
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, DC 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended **June 30, 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: **001-36289**

Genocea Biosciences, Inc.

(Exact Name of Registrant as Specified in Its Charter)

Delaware

(State or Other Jurisdiction of
Incorporation or Organization)

51-0596811

(IRS Employer
Identification No.)

100 Acorn Park Drive

Cambridge, Massachusetts

(Address of Principal Executive Offices)

02140

(Zip Code)

(617) 876-8191

(Registrant's Telephone Number, Including Area Code)

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post 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. (Check one):

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
	(Do not check if a smaller reporting company)	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 August 1, 2018, there were 86,625,975 shares of the registrant's Common Stock, par value \$0.001 per share, outstanding.

FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q contains forward-looking statements that involve substantial risks and uncertainties. Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, our clinical results and other future conditions. The words “anticipate”, “believe”, “contemplate”, “continue”, “could”, “estimate”, “expect”, “forecast”, “goal”, “intend”, “may”, “plan”, “potential”, “predict”, “project”, “should”, “target”, “will”, “would”, or the negative of these terms or other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

Any forward-looking statements in this Quarterly Report on Form 10-Q reflect our current views with respect to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed in our Annual Report on Form 10-K and other filings with the Securities Exchange Commission (the “SEC”), including the following:

- our estimates regarding the timing and amount of funds we require to initiate clinical trials for GEN-009 and to continue our investments in immuno-oncology;
- our estimate for when we will require additional funding;
- our plans to commercialize GEN-009 and our other product candidates;
- the timing of, and our ability to, obtain and maintain regulatory approvals for our product candidates;
- the rate and degree of market acceptance and clinical utility of any approved product candidate;
- the potential benefits of strategic partnership agreements and our ability to enter into strategic partnership arrangements;
- our ability to quickly and efficiently identify and develop product candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position; and
- our estimates regarding expenses, future revenues, capital requirements, the sufficiency of our current and expected cash resources and our need for additional financing.

Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

Information in this Quarterly Report on Form 10-Q that is based on estimates, forecasts, projections, market research or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained any industry, business, market or other data from reports, research surveys, studies and similar data prepared by market research firms and other third parties, industry, medical and general publications, government data and similar sources.

Genocea Biosciences, Inc.
Form 10-Q
For the Quarter Ended June 30, 2018

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PART I. FINANCIAL INFORMATION
Item 1. Financial Statements

Genocea Biosciences, Inc.
Condensed Consolidated Balance Sheets
(unaudited)
(in thousands)

	June 30, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	\$ 44,215	\$ 12,273
Prepaid expenses and other current assets	1,269	808
Total current assets	45,484	13,081
Property and equipment, net	3,069	3,460
Restricted cash	316	316
Other non-current assets	171	631
Total assets	<u>\$ 49,040</u>	<u>\$ 17,488</u>
Liabilities and stockholders' equity (deficit)		
Current liabilities:		
Accounts payable	\$ 1,656	\$ 3,516
Accrued expenses and other current liabilities	3,075	5,604
Current portion of long-term debt	1,924	6,659
Total current liabilities	6,655	15,779
Non-current liabilities:		
Warrant liability	15,915	—
Long-term debt, net of current portion and discount	12,544	7,652
Other non-current liabilities	61	107
Total liabilities	35,175	23,538
Commitments and contingencies (Note 6)		
Stockholders' equity (deficit):		
Preferred stock	702	—
Common stock	87	29
Additional paid-in-capital	297,597	258,114
Accumulated deficit	(284,521)	(264,193)
Total stockholders' equity (deficit)	13,865	(6,050)
Total liabilities and stockholders' equity (deficit)	<u>\$ 49,040</u>	<u>\$ 17,488</u>

See accompanying notes to unaudited condensed consolidated financial statements.

Genocea Biosciences, Inc.
Condensed Consolidated Statements of Operations and Comprehensive Loss
(unaudited)
(in thousands, except per share data)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Operating expenses:				
Research and development	\$ 5,316	\$ 11,427	\$ 12,591	\$ 21,169
General and administrative	4,472	3,571	7,581	7,205
Total operating expenses	9,788	14,998	20,172	28,374
Loss from operations	(9,788)	(14,998)	(20,172)	(28,374)
Other income (expense):				
Change in fair value of warrants	5,498	—	199	—
Interest expense, net	(241)	(370)	(442)	(728)
Other income (expense)	93	(7)	87	(8)
Total other income (expense)	5,350	(377)	(156)	(736)
Net loss	<u>\$ (4,438)</u>	<u>\$ (15,375)</u>	<u>\$ (20,328)</u>	<u>\$ (29,110)</u>
Other comprehensive loss:				
Unrealized gain on available-for-sale securities	—	3	—	—
Comprehensive loss	<u>\$ (4,438)</u>	<u>\$ (15,372)</u>	<u>\$ (20,328)</u>	<u>\$ (29,110)</u>
Net loss per share - basic and diluted	<u>\$ (0.05)</u>	<u>\$ (0.54)</u>	<u>\$ (0.26)</u>	<u>\$ (1.02)</u>
Weighted-average number of common shares used in computing net loss per share	<u>85,538</u>	<u>28,541</u>	<u>78,428</u>	<u>28,519</u>

See accompanying notes to unaudited condensed consolidated financial statements.

Genocea Biosciences, Inc.
Condensed Consolidated Statements of Cash Flows
(unaudited)
(in thousands)

	Six Months Ended June 30,	
	2018	2017
Operating activities		
Net loss	\$ (20,328)	\$ (29,110)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	543	878
Stock-based compensation	1,236	2,175
Allocation of proceeds to transaction expenses	2,115	—
Change in fair value of warrant liability	(2,315)	—
Gain on sale of equipment	(50)	—
Write-off of deferred financing fees	355	—
Non-cash interest expense	291	256
Changes in operating assets and liabilities	(5,222)	(2,199)
Net cash used in operating activities	(23,375)	(28,000)
Investing activities		
Purchases of property and equipment	(174)	(735)
Proceeds from sale of equipment	72	—
Proceeds from maturities of investments	—	36,089
Purchases of investments	—	(153)
Net cash (used in) provided by investing activities	(102)	35,201
Financing activities		
Proceeds from equity offerings, net of issuance costs	2,920	246
Proceeds from underwritten public offering, net of issuance costs	52,538	—
Payment of deferred financing costs	(127)	—
Proceeds from long-term debt	592	—
Repayment of long-term debt	(535)	—
Proceeds from exercise of stock options	—	204
Proceeds from the issuance of common stock under ESPP	31	150
Net cash provided by financing activities	55,419	600
Net increase in cash and cash equivalents	\$ 31,942	\$ 7,801
Cash, cash equivalents and restricted cash at beginning of period	12,589	27,740
Cash, cash equivalents and restricted cash at end of period	\$ 44,531	\$ 35,541
Supplemental cash flow information		
Cash paid for interest	\$ 508	\$ 620
Property and equipment included in accounts payable and accrued expenses	\$ —	\$ 181
Reclassification of warrants to additional paid-in capital	\$ 190	\$ —

See accompanying notes to unaudited condensed consolidated financial statements.

Genocea Biosciences, Inc.
Notes to Condensed Consolidated Financial Statements
(unaudited)

1. Organization and operations

The Company

Genocea Biosciences, Inc. (the "Company") is a biopharmaceutical company that was incorporated in Delaware on August 16, 2006 and has a principal place of business in Cambridge, Massachusetts. The Company seeks to discover and develop novel cancer vaccines and immunotherapies through its AnTigen Lead Acquisition System ("ATLAS"TM) proprietary discovery platform. The ATLAS platform is designed to recall a patient's pre-existing CD4+ and CD8+ T cell immune responses to their tumor to identify neoantigens and antigens for inclusion in vaccines and immunotherapies that are designed to act through T cell (or cellular) immune responses. The Company believes that using ATLAS to identify neoantigens and antigens could lead to more immunogenic and efficacious cancer vaccines and immunotherapies.

The Company's most advanced program in active development is its preclinical immuno-oncology program, GEN-009, a neoantigen cancer vaccine, for which Genocea has initiated a Phase 1/2a clinical trial. The GEN-009 program uses ATLAS to identify patient neoantigens, or newly formed antigens unique to each patient, that are associated with that individual's tumor. The Company is also exploring GEN-010, a next-generation neoantigen vaccine program, and GEN-011, a neoantigen adoptive T cell therapy program, and has identified candidate T cell antigens for cancer vaccines targeting tumor-associated antigens and a vaccine targeting cancers caused by Epstein-Barr Virus ("EBV").

The Company has one non-active Phase 3-ready product candidate, GEN-003, an investigational immunotherapy for the treatment of genital herpes, for which it is currently exploring strategic opportunities.

The Company is devoting substantially all its efforts to product research and development, initial market development, and raising capital. To date, the Company has not generated any product revenue related to its primary business purpose and is subject to a number of risks similar to those of other preclinical stage companies, including dependence on key individuals, competition from other companies, the need and related uncertainty associated with the development of commercially viable products, and the need to obtain adequate additional financing to fund the development of its product candidates. The Company is also subject to a number of risks similar to other companies in the life sciences industry, including the uncertainty of success of its preclinical and clinical trials, regulatory approval of products, competition from substitute products, compliance with government regulations, protection of proprietary technology, and dependence on third parties. The Company anticipates that it will continue to incur significant operating losses for the next several years as it continues to develop its product candidates.

Liquidity

As of June 30, 2018, the Company had an accumulated deficit of approximately \$284.5 million. The Company had cash and cash equivalents of \$44.2 million at June 30, 2018. The Company expects that the balance of cash and cash equivalents as of June 30, 2018 is sufficient to support operating expenses and capital expenditure requirements into the fourth quarter of 2019.

2. Summary of significant accounting policies

Basis of presentation and use of estimates

The accompanying unaudited condensed consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP") for interim financial information and the instructions of Form 10-Q and Article 10 of Regulation S-X. Any reference in these notes to applicable guidance is meant to refer to GAAP as found in the Accounting Standards Codification ("ASC") and Accounting Standards Update ("ASU") of the Financial Accounting Standards Board ("FASB"). Certain information and footnote disclosures normally included in the Company's annual financial statements have been condensed or omitted. These interim condensed financial statements, in the opinion of management, reflect all normal recurring adjustments necessary for a fair presentation of the Company's financial position as of June 30, 2018 and results of operations for the three and six months ended June 30, 2018 and 2017, respectively.

The results of operations for the interim periods are not necessarily indicative of the results of operations to be expected for the full fiscal year. These interim financial statements should be read in conjunction with the audited financial statements as of and for the year ended December 31, 2017 and the notes thereto which are included in the Company's Annual Report on Form 10-K, as filed with the SEC on February 16, 2018.

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. On an ongoing basis, the Company's management evaluates its estimates, which include, but are not limited to, estimates related to prepaid and accrued research and development expenses, stock-based compensation expense, contingencies, tax valuation reserves, fair value measurements, and reported amounts of expenses during the reporting periods. The Company bases its estimates on historical experience and other market-specific or other relevant assumptions that it believes to be reasonable under the circumstances. Actual results may differ from those estimates or assumptions.

There were no changes to significant accounting policies during the six months ended June 30, 2018, as compared to the those identified in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017.

Fair value of financial instruments

The Company is required to disclose information on all assets and liabilities reported at fair value that enables an assessment of the inputs used in determining the reported fair values. ASC Topic 820, *Fair Value Measurement and Disclosures*, established a hierarchy of inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the observable inputs be used when available. Observable inputs are inputs that market participants would use in pricing the financial instrument based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the financial instrument and are developed based on the best information available under the circumstances. The fair value hierarchy applies only to the valuation inputs used in determining the reported or disclosed fair value of the financial instruments and is not a measure of the investment credit quality. Fair value measurements are classified and disclosed in one of the following three categories:

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date.
- Level 2—Valuations based on quoted prices for similar assets or liabilities in markets that are not active or for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations that require inputs that reflect the Company's own assumptions that are both significant to the fair value measurement and unobservable.

To the extent that valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Financial instruments measured at fair value on a recurring basis include cash equivalents (Note 3) and liability-classified common stock warrants (Note 7). The Company is also required to disclose the fair value of financial instruments not carried at fair value. The fair value of the Company's debt (Note 5) is determined using current applicable rates for similar instruments as of the balance sheet dates and an assessment of the credit rating of the Company. The carrying value of the Company's debt approximates fair value because the Company's interest rate yield is near current market rates for comparable debt instruments. The Company's debt is considered a Level 3 liability within the fair value hierarchy.

For the six months ended June 30, 2018, there were no transfers among Level 1, Level 2, or Level 3 categories. Additionally, there were no changes to the valuation methods utilized by the Company during the six months ended June 30, 2018, other than those related to the liability-classified common stock warrants described in Note 7. The remainder of the Company's significant accounting policies are described in its Annual Report filed on Form 10-K for the fiscal year ended December 31, 2017.

Recently adopted accounting standards

Standard	Description	Effect on the financial statements
ASU No. 2014-09, <i>Revenue from Contracts with Customers (Topic 606)</i>	<p>In May 2014, the FASB issued new revenue guidance under ASU No. 2014-09, <i>Revenue from Contracts with Customers (Topic 606)</i>. The standard replaces existing revenue recognition standards and significantly expand the disclosure requirements for revenue arrangements. It may be adopted either retrospectively or on a modified retrospective basis to new contracts and existing contracts with remaining performance obligations as of the effective date.</p> <p>ASU No. 2014-09 is effective for annual reporting periods, and interim periods therein, beginning after December 15, 2017.</p>	The Company adopted ASU No. 2014-09 as of January 1, 2018. The adoption of ASU No. 2014-09 did not impact the Company's financial statements as the Company does not currently have any contracts with customers.
ASU No. 2016-15, <i>Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments</i>	<p>In August 2016 the FASB issued ASU No. 2016-15, <i>Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments</i> ("ASU No. 2016-15"). This guidance addresses the presentation and classification of certain cash receipts and cash payments in the statement of cash flows.</p> <p>The standard is effective for annual periods beginning after December 15, 2017 and for interim periods within those fiscal years. Early adoption is permitted.</p>	The Company adopted ASU No. 2016-15 effective January 1, 2018. The adoption of ASU No. 2016-15 did not have a material impact on the Company's financial statements.
ASU No. 2016-18, <i>Statement of Cash Flows (Topic 230): Restricted Cash</i>	<p>In November 2016, the FASB issued ASU 2016-18, which requires additional disclosures related to restricted cash. The new standard requires that amounts generally described as restricted cash and restricted cash equivalents be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows.</p> <p>ASU No. 2016-18 is effective for fiscal years, and interim periods within those years, beginning after December 15, 2017.</p>	The Company adopted the standard on January 1, 2018 and reclassified \$0.3 million of restricted cash to be included with cash and cash equivalents on the statement of cash flows.
ASU No. 2017-09, <i>Compensation-Stock Compensation (Topic 718)</i>	<p>In May 2017, the FASB issued ASU No. 2017-09, <i>Compensation-Stock Compensation (Topic 718): Scope of Modification Accounting</i> ("ASU No. 2017-09"). This update clarifies the changes to terms or conditions of a share-based payment award that require an entity to apply modification accounting.</p> <p>ASU No. 2017-09 is effective for annual reporting periods, and interim periods therein, beginning after December 15, 2017. Early application is permitted, and prospective application is required.</p>	The Company adopted ASU No. 2017-09 effective January 1, 2018. The adoption of ASU No. 2017-09 did not have a material impact on the Company's financial statements.

Recently issued accounting standards

Standard	Description	Effect on the financial statements
ASU No. 2016-02, <i>Leases (Topic 842)</i>	In February 2016, the FASB issued ASU No. 2016-02, <i>Leases (Topic 842)</i> , which replaces the existing lease accounting standards. The new standard requires a dual approach for lessee accounting under which a lessee would account for leases as finance (also referred to as capital) leases or operating leases. Both finance leases and operating leases will result in the lessee recognizing a right-of-use asset and corresponding lease liability. For finance leases the lessee would recognize interest expense and amortization of the right-of-use asset and for operating leases the lessee would recognize straight-line total lease expense. ASU No. 2016-02 is effective for fiscal years, and interim periods within those years, beginning after December 15, 2018.	The Company generally does not finance purchases of equipment but it does lease office and lab facilities. The Company is in the process of evaluating the effect that this ASU will have on its consolidated financial statements and related disclosures, but expects the adoption will result in an increase in assets and liabilities on its consolidated balance sheets.
ASU No. 2018-07, <i>Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting</i>	In June 2018, the FASB issued ASU No. 2018-07, <i>Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting</i> . The new standard largely aligns the accounting for share-based payment awards issued to employees and nonemployees by expanding the scope of ASC 718 to apply to nonemployee share-based transactions, as long as the transaction is not effectively a form of financing. The new guidance will be effective for the Company on January 1, 2019.	The Company is currently evaluating the potential impact that this guidance may have on its consolidated financial statements.

3. Fair value of financial instruments

The following table presents the Company's financial instruments that were measured at fair value on a recurring basis by level in accordance with the hierarchy defined in Note 2 (in thousands):

	Total	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
June 30, 2018				
Assets:				
Money market funds, included in cash equivalents	\$ 43,822	\$ 43,822	\$ —	\$ —
Total assets	\$ 43,822	\$ 43,822	\$ —	\$ —
Liabilities:				
Common stock warrant liabilities	\$ 15,915	\$ —	\$ —	\$ 15,915
Total liabilities	\$ 15,915	\$ —	\$ —	\$ 15,915
December 31, 2017				
Assets:				
Money market funds, included in cash equivalents	\$ 11,528	\$ 11,528	\$ —	\$ —
Total assets	\$ 11,528	\$ 11,528	\$ —	\$ —

Cash equivalents have been initially valued at the transaction price and subsequently valued, at the end of each reporting period, utilizing third party pricing services or other market observable data. The pricing services utilize industry standard valuation models, including both income and market-based approaches and observable market inputs to determine value. The Company validates the prices provided by its third-party pricing services by reviewing their pricing methods and obtaining market values from other pricing sources. After completing its validation procedures, the Company did not adjust any fair value measurements provided by the pricing services as of June 30, 2018 and December 31, 2017.

As of June 30, 2018 and December 31, 2017, cash and cash equivalents were comprised of funds in depository and money market accounts.

In connection with an underwritten public offering of common and preferred stock in January 2018 (see Note 7), the Company issued Class A warrants (the "Warrants") to purchase shares of the Company's common stock, classified as liabilities in the condensed consolidated balance sheets. The Warrants were recorded at their fair value on the date of issuance and are remeasured as of any Warrant exercise date and at the end of the reporting period, with changes in fair value recognized as income (decrease in fair value) or expense (increase in fair value) in change in fair value of warrant liability in the statements of operations.

As of the issuance dates of the Warrants, and June 30, 2018, the Company utilized an option-based methodology to value the Warrants combined with a multi-scenario model, specifically a Monte Carlo simulation, in order to model the future movement of the stock price throughout the term of the Warrants. In addition, the valuation model includes the probability of the Company being acquired during each annual period within the Warrant term, as an acquisition event can potentially impact the settlement of the Warrants.

The assumptions used in calculating the estimated fair value of the Warrants represent the Company's best estimates and include probabilities of settlement scenarios, future changes in the Company's stock price, risk-free interest rates and volatility. The estimates are based, in part, on subjective assumptions and could differ materially in the future.

The following table details the assumptions used in the Monte Carlo simulation models used to estimate the fair value of the Warrants at issuance and as of June 30, 2018:

	Issuance Date	June 30, 2018
Stock price	\$ 0.89	\$ 0.86
Volatility	111.5%	107.2%
Remaining term (years)	5	4.6
Expected dividend yield	—%	—%
Risk-free rate	2.4% - 2.5%	2.7%
Range of annual acquisition event probability	0.0% - 30.0%	0.0% - 30.0%

The following table reflects the change in the Company's Level 3 Warrants from issuance through June 30, 2018

	Common Stock Warrant Liabilities	
Issuance of Warrants	\$	18,231
Change in fair value		(2,316)
Warrants exercised		(2)
Balance at June 30, 2018	\$	15,915

In connection with the underwritten public offering, the Company also granted the underwriters a 30-day option to purchase additional shares of common stock and/or additional Warrants (the "Overallotment Option"). The Company's Overallotment Option is also a Level 3 liability. The assumptions used to determine the fair value are described in Note 7. The following table reflects the change in the fair value of the Overallotment Option liability from issuance through June 30, 2018:

	Overallotment Option Liability	
Issuance of Overallotment Option	\$	2,441
Change in fair value		194
Exercise of Overallotment Option		(877)
Expiration of Overallotment Option in March 2018		(1,758)
Balance at June 30, 2018	\$	—

4. Accrued expenses and other current liabilities

Accrued expenses and other current liabilities consisted of the following (in thousands):

	June 30,	December 31,
	2018	2017
Research and development costs	\$ 1,720	\$ 2,886
Payroll and employee-related costs	1,209	1,830
Other current liabilities	146	844
Restructuring costs	—	44
Total	\$ 3,075	\$ 5,604

5. Long-term debt

On April 24, 2018 (the “Closing Date”), the Company entered into an amended and restated loan and security agreement (the “2018 Loan Agreement”) with Hercules Capital, Inc. (f/k/a Hercules Technology Growth Capital, Inc.) (“Hercules”), which provided up to \$14.0 million in debt financing in the form of a term loan funded on the Closing Date (the “2018 Term Loan”). The 2018 Loan Agreement amended and restated the Company’s loan and security agreement (as amended, the “2014 Loan Agreement”) with Hercules, which had provided up to \$27.0 million in debt financing (the “2014 Term Loan”). The Company is accounting for the amendment as a modification to the loan.

The 2018 Term Loan will mature on May 1, 2021 and accrues interest at a floating rate per annum equal to the greater of (i) 7.75% or (ii) the sum of 7.75% plus the prime rate minus 5.0%. The 2018 Loan Agreement provides for interest-only payments until June 1, 2019, which may be extended to December 1, 2019 if certain performance milestones are met before May 31, 2019 and no event of default has occurred or is continuing. Interest-only payments may be further extended to June 1, 2020 if certain additional performance milestones are met before November 30, 2019. Thereafter, amortization payments will be payable monthly in equal installments of principal and interest (subject to recalculation upon a change in prime rates) upon expiration of the interest only period through maturity.

The 2018 Term Loan may be prepaid in whole or in part upon seven business days’ prior written notice to Hercules, subject to a prepayment charge of 3.0%, if such advance is prepaid in any of the first twelve months following the Closing Date, 2.0%, if such advance is prepaid after twelve months following the Closing Date but on or prior to 24 months following the Closing Date, and 1.0% thereafter. The Company is also obligated to pay an end-of-term charge in connection with the 2014 Loan Agreement of 4.95% of the term loan advances under the 2014 Loan Agreement on January 1, 2019 and an additional end of term charge of 6.70% of the Term Loan when the Term Loan is repaid (the “End of Term Charges”).

The 2018 Term Loan is secured by a lien on substantially all of the assets of the Company, other than intellectual property, provided that such lien on substantially all assets includes any rights to payments and proceeds from the sale, licensing or disposition of intellectual property. The Loan Agreement contains non-financial covenants and representations, including a financial reporting covenant, and limitations on dividends, indebtedness, collateral, investments, distributions, transfers, mergers or acquisitions, taxes, corporate changes, deposit accounts, and subsidiaries. There are no financial covenants.

Under the provisions of the 2014 Loan Agreement and the 2018 Loan Agreement, the Company has also entered into account control agreements (“ACAs”) with Hercules and certain of the Company’s financial institutions in which cash, cash equivalents, and investments are held. These ACAs grant Hercules a perfected first priority security interest in the subject accounts. The ACAs do not restrict the Company’s ability to utilize cash, cash equivalents, or investments to fund operations and capital expenditures unless there is an event of default and Hercules activates its rights under the ACAs.

The 2018 Loan Agreement contains a material adverse effect ("Material Adverse Effect") provision that requires all material adverse effects to be reported under the financial reporting covenant. Loan advances are subject to a representation that no event that has had, or could reasonably be expected to have, a Material Adverse Effect has occurred and is continuing. Under the Loan Agreement, a Material Adverse Effect means a material adverse effect upon: (i) the business, operations, properties, assets or condition (financial or otherwise) of the Company; or (ii) the ability of the Company to perform the secured obligations in accordance with the terms of the loan documents, or the ability of agent or lender to enforce any of its rights or remedies with respect to the secured obligations; or (iii) the collateral or agent's liens on the collateral or the priority of such liens. Any event that has a Material Adverse Effect or would reasonably be expected to have a Material Adverse Effect is an event of default under the Loan Agreement and repayment of amounts due under the Loan Agreement may be accelerated by Hercules under the same terms as an event of default.

Events of default under the Loan Agreement include failure to make any payments of principal or interest as due on any outstanding indebtedness, breach of any covenant, any false or misleading representations or warranties, insolvency or bankruptcy, any attachment or judgment on the Company's assets of at least \$100 thousand, or the occurrence of any material default of the Company involving indebtedness in excess of \$100 thousand. If an event of default occurs, repayment of all amounts due under the Loan Agreement may be accelerated by Hercules, including the applicable prepayment charge.

The 2018 Term Loan is automatically redeemable upon a change in control. The Company must prepay the outstanding principal and any accrued and unpaid interest through the prepayment date and the applicable prepayment charge. If a change in control occurs, repayment of amounts due under the Loan Agreement may be accelerated by Hercules. The Company believes acceleration of the repayment of amounts outstanding under the loan is remote, and therefore the debt balance is classified according to the contractual payment terms at June 30, 2018.

In connection with the 2014 Term Loan, the Company issued a common stock warrant to Hercules on November 20, 2014 (the "First Warrant"). The First Warrant is exercisable for 73,725 shares of the Company's Common Stock (equal to \$607,500 divided by the exercise price of \$8.24). The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of Common Stock, subdivision or combination of the shares of Common Stock or certain dividends payments. The First Warrant is exercisable until November 20, 2019 and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of Common Stock is greater than the exercise price then in effect. The First Warrant has been classified as equity for all periods it has been outstanding.

In connection with the 2018 Loan Agreement, the Company issued a common stock warrant to Hercules on April 24, 2018 (the "Second Warrant" and together with the First Warrant, the "Warrants"). The Second Warrant is exercisable for 329,411 shares of the Company's common stock at an initial exercise price of \$0.85 per share. The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The Second Warrant is exercisable until April 24, 2023 and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of common stock is greater than the exercise price then in effect.

In connection with the 2018 Loan Agreement, on April 24, 2018, the Company also entered into an amendment to the equity rights letter agreement, dated November 20, 2014 (the "Amended Equity Rights Letter Agreement"). Pursuant to the Amended Equity Rights Letter Agreement, the Company had already issued to Hercules 223,463 shares (the "Shares") of the Company's Common Stock for an aggregate purchase price of approximately \$2.0 million on November 20, 2014 at a price per share equal to the closing price of the Company's Common Stock as reported on The Nasdaq Global Market on November 19, 2014. The Shares were issued pursuant to an exemption provided by Section 4(a)(2) of the Securities Act of 1933, as amended (the "Securities Act"). Accordingly, the Shares will be subject to resale limitations and may be resold only pursuant to an effective registration statement or an exemption from registration.

Additionally, under the Amended Equity Rights Letter Agreement, Hercules has the right to participate in any one or more subsequent private placement equity financings of up to \$2.0 million on the same terms and conditions as purchases by the other investors in each subsequent equity financing. The Amended Equity Rights Letter Agreement, and all rights and obligations thereunder, will terminate upon the earlier of (1) such time when Hercules has purchased \$2.0 million of subsequent equity financing securities in the aggregate, and (2) the later of (a) the repayment of all indebtedness under the Loan Agreement, or (b) the expiration or termination of the exercise period for the warrant issued in connection with the Loan Agreement. The Company allocated \$36 thousand of financing costs to additional paid-in capital for issuance fees that were reimbursed to Hercules.

The Company accounted for the April 2018 amendment to the Term Loan as a modification pursuant to ASC 470-50. The remaining balance of unamortized debt financing costs of \$0.3 million and \$0.1 million of fees associated with the 2018 Term

Loan that met the criteria to be capitalized are being amortized through the maturity date of the 2018 Term Loan, accordingly. The End of Term Charges from the 2014 Term Loan and the 2018 Term Loan are being amortized to interest expense over the life of the 2018 Term Loan using the effective interest method. At June 30, 2018 the 2018 Term Loan bears an effective interest rate of 12.0%.

As of June 30, 2018, the Company had outstanding borrowings under the 2018 Loan Agreement of \$14.5 million. At December 31, 2017, the Company had outstanding borrowings under the 2014 Term Loan of \$14.3 million. Interest expense was \$0.4 million and \$0.4 million for the three months ended June 30, 2018 and 2017, respectively, and \$0.8 million and \$0.9 million for the six months ended June 30, 2018 and 2017, respectively.

Future principal payments, including the End of Term Charges, are as follows (in thousands):

	June 30, 2018
2019	\$ 4,693
2020	7,030
2021	4,057
Total	\$ 15,780

6. Commitments and contingencies

Lease commitments

In May 2016, the Company entered into a lease amendment (the "2016 Lease") for office and laboratory space occupied under an original lease that commenced in March 2014 and was set to expire in February 2017 (the "2014 Lease"). The 2016 Lease extended the 2014 Lease to February 2020. In June 2015, the Company signed a second operating lease (the "2015 Lease") for office space in the same building as the 2014 Lease. In August 2016, the Company exercised a three-year renewal option extending the 2015 Lease to February 2020.

The combined minimum future lease payments under both the 2016 Lease and the 2015 Lease are as follows (in thousands):

	June 30, 2018
2018	\$ 806
2019	1,637
2020	273
Total	\$ 2,716

At June 30, 2018 and December 31, 2017, the Company has an outstanding letter of credit of \$316 thousand with a financial institution related to a security deposit for the 2016 Lease, which is secured by cash on deposit and expires on February 29, 2020. An additional unsecured deposit was required for the 2015 Lease.

Litigation

From time-to-time the Company may be subject to legal proceedings and claims which arise in the ordinary course of its business. The Company records a liability in its consolidated financial statements for these matters when a loss is known or considered probable and the amount can be reasonably estimated to the extent necessary to make the consolidated financial statements not misleading. If a loss is not probable or cannot be reasonably estimated, a liability is not recorded in its consolidated financial statements.

On October 31, 2017, a putative class action complaint was filed in the U.S. District Court for the District of Massachusetts (the "District of Massachusetts" or the "Court"), naming the Company, Chief Executive Officer William D. Clark, and Chief Financial Officer Jonathan Poole as defendants. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 10b-5 in connection with disclosures made in and subsequent to the Company's Quarterly Report on Form 10-Q for the period ending March 31, 2017, filed with the SEC on May 5, 2017, and the Company's announcement of a strategic shift to immuno-oncology on September 25, 2017. The plaintiff sought to represent a class of shareholders who purchased or otherwise

acquired the Company's securities between May 5, 2017 and September 25, 2017. The complaint sought unspecified damages and costs. On November 3, 2017, another purported Company shareholder filed a substantially identical complaint in the District of Massachusetts. On December 15, 2017, a purported Company shareholder filed a third complaint in the District of Massachusetts, substantially the same as the previous two, but alleging a class period beginning on August 4, 2016 and ending on September 25, 2017. The District of Massachusetts designated all three complaints as related, and entered an order in each action recognizing that the defendants are not obligated to respond to the initial complaint filed in any of the three actions. Per the procedures set forth by federal securities laws, applications for appointment of lead plaintiff(s) and lead counsel in the three actions were due to the Court on January 2, 2018. Three applications for lead plaintiff and lead counsel were submitted to the Court on that date; one of the three movants subsequently withdrew their application. The Court held a hearing on the two remaining motions for lead plaintiff(s) and lead counsel on January 31, 2018. The Court consolidated the three actions into one case, under the docket number Civil Action No. 17-cv-12137-PBS, U.S. District Court (Mass.), and took the motions for lead plaintiff(s) and counsel under advisement. Counsel for both lead plaintiff movants told the Court that they intended to file an amended complaint in the consolidated action, if appointed. On February 12, 2018, the Court appointed the Genocia Investor Group (a group of five purported shareholders) as lead plaintiff, and appointed Scott+Scott LLP, Levi & Korsinsky LLP, and Block & Leviton LLP as lead counsel. On February 20, 2018, the court entered an order establishing a schedule for the lead plaintiffs' amended complaint, and for a motion to dismiss and corresponding briefing in response, with the following deadlines: filing of an amended complaint by the lead plaintiffs and counsel due March 29, 2018; filing of an answer or motion to dismiss by defendants on May 14, 2018; filing of any opposition by plaintiffs to a motion to dismiss on June 28, 2018; and filing of any reply by defendants in support of a motion to dismiss on July 30, 2018. On March 29, 2018, counsel for the lead plaintiff filed an amended complaint in the District of Massachusetts that alleges the same causes of action and seeks the same relief as the original complaints. The amended complaint adds Seth V. Hetherington, former Chief Medical Officer, to the original named defendants. The defendants filed a motion to dismiss on May 14, 2018. Plaintiffs filed an opposition to defendants' motion to dismiss on June 28, 2018, as well as a motion to strike exhibits referenced in defendants' motion to dismiss on June 29, 2018. The Company and the other named defendants filed a reply brief to plaintiffs' opposition to defendants' motion to dismiss, and an opposition brief to plaintiffs' motion to strike, on July 30, 2018. Oral argument on the motion to dismiss has been scheduled for September 25, 2018.

On January 31, 2018, a putative shareholder derivative action was filed in the U.S. District Court for the District of Delaware (the "*Kahr*" action), naming certain of the Company's officers and directors as defendants (including certain former directors and officers), and naming the Company as a nominal defendant. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 14a-9 in connection with disclosures made in the Company's Schedule 14A Proxy Statement, filed with the SEC on April 21, 2017. The complaint also alleges claims for breach of fiduciary duty, unjust enrichment, and waste of corporate assets. On May 1, 2018, the parties filed a joint stipulation and proposed order agreeing to stay the action until, *inter alia*, the entry of an order granting or denying any motion to dismiss the action in the District of Massachusetts, and on May 9, 2018, the court entered the joint stipulation agreeing to stay the action. On June 20, 2018, another putative shareholder derivative action was filed in the U.S. District Court for the District of Delaware (the "*Howard*" action), naming certain of the Company's officers and directors (including a certain former officer), and naming the Company as a nominal defendant. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 14a-9 in connection with disclosures made in the Company's Schedule 14A Proxy Statement, which was filed with the SEC on April 21, 2017. The complaint also alleges claims for breach of fiduciary duty, unjust enrichment, and waste of corporate assets.

The Company is unable at this time to determine whether the outcome of any of the litigation would have a material impact on its results of operations, financial condition or cash flows. The Company does not have contingency reserves established for any litigation liabilities.

7. Stockholders' equity

As of June 30, 2018, the Company authorized 250,000,000 shares of common stock at \$0.001 par value per share and 25,000,000 shares of preferred stock at \$0.001 par value per share. As of June 30, 2018, 86,625,975 shares of common stock and 1,635 shares of preferred stock were issued and outstanding. As of December 31, 2017, 28,734,898 shares of common stock were issued and outstanding and no shares of preferred stock were issued and outstanding.

Underwritten public offering

On January 17, 2018, the Company entered into two underwriting agreements, the first relating to the underwritten public offering of 53,365,000 shares of the Company's common stock, par value \$0.001 per share, and accompanying Warrants to purchase up to 26,682,500 shares of common stock, at a combined price to the public of \$1.00 per share, for gross proceeds of approximately \$53.4 million (the "Common Stock Offering") and the second relating to the underwritten public offering of 1,635 shares of the Company's Series A convertible preferred stock, par value \$0.001 per share, which are convertible into 1,635,000 shares of common stock, and accompanying warrants to purchase up to 817,500 shares of common stock for gross proceeds of

approximately \$1.6 million (the “Preferred Stock Offering,” and together with the Common Stock Offering, the “January 2018 Financing”).

Under the terms of the underwriting agreement for the Common Stock Offering, the Company also granted the underwriters the Overallotment Option to purchase up to an additional 8,004,750 shares of common stock and/or additional warrants to purchase up to 4,002,375 shares of common stock. On January 19, 2018, the underwriters exercised their Overallotment Option to acquire additional warrants to purchase up to 1,438,050 shares of common stock. On February 21, 2018, the underwriters exercised their Overallotment Option to acquire an additional 957,745 shares of common stock. The Company received approximately \$1.0 million in gross proceeds from the underwriter’s exercise of the Overallotment Option. The remainder of the Overallotment Options expired unexercised.

Preferred Stock

Each share of preferred stock is convertible at any time at the option of the holder, provided that the holder will be prohibited from converting the preferred stock into shares of common stock if, as a result of such conversion, the holder, together with its affiliates, would own more than 9.99% of the total number of shares of common stock then issued and outstanding. Each share of preferred stock is initially convertible into 1,000 shares of common stock, subject to certain adjustments upon stock dividends and stock splits.

The preferred stock ranks *pari passu* on an as-converted to common stock basis with the common stock as to distributions of assets upon the Company’s liquidation, dissolution or winding up, whether voluntarily or involuntarily, or a “Fundamental Transaction,” as defined in the Certificate of Designation.

Shares of preferred stock have no voting rights, except as required by law and except that the consent of the holders of a majority of the outstanding preferred stock is required to amend the terms of the preferred stock.

The holders of preferred stock shall be entitled to receive dividends in the same form as dividends actually paid on shares of common stock when, as and if such dividends are declared and paid on shares of the common stock, on an as-if-converted-to-common stock basis.

Warrants

The Warrants are exercisable at any time, or from time-to-time during the period beginning on the date of issuance and expiring on the five-year anniversary of such issuance date, at an exercise price of \$1.20 per share.

In the event of an “Acquisition,” defined generally to include a merger or consolidation resulting in the sale of 50% or more of the voting securities of the Company, the sale of all, or substantially all, of the assets or voting securities of the Company, or other change of control transaction, as defined in the Warrants, the Company will be obligated to use its best efforts to ensure that the holders of the Warrants receive new warrants from the surviving or acquiring entity (the “Acquirer”). The new warrants to purchase shares in the Acquirer shall have the same expiration date as the Warrants and a strike price that is based on the proportion of the value of the Acquirer’s stock to the Company’s common stock. If the Company is unable, despite its best efforts, to cause the Acquirer to issue new warrants in the Acquisition as described above, then, if the Company’s stockholders are to receive cash in the Acquisition, the Company will settle the Warrants in cash and if the Company’s stockholders are to receive stock in the Acquisition, the Company will issue shares of its common stock to each Warrant holder.

Accounting for the January 2018 Financing Transaction

In assessing the accounting for the January 2018 Financing, the Company first determined that the common and preferred stock and the Warrants represented separable freestanding financial instruments.

Next, the Company determined that the Warrants should be liability classified in accordance with ASC 480, *Distinguishing Liabilities from Equity* (“ASC 480”), given the ability for the holders of the Warrants to redeem the Warrants for cash in certain Acquisition scenarios, as described above. As such, the Company allocated proceeds from the Common Stock Offering and Preferred Stock Offering in order to record the related Warrants at their fair value as of the date of issuance. In addition, the Company recorded the Warrants issued to the underwriters as part of the exercise of their Overallotment Option at their fair value as of the date of issuance. As the Warrants are liability-classified, the Company remeasures the fair value of the Warrants at each reporting date. The Company recorded the Warrants issued in the January 2018 Financing at their estimated fair value of approximately \$18.2 million as of the issuance date. The Company recorded expense of approximately \$3.2 million in the quarter ended March 31, 2018, and income of \$5.5 million in the quarter ended June 30, 2018 in changes in the fair value of

warrant liability in the condensed consolidated statement of operations associated with the remeasurement of the Warrants to fair value. The fair value of the warrant liability is approximately \$15.9 million as of June 30, 2018 (see Note 3).

In assessing the preferred stock, the Company determined that it was more equity-like in nature, which served as the basis for evaluating the other embedded features within the preferred stock. The Company determined that the conversion feature, redemption feature and other embedded features of the preferred stock did not meet the definition of derivatives and did not require separate accounting. The Company determined that the preferred stock should be classified as permanent equity as its redemption, dividends, covenants, liquidation and conversion features are more equity-like than debt-like. The Company further assessed the conversion feature of the preferred stock to determine if it was beneficial to the holder at issuance. Given the value allocated from the preferred stock to the Warrants issued in the Preferred Stock Offering, the Company determined that the effective conversion price was in the money at issuance and calculated the intrinsic value of the beneficial conversion of approximately \$0.3 million. The Company recorded this amount to additional paid-in capital upon the issuance of the preferred stock.

The Company determined that the Overallotment Option should be classified as a liability in accordance with ASC 480 on the basis that the Overallotment Option was exercisable for Warrants that are classified as liabilities under ASC 480. As the Overallotment Option is a traditional overallotment option that remained with the underwriters, no proceeds from the January 2018 Financing were allocated. Given the short-term duration of the Overallotment Option, the Company estimated its fair value was representative of the intrinsic value of the related Warrants, based on the estimated fair value of the Warrants at issuance and the exercise price of the Overallotment Option. The Company estimated the fair value of the Overallotment Option at the issuance to be approximately \$2.4 million. Upon the partial exercise of the Overallotment Option by the underwriters, the Company reclassified a proportional amount of the Overallotment Option liability of \$0.9 million to the Warrant liability, to reflect the fair value of the Warrants issued to the underwriters. Upon expiration of the Overallotment Option, the Company recognized the \$1.8 million liability balance as expense accordingly.

In connection with the January 2018 Financing, the Company incurred approximately \$4.0 million of issuance costs. The Company allocated approximately \$2.6 million of the issuance costs to the common and preferred stock, and recorded these amounts against the proceeds received, and approximately \$1.4 million of the issuance costs to the Warrants, on the basis of the relative values assigned. As the Warrants were classified as liabilities, the Company immediately expensed the issuance costs allocated to the Warrants.

At-the-market equity offering program

On March 2, 2015, the Company entered into a Sales Agreement with Cowen and Company, LLC (the "Sales Agreement") to establish an at-the-market equity offering program ("ATM") pursuant to which it was able to offer and sell up to \$40 million of its common stock at prevailing market prices from time to time. On May 8, 2015, the Sales Agreement was amended to increase the offering amount under the ATM to \$50 million of its common stock. Through August 1, 2018, the Company sold an aggregate of approximately 3.7 million shares under the ATM and received approximately \$4.0 million in net proceeds after deducting commissions.

Warrants

As of June 30, 2018 and December 31, 2017, the Company had warrants outstanding that represent the right to acquire 29,342,564 and 77,603 shares of common stock, respectively. As of June 30, 2018, the common stock underlying the warrants consist of 28,935,550 shares of common stock reserved for issuance upon the exercise of the Warrants, 403,136 shares of common stock reserved for issuance upon the exercise of warrants issued to Hercules and 3,878 shares of common stock reserved for issuance upon the exercise of warrants issued in periods prior to the Company's initial public offering ("IPO").

8. Stock and employee benefit plans

Stock-based compensation expense

Total stock-based compensation expense is recognized for stock options and restricted stock awards granted to employees and non-employees and has been reported in the Company's statements of operations as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Research and development	\$ 159	\$ 351	\$ 300	\$ 738
General and administrative	433	803	936	1,437
Total	\$ 592	\$ 1,154	\$ 1,236	\$ 2,175

Stock options

The following table summarizes stock option activity for employees and non-employees (shares in thousands):

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Outstanding at December 31, 2017	4,129	\$ 5.48	7.07	\$ —
Granted	3,355	\$ 0.99		
Exercised	—	\$ —		
Canceled	(1,787)	\$ 5.24		
Outstanding at June 30, 2018	5,697	\$ 2.91	8.05	\$ —
Exercisable at June 30, 2018	2,182	\$ 4.55	6.18	\$ —

Restricted stock

In May 2017, the Company granted an officer 47,620 units of restricted stock ("RSUs") in accordance with the 2014 Equity Incentive Plan and subject to a Restricted Stock Unit Award Agreement with the Company. On the date of grant, 7,937 RSUs vested immediately and another 23,810 RSUs were to vest on the eighteen-month anniversary of the grant date, subject to the continued employment of the officer. The remaining 15,873 RSUs, which contained a performance condition of completing a material financing event on or before September 30, 2017, were canceled as the performance criterion was not achieved. Upon the resignation of the officer in March 2018, the remaining 23,810 RSUs were forfeited.

Performance-based awards

The Company granted stock awards to certain employees, executive officers and consultants, which contain performance-based vesting criteria. Milestone events are specific to the Company's corporate goals, which include, but are not limited to, certain clinical development milestones, business development agreements, and capital fundraising events. Stock-based compensation expense associated with these performance-based stock options is recognized if the performance conditions are considered probable of being achieved, using management's best estimates. The Company determined that none of the performance-based milestones were probable of achievement during the three and six months ended June 30, 2018, respectively, and did not recognize stock-based compensation expense for these periods. As of June 30, 2018, there were 56,336 performance-based common stock awards outstanding for which the probability of achievement was not deemed probable.

Employee stock purchase plan

On February 10, 2014, the Company's board of directors adopted the 2014 Employee Stock Purchase Plan (the "2014 ESPP"). The 2014 ESPP authorizes the initial issuance of up to 200,776 shares of common stock to participating eligible employees. The 2014 ESPP provides for six-month option periods commencing on January 1 and ending June 30 and commencing July 1 and ending December 31 of each calendar year.

In June of 2018, 2,500,000 additional shares were authorized under the 2014 ESPP and 42,132 shares were issued. As of June 30, 2018, 2,457,875 shares remain available for future issuance. The Company incurred stock-based compensation expense related to the 2014 ESPP of \$11 thousand and \$21 thousand the three and six months ended June 30, 2018, respectively, and \$38 thousand and \$76 thousand for the three and six months ended June 30, 2017, respectively.

9. Net loss per share

The Company computes basic and diluted earnings (loss) per share using a methodology that gives effect to the impact of outstanding participating securities (the “two-class method”). For both the three and six-month periods ended June 30, 2018 and 2017, respectively, there is no income allocation required under the two-class method or dilution attributed to weighted average shares outstanding in the calculation of diluted loss per share.

The following common stock equivalents, presented on an as converted basis, were excluded from the calculation of net loss per share for the periods presented, due to their anti-dilutive effect (in thousands):

	Six Months Ended June 30,	
	2018	2017
Stock options	5,697	4,717
Restricted stock units	—	40
Warrants	29,343	78
Total	<u>35,040</u>	<u>4,835</u>

10. Restructuring costs

On September 25, 2017, the Company announced a strategic shift to immuno-oncology and a focus on the development of neoantigen cancer vaccines, including GEN-009. The Company also announced that it is exploring strategic alternatives for GEN-003, its Phase 3-ready investigational immunotherapy for the treatment of genital herpes. Consequently, substantially all GEN-003 spending and activities were ceased, and the Company reduced its workforce by approximately 40 percent as of the quarter ended September 30, 2017. Pursuant to ASC 420, Exit or Disposal Cost Obligations, charges for employee severance, employee benefits, and contract terminations were recorded in the year ended December 31, 2017. Asset impairment charges, pursuant to ASC 360, Property, Plant, and Equipment, were also recorded in the year ended December 31, 2017 and primarily related to fixed assets specific to GEN-003 research and development activities.

The following table summarizes the impact of the September 2017 restructuring activities for the year ended December 31, 2017 and three months ended March 31, 2018, along with the current liability recorded in the balance sheet as of December 31, 2017 and June 30, 2018 (in thousands):

(in thousands)	Charges incurred during the year ended December 31, 2017	Amount paid through December 31, 2017	Less non-cash charges during the year ended December 31, 2017	Remaining liability at December 31, 2017	Amount paid during Q1 2018	Remaining liability at June 30, 2018
Employee severance, benefits and related costs	\$ 1,064	\$ (1,050)	\$ —	\$ 14	\$ (14)	\$ —
Contract terminations	526			526	(526)	—
Asset impairments	1,028	—	(1,028)	—	—	—
Total	<u>\$ 2,618</u>	<u>\$ (1,050)</u>	<u>\$ (1,028)</u>	<u>\$ 540</u>	<u>\$ (540)</u>	<u>\$ —</u>

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

The following information should be read in conjunction with the unaudited consolidated financial information and the notes thereto included in this Quarterly Report on Form 10-Q. The following disclosure contains forward-looking statements that involve risk and uncertainties. Our actual results and timing of certain events could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including those discussed in our Annual Report on Form 10-K.

Overview

We are a biopharmaceutical company that seeks to discover and develop novel cancer vaccines and immunotherapies. We use our proprietary discovery platform, ATLAS, to recall a patient's pre-existing CD4+ and CD8+ T cell immune responses to their tumor to identify neoantigens and antigens for inclusion in vaccines that are designed to act through T cell (or cellular) immune responses. We believe that using ATLAS to identify neoantigens and antigens for inclusion in cancer vaccines could lead to more immunogenic and efficacious cancer vaccines and immunotherapies.

In September 2017, we announced a strategic shift to immuno-oncology and a focus on the development of neoantigen cancer vaccines. Our most advanced program in active development is our preclinical immuno-oncology program, GEN-009, a neoantigen cancer vaccine, for which we have initiated a Phase 1/2a clinical trial. The GEN-009 program uses ATLAS to identify patient neoantigens, or newly formed antigens unique to each patient, that are associated with that individual's tumor. We are also exploring GEN-010, a next-generation neoantigen vaccine program, and GEN-011, a neoantigen adoptive T cell therapy program, and has identified candidate T cell antigens for cancer vaccines targeting tumor-associated antigens and a vaccine targeting cancers caused by EBV.

We have one non-active Phase 3-ready product candidate, GEN-003, an investigational immunotherapy for the treatment of genital herpes. In September 2017, we announced that we are exploring strategic alternatives for GEN-003. Consequently, substantially all GEN-003 spending and activities were ceased, and we reduced our workforce by approximately 40 percent.

ATLAS Platform

The importance of the T cell arm of the immune system is increasingly understood to be critical in the treatment of certain cancers. However, the discovery of effective T cell targets has been particularly challenging for two reasons. First, the diversity of human T cell responses means that an effective T cell target for one person may be different from an effective T cell target for another person. Second, the number of candidate targets for T cell responses can be very large with up to thousands of candidate antigens per patient in some cancers. These complexities represent fundamental barriers that traditional cancer vaccine target discovery tools, which rely largely on computer modeling - so-called predictive algorithms - have, as yet, only been poorly addressed.

We have designed the ATLAS platform to overcome these T cell target discovery challenges by identifying true neoantigens in an individual rather than using traditional predictive methods. We believe ATLAS represents the most comprehensive and accurate high throughput system for T cell vaccine and immunotherapy discovery in the biopharmaceutical industry. ATLAS is designed to mimic the T cell arm of the human immune system in a laboratory setting. Using ATLAS, we are able to measure T cell responses to the entire set of potential T cell targets for an individual's cancer, allowing us to identify vaccine and immunotherapy targets associated with T cell responses which may kill an individual's cancer.

We believe we are a leader in the field of T cell vaccine and immunotherapy discovery and development. Our management and scientific teams possess considerable experience in vaccine, immunotherapy and anti-infective research, manufacturing, clinical development and regulatory matters.

Our Immuno-Oncology Program

We are focused on combining our antigen selection and vaccine development expertise to create new immuno-oncology treatments. Our potential cancer vaccines and immunotherapies will be designed to educate T cells to recognize and attack specific targets and thereby kill cancer cells. We are first working to develop personalized cancer vaccines by applying ATLAS to identify patient neoantigens that are associated with that individual's pre-existing immune responses to a tumor.

Neoantigens are personalized tumor mutations that are seen as "foreign" by an individual's immune system. Data published in recent years have indicated that an individual's response to neoantigens drives checkpoint inhibitor efficacy and that it is possible to vaccinate an individual against their own neoantigens. If approved, neoantigen vaccines could be used in combination with existing treatment approaches for cancer, including immune checkpoint inhibitors, to potentially direct and enhance an individual's T cell response to the individual's cancer, thereby potentially affording better clinical outcomes.

Our lead immuno-oncology program, GEN-009, is an adjuvanted neoantigen peptide vaccine candidate designed to direct a patient's immune system to attack their tumor. GEN-009's neoantigens are identified by our proprietary ATLAS platform, which recalls a patient's pre-existing CD4+ and CD8+ cell immune responses to their tumor. Following ATLAS neoantigen identification, we will manufacture a personal vaccine for each patient.

We recently announced that in May 2018 that the FDA accepted our investigational new drug ("IND") application with the FDA for GEN-009. In June, 2018, we initiated a Phase 1/2a clinical trial for GEN-009 in a range of tumor types in subjects with no evidence of disease but a high risk of relapse. We expect to report initial immunogenicity data from this trial in the first half of 2019.

We are also using ATLAS to develop cancer vaccines targeting tumor-associated, or shared, antigens and vaccines against cancers of viral origin. Our strategy in immuno-oncology combines our own internal neoantigen vaccine development programs with a focus on partnering ATLAS for these other immuno-oncology applications.

In November 2015, we commenced a program focused on Epstein-Barr Virus, or EBV. EBV infection has been linked to cancers with high unmet needs such as non-Hodgkin's lymphoma, nasopharyngeal carcinoma and gastric carcinoma. We believe that ATLAS is highly suited to the creation of a new immunotherapy for EBV, given that T cell responses are understood to be crucial for protection against EBV. Furthermore, EBV is part of the herpes virus family, in which we have deep experience through our development of GEN-003. We are currently seeking a partner to advance the development of this vaccine.

The following table describes our active programs in development:

Vaccine Candidate	Program	Stage of Development	Next Milestone	Anticipated Timeline
GEN-009	Neoantigen cancer vaccine	Clinical	Immunogenicity data from the first patient cohort	First half of 2019
GEN-010	Second generation neoantigen cancer vaccine	Pre-clinical	Select delivery technology platform	Ongoing
GEN-011	Adoptive T cell therapy	Research	Initiate preclinical program	To be determined
GEN-007	Epstein-Barr Virus	Research	Select antigen candidates	Ongoing, exploring partnering opportunities
GEN-006	Immuno-oncology - tumor-associated antigen vaccine	Research	Select antigen candidates	Ongoing, exploring partnering opportunities

GEN-003 — Phase 2 immunotherapy for genital herpes, currently exploring strategic alternatives

Prior to our September 2017 strategic shift announcement, our lead program was GEN-003, a Phase 3-ready investigational immunotherapy for the treatment of genital herpes that had completed three positive clinical trials. We are currently exploring strategic alternatives to maximize shareholder value from GEN-003, during which time we have ceased substantially all activities under the GEN-003 program.

Financing and business operations

We commenced business operations in August 2006. To date, our operations have been limited to organizing and staffing our company, acquiring and developing our proprietary ATLAS technology, identifying potential product candidates, and undertaking preclinical studies and clinical trials for our product candidates. All of our revenue to date has been grant revenue. We have not generated any product revenue and do not expect to do so for the foreseeable future. We have financed our operations primarily through the issuance of our equity securities, debt financings, and amounts received through grants. As of June 30, 2018, we had received an aggregate of \$339.5 million in gross proceeds from the issuance of equity securities and gross proceeds from debt facilities and an aggregate of \$7.9 million from grants. At June 30, 2018, our cash and cash equivalents were \$44.2 million.

Since inception, we have incurred significant operating losses. Our net losses were \$4.4 million and \$20.3 million for the three months and six months ended June 30, 2018, and our accumulated deficit was \$284.5 million as of June 30, 2018. We expect to incur significant expenses and increasing operating losses for the foreseeable future. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year. We will need to generate significant revenue to achieve profitability, and we may never do so.

In March 2015, we completed an underwritten public offering of 6.3 million shares of our common stock at a public offering price of \$8.25 per share for an aggregate offering price of \$51.7 million. In August 2015, we completed another underwritten public offering of 3.9 million shares of our common stock at a public offering price of \$13.00 per share for an aggregate offering price of \$50.1 million. We received net proceeds from these offerings of approximately \$95.7 million, after deducting approximately \$6.1 million in underwriting discounts and commissions, excluding offering costs payable by us.

In January 2018, we completed Concurrent Offerings in which we sold (i) 53.4 million shares of our common stock and accompanying 53.4 million Class A warrants to purchase up to 26.7 million shares of our common stock, at a combined price of \$1.00 per share, for aggregate gross proceeds of approximately \$53.4 million and (ii) 1,635 shares of our Series A convertible preferred stock, which are convertible into 1.6 million shares of our common stock, and accompanying Class A warrants to purchase up to 0.8 million shares of our common stock for aggregate gross proceeds of approximately \$1.6 million. Each Class A warrant has an exercise price of \$1.20 per share and will expire five years from the date of issuance. We received net proceeds

from these offerings of approximately \$51.7 million, after deducting approximately \$3.3 million in underwriting discounts and commissions, excluding offering costs payable by us.

In April 2018, we sold 3.5 million shares under our ATM program and received net proceeds of \$2.9 million, after deducting commissions. Other than the shares sold in April 2018, we did not sell any additional shares during the six months ended June 30, 2018. For the six months ended June 30, 2017, we sold 52 thousand shares under the ATM program and received 0.2 million in net proceeds after deducting commissions. For the three months ended June 30, 2017 there were no additional ATM sales.

Costs related to clinical trials can be unpredictable and therefore there can be no guarantee that our current balances of cash, cash equivalents and investments, and any proceeds received from other sources, will be sufficient to fund our studies or operations through this period. These funds will not be sufficient to enable us to conduct pivotal clinical trials for, seek marketing approval for, or commercially launch GEN-009 or any other product candidate. Accordingly, to obtain marketing approval for and to commercialize these or any other product candidates, we will be required to obtain further funding through public or private equity offerings, debt financings, collaboration and licensing arrangements or other sources. Adequate additional financing may not be available to us on acceptable terms, or at all. Our failure to raise capital when needed would have a negative effect on our financial condition and our ability to pursue our business strategy.

Financial Overview

Research and development expenses

Research and development expenses consist primarily of costs incurred to advance our preclinical and clinical candidates, which include:

- personnel-related expenses, including salaries, benefits, stock-based compensation expense, and travel;
- expenses incurred under agreements with contract research organizations ("CROs"), contract manufacturing organizations ("CMOs"), consultants, and other vendors that conduct our clinical trials and preclinical activities;
- costs of acquiring, developing, and manufacturing clinical trial materials and lab supplies; and
- facility costs, depreciation, and other expenses, which include direct and allocated expenses for rent and maintenance of facilities, insurance, and other supplies.

We expense internal research and development costs to operations as incurred. We expense third-party costs for research and development activities, such as conducting clinical trials, based on an evaluation of the progress to completion of specific performance or tasks such as patient enrollment, clinical site activations or information, which is provided to us by our vendors.

The following table identifies research and development expenses on a program-specific basis for our product candidates as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Genital herpes (GEN-003)(1)	\$ 45	\$ 6,987	\$ 550	\$ 13,346
Immuno-oncology program (2)	4,199	3,281	10,071	5,112
Other research and development (3)	1,072	1,159	1,970	2,711
Total research and development	\$ 5,316	\$ 11,427	\$ 12,591	\$ 21,169

(1) Includes direct and indirect internal costs and external costs such as CMO and CRO costs.

(2) Includes direct and indirect internal costs and external costs for our immuno-oncology research and development activities.

(3) Includes costs that are not specifically allocated by project, including facilities costs, depreciation expense, and other costs. In addition, costs for programs that were paused in 2016 or earlier are included in this line item.

General and administrative expenses

General and administrative expenses consist principally of salaries and related costs for executive, finance, and other administrative personnel, professional fees, business insurance, rent, general legal activities, including the cost of maintaining our intellectual property portfolio, and other corporate expenses.

Our results also include stock-based compensation expense as a result of the issuance of stock option grants to our employees, directors, and consultants. The stock-based compensation expense is included in the respective categories of expense in our condensed consolidated statements of operations and comprehensive loss (i.e., research and development or general and administrative expenses).

We anticipate that our overall general and administrative expenses will remain flat for the foreseeable future given the completion of the strategic shift and restructuring announced in September 2017. We expect that costs for certain professional services, such as lawyers and accountants, to increase slightly in the near term due to litigation expenses associated with the matters discussed under Part II, Item 1 - *Legal Proceedings*, and costs associated with our requirements to operate as a public company but anticipate such costs to level out or decrease slightly by mid-2019. If and when we conclude that a regulatory approval of our first product candidate appears likely, we anticipate that we will increase our salary and personnel costs and other expenses as a result of our preparation for commercial operations.

Other income (expense)

Other income and expense consists of the change in warranty liability, interest expense, net, including interest expense, non cash interest related to the amortization of debt discount and issuance costs net of interest income and other income (expense) for other miscellaneous expenses.

Critical Accounting Policies and Significant Judgments and Estimates

We believe that several accounting policies are important to understanding our historical and future performance. We refer to these policies as critical because these specific areas generally require us to make judgments and estimates about matters that are uncertain at the time we make the estimate, and different estimates—which also would have been reasonable—could have been used. The preparation of financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. On an ongoing basis, we evaluate estimates, which include, but are not limited to, estimates related to clinical trial accruals, prepaid and accrued research and development expenses, stock-based compensation expense, and reported amounts of revenues and expenses, including other expense as it includes fair value adjustments with respect to our warrant liability and offering costs allocated to the warrants that were expensed immediately, during the reported period. We base our estimates on historical experience and other market-specific or other relevant assumptions that we believe to be reasonable under the circumstances. Actual results may differ materially from those estimates or assumptions.

The critical accounting policies we identified in our most recent Annual Report on Form 10-K for the fiscal year ended December 31, 2017 related to prepaid and accrued research and development expenses and stock-based compensation. There have been no material changes to our accounting policies from those described in our Annual Report on Form 10-K. It is important that the discussion of our operating results that follows be read in conjunction with the critical accounting policies disclosed in our Annual Report on Form 10-K, as filed with the SEC on February 16, 2018.

Results of Operations

Comparison of the Three Months Ended June 30, 2018 and June 30, 2017

(in thousands)	Three Months Ended June 30,		Increase (Decrease)
	2018	2017	
Operating expenses:			
Research and development	\$ 5,316	\$ 11,427	\$ (6,111)
General and administrative	4,472	3,571	901
Total operating expenses	9,788	14,998	(5,210)
Loss from operations	(9,788)	(14,998)	(5,210)
Other income (expense):			
Change in fair value of warrants	5,498	—	5,498
Interest expense, net	(241)	(370)	(129)
Other income (expense)	93	(7)	100
Total other income (expense)	5,350	(377)	5,727
Net loss	\$ (4,438)	\$ (15,375)	(10,937)

Research and development expenses

Research and development ("R&D") expenses decreased \$6.1 million in the three months ended June 30, 2018 as compared to the three months ended June 30, 2017. The decrease was due largely to reduced headcount costs of \$1.7 million and decreased external development and lab costs of \$3.0 million. The remaining decrease in quarter over quarter expenses was comprised of decreased clinical costs of approximately \$0.9 million and other R&D costs of approximately \$0.5 million.

On a program basis, GEN-003 costs decreased by \$6.9 million for the three months ended June 30, 2018 driven by decreased compensation and external manufacturing related expenses of \$4.7 million, consulting and professional service related costs of \$0.6 million and decreased clinical costs of \$1.1 million following the September 2017 strategic pivot. Spending increases on GEN-009 and immuno-oncology programs of \$0.9 million were driven primarily by increased headcount, clinical and consulting costs of \$1.3 million in preparation of our Phase 1/2a clinical trial for GEN-009 in the second half of 2018, offset by decreased external manufacturing costs of \$0.5 million. Increased spending on these programs was offset by lower costs on deprioritized infectious disease programs.

General and administrative expenses

General and administrative expenses were \$4.5 million for the three months ended June 30, 2018, a \$0.9 million increase from the same three-month period in 2017. The increase was primarily due to increased consulting and professional services costs of \$1.9 million, offset by reduced compensation and benefits costs of \$0.8 million compared to the same quarter in the prior year.

Change in fair value of warrants

Change in fair value of warrants reflects non-cash change in fair value of Class A warrants issued in connection the underwritten public offering of common and preferred stock in January 2018. The Warrants were recorded at their fair value on the date of issuance and are remeasured as of any Warrant exercise date and at the end of the reporting period.

Interest expense, net

Interest expense, net consists primarily of interest expense on our long-term debt facilities and non-cash interest related to the amortization of debt discount and issuance costs, offset by interest earned on our cash, cash equivalent and investment portfolio. The decreased of \$0.1 million for the three months ended June 30, 2018, as compared to the three months ended June 30, 2017 reflects the lower outstanding principal in the three months ended June 30, 2018 as compared to the same three month period in 2017 an increased interest income earned on our cash and cash equivalents.

Other income (expense)

Other income (expense) increased by \$0.1 million for the three month period ended June 30, 2018 compared to the three month period ended June 30, 2017. The increase in other income (expense) for the three months ended June 30, 2018 was due to foreign currency exchange adjustments recorded during the three months ended June 30, 2018 compared to the corresponding period of the prior year.

Comparison of the Six Months Ended June 30, 2018 and June 30, 2017

(in thousands)	Six Months Ended June 30,		Increase (Decrease)
	2018	2017	
Operating expenses:			
Research and development	\$ 12,591	\$ 21,169	\$ (8,578)
General and administrative	7,581	7,205	376
Total operating expenses	20,172	28,374	(8,202)
Loss from operations	(20,172)	(28,374)	(8,202)
Other income (expense):			
Change in fair value of warrants	199	—	199
Interest expense, net	(442)	(728)	(286)
Other income (expense)	87	(8)	95
Total Other income (expense)	(156)	(736)	(580)
Net loss	\$ (20,328)	\$ (29,110)	\$ (8,782)

Research and development expenses decreased by \$8.6 million in the six months ended June 30, 2018 as compared to the six months ended June 30, 2017. The decrease was due largely to reduced headcount costs of \$3.4 million and decreased external development and clinical costs of \$3.5 million. The remaining decrease was comprised of lab related costs of \$0.4 million, consulting and professional services costs of \$0.5 million and other R&D costs of approximately \$0.7 million.

On a program basis, GEN-003 costs decreased by \$12.8 million for the six months ended June 30, 2018 driven by decreased compensation and external manufacturing related expenses of \$8.5 million, consulting and professional service related costs of \$1.3 million and decreased clinical and lab related costs of \$2.4 million following the September 2017 strategic shift. Spending increases on GEN-009 and immuno-oncology programs of \$5.0 million were driven primarily by increased headcount, clinical and consulting costs of \$3.3 million and increased external manufacturing costs of \$1.1 million in preparation of our Phase 1/2a clinical trial for GEN-009 in the second half of 2018. Increased spending on these programs was offset by lower costs on deprioritized infectious disease programs.

General and administrative expenses

General and administrative expenses were \$7.6 million for the six months ended June 30, 2018, a \$0.4 million increase from the same six-month period in 2017. The increase was primarily due to increased consulting and professional services costs of \$1.7 million, offset by reduced compensation and benefits costs of \$1.2 million compared to the same quarter in the prior year.

Change in fair value of warrants

Change in fair value of warrants reflects non-cash change in fair value of Class A warrants issued in connection the underwritten public offering of common and preferred stock in January 2018. The Warrants were recorded at their fair value on the date of issuance and are remeasured as of any Warrant exercise date and at the end of the reporting period.

Interest expense, net

Interest expense decreased by \$0.3 million for the six month period ended June 30, 2018 compared to the six month period ended June 30, 2017. The decrease in interest expense reflects the lower outstanding principal balance on our debt facility in the six months ended June 30, 2018 in addition to increased interest income driven by higher average cash balances in the first 6 months of 2018 compared to 2017.

Other income (expense)

Other income (expense) increased by \$0.1 million for the six month period ended June 30, 2018 compared to the six month period ended June 30, 2017. The increase in other income (expense) for the three months ended June 30, 2018 was due to foreign currency exchange adjustments recorded during the three months ended June 30, 2018 compared to the corresponding period of the prior year.

Liquidity and Capital Resources

Overview

Since our inception through June 30, 2018, we have received an aggregate of \$339.5 million in gross proceeds from the issuance of equity securities and gross proceeds from debt facilities and an aggregate of \$7.9 million from grants. At June 30, 2018, our cash and cash equivalents were \$44.2 million.

For the six months ended June 30, 2017, we sold 52 thousand shares under our ATM program and received \$0.2 million in net proceeds after deducting commissions. For the six months ended June 30, 2018 we sold an additional 3.5 million shares under the ATM program and received \$2.9 million in net proceeds after the deducting commissions.

Debt Financings

On April 24, 2018 (the "Closing Date"), we entered into an amended and restated loan and security agreement (the "2018 Loan Agreement") with Hercules (renamed to Hercules Capital, Inc.), which provided up to \$14.0 million in debt financing in the form of a term loan funded on the Closing Date (the "2018 Term Loan"). The 2018 Loan Agreement amended and restated the 2014 Loan Agreement.

The 2018 Term Loan will mature on May 1, 2021 and accrues interest at a floating rate per annum equal to the greater of (i) 7.75% or (ii) the sum of 7.75% plus the prime rate minus 5.0%. The 2018 Loan Agreement provides for interest-only payments until June 1, 2019, which may be extended to December 1, 2019 if certain performance milestones are met before May 31, 2019 and no event of default has occurred or is continuing. Interest-only payments may be further extended to June 1, 2020 if certain additional performance milestones are met before November 30, 2019. Thereafter, amortization payments will be payable monthly in equal installments of principal and interest (subject to recalculation upon a change in prime rates) upon expiration of the interest only period through maturity.

The 2018 Term Loan may be prepaid in whole or in part upon seven business days' prior written notice to Hercules, subject to a prepayment charge of 3.0%, if such advance is prepaid in any of the first twelve months following the Closing Date, 2.0%, if such advance is prepaid after twelve months following the Closing Date but on or prior to 24 months following the Closing Date, and 1.0% thereafter. We are also obligated to pay an end of term charge in connection with the 2014 Loan Agreement of 4.95% of the term loan advances under the 2014 Loan Agreement on January 1, 2019 and an additional end of term charge of 6.70% of the Term Loan when the Term Loan is repaid (the "End of Term Charges").

The 2018 Term Loan is secured by a lien on substantially all of our assets, other than intellectual property, provided that such lien on substantially all assets includes any rights to payments and proceeds from the sale, licensing or disposition of intellectual property. The Loan Agreement contains non-financial covenants and representations, including a financial reporting covenant, and limitations on dividends, indebtedness, collateral, investments, distributions, transfers, mergers or acquisitions, taxes, corporate changes, deposit accounts, and subsidiaries. There are no financial covenants.

Contemporaneously with the 2018 Loan Agreement, we also entered into an amendment to the equity rights letter agreement, dated November 20, 2014 (the "Amended Equity Rights Letter Agreement"). Pursuant to the Amended Equity Rights Letter Agreement, we had already issued to Hercules 223,463 shares of the Company's Common Stock for an aggregate purchase price of approximately \$2.0 million at a price per share equal to the closing price of our common stock as reported on The Nasdaq Global Market on November 19, 2014. The shares will be subject to resale limitations and may be resold only pursuant to an effective registration statement or an exemption from registration.

Additionally, under the Amended Equity Rights Letter Agreement, Hercules has the right to participate in any one or more subsequent private placement equity financings of up to \$2.0 million on the same terms and conditions as purchases by the other investors in each subsequent equity financing. The Amended Equity Rights Letter Agreement, and all rights and obligations thereunder, will terminate upon the earlier of (1) such time when Hercules has purchased \$2.0 million of subsequent equity financing securities in the aggregate and (2) the later of (a) the repayment of all indebtedness under the Loan Agreement and (b) the expiration or termination of the exercise period for the warrant issued in connection with the Loan Agreement.

In connection with the 2014 Term Loan, we issued a common stock warrant to Hercules on November 20, 2014 (the "First Warrant"). The First Warrant is exercisable for 73,725 shares of the Company's Common Stock (equal to \$607,500 divided by the exercise price of \$8.24). The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of Common Stock, subdivision or combination of the shares of Common Stock or certain dividends payments. The First

Warrant is exercisable until November 20, 2019 and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of Common Stock is greater than the exercise price then in effect. The First Warrant has been classified as equity for all periods it has been outstanding.

In connection with the 2018 Loan Agreement, we issued a common stock warrant to Hercules on April 24, 2018, (the "Second Warrant" and together with the First Warrant, the "Warrants"). The Second Warrant is exercisable for 329,411 shares of the Company's common stock. The exercise price and the number of shares are subject to adjustment upon a merger event, reclassification of the shares of common stock, subdivision or combination of the shares of common stock or certain dividends payments. The Second Warrant is exercisable until April 24, 2023 and will be exercised automatically on a net issuance basis if not exercised prior to the expiration date and if the then-current fair market value of one share of common stock is greater than the exercise price then in effect.

Operating Capital Requirements

Our primary uses of capital are for compensation and related expenses, manufacturing costs for pre-clinical and clinical materials, third-party clinical trial R&D services, laboratory and related supplies, clinical costs, legal and other regulatory expenses, and general overhead costs. We expect these costs will continue to be the primary operating capital requirements for the near future.

We expect that our existing cash and cash equivalents as of June 30, 2018, are sufficient to support our operating expenses and capital expenditure requirements into the fourth quarter of 2019.

We have based our projections of operating capital requirements on assumptions that may prove to be incorrect and we may use all of our available capital resources sooner than we expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical products, we are unable to estimate the exact amount of our operating capital requirements. Our future funding requirements will depend on many factors, including, but not limited to:

- the timing and costs of our planned clinical trials for GEN-009;
- the progress, timing, and costs of manufacturing GEN-009 for planned clinical trials;
- the initiation, progress, timing, costs, and results of preclinical studies and clinical trials for our other product candidates and potential product candidates;
- the outcome, timing, and costs of seeking regulatory approvals;
- the costs of commercialization activities for GEN-009 and other product candidates if we receive marketing approval, including the costs and timing of establishing product sales, marketing, distribution, and manufacturing capabilities;
- the receipt of marketing approval;
- revenue received from commercial sales of our product candidates;
- the terms and timing of any future collaborations, grants, licensing, consulting, or other arrangements that we may establish;
- the amount and timing of any payments we may be required to make, or that we may receive, in connection with the licensing, filing, prosecution, defense and enforcement of any patents or other intellectual property rights, including milestone and royalty payments, and patent prosecution fees that we are obligated to pay pursuant to our license agreements;
- the costs of preparing, filing, and prosecuting patent applications, maintaining and protecting our intellectual property rights, and defending against intellectual property related claims; and
- the extent to which we in-license or acquire other products and technologies.

We will need to obtain substantial additional funding in order to commence and complete clinical trials for GEN-009 and our other product candidates in order to receive regulatory approval. To the extent that we raise additional capital through the sale of our common stock, convertible securities, or other equity securities, the ownership interests of our existing stockholders may be materially diluted and the terms of these securities could include liquidation or other preferences that could adversely affect the rights of our existing stockholders. In addition, debt financing, if available, would result in increased fixed payment obligations

and may involve agreements that include restrictive covenants that limit our ability to take specific actions, such as incurring additional debt, making capital expenditures, or declaring dividends, that could adversely affect our ability to conduct our business.

If we are unable to raise capital when needed or on attractive terms, we could be forced to significantly delay, scale back or discontinue the development of GEN-009 or our other product candidates, seek collaborators at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available, and relinquish or license, potentially on unfavorable terms, our rights to GEN-003, GEN-009 or our other product candidates that we otherwise would seek to develop or commercialize ourselves.

Cash Flows

The following table summarizes our sources and uses of cash for each of the periods below (in thousands):

	Six Months Ended June 30,	
	2018	2017
Net cash used in operating activities	\$ (23,375)	\$ (28,000)
Net cash provided by investing activities	(102)	35,201
Net cash provided by financing activities	55,419	600
Net increase in cash and cash equivalents	\$ 31,942	\$ 7,801

Operating Activities

Net cash used in operations decreased by approximately \$4.6 million to \$23.4 million for the six months ended June 30, 2018 from \$28.0 million for the six months ended June 30, 2017. The decrease in net cash used was due primarily to an increase in non-cash items primarily attributable to the change in fair value and the warrants and transaction costs associated with the January 2018 financing.

Investing Activities

Net cash used by investing activities was \$0.1 million for the six months ended June 30, 2018 as compared to net cash provided by investing activities of \$35.2 million for the six months ended June 30, 2017. The decrease in cash provided was due to the receipt of proceeds from maturities of investments, net of investments made, of approximately \$35.9 million in the six months ended June 30, 2017, as compared to the same period in 2018, partially offset by a decrease in cash used to purchase capital equipment in the six months ended June 30, 2018, as compared to the same period in the prior year.

Financing Activities

Net cash provided by financing activities increased \$54.8 million for the six months ended June 30, 2018 compared to the six months ended June 30, 2017 as a result of the proceeds from the January 2018 underwritten public offering and the shares of common stock issued pursuant to our ATM facility.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements.

Contractual Obligations

There have been no material changes to our contractual obligations from those described in our Annual Report on Form 10-K, as filed with the SEC on February 16, 2018 other than the impact of the 2018 Loan Agreement that increased our outstanding obligations to \$14.0 million and deferred payment of principal and interest to June 1, 2019.

Item 3. Quantitative and Qualitative Disclosures about Market Risks

We are exposed to market risk related to changes in interest rates. As of June 30, 2018, we had cash and cash equivalents of \$44.2 million compared to cash and cash equivalents of \$12.3 million at December 31, 2017, consisting of money market funds. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates. Our available for sale securities are subject to interest rate risk and will fall in value if market interest rates increase. Due to the short-term duration most of our investment portfolio and the low risk profile of our investments, an immediate 100 basis point change in interest rates would not have a material effect on the fair market value of our portfolio.

We are also exposed to market risk related to change in foreign currency exchange rates. We contract with certain vendors that are located in Europe which have contracts denominated in foreign currencies. We are subject to fluctuations in foreign currency rates in connection with these agreements. We do not currently hedge our foreign exchange rate risk. As of June 30, 2018 and December 31, 2017, we had minimal liabilities denominated in foreign currencies.

Item 4. Controls and Procedures

Management's Evaluation of our Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file or submit under the Securities and Exchange Act of 1934 is (1) recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms and (2) accumulated and communicated to our management, including our principal executive officer and principal financial officer, to allow timely decisions regarding required disclosure.

Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of June 30, 2018 (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities and Exchange Act of 1934). Our management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Our principal executive officer and principal financial officer have concluded based upon the evaluation described above that, as of June 30, 2018, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control Over Financial Reporting

During the six months ended June 30, 2018, there have been no changes in our internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) promulgated under the Securities Exchange Act of 1934, 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

In the ordinary course of business, we are from time to time involved in lawsuits, claims, investigations, proceedings, and threats of litigation relating to intellectual property, commercial arrangements and other matters. Except as discussed below, we do not believe we are currently party to any pending legal action, arbitration proceeding or governmental proceeding, the outcome of which, if determined adversely to us, would individually or in the aggregate be reasonably expected to have a material adverse effect on our business or operating results. We are not a party to any material proceedings in which any director, member of senior management or affiliate of ours is either a party adverse to us or our subsidiaries or has a material interest adverse to us or our subsidiaries.

On October 31, 2017, a putative class action complaint was filed in the District of Massachusetts, naming the Company, Chief Executive Officer William D. Clark, and Chief Financial Officer Jonathan Poole as defendants. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 10b-5 in connection with disclosures made in and subsequent to the Company's Quarterly Report on Form 10-Q for the period ending March 31, 2017, filed with the SEC on May 5, 2017, and the Company's announcement of a strategic shift to immuno-oncology on September 25, 2017. The plaintiff sought to represent a class of shareholders who purchased or otherwise acquired the Company's securities between May 5, 2017 and September 25, 2017. The complaint sought unspecified damages and costs. On November 3, 2017, another purported Company shareholder filed a substantially identical complaint in the District of Massachusetts. On December 15, 2017, a purported Company shareholder filed a third complaint in the District of Massachusetts, substantially the same as the previous two, but alleging a class period beginning on August 4, 2016 and ending on September 25, 2017. The District of Massachusetts designated all three complaints as related, and entered an order in each action recognizing that the defendants are not obligated to respond to the initial complaint filed in any of the three actions. Per the procedures set forth by federal securities laws, applications for appointment of lead plaintiff(s) and lead counsel in the three actions were due to the Court on January 2, 2018. Three applications for lead plaintiff and lead counsel were submitted to the Court on that date; one of the three movants subsequently withdrew their application. The Court held a hearing on the two remaining motions for lead plaintiff(s) and lead counsel on January 31, 2018. The Court consolidated the three actions into one case, under the docket number Civil Action No. 17-cv-12137-PBS, U.S. District Court (Mass.), and took the motions for lead plaintiff(s) and counsel under advisement. Counsel for both lead plaintiff movants told the Court that they intended to file an amended complaint in the consolidated action, if appointed. On February 12, 2018, the Court appointed the Genocera Investor Group (a group of five purported shareholders) as lead plaintiff, and appointed Scott+Scott LLP, Levi & Korsinsky LLP, and Block & Leviton LLP as lead counsel. On February 20, 2018, the court entered an order establishing a schedule for the lead plaintiffs' amended complaint, and for a motion to dismiss and corresponding briefing in response, with the following deadlines: filing of an amended complaint by the lead plaintiffs and counsel due March 29, 2018; filing of an answer or motion to dismiss by defendants on May 14, 2018; filing of any opposition by plaintiffs to a motion to dismiss on June 28, 2018; and filing of any reply by defendants in support of a motion to dismiss on July 30, 2018. On March 29, 2018, counsel for the lead plaintiff filed an amended complaint in the District of Massachusetts that alleges the same causes of action and seeks the same relief as the original complaints. The amended complaint adds Seth V. Hetherington, former Chief Medical Officer, to the original named defendants. The defendants filed a motion to dismiss on May 14, 2018. Plaintiffs filed an opposition to defendants' motion to dismiss on June 28, 2018, as well as a motion to strike exhibits referenced in defendants' motion to dismiss, on June 29, 2018. The Company and the other named defendants filed a reply brief to plaintiffs' opposition to defendants' motion to dismiss, and an opposition brief to plaintiffs' motion to strike, on July 30, 2018. Oral argument on the motion to dismiss has been scheduled for September 25, 2018.

On January 31, 2018, a putative shareholder derivative action was filed in the U.S. District Court for the District of Delaware (the "*Kahr*" action), naming certain of the Company's officers and directors as defendants (including certain former directors and officers), and naming the Company as a nominal defendant. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 14a-9 in connection with disclosures made in the Company's Schedule 14A Proxy Statement, filed with the SEC on April 21, 2017. The complaint also alleges claims for breach of fiduciary duty, unjust enrichment, and waste of corporate assets. On May 1, 2018, the parties filed a joint stipulation and proposed order agreeing to stay the action until, *inter alia*, the entry of an order granting or denying any motion to dismiss the action in the District of Massachusetts, and on May 9, 2018, the court entered the joint stipulation agreeing to stay the action. On June 20, 2018, another putative shareholder derivative action was filed in the U.S. District Court for the District of Delaware (the "*Howard*" action), naming certain of the Company's officers and directors (including a certain former officer), and naming the Company as a nominal defendant. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 14a-9 in connection with disclosures made in the Company's Schedule 14A Proxy Statement, which was filed with the SEC on April 21, 2017. The complaint also alleges claims for breach of fiduciary duty, unjust enrichment, and waste of corporate assets. We intend to vigorously defend ourselves against this action. We are unable at this time to determine whether the outcome of the litigation would have a material impact on our results of operations, financial condition or cash flows.

Item 1A. Risk Factors

There have been no material changes from the risk factors set forth in the Company's Annual Report of Form 10-K for the year ended December 31, 2017.

Item 6. Exhibits

The exhibits filed as part of this Quarterly Report on Form 10-Q are set forth on the Exhibits Index, which Exhibit Index is incorporated herein by reference.

Exhibit Number	Exhibit
3.1	<u>Certificate of Amendment to the Amended and Restated Certificate of Incorporation of Genoclea Biosciences, Inc. (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 25, 2018)</u>
4.1	<u>Warrant Agreement between Genoclea Biosciences, Inc. and Hercules Capital, Inc., dated April 24, 2018 (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on April 30, 2018)</u>
10.1	<u>Amendment to Equity Rights Letter Agreement between Genoclea Biosciences, Inc. and Hercules Capital, Inc., dated April 24, 2018 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on April 30, 2018)</u>
10.2†	<u>Genoclea Biosciences, Inc. Amended and Restated 2014 Equity Incentive Plan (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 25, 2018)</u>
10.3†	<u>Genoclea Biosciences, Inc. 2014 Employee Stock Purchase Plan, as amended (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 25, 2018)</u>
10.4+*	<u>Amended and Restated Loan and Security Agreement between Genoclea Biosciences, Inc. and Hercules Capital, Inc., dated April 24, 2018.</u>
31.1	<u>Certification pursuant to Section 302 of Sarbanes Oxley Act of 2002 by Chief Executive Officer</u>
31.2	<u>Certification pursuant to Section 302 of Sarbanes Oxley Act of 2002 by Principal Financial Officer</u>
32.1	<u>Certification of periodic financial report pursuant to Section 906 of Sarbanes Oxley Act of 2002 by Chief Executive Officer</u>
32.2	<u>Certification of periodic financial report pursuant to Section 906 of Sarbanes Oxley Act of 2002 by Principal Financial Officer</u>
101	The following materials from the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2018, formatted in XBRL (eXtensible Business Reporting Language): (i) Condensed Consolidated Balance Sheets as of June 30, 2018 and December 31, 2017, (ii) Condensed Consolidated Statements of Operations and Comprehensive Income for the three and six months ended June 30, 2018 and 2017, (iii) Condensed Consolidated Statements of Cash Flows for the six months ended June 30, 2018 and 2017 and (iv) Notes to Unaudited Condensed Consolidated Financial Statements

* Filed herewith.

† Indicates a compensatory plan.

+ Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment and this exhibit has been submitted separately to the Securities and Exchange Commission.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Genocea Biosciences, Inc.

Date: August 3, 2018

By: /s/ WILLIAM D. CLARK

William D. Clark

President and Chief Executive Officer and Director (Principal Executive Officer)

Date: August 3, 2018

By: /s/ MICHAEL ALFIERI

Michael Alfieri

Vice President, Finance and Principal Financial Officer

THIS EXHIBIT HAS BEEN REDACTED AND IS THE SUBJECT OF A CONFIDENTIAL TREATMENT REQUEST. REDACTED MATERIAL IS MARKED WITH [* * *] AND HAS BEEN FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION.

AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT

THIS AMENDED AND RESTATED LOAN AND SECURITY AGREEMENT is made and dated as of April 24, 2018 and is entered into by and between GENOCEA BIOSCIENCES, INC., a Delaware corporation (“Borrower”), the several banks and other financial institutions or entities from time to time parties to this Agreement (collectively, referred to as “Lender”) and HERCULES CAPITAL, INC., a Maryland corporation, in its capacity as administrative agent and collateral agent for itself and the Lender (in such capacity, the “Agent”).

RECITALS

A. Borrower and the Lenders party thereto entered into that certain Loan and Security Agreement, dated as of November 20, 2014, as amended by that certain First Amendment to Loan and Security Agreement dated as of December 17, 2015, and as further amended by that certain Second Amendment to Loan and Security Agreement dated as of January 22, 2018, and as may be further amended, restated, supplemented, or otherwise modified from time to time prior to the effectiveness hereof (the “Original Loan and Security Agreement”);

B. The parties to the Original Loan and Security Agreement have agreed to amend and restate the Original Loan and Security Agreement as set forth in this Agreement, without constituting a novation;

C. Borrower has requested Lender to make available to Borrower a term loan (“Term Loan Advance”) in an aggregate principal amount of up to Fourteen Million Dollars (\$14,000,000) (the “Maximum Term Loan Amount”); and

D. Lender is willing to make the Term Loan Advance on the terms and conditions set forth in this Agreement.

AGREEMENT

NOW, THEREFORE, Borrower, Agent and Lender agree as follows:

SECTION 1. DEFINITIONS AND RULES OF CONSTRUCTION

1.1 Unless otherwise defined herein, the following capitalized terms shall have the following meanings:

“Account Control Agreement(s)” means any agreement entered into by and among Agent, Borrower and a third party Bank or other institution (including a Securities Intermediary) in which Borrower maintains a Deposit Account or an account holding Investment Property, in each case, not constituting any (i) accounts securing Borrower’s reimbursement obligations under letters of credit permitted hereunder, (ii) accounts used solely to fund payroll or employee benefits or (iii) withholding tax, benefits, trust, escrow or fiduciary accounts, which grants to Agent a perfected first priority security interest in the subject account or accounts.

“ACH Authorization” means the ACH Debit Authorization Agreement in substantially the form of Exhibit H.

“ACH Failure” means the failure of the Automated Clearing House (ACH) system to effect a transfer of the funds due to an administrative error in connection with the institution and execution of the ACH Authorization.

“Advance(s)” means the Term Loan Advance.

“Advance Date” means the funding date of any Advance.

“Advance Request” means a request for an Advance submitted by Borrower to Agent in substantially the form of Exhibit A.

“Affiliate” means (a) any Person that directly or indirectly controls, is controlled by, or is under common control with the Person in question, (b) any Person directly or indirectly owning, controlling or holding with power to vote ten percent (10%) or more of the outstanding voting securities of another Person, (c) any Person ten percent (10%) or more of whose outstanding voting securities are directly or indirectly owned, controlled or held by another Person with power to vote such securities, or (d) any Person related by blood or marriage to any Person described in subsection (a), (b) or (c) of this paragraph. As used in the definition of “Affiliate,” the term “control” means the possession, directly or indirectly, of the power to direct or cause the direction of the

management and policies of a Person, whether through ownership of voting securities, by contract or otherwise.

“Agent” has the meaning given to it in the preamble to this Agreement.

“Agreement” means this Loan and Security Agreement, as amended from time to time.

“Amortization Date” means June 1, 2019; provided, however, that if Performance Milestone I occurs prior to May 31, 2019, at the request of Borrower, the Amortization Date shall mean December 1, 2019; provided however, that if Performance Milestone II occurs prior to November 30, 2019, at the request of Borrower, the Amortization Date shall mean June 1, 2020.

“Anti-Corruption Laws” shall mean all laws, rules, and regulations of any jurisdiction applicable to Borrower or any of its Affiliates from time to time concerning or relating to bribery or corruption, including without limitation the United States Foreign Corrupt Practices Act of 1977, as amended, the UK Bribery Act 2010 and other similar legislation in any other jurisdictions.

“Anti Terrorism Laws” means any laws, rules, regulations or orders relating to terrorism or money laundering, including without limitation Executive Order No. 13224 (effective September 24, 2001), the USA PATRIOT Act, the laws comprising or implementing the Bank Secrecy Act, and the laws administered by OFAC.

“Assignee” has the meaning given to it in Section 11.13.

“Blocked Person” means any Person: (a) listed in the annex to, or is otherwise subject to the provisions of, Executive Order No. 13224, (b) a Person owned or controlled by, or acting for or on behalf of, any Person that is listed in the annex to, or is otherwise subject to the provisions of, Executive Order No. 13224, (c) a Person with which any Lender is prohibited from dealing or otherwise engaging in any transaction by any Anti Terrorism Law, (d) a Person that commits, threatens or conspires to commit or supports “terrorism” as defined in Executive Order No. 13224, or (e) a Person that is named a “specially designated national” or “blocked person” on the most current list published by OFAC or other similar list.

“Board” means Borrower’s board of directors.

“Borrower Products” means all products, software, service offerings, technical data or technology currently being designed, manufactured or sold by Borrower or which Borrower intends to sell, license, or distribute in the future including any products or service offerings under development, collectively, together with all products, software, service offerings, technical data or technology that have been sold, licensed or distributed by Borrower since its incorporation.

“Business Day” means any day other than Saturday, Sunday and any other day on which banking institutions in the State of California are closed for business.

“Cash” means all cash and liquid funds.

“Cash Equivalents” means: (a) marketable direct obligations issued or unconditionally guaranteed by the United States of America or any agency or any State thereof maturing within two years from the date of acquisition thereof, (b) commercial paper maturing no more than two years from the date of creation thereof and currently having a rating of at least A-2 or P-2 from either Standard & Poor’s Corporation or Moody’s Investors Service, (c) certificates of deposit issued by any bank with an IDC Rating of greater than 150 maturing no more than two years from the date of investment therein and (d) money market accounts. For the avoidance of doubt, this definition is only applicable for the calculation of the Liquidity Requirement.

“Change in Control” means any (i) reorganization, recapitalization, consolidation or merger (or similar transaction or series of related transactions) of Borrower or any Subsidiary, sale or exchange of outstanding shares (or similar transaction or series of related transactions) of Borrower or any Subsidiary in which the holders of Borrower or Subsidiary’s outstanding shares immediately before consummation of such transaction or series of related transactions do not, immediately after consummation of such transaction or series of related transactions, retain shares representing more than fifty percent (50%) of the voting power of the surviving entity of such transaction or series of related transactions (or the parent of such surviving entity if such surviving entity is wholly owned by such parent), in each case without regard to whether Borrower or Subsidiary is the surviving entity, or (ii) sale or issuance by Borrower of equity securities to one or more purchasers, in a single transaction or series of related transactions not registered under the Securities Act, which securities represent, as of immediately following the closing (or, if there be more than one, any closing) thereof, fifty percent (50%) or more of the then-outstanding total combined voting power of Borrower, other than an issuance of equity securities in a bona fide equity financing or an issuance to the Borrower’s existing shareholders.

“Claims” has the meaning given to it in Section 11.10.

“Closing Date” means the date of this Agreement.

“Code” shall mean the Internal Revenue Code of 1986, as amended from time to time.

“Collateral” means the property described in Section 3.

“Common Stock” means the common stock, \$0.001 par value per share, of Borrower.

“Confidential Information” has the meaning given to it in Section 11.12.

“Contingent Obligation” means, as applied to any Person, any direct or indirect liability, contingent or otherwise, of that Person with respect to (i) any Indebtedness, lease, dividend, letter of credit or other obligation of another, including any such obligation directly or indirectly guaranteed, endorsed, co-made or discounted or sold with recourse by that Person, or in respect of which that Person is otherwise directly or indirectly liable; (ii) any obligations with respect to undrawn letters of credit, corporate credit cards or merchant services issued for the account of that Person; and (iii) all obligations arising under any interest rate, currency or commodity swap agreement, interest rate cap agreement, interest rate collar agreement, or other agreement or arrangement designated to protect a Person against fluctuation in interest rates, currency exchange rates or commodity prices; provided, however, that the term “Contingent Obligation” shall not include endorsements for collection or deposit in the ordinary course of business. The amount of any Contingent Obligation shall be deemed to be an amount equal to the stated or determined amount of the primary obligation in respect of which such Contingent Obligation is made or, if not stated or determinable, the maximum reasonably anticipated liability in respect thereof as determined by such Person in good faith; provided, however, that such amount shall not in any event exceed the maximum amount of the obligations under the guarantee or other support arrangement.

“Copyright License” means any written agreement granting any right to use any Copyright or Copyright registration, now owned or hereafter acquired by Borrower or in which Borrower now holds or hereafter acquires any interest.

“Copyrights” means all copyrights, whether registered or unregistered, held pursuant to the laws of the United States, any State thereof, or of any other country.

“Default Rate” is defined in Section 2.3.

“Deposit Accounts” means any “deposit accounts,” as such term is defined in the UCC, and includes any checking account, savings account, or certificate of deposit.

“Domestic Subsidiary” means a Subsidiary of that is a “United States person” within the meaning of Section 7701(a) (30) of the Code.

“Eligible Cash” means all unrestricted and unencumbered cash and Cash Equivalents; provided that Eligible Cash shall not include any cash or Cash Equivalents in (i) accounts or any amounts securing Borrower’s reimbursement obligations under letters of credit permitted hereunder, (ii) accounts used to fund payroll or employee benefits or (iii) withholding tax, benefits, trust, escrow, fiduciary, or similar accounts.

“End of Term Charge” is defined in Section 2.5.

“Equity Rights Letter Agreement” means the Equity Rights Letter Agreement dated as of November 20, 2014 by and between Agent and Borrower, as amended by that certain Amendment to Equity Rights Letter Agreement dated as of even date hereof by and between Agent and Borrower.

“ERISA” means the Employee Retirement Income Security Act of 1974, as amended, and the regulations promulgated thereunder.

“Event of Default” has the meaning given to it in Section 9.

“Facility Charge” means one-half of one percent (0.50%) of the Maximum Term Loan Amount, which is Seventy-Thousand Dollars (\$70,000).

“Financial Statements” has the meaning given to it in Section 7.1.

“Foreign Subsidiary” means any Subsidiary other than a Subsidiary organized under the laws of any state within the United States.

“GAAP” means generally accepted accounting principles in the United States of America, as in effect from time to time, consistently applied, except that for purposes of the classification of operating leases (other than with respect to Section 7.1), GAAP shall be determined on the basis of such principles in effect on the Closing Date. For purposes of Section 7.1, GAAP shall be determined on the basis of such principles in effect and consistent with those used in the preparation of the most recent audited or

unaudited financial statements filed with the Securities and Exchange Commission in a Form 10-K or Form 10-Q (with such changes as are permitted to be made to GAAP pursuant to Section 7.1).

“IDC Rating” means: IDC Financial Publishing, Inc.’s rankings of financial ratios to determine the safety ratings of banks, bank holding companies savings institutions and credit unions.

“Indebtedness” means indebtedness of any kind, including (a) all indebtedness for borrowed money or the deferred purchase price of property or services, including reimbursement and other obligations with respect to surety bonds and letters of credit, (b) all obligations evidenced by notes, bonds, debentures or similar instruments, (c) all capital lease obligations, and (d) all Contingent Obligations; provided that Indebtedness shall not include (i) trade credit entered into in the ordinary course of business due within sixty (60) days, (ii) prepaid or deferred revenue arising in the ordinary course of business and (iii) endorsements of checks or drafts arising in the ordinary course of business.

“Insolvency Proceeding” is any proceeding by or against any Person under the United States Bankruptcy Code, or any other bankruptcy or insolvency law, including assignments for the benefit of creditors, compositions, extensions generally with its creditors, or proceedings seeking reorganization, arrangement, or other similar relief.

“Intellectual Property” means all of Borrower’s Copyrights; Trademarks; Patents; Licenses; trade secrets and inventions; mask works; Borrower’s applications therefor and reissues, extensions, or renewals thereof; and Borrower’s goodwill associated with any of the foregoing, together with Borrower’s rights to sue for past, present and future infringement of Intellectual Property and the goodwill associated therewith.

“Investment” means any beneficial ownership (including stock, partnership or limited liability company interests) of or in any Person, or any loan, advance or capital contribution to any Person or the acquisition of all, or substantially all, of the assets of another Person. The amount of any Investment at any time shall be the original principal amount thereof less all dividends, distributions, interest payments, returns of principal or equity or other amount received on the sale or disposition of such Investment on or before such time and shall, if made by the transfer or exchange of assets other than cash, be deemed to have been made in an amount equal to the fair market value of such assets at the time of such Investment.

“Joinder Agreements” means for each Subsidiary, a completed and executed Joinder Agreement in substantially the form attached hereto as Exhibit G.

“Lender” has the meaning given to it in the preamble to this Agreement.

“License” means any Copyright License, Patent License, Trademark License or other license of rights or interests.

“Lien” means any mortgage, deed of trust, pledge, hypothecation, assignment for security, security interest, encumbrance, levy, lien or charge of any kind, whether voluntarily incurred or arising by operation of law or otherwise, against any property, any conditional sale or other title retention agreement, and any lease in the nature of a security interest; provided that in no event shall an operating lease entered into in the ordinary course of business or any precautionary UCC filings made pursuant thereto by an applicable lessor or lessee, be deemed to be a Lien.

“Liquidity Requirement” shall have the meaning assigned to such term in Section 7.16.

“Loan” means the Advances made under this Agreement.

“Loan Documents” means this Agreement, the Notes (if any), the ACH Authorization, the Account Control Agreements, the Joinder Agreements, all UCC Financing Statements, the Warrant, the Equity Rights Letter Agreement, any subordination agreement, and any other documents executed in connection with the Secured Obligations or the transactions contemplated hereby, as the same may from time to time be amended, modified, supplemented or restated.

“Material Adverse Effect” means a material adverse effect upon: (i) the business, operations, properties, assets or condition (financial or otherwise) of Borrower; or (ii) the ability of Borrower to perform the Secured Obligations in accordance with the terms of the Loan Documents, or the ability of Agent or Lender to enforce any of its rights or remedies with respect to the Secured Obligations; or (iii) the Collateral or Agent’s Liens on the Collateral or the priority of such Liens.

“Maximum Term Loan Amount” shall have the meaning assigned to such term in the preamble to this Agreement.

“Maximum Rate” shall have the meaning assigned to such term in Section 2.2.

“Note(s)” means a promissory note or promissory notes to evidence Lender’s Loans.

“OFAC” is the U.S. Department of Treasury Office of Foreign Assets Control.

“OFAC Lists” are, collectively, the Specially Designated Nationals and Blocked Persons List maintained by OFAC pursuant to Executive Order No. 13224, 66 Fed. Reg. 49079 (Sept. 25, 2001) and/or any other list of terrorists or other restricted Persons maintained pursuant to any of the rules and regulations of OFAC or pursuant to any other applicable Executive Orders.

“Original End of Term Charge” is defined in Section 2.6.

“Original Term Loan Advances” is defined in Section 2.1(a).

“Patent License” means any written agreement granting any right with respect to any invention on which a Patent is in existence or a Patent application is pending, in which agreement Borrower now holds or hereafter acquires any interest.

“Patents” means all letters patent of, or rights corresponding thereto, in the United States or in any other country, all registrations and recordings thereof, and all applications for letters patent of, or rights corresponding thereto, in the United States or any other country.

“Performance Milestone I” means confirmation by Agent, in Agent’s reasonable discretion, after the Closing Date, but on or prior to May 31, 2019 that (a) Borrower has delivered evidence satisfactory to Agent in Agent’s reasonable discretion that [* * *]; (b) at least one of the following milestones have been achieved: [* * *] and (c) no Event of Default has occurred or is continuing.

“Performance Milestone II” means confirmation by Agent, in Agent’s reasonable discretion, that after the Closing Date, but on or prior to November 30, 2019 (a) Performance Milestone I has occurred and (b) [* * *].

“Permitted Indebtedness” means: (i) Indebtedness of Borrower in favor of Lender or Agent arising under this Agreement or any other Loan Document; (ii) Indebtedness existing on the Closing Date which is disclosed in Schedule 1A; (iii) Indebtedness of up to \$150,000 outstanding at any time secured by a Lien described in clause (vii) of the defined term “Permitted Liens,” provided such Indebtedness does not exceed the lesser of the cost or fair market value of the Equipment financed with such Indebtedness; (iv) Indebtedness to trade creditors incurred in the ordinary course of business, including Indebtedness incurred in the ordinary course of business with corporate credit cards; (v) Indebtedness that also constitutes a Permitted Investment; (vi) Subordinated Indebtedness; (vii) reimbursement obligations in connection with letters of credit that are secured by cash or cash equivalents and issued on behalf of Borrower or a Subsidiary thereof in an amount not to exceed \$475,000 at any time outstanding, (viii) other Indebtedness in an amount not to exceed \$150,000 at any time outstanding, and (ix) extensions, refinancings, renewals, modifications, amendments or restatements of any items of Permitted Indebtedness, provided that the principal amount is not increased or the terms modified do not impose materially more burdensome terms upon Borrower or its Subsidiary, as the case may be.

“Permitted Investment” means: (i) Investments existing on the Closing Date which are disclosed in Schedule 1B; (ii) (a) marketable direct obligations issued or unconditionally guaranteed by the United States of America or any agency or any State thereof maturing within one year from the date of acquisition thereof, (b) commercial paper maturing no more than one year from the date of creation thereof and currently having a rating of at least A-2 or P-2 from either Standard & Poor’s Corporation or Moody’s Investors Service, (c) certificates of deposit issued by any bank with assets of at least \$500,000,000 maturing no more than one year from the date of investment therein, and (d) money market accounts; (iii) repurchases of stock from former employees, directors, or consultants of Borrower under the terms of applicable repurchase agreements at the original issuance price of such securities in an aggregate amount not to exceed \$250,000 in any fiscal year, provided that no Event of Default has occurred, is continuing or would exist after giving effect to the repurchases; (iv) Investments accepted in connection with Permitted Transfers; (v) Investments (including debt obligations) received in connection with the bankruptcy or reorganization of customers or suppliers and in settlement of delinquent obligations of, and other disputes with, customers or suppliers arising in the ordinary course of Borrower’s business; (vi) Investments consisting of notes receivable of, or prepaid royalties and other credit extensions, to customers and suppliers who are not Affiliates, in the ordinary course of business, provided that this subparagraph (vi) shall not apply to Investments of Borrower in any Subsidiary; (vii) Investments consisting of loans not involving the net transfer on a substantially contemporaneous basis of cash proceeds to employees, officers or directors relating to the purchase of capital stock of Borrower pursuant to employee stock purchase plans or other similar agreements approved by Borrower’s Board; (viii) Investments consisting of travel advances in the ordinary course of business; (ix) Investments in newly-formed Domestic Subsidiaries, provided that each such Domestic Subsidiary enters into a Joinder Agreement promptly after its formation by Borrower and execute such other documents as shall be reasonably requested by Agent; (x) Investments in Foreign Subsidiaries approved in advance in writing by Agent; (xi) Investments in joint ventures in which (a) Borrower has the power to direct or cause the direction of the management and policies of such joint venture, whether through ownership of voting securities or by contract or otherwise and (b) the aggregate cash Investments by Borrower and/or its Subsidiaries with respect to, and in connection with, any such joint venture, at any time outstanding does not exceed \$1,000,000 and not to exceed \$3,000,000 in the aggregate for all joint ventures; (xii) Investments consisting of Permitted Indebtedness; (xiii) additional Investments that do not exceed \$250,000 in the aggregate; (xiv) any Investments permitted by Borrower’s investment policy attached hereto as Exhibit I, as amended from time to time, provided that any such amendment thereto has been approved in writing by Lender; and (xv) Investments in

Securities Corporation, provided that Borrower is, at all times, in compliance with the Liquidity Requirement.

“Permitted Liens” means any and all of the following: (i) Liens in favor of Agent or Lender; (ii) Liens existing on the Closing Date which are disclosed in Schedule 1C; (iii) Liens for taxes, fees, assessments or other governmental charges or levies, either not delinquent or being contested in good faith by appropriate proceedings; provided, that Borrower maintains adequate reserves therefor in accordance with GAAP; (iv) Liens securing claims or demands of materialmen, artisans, mechanics, carriers, warehousemen, landlords and other like Persons arising in the ordinary course of Borrower’s business and imposed without action of such parties; provided, that the payment thereof is not yet required; (v) Liens arising from judgments, decrees or attachments in circumstances which do not constitute an Event of Default hereunder; (vi) the following deposits, to the extent made in the ordinary course of business: deposits under worker’s compensation, unemployment insurance, social security and other similar laws, or to secure the performance of bids, tenders or contracts (other than for the repayment of borrowed money) or to secure indemnity, performance or other similar bonds for the performance of bids, tenders or contracts (other than for the repayment of borrowed money) or to secure statutory obligations (other than Liens arising under ERISA or environmental Liens) or surety or appeal bonds, or to secure indemnity, performance or other similar bonds; (vii) Liens on Equipment or software or other intellectual property constituting purchase money Liens and Liens in connection with capital leases securing Indebtedness permitted in clause (iii) of “Permitted Indebtedness”; (viii) Liens incurred in connection with Subordinated Indebtedness, provided such Liens only encumber assets and property of Borrower that are subject to a first priority perfected security interest in favor of Agent (ix) leasehold interests in leases or subleases and licenses granted in the ordinary course of business and not interfering in any material respect with the business of the licensor; (x) Liens in favor of customs and revenue authorities arising as a matter of law to secure payment of custom duties that are promptly paid on or before the date they become due; (xi) Liens on insurance proceeds securing the payment of financed insurance premiums that are promptly paid on or before the date they become due (provided that such Liens extend only to such insurance proceeds and not to any other property or assets); (xii) statutory and common law rights of set-off and other similar rights as to deposits of cash and securities in favor of banks, other depository institutions and brokerage firms; (xiii) easements, zoning restrictions, rights-of-way and similar encumbrances on real property imposed by law or arising in the ordinary course of business so long as they do not materially impair the value or marketability of the related property; (xiv) Liens on cash or cash equivalents securing obligations permitted under clause (vii) of the definition of Permitted Indebtedness; and (xv) Liens incurred in connection with the extension, renewal or refinancing of the Indebtedness secured by Liens of the type described in clauses (i) through (xi) above; provided, that any extension, renewal or replacement Lien shall be limited to the property encumbered by the existing Lien and the principal amount of the Indebtedness being extended, renewed, refinanced, modified, amended or restated (as may have been reduced by any payment thereon) does not increase.

“Permitted Transfers” means (i) sales of Inventory in the ordinary course of business, (ii) licenses and similar arrangements for the use of Intellectual Property in the ordinary course of business and licenses that could not result in a legal transfer of title of the licensed property but that may be exclusive in the ordinary course of business, (iii) dispositions of worn-out, obsolete or surplus Equipment at fair market value in the ordinary course of business, (iv) the use or transfer of money or cash equivalents in a manner that is not prohibited by the terms of this Agreement or the other Loan Documents and in the ordinary course of business, (v) consisting of Permitted Liens, (vi) other Transfers of assets having a fair market value of not more than \$250,000 in the aggregate in any fiscal year, and (vii) any transfers from time to time between Borrower and Securities Corporation, provided that Borrower, is at all times, in compliance with the Liquidity Requirement.

“Person” means any individual, sole proprietorship, partnership, joint venture, trust, unincorporated organization, association, corporation, limited liability company, institution, other entity or government.

“Prepayment Charge” shall have the meaning assigned to such term in Section 2.4.

“Prime Rate” means the “prime rate” as reported in The Wall Street Journal, and if not reported, then the prime rate most recently reported in The Wall Street Journal.

“Receivables” means (i) all of Borrower’s Accounts, Instruments, Documents, Chattel Paper, Supporting Obligations, letters of credit, proceeds of any letter of credit, and Letter of Credit Rights, and (ii) all customer lists, software, and business records related thereto.

“Required Lenders” means at any time, the holders of more than 50% of the aggregate unpaid principal amount of the Term Loan Advance then outstanding.

“Sanctioned Country” shall mean, at any time, a country or territory which is the subject or target of any Sanctions.

“Sanctioned Person” shall mean, at any time, (a) any Person listed in any Sanctions-related list of designated Persons maintained by the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State, or by the United Nations Security Council, the European Union or any EU member state, (b) any Person operating, organized or resident in a Sanctioned Country or (c) any Person controlled by any such Person.

“Sanctions” shall mean economic or financial sanctions or trade embargoes imposed, administered or enforced from time to time by (a) the U.S. government, including those administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State, or (b) the United Nations Security Council, the European Union or Her Majesty’s Treasury of the United Kingdom.

“Securities Corporation” means Genocsea Securities Corp., a Massachusetts securities corporation.

“Secured Obligations” means Borrower’s obligations under this Agreement and any Loan Document (other than the Warrant), including any obligation to pay any amount now owing or later arising.

“Securities Act” means the Securities Act of 1933, as amended.

“Subordinated Indebtedness” means Indebtedness subordinated to the Secured Obligations in amounts and on terms and conditions satisfactory to Agent in its sole reasonable discretion.

“Subsequent Financing” means the closing of any Borrower financing which becomes effective after the Closing Date and results in aggregate proceeds to Borrower of at least \$10,000,000.

“Subsidiary” means an entity, whether corporate, partnership, limited liability company, joint venture or otherwise, in which Borrower owns or controls 50% or more of the outstanding voting securities, including each entity listed on Schedule 1 hereto.

“Term Commitment” means as to any Lender, the obligation of such Lender, if any, to make the Term Loan Advance to Borrower in a principal amount not to exceed the amount set forth under the heading “Term Commitment” opposite such Lender’s name on Schedule 1.1.

“Term Loan Advance” is defined in Recital C hereof.

“Term Loan Interest Rate” means for any day, a floating per annum rate equal to the greater of either (i) seven and three quarters of one percent (7.75%), or (ii) the sum of (A) seven and three quarters of one percent (7.75%), plus (B) the Prime Rate minus (C) five percent (5.0%). The Term Loan Interest Rate will change from time to time on the day the Prime Rate changes.

“Term Loan Maturity Date” means May 1, 2021.

“Trademark License” means any written agreement granting any right to use any Trademark or Trademark registration, now owned or hereafter acquired by Borrower or in which Borrower now holds or hereafter acquires any interest.

“Trademarks” means all trademarks (registered, common law or otherwise) and any applications in connection therewith, including registrations, recordings and applications in the United States Patent and Trademark Office or in any similar office or agency of the United States, any State thereof or any other country or any political subdivision thereof.

“UCC” means the Uniform Commercial Code as the same is, from time to time, in effect in the State of California; provided, that in the event that, by reason of mandatory provisions of law, any or all of the attachment, perfection or priority of, or remedies with respect to, Agent’s Lien on any Collateral is governed by the Uniform Commercial Code as the same is, from time to time, in effect in a jurisdiction other than the State of California, then the term “UCC” shall mean the Uniform Commercial Code as in effect, from time to time, in such other jurisdiction solely for purposes of the provisions thereof relating to such attachment, perfection, priority or remedies and for purposes of definitions related to such provisions.

“Warrant” means, collectively, (a) the Warrant Agreement dated as of November 20, 2014, by and between Agent and Borrower and (b) the Warrant Agreement dated as of even date herewith by and between Agent and Borrower, in each case, as may be amended, restated or modified from time to time.

Unless otherwise specified, all references in this Agreement or any Annex or Schedule hereto to a “Section,” “subsection,” “Exhibit,” “Annex,” or “Schedule” shall refer to the corresponding Section, subsection, Exhibit, Annex, or Schedule in or to this Agreement. Unless otherwise specifically provided herein, any accounting term used in this Agreement or the other Loan Documents shall have the meaning customarily given such term in accordance with GAAP, and all financial computations hereunder shall be computed in accordance with GAAP, consistently applied. Unless otherwise defined herein or in the other Loan Documents, terms that are used herein or in the other Loan Documents and defined in the UCC shall have the meanings given to them in the UCC.

SECTION 2. THE LOAN

2.1 Term Loan.

(a) Advance. Pursuant to the Original Loan and Security Agreement, the Lenders party thereto extended the “Term A Loan Advance” and the “Term B Loan Advance” (each as defined in the Original Loan and Security Agreement) to Borrower in the original aggregate principal amount of Seventeen Million Dollars (\$17,000,000) (the “Original Term Loan Advances”). Borrower acknowledges and agrees that, as of the Closing Date, Thirteen Million Three Hundred Sixteen Thousand One Hundred Four and 36/100 Dollars (\$13,316,104.36) of the principal amount of the Original Term Loan Advances remains outstanding and such entire outstanding principal balance shall for all purposes hereunder be deemed to constitute and be referred to, and hereby is converted into, the Term Loan Advance hereunder, without constituting a novation. Such conversion of the Original Term Loan Advances into the Term Loan Advance hereunder shall be deemed an Advance on the Closing Date for purposes of this Agreement. The aggregate outstanding Advances shall not exceed the Maximum Term Loan Amount. Subject to the terms and conditions of this Agreement, Lender will severally (and not jointly) make, in an amount not to exceed its respective Term Commitment, and Borrower agrees to draw, the Term Loan Advance on the Closing Date.

(b) Advance Request. To obtain the Term Loan Advance, Borrower shall complete, sign and deliver an Advance Request to Agent (at least one (1) Business Day before the Closing Date). Lender shall fund the Term Loan Advance in the manner requested by the Advance Request provided that each of the conditions precedent to the Term Loan Advance are satisfied as of the requested Closing Date.

(c) Interest. The principal balance of the Term Loan Advance shall bear interest thereon from the Advance Date at the Term Loan Interest Rate based on a year consisting of 360 days, with interest computed daily based on the actual number of days elapsed. The Term Loan Interest Rate will float and change on the day the Prime Rate changes from time to time.

(d) Payment. Borrower will pay interest on the Term Loan Advance on the first (1st) Business Day of each month, beginning the month after the Advance Date. Borrower shall repay the aggregate principal balance of the Term Loan Advance that is outstanding on the day immediately preceding the Amortization Date in equal monthly installments of principal and interest (mortgage style) beginning on the Amortization Date and continuing on the first (1st) Business Day of each month thereafter, until the Secured Obligations (other than inchoate indemnity obligations) are repaid. The entire principal balance of the Term Loan Advance and all accrued but unpaid interest hereunder, and all other Secured Obligations with respect to the Term Loan Advance, shall be due and payable on Term Loan Maturity Date. Borrower shall make all payments under this Agreement without setoff, recoupment or deduction and regardless of any counterclaim or defense. Lender will initiate debit entries to Borrower’s account as authorized on the ACH Authorization (i) on each payment date of all periodic obligations payable to Lender under the Term Advance and (ii) reasonable and invoiced out-of-pocket legal fees and costs incurred by Agent or Lender in connection with Section 11.11 of this Agreement; provided, with respect to clause (i) above, in the event that Lender or Agent informs Borrower that Lender will not initiate a debit entry to Borrower’s account for a certain amount of the periodic obligations due on a specific payment date, Borrower shall pay to Lender such amount of periodic obligations in full in immediately available funds on such payment date; provided, further, that, with respect to clause (i) above, if Lender or Agent informs Borrower that Lender will not initiate a debit entry as described above later than the date that is three (3) Business Days prior to such payment date, Borrower shall pay to Lender such amount of periodic obligations in full in immediately available funds on the date that is three (3) Business Days after the date on which Lender or Agent notifies Borrower of such; provided, further, that, with respect to clause (ii) above, in the event that Lender or Agent informs Borrower that Lender will not initiate a debit entry to Borrower’s account for certain amount of such out-of-pocket legal fees and costs incurred by Agent or Lender, Borrower shall pay to Lender such amount in full in immediately available funds within three (3) Business Days. Once repaid, the Term Loan Advance or any portion thereof may not be reborrowed.

2.2 Maximum Interest. Notwithstanding any provision in this Agreement or any other Loan Document, it is the parties’ intent not to contract for, charge or receive interest at a rate that is greater than the maximum rate permissible by law that a court of competent jurisdiction shall deem applicable hereto (which under the laws of the State of California shall be deemed to be the laws relating to permissible rates of interest on commercial loans) (the “Maximum Rate”). If a court of competent jurisdiction shall finally determine that Borrower has actually paid to Lender an amount of interest in excess of the amount that would have been payable if all of the Secured Obligations had at all times borne interest at the Maximum Rate, then such excess interest actually paid by Borrower shall be applied as follows: first, to the payment of the Secured Obligations consisting of the outstanding principal amount of the Term Loan Advance; second, after all principal is repaid, to the payment of Lender’s accrued interest, costs, expenses, professional fees and any other Secured Obligations; and third, after all Secured Obligations are repaid, the excess (if any) shall be refunded to Borrower.

2.3 Default Interest. In the event any payment is not paid on the scheduled payment date (or within three (3) Business Days of the scheduled payment date, provided that such late payment is due to an ACH Failure), an amount equal to five percent (5%) of the past due amount shall be payable on demand, provided that no such amount shall be payable if such nonpayment is due to Lender’s failure to initiate debt entries pursuant to the ACH Authorization. In addition, upon the occurrence and during the continuation of an Event of Default hereunder, all Secured Obligations, including principal, interest, compounded interest, and professional fees, shall bear interest at a rate per annum equal to the rate set forth in Section 2.1(c), plus five percent (5%) per

annum (the "Default Rate"). In the event any interest is not paid when due hereunder, delinquent interest shall be added to principal and shall bear interest on interest, compounded at the rate set forth in Section 2.1(c) or Section 2.3, as applicable.

2.4 Prepayment. At its option upon at least seven (7) Business Days prior notice to the Agent, Borrower may at any time prepay all or a portion of the outstanding Advance by paying the entire principal balance (or such portion thereof), all accrued and unpaid interest thereon, together with a prepayment charge equal to the following percentage of the Advance amount being prepaid: if the Advance amount is prepaid in any of the first twelve (12) months following the Closing Date, three percent (3.0%); after twelve (12) months following the Closing Date but on or prior to twenty four (24) months following the Closing Date, two percent (2.0%); and thereafter, one percent (1.0%) (each, a "Prepayment Charge"). Borrower agrees that the Prepayment Charge is a reasonable calculation of Lender's lost profits in view of the difficulties and impracticality of determining actual damages resulting from an early repayment of the Advance. Borrower shall prepay the outstanding amount of all principal and accrued interest through the prepayment date and the Prepayment Charge upon the occurrence of a Change in Control. Notwithstanding the foregoing, Agent and Lender agree to waive the Prepayment Charge if Agent and Lender (in its sole and absolute discretion) agree in writing to refinance the Advance prior to the Term Loan Maturity Date. For the avoidance of doubt, Lender and Agent hereby agree that the Term Loan Advance hereunder does not constitute prepayment of the Original Term Loan Advances.

2.5 End of Term Charge. On the earliest to occur of (i) the Term Loan Maturity Date, (ii) the date that Borrower prepays the outstanding Secured Obligations, or (iii) the date that the Secured Obligations (other than any inchoate indemnity obligations) become due and payable, Borrower shall pay Lender a charge equal to six and seven-tenths of one percent (6.70%) of the aggregate original principal amount of the Term Loan Advance extended by Lender, which is Nine Hundred Thirty-Eight Thousand Dollars (\$938,000) (the "End of Term Charge"). Notwithstanding the required payment date of such charge, it shall be deemed earned by Lender as of the Closing Date.

2.6 Original Loan and Security Agreement End of Term Charge. On the earliest to occur of (i) January 1, 2019, (ii) the date that Borrower prepays the outstanding Secured Obligations, or (iii) the date that the Secured Obligations become due and payable, Borrower shall pay Lender a charge equal to four and ninety-five hundredths of one percent (4.95%) of the Original Term Loan Advances, which is Eight Hundred Forty-One Thousand Five Hundred Dollars (\$841,500) (the "Original End of Term Charge"). Notwithstanding the required payment date of such charge, it shall be deemed earned by Lender as of November 20, 2014.

2.7 Notes. If so requested by Lender by written notice to Borrower, then Borrower shall execute and deliver to Lender (and/or, if applicable and if so specified in such notice, to any Person who is an assignee of Lender pursuant to Section 11.13) (promptly after Borrower's receipt of such notice) a Note or Notes to evidence Lender's Loans.

2.8 Pro Rata Treatment. Each payment (including prepayment) on account of any fee and any reduction of the Term Loans shall be made pro rata according to the Term Commitments of the relevant Lender.

SECTION 3. SECURITY INTEREST

3.1 As security for the prompt, complete and indefeasible payment when due (whether on the payment dates or otherwise) of all the Secured Obligations, Borrower grants to Agent a security interest in all of Borrower's right, title, and interest in and to the following personal property whether now owned or hereafter acquired (collectively, the "Collateral"): (a) Receivables; (b) Equipment; (c) Fixtures; (d) General Intangibles (other than Intellectual Property); (e) Inventory; (f) Investment Property (but excluding thirty-five percent (35%) of the capital stock of any Foreign Subsidiary that constitutes a Permitted Investment); (g) Deposit Accounts; (h) Cash; (i) Goods; and all other tangible and intangible personal property of Borrower (other than Intellectual Property) whether now or hereafter owned or existing, leased, consigned by or to, or acquired by, Borrower and wherever located, and any of Borrower's property in the possession or under the control of Agent; and, to the extent not otherwise included, all Proceeds of each of the foregoing and all accessions to, substitutions and replacements for, and rents, profits and products of each of the foregoing; provided, however, that the Collateral shall include all Accounts and General Intangibles that consist of rights to payment and proceeds from the sale, licensing or disposition of all or any part, or rights in, the Intellectual Property (the "Rights to Payment"). Notwithstanding the foregoing, Borrower is not granting to Agent, and Agent is not receiving from Borrower, any grant of a security interest in (a) any of the outstanding capital stock or other equity interests of any directly owned Foreign Subsidiary of Borrower in excess of sixty-five percent (65%) of the voting power of all classes of such capital stock or other equity interests of such Subsidiary entitled to vote, (b) any particular asset if the pledge thereof or the security interest therein is prohibited or restricted by applicable law, rule or regulation (including any requirement to obtain the consent of any governmental authority, regulatory authority or third party), provided that the foregoing exclusion of this clause (b) shall in no way be construed (1) to apply to the extent that any described prohibition or restriction is unenforceable under Section 9-406, 9-407, 9-408, or 9-409 of the UCC or other applicable law or (2) to apply to the extent that any consent or waiver has been obtained, or is hereafter obtained, that would permit the Agent's security interest or Lien notwithstanding the prohibition

or restriction on the pledge of such asset, or (c) rights held under a license that are not assignable by their terms without the consent of the licensor thereof (but only to the extent such restriction on assignment is enforceable under applicable law).

SECTION 4. CONDITIONS PRECEDENT TO LOAN

The obligation of Lender to make the Term Loan Advance hereunder is subject to the satisfaction by Borrower of the following conditions:

4.1 Initial Advance. On or prior to the Closing Date, Borrower shall have delivered to Agent the following:

- (a) executed originals of the Loan Documents, Account Control Agreements, and any other documents and instruments reasonably required by Agent to effectuate the transactions contemplated hereby or to create and perfect the Liens of Agent with respect to all Collateral, in all cases in form and substance reasonably acceptable to Agent;
- (b) certified copy of resolutions of Borrower's Board evidencing approval of (i) the Loan and other transactions evidenced by the Loan Documents; and (ii) the Warrant and transactions evidenced thereby;
- (c) certified copies of the Certificate of Incorporation and the Bylaws, as amended through the Closing Date, of Borrower;
- (d) a certificate of good standing for Borrower from its state of incorporation and similar certificates from all other jurisdictions in which it does business and where the failure to be qualified would have a Material Adverse Effect;
- (e) payment of the Facility Charge and reimbursement of Agent's and Lender's current expenses reimbursable pursuant to this Agreement, which amounts may be deducted from the initial Advance;
- (f) all certificates of insurance and copies of each insurance policy required hereunder; and
- (g) such other documents as Agent may reasonably request.

4.2 All Advances. On the Advance Date:

- (a) Agent shall have received (i) the Advance Request for the Advance as required by Section 2.1(b), duly executed by Borrower's Chief Executive Officer or Chief Financial Officer, and (ii) any other documents Agent may reasonably request.
- (b) The representations and warranties set forth in Section 5 of this Agreement and in Section 5 of the Warrant shall be true and correct in all material respects on and as of the Advance Date with the same effect as though made on and as of such date, except to the extent such representations and warranties expressly relate to an earlier date, in which case such representations and warranties shall be true and correct in all material respects as of such earlier date.
- (c) Borrower shall be in compliance with all the terms and provisions set forth herein and in each other Loan Document on its part to be observed or performed, and at the time of and immediately after the Advance no Event of Default shall have occurred and be continuing.
- (d) The Advance Request shall be deemed to constitute a representation and warranty by Borrower on the Advance Date as to the matters specified in paragraphs (b) and (c) of this Section 4.2 and as to the matters set forth in the Advance Request.

4.3 No Default. As of the Closing Date and the Advance Date, (i) no fact or condition exists that would (or would, with the passage of time, the giving of notice, or both) constitute an Event of Default and (ii) no event that has had or could reasonably be expected to have a Material Adverse Effect has occurred and is continuing.

SECTION 5. REPRESENTATIONS AND WARRANTIES OF BORROWER

Borrower represents and warrants that:

5.1 Corporate Status. Borrower is a corporation duly organized, legally existing and in good standing under the laws of the State of Delaware, and is duly qualified as a foreign corporation in all jurisdictions in which the nature of its business or location of its properties require such qualifications and where the failure to be qualified could reasonably be expected to have a Material Adverse Effect. Borrower's present name, former names (if any), locations, place of formation, tax identification number, organizational identification number and other information are correctly set forth in Exhibit C, as may be updated by

Borrower in a written notice (including any Compliance Certificate) provided to Agent after the Closing Date.

5.2 Collateral. Borrower owns the Collateral and the Intellectual Property, free of all Liens, except for Permitted Liens. Borrower has the power and authority to grant to Agent a Lien in the Collateral as security for the Secured Obligations .

5.3 Consents. Borrower's execution, delivery and performance of this Agreement and all other Loan Documents, and Borrower's execution of the Warrant, (i) have been duly authorized by all necessary corporate action of Borrower, (ii) will not result in the creation or imposition of any Lien upon the Collateral, other than Permitted Liens and the Liens created by this Agreement and the other Loan Documents, (iii) do not violate any provisions of Borrower's Certificate or Articles of Incorporation (as applicable), bylaws, or any, law, regulation, order, injunction, judgment, decree or writ to which Borrower is subject and (iv) except as described on Schedule 5.3, do not materially violate any material contract or agreement or require the consent or approval of any other Person which has not already been obtained except for consents and approvals the failure of which to obtain could not reasonably be expected to have a material adverse effect on Borrower's business. The individual or individuals executing the Loan Documents and the Warrant are duly authorized to do so.

5.4 Material Adverse Effect. No event that has had or could reasonably be expected to have a Material Adverse Effect has occurred and is continuing.

5.5 Actions Before Governmental Authorities. Except as described on Schedule 5.5, there are no actions, suits or proceedings at law or in equity or by or before any governmental authority now pending or, to the knowledge of Borrower, threatened against or affecting Borrower or its property, which would reasonably be expected to result in liability in excess of \$100,000.

5.6 Laws. Neither Borrower nor any of its Subsidiaries is in violation of any law, rule or regulation, or in default with respect to any judgment, writ, injunction or decree of any governmental authority, where such violation or default is reasonably expected to result in a Material Adverse Effect. Borrower is not in default in any manner under any provision of any material agreement or instrument evidencing Indebtedness in excess of \$100,000, or any other material agreement to which it is a party or by which it is bound, which default could reasonably be expected to have a Material Adverse Effect.

Neither Borrower nor any of its Subsidiaries is an "investment company" or a company "controlled" by an "investment company" under the Investment Company Act of 1940, as amended. Neither Borrower nor any of its Subsidiaries is engaged as one of its important activities in extending credit for margin stock (under Regulations X, T and U of the Federal Reserve Board of Governors). Borrower and each of its Subsidiaries has complied in all material respects with the Federal Fair Labor Standards Act. Neither Borrower nor any of its Subsidiaries is a "holding company" or an "affiliate" of a "holding company" or a "subsidiary company" of a "holding company" as each term is defined and used in the Public Utility Holding Company Act of 2005. Neither Borrower's nor any of its Subsidiaries' properties or assets has been used by Borrower or such Subsidiary or, to Borrower's Knowledge, by previous Persons, in disposing, producing, storing, treating, or transporting any hazardous substance other than in material compliance with applicable laws. Borrower and each of its Subsidiaries has obtained all consents, approvals and authorizations of, made all declarations or filings with, and given all notices to, all Governmental Authorities that are necessary to continue their respective businesses as currently conducted where failure to do so could reasonably be expected to have a Material Adverse Effect.

None of Borrower, any of its Subsidiaries, or any of Borrower's or its Subsidiaries' Affiliates or any of their respective agents acting or benefiting in any capacity in connection with the transactions contemplated by this Agreement is (i) in violation of any Anti Terrorism Law, (ii) engaging in or conspiring to engage in any transaction that evades or avoids, or has the purpose of evading or avoiding or attempts to violate, any of the prohibitions set forth in any Anti Terrorism Law, or (iii) is a Blocked Person. None of Borrower, any of its Subsidiaries, or to the knowledge of Borrower and any of their Affiliates or agents, acting or benefiting in any capacity in connection with the transactions contemplated by this Agreement, (x) conducts any business or engages in making or receiving any contribution of funds, goods or services to or for the benefit of any Blocked Person, or (y) deals in, or otherwise engages in any transaction relating to, any property or interest in property blocked pursuant to Executive Order No. 13224, any similar executive order or other Anti Terrorism Law. None of the funds to be provided under this Agreement will be used, directly or indirectly, (a) for any activities in violation of any applicable anti-money laundering, economic sanctions and anti-bribery laws and regulations laws and regulations or (b) for any payment to any governmental official or employee, political party, official of a political party, candidate for political office, or anyone else acting in an official capacity, in order to obtain, retain or direct business or obtain any improper advantage, in violation of the United States Foreign Corrupt Practices Act of 1977, as amended.

5.7 Information Correct and Current. No information, report, Advance Request, financial statement, exhibit or schedule furnished, by or on behalf of Borrower to Agent in connection with any Loan Document or included therein or delivered pursuant thereto, taken as a whole for the relevant period, contained, contains or will contain any material misstatement of fact or

omitted, omits or will omit to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were, are or will be made, not misleading at the time such statement was made or deemed made (it being recognized by Agent and the Lenders that the projections and forecasts provided by Borrower in good faith and based upon reasonable assumptions are not viewed as facts and that actual results during the period or periods covered by such projections and forecasts may differ from the projected or forecasted results). Additionally, any and all financial or business projections provided by Borrower to Agent, whether prior to or after the Closing Date, shall be (i) provided in good faith and based on the most current data and information available to Borrower, and (ii) the most current of such projections provided to Borrower's Board.

5.8 Tax Matters. Except as described on Schedule 5.8, (a) Borrower has filed all federal, state and local tax returns that it is required to file, (b) Borrower has duly paid or fully reserved for all taxes or installments thereof (including any interest or penalties) as and when due, which have or may become due pursuant to such returns, and (c) Borrower has paid or fully reserved for any tax assessment received by Borrower for the three (3) years preceding the Closing Date, if any (including any taxes being contested in good faith and by appropriate proceedings), in each case ((a)-(c)) except with respect to taxes that do not exceed \$25,000 in the aggregate.

5.9 Intellectual Property Claims. Borrower is the sole owner of, or otherwise has the right to use, the Intellectual Property. Each of the material Copyrights, Trademarks and Patents is valid and enforceable, no material part of the Intellectual Property has been judged invalid or unenforceable, in whole or in part, and no claim has been made to Borrower that any material part of the Intellectual Property violates the rights of any third party which could reasonably be expected to have a material adverse effect on Borrower's business. Exhibit D is a true, correct and complete list of each of Borrower's Patents, registered Trademarks, registered Copyrights, and material agreements under which Borrower licenses Intellectual Property from third parties (other than shrink-wrap software licenses), together with application or registration numbers, as applicable, owned by Borrower or any Subsidiary, in each case as of the Closing Date. Borrower is not in material breach of, nor has Borrower failed to perform any material obligations under, any of the foregoing contracts, licenses or agreements and, to Borrower's knowledge, no third party to any such contract, license or agreement is in material breach thereof or has failed to perform any material obligations thereunder which material breach could reasonably be expected to have a material adverse effect on Borrower's business.

5.10 Intellectual Property. Except as described on Schedule 5.10, Borrower has, or in the case of any proposed business, will have, all material rights with respect to Intellectual Property necessary in the operation or conduct of Borrower's business as currently conducted and proposed to be conducted by Borrower. Without limiting the generality of the foregoing, and in the case of Licenses, except for restrictions that are unenforceable under Division 9 of the UCC, Borrower has the right, to the extent required to operate Borrower's business, to freely transfer, license or assign Intellectual Property owned by Borrower without condition, restriction or payment of any kind (other than license payments in the ordinary course of business) to any third party, and Borrower owns or has the right to use, pursuant to valid licenses, all software development tools, library functions, compilers and all other third-party software and other items that are used in the design, development, promotion, sale, license, manufacture, import, export, use or distribution of Borrower Products, except customary covenants in inbound license agreements, equipment leases and real property leases where Borrower is the licensee or lessee.

5.11 Borrower Products. No Intellectual Property owned by Borrower or Borrower Product has been or is subject to any actual or, to the knowledge of Borrower, threatened litigation, proceeding (including any proceeding in the United States Patent and Trademark Office or any corresponding foreign office or agency) or outstanding decree, order, judgment, settlement agreement or stipulation that restricts in any manner Borrower's use, transfer or licensing thereof or that may affect the validity, use or enforceability thereof, in each case, which could reasonably be expected to have a material adverse effect on Borrower's business. There is no decree, order, judgment, agreement, stipulation, arbitral award or other provision entered into in connection with any litigation or proceeding that obligates Borrower to grant licenses or ownership interest in any future Intellectual Property related to the operation or conduct of the business of Borrower or Borrower Products. Except as set forth on the Compliance Certificate, Borrower has not received any written notice or claim, or, to the knowledge of Borrower, oral notice or claim, challenging or questioning Borrower's ownership in any Intellectual Property material to Borrower's business (or written notice of any claim challenging or questioning the ownership in any licensed Intellectual Property material to Borrower's business of the owner thereof) or suggesting that any third party has any claim of legal or beneficial ownership with respect thereto nor, to Borrower's knowledge, in each case, is there a reasonable basis for any such claim. Neither Borrower's use of its Intellectual Property material to Borrower's business nor the production and sale of Borrower Products infringes the Intellectual Property or other rights of others.

5.12 Financial Accounts. Exhibit E, as may be updated by Borrower in a written notice provided to Agent after the Closing Date, is a true, correct and complete list of (a) all banks and other financial institutions at which Borrower or any Subsidiary maintains Deposit Accounts and (b) all institutions at which Borrower or any Subsidiary maintains an account holding Investment Property, and such exhibit correctly identifies the name, address and telephone number of each bank or other

institution, the name in which the account is held, a description of the purpose of the account, and the complete account number therefor.

5.13 Employee Loans. Except as permitted by Section 7.7(c), Borrower has no outstanding loans to any employee, officer or director of Borrower nor has Borrower guaranteed the payment of any loan made to an employee, officer or director of Borrower by a third party.

5.14 Subsidiaries. Borrower does not own any stock, partnership interest or other securities of any Person, except for Permitted Investments. Attached as Schedule 1, as may be updated by Borrower in a written notice provided after the Closing Date, is a true, correct and complete list of each Subsidiary.

SECTION 6. INSURANCE; INDEMNIFICATION

6.1 Coverage. Borrower shall cause to be carried and maintained commercial general liability insurance, on an occurrence form, against risks customarily insured against in Borrower's line of business. Such risks shall include the risks of bodily injury, including death, property damage, personal injury, advertising injury, and contractual liability per the terms of the indemnification agreement found in Section 6.3. Borrower must maintain a minimum of \$2,000,000 of commercial general liability insurance for each occurrence. Borrower has and agrees to maintain a minimum of \$2,000,000 of directors' and officers' insurance for each occurrence and \$5,000,000 in the aggregate. So long as there are any Secured Obligations outstanding, Borrower shall also cause to be carried and maintained insurance upon the Collateral, insuring against all risks of physical loss or damage howsoever caused, in an amount not less than the full replacement cost of the Collateral, provided that such insurance may be subject to standard exceptions and deductibles.

6.2 Certificates. Borrower shall deliver to Agent certificates of insurance that evidence Borrower's compliance with its insurance obligations in Section 6.1 and the obligations contained in this Section 6.2. Borrower's insurance certificate shall state Agent (shown as "Hercules Capital, Inc., as Agent") is an additional insured for commercial general liability, a loss payee for all risk property damage insurance, subject to the insurer's approval, and a loss payee for property insurance and additional insured for liability insurance for any future insurance that Borrower may acquire from such insurer. Attached to the certificates of insurance will be additional insured endorsements for liability and lender's loss payable endorsements for all risk property damage insurance. All certificates of insurance will provide for a minimum of thirty (30) days advance written notice to Agent of cancellation (other than cancellation for non-payment of premiums, for which ten (10) days' advance written notice shall be sufficient) or any other change adverse to Agent's interests. Any failure of Agent to scrutinize such insurance certificates for compliance is not a waiver of any of Agent's rights, all of which are reserved. Borrower shall provide Agent with copies of each insurance policy, and upon entering or amending any insurance policy required hereunder, Borrower shall provide Agent with copies of such policies and shall promptly deliver to Agent updated insurance certificates with respect to such policies.

6.3 Indemnity. Borrower agrees to indemnify and hold Agent, Lender and their officers, directors, employees, agents, in-house attorneys, representatives and shareholders (each, an "Indemnified Person") harmless from and against any and all claims, costs, expenses, damages and liabilities (including such claims, costs, expenses, damages and liabilities based on liability in tort, including strict liability in tort), including reasonable and documented out-of-pocket costs (including reasonable attorneys' fees and disbursements and other costs of investigation or defense (including those incurred upon any appeal) (collectively, "Liabilities"), that may be instituted or asserted against or incurred by such Indemnified Person as the result of credit having been extended, suspended or terminated under this Agreement and the other Loan Documents or the administration of such credit, or in connection with or arising out of the transactions contemplated hereunder and thereunder, or any actions or failures to act in connection therewith, or arising out of the disposition or utilization of the Collateral, excluding in all cases Liabilities to the extent resulting solely from any Indemnified Person's gross negligence or willful misconduct. Borrower agrees to pay, and to save Agent and Lender harmless from, any and all liabilities with respect to, or resulting from any delay in paying, any and all excise, sales or other similar taxes (excluding taxes imposed on or measured by the net income of Agent or Lender) that may be payable or determined to be payable with respect to any of the Collateral or this Agreement. In no event shall any Indemnified Person be liable on any theory of liability for any special, indirect, consequential or punitive damages (including any loss of profits, business or anticipated savings). This Section 6.3 shall survive the repayment of indebtedness under, and otherwise shall survive the expiration or other termination of, the Loan Agreement.

SECTION 7. COVENANTS OF BORROWER

Borrower agrees as follows:

7.1 Financial Reports. Borrower shall furnish to Agent the financial statements and reports listed hereinafter (the "Financial Statements"):

(a) as soon as practicable (and in any event within 30 days) after the end of each calendar month, unaudited interim and year-to-date financial statements as of the end of such month (prepared on a consolidated and consolidating basis, if applicable), including balance sheet and related statements of income accompanied by a report detailing any material contingencies (including the commencement of any material litigation by or against Borrower) or any other occurrence that would reasonably be expected to have a Material Adverse Effect, all certified by Borrower's Chief Executive Officer or Chief Financial Officer to the effect that they have been prepared in accordance with GAAP, except (i) for the absence of footnotes, (ii) that they are subject to normal year end adjustments, and (iii) they do not contain certain non-cash items that are customarily included in quarterly and annual financial statements;

(b) as soon as practicable (and in any event within 45 days) after the end of last day of each of the first three fiscal quarters of each fiscal year, the unaudited interim and year-to-date financial statements as of the end of such applicable fiscal quarter filed with the Securities and Exchange Commission in a Form 10-Q; provided that if a Form 10-Q is not filed, Borrower shall provide the unaudited interim and year-to-date financial statements as of the end of such fiscal quarter (prepared on a consolidated and consolidating basis, if applicable), including balance sheet and related statements of income and cash flows accompanied by a report detailing any material contingencies (including the commencement of any material litigation by or against Borrower) or any other occurrence that would reasonably be expected to have a Material Adverse Effect, certified by Borrower's Chief Executive Officer or Chief Financial Officer to the effect that they have been prepared in accordance with GAAP, except (i) for the absence of footnotes, and (ii) that they are subject to normal year end adjustments;

(c) (i) the unqualified audited financial statements as of the end of such year within five (5) days of filing with the Securities and Exchange Commission in a Form 10-K and (ii) as soon as practical (and in any event within ten (10) days after delivery of the audit in clause (c)(i), any management report from the accounting firm that prepared the audited financial statements included in such Form 10-K; provided that if a Form 10-K is not filed, Borrower shall provide, within one hundred fifty (150) days after the end of each fiscal year, unqualified audited financial statements as of the end of such year (prepared on a consolidated and consolidating basis, if applicable), including balance sheet and related statements of income and cash flows, and setting forth in comparative form the corresponding figures for the preceding fiscal year, certified by a firm of independent certified public accountants selected by Borrower and reasonably acceptable to Agent, and (ii) as soon as practical (and in any event within ten (10) days after delivery of the audit) any management report from such accountants;

(d) as soon as practicable (and in any event within 30 days) after the end of each month, a Compliance Certificate in the form of Exhibit F;

(e) promptly after the sending or filing thereof, as the case may be, copies of any proxy statements, financial statements or reports that Borrower has made available to holders of its capital stock and copies of any regular, periodic and special reports or registration statements that Borrower files with the Securities and Exchange Commission or any governmental authority that may be substituted therefor, or any national securities exchange; and

(f) financial and business projections promptly following their approval by Borrower's Board, as well as budgets, operating plans and other financial information reasonably requested by Agent (excluding any materials subject to attorney-client privilege and attorney work-product.

Borrower shall not make any change in its (a) accounting policies or reporting practices except for (i) any change required by GAAP through the mandate of new procedures or (ii) any immaterial changes or (b) fiscal years or fiscal quarters. The fiscal year of Borrower shall end on December 31.

The executed Compliance Certificate may be sent via email to Agent at legal@herculestech.com. All Financial Statements required to be delivered pursuant to clauses (a), (b) and (c) shall be sent via e-mail to financialstatements@herculestech.com with a copy to legal@herculestech.com provided, that if e-mail is not available or sending such Financial Statements via e-mail is not possible, they shall be faxed to Agent at: (650) 473-9194, attention Account Manager: Genoccea Biosciences, Inc.

Notwithstanding the foregoing, documents required to be delivered under Sections 7.1(a), (b), (c) or (f) (to the extent any such documents are included in materials otherwise filed with the SEC) may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date on which Borrower emails such documents or a link thereto to Agent; provided that Borrower shall directly provide Agent all Financial Statements required to be delivered pursuant to Section 7.1(b) and (c) hereunder.

7.2 Management Rights. Borrower shall permit any representative that Agent or Lender authorizes, including any of their attorneys and accountants, to inspect the Collateral and examine and make copies and abstracts of the books of account and records of Borrower at reasonable times and upon reasonable notice during normal business hours. In addition, any such representative shall have the right to meet with management and officers of Borrower to discuss such books of account and

records at reasonable times and upon reasonable notice during normal business hours. In addition, Agent or Lender shall be entitled at reasonable times and intervals acceptable to Borrower to consult with and advise the management and officers of Borrower concerning significant business issues affecting Borrower, provided that management and officers of Borrower are not bound to accept any such advisement. Such consultations shall not unreasonably interfere with Borrower's business operations. The parties intend that the rights granted Agent and Lender shall constitute "management rights" within the meaning of 29 C.F.R. Section 2510.3-101(d)(3)(ii), but that any advice, recommendations or participation by Agent or Lender with respect to any business issues shall not be deemed to give Agent or Lender, nor be deemed an exercise by Agent or Lender of, control over Borrower's management or policies.

7.3 Further Assurances. Borrower shall from time to time execute, deliver and file, alone or with Agent, any financing statements, security agreements, collateral assignments, notices, control agreements, or other documents to perfect or give the highest priority to Agent's Lien on the Collateral. Borrower shall from time to time procure any instruments or documents as may be requested by Agent, and take all further action that may be necessary or desirable, or that Agent may reasonably request, to perfect and protect the Liens granted hereby and thereby. In addition, and for such purposes only, Borrower hereby authorizes Agent to execute and deliver on behalf of Borrower and to file such financing statements (including an indication that the financing statement covers "all assets or all personal property" of Borrower in accordance with Section 9-504 of the UCC), collateral assignments, notices, control agreements, security agreements and other documents without the signature of Borrower either in Agent's name or in the name of Agent as agent and attorney-in-fact for Borrower. Borrower shall protect and defend Borrower's title to the Collateral and Agent's Lien thereon against all Persons claiming any interest adverse to Borrower or Agent other than Permitted Liens.

7.4 Indebtedness. Borrower shall not create, incur, assume, guarantee or be or remain liable with respect to any Indebtedness, or permit any Subsidiary to do so, other than Permitted Indebtedness, or prepay any Indebtedness (other than in connection with any refinancings thereof) or take any actions which impose on Borrower an obligation to prepay any Indebtedness, except for the conversion of Indebtedness into equity securities and the payment of cash in lieu of fractional shares in connection with such conversion.

7.5 Collateral. Borrower shall at all times keep the Collateral, the Intellectual Property and all other property and assets used in Borrower's business or in which Borrower now or hereafter holds any interest free and clear from any legal process or Liens whatsoever, and shall give Agent prompt written notice of any legal process affecting the Collateral, the Intellectual Property, such other property and assets, or any Liens thereon, provided however, that the Collateral and such other property and assets may be subject to Permitted Liens except that there shall be no Liens whatsoever on Intellectual Property. Borrower shall cause its Subsidiaries to protect and defend such Subsidiary's title to its assets from and against all Persons claiming any interest adverse to such Subsidiary, and Borrower shall cause its Subsidiaries at all times to keep such Subsidiary's property and assets free and clear from any legal process or Liens whatsoever (except for Permitted Liens, provided however, that there shall be no Liens whatsoever on Intellectual Property), and shall give Agent prompt written notice of any legal process affecting such Subsidiary's assets. Borrower shall not agree with any Person other than Agent or Lender not to encumber its property other than (i) as is otherwise permitted in the definition of "Permitted Liens" herein and "Permitted Transfers" herein, and (ii) restrictions by reason of customary provisions restricting assignment, subletting or other transfers contained in leases, licenses and similar agreements entered into in the ordinary course of business (provided that such restrictions are limited to the property or assets secured by such Liens or the property or assets subject to such leases, licenses or similar agreements as the case may be).

7.6 Investments. Borrower shall not directly or indirectly acquire or own, or make any Investment in or to any Person, or permit any of its Subsidiaries so to do, other than Permitted Investments.

7.7 Distributions. Except as permitted in clause (iii) of the definition of "Permitted Investments", Borrower shall not, and shall not allow any Subsidiary to, (a) repurchase or redeem any class of stock or other equity interest other than pursuant to employee, director or consultant repurchase plans or other similar agreements, provided, however, in each case the repurchase or redemption price does not exceed the original consideration paid for such stock or equity interest, or (b) declare or pay any cash dividend or make a cash distribution on any class of stock or other equity interest, except that a Subsidiary may pay dividends or make distributions to Borrower, or (c) lend money to any employees, officers or directors or guarantee the payment of any such loans granted by a third party in excess of \$100,000 in the aggregate or (d) waive, release or forgive any Indebtedness owed by any employees, officers or directors in excess of \$100,000 in the aggregate. Notwithstanding anything to the contrary contained herein, so long as the Borrower is in compliance, at all times, with the Liquidity Requirement, the making of any distributions or payment of any dividends as between the Borrower and Securities Corporation shall be permitted.

7.8 Transfers. Except for Permitted Transfers, Borrower shall not voluntarily or involuntarily transfer, sell, lease, license, lend or in any other manner convey any equitable, beneficial or legal interest in any material portion of its assets.

7.9 Mergers or Acquisitions. Borrower shall not merge or consolidate, or permit any of its Subsidiaries to merge or

consolidate, with or into any other business organization (other than mergers or consolidations of (a) a Subsidiary which is not a Borrower into another Subsidiary or into Borrower or (b) a Borrower into another Borrower), or acquire, or permit any of its Subsidiaries to acquire, all or substantially all of the capital stock or property of another Person without the prior written consent of the Agent.

7.10 Taxes. Borrower and its Subsidiaries shall pay when due all taxes, fees or other charges of any nature whatsoever (together with any related interest or penalties) now or hereafter imposed or assessed against Borrower, Agent, Lender or the Collateral or upon Borrower's ownership, possession, use, operation or disposition thereof or upon Borrower's rents, receipts or earnings arising therefrom. Borrower shall file on or before the due date therefor all personal property tax returns in respect of the Collateral. Notwithstanding the foregoing, Borrower may contest, in good faith and by appropriate proceedings, taxes for which Borrower maintains adequate reserves therefor in accordance with GAAP.

7.11 Corporate Changes. Neither Borrower nor any Subsidiary shall change its corporate name, legal form or jurisdiction of formation without twenty (20) days' prior written notice to Agent. Neither Borrower nor any Subsidiary shall suffer a Change in Control. Neither Borrower nor any Subsidiary shall relocate its chief executive office or its principal place of business unless: (i) it has provided prior written notice to Agent; and (ii) such relocation shall be within the continental United States. Neither Borrower nor any Subsidiary shall relocate any item of Collateral (other than (x) sales of Inventory in the ordinary course of business, (y) relocations of Equipment having an aggregate value of up to \$150,000 in any fiscal year, and (z) relocations of Collateral from a location described on Exhibit C to another location described on Exhibit C) unless (i) it has provided prompt written notice to Agent, (ii) such relocation is within the continental United States and, (iii) if such relocation is to a third party bailee, it has used its commercially reasonable efforts to deliver a bailee agreement in form and substance reasonably acceptable to Agent.

7.12 Deposit Accounts. Neither Borrower nor any Subsidiary (other than Securities Corporation) shall maintain any Deposit Accounts, or accounts holding Investment Property, except with respect to which Agent has an Account Control Agreement, provided that no Account Control Agreement shall be required for any (i) accounts securing Borrower's reimbursement obligations under letters of credit permitted hereunder, (ii) accounts used solely to fund payroll or employee benefits or (iii) withholding tax, benefits, trust, escrow or fiduciary accounts.

7.13 Subsidiaries. Borrower shall notify Agent of each Subsidiary formed subsequent to the Closing Date and, within 15 days of formation, shall cause any such Subsidiary to execute and deliver to Agent a Joinder Agreement. Notwithstanding anything to the contrary contained herein, Borrower shall not be required to cause Securities Corporation to execute and deliver to Agent a Joinder Agreement so long as Borrower remains in compliance, at all times, with the Liquidity Requirement.

7.14 Notification of Event of Default. Borrower shall notify Agent immediately of the occurrence of any Event of Default.

7.15 Use of Proceeds. Borrower agrees that the proceeds of the Loans shall be used solely to refinance existing indebtedness, to pay related fees and expenses in connection with this Agreement and for working capital and general corporate purposes. The proceeds of the Term Loan Advance will not be used in violation of Anti-Corruption Laws or applicable Sanctions.

7.16 Compliance with Laws.

Borrower shall maintain, and shall cause its Subsidiaries to maintain, compliance in all material respect with all applicable laws, rules or regulations (including any law, rule or regulation with respect to the making or brokering of loans or financial accommodations), and shall, or cause its Subsidiaries to, obtain and maintain all required governmental authorizations, approvals, licenses, franchises, permits or registrations reasonably necessary in connection with the conduct of Borrower's business, in each case, where failure to do so could reasonably be expected to have a Material Adverse Effect.

Neither Borrower nor any of its Subsidiaries shall, nor shall Borrower or any of its Subsidiaries permit any Affiliate to, directly or indirectly, knowingly enter into any documents, instruments, agreements or contracts with any Person listed on the OFAC Lists. Neither Borrower nor any of its Subsidiaries shall, nor shall Borrower or any of its Subsidiaries, permit any Affiliate to, directly or indirectly, (i) conduct any business or engage in any transaction or dealing with any Blocked Person, including, without limitation, the making or receiving of any contribution of funds, goods or services to or for the benefit of any Blocked Person, (ii) deal in, or otherwise engage in any transaction relating to, any property or interests in property blocked pursuant to Executive Order No. 13224 or any similar executive order or other Anti-Terrorism Law, or (iii) engage in or conspire to engage in any transaction that evades or avoids, or has the purpose of evading or avoiding, or attempts to violate, any of the prohibitions set forth in Executive Order No. 13224 or other Anti-Terrorism Law.

None of Borrower, any of its Subsidiaries or any of their respective directors, officers or employees, or to the knowledge of Borrower, any agent for Borrower or its Subsidiaries that will act in any capacity in connection with or benefit from the credit facility established hereby, is a Sanctioned Person. No Loan, use of proceeds or other transaction contemplated by this Agreement will violate Anti-Corruption Laws or applicable Sanctions.

7.17 Financial Covenant – Liquidity. Borrower shall maintain Eligible Cash at all times in an account in the name of Borrower and subject to an Account Control Agreement in an amount equal to or greater than the lesser of (i) the aggregate principal amount of the Term Loan Advance outstanding, or (ii) one hundred percent (100%) of all Eligible Cash of Borrower and its Subsidiaries (the “Liquidity Requirement”). For purposes of clarity, if Eligible Cash is less than the aggregate principal amount of the Term Loan Advance outstanding, Securities Corporation shall hold no Eligible Cash.

7.18 Transactions with Affiliates. Borrower shall not and shall not permit any Subsidiary to, directly or indirectly, enter into or permit to exist any transaction of any kind with any Affiliate of Borrower or such Subsidiary on terms that are less favorable to Borrower or such Subsidiary, as the case may be, than those that might be obtained in an arm’s length transaction from a Person who is not an Affiliate of Borrower or such Subsidiary, except for (a) transactions permitted under Section 7.7, (b) Permitted Investments and (c) transactions among Borrower and any of its Subsidiaries that has executed a Joinder Agreement.

7.19 Post-Closing Deliverables. Borrower shall deliver to Agent within twenty (20) business days after the Closing Date, in form and substance reasonably satisfactory to Agent, (a) endorsements to its property and liability policies, which endorsements shall name Agent as lender loss payee and additional insured and provided that Agent shall receive prior notice of cancellation of such property and liability policies in form and substance reasonably satisfactory to Agent, and (b) fully-executed acknowledgement letters with respect to each of (i) that certain Deposit Account Control Agreement by and among Agent, Borrower, and Silicon Valley Bank dated as of November 20, 2014 and (ii) that certain Securities Account Control Agreement by and among Agent, Borrower, SVB Asset Management, and U.S. Bank, N.A., dated as of November 20, 2014.

SECTION 8. RIGHT TO INVEST

8.1 Lender or its assignee or nominee shall have the right, in its discretion, to participate in any Subsequent Financing (as defined in the Equity Rights Letter Agreement) pursuant to the terms set forth in the Equity Rights Letter Agreement.

SECTION 9. EVENTS OF DEFAULT

The occurrence of any one or more of the following events shall be an Event of Default:

9.1 Payments. Borrower fails to pay any amount due under this Agreement or any of the other Loan Documents on the due date; provided, however, that an Event of Default shall not occur on account of a failure to pay due solely to an administrative or operational error of Agent or Lender or Borrower’s bank if Borrower had the funds to make the payment when due and makes the payment within three (3) Business Days following Borrower’s knowledge of such failure to pay; or

9.2 Covenants. Borrower breaches or defaults in the performance of any covenant or Secured Obligation under this Agreement, or any of the other Loan Documents or any other agreement among Borrower, Agent and Lender, and (a) with respect to a default under any covenant under this Agreement (other than under Sections 6 (other than delivery of certificates of insurance pursuant to Section 6.2), 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.14, 7.15, 7.16, 7.17, 7.18, and 7.19), any other Loan Document or any other agreement among Borrower, Agent and Lender, such default continues for more than fifteen (15) days (or three (3) days with respect to a default due to the failure to deliver certificates of insurance pursuant to Section 6.2) after the earlier of the date on which (i) Agent or Lender has given notice of such default to Borrower and (ii) Borrower has actual knowledge of such default or (b) with respect to a default under any of Sections 6 (other than delivery of certificates of insurance pursuant to Section 6.2), 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.14, 7.15, 7.16, 7.17, 7.18, and 7.19, or the occurrence of such default; or

9.3 Material Adverse Effect. A circumstance has occurred that would reasonably be expected to have a Material Adverse Effect; or

9.4 Representations. Any representation or warranty made by Borrower in any Loan Document or in the Warrant shall have been false or misleading in any material respect; or

9.5 Insolvency. Borrower (A) (i) shall make an assignment for the benefit of creditors; or (ii) shall be unable to pay its debts as they become due, or be unable to pay or perform under the Loan Documents, or shall become insolvent; or (iii) shall file a voluntary petition in bankruptcy; or (iv) shall file any petition, answer, or document seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation pertinent to such circumstances; or (v) shall seek or consent to or acquiesce in the appointment of any trustee, receiver, or liquidator of Borrower or of all or any substantial part (i.e., 33-1/3% or more) of the assets or property of Borrower; or

(vi) shall cease operations of its business as its business has normally been conducted, or terminate substantially all of its employees; or (vii) Borrower or its Board or majority shareholders shall take any action initiating any of the foregoing actions described in clauses (i) through (vi); or (B) either (i) thirty (30) days shall have expired after the commencement of an involuntary action against Borrower seeking reorganization, arrangement, composition, readjustment, liquidation, dissolution or similar relief under any present or future statute, law or regulation, without such action being dismissed or all orders or proceedings thereunder affecting the operations or the business of Borrower being stayed; or (ii) a stay of any such order or proceedings shall thereafter be set aside and the action setting it aside shall not be timely appealed; or (iii) Borrower shall file any answer admitting or not contesting the material allegations of a petition filed against Borrower in any such proceedings; or (iv) the court in which such proceedings are pending shall enter a decree or order granting the relief sought in any such proceedings; or (v) thirty (30) days shall have expired after the appointment, without the consent or acquiescence of Borrower, of any trustee, receiver or liquidator of Borrower or of all or any substantial part of the properties of Borrower without such appointment being vacated; or

9.6 Attachments; Judgments. Any portion of Borrower's assets is attached or seized, or a levy is filed against any such assets, or a judgment or judgments is/are entered, for the payment of money, individually or in the aggregate, of at least \$100,000, or Borrower is enjoined or in any way prevented by court order from conducting any part of its business, and such attachment, seizure, levy, judgment, or enjoinder is not, within fifteen (15) days after the occurrence thereof, discharged or stayed (whether through the posting of a bond or otherwise); provided, however, no Advances shall be made during any fifteen (15) day cure period; or

9.7 Other Obligations. The occurrence of any default under any agreement or obligation of Borrower involving any Indebtedness in excess of \$100,000 after giving effect to any applicable grace period thereunder (if any).

SECTION 10. REMEDIES

10.1 General. Upon and during the continuance of any one or more Events of Default, (i) Agent may, at the direction of the Required Lenders, at its option, accelerate and demand payment of all or any part of the Secured Obligations together with a Prepayment Charge and declare them to be immediately due and payable (provided, that upon the occurrence of an Event of Default of the type described in Section 9.5, all of the Secured Obligations shall automatically be accelerated and made due and payable, in each case without any further notice or act), (ii) Agent may, at the direction of the Required Lenders, at its option, sign and file in Borrower's name any and all collateral assignments, notices, control agreements, security agreements and other documents it deems necessary or appropriate to perfect or protect the repayment of the Secured Obligations, and in furtherance thereof, Borrower hereby grants Agent an irrevocable power of attorney coupled with an interest, and (iii) Agent may notify any of Borrower's account debtors to make payment directly to Agent, compromise the amount of any such account on Borrower's behalf and endorse Agent's name without recourse on any such payment for deposit directly to Agent's account. Agent may exercise all rights and remedies with respect to the Collateral under the Loan Documents or otherwise available to it under the UCC and other applicable law, including the right to release, hold, sell, lease, liquidate, collect, realize upon, or otherwise dispose of all or any part of the Collateral and the right to occupy, utilize, process and commingle the Collateral. All Agent's rights and remedies shall be cumulative and not exclusive.

10.2 Collection; Foreclosure. Upon the occurrence and during the continuance of any Event of Default, Agent may, at the direction of the Required Lenders, at any time or from time to time, apply, collect, liquidate, sell in one or more sales, lease or otherwise dispose of, any or all of the Collateral, in its then condition or following any commercially reasonable preparation or processing, in such order as Agent may elect. Any such sale may be made either at public or private sale at its place of business or elsewhere. Borrower agrees that any such public or private sale may occur upon ten (10) calendar days' prior written notice to Borrower. Agent may require Borrower to assemble the Collateral and make it available to Agent at a place designated by Agent that is reasonably convenient to Agent and Borrower. The proceeds of any sale, disposition or other realization upon all or any part of the Collateral shall be applied by Agent in the following order of priorities:

First, to Agent and Lender in an amount sufficient to pay in full Agent's and Lender's costs and professionals' and advisors' fees and expenses as described in Section 11.11;

Second, to Lender in an amount equal to the then unpaid amount of the Secured Obligations (including principal, interest, and the Default Rate interest), in such order and priority as Agent may choose in its sole discretion; and

Finally, after the full, final, and indefeasible payment in Cash of all of the Secured Obligations, to any creditor holding a junior Lien on the Collateral, or to Borrower or its representatives or as a court of competent jurisdiction may direct.

Agent shall be deemed to have acted reasonably in the custody, preservation and disposition of any of the Collateral if it complies with the obligations of a secured party under the UCC.

10.3 No Waiver. Agent shall be under no obligation to marshal any of the Collateral for the benefit of Borrower or any other Person, and Borrower expressly waives all rights, if any, to require Agent to marshal any Collateral.

10.4 Cumulative Remedies. The rights, powers and remedies of Agent hereunder shall be in addition to all rights, powers and remedies given by statute or rule of law and are cumulative. The exercise of any one or more of the rights, powers and remedies provided herein shall not be construed as a waiver of or election of remedies with respect to any other rights, powers and remedies of Agent.

SECTION 11. MISCELLANEOUS

11.1 Severability. Whenever possible, each provision of this Agreement shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement shall be prohibited by or invalid under such law, such provision shall be ineffective only to the extent and duration of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Agreement.

11.2 Notice. Except as otherwise provided herein, any notice, demand, request, consent, approval, declaration, service of process or other communication (including the delivery of Financial Statements) that is required, contemplated, or permitted under the Loan Documents or with respect to the subject matter hereof shall be in writing, and shall be deemed to have been validly served, given, delivered, and received upon the earlier of: (i) the day of transmission by facsimile or hand delivery or delivery by an overnight express service or overnight mail delivery service; or (ii) the third calendar day after deposit in the United States mails, with proper first class postage prepaid, in each case addressed to the party to be notified as follows:

(a) If to Agent:

HERCULES CAPITAL, INC.
Legal Department
Attention: Chief Legal Officer and Mr. Bryan Jadot
400 Hamilton Avenue, Suite 310
Palo Alto, CA 94301
email: legal@herculestech.com
Telephone: 650-289-3060

(b) If to Lender:

HERCULES CAPITAL, INC.
Legal Department
Attention: Chief Legal Officer and Mr. Bryan Jadot
400 Hamilton Avenue, Suite 310
Palo Alto, CA 94301
email: legal@herculestech.com
Telephone: 650-289-3060

(c) If to Borrower:

Genocea Biosciences, Inc.
Attention: Chip Clark
100 Acorn Park Drive, 5th Floor
Cambridge, Massachusetts 02140
Facsimile: 617.876.8192
Telephone: 617.715.7795
E-mail: chip.clark@genocea.com

or to such other address as each party may designate for itself by like notice.

11.3 Entire Agreement; Amendments.

(a) This Agreement and the other Loan Documents constitute the entire agreement and understanding of the parties hereto in respect of the subject matter hereof and thereof, and supersede and replace in their entirety any prior proposals, term sheets, non-disclosure or confidentiality agreements, letters, negotiations or other documents or agreements, whether written or oral, with respect to the subject matter hereof or thereof (including Agent's revised proposal letter dated March 21, 2018).

(b) Neither this Agreement, any other Loan Document, nor any terms hereof or thereof may be amended,

supplemented or modified except in accordance with the provisions of this Section 11.3(b). The Required Lenders and Borrower party to the relevant Loan Document may, or, with the written consent of the Required Lenders, Agent and Borrower party to the relevant Loan Document may, from time to time, (i) enter into written amendments, supplements or modifications hereto and to the other Loan Documents for the purpose of adding any provisions to this Agreement or the other Loan Documents or changing in any manner the rights of Lenders or of Borrower hereunder or thereunder or (ii) waive, on such terms and conditions as the Required Lenders or Agent, as the case may be, may specify in such instrument, any of the requirements of this Agreement or the other Loan Documents or any default or Event of Default and its consequences; provided, however, that no such waiver and no such amendment, supplement or modification shall (A) forgive the principal amount or extend the final scheduled date of maturity of any Loan, extend the scheduled date of any amortization payment in respect of any Term Loan, reduce the stated rate of any interest or fee payable hereunder, or extend the scheduled date of any payment thereof, in each case without the written consent of each Lender directly affected thereby; (B) eliminate or reduce the voting rights of any Lender under this Section 11.3(b) without the written consent of such Lender; (C) reduce any percentage specified in the definition of Required Lenders, consent to the assignment or transfer by Borrower of any of its rights and obligations under this Agreement and the other Loan Documents, release all or substantially all of the Collateral or release a Borrower from its obligations under the Loan Documents, in each case without the written consent of all Lenders; or (D) amend, modify or waive any provision of Section 11.17 without the written consent of Agent. Any such waiver and any such amendment, supplement or modification shall apply equally to each Lender and shall be binding upon Borrower, Lender, Agent and all future holders of the Loans.

11.4 No Strict Construction. The parties hereto have participated jointly in the negotiation and drafting of this Agreement. In the event an ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the parties hereto and no presumption or burden of proof shall arise favoring or disfavoring any party by virtue of the authorship of any provisions of this Agreement.

11.5 No Waiver. The powers conferred upon Agent and Lender by this Agreement are solely to protect its rights hereunder and under the other Loan Documents and its interest in the Collateral and shall not impose any duty upon Agent or Lender to exercise any such powers. No omission or delay by Agent or Lender at any time to enforce any right or remedy reserved to it, or to require performance of any of the terms, covenants or provisions hereof by Borrower at any time designated, shall be a waiver of any such right or remedy to which Agent or Lender is entitled, nor shall it in any way affect the right of Agent or Lender to enforce such provisions thereafter.

11.6 Survival. All agreements, representations and warranties contained in this Agreement and the other Loan Documents or in any document delivered pursuant hereto or thereto shall be for the benefit of Agent and Lender and shall survive the execution and delivery of this Agreement. Section 6.3 of this Agreement and the Equity Rights Letter shall survive the termination of this Agreement.

11.7 Successors and Assigns. The provisions of this Agreement and the other Loan Documents shall inure to the benefit of and be binding on Borrower and its permitted assigns. Borrower shall not assign its obligations under this Agreement or any of the other Loan Documents without Agent's express prior written consent, and any such attempted assignment shall be void and of no effect. Agent and Lender may assign, transfer, or endorse its rights hereunder and under the other Loan Documents without prior notice to Borrower, and all of such rights shall inure to the benefit of Agent's and Lender's successors and assigns.

11.8 Governing Law. This Agreement and the other Loan Documents have been negotiated and delivered to Agent and Lender in the State of California, and shall have been accepted by Agent and Lender in the State of California. Payment to Agent and Lender by Borrower of the Secured Obligations is due in the State of California. This Agreement and the other Loan Documents shall be governed by, and construed and enforced in accordance with, the laws of the State of California, excluding conflict of laws principles that would cause the application of laws of any other jurisdiction.

11.9 Consent to Jurisdiction and Venue. All judicial proceedings (to the extent that the reference requirement of Section 11.10 is not applicable) arising in or under or related to this Agreement or any of the other Loan Documents may be brought in any state or federal court located in the State of California. By execution and delivery of this Agreement, each party hereto generally and unconditionally: (a) consents to nonexclusive personal jurisdiction in Santa Clara County, State of California; (b) waives any objection as to jurisdiction or venue in Santa Clara County, State of California; (c) agrees not to assert any defense based on lack of jurisdiction or venue in the aforesaid courts; and (d) irrevocably agrees to be bound by any judgment rendered thereby in connection with this Agreement or the other Loan Documents. Service of process on any party hereto in any action arising out of or relating to this Agreement shall be effective if given in accordance with the requirements for notice set forth in Section 11.2, and shall be deemed effective and received as set forth in Section 11.2. Nothing herein shall affect the right to serve process in any other manner permitted by law or shall limit the right of either party to bring proceedings in the courts of any other jurisdiction.

11.10 Mutual Waiver of Jury Trial / Judicial Reference.

(a) Because disputes arising in connection with complex financial transactions are most quickly and economically resolved by an experienced and expert Person and the parties wish applicable state and federal laws to apply (rather than arbitration rules), the parties desire that their disputes be resolved by a judge applying such applicable laws. EACH OF BORROWER, AGENT AND LENDER SPECIFICALLY WAIVES ANY RIGHT IT MAY HAVE TO TRIAL BY JURY OF ANY CAUSE OF ACTION, CLAIM, CROSS-CLAIM, COUNTERCLAIM, THIRD PARTY CLAIM OR ANY OTHER CLAIM (COLLECTIVELY, "CLAIMS") ASSERTED BY BORROWER AGAINST AGENT, LENDER OR THEIR RESPECTIVE ASSIGNEE OR BY AGENT, LENDER OR THEIR RESPECTIVE ASSIGNEE AGAINST BORROWER. This waiver extends to all such Claims, including Claims that involve Persons other than Agent, Borrower and Lender; Claims that arise out of or are in any way connected to the relationship among Borrower, Agent and Lender; and any Claims for damages, breach of contract, tort, specific performance, or any equitable or legal relief of any kind, arising out of this Agreement, any other Loan Document.

(b) If the waiver of jury trial set forth in Section 11.10(a) is ineffective or unenforceable, the parties agree that all Claims shall be resolved by reference to a private judge sitting without a jury, pursuant to Code of Civil Procedure Section 638, before a mutually acceptable referee or, if the parties cannot agree, a referee selected by the Presiding Judge of the Santa Clara County, California. Such proceeding shall be conducted in Santa Clara County, California, with California rules of evidence and discovery applicable to such proceeding.

(c) In the event Claims are to be resolved by judicial reference, either party may seek from a court identified in Section 11.9, any prejudgment order, writ or other relief and have such prejudgment order, writ or other relief enforced to the fullest extent permitted by law notwithstanding that all Claims are otherwise subject to resolution by judicial reference.

11.11 Professional Fees. Borrower promises to pay Agent's and Lender's reasonable invoiced out-of-pocket fees and expenses necessary to finalize the loan documentation, including but not limited to reasonable attorneys fees, UCC searches, filing costs, and other miscellaneous expenses. In addition, Borrower promises to pay within ten (10) days after receipt of an invoice any and all reasonable attorneys' and other professionals' fees and expenses (including fees and expenses of in-house counsel) incurred by Agent and Lender after the Closing Date in connection with or related to: (a) the Loan; (b) the administration, collection, or enforcement of the Loan; (c) the amendment or modification of the Loan Documents; (d) any waiver, consent, release, or termination under the Loan Documents; (e) the protection, preservation, audit, field exam, sale, lease, liquidation, or disposition of Collateral or the exercise of remedies with respect to the Collateral; (f) any legal, litigation, administrative, arbitration, or out of court proceeding in connection with or related to Borrower or the Collateral, and any appeal or review thereof; and (g) any bankruptcy, restructuring, reorganization, assignment for the benefit of creditors, workout, foreclosure, or other action related to Borrower, the Collateral, the Loan Documents, including representing Agent or Lender in any adversary proceeding or contested matter commenced or continued by or on behalf of Borrower's estate, and any appeal or review thereof. For the avoidance of doubt, the Facility Charge and payment of Agent's and Lender's current expenses reimbursable pursuant to this Agreement (including reasonable attorneys' fees and expenses), shall be deducted from the Term Loan Advance on the Closing Date.

11.12 Confidentiality. Agent and Lender acknowledge that certain items of Collateral and information provided to Agent and Lender by Borrower are confidential and proprietary information of Borrower, if and to the extent such information either (x) is marked as confidential by Borrower at the time of disclosure, or (y) should reasonably be understood to be confidential (the "Confidential Information"). Accordingly, Agent and Lender agree that any Confidential Information it may obtain shall not be disclosed to any other Person or entity in any manner whatsoever, in whole or in part, without the prior written consent of Borrower, except that Agent and Lender may disclose any such information: (a) to its own directors, officers, employees, accountants, counsel and other professional advisors and to its Affiliates if Agent or Lender in their sole discretion determines that any such party should have access to such information in connection with such party's responsibilities in connection with the Loan or this Agreement and, provided that such recipient of such Confidential Information either (i) agrees to be bound by the confidentiality provisions of this paragraph or (ii) is otherwise subject to confidentiality restrictions that reasonably protect against the disclosure of Confidential Information; (b) if such information is generally available to the public; (c) if required or appropriate in any report, statement or testimony submitted to any governmental authority having or claiming to have jurisdiction over Agent or Lender; (d) if required or appropriate in response to any summons or subpoena or in connection with any litigation, to the extent permitted or deemed advisable by Agent's or Lender's counsel; (e) to comply with any legal requirement or law applicable to Agent or Lender; (f) to the extent reasonably necessary in connection with the exercise of any right or remedy under any Loan Document, including Agent's sale, lease, or other disposition of Collateral after an Event of Default; (g) to any participant or assignee of Agent or Lender or any prospective participant or assignee; provided, that such participant or assignee or prospective participant or assignee agrees in writing to be bound by this Section prior to disclosure; or (h) otherwise with the prior consent of Borrower; provided, that any disclosure made in violation of this Agreement shall not affect the obligations of Borrower or any of its Affiliates or any guarantor under this Agreement or the other Loan Documents.

11.13 Assignment of Rights. Borrower acknowledges and understands that Agent or Lender may sell and assign all or part of its interest hereunder and under the Loan Documents to any Person or entity (an "Assignee"). After such assignment the term "Agent" or "Lender" as used in the Loan Documents shall mean and include such Assignee, and such Assignee shall be vested with all rights, powers and remedies of Agent and Lender hereunder with respect to the interest so assigned; but with respect to any such interest not so transferred, Agent and Lender shall retain all rights, powers and remedies hereby given. No such assignment by Agent or Lender shall relieve Borrower of any of its obligations hereunder. Lender agrees that in the event of any transfer by it of the Note(s)(if any), it will endorse thereon a notation as to the portion of the principal of the Note(s), which shall have been paid at the time of such transfer and as to the date to which interest shall have been last paid thereon.

11.14 Revival of Secured Obligations. This Agreement and the Loan Documents shall remain in full force and effect and continue to be effective if any petition is filed by or against Borrower for liquidation or reorganization, if Borrower becomes insolvent or makes an assignment for the benefit of creditors, if a receiver or trustee is appointed for all or any significant part of Borrower's assets, or if any payment or transfer of Collateral is recovered from Agent or Lender. The Loan Documents and the Secured Obligations and Collateral security shall continue to be effective, or shall be revived or reinstated, as the case may be, if at any time payment and performance of the Secured Obligations or any transfer of Collateral to Agent, or any part thereof is rescinded, avoided or avoidable, reduced in amount, or must otherwise be restored or returned by, or is recovered from, Agent, Lender or by any obligee of the Secured Obligations, whether as a "voidable preference," "fraudulent conveyance," or otherwise, all as though such payment, performance, or transfer of Collateral had not been made. In the event that any payment, or any part thereof, is rescinded, reduced, avoided, avoidable, restored, returned, or recovered, the Loan Documents and the Secured Obligations shall be deemed, without any further action or documentation, to have been revived and reinstated except to the extent of the full, final, and indefeasible payment to Agent or Lender in Cash.

11.15 Counterparts. This Agreement and any amendments, waivers, consents or supplements hereto may be executed in any number of counterparts, and by different parties hereto in separate counterparts, each of which when so delivered shall be deemed an original, but all of which counterparts shall constitute but one and the same instrument.

11.16 No Third Party Beneficiaries. No provisions of the Loan Documents are intended, nor will be interpreted, to provide or create any third-party beneficiary rights or any other rights of any kind in any Person other than Agent, Lender and Borrower unless specifically provided otherwise herein, and, except as otherwise so provided, all provisions of the Loan Documents will be personal and solely among Agent, Lender and Borrower.

11.17 Agency.

(a) Lender hereby irrevocably appoints Hercules Capital, Inc. to act on its behalf as Agent hereunder and under the other Loan Documents and authorizes Agent to take such actions on its behalf and to exercise such powers as are delegated to Agent by the terms hereof or thereof, together with such actions and powers as are reasonably incidental thereto.

(b) Lender agrees to indemnify Agent in its capacity as such (to the extent not reimbursed by Borrower and without limiting the obligation of Borrower to do so), according to its respective Term Commitment percentages (based upon the total outstanding Term Loan Commitments) in effect on the date on which indemnification is sought under this Section 11.17, from and against any and all liabilities, obligations, losses, damages, penalties, actions, judgments, suits, costs, expenses or disbursements of any kind whatsoever that may at any time be imposed on, incurred by or asserted against Agent in any way relating to or arising out of, this Agreement, any of the other Loan Documents or any documents contemplated by or referred to herein or therein or the transactions contemplated hereby or thereby or any action taken or omitted by Agent under or in connection with any of the foregoing; The agreements in this Section shall survive the payment of the Loans and all other amounts payable hereunder.

(c) Agent in Its Individual Capacity. The Person serving as Agent hereunder shall have the same rights and powers in its capacity as a Lender as any other Lender and may exercise the same as though it were not the Agent and the term "Lender" shall, unless otherwise expressly indicated or unless the context otherwise requires, include each such Person serving as Agent hereunder in its individual capacity.

(d) Exculpatory Provisions. Agent shall have no duties or obligations except those expressly set forth herein and in the other Loan Documents. Without limiting the generality of the foregoing, Agent shall not:

- i. be subject to any fiduciary or other implied duties, regardless of whether any default or any Event of Default has occurred and is continuing;

ii. have any duty to take any discretionary action or exercise any discretionary powers, except discretionary rights and powers expressly contemplated hereby or by the other Loan Documents that Agent is required to exercise as directed in writing by Lender, provided that Agent shall not be required to take any action that, in its opinion or the opinion of its counsel, may expose Agent to liability or that is contrary to any Loan Document or applicable law; and

iii. except as expressly set forth herein and in the other Loan Documents, have any duty to disclose, and Agent shall not be liable for the failure to disclose, any information relating to Borrower or any of its Affiliates that is communicated to or obtained by any Person serving as the Agent or any of its Affiliates in any capacity.

(e) Agent shall not be liable for any action taken or not taken by it (i) with the consent or at the request of Lender or as Agent shall believe in good faith shall be necessary, under the circumstances or (ii) in the absence of its own gross negligence or willful misconduct.

(f) Agent shall not be responsible for or have any duty to ascertain or inquire into (i) any statement, warranty or representation made in or in connection with this Agreement or any other Loan Document, (ii) the contents of any certificate, report or other document delivered hereunder or thereunder or in connection herewith or therewith, (iii) the performance or observance of any of the covenants, agreements or other terms or conditions set forth herein or therein or the occurrence of any default or Event of Default, (iv) the validity, enforceability, effectiveness or genuineness of this Agreement, any other Loan Document or any other agreement, instrument or document or (v) the satisfaction of any condition set forth in Section 4 or elsewhere herein, other than to confirm receipt of items expressly required to be delivered to Agent.

(g) Reliance by Agent. Agent may rely, and shall be fully protected in acting, or refraining to act, upon, any resolution, statement, certificate, instrument, opinion, report, notice, request, consent, order, bond or other paper or document that it has no reason to believe to be other than genuine and to have been signed or presented by the proper party or parties or, in the case of cables, telecopies and telexes, to have been sent by the proper party or parties. In the absence of its gross negligence or willful misconduct, Agent may conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon any certificates or opinions furnished to Agent and conforming to the requirements of the Loan Agreement or any of the other Loan Documents. Agent may consult with counsel, and any opinion or legal advice of such counsel shall be full and complete authorization and protection in respect of any action taken, not taken or suffered by Agent hereunder or under any Loan Documents in accordance therewith. Agent shall have the right at any time to seek instructions concerning the administration of the Collateral from any court of competent jurisdiction. Agent shall not be under any obligation to exercise any of the rights or powers granted to Agent by this Agreement, the Loan Agreement and the other Loan Documents at the request or direction of Lenders unless Agent shall have been provided by Lender with adequate security and indemnity against the costs, expenses and liabilities that may be incurred by it in compliance with such request or direction.

11.18 Publicity. None of the parties hereto nor any of its respective member businesses and Affiliates shall, without the other parties' prior written consent (which shall not be unreasonably withheld or delayed), publicize or use (a) the other party's name (including a brief description of the relationship among the parties hereto), logo or hyperlink to such other parties' web site, separately or together, in written and oral presentations, advertising, promotional and marketing materials, client lists, public relations materials or on its web site (together, the "Publicity Materials"); (b) the names of officers of such other parties in the Publicity Materials; and (c) such other parties' name, trademarks, servicemarks in any news or press release concerning such party; provided however, notwithstanding anything to the contrary herein, no such consent shall be required (i) to the extent necessary to comply with the requests of any regulators, legal requirements or laws applicable to such party, pursuant to any listing agreement with any national securities exchange (so long as such party provides prior notice to the other party hereto to the extent reasonably practicable) and (ii) to comply with Section 11.12.

11.19 Amendment and Restatement. This Agreement amends and restates in its entirety the Original Loan and Security Agreement effective as of the date hereof. Anything contained herein to the contrary notwithstanding, this Agreement is not intended to and shall not serve to effect a novation of the "Secured Obligations" (as defined in the Original Loan and Security Agreement). Instead, it is the express intention of the parties hereto to reaffirm the indebtedness, obligations and liabilities created under the Original Loan and Security Agreement which is secured by the Collateral pursuant to the terms of the applicable Loan Documents. Each Borrower acknowledges and confirms that the liens and security interests granted pursuant to the applicable Loan Documents secure the applicable indebtedness, liabilities and obligations of Borrower to the Lenders under the Original Loan and Security Agreement, as amended and restated by this Agreement, the Loan Documents shall continue in full force and effect in accordance with their terms unless otherwise amended by the parties thereto, and that the term "Secured Obligations" as used in the Loan Documents (or any other term used therein to describe or refer to the indebtedness, liabilities and obligations of Borrower to Agent and the Lenders) includes, without limitation, the indebtedness, liabilities and obligations of Borrower under this Agreement, and under the Original Loan and Security Agreement, as amended and restated hereby, as the same further may

be amended, modified, supplemented and/or restated from time to time. The Loan Documents and all agreements, instruments and documents executed or delivered in connection with any of the foregoing shall each be deemed to be amended to the extent necessary to give effect to the provisions of this Agreement. Each reference to the "Loan and Security Agreement" in any Loan Document shall mean and be a reference to this Agreement (as further amended, restated, supplemented or otherwise modified from time to time). Cross-references in the Loan Documents to particular section numbers in the Original Loan and Security Agreement shall be deemed to be cross-references to the corresponding sections, as applicable, of this Agreement.

(SIGNATURES TO FOLLOW)

IN WITNESS WHEREOF, Borrower, Agent and Lender have duly executed and delivered this Loan and Security Agreement as of the day and year first above written.

BORROWER:

GENOCEA BIOSCIENCES, INC.

Signature: /s/ William D. Clark

Print Name: William D. Clark

Title: President, CEO & Secretary

Accepted in Palo Alto, California:

AGENT:

HERCULES CAPITAL, INC.

Signature: /s/ Melanie Grace

Print Name: Melanie Grace

Title: Secretary

LENDER:

HERCULES CAPITAL, INC.

Signature: /s/ Melanie Grace

Print Name: Melanie Grace

Title: Secretary

Table of Exhibits and Schedules

Exhibit A: Advance Request
Attachment to Advance Request

Exhibit B: Promissory Note

Exhibit C: Name, Locations, and Other Information for Borrower

Exhibit D: Borrower's Patents, Trademarks, Copyrights and Licenses

Exhibit E: Borrower's Deposit Accounts and Investment Accounts

Exhibit F: Compliance Certificate

Exhibit G: Joinder Agreement

Exhibit H: ACH Debit Authorization Agreement

Exhibit I: Investment Policy

Schedule 1 Subsidiaries

Schedule 1.1 Commitments

Schedule 1A Existing Permitted Indebtedness

Schedule 1B Existing Permitted Investments

Schedule 1C Existing Permitted Liens

Schedule 5.3 Consents, Etc.

Schedule 5.5 Actions Before Governmental Authorities

Schedule 5.8 Tax Matters

Schedule 5.10 Intellectual Property

EXHIBIT A

ADVANCE REQUEST

To: Agent: Date: _____, 2018

Hercules Capital, Inc. (the "Agent")
400 Hamilton Avenue, Suite 310
Palo Alto, CA 94301
Facsimile: 650-473-9194
Attn:

Genocea Biosciences, Inc. ("Borrower") hereby requests from Hercules Capital, Inc. ("Lender") an Advance in the amount of _____ Dollars (\$ _____) on _____, _____ (the "Advance Date") pursuant to the Loan and Security Agreement among Borrower, Agent and Lender (the "Agreement"). Capitalized words and other terms used but not otherwise defined herein are used with the same meanings as defined in the Agreement.

Please:

(a) Issue a check payable to Borrower _____

or

(b) Wire Funds to Borrower's account _____

Bank: _____

Address: _____

ABA Number: _____

Account Number: _____

Account Name: _____

Borrower represents that the conditions precedent to the Advance set forth in the Agreement are satisfied, waived or shall be satisfied upon the making of the Advance, including but not limited to: (i) that no event that has had or could reasonably be expected to have a Material Adverse Effect has occurred and is continuing; (ii) that the representations and warranties set forth in the Agreement and in the Warrant are and shall be true and correct in all material respects on and as of the Advance Date with the same effect as though made on and as of such date, except to the extent such representations and warranties expressly relate to an earlier date; (iii) that

Borrower is in compliance in all material respects with all the terms and provisions set forth in each Loan Document on its part to be observed or performed; and (iv) that as of the Advance Date, no fact or condition exists that would (or would, with the passage of time, the giving of notice, or both) constitute an Event of Default under the Loan Documents. Borrower understands and acknowledges that Agent has the right to review the financial information supporting this representation and, based upon such review in its sole discretion, Lender may decline to fund the requested Advance.

Borrower hereby represents that Borrower’s corporate status and locations have not changed since the date of the Agreement or, if the Attachment to this Advance Request is completed, are as set forth in the Attachment to this Advance Request.

Borrower agrees to notify Agent promptly before the funding of the Loan if any of the matters which have been represented above shall not be true and correct on the Borrowing Date and if Agent has received no such notice before the Advance Date then the statements set forth above shall be deemed to have been made and shall be deemed to be true and correct as of the Advance Date.

Executed as of [], 20[].

BORROWER:

GENOCEA BIOSCIENCES, INC.

SIGNATURE: _____

TITLE: _____

PRINT NAME: _____

ATTACHMENT TO ADVANCE REQUEST

Dated: _____

Borrower hereby represents and warrants to Agent that Borrower’s current name and organizational status is as follows:

Name: Genoce Biosciences, Inc.
Type of organization: Corporation
State of organization: Delaware
Organization file number: 4204354

Borrower hereby represents and warrants to Agent that the street addresses, cities, states and postal codes of its current locations are as follows:

EXHIBIT B

PROMISSORY NOTE

[\$],000,000

Advance Date: ____ __, 20[]

Maturity Date: ____ __, 20[]

FOR VALUE RECEIVED, Genoce Biosciences, Inc., a Delaware corporation (the “Borrower”) hereby promises to pay to the order of Hercules Capital, Inc., a Maryland corporation or the holder of this Note (the “Lender”) at 400 Hamilton Avenue, Suite 310, Palo Alto, CA 94301 or such other place of payment as the holder of this Secured Term Promissory Note (this “Promissory Note”) may specify from time to time in writing, in lawful money of the United States of America, the principal amount of [] Million Dollars (\$[],000,000) or such other principal amount as Lender has advanced to Borrower, together with interest at a floating rate equal to the greater of either (i) seven and one quarter of one percent (7.25%), or (ii) the sum of (A) seven and one quarter of one percent (7.25%), plus (B) the Prime Rate minus five percent (5.0%) per annum based upon a year consisting of 360 days, with interest computed daily based on the actual number of days in each month.

This Promissory Note is the Note referred to in, and is executed and delivered in connection with, that certain Loan and

Security Agreement dated [], 2018, by and among Borrower, Hercules Capital, Inc., a Maryland corporation (the “Agent”) and the several banks and other financial institutions or entities from time to time party thereto as lender (as the same may from time to time be amended, modified or supplemented in accordance with its terms, the “Loan Agreement”), and is entitled to the benefit and security of the Loan Agreement and the other Loan Documents (as defined in the Loan Agreement), to which reference is made for a statement of all of the terms and conditions thereof. All payments shall be made in accordance with the Loan Agreement. All terms defined in the Loan Agreement shall have the same definitions when used herein, unless otherwise defined herein. An Event of Default under the Loan Agreement shall constitute a default under this Promissory Note.

Borrower waives presentment and demand for payment, notice of dishonor, protest and notice of protest under the UCC or any applicable law. Borrower agrees to make all payments under this Promissory Note without setoff, recoupment or deduction and regardless of any counterclaim or defense. This Promissory Note has been negotiated and delivered to Lender and is payable in the State of California. This Promissory Note shall be governed by and construed and enforced in accordance with, the laws of the State of California, excluding any conflicts of law rules or principles that would cause the application of the laws of any other jurisdiction.

[Signature page follows]

BORROWER FOR ITSELF AND
ON BEHALF OF ITS SUBSIDIARIES: GENOCEA BIOSCIENCES, INC.

By:
Title:

EXHIBIT C

NAME, LOCATIONS, AND OTHER INFORMATION FOR BORROWER

1. Borrower represents and warrants to Agent that Borrower’s current name and organizational status as of the Closing Date is as follows:

Name: Genoce Biosciences, Inc.

Type of organization: Corporation

State of organization: Delaware

Organization file number: 4204354

2. Borrower represents and warrants to Agent that for five (5) years prior to the Closing Date, Borrower did not do business under any other name or organization or form except the following:

Name: N/A
Used during dates of: N/A
Type of Organization: N/A
State of organization: N/A
Organization file Number: N/A
Borrower’s fiscal year ends on 12/31
Borrower’s federal employer tax identification number is: 51-0596811

3. Borrower represents and warrants to Agent that its chief executive office is located at 100 Acorn Park Drive 5Th Floor, Cambridge MA 02140.

EXHIBIT D

BORROWER’S PATENTS, TRADEMARKS, COPYRIGHTS AND LICENSES

See attached.

COPYRIGHTS

N/A

PATENTS

Genocea Biosciences GEN-003 Intellectual Property

Patents and Patent Applications I: GEN-003 Compositions

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
HSV-2 001a + 001b: GENOCEA-OWNED				
<p>COMPOSITIONS AND METHODS FOR ELICITING AN IMMUNE RESPONSE TO HERPES SIMPLEX VIRUS TYPE 2</p> <p>(HSV-2 001a family) VACCINES AGAINST HERPES SIMPLEX VIRUS</p> <p>(HSV-2 001b family) VACCINES AGAINST HERPES SIMPLEX VIRUS TYPE 2: COMPOSITIONS AND METHODS FOR ELICITING AN IMMUNE RESPONSE</p> <p>NB: priority to 5 provisionals in 001a and 001b families above.</p> <p>(HSV-2 001a + 001b family)</p>	Flechtner Skoberne Long *Siber (Genocea)	PROV 1	US 61/180,784 22 May, 2009	Converted
		PROV 2	US 61/235,628 August 20, 2009	Converted
		PROV 3 *	US 61/305,918 February 18, 2010	Converted
	Long Flechtner (Genocea)	PROV 4	US 61/240,587 September 8, 2009	Converted
		PROV 5	US 61/240,626 September 8, 2009	Converted
	Long Flechtner Skoberne Siber (Genocea)	PAR	US 12/786,425 May 24, 2010	Issued US Patent 8,617,564 December 31, 2013 (expires May 24, 2030 + 166 days of PTA = Nov 6, 2030) Published: US 2010/0330112 December 30, 2010
		CONT 1	US 14/077,676 [November 12, 2013]	Issued US Patent 9,895,436 February 20, 2018 (expires May 24, 2030; no PTA) Published: US 2014/0227307 August 14, 2014
		DIV 1	US 15/860,742 [January 3, 2018]	Pending
		PCT 1	PCT/US2010/035998 May 24, 2010	Nationalized Published: WO 2010/135747 November 25, 2010 30 Month Nat'l Phase: November 22, 2011

			AU 2010 249330	Granted AU Patent No. 2010249330
			BR PI 1012811-5	Pending
			CA 2797937	Pending
			CN 2010 80033258.1	Granted CN Patent ZL2010 80033258.1
			CN Div1 201611104488.8	Pending
			EP 10778532.1	Pending EPO Pub No. 2432504 March 28, 2012
			HK 12109133.5	Pending via EP
			ID W00 2011 04538	Granted ID Patent No. P000037357
			IL 216508	Granted IL Patent 216508
			IN 9854/DELNP/2011	Pending
			JP 2012-512087	Granted JP Patent No. 5771605
			JP Div 2015-129772	Granted JP Patent No. 6096839
			KR 10-2011-7030122	Granted KR Patent No. 10-1746872
			MX/a/2011/012347	Granted MX Patent No. 326881
			MY PI 2011005631	Granted MY Patent 159500A
			NZ 597182	Granted NZ Patent No. 597182
				Abandoned (precautionary filing)
			RU 2011 147153	Granted RU Patent 2585961
			SG 201108653-5	Granted SG Patent No. 176207
			ZA 2011/09444	Granted ZA Patent No. 2011/09444
HERPES SIMPLEX VIRUS TYPE 2: COMPOSITIONS AND METHODS FOR ELICITING AN IMMUNE RESPONSE (NB: same spec as PCT 1, different claims; recombined with claims of PCT1 for Nat'l Phase.)	Long Flechtner Skoberne (Genocea)	PCT-2	PCT/US2010/036000 May 24, 2010	Abandoned in favor of PCT 1 Published: WO 2010/135749 November 25, 2010

Patents and Patent Applications II: GEN-003 + Antiviral Combo; GEN-003 Maintenance

Dosing				
<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>HSV-2 004: GENOCEA-OWNED</i>				

METHODS AND COMPOSITIONS FOR TREATING HERPES (GEN-003 + Antiviral Combo)	Hetherington (Genocea)	PROV 1	US 62/401,148 September 28, 2016	Converted
		PAR	US 15/717,849 September 27, 2017	Pending
		PCT	PCT/US2017/053835 September 27, 2017	Pending 30 Month Nat'l Phase: March 28, 2019
HSV-2 005: GENOCEA-OWNED				
METHODS AND COMPOSITIONS FOR TREATING HERPES (GEN-003 Maintenance Dosing)	Heineman Hetherington Natenshon (Genocea)	PROV 1	US 62/500,992 May 3, 2017	Pending
		PAR	tbd	(converting on May 3, 2018)
		PCT	tbd	(converting on May 3, 2018)

Patents and Patent Applications III: ISCOM Adjuvants, incl. Matrix-M2

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
ISCOM PREPARATION AND USE THEREOF	Morein Lovgren-Bengtsson (Isconova AB, now Novavax, Inc.)	PAR	SE 0202110-3 July 5, 2002	Granted SE Patent No. 03738849.3
		PCT	PCT/SE2003/001180 July 7, 2003	Nationalized Published: WO 2004/004762 January 15, 2004
			AU	Granted AU Patent No. 2003-245220
			BR P10312472-0	Granted BR Patent No. 200312472A
			CA 2491457	Granted CA Patent No. 2 491 457
			EP 03738849.3	Granted EP Patent No. 1 539 231 June 24, 2009 Validated: AT, BE, CH, DE, DK, ES, FR, GB, HU, IT, NL
			JP 2006-511451	Granted JP Patent No. 4636877 February 23, 2011
			NZ	Granted NZ Patent No. 537661
				Abandoned Published: US 2006/0121065 June 8, 2006
			US CONT1 14/587,116 [December 31, 2014]	Pending Published: US 2015/0209425 July 30, 2015
ZA	Granted ZA Patent No. 2005/0073			
aka "QWT": IN-LICENSED				
QUIL A FRACTION WITH LOW TOXICITY AND USE THEREOF	Morein Lovgren-Bengtsson Ekstrom Ranlund Hu (Isconova AB, now Novavax, Inc.)	PAR	SE 0301998-1 July 7, 2003	Granted SE Patent No. 04749076.8
		PCT	PCT/SE2004/01038 July 7, 2004	Nationalized Published: WO 2005/002620 January 13, 2005

		AU	Granted AU Patent No. 2004-254152
		BR P10412444-8	Granted BR Patent No. 200412444A
		CA 2529363	Granted CA Patent No. 2 529 363
		EP 04749076.8	Granted EP Patent No. 1 648 505 September 9, 2009 Validated: AT, CH, DE, DK, ES, FR, GB, IT, PL, NL
		JP 2007-527386	Granted JP Patent No. 4731475 July 27, 2011
		NZ	Granted NZ Patent No. 544299
		US 10/562,866	Issued US Patent 8,821,881 September 2, 2014 (773 days PTA = expires August 19, 2026) Published: US 2006/0239963 October 26, 2006
		US CONT 1 14/445,690 [July 29, 2014]	Abandoned Published: US 2014/0335049 November 13, 2014
		ZA	Granted ZA Patent No. 2006/00151

**Genocea Biosciences Intellectual Property
(co-owned with Boston Children's Hospital)**

Patents and Patent Applications I: Strep. pneumoniae Program

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>STREP. PNEUMONIAE 001a + 001b, 001c, 001d, 001e; GENOCEA CO-OWNED WITH BCH</i>				
ANTIGENS IDENTIFIED IN SCREENS OF MURINE OR HUMAN T CELLS, AND METHODS FOR ELICITING AN IMMUNE RESPONSE TO STREPTOCOCCUS PNEUMONIAE (<i>S. pneu 001a family</i>)	Gierahn Malley (Genocea; Boston Children's Hospital)	PROV 1	61/221,541 June 29, 2009	Converted
		PROV 2	61/240,616 September 8, 2009	Converted
		PROV 3	61/316,267 March 22, 2010	Converted
VACCINES AGAINST STREPTOCOCCUS PNEUMONIAE (<i>S. pneu 001b family</i>)	Malley Gierahn (Boston Children's Hospital; Genocea)	PROV 1	61/240,598 September 8, 2009	Converted

<p>VACCINES AND COMPOSITIONS AGAINST STREPTOCOCCUS PNEUMONIAE NB. Priority to 4 provisionals in 001a and 001b families above.</p> <p><i>(S. pneu 001a + 001b family) aka CMCC 1857</i></p>	<p>Gierahn Malley (Genocea; Boston Children's Hospital)</p>	PAR	12/826,084 June 29, 2010	Pending Published: US 2011/0020386 January 27, 2011
		PCT 1	PCT/US2010/040406 June 29, 2010	Nationalized Published: WO 2011/008548 January 20, 2011 30 Month Nat'l Phase: December 29, 2011
			AU 2010 273708	Granted AU Patent No. 2010273708
			BR PI 1011919-1	Pending
			CA 2803061	Pending
			CN 201080038874.6	Abandoned in favor of Div1 Published: CN 102548572A July 4, 2012
			CN Div1 201710169055.9	Pending
			EP 10800303.9	Pending EPO Pub No. 2448592 May 9, 2012
			HK 12113099.9	Pending via CN
			ID W00 2012 00369	Granted ID Patent No. IDP000045600
			IL 217166	Pending
			IN 791/DELNP/2012	Pending
			JP 2012-518575	Granted JP Patent No. 5931724
			KR 10-2012-7001971	Granted KR Patent No. 10-1748453
			MX/a/2012/000158	Pending
			MY PI 20116340	Pending
			NZ 597858	Granted NZ Patent No. 597858
RU 2011153032	Granted RU Patent No. 2580299			
SG 2011-096898	Abandoned			
SG Div1 10201403702S	Pending			
ZA 2012/00702	Pending			
<p>VACCINES AND COMPOSITIONS AGAINST STREPTOCOCCUS PNEUMONIAE</p> <p><i>(S. pneu 001c family)</i></p> <p>aka CMCC 2249</p>	<p>Gierahn Malley (Genocea; Boston Children's Hospital)</p> <p>Additional inventor: Alderson (PATH) for B + T cell combo aspects of PROV 1 and PCT 2</p>	PROV 1	61/434,818 January 20, 2011 (SP1912 and B+T cell Ag combos)	Converted
		PAR (not PATH)	13/355,468 January 20, 2012 (SP1912)	<p>Issued US Patent No. 9,393,294 July 19, 2016</p> <p><i>(expires Jan 20, 2032; no PTA)</i></p> <p><i>(Maintenance fee due 2020)</i></p> <p>Published: US2012/0189649 July 26, 2012</p>

	DIV 1	US 15/180,844 [June 13, 2016]	Pending Published; US2017/0157234 June 8, 2017
	PCT 1 (not PATH)	PCT/US2012/022128 January 20, 2012 (SP1912)	Nationalized Published: WO2012/100234 July 26, 2012 30 Month Nat'l Phase: July 20, 2013
		AU 2012 207089	Granted AU Patent No. 2012207089
		BR 112013018642-9	Pending
		CA 2861313	Pending
		CN 201280006067.5	Pending
		CN Div 1 2016 10211251.3 (precautionary)	Pending
		EP 12736908.0	Pending EPO Pub No. 2665490 November 27, 2013
		HK 14105692.4	Pending via CN
		ID W00201303721	Granted ID Patent No. IDP000041447B
		IL 227554	Granted IL Patent No. 227554
		IN 7348/DELNP/2013	Pending
		JP 2013-550649	Granted JP Patent No. 6126993
		KR 10-2013-7021818	Pending
		MX/a/2013/008358	Granted MX Patent No. 344120
		MY PI2013002729	Allowed
		NZ 614460	Granted NZ Patent No. 614460
		NZ Div1 709927 (precautionary)	Abandoned
		RU 2013138563	Granted RU Patent No. 2623174
		SG 2013-05549-6	Abandoned
		SG Div1 10201600435	Pending
	ZA 2013/06236	Pending	
	PCT2	PCT/US2012/022127 January 20, 2012 (B+T cell Ag combos)	Abandoned in favor of PCT 1 Nat'l Phase Published: WO2012/100233 July 26, 2012 30 Month Nat'l Phase: July 20, 2013
		AU 2012 207088	Abandoned

<p>FUSED ANTIGEN VACCINES AND COMPOSITIONS AGAINST STREPTOCOCCUS PNEUMONIAE</p> <p>(<i>S. pneu 001d</i> family)</p> <p>aka CMCC 2409</p>	<p>Flechtner Malley</p> <p>(Genocea; Boston Children's Hospital)</p>	PROV 1	61/589,267 January 20, 2012 (<i>T cell Ag fusions</i>)	Converted
		PCT 1	PCT/US2013/022309 January 18, 2013	Pending
			(<i>T cell Ag fusions w/ GAGA data</i>)	Published/republished: WO2013/109995 July 25, 2013 and September 12, 2014
				30 Month Nat'l Phase July 18, 2014
			AU 2013209513	Accepted Oct 5, 2017
			CA 2897020	Abandoned (can reinstate by Jan 18, 2019)
			EP 13738798.1	Pending EPO Pub No. 2804627 November 26, 2014
			JP 2014-553490	Pending
JP Div1 2017-91198 (precautionary)	Pending			
US 14/373,179	Issued US Patent No. 9,765,125 September 19, 2017			
	(expires January 20, 2032; terminal			
	disclaimer against '294 patent)			
	(Maintenance fee due 2021)			
	Published: US2015/0056239 February 5, 2015			
	Abandoned in favor of PCT 1 No publication			
<p>FUSED ANTIGEN VACCINES AND COMPOSITIONS AGAINST STREPTOCOCCUS PNEUMONIAE</p> <p>(<i>S. pneu 001c</i> family: limited B+T cell Ag fusions)</p>	<p>Maisonneuve Briles Munzer</p> <p>(PATH; U Alabama; Genocea)</p>	PROV 1	61/676,276 July 26, 2012	Converted
		PCT4-	PCT/US2013/052352 July 26, 2013	Abandoned Jan 2015 Published: WO 2014/018904 January 30, 2014 30 Month Nat'l Phase: January 26, 2015

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>TH17 ADJUVANT 001: GENOCEA CO-OWNED WITH BCH AND ABANDONED</i>				
INDUCTION OF TH17 IMMUNE RESPONSE	Giorahn Malley (Genocea; Boston Children's Hospital)	PROV	61/609 171 March 9, 2012	Converted
		PCT4	PCT/US2013/029907 March 8, 2013	Abandoned Published: WO 2013/134656 September 12, 2013 30 Month Nat'l Phase September 9, 2014

Genocea Biosciences Intellectual Property:
Antigen Discovery Platform (ATLAS™) and Immuno-Oncology

Patents and Patent Applications I: Antigen Discovery Platform (ATLAS™)

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>ANTIGEN DISCOVERY PLATFORM 001: IN-LICENSED</i>				
BACTERIA EXPRESSING NONSECRETED CYTOLYSIN AS INTRACELLULAR MICROBIAL DELIVERY VEHICLES TO EUKARYOTIC CELLS (PARENT) INTRACELLULAR DELIVERY VEHICLES (CONTINUATIONS)	Portnoy Higgins (U California)	PAR	US 09/133,914 August 13, 1998	Issued, Re-examined US Patent 6,004,815 December 21, 1999 <i>(expires August 13, 2018; no PTA)</i> Re-examination No. 90/008,860 Re-exam Certificate: October 14, 2008
		CONT 1	US 09/469,197 [December 21, 1999]	Issued, Re-examined US Patent 6,287,556 September 11, 2001 <i>(expires August 13, 2018; no PTA)</i> Re-examination No. 90/008,859 Re-exam Certificate: October 14, 2008
		CONT 2	US 09/949,109 [September 7, 2001]	Issued, Re-examined US Patent 6,599,502 July 29, 2003 <i>(expires August 13, 2018; no PTA)</i> Re-examination No. 90/008,857 Re-exam Certificate: October 14, 2008

		CONT 3	US 10/627,452 [July 25, 2003]	Abandoned in favor of CONT4 Published: US 2004/115221 June 17, 2004
		CONT 4	US 11/861,413 [September 26, 2007]	Abandoned Published: US 2008/166366 July 10, 2008
		PCT4-	PCT/US1999/18466 August 13, 1999	Nationalized Published: WO 2000/09733 February 24, 2000
			AU, CA, EP, JP	Abandoned EPO Pub No.1105512 June 13, 2001
ANTIGEN DISCOVERY PLATFORM 002: IN-LICENSED				
<p>COMPOSITIONS AND METHODS OF IDENTIFYING ANTIGENS</p> <p>(aka HU2659; covers both antigen screening methods and single Chlamydia antigen CT788) License to Type I Licensed Products (comprising Harvard Chlamydia antigens) terminated by Genocoea December 8, 2014, fully effective March 8, 2015—applies to any residual claims to CT788 in HU2659</p>	<p>Higgins Gierahn Roan Starnbach (Harvard U)</p>	PROV 1	US 60/775,462 February 21, 2006	Converted
		PROV 2	US 60/817,471 June 29, 2006	Converted
		PCT 1	PCT/US2007/004675 February 21, 2007	Nationalized Published: WO 2007/098255 August 30, 2007 30 Month Nat'l Phase: August 21, 2008
			AU 2007217515	Granted AU Patent No. 2007-217515
			CA 2642748	Granted CA Patent No. 2642748
			CA Div1 2954644 [January 12, 2017]	Pending
			EP 07751440.4 (CT788 only)	Abandoned Granted EP Patent 2 024 538 November 14, 2012 Validated: CH, DE, FR, GB, NL
			EP Div1 12006532.1 [September 17, 2012]	Granted EP Patent 2 537 932 Validated: BE, CH, DE, FR, GB, IR, NE
			EP Div2 16158036.0	Pending EPO Pub No. 3042958 July 13, 2016
			US 12/224,074 [August 15, 2008]	Issued US Patent 9,051,564 June 9, 2015 (expires December 7, 2031, incl. 1750 days of PTA) Published: US 2011/0076288 March 31, 2011

			US CONT1 14/705,815 [May 6, 2015]	Issued US Patent 9,920,314 March 20, 2018 (expires June 19, 2028, incl. 484 days of PTA) Published: US 2016/0090589 March 31, 2016
			US CONT2 15/894,537 [February 12, 2018]	Pending
			CN, IN	Abandoned
ANTIGEN DISCOVERY PLATFORM 003: GENOCEA-OWNED				
ANTIGEN SCREENING SYSTEM	Flechtner Gierahn (Genocea)	PROV 1	US 61/077,323 July 1, 2008	Converted
		PAR	US 12/496,171 July 1, 2009	Issued US Patent 8,313,894 November 20, 2012 <i>(expires August 20, 2030, incl. 415 days of PTA)</i> Published: US 2010/0048418 February 25, 2010
		CONT 1	US 13/627,332 [September 26, 2012]	Issued US Patent 9,045,791 June 2, 2015 <i>(expires Aug 23, 2029, incl. 53 days of PTA)</i> Published US 2013/0102496 April 25, 2013
		CONT 2	US 14/700,573 [Apr 30, 2015]	Issued US Patent 9,873,870 Jan 23, 2018 <i>(expires July 1, 2029; no PTA, terminal disclaimer against PAR)</i> Published: US 2016/0083717 March 24, 2016
		DIV1	US 15/846,602 [Dec 19, 2017]	Pending
		PCT 1	PCT/US2009/049406 July 1, 2009	Nationalized Published: WO 2010/002993 January 7, 2010 30 Month Nat'l Phase: January 3, 2011
			AU 2009266924	Granted AU Patent No. 2009-266924

			AU Div1 2016201551 [March 10, 2016]	Pending
			CA 2728927	Allowed as of May 26, 2017
			CA Div1 2987102 [December 19, 2017]	Pending
			EP 09774443.7	Pending EPO Pub. No. 2300828 March 30, 2011

Patents and Patent Applications II: Immuno-Oncology

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>IMMUNO-ONCOLOGY 001: GENOCEA-OWNED</i>				
TREATMENT METHODS	Flechtner Broom	PROV 1	US 62/473,899 March 20, 2017	Converted
	(Genocea)	PROV 2	US 62/484,258 April 11, 2017	Converted
		PROV 3	US 62/583,233 November 8, 2017	Converted
		PAR	US 15/927,067 March 20, 2018	Pending
		PCT	PCT/US2018/023442 March 20, 2018	Pending 30-month Nat'l Phase: September 20, 2019

**Genocea Biosciences Intellectual Property:
Other HSV-2 Programs (not GEN-003)**

Patents and Patent Applications I: HSV-2 Prophylactic and DNA Vaccine Programs

<u>TITLE</u>	<u>INVENTORS (ASSIGNEE)</u>	<u>APP TYPE</u>	<u>SERIAL NO. FILING DATE</u>	<u>STATUS ISSUE, PUB'N, 30 MONTH NAT'L PHASE DATES</u>
<i>HSV-2 002: GENOCEA-OWNED</i>				

<p>VACCINES AGAINST HERPES SIMPLEX VIRUS TYPE 2: COMPOSITIONS AND METHODS FOR ELICITING AN IMMUNE RESPONSE</p> <p>(Construct for potential prophylactic vaccine composition. As of December 18, 2017: abandon this family except for issued US patent. CPi instructed December 21, 2017 to NOT pay annuities/maintenance except for issued US patent.)</p>	<p>Long Flechtner Skoberne (Genocea)</p>	<p>PROV 1</p>	<p>US 61/417,089 November 24, 2010</p>	<p>Converted</p>
		<p>PCT 1</p>	<p>PCT/US2011/062120 November 23, 2011</p>	<p>Nationalized</p> <p>Published/republished: WO 2012/074881 June 7, 2012 and September 13, 2012</p> <p>30 Month Nat'l Phase: May 24, 2013</p>
			<p>AU 2011 336894</p>	<p>Granted AU Patent No. 2011-336894</p>
			<p>CA 2856697</p>	<p>Pending</p>
			<p>EP 11844992.5</p>	<p>Pending</p> <p>EPO Pub No. 2643014 October 12, 2013</p>
			<p>JP 2013-541060</p>	<p>Granted JP Patent No. 6055776</p>
<p>US 13/989,119 (Maintenance fee due 2021)</p>	<p>Issued US Patent 9,782,474 Oct 10, 2017</p> <p>(expires November 23, 2031; no PTA)</p> <p>Published: US2013/0337000 December 24, 2013</p>			
<p>HSV-2 003:</p>				
<p>NUCLEIC ACID VACCINES AGAINST HERPES SIMPLEX VIRUS TYPE 2: COMPOSITIONS AND METHODS FOR ELICITING AN IMMUNE RESPONSE</p>	<p>Long Flechtner Skoberne (Genocea)</p>	<p>PROV 1</p>	<p>US 61/563,507 November 23, 2011</p>	<p>Converted</p>
		<p>PCT 1</p>	<p>PCT/US2012/066241 November 21, 2012</p>	<p>Pending</p> <p>Published WO 2013/078299 May 30, 2013</p> <p>30 Month Nat'l Phase: May 23, 2014</p>
			<p>AU 2012 340712</p>	<p>Granted AU Patent No. 2012-2340712</p>
			<p>CA 2,885,693</p>	<p>Pending</p>
			<p>EP 12851895.8</p>	<p>Pending</p> <p>EPO Pub No. 2782597 October 1, 2014</p>
<p>JP 2014-543554</p>	<p>Granted JP Patent No. 6199878</p>			
			<p>US 14/360,137</p>	<p>Issued US Patent 9,624,273 April 18, 2017</p> <p>(expires November 21, 2032; no PTA)</p> <p>Published: US 2014/0328870 November 6, 2014</p>

TRADEMARKS

Registered Marks:

- GENOCEA BIOSCIENCES and “Macy” design
 - o Int’l Class 42: Research and development of vaccines
 - o Service Mark Registration No. 3,627,700 (May 26, 2009)
 - o First use/in commerce December 2008
 - o US Application Serial No. 77/232,690

- “Macy” design
 - o Int’l Class 42: Research and development of vaccines
 - o Service Mark Registration No. 3,627,701 (May 26, 2009)
 - o First use/in commerce December 2008
 - o US Application Serial No. 77/232,698

- “Macy” design
 - o Int’l Class 5: Vaccines
 - o Service Mark Registration No. 4,671,241 (January 13, 2015)
 - o First use in commerce June 2014
 - o US Application Serial No. 86/304,063
 - o also WIPO Madrid Protocol Registration No. 1 230 976 (November 4, 2014) for AU, CN, CTM (EU), IN, IL, JP, MX, NZ, NO, KR, RU, SG, CH, TR; and foreign applications/registrations under Paris Convention for AR, BR, CA, ID, MY, TH, VZ, ZA

- GENOCEA
 - o Int’l Class 5: Vaccines
 - o Int’l Class 42: Research and development of vaccines
 - o Service Mark Registration No. 4,801,942 (September 1, 2015)
 - o First use/in commerce August 2012
 - o US Application Serial No. 86/181,328;
 - o also WIPO Madrid Protocol Registration No. 1 218 398 (June 18, 2014) for AU, CN, CTM (EU), IN, IL, JP, MX, NZ, NO, KR, RU, SG, CH, TR; and foreign applications/registrations under Paris Convention for AR, BR, CA, ID, MY, TH, VZ, ZA

LICENSES

Other Party:	Agreement type:	Effective Date:	Covers:
Regents of the University of California aka UC Berkeley	Exclusive License [commercial use; all fields]	Aug 18, 2006 <i>[expires with patent rights on Aug 13, 2018]</i>	Use of Listeriolysin (LLO), antigen screening, delivery: US Patents 6,004,815; 6,287,556; 6,599,502; and now-abandoned continuation app’s

President and Fellows of Harvard College	Exclusive License [commercial use; Type I, Type II Products and Services, not limited by field]	Nov 30, 2007 <i>[superseded]</i>	Harvard Case No. HU2659 (PCT/US07/004675) [also Chlamydia antigens: HU2847(PCT/US08/009282) and HU3095 (PCT/US08/013298)]
	Amended and Restated License Agreement [commercial use; Type I, Type II Licensed Products and Services, not limited by field]	Nov 19, 2012 <i>[expires with patent rights Dec 7, 2031 in US; Feb 21, 2027 exUS]</i>	See above
	Partial Termination Letter	Dec 8, 2014 <i>[fully effective Mar 8, 2015]</i>	Terminates license to Type I Licensed Products only, ie Chlamydia antigens: HU2847 (PCT/US08/009282 family); HU3095 (PCT/US08/013298 family); and residual claims to CT788 in HU2659 family

GEN-004 (Streptococcus pneumoniae) Program

Children's Medical Center Corporation dba Children's Hospital Boston (CHB) aka Boston Children's Hospital	Exclusive License Agreement [commercial use; prevention and treatment of S. pneu]	Feb 18, 2010 <i>[superseded]</i>	Jointly-owned applications on SPN antigens.
	Amendment No. 1		
	Amended and Restated Exclusive License Agreement	Mar 30, 2011 <i>[superseded]</i>	Updates table of licensed IP Jointly-owned applications on SPN antigens.
	Side Letter	Mar 29, 2012 <i>[expires with patent rights of CMCC 2409 on Jan 18, 2033]</i>	
		Mar 23, 2012	Clarifies share of sublicense payments

GEN-003 (HSV-2) Program

University of Pennsylvania	Tangible Research Materials License Agreement	May 4, 2009 [expires May 4, 2019]	gD2t construct
	Tangible Research Materials License Agreement	Oct 7, 2014 [expires Oct 7, 2024]	Hybridoma producing mAb against gH/gL; also rabbit polyclonal Abs and protein
	Tangible Research Materials License Agreement	Aug 21, 2015 [expires Aug 21, 2025]	Six hybridomas producing mAbs to gD2 (eventually for lot release of product)
	Tangible Research Materials License Agreement	Sept 24, 2015 [expires Sept 24, 2025]	gH/gL purified protein
	Memorandum of Understanding	Oct 27, 2015 [expires Aug 21, 2025]	Terms for a commercial license to any of 7 hybridomas against gD2; elect license during term of TRM license above
Expression Systems, LLC	Commercial License Agreement	Aug 15, 2013 [Annual fees due until Sept 2022]	BestBac baculovirus expression vector
Galen Research Ltd	License of Copyright	July 20, 2015 [signed July 29, 2015; “for duration of study and thereafter (for marketing”]	Recurrent Genital Herpes Quality of Life Questionnaire, Herpes Symptom Checklist, and Herpes Outbreak Impact Questionnaire
Northwestern University	Materials License Agreement	Dec 17, 2015 [retroactive to June 1, 2011; expires June 1, 2021]	Herpes virus reporter constructs HSV-2 333/Gal and HSV-1 KOS/tk12 (Dr. Richard Longnecker lab)
	Side Letter	Aug 16, 2016	Authorizes transfer to CRO

Adjuvants

Isconova AB, now Novavax, Inc.	License and Collaboration Agreement + Exhibits + Amendments	Aug 5, 2009	Matrix-M2: research collaboration, manufacturing and supply
	Amendment No. 1		Cost of clinical supplies
	Amendment No. 2	Mar 19, 2010	Selection of Genocea exclusive and non-exclusive fields
		June 18, 2010 [confirmed June 24, 2010]	Replacement excluded field
	Amendment No. 3	Aug 17, 2010	Replacement exclusive and non-exclusive fields
	Amendment No. 4	Aug 16, 2011	Extension of time
	Amendment No. 5	Oct 19, 2011	Revision of cost
	Amendment No. 6	Feb 6, 2012	

Oncovir, Inc.	License and Supply Agreement	Jan 26, 2018 [active until terminated; Royalty Term expires Dec 2028]	Supply of Hiltonol (poly IC-LC adjuvant); Oncovir IP (US 7,439,349; US 7,834,064; US 8,592,391; EP 1778186)
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EXHIBIT E

BORROWER'S DEPOSIT ACCOUNTS AND INVESTMENT ACCOUNTS

ACCOUNT	ACCOUNT DETAILS
HRA	[* * *]
SVB Analysis Checking	[* * *]
SVB Collateral MMA	[* * *]
SVB Asset Management (MM & Treasuries)	[* * *]
Oppenheimer (MM & CDs)	[* * *]
Oppenheimer	[* * *]

[Borrower please update accordingly]

EXHIBIT F

COMPLIANCE CERTIFICATE

Hercules Capital, Inc.
400 Hamilton Avenue, Suite 310
Palo Alto, CA 94301

Reference is made to that certain Amended and Restated Loan and Security Agreement dated [], 2018 and all ancillary documents entered into in connection with such Amended and Restated Loan and Security Agreement all as may be amended from time to time, (hereinafter referred to collectively as the "Loan Agreement") by and among Hercules Capital, Inc., the several banks and other financial institutions or entities from time to time party thereto (collectively, the "Lender") and Hercules Capital, Inc., as agent for the Lender (the "Agent") and Genoclea Biosciences, Inc. (the "Borrower") as Borrower. All capitalized terms not defined herein shall have the same meaning as defined in the Loan Agreement.

The undersigned is an officer of the Borrower, knowledgeable of all Borrower financial matters, and is authorized to provide certification of information regarding the Borrower; hereby certifies in his/her individual capacity as an officer of the Borrower and not in his/her individual capacity that in accordance with the terms and conditions of the Loan Agreement, the Borrower is in compliance for the period ending _____ of all covenants, conditions and terms and hereby reaffirms that all representations and warranties contained therein are true and correct in all material respects on and as of the date of this Compliance Certificate with the same effect as though made on and as of such date, except to the extent such representations and warranties expressly relate to an earlier date, after giving effect in all cases to any standard(s) of materiality contained in the Loan Agreement as to such representations and warranties.

Attached are the required documents supporting the above certification. The undersigned further certifies that these are prepared in accordance with GAAP (except for the absence of footnotes with respect to unaudited financial statement and subject to normal year end adjustments) and are consistent from one period to the next except as explained below.

REPORTING REQUIREMENT	REQUIRED	CHECK IF ATTACHED
Interim Financial Statements	Monthly within 30 days	
Interim Financial Statements	Quarterly within 45 days for first three quarters/ Form 10-Q	
Audited Financial Statements	FYE within 150 days/Form 10-K	

FINANCIAL COVENANT	REQUIRED	ACTUAL
Liquidity	Lesser of (i) the aggregate principal amount of the Term Loan Advance outstanding, or (ii) one hundred percent (100%) of all Eligible Cash of Borrower and its Subsidiaries. For purposes of clarity, if Eligible Cash is less than the aggregate principal amount of the Term Loan Advance outstanding, Securities Corporation shall hold no Eligible Cash	

Has the Borrower received any written notice or claim, oral notice or claim, challenging or questioning Borrower's ownership in any Intellectual Property material to Borrower's business (or written notice of any claim challenging or questioning the ownership in any licensed Intellectual Property material to Borrower's business of the owner thereof) or suggesting that any third party has any claim of legal or beneficial ownership with respect thereto? If yes, provide details below:

Yes No

The undersigned hereby also confirms the below disclosed accounts represent all depository accounts and securities accounts presently open in the name of each Borrower or Subsidiary or Affiliate, as applicable.

	Depository AC #	Financial Institution	Account Type (Depository / Securities)	Last Month Ending Account Balance	Purpose of Account
BORROWER Name/Address:					
	1				

	2					
	3					
	4					
	5					
	6					
	7					

**BORROWER SUSIDIARY /
AFFILIATE COMPANY**
Name/Address

	1					
	2					
	3					
	4					
	5					
	6					
	7					

Very Truly Yours,

GENOCEA BIOSCIENCES, INC.

By: _____

Name: _____

Its: _____

EXHIBIT G

FORM OF JOINDER AGREEMENT

This Joinder Agreement (the "Joinder Agreement") is made and dated as of [], 20[], and is entered into by and between _____, a _____ corporation ("Subsidiary"), and HERCULES CAPITAL, INC., a Maryland

corporation (as "Agent").

RECITALS

A. Subsidiary's Affiliate, GENOCEA BIOSCIENCES, INC. ("Borrower") [has entered/desires to enter] into that certain Amended and Restated Loan and Security Agreement dated [], 2018, with the several banks and other financial institutions or entities from time to time party thereto as lender (collectively, the "Lender") and Agent, as such agreement may be amended (the "Loan Agreement"), together with the other agreements executed and delivered in connection therewith;

B. Subsidiary acknowledges and agrees that it will benefit both directly and indirectly from Borrower's execution of the Loan Agreement and the other agreements executed and delivered in connection therewith;

AGREEMENT

NOW THEREFORE, Subsidiary and Agent agree as follows:

1. The recitals set forth above are incorporated into and made part of this Joinder Agreement. Capitalized terms not defined herein shall have the meaning provided in the Loan Agreement.
2. By signing this Joinder Agreement, Subsidiary shall be bound by the terms and conditions of the Loan Agreement the same as if it were the Borrower (as defined in the Loan Agreement) under the Loan Agreement, mutatis mutandis, provided however, that (a) with respect to (i) Section 5.1 of the Loan Agreement, Subsidiary represents that it is an entity duly organized, legally existing and in good standing under the laws of [], (b) neither Agent nor Lender shall have any duties, responsibilities or obligations to Subsidiary arising under or related to the Loan Agreement or the other agreements executed and delivered in connection therewith, (c) that if Subsidiary is covered by Borrower's insurance, Subsidiary shall not be required to maintain separate insurance or comply with the provisions of Sections 6.1 and 6.2 of the Loan Agreement, and (d) that as long as Borrower satisfies the requirements of Section 7.1 of the Loan Agreement, Subsidiary shall not have to provide Agent separate Financial Statements. To the extent that Agent or Lender has any duties, responsibilities or obligations arising under or related to the Loan Agreement or the other agreements executed and delivered in connection therewith, those duties, responsibilities or obligations shall flow only to Borrower and not to Subsidiary or any other Person or entity. By way of example (and not an exclusive list): (i) Agent's providing notice to Borrower in accordance with the Loan Agreement or as otherwise agreed among Borrower, Agent and Lender shall be deemed provided to Subsidiary; (ii) a Lender's providing an Advance to Borrower shall be deemed an Advance to Subsidiary; and (iii) Subsidiary shall have no right to request an Advance or make any other demand on Lender.
3. Subsidiary agrees not to certificate its equity securities without Agent's prior written consent, which consent may be conditioned on the delivery of such equity securities to Agent in order to perfect Agent's security interest in such equity securities.
4. Subsidiary acknowledges that it benefits, both directly and indirectly, from the Loan Agreement, and hereby waives, for itself and on behalf on any and all successors in interest (including without limitation any assignee for the benefit of creditors, receiver, bankruptcy trustee or itself as debtor-in-possession under any bankruptcy proceeding) to the fullest extent provided by law, any and all claims, rights or defenses to the enforcement of this Joinder Agreement on the basis that (a) it failed to receive adequate consideration for the execution and delivery of this Joinder Agreement or (b) its obligations under this Joinder Agreement are avoidable as a fraudulent conveyance.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

[SIGNATURE PAGE TO JOINDER AGREEMENT]

SUBSIDIARY:

_____.

By:
Name:
Title:

Address:

Telephone: _____
Facsimile: _____

AGENT:

HERCULES CAPITAL, INC.

By: _____
Name: _____
Title: _____

Address:
400 Hamilton Ave., Suite 310
Palo Alto, CA 94301
Facsimile: 650-473-9194
Telephone: 650-289-3060

EXHIBIT H
ACH DEBIT AUTHORIZATION AGREEMENT

Hercules Capital, Inc.
400 Hamilton Avenue, Suite 310
Palo Alto, CA 94301

Re: Amended and Restated Loan and Security Agreement dated April [____], 2018, and as amended from time to time by and among Genoccea Biosciences, Inc. (“Borrower”), Hercules Capital, Inc., as agent (“Agent”) and the lenders party thereto (collectively, the “Lender”) (the “Agreement”)

In connection with the above referenced Agreement, Borrower hereby authorizes Agent to initiate debit entries for (i) the periodic payments due under the Agreement and (ii) out-of-pocket legal fees and costs incurred by Agent or Lender pursuant to Section 11.11 of the Agreement to Borrower’s account indicated below. Borrower authorizes the depository institution named below to debit to such account.

DEPOSITORY NAME SILICON VALLEY BANK	BRANCH 3003 TASMAN DRIVE
CITY SANTA CLARA	STATE AND ZIP CODE CALIFORNIA, 95054
TRANSIT/ABA NUMBER 121140399	ACCOUNT NUMBER 3300542794

This authority will remain in full force and effect so long as any amounts are due under the Agreement.

GENOCEA BIOSCIENCES, INC.

(Borrower)(Please Print)

By: _____

Date: _____

Acknowledged and agreed to:

AGENT:

HERCULES CAPITAL, INC.

By: _____

Name: _____

Title: _____

LENDER:

HERCULES CAPITAL, INC.

By: _____

Name: _____

Title: _____

Address:

400 Hamilton Ave., Suite 310

Palo Alto, CA 94301

Facsimile: 650-473-9194

Telephone: 650-289-3060

SCHEDULE 1

SUBSIDIARIES

Genocea Securities Corp., a Massachusetts securities corporation.

SCHEDULE 1.1

COMMITMENTS

LENDER	TERM COMMITMENT
HERCULES CAPITAL, INC.	\$14,000,000
TOTAL COMMITMENTS	\$14,000,000

SCHEDULE 1A

EXISTING PERMITTED INDEBTEDNESS

None.

SCHEDULE 1B
EXISTING PERMITTED INVESTMENTS

None.

SCHEDULE 1C
EXISTING PERMITTED LIENS

None.

SCHEDULE 5.3
CONSENTS, ETC.

None.

SCHEDULE 5.5
ACTIONS BEFORE GOVERNMENTAL AUTHORITIES

shareholders filed placeholder complaints against the Borrower and certain of its officers alleging violations of the federal securities laws in connection with with the Borrower's disclosures related to GEN-003, a Phase 3-ready investigational immunotherapy for the treatment of genital herpes infections. On February 12, 2018, the Court appointed the Genocea Investor Group (a group of five purported shareholders) as lead plaintiff in the consolidated proposed class action, and appointed Scott+Scott LLP, Levi & Korsinsky LLP, and Block & Leviton LLP as lead counsel. The lead plaintiff filed an amended complaint on March 30, 2018. The defendants anticipate filing a motion to dismiss on May 14, 2018, and intend to contest the case vigorously.

Kahr v. William Clark et al., U.S. District Court (Del.), Civil Action No. 18-cv-00186-UNA. On January 31, 2018, Barry Kahr, a purported Company shareholder, filed a putative shareholder derivative complaint against certain of the Borrower's officers and directors, naming the Borrower as a derivative defendant. The complaint alleges violations of the Securities Exchange Act of 1934 and Rule 14a-9 in connection with disclosures made in the Borrower's Schedule 14A Proxy Statement, filed with the SEC on April 21, 2017. The complaint also alleges claims for breach of fiduciary duty, unjust enrichment, and waste of corporate assets. No defendant has been served in this action.

SCHEDULE 5.8

TAX MATTERS

None.

SCHEDULE 5.10

INTELLECTUAL PROPERTY

None.

2285337.4

**CERTIFICATION PURSUANT TO
SECURITIES EXCHANGE ACT RULES 13a-14 and 15d-14
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, William D. Clark, President & Chief Executive Officer, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Genocoea Biosciences, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ WILLIAM D. CLARK

William D. Clark
President & Chief Executive Officer

Date: August 3, 2018

**CERTIFICATION PURSUANT TO
SECURITIES EXCHANGE ACT RULES 13a-14 and 15d-14
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Michael Alfieri, Principal Financial Officer, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Genocoea Biosciences, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ MICHAEL ALFIERI

Michael Alfieri

Vice President, Finance and Principal Financial Officer

Date: August 3, 2018

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of Genocea Biosciences, Inc. (the "Company") for the period ended June 30, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, the undersigned, William D. Clark, as the President & Chief Executive Officer of the Company, does 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 my knowledge:

- (1) The Report 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/ WILLIAM D. CLARK

William D. Clark*

President & Chief Executive Officer

Date: August 3, 2018

* A signed original 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.

The foregoing certification is being furnished solely pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code) and is not being filed as part of the Form 10-Q or as a separate disclosure document.

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of Genocoea Biosciences, Inc. (the "Company") for the period ended June 30, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, the undersigned, William D. Clark, as the Principal 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 my knowledge:

- (1) The Report 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/ MICHAEL ALFIERI

Michael Alfieri*

Vice President, Finance and Principal Financial Officer

Date: August 3, 2018

*A signed original 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.

The foregoing certification is being furnished solely pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code) and is not being filed as part of the Form 10-Q or as a separate disclosure document.

