preceding date for which such quotation exists.

(iii) In the absence of such markets for the Common Stock, the Fair Market Value will be determined by the Board in good faith and in a manner that complies with Sections 409A and 422 of the Code.

(y) “**Incentive Stock Option**” means an option granted pursuant to Section 5 of the Plan that is intended to be, and qualifies as, an “incentive stock option” within the meaning of Section 422 of the Code.

(z) “**Inducement Award**” means a Stock Award, other than an Incentive Stock Option, that is granted pursuant to Section 3(f) of the Plan.

(aa) “**IPO Date**” means the date of the underwriting agreement between the Company and the underwriter(s) managing the initial public offering of the Common Stock, pursuant to which the Common Stock is priced for the initial public offering.

(bb) “**Non-Employee Director**” means a Director who either (i) is not a current employee or officer of the Company or an Affiliate, does not receive compensation, either directly or indirectly, from the Company or an Affiliate for services rendered as a consultant or in any capacity other than as a Director (except for an amount as to which disclosure would not be required under Item 404(a) of Regulation S-K promulgated pursuant to the Securities Act (“**Regulation S-K**”)), does not possess an interest in any other transaction for which disclosure would be required under Item 404(a) of Regulation S-K, and is not engaged in a business relationship for which disclosure would be required pursuant to Item 404(b) of Regulation S-K; or (ii) is otherwise considered a “non-employee director” for purposes of Rule 16b-3.

(cc) “**Nonstatutory Stock Option**” means any Option granted pursuant to Section 5 of the Plan that does not qualify as an Incentive Stock Option.



(dd) “ **Officer** ” means a person who is an officer of the Company within the meaning of Section 16 of the Exchange Act.

(ee) “ **Option** ” means an Incentive Stock Option or a Nonstatutory Stock Option to purchase shares of Common Stock granted pursuant to the Plan.

(ff) “ **Option Agreement** ” means a written agreement between the Company and an Optionholder evidencing the terms and conditions of an Option grant. Each Option Agreement will be subject to the terms and conditions of the Plan.

(gg) “ **Optionholder** ” means a person to whom an Option is granted pursuant to the Plan or, if applicable, such other person who holds an outstanding Option.

(hh) “ **Other Stock Award** ” means an award based in whole or in part by reference to the Common Stock which is granted pursuant to the terms and conditions of Section 6(d).

(ii) “ **Other Stock Award Agreement** ” means a written agreement between the Company and a holder of an Other Stock Award evidencing the terms and conditions of an Other Stock Award grant. Each Other Stock Award Agreement will be subject to the terms and conditions of the Plan.

(jj) “ **Outside Director** ” means a Director who either (i) is not a current employee of the Company or an “affiliated corporation” (within the meaning of Treasury Regulations promulgated under Section 162(m) of the Code), is not a former employee of the Company or an “affiliated corporation” who receives compensation for prior services (other than benefits under a tax-qualified retirement plan) during the taxable year, has not been an officer of the Company or an “affiliated corporation,” and does not receive remuneration from the Company or an “affiliated corporation,” either directly or indirectly, in any capacity other than as a Director, or (ii) is otherwise considered an “outside director” for purposes of Section 162(m) of the Code.

(kk) “ **Own,** ” “ **Owned,** ” “ **Owner,** ” “ **Ownership** ” means a person or Entity will be deemed to “Own,” to have “Owned,” to be the “Owner” of, or to have acquired “Ownership” of securities if such person or Entity, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares voting power, which includes the power to vote or to direct the voting, with respect to such securities.

(ll) “ **Participant** ” means a person to whom an Award is granted pursuant to the Plan or, if applicable, such other person who holds an outstanding Stock Award.

(mm) “ **Performance Cash Award** ” means an award of cash granted pursuant to the terms and conditions of Section 6(c)(ii).

(nn) “ **Performance Criteria** ” means the one or more criteria that the Board will select for purposes of establishing the Performance Goals for a Performance Period. The Performance Criteria that will be used to establish such Performance Goals may be based on any one of, or combination of, the following as determined by the Board: (i) earnings (including earnings per share and net earnings); (ii) earnings before interest, taxes and depreciation; (iii) earnings before interest, taxes, depreciation and amortization; (iv) earnings before interest, taxes, depreciation, amortization and legal settlements; (v) earnings before interest, taxes, depreciation, amortization, legal settlements and other income (expense); (vi) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense) and stock-based compensation; (vii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation and changes in deferred revenue; (viii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation, other non-cash expenses and changes in deferred revenue; (ix) total stockholder return; (x) return on equity or average stockholder’s equity; (xi) return on assets, investment, or capital employed; (xii) stock price; (xiii) margin (including gross margin); (xiv) income (before or after taxes); (xv) operating income; (xvi) operating income after taxes; (xvii) pre-tax profit; (xviii) operating cash flow; (xix) sales or revenue targets; (xx) increases in revenue or product revenue; (xxi) expenses and cost reduction goals; (xxii) improvement in or attainment of working capital levels; (xxiii) economic value added (or an equivalent metric); (xxiv) market share; (xxv) cash flow; (xxvi) cash flow per share; (xxvii) cash balance; (xxviii) cash burn; (xxix) cash collections; (xxx) share price performance; (xxxi) debt reduction; (xxxii) implementation or completion of projects or processes (including, without limitation, discovery of a pre-clinical drug candidate, recommendation of a drug candidate to enter a clinical trial, clinical trial initiation, clinical trial enrollment and dates, clinical trial results, regulatory filing submissions (such as IND, BLA and NDA), regulatory filing acceptances, regulatory or advisory committee interactions, regulatory approvals, and product supply) ; (xxxiii) stockholders’ equity; (xxxiv) capital expenditures; (xxxv) financings; (xxxvi) operating profit or net operating profit; (xxxvii) workforce diversity; (xxxviii) growth of net income or operating income; (xxxix) employee retention; (xl) initiation of studies by specific dates; (xli) budget management; (xlii) submission to, or approval by, a regulatory body (including, but not limited to the U.S. Food and Drug Administration) of an applicable filing or a product; (xliii) regulatory milestones; (xliv) progress of internal research or development programs; (xlvi)

partner satisfaction ; ( x l v ii ) timely completion of clinical trials ; ( x l v iii ) milestones related to research development (including, but not limited to, preclinical and clinical studies), product development and manufacturing ; ( x l ix ) expansion of sales in additional geographies or markets; (l) research progress, including the development of programs ; (li) strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property; (lii) filing of patent applications and granting of patents; and (lii i ) to the extent that an A ward is not intended to comply with Section 162(m) of the Code, other measures of performance selected by the Board .

**(oo) “ Performance Goals ”** means, for a Performance Period, the one or more goals established by the Board for the Performance Period based upon the Performance Criteria. Performance Goals may be based on a Company-wide basis, with respect to one or more business units, divisions, Affiliates, or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Unless specified otherwise by the Board (i) in the Award Agreement at the time the Award is granted or (ii) in such other document setting forth the Performance Goals at the time the Performance Goals are established, the Board will appropriately make adjustments in the method of calculating the attainment of Performance Goals for a Performance Period as follows: (1) to exclude restructuring and/or other nonrecurring charges; (2) to exclude exchange rate effects; (3) to exclude the effects of changes to generally accepted accounting principles; (4) to exclude the effects of any statutory adjustments to corporate tax rates; (5) to exclude the effects of items that are “unusual” in nature or occur “infrequently” as determined under generally accepted accounting principles; (6) to exclude the dilutive effects of acquisitions or joint ventures; (7) to assume that any business divested by the Company achieved performance objectives at targeted levels during the balance of a Performance Period following such divestiture; (8) to exclude the effect of any change in the outstanding shares of common stock of the Company by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; (9) to exclude the effects of stock based compensation and the award of bonuses under the Company’s bonus plans; (10) to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under generally accepted accounting principles; (11) to exclude the goodwill and intangible asset impairment charges that are required to be recorded under generally accepted accounting principles; and (12) to exclude the effects of the timing of acceptance for review and/or approval of submissions to the U.S. Food and Drug Administration or any other regulatory body. In addition, the Board retains the discretion to reduce or eliminate the compensation or economic benefit due upon attainment of Performance Goals and to define the manner of calculating the Performance Criteria it selects to use for such Performance Period. Partial achievement of the specified criteria may result in the payment or vesting corresponding to the degree of achievement as specified in the Stock Award Agreement or the written terms of a Performance Cash Award.

**(pp) “ Performance Period ”** means the period of time selected by the Board over which the attainment of one or more Performance Goals will be measured for the purpose of determining a Participant’s right to and the payment of a Stock Award or a Performance Cash Award. Performance Periods may be of varying and overlapping duration, at the sole discretion of the Board.

**(qq) “ Performance Stock Award ”** means a Stock Award granted under the terms and conditions of Section 6(c)(i).

**(rr) “ Plan ”** means this Tocagen Inc. 2017 Equity Incentive Plan.

**(ss) “ Restricted Stock Award ”** means an award of shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(a).

**(tt) “ Restricted Stock Award Agreement ”** means a written agreement between the Company and a holder of a Restricted Stock Award evidencing the terms and conditions of a Restricted Stock Award grant. Each Restricted Stock Award Agreement will be subject to the terms and conditions of the Plan.

**(uu) “ Restricted Stock Unit Award ”** means a right to receive shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(b).

**(vv) “ Restricted Stock Unit Award Agreement ”** means a written agreement between the Company and a holder of a Restricted Stock Unit Award evidencing the terms and conditions of a Restricted Stock Unit Award grant. Each Restricted Stock Unit Award Agreement will be subject to the terms and conditions of the Plan.

**(ww) “ Rule 16b-3 ”** means Rule 16b-3 promulgated under the Exchange Act or any successor to Rule 16b-3, as in effect from time to time.

**(xx) “ Securities Act ”** means the Securities Act of 1933, as amended.

(yy) “ **Stock Appreciation Right** ” or “ **SAR** ” means a right to receive the appreciation on Common Stock that is granted pursuant to the terms and conditions of Section 5 .

(zz) “ **Stock Appreciation Right Agreement** ” means a written agreement between the Company and a holder of a Stock Appreciation Right evidencing the terms and conditions of a Stock Appreciation Right grant. Each Stock Appreciation Right Agreement will be subject to the terms and conditions of the Plan.

(aaa) “ **Stock Award** ” means any right to receive Common Stock granted under the Plan, including an Incentive Stock Option, a Nonstatutory Stock Option, a Restricted Stock Award, a Restricted Stock Unit Award, a Stock Appreciation Right, a Performance Stock Award or any Other Stock Award.

(bbb) “ **Stock Award Agreement** ” means a written agreement between the Company and a Participant evidencing the terms and conditions of a Stock Award grant. Each Stock Award Agreement will be subject to the terms and conditions of the Plan.

(ccc) “ **Subsidiary** ” means, with respect to the Company, (i) any corporation of which more than 50% of the outstanding capital stock having ordinary voting power to elect a majority of the board of directors of such corporation (irrespective of whether, at the time, stock of any other class or classes of such corporation will have or might have voting power by reason of the happening of any contingency) is at the time, directly or indirectly, Owned by the Company, and (ii) any partnership, limited liability company or other entity in which the Company has a direct or indirect interest (whether in the form of voting or participation in profits or capital contribution) of more than 50%.

(ddd) “ **Ten Percent Stockholder** ” means a person who Owns (or is deemed to Own pursuant to Section 424(d) of the Code) stock possessing more than 10% of the total combined voting power of all classes of stock of the Company or any Affiliate.

(eee) “ **Transaction** ” means a Corporate Transaction or a Change in Control.



**Additional Terms/Acknowledgements:** Optionholder acknowledges receipt of, and understands and agrees to, this Stock Option Grant Notice, the Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as of the Date of Grant, this Stock Option Grant Notice, the Option Agreement, and the Plan set forth the entire understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein. By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**T OCAGEN I NC .**

**O PTIONHOLDER :**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**A TTACHMENTS :** Option Agreement, 2017 Equity Incentive Plan and Notice of Exercise

A TTACHMENT I

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Pursuant to your Stock Option Grant Notice (“*Grant Notice*”) and this Option Agreement, Tocagen Inc. (the “*Company*”) has granted you an option under its 2017 Equity Incentive Plan (the “*Plan*”) to purchase the number of shares of the Company’s Common Stock indicated in your Grant Notice at the exercise price indicated in your Grant Notice. The option is granted to you effective as of the date of grant set forth in the Grant Notice (the “*Date of Grant*”). If there is any conflict between the terms in this Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Option Agreement or in the Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Grant Notice and the Plan, are as follows:

**1. VESTING.** Subject to the provisions contained herein, your option will vest as provided in your Grant Notice. Vesting will cease upon the termination of your Continuous Service.

**2. NUMBER OF SHARES AND EXERCISE PRICE.** The number of shares of Common Stock subject to your option and your exercise price per share in your Grant Notice will be adjusted for Capitalization Adjustments.

**3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES.** If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a “*Non-Exempt Employee*”), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your “retirement” (as defined in the Company’s benefit plans).

**4. EXERCISE PRIOR TO VESTING (“EARLY EXERCISE”).** If permitted in your Grant Notice ( *i.e.* , the “Exercise Schedule” indicates “Early Exercise Permitted”) and subject to the provisions of your option, you may elect at any time that is both (i) during the period of your Continuous Service and (ii) during the term of your option, to exercise all or part of your option, including the unvested portion of your option; *provided, however*, that:

(a) a partial exercise of your option will be deemed to cover first vested shares of Common Stock and then the earliest vesting installment of unvested shares of Common Stock;

(b) any shares of Common Stock so purchased from installments that have not vested as of the date of exercise will be subject to the purchase option in favor of the Company as described in the Company’s form of Early Exercise Stock Purchase Agreement;

(c) you will enter into the Company’s form of Early Exercise Stock Purchase Agreement with a vesting schedule that will result in the same vesting as if no early exercise had occurred; and

(d) if your option is an Incentive Stock Option, then, to the extent that the aggregate Fair Market Value (determined at the Date of Grant) of the shares of Common Stock with respect to which your option plus all other Incentive Stock Options you hold are exercisable for the first time by you during any calendar year (under all plans of the Company and its Affiliates) exceeds one hundred thousand dollars (\$100,000), your option(s) or portions thereof that exceed such limit (according to the order in which they were granted) will be treated as Nonstatutory Stock Options.

**5. METHOD OF PAYMENT.** You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft or money order payable to the Company or in any other manner *permitted by your Grant Notice*, which may include one or more of the following:

(a) Provided that at the time of exercise the Common Stock is publicly traded, pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds. This manner of payment is also known as a “broker-assisted exercise”, “same day sale”, or “sell to cover”.

(b) Provided that at the time of exercise the Common Stock is publicly traded, by delivery to the Company (either by actual delivery or attestation) of already-owned shares of Common Stock that are owned free and clear of any liens, claims, encumbrances or security interests, and that are valued at Fair Market Value on the date of exercise. “Delivery” for these purposes, in the sole discretion of the Company at the time you exercise your option, will include delivery to the Company of your attestation of ownership of such shares of Common Stock in a form approved by the Company. You may not exercise your option by delivery to the Company of Common Stock if doing so would violate the provisions of any law, regulation or agreement restricting the redemption of the Company’s stock.

(c) If this option is a Nonstatutory Stock Option, subject to the consent of the Company at the time of exercise, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Common Stock issued upon exercise of your option by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price. You must pay any remaining balance of the aggregate exercise price not satisfied by the “net exercise” in cash or other permitted form of payment. Shares of Common Stock will no longer be outstanding under your option and will not be exercisable thereafter if those shares (i) are used to pay the exercise price pursuant to the “net exercise,” (ii) are delivered to you as a result of such exercise, and (iii) are withheld to satisfy your tax withholding obligations.

**6. WHOLE SHARES.** You may exercise your option only for whole shares of Common Stock.

**7. SECURITIES LAW COMPLIANCE.** In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

**8. TERM.** You may not exercise your option before the Date of Grant or after the expiration of the option’s term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

(a) immediately upon the termination of your Continuous Service for Cause;

(b) three (3) months after the termination of your Continuous Service for any reason other than Cause, your Disability or your death (except as otherwise provided in Section 8(d) below); *provided, however*, that if during any part of such three (3) month period your option is not exercisable solely because of the condition set forth in Section 7 above, your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service; *provided further*, if during any part of such three (3) month period, the sale of any Common Stock received upon exercise of your option would violate the Company’s insider trading policy, then your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service during which the sale of the Common Stock received upon exercise of your option would not be in violation of the Company’s insider trading policy. Notwithstanding the foregoing, if (i) you are a Non-Exempt Employee, (ii) your Continuous Service terminates within six (6) months after the Date of Grant, and (iii) you have vested in a portion of your option at the time of your termination of Continuous Service, your option will not expire until the earlier of (x) the later of (A) the date that is seven (7) months after the Date of Grant, and (B) the date that is three (3) months after the termination of your Continuous Service, and (y) the Expiration Date;

(c) twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d) below);

(d) eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

(e) the Expiration Date indicated in your Grant Notice; or

(f) the day before the tenth (10th) anniversary of the Date of Grant.

If your option is an Incentive Stock Option, note that to obtain the federal income tax advantages associated with an Incentive Stock Option, the Code requires that at all times beginning on the Date of Grant and ending on the day three (3) months before the date of your option's exercise, you must be an employee of the Company or an Affiliate, except in the event of your death or Disability. The Company has provided for extended exercisability of your option under certain circumstances for your benefit but cannot guarantee that your option will necessarily be treated as an Incentive Stock Option if you continue to provide services to the Company or an Affiliate as a Consultant or Director after your employment terminates or if you otherwise exercise your option more than three (3) months after the date your employment with the Company or an Affiliate terminates.

#### 9. EXERCISE.

(a) You may exercise the vested portion of your option (and the unvested portion of your option if your Grant Notice so permits) during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any applicable withholding taxes to the Company's Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, (ii) the lapse of any substantial risk of forfeiture to which the shares of Common Stock are subject at the time of exercise, or (iii) the disposition of shares of Common Stock acquired upon such exercise.

(c) If your option is an Incentive Stock Option, by exercising your option you agree that you will notify the Company in writing within fifteen (15) days after the date of any disposition of any of the shares of the Common Stock issued upon exercise of your option that occurs within two (2) years after the Date of Grant or within one (1) year after such shares of Common Stock are transferred upon exercise of your option.

(d) By accepting your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale, any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2711 or NYSE Member Rule 472 or any successor or similar rules or regulation (the "**Lock-Up Period**"); *provided, however*, that nothing contained in this Section 9(d) will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(d). The underwriters of the Company's stock are intended third party beneficiaries of this Section 9(d) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

**10. TRANSFERABILITY.** Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) **Certain Trusts.** Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic



relations order or marital settlement agreement. If this option is an Incentive Stock Option, this option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

**(c) Beneficiary Designation.** Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a Designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

**11. OPTION NOT A SERVICE CONTRACT.** Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.

**12. WITHHOLDING OBLIGATIONS.**

**(a)** At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a “same day sale” pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option.

**(b)** If this option is a Nonstatutory Stock Option, then upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the minimum amount of tax required to be withheld by law (or such lower amount as may be necessary to avoid classification of your option as a liability for financial accounting purposes). If the date of determination of any tax withholding obligation is deferred to a date later than the date of exercise of your option, share withholding pursuant to the preceding sentence shall not be permitted unless you make a proper and timely election under Section 83(b) of the Code, covering the aggregate number of shares of Common Stock acquired upon such exercise with respect to which such determination is otherwise deferred, to accelerate the determination of such tax withholding obligation to the date of exercise of your option. Notwithstanding the filing of such election, shares of Common Stock shall be withheld solely from fully vested shares of Common Stock determined as of the date of exercise of your option that are otherwise issuable to you upon such exercise. Any adverse consequences to you arising in connection with such share withholding procedure shall be your sole responsibility.

**(c)** You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

**13. TAX CONSEQUENCES.** You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Grant Notice is at least equal to the “fair market value” per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

**14. NOTICES.** Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**15. G OVERNING P LAN D OCUMENT .** Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law.

**16. O THER D OCUMENTS .** You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company’s policy permitting certain individuals to sell shares only during certain “window” periods and the Company’s insider trading policy, in effect from time to time.

**17. E FFECT ON O THER E MPLOYEE B ENEFIT P LANS .** The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company’s or any Affiliate’s employee benefit plans.

**18. V OTING R IGHTS .** You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to you. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

**19. S EVERABILITY .** If all or any part of this Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Option Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Option Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**20. M ISCELLANEOUS .**

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company’s successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

\* \* \*

This Option Agreement will be deemed to be signed by you upon the signing by you of the Stock Option Grant Notice to which it is attached.

**A TTACHMENT II**

**2017 E Q U I T Y I N C E N T I V E P L A N**

ATTACHMENT III

NOTICE OF EXERCISE

**Tocagen Inc.**

[Address]

Date of Exercise:

This constitutes notice to Tocagen Inc. (the “*Company*”) under my stock option that I elect to purchase the below number of shares of Common Stock of the Company (the “*Shares*”) for the price set forth below.

Type of option (check one):	Incentive <input type="checkbox"/>	Nonstatutory <input type="checkbox"/>
Stock option dated:		
Number of Shares as to which option is exercised:		
Certificates to be issued in name of:		
Total exercise price:	\$	\$
Cash payment delivered herewith:	\$	\$
[Value of Shares delivered herewith <sup>2</sup> :	\$	\$ ]
[Value of Shares pursuant to net exercise <sup>3</sup> :	\$	\$ ]
[Regulation T Program (cashless exercise <sup>4</sup> ):	\$	\$ ]

<sup>2</sup> Shares must meet the public trading requirements set forth in the option. Shares must be valued in accordance with the terms of the option being exercised, and must be owned free and clear of any liens, claims, encumbrances or security interests. Certificates must be endorsed or accompanied by an executed assignment separate from certificate.

<sup>3</sup> The option must be a Nonstatutory Stock Option, and the Company must have established net exercise procedures at the time of exercise, in order to utilize this payment method.

<sup>4</sup> Shares must meet the public trading requirements set forth in the option.

By this exercise, I agree (i) to provide such additional documents as you may require pursuant to the terms of the Tocagen Inc. 2017 Equity Incentive Plan, (ii) to provide for the payment by me to you (in the manner designated by you) of your withholding obligation, if any, relating to the exercise of this option, and (iii) if this exercise relates to an incentive stock option, to notify you in writing within fifteen (15) days after the date of any disposition of any of the Shares issued upon exercise of this option that occurs within two (2) years after the date of grant of this option or within one (1) year after such Shares are issued upon exercise of this option.

Very truly yours,

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**Additional Terms/Acknowledgements:** Optionholder acknowledges receipt of, and understands and agrees to, this Stock Option Grant Notice, the Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as of the Date of Grant, this Stock Option Grant Notice, the Option Agreement, and the Plan set forth the entire understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein. By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**TOCAGEN INC.**

**OPTIONHOLDER :**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENTS :** Option Agreement, 2017 Equity Incentive Plan and Notice of Exercise

A TTACHMENT I

T OCAGEN I NC .  
2017 E QUITY I NCENTIVE P LAN

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(I NCENTIVE S TOCK O PTION OR N ONSTATUTORY S TOCK O PTION )

Pursuant to your Stock Option Grant Notice (“ **Grant Notice** ”) and this Option Agreement, Tocagen Inc.(the “ **Company** ”) has granted you an option under its 2017 Equity Incentive Plan (the “ **Plan** ”) to purchase the number of shares of the Company’s Common Stock indicated in your Grant Notice at the exercise price indicated in your Grant Notice. The option is granted to you effective as of the date of grant set forth in the Grant Notice (the “ **Date of Grant** ”). If there is any conflict between the terms in this Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Option Agreement or in the Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Grant Notice and the Plan, are as follows:

**1. VESTING.** Subject to the provisions contained herein, your option will vest as provided in your Grant Notice. Vesting will cease upon the termination of your Continuous Service. “ **Double-Trigger** ” **Vesting Acceleration Provision:** If a Change in Control occurs and within one (1) month prior to, or within twelve (12) months after, the effective time of such Change in Control, your Continuous Service terminates due to an involuntary termination (not including death or Disability) without Cause or due to your voluntary termination with Good Reason, then, as of the date of termination of Continuous Service, the vesting and exercisability of your option will be accelerated in full.

(a) “ **Good Reason** ” means that one or more of the following are undertaken by the Company (or successor to the Company, if applicable) without your express written consent: (i) a material reduction in your annual base salary; *provided, however* , that Good Reason will not be deemed to have occurred in the event of a reduction in your annual base salary that is pursuant to a salary reduction program affecting substantially all of the employees of the Company and that does not adversely affect you to a greater extent than other similarly situated employees; (ii) a material reduction in your authority, duties or responsibilities; (iii) any failure by the Company to continue in effect any material benefit plan or program, including incentive plans or plans with respect to the receipt of securities of the Company, in which you were participating immediately prior to the effective date of the Change in Control (hereinafter referred to as “ **Benefit Plans** ”), or the taking of any action by the Company that would adversely affect your participation in or reduce your benefits under the Benefit Plans or deprive you of any fringe benefit that you enjoyed immediately prior to the effective date of the Change in Control; *provided, however* , that Good Reason will not be deemed to have occurred if the Company provides for your participation in benefit plans and programs that, taken as a whole, are comparable to the Benefit Plans; (iv) a relocation of your principal place of employment with the Company (or successor to the Company, if applicable) to a place that increases your one-way commute by more than fifty (50) miles as compared to your then-current principal place of employment immediately prior to such relocation, except for required travel by you on the Company’s business to an extent substantially consistent with your business travel obligations prior to the effective date of the Change in Control; or (v) a material breach by the Company of any provision of the Plan or the Option Agreement or any other material agreement between you and the Company concerning the terms and conditions of your employment or service with the Company.

(b) If any payment or benefit you would receive from the Company or otherwise in connection with a Change in Control or other similar transaction (a “ **280G Payment** ”) would (i) constitute a “parachute payment” within the meaning of Section 280G of the Code, and (ii) but for this sentence, be subject to the excise tax imposed by Section 4999 of the Code (the “ **Excise Tax** ”), then any such 280G Payment (a “ **Payment** ”) shall be equal to the Reduced Amount. The “ **Reduced Amount** ” shall be either (x) the largest portion of the Payment that would result in no portion of the Payment (after reduction) being subject to the Excise Tax or (y) the largest portion, up to and including the total, of the Payment, whichever amount (i.e., the amount determined by clause (x) or by clause (y)), after taking into account all applicable federal, state and local employment taxes, income taxes, and the Excise Tax (all computed at the highest applicable marginal rate), results in your receipt, on an after-tax basis, of the greater economic benefit notwithstanding that all or some portion of the Payment may be subject to the Excise Tax. If a reduction in a Payment is required pursuant to the preceding sentence and the Reduced Amount is determined pursuant to clause (x) of the preceding sentence, the reduction shall occur in the manner (the “ **Reduction Method** ”) that results in the greatest economic benefit for you. If more than one method of reduction will result in the same economic benefit, the items so reduced will be reduced pro rata (the “ **Pro Rata Reduction Method** ”).



Notwithstanding the foregoing, if the Reduction Method or the Pro Rata Reduction Method would result in any portion of the Payment being subject to taxes pursuant to Section 409A of the Code that would not otherwise be subject to taxes pursuant to Section 409A of the Code, then the Reduction Method and/or the Pro Rata Reduction Method, as the case may be, shall be modified so as to avoid the imposition of taxes pursuant to Section 409A of the Code as follows: (A) as a first priority, the modification shall preserve to the greatest extent possible, the greatest economic benefit for you as determined on an after-tax basis; (B) as a second priority, Payments that are contingent on future events (e.g., being terminated without cause), shall be reduced (or eliminated) before Payments that are not contingent on future events; and (C) as a third priority, Payments that are “deferred compensation” within the meaning of Section 409A of the Code shall be reduced (or eliminated) before Payments that are not deferred compensation within the meaning of Section 409A of the Code.

Unless you and the Company agree on an alternative accounting firm, the accounting firm engaged by the Company for general tax compliance purposes as of the day prior to the effective date of the change of control transaction triggering the Payment shall perform the foregoing calculations. If the accounting firm so engaged by the Company is serving as accountant or auditor for the individual, entity or group effecting the change of control transaction, the Company shall appoint a nationally recognized accounting firm to make the determinations required hereunder. The Company shall bear all expenses with respect to the determinations by such accounting firm required to be made hereunder. The Company shall use commercially reasonable efforts to cause the accounting firm engaged to make the determinations hereunder to provide its calculations, together with detailed supporting documentation, to you and the Company within fifteen (15) calendar days after the date on which your right to a 280G Payment becomes reasonably likely to occur (if requested at that time by you or the Company) or such other time as requested by you or the Company.

If you receive a Payment for which the Reduced Amount was determined pursuant to clause (x) of the first paragraph of this Section 1(b) and the Internal Revenue Service determines thereafter that some portion of the Payment is subject to the Excise Tax, you shall promptly return to the Company a sufficient amount of the Payment (after reduction pursuant to clause (x) of the first paragraph of this Section 1(b) so that no portion of the remaining Payment is subject to the Excise Tax. For the avoidance of doubt, if the Reduced Amount was determined pursuant to clause (y) in the first paragraph of this Section 1(b), you shall have no obligation to return any portion of the Payment pursuant to the preceding sentence.

**2. NUMBER OF SHARES AND EXERCISE PRICE.** The number of shares of Common Stock subject to your option and your exercise price per share in your Grant Notice will be adjusted for Capitalization Adjustments.

**3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES.** If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a “*Non-Exempt Employee*”), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your “retirement” (as defined in the Company’s benefit plans).

**4. EXERCISE PRIOR TO VESTING (“EARLY EXERCISE”).** If permitted in your Grant Notice ( *i.e.* , the “Exercise Schedule” indicates “Early Exercise Permitted”) and subject to the provisions of your option, you may elect at any time that is both (i) during the period of your Continuous Service and (ii) during the term of your option, to exercise all or part of your option, including the unvested portion of your option; *provided, however*, that:

(a) a partial exercise of your option will be deemed to cover first vested shares of Common Stock and then the earliest vesting installment of unvested shares of Common Stock;

(b) any shares of Common Stock so purchased from installments that have not vested as of the date of exercise will be subject to the purchase option in favor of the Company as described in the Company’s form of Early Exercise Stock Purchase Agreement;

(c) you will enter into the Company’s form of Early Exercise Stock Purchase Agreement with a vesting schedule that will result in the same vesting as if no early exercise had occurred; and

(d) if your option is an Incentive Stock Option, then, to the extent that the aggregate Fair Market Value (determined at the Date of Grant) of the shares of Common Stock with respect to which your option plus all other Incentive Stock Options you hold are exercisable for the first time by you during any calendar year (under all plans of the Company and its Affiliates) exceeds one hundred thousand dollars (\$100,000), your option(s) or portions thereof that exceed such limit (according to the order in which they were granted) will be treated as Nonstatutory Stock Options.

**5. METHOD OF PAYMENT.** You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft or money order payable to the Company or in any other manner *permitted by your Grant Notice*, which may include one or more of the following:

(a) Provided that at the time of exercise the Common Stock is publicly traded, pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds. This manner of payment is also known as a “broker-assisted exercise”, “same day sale”, or “sell to cover”.

(b) Provided that at the time of exercise the Common Stock is publicly traded, by delivery to the Company (either by actual delivery or attestation) of already-owned shares of Common Stock that are owned free and clear of any liens, claims, encumbrances or security interests, and that are valued at Fair Market Value on the date of exercise. “Delivery” for these purposes, in the sole discretion of the Company at the time you exercise your option, will include delivery to the Company of your attestation of ownership of such shares of Common Stock in a form approved by the Company. You may not exercise your option by delivery to the Company of Common Stock if doing so would violate the provisions of any law, regulation or agreement restricting the redemption of the Company’s stock.

(c) If this option is a Nonstatutory Stock Option, subject to the consent of the Company at the time of exercise, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Common Stock issued upon exercise of your option by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price. You must pay any remaining balance of the aggregate exercise price not satisfied by the “net exercise” in cash or other permitted form of payment. Shares of Common Stock will no longer be outstanding under your option and will not be exercisable thereafter if those shares (i) are used to pay the exercise price pursuant to the “net exercise,” (ii) are delivered to you as a result of such exercise, and (iii) are withheld to satisfy your tax withholding obligations.

**6. WHOLE SHARES.** You may exercise your option only for whole shares of Common Stock.

**7. SECURITIES LAW COMPLIANCE.** In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

**8. TERM.** You may not exercise your option before the Date of Grant or after the expiration of the option’s term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

(a) immediately upon the termination of your Continuous Service for Cause;

(b) three (3) months after the termination of your Continuous Service for any reason other than Cause, your Disability or your death (except as otherwise provided in Section 8(d) below); *provided, however*, that if during any part of such three (3) month period your option is not exercisable solely because of the condition set forth in Section 7 above, your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service; *provided further*, if during any part of such three (3) month period, the sale of any Common Stock received upon exercise of your option would violate the Company’s insider trading policy, then your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service during which the sale of the Common Stock received upon exercise of your option would not be in violation of the Company’s insider trading policy. Notwithstanding the foregoing, if (i) you are a Non-Exempt Employee, (ii) your Continuous Service terminates within six (6) months after the Date of Grant, and (iii) you have vested in a portion of your option at the time of your termination of Continuous Service, your option will not expire until the earlier of (x) the later of (A) the date that is seven (7) months after the Date of Grant, and (B) the date that is three (3) months after the termination of your Continuous Service, and (y) the Expiration Date;

(c) twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d) below);

(d) eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

(e) the Expiration Date indicated in your Grant Notice; or

(f) the day before the tenth (10th) anniversary of the Date of Grant.

If your option is an Incentive Stock Option, note that to obtain the federal income tax advantages associated with an Incentive Stock Option, the Code requires that at all times beginning on the Date of Grant and ending on the day three (3) months before the date of your option's exercise, you must be an employee of the Company or an Affiliate, except in the event of your death or Disability. The Company has provided for extended exercisability of your option under certain circumstances for your benefit but cannot guarantee that your option will necessarily be treated as an Incentive Stock Option if you continue to provide services to the Company or an Affiliate as a Consultant or Director after your employment terminates or if you otherwise exercise your option more than three (3) months after the date your employment with the Company or an Affiliate terminates.

#### 9. EXERCISE.

(a) You may exercise the vested portion of your option (and the unvested portion of your option if your Grant Notice so permits) during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any applicable withholding taxes to the Company's Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, (ii) the lapse of any substantial risk of forfeiture to which the shares of Common Stock are subject at the time of exercise, or (iii) the disposition of shares of Common Stock acquired upon such exercise.

(c) If your option is an Incentive Stock Option, by exercising your option you agree that you will notify the Company in writing within fifteen (15) days after the date of any disposition of any of the shares of the Common Stock issued upon exercise of your option that occurs within two (2) years after the Date of Grant or within one (1) year after such shares of Common Stock are transferred upon exercise of your option.

(d) By accepting your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale, any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2711 or NYSE Member Rule 472 or any successor or similar rules or regulation (the "**Lock-Up Period**"); *provided, however*, that nothing contained in this Section 9(d) will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(d). The underwriters of the Company's stock are intended third party beneficiaries of this Section 9(d) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

**10. TRANSFERABILITY.** Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) **Certain Trusts.** Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic relations order or marital settlement agreement. If this option is an Incentive Stock Option, this option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

**(c) Beneficiary Designation.** Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a Designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

**11. OPTION NOT A SERVICE CONTRACT.** Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.

**12. WITHHOLDING OBLIGATIONS.**

**(a)** At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a “same day sale” pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option.

**(b)** If this option is a Nonstatutory Stock Option, then upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the minimum amount of tax required to be withheld by law (or such lower amount as may be necessary to avoid classification of your option as a liability for financial accounting purposes). If the date of determination of any tax withholding obligation is deferred to a date later than the date of exercise of your option, share withholding pursuant to the preceding sentence shall not be permitted unless you make a proper and timely election under Section 83(b) of the Code, covering the aggregate number of shares of Common Stock acquired upon such exercise with respect to which such determination is otherwise deferred, to accelerate the determination of such tax withholding obligation to the date of exercise of your option. Notwithstanding the filing of such election, shares of Common Stock shall be withheld solely from fully vested shares of Common Stock determined as of the date of exercise of your option that are otherwise issuable to you upon such exercise. Any adverse consequences to you arising in connection with such share withholding procedure shall be your sole responsibility.

**(c)** You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

**13. TAX CONSEQUENCES.** You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Grant Notice is at least equal to the “fair market value” per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

**14. NOTICES.** Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**15. G OVERNING P LAN D OCUMENT .** Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law.

**16. O THER D OCUMENTS .** You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company’s policy permitting certain individuals to sell shares only during certain “window” periods and the Company’s insider trading policy, in effect from time to time.

**17. E FFECT ON O THER E MPLOYEE B ENEFIT P LANS .** The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company’s or any Affiliate’s employee benefit plans.

**18. V OTING R IGHTS .** You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to you. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

**19. S EVERABILITY .** If all or any part of this Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Option Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Option Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**20. M ISCELLANEOUS .**

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company’s successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

\* \* \*

This Option Agreement will be deemed to be signed by you upon the signing by you of the Stock Option Grant Notice to which it is attached.

**A TTACHMENT II**

**2017 E Q U I T Y I N C E N T I V E P L A N**

ATTACHMENT III

NOTICE OF EXERCISE

**Tocagen Inc.**

[Address]

Date of Exercise:

This constitutes notice to Tocagen Inc. (the “*Company*”) under my stock option that I elect to purchase the below number of shares of Common Stock of the Company (the “*Shares*”) for the price set forth below.

Type of option (check one):	Incentive <input type="checkbox"/>	Nonstatutory <input type="checkbox"/>
Stock option dated:		
Number of Shares as to which option is exercised:		
Certificates to be issued in name of:		
Total exercise price:	\$	\$
Cash payment delivered herewith:	\$	\$
[Value of Shares delivered herewith <sup>2</sup> :	\$	\$ ]
[Value of Shares pursuant to net exercise <sup>3</sup> :	\$	\$ ]
[Regulation T Program (cashless exercise <sup>4</sup> ):	\$	\$ ]

- <sup>2</sup> Shares must meet the public trading requirements set forth in the option. Shares must be valued in accordance with the terms of the option being exercised, and must be owned free and clear of any liens, claims, encumbrances or security interests. Certificates must be endorsed or accompanied by an executed assignment separate from certificate.
- <sup>3</sup> The option must be a Nonstatutory Stock Option, and the Company must have established net exercise procedures at the time of exercise, in order to utilize this payment method.
- <sup>4</sup> Shares must meet the public trading requirements set forth in the option.

By this exercise, I agree (i) to provide such additional documents as you may require pursuant to the terms of the Tocagen Inc. 2017 Equity Incentive Plan, (ii) to provide for the payment by me to you (in the manner designated by you) of your withholding obligation, if any, relating to the exercise of this option, and (iii) if this exercise relates to an incentive stock option, to notify you in writing within fifteen (15) days after the date of any disposition of any of the Shares issued upon exercise of this option that occurs within two (2) years after the date of grant of this option or within one (1) year after such Shares are issued upon exercise of this option.

Very truly yours,

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**Additional Terms/Acknowledgements:** Optionholder acknowledges of the Date of Grant, this Stock Option Grant Notice, the Option Agreement, and the Plan set forth the entire receipt of, and understands and agrees to, this Stock Option Grant Notice, the Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein. By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**COMPANY :**

**OPTIONHOLDER :**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_   
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENTS :** Option Agreement, 2017 Equity Incentive Plan and Notice of Exercise

A TTACHMENT I

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2017 E QUITY I NCENTIVE P LAN

O PTION A GREEMENT  
(I NCENTIVE S TOCK O PTION OR N ONSTATUTORY S TOCK O PTION )

Pursuant to your Stock Option Grant Notice (“*Grant Notice*”) and this Option Agreement, Tocagen Inc. (the “*Company*”) has granted you an option under its 2017 Equity Incentive Plan (the “*Plan*”) to purchase the number of shares of the Company’s Common Stock indicated in your Grant Notice at the exercise price indicated in your Grant Notice. The option is granted to you effective as of the date of grant set forth in the Grant Notice (the “*Date of Grant*”). If there is any conflict between the terms in this Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Option Agreement or in the Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Grant Notice and the Plan, are as follows:

1. V ESTING .

(a) Subject to the provisions contained herein, your option will vest as provided in your Grant Notice. Vesting will cease upon the termination of your Continuous Service. If a Change in Control occurs and your Continuous Service has not terminated as of immediately prior to such Change in Control, the vesting and exercisability of your option will be accelerated in full.

(b) If any payment or benefit you would receive from the Company or otherwise in connection with a Change in Control or other similar transaction (a “*280G Payment*”) would (i) constitute a “parachute payment” within the meaning of Section 280G of the Code, and (ii) but for this sentence, be subject to the excise tax imposed by Section 4999 of the Code (the “*Excise Tax*”), then any such 280G Payment (a “*Payment*”) shall be equal to the Reduced Amount. The “*Reduced Amount*” shall be either (x) the largest portion of the Payment that would result in no portion of the Payment (after reduction) being subject to the Excise Tax or (y) the largest portion, up to and including the total, of the Payment, whichever amount (i.e., the amount determined by clause (x) or by clause (y)), after taking into account all applicable federal, state and local employment taxes, income taxes, and the Excise Tax (all computed at the highest applicable marginal rate), results in your receipt, on an after-tax basis, of the greater economic benefit notwithstanding that all or some portion of the Payment may be subject to the Excise Tax. If a reduction in a Payment is required pursuant to the preceding sentence and the Reduced Amount is determined pursuant to clause (x) of the preceding sentence, the reduction shall occur in the manner (the “*Reduction Method*”) that results in the greatest economic benefit for you. If more than one method of reduction will result in the same economic benefit, the items so reduced will be reduced pro rata (the “*Pro Rata Reduction Method*”).

Notwithstanding the foregoing, if the Reduction Method or the Pro Rata Reduction Method would result in any portion of the Payment being subject to taxes pursuant to Section 409A of the Code that would not otherwise be subject to taxes pursuant to Section 409A of the Code, then the Reduction Method and/or the Pro Rata Reduction Method, as the case may be, shall be modified so as to avoid the imposition of taxes pursuant to Section 409A of the Code as follows: (A) as a first priority, the modification shall preserve to the greatest extent possible, the greatest economic benefit for you as determined on an after-tax basis; (B) as a second priority, Payments that are contingent on future events (e.g., being terminated without cause), shall be reduced (or eliminated) before Payments that are not contingent on future events; and (C) as a third priority, Payments that are “deferred compensation” within the meaning of Section 409A of the Code shall be reduced (or eliminated) before Payments that are not deferred compensation within the meaning of Section 409A of the Code.

Unless you and the Company agree on an alternative accounting firm, the accounting firm engaged by the Company for general tax compliance purposes as of the day prior to the effective date of the change of control transaction triggering the Payment shall perform the foregoing calculations. If the accounting firm so engaged by the Company is serving as accountant or auditor for the individual, entity or group effecting the change of control transaction, the Company shall appoint a nationally recognized accounting firm to make the determinations required hereunder. The Company shall bear all expenses with respect to the determinations by such accounting firm required to be made hereunder. The Company shall use commercially reasonable efforts to cause the accounting firm engaged to make the determinations hereunder to provide its calculations, together with detailed supporting documentation, to you and the Company within fifteen (15) calendar days after the date on which your right to a 280G Payment becomes reasonably likely to occur (if requested at that time by you or the Company) or such other time as requested by you or the Company.

If you receive a Payment for which the Reduced Amount was determined pursuant to clause (x) of the first paragraph of this Section 1(b) and the Internal Revenue Service determines thereafter that some portion of the Payment is subject to the Excise Tax, you shall promptly return to the Company a sufficient amount of the Payment (after reduction pursuant to clause (x) of the first paragraph of this Section 1(b) so that no portion of the remaining Payment is subject to the Excise Tax. For the avoidance of doubt, if the Reduced Amount was determined pursuant to clause (y) in the first paragraph of this Section 1(b), you shall have no obligation to return any portion of the Payment pursuant to the preceding sentence.

**2. NUMBER OF SHARES AND EXERCISE PRICE.** The number of shares of Common Stock subject to your option and your exercise price per share in your Grant Notice will be adjusted for Capitalization Adjustments.

**3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES.** If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a “*Non-Exempt Employee*”), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your “retirement” (as defined in the Company’s benefit plans).

**4. EXERCISE PRIOR TO VESTING (“EARLY EXERCISE”).** If permitted in your Grant Notice ( *i.e.* , the “Exercise Schedule” indicates “Early Exercise Permitted”) and subject to the provisions of your option, you may elect at any time that is both (i) during the period of your Continuous Service and (ii) during the term of your option, to exercise all or part of your option, including the unvested portion of your option; *provided, however*, that:

(a) a partial exercise of your option will be deemed to cover first vested shares of Common Stock and then the earliest vesting installment of unvested shares of Common Stock;

(b) any shares of Common Stock so purchased from installments that have not vested as of the date of exercise will be subject to the purchase option in favor of the Company as described in the Company’s form of Early Exercise Stock Purchase Agreement;

(c) you will enter into the Company’s form of Early Exercise Stock Purchase Agreement with a vesting schedule that will result in the same vesting as if no early exercise had occurred; and

(d) if your option is an Incentive Stock Option, then, to the extent that the aggregate Fair Market Value (determined at the Date of Grant) of the shares of Common Stock with respect to which your option plus all other Incentive Stock Options you hold are exercisable for the first time by you during any calendar year (under all plans of the Company and its Affiliates) exceeds one hundred thousand dollars (\$100,000), your option(s) or portions thereof that exceed such limit (according to the order in which they were granted) will be treated as Nonstatutory Stock Options.

**5. METHOD OF PAYMENT.** You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft or money order payable to the Company or in any other manner *permitted by your Grant Notice*, which may include one or more of the following:

(a) Provided that at the time of exercise the Common Stock is publicly traded, pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds. This manner of payment is also known as a “broker-assisted exercise”, “same day sale”, or “sell to cover”.

(b) Provided that at the time of exercise the Common Stock is publicly traded, by delivery to the Company (either by actual delivery or attestation) of already-owned shares of Common Stock that are owned free and clear of any liens, claims, encumbrances or security interests, and that are valued at Fair Market Value on the date of exercise. “Delivery” for these purposes, in the sole discretion of the Company at the time you exercise your option, will include delivery to the Company of your attestation of ownership of such shares of Common Stock in a form approved by the Company. You may not exercise your option by delivery to the Company of Common Stock if doing so would violate the provisions of any law, regulation or agreement restricting the redemption of the Company’s stock.

(c) If this option is a Nonstatutory Stock Option, subject to the consent of the Company at the time of exercise, by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Common Stock issued upon exercise of your option by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price. You must pay any remaining balance of the aggregate exercise price not satisfied by the “net exercise” in cash or other permitted form of payment. Shares of Common Stock will no longer be outstanding under your option and will not be exercisable thereafter if those shares (i) are used to pay the exercise price pursuant to the “net exercise,” (ii) are delivered to you as a result of such exercise, and (iii) are withheld to satisfy your tax withholding obligations.

**6. WHOLE SHARES .** You may exercise your option only for whole shares of Common Stock.

**7. SECURITIES LAW COMPLIANCE .** In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

**8. TERM .** You may not exercise your option before the Date of Grant or after the expiration of the option’s term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

(a) immediately upon the termination of your Continuous Service for Cause;

(b) twelve (12) months after the termination of your Continuous Service for any reason other than Cause, your Disability or your death (except as otherwise provided in Section 8(d));

(c) twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d)) below;

(d) eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

(e) the Expiration Date indicated in your Grant Notice; or

(f) the day before the tenth (10th) anniversary of the Date of Grant.

If your option is an Incentive Stock Option, note that to obtain the federal income tax advantages associated with an Incentive Stock Option, the Code requires that at all times beginning on the Date of Grant and ending on the day three (3) months before the date of your option’s exercise, you must be an employee of the Company or an Affiliate, except in the event of your death or Disability. The Company has provided for extended exercisability of your option under certain circumstances for your benefit but cannot guarantee that your option will necessarily be treated as an Incentive Stock Option if you continue to provide services to the Company or an Affiliate as a Consultant or Director after your employment terminates or if you otherwise exercise your option more than three (3) months after the date your employment with the Company or an Affiliate terminates.

**9. EXERCISE .**

(a) You may exercise the vested portion of your option (and the unvested portion of your option if your Grant Notice so permits) during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any applicable withholding taxes to the Company’s Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, (ii) the lapse of any substantial risk of forfeiture to which the shares of Common Stock are subject at the time of exercise, or (iii) the disposition of shares of Common Stock acquired upon such exercise.

(c) If your option is an Incentive Stock Option, by exercising your option you agree that you will notify the Company in writing within fifteen (15) days after the date of any disposition of any of the shares of the Common Stock issued upon exercise of your option that occurs within two (2) years after the Date of Grant or within one (1) year after such shares of Common Stock are transferred upon exercise of your option.

(d) By accepting your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale, any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2711 or NYSE Member Rule 472 or any successor or similar rules or regulation (the “**Lock-Up Period**”); *provided, however*, that nothing contained in this Section 9(d) will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(d). The underwriters of the Company’s stock are intended third party beneficiaries of this Section 9(d) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

**10. TRANSFERABILITY.** Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) **Certain Trusts.** Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic relations order or marital settlement agreement. If this option is an Incentive Stock Option, this option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

(c) **Beneficiary Designation.** Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a Designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

**11. OPTION NOT A SERVICE CONTRACT.** Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.

**12. WITHHOLDING OBLIGATIONS.**

(a) At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a “same day sale” pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option.

(b) If this option is a Nonstatutory Stock Option, then upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the minimum amount of tax required to be withheld by law (or such lower amount as may be necessary to avoid classification of your option as a liability for financial accounting purposes). If the date of determination of any tax withholding obligation is deferred to a date later than the date of exercise of your option, share withholding pursuant to the preceding sentence shall not be permitted unless you make a proper and timely election under Section 83(b) of the Code, covering the aggregate number of shares of Common Stock acquired upon such exercise with respect to which such determination is otherwise deferred, to accelerate the determination of such tax withholding obligation to the date of exercise of your option. Notwithstanding the filing of such election, shares of Common Stock shall be withheld solely from fully vested shares of Common Stock determined as of the date of exercise of your option that are otherwise issuable to you upon such exercise. Any adverse consequences to you arising in connection with such share withholding procedure shall be your sole responsibility.

(c) You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

**13. TAX CONSEQUENCES .** You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Grant Notice is at least equal to the “fair market value” per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

**14. NOTICES.** Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**15. GOVERNING PLAN DOCUMENT.** Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law.

**16. OTHER DOCUMENTS.** You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company’s policy permitting certain individuals to sell shares only during certain “window” periods and the Company’s insider trading policy, in effect from time to time.

**17. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS.** The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company’s or any Affiliate’s employee benefit plans.

**18. VOTING RIGHTS .** You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to you. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

**19. SEVERABILITY.** If all or any part of this Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Option Agreement or the Plan not

declared to be unlawful or invalid. Any Section of this Option Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**20. MISCELLANEOUS .**

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company's successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

\* \* \*

This Option Agreement will be deemed to be signed by you upon the signing by you of the Stock Option Grant Notice to which it is attached.



**A TTACHMENT II**

**2017 E Q U I T Y I N C E N T I V E P L A N**

A TTACHMENT III

N OTICE OF E XERCISE

**Tocagen Inc.**  
[Address]

Date of Exercise:

This constitutes notice to Tocagen Inc. (the “ *Company* ”) under my stock option that I elect to purchase the below number of shares of Common Stock of the Company (the “ *Shares* ”) for the price set forth below.

Type of option (check one):	Incentive <input type="checkbox"/>	Nonstatutory <input checked="" type="checkbox"/>
Stock option dated:		
Number of Shares as to which option is exercised:		
Certificates to be issued in name of:		
Total exercise price:	\$	\$
Cash payment delivered herewith:	\$	\$
[Value of Shares delivered herewith <sup>2</sup> :	\$	\$ ]
[Value of Shares pursuant to net exercise <sup>3</sup> :	\$	\$ ]
[Regulation T Program (cashless exercise <sup>4</sup> ):	\$	\$ ]

- <sup>2</sup> Shares must meet the public trading requirements set forth in the option. Shares must be valued in accordance with the terms of the option being exercised, and must be owned free and clear of any liens, claims, encumbrances or security interests. Certificates must be endorsed or accompanied by an executed assignment separate from certificate.
- <sup>3</sup> The option must be a Nonstatutory Stock Option, and the Company must have established net exercise procedures at the time of exercise, in order to utilize this payment method.
- <sup>4</sup> Shares must meet the public trading requirements set forth in the option.

By this exercise, I agree (i) to provide such additional documents as you may require pursuant to the terms of the Tocagen Inc. 2017 Equity Incentive Plan, (ii) to provide for the payment by me to you (in the manner designated by you) of your withholding obligation, if any, relating to the exercise of this option, and (iii) if this exercise relates to an incentive stock option, to notify you in writing within fifteen (15) days after the date of any disposition of any of the Shares issued upon exercise of this option that occurs within two (2) years after the date of grant of this option or within one (1) year after such Shares are issued upon exercise of this option.

Very truly yours,

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**TOCAGEN INC.**  
**STOCK OPTION GRANT NOTICE**  
**(2017 EQUITY INCENTIVE PLAN; INDUCEMENT AWARD)**

Tocagen Inc. (the “ **Company** ”), pursuant to its 2017 Equity Incentive Plan (the “ **Plan** ”), hereby grants to Optionholder an option to purchase the number of shares of the Company’s Common Stock set forth below. This option is subject to all of the terms and conditions as set forth in this Stock Option Grant Notice, in the Option Agreement, the Plan and the Notice of Exercise, all of which are attached hereto and incorporated herein in their entirety. Capitalized terms not explicitly defined herein but defined in the Plan or the Option Agreement will have the same definitions as in the Plan or the Option Agreement. If there is any conflict between the terms in this Stock Option Grant Notice and the Plan, the terms of the Plan will control.

This option is intended to be an Inducement Award (as defined in the Plan), and all shares issued on exercise of this option shall be funded from the Inducement Shares as provided in Section 3(f) of the Plan.

Optionholder:	_____
Date of Grant:	_____
Vesting Commencement Date:	_____
Number of Shares Subject to Option:	_____
Exercise Price (Per Share):	_____
Total Exercise Price:	_____
Expiration Date:	_____

**Type of Grant:** Nonstatutory Stock Option

**Exercise Schedule :**  Same as Vesting Schedule  Early Exercise Permitted

**Vesting Schedule :** [ One-fourth ( 1/4<sup>th</sup> ) of the shares vest one year after the Vesting Commencement Date; the balance of the shares vest in a series of thirty-six (36) successive equal monthly installments measured from the first anniversary of the Vesting Commencement Date, subject to Optionholder’s Continuous Service as of each such date ]

**Payment:** By one or a combination of the following items (described in the Option Agreement):

- By cash, check, bank draft or money order payable to the Company
- Pursuant to a Regulation T Program if the shares are publicly traded
- By delivery of already-owned shares if the shares are publicly traded
- Subject to the Company’s consent at the time of exercise, by a “net exercise” arrangement

**Additional Terms/Acknowledgements:** Optionholder acknowledges receipt of, and understands and agrees to, this Stock Option Grant Notice, the Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as of the Date of Grant, this Stock Option Grant Notice, the Option Agreement, and the Plan set forth the entire understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein. By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**TOCAGEN INC.**

**OPTIONHOLDER:**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**ATTACHMENTS :** Option Agreement, 2017 Equity Incentive Plan and Notice of Exercise

ATTACHMENT I

TOCAGEN INC.  
2017 EQUITY INCENTIVE PLAN

OPTION AGREEMENT  
(INDUCEMENT AWARD)

Pursuant to your Stock Option Grant Notice (“*Grant Notice*”) and this Option Agreement, Tocagen Inc. (the “*Company*”) has granted you an option under its 2017 Equity Incentive Plan (the “*Plan*”) to purchase the number of shares of the Company’s Common Stock indicated in your Grant Notice at the exercise price indicated in your Grant Notice. The option is granted to you effective as of the date of grant set forth in the Grant Notice (the “*Date of Grant*”). If there is any conflict between the terms in this Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Option Agreement or in the Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Grant Notice and the Plan, are as follows:

**1. VESTING.** Subject to the provisions contained herein, your option will vest as provided in your Grant Notice. Vesting will cease upon the termination of your Continuous Service.

**2. NUMBER OF SHARES AND EXERCISE PRICE.** The number of shares of Common Stock subject to your option and your exercise price per share in your Grant Notice will be adjusted for Capitalization Adjustments.

**3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES.** If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a “*Non-Exempt Employee*”), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your “retirement” (as defined in the Company’s benefit plans).

**4. EXERCISE PRIOR TO VESTING (“EARLY EXERCISE”).** If permitted in your Grant Notice ( *i.e.* , the “Exercise Schedule” indicates “Early Exercise Permitted”) and subject to the provisions of your option, you may elect at any time that is both (i) during the period of your Continuous Service and (ii) during the term of your option, to exercise all or part of your option, including the unvested portion of your option; *provided, however*, that:

(a) a partial exercise of your option will be deemed to cover first vested shares of Common Stock and then the earliest vesting installment of unvested shares of Common Stock;

(b) any shares of Common Stock so purchased from installments that have not vested as of the date of exercise will be subject to the purchase option in favor of the Company as described in the Company’s form of Early Exercise Stock Purchase Agreement; and

(c) you will enter into the Company’s form of Early Exercise Stock Purchase Agreement with a vesting schedule that will result in the same vesting as if no early exercise had occurred.

**5. METHOD OF PAYMENT.** You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft or money order payable to the Company or in any other manner *permitted by your Grant Notice*, which may include one or more of the following:

(a) Provided that at the time of exercise the Common Stock is publicly traded, pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds. This manner of payment is also known as a “broker-assisted exercise”, “same day sale”, or “sell to cover”.

**(b)** Provided that at the time of exercise the Common Stock is publicly traded, by delivery to the Company (either by actual delivery or attestation) of already-owned shares of Common Stock that are owned free and clear of any liens, claims, encumbrances or security interests, and that are valued at Fair Market Value on the date of exercise. "Delivery" for these purposes, in the sole discretion of the Company at the time you exercise your option, will include delivery to the Company of your attestation of ownership of such shares of Common Stock in a form approved by the Company. You may not exercise your option by delivery to the Company of Common Stock if doing so would violate the provisions of any law, regulation or agreement restricting the redemption of the Company's stock.

**(c)** Subject to the consent of the Company at the time of exercise, by a "net exercise" arrangement pursuant to which the Company will reduce the number of shares of Common Stock issued upon exercise of your option by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price. You must pay any remaining balance of the aggregate exercise price not satisfied by the "net exercise" in cash or other permitted form of payment. Shares of Common Stock will no longer be outstanding under your option and will not be exercisable thereafter if those shares (i) are used to pay the exercise price pursuant to the "net exercise," (ii) are delivered to you as a result of such exercise, and (iii) are withheld to satisfy your tax withholding obligations.

**6. WHOLE SHARES.** You may exercise your option only for whole shares of Common Stock.

**7. SECURITIES LAW COMPLIANCE.** In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

**8. TERM.** You may not exercise your option before the Date of Grant or after the expiration of the option's term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

**(a)** immediately upon the termination of your Continuous Service for Cause;

**(b)** three (3) months after the termination of your Continuous Service for any reason other than Cause, your Disability or your death (except as otherwise provided in Section 8(d) below); *provided, however*, that if during any part of such three (3) month period your option is not exercisable solely because of the condition set forth in Section 7 above, your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service; *provided further*, if during any part of such three (3) month period, the sale of any Common Stock received upon exercise of your option would violate the Company's insider trading policy, then your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service during which the sale of the Common Stock received upon exercise of your option would not be in violation of the Company's insider trading policy. Notwithstanding the foregoing, if (i) you are a Non-Exempt Employee, (ii) your Continuous Service terminates within six (6) months after the Date of Grant, and (iii) you have vested in a portion of your option at the time of your termination of Continuous Service, your option will not expire until the earlier of (x) the later of (A) the date that is seven (7) months after the Date of Grant, and (B) the date that is three (3) months after the termination of your Continuous Service, and (y) the Expiration Date;

**(c)** twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d) below);

**(d)** eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

**(e)** the Expiration Date indicated in your Grant Notice; or

**(f)** the day before the tenth (10th) anniversary of the Date of Grant.

## 9. EXERCISE.

(a) You may exercise the vested portion of your option (and the unvested portion of your option if your Grant Notice so permits) during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any applicable withholding taxes to the Company's Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, (ii) the lapse of any substantial risk of forfeiture to which the shares of Common Stock are subject at the time of exercise, or (iii) the disposition of shares of Common Stock acquired upon such exercise.

(c) By accepting your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale, any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2711 or NYSE Member Rule 472 or any successor or similar rule or regulation (the "**Lock-Up Period**"); *provided, however*, that nothing contained in this Section 9(c) will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(c). The underwriters of the Company's stock are intended third party beneficiaries of this Section 9(c) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

**10. TRANSFERABILITY.** Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) **Certain Trusts.** Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

(b) **Domestic Relations Orders.** Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic relations order or marital settlement agreement.

(c) **Beneficiary Designation.** Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

**11. OPTION NOT A SERVICE CONTRACT.** Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.



## 12. WITHHOLDING OBLIGATIONS.

(a) At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a “same day sale” pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option.

(b) Upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the minimum amount of tax required to be withheld by law (or such lower amount as may be necessary to avoid classification of your option as a liability for financial accounting purposes). If the date of determination of any tax withholding obligation is deferred to a date later than the date of exercise of your option, share withholding pursuant to the preceding sentence shall not be permitted unless you make a proper and timely election under Section 83(b) of the Code, covering the aggregate number of shares of Common Stock acquired upon such exercise with respect to which such determination is otherwise deferred, to accelerate the determination of such tax withholding obligation to the date of exercise of your option. Notwithstanding the filing of such election, shares of Common Stock shall be withheld solely from fully vested shares of Common Stock determined as of the date of exercise of your option that are otherwise issuable to you upon such exercise. Any adverse consequences to you arising in connection with such share withholding procedure shall be your sole responsibility.

(c) You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

**13. TAX CONSEQUENCES.** You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Grant Notice is at least equal to the “fair market value” per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

**14. NOTICES.** Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

**15. GOVERNING PLAN DOCUMENT.** Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law.

**16. OTHER DOCUMENTS.** You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company’s policy permitting certain individuals to sell shares only during certain “window” periods and the Company’s insider trading policy, in effect from time to time.

**17. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS.** The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company’s or any Affiliate’s employee benefit plans.

**18. VOTING RIGHTS.** You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to you. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

**19. SEVERABILITY.** If all or any part of this Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Option Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Option Agreement (or part of such a Section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

**20. MISCELLANEOUS .**

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company's successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

\* \* \*

This Option Agreement will be deemed to be signed by you upon the signing by you of the Stock Option Grant Notice to which it is attached.

**ATTACHMENT II**  
**2017 EQUITY INCENTIVE PLAN**

ATTACHMENT III

NOTICE OF EXERCISE

Tocagen Inc.

[Address]

Date of Exercise:

This constitutes notice to Tocagen Inc. (the “ *Company* ”) under my stock option that I elect to purchase the below number of shares of Common Stock of the Company (the “ *Shares* ”) for the price set forth below.

Type of option:	Nonstatutory
Stock option dated:	_____
Number of Shares as to which option is exercised:	_____
Certificates to be issued in name of:	_____
Total exercise price:	\$ _____
Cash payment delivered herewith:	\$ _____
[Value of _____ Shares delivered herewith <sup>1</sup> :	\$ _____ ]
[Value of _____ Shares pursuant to net exercise <sup>2</sup> :	\$ _____ ]
[Regulation T Program (cashless exercise <sup>3</sup> ):	\$ _____ ]

<sup>1</sup> Shares must meet the public trading requirements set forth in the option. Shares must be valued in accordance with the terms of the option being exercised, and must be owned free and clear of any liens, claims, encumbrances or security interests. Certificates must be endorsed or accompanied by an executed assignment separate from certificate.

<sup>2</sup> The Company must have established net exercise procedures at the time of exercise, in order to utilize this payment method.

<sup>3</sup> Shares must meet the public trading requirements set forth in the option.

By this exercise, I agree (i) to provide such additional documents as you may require pursuant to the terms of the Tocagen Inc. 2017 Equity Incentive Plan and (ii) to provide for the payment by me to you (in the manner designated by you) of your withholding obligation, if any, relating to the exercise of this option.

Very truly yours,

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**CERTIFICATION**

I, Martin J. Duvall, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Tocagen Inc., a Delaware corporation (the “registrant”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) 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) 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
  - (c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 8, 2018

/s/ MARTIN J. DUVALL

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**Martin J. Duvall**  
**Chief Executive Officer**  
**(Principal Executive Officer)**

**CERTIFICATION**

I, Mark Foletta, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Tocagen Inc., a Delaware corporation (the “registrant”);
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a–15(e) and 15d–15(e)) 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) 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
  - (c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 8, 2018

/s/ MARK FOLETTA

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**Mark Foletta**  
**Chief Financial Officer**  
**(Principal Financial Officer)**

## SECTION 1350 CERTIFICATION

Each of the undersigned, Martin J. Duvall, Chief Executive Officer of Tocagen Inc., a Delaware corporation (the “Company”), and Mark Foletta, Chief Financial Officer of the Company, do hereby certify, pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to the best of his knowledge (1) the quarterly report on Form 10-Q of the Company for the quarterly period ended September 30, 2018, as filed with the Securities and Exchange Commission on the date hereof (the “Report”) and to which this Certification is attached as Exhibit 32.1, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, 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/ MARTIN J. DUVALL

\_\_\_\_\_  
Name: Martin J. Duvall

Title: Chief Executive Officer (Principal Executive Officer)

Dated: November 8, 2018

/s/ MARK FOLETTA

\_\_\_\_\_  
Name: Mark Foletta

Title: Chief Financial Officer (Principal Financial Officer)

Dated: November 8, 2018

*This certification accompanies and is being “furnished” with this Report, shall not be deemed “filed” by the Company for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to liability under that Section and shall not be deemed to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Report, irrespective of any general incorporation language contained in such filing. A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.*