UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-Q

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

For the quarterly period ended June 30, 2020

OR

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

For the transition period from to
Commission File Number: 001-36289

Genocea Biosciences, Inc.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**51-0596811**
(State or Other Jurisdiction of Incorporation or Organization)	(IRS Employer Identification No.)

100 Acorn Park Drive
Cambridge, Massachusetts 02140
(Address of Principal Executive Offices) (Zip Code)
Registrant's Telephone Number, Including Area Code: (617) 876-8191

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading symbol(s)	Name of each exchange on which registered
Common stock, $0.001 par value per share	GNCA	NASDAQ Capital Market

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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	☐	Accelerated filer	☒
Non-accelerated filer	☐	Smaller reporting company	☒
		Emerging growth company	☐

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

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

As of July 21, 2020, there were 29,964,496 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 conduct clinical trials for GEN-009 and GEN-011, to continue preclinical studies for our other product candidates and to continue our investments in immuno-oncology;
- our estimates regarding expenses, future revenues, capital requirements, the sufficiency of our current and expected cash resources and our need for additional financing;
- the timing of, and our ability to, obtain and maintain regulatory approvals for our product candidates;
- the effect of the novel coronavirus (COVID-19) pandemic on the economy generally and on our business and operations specifically, including our research and development efforts, our clinical trials and our employees, and the potential disruptions in supply chains and to our third party manufacturers, including the availability of materials and equipment;
- the potential benefits of strategic partnership agreements and our ability to enter into strategic partnership arrangements;
- our intellectual property position;
- the rate and degree of market acceptance and clinical utility of any approved product candidate;
- our ability to quickly and efficiently identify and develop product candidates; and
- our commercialization, marketing and manufacturing capabilities and strategies.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make or collaborations or strategic partnerships we may enter into. 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.

This Quarterly Report on Form 10-Q includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. While we believe these industry publications and third-party research, surveys and studies are reliable, we have not independently verified such data.

Genocea Biosciences, Inc.
Form 10-Q
For the Quarter Ended June 30, 2020

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PART I. FINANCIAL INFORMATION
Item 1. Financial Statements

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

	June 30, 2020	December 31, 2019
Assets		
Current assets:		
Cash and cash equivalents	$ 22,108	$ 40,127
Prepaid expenses and other current assets	2,559	1,457
Total current assets	24,667	41,584
Property and equipment, net	2,519	2,617
Right of use assets	11,265	6,306
Restricted cash	631	631
Other non-current assets	1,434	1,473
Total assets	$ 40,516	$ 52,611
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 678	$ 553
Accrued expenses and other current liabilities	4,071	4,611
Deferred revenue	1,094	—
Lease liabilities	2,053	1,117
Current portion of long-term debt	13,627	—
Total current liabilities	21,523	6,281
Non-current liabilities:		
Long-term debt, net of current portion	—	13,407
Warrant liability	1,483	2,486
Lease liabilities, net of current portion	9,473	5,395
Total liabilities	32,479	27,569
Commitments and contingencies (Note 6)		
Stockholders' equity:		
Preferred stock, $0.001 par value; (shares authorized of 25,000,000 at June 30, 2020 and December 31, 2019; 1,635 shares issued and outstanding at June 30, 2020 and December 31, 2019)	701	701
Common stock, $0.001 par value; (shares authorized of 170,000,000 at June 30, 2020 and 85,000,000 at December 31, 2019, 29,964,496 shares issued and outstanding at June 30, 2020 and 27,452,900 shares issued and outstanding at December 31, 2019)	30	27
Additional paid-in capital	362,434	355,268
Accumulated deficit	(355,128)	(330,954)
Total stockholders' equity	8,037	25,042
Total liabilities and stockholders' equity	$ 40,516	$ 52,611

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,	
	2020	2019	2020	2019
License revenue	$ 906	$ —	$ 906	$ —
Operating expenses:				
Research and development	8,587	6,849	18,574	13,309
General and administrative	3,480	3,217	6,868	6,234
Total operating expenses	12,067	10,066	25,442	19,543
Loss from operations	(11,161)	(10,066)	(24,536)	(19,543)
Other (expense) income:				
Change in fair value of warrants	222	3,870	1,003	(1,917)
Interest expense, net	(365)	(299)	(624)	(601)
Other expense	(17)	—	(17)	(1)
Total other (expense) income	(160)	3,571	362	(2,519)
Net loss	$ (11,321)	$ (6,495)	$ (24,174)	$ (22,062)
Comprehensive loss	$ (11,321)	$ (6,495)	$ (24,174)	$ (22,062)
Net loss per share - basic and diluted	$ (0.39)	$ (0.42)	$ (0.84)	$ (1.57)
Weighted-average number of common shares used in computing net loss per share	29,142	15,344	28,642	14,035

See accompanying notes to unaudited condensed consolidated financial statements.

Genocea Biosciences, Inc.
Condensed Consolidated Statements of Stockholders' Equity
(unaudited)
(in thousands)

	Common Shares		Preferred Shares Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2019	27,453	$ 27	$ 701	$ 355,268	$ (330,954)	$ 25,042
Issuance of common stock, net	187	1	—	439	—	440
Stock-based compensation expense	—	—	—	384	—	384
Issuance of common stock under employee benefit plans	4	—	—	—	—	—
Net loss	—	—	—	—	(12,853)	(12,853)
Balance at March 31, 2020	27,644	$ 28	$ 701	$ 356,091	$ (343,807)	$ 13,013
Issuance of common stock, net	2,287	2	—	5,797	—	5,799
Issuance of common stock; ESPP purchase	33	—	—	60	—	60
Stock-based compensation expense	—	—	—	486	—	486
Net loss	—	—	—	—	(11,321)	(11,321)
Balance at June 30, 2020	29,964	$ 30	$ 701	$ 362,434	$ (355,128)	$ 8,037

	Common Shares		Preferred Shares Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balance at December 31, 2018	10,847	$ 11	$ 701	$ 298,627	$ (292,004)	$ 7,335
Issuance of common stock, net	3,200	3	—	14,023	—	14,026
Exercise of stock options	3	—	—	12	—	12
Stock-based compensation expense	—	—	—	429	—	429
Net loss	—	—	—	—	(15,567)	(15,567)
Balance at March 31, 2019	14,050	$ 14	$ 701	$ 313,091	$ (307,571)	$ 6,235
Issuance of common stock, net	12,074	12	—	38,155	—	38,167
Issuance of common stock; ESPP purchase	24	—	—	48	—	48
Exercise of stock options	2	—	—	9	—	9
Stock-based compensation	—	—	—	474	—	474
Net loss	—	—	—	—	(6,495)	(6,495)
Balance at June 30, 2019	26,150	$ 26	$ 701	$ 351,777	$ (314,066)	$ 38,438

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,	
	2020	**2019**
Operating activities		
Net loss	$ (24,174)	$ (22,062)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	556	550
Stock-based compensation	870	902
Change in fair value of warrant liability	(1,003)	1,917
Gain (loss) on sale of equipment	3	(19)
Non-cash interest expense	220	41
Asset impairment	97	—
Changes in operating assets and liabilities	(281)	729
Net cash used in operating activities	(23,712)	(17,942)
Investing activities		
Purchases of property and equipment	(550)	(654)
Proceeds from sale of equipment	22	19
Net cash used in investing activities	(528)	(635)
Financing activities		
Proceeds from issuance of common stock, net	6,239	52,194
Proceeds from the issuance of common stock under ESPP	60	48
Payments on finance lease	(78)	—
Proceeds from exercise of stock options	—	21
Repayment of long-term debt	—	(1,377)
Net cash provided by financing activities	6,221	50,886
Net (decrease) increase in cash, cash equivalents and restricted cash	$ (18,019)	$ 32,309
Cash, cash equivalents and restricted cash at beginning of period	40,758	26,677
Cash, cash equivalents and restricted cash at end of period	$ 22,739	$ 58,986
Non-cash financing activities and supplemental cash flow information		
Right-of-use asset obtained in exchange for lease liabilities	$ 5,931	$ 5,385
Cash paid in connection with operating lease liabilities	$ 1,097	$ 816
Cash paid for interest	$ 523	$ 577
Property and equipment included in accounts payable and accrued expenses	$ —	$ 127

See accompanying notes to unaudited condensed consolidated financial statements.

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 immunotherapies using its ATLAS™ proprietary discovery platform. The ATLAS platform profiles each patient's $CD4^+$ and $CD8^+$ T cell immune responses to every potential target or "antigen" in that patient's tumor. The Company believes that this approach optimizes antigen selection for immunotherapies such as cancer vaccines and cellular therapies. Consequently, the Company believes that ATLAS could lead to more immunogenic and efficacious cancer immunotherapies.

The Company's most advanced program is GEN-009, a personalized neoantigen cancer vaccine, for which it is conducting a Phase 1/2a clinical trial. The GEN-009 program uses ATLAS to identify neoantigens, or immunogenic tumor mutations unique to each patient, for inclusion in each patient's GEN-009 vaccine. The Company is also advancing GEN-011, a neoantigen-specific adoptive T cell therapy program that also relies on ATLAS. In June 2020, the Company submitted an Investigational New Drug ("IND") application to support the initiation of a Phase 1/2 clinical trial. The Company has received verbal notification from the U.S. Food and Drug Administration ("FDA") that the agency has completed its review of the Company's IND application for GEN-011. In this verbal feedback, the FDA informed the Company that it is placing the IND on clinical hold until it receives additional information pertaining to certain third-party reagents used in the GEN-011 manufacturing process. These reagents are not a component of the final cell therapy product. The Company expects to receive official written communication from the FDA regarding the hold and the FDA's position in the near future and plans to work with the FDA to resolve their questions as quickly as possible.

The Company is devoting substantially all of its efforts to product research and development, initial market development, and raising capital. The Company has not generated any product revenue related to its primary business purpose to date and is subject to a number of risks and uncertainties common to companies in the biotech and pharmaceutical industry, including, but not limited to, the risks associated with the uncertainty of success of its preclinical and clinical trials; the challenges associated with gaining regulatory approval of product candidates; the risks associated with commercializing pharmaceutical products, if approved for marketing and sale; the potential for development by third parties of new technological innovations that may compete with the Company's products; the dependence on key personnel; the challenges of protecting proprietary technology; the need to comply with government regulations; the high cost of drug development; competition from other companies; the uncertainty of being able to secure additional capital when needed to fund operations; and the challenges and uncertainty associated with the recent outbreak of the coronavirus, or referred to as COVID-19, that have arisen in the global economy, that could adversely impact the Company's operations, supply chain, preclinical development work, clinical trials and ability to raise capital.

Accounting Standards Codification ("ASC") 205-40, *Presentation of Financial Statements-Going Concern* ("ASC 205-40"), requires the Company to evaluate whether conditions and/or events raise substantial doubt about its ability to meet its future financial obligations as they become due within one year after the financial statements are issued. As of June 30, 2020, the Company had an accumulated deficit of $355.1 million and anticipates that it will continue to incur significant operating losses for the foreseeable future as it continues to develop its product candidates. Until such time, if ever, as the Company can generate substantial product revenue and achieve profitability, the Company expects to finance its cash needs through a combination of equity offerings, debt financing, strategic transactions, or other sources of funding. If the Company is unable to raise additional funds when needed, the Company may be required to implement further cost reduction strategies, including ceasing development of GEN-009, GEN-011, or other corporate programs and activities.

As reflected in the consolidated financial statements, the Company had available cash and cash equivalents of $22.1 million at June 30, 2020. In addition, the Company had cash used in operating activities of $23.7 million for the six months ended June 30, 2020. In July 2020, the Company entered into a private placement financing transaction in which the Company will issue shares of its common stock, pre-funded warrants and warrants for gross cash proceeds of approximately $80.0 million, before deducting fees to the placement agent and other offering expenses payable by the Company. The closing of the private placement financing is expected to occur on or about July 24, 2020. The proceeds from this financing combined with the Company's available cash and cash equivalents at June 30, 2020 are expected to fund operations to mid-2022.

2. Summary of significant accounting policies

The information included in this Quarterly Report on Form 10-Q should be read in conjunction with the Company's audited consolidated financial statements and the accompanying notes included in the Company's Annual Report on Form 10-K for the year ended December 31, 2019 ("2019 Form 10-K"). The Company's accounting policies are described in the "Notes to Consolidated Financial Statements" in the Company's 2019 Form 10-K and updated, as necessary, in the Company's Quarterly Reports on Form 10-Q. The December 31, 2019 condensed consolidated balance sheet data presented for comparative purposes were derived from the Company's audited financial statements but do not include all disclosures required by U.S. GAAP. The results of operations for the three and six months ended June 30, 2020 are not necessarily indicative of the operating results for the full year or for any other subsequent interim period.

Basis of presentation

The accompanying unaudited condensed consolidated financial statements include those accounts of the Company and a wholly owned subsidiary after elimination of all intercompany accounts and transactions. The Company operates as one segment, which is discovering, researching, developing and commercializing novel cancer immunotherapies.

Use of estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. On an ongoing basis, the Company's management evaluates its estimates, which include, but are not limited to, estimates related to clinical trial accruals, estimates related to prepaid and accrued research and development expenses, revenue recognition, and warrants to purchase redeemable securities. 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.

Significant accounting policies

There were no changes to significant accounting policies during the six months ended June 30, 2020, as compared to the those disclosed in the 2019 Form 10-K, except as set forth below.

Foreign Currency Translation

Realized and unrealized gains and losses resulting from foreign currency transactions denominated in currencies other than the functional currency are reflected as other (expense) income, net in the consolidated statements of operations in accordance with ASC Topic 830, *Foreign Currency Matters* ("ASC 830").

Revenue Recognition

In accordance with ASC Topic 606, *Revenue from Contracts with Customers* ("ASC 606"), revenue is recognized when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled in exchange for these goods and services. To achieve this core principle, the Company applies the following five steps: 1) identify the customer contract; 2) identify the contract's performance obligations; 3) determine the transaction price; 4) allocate the transaction price to the performance obligations; and 5) recognize revenue when or as a performance obligation is satisfied.

Licensing arrangements are analyzed to determine whether the promised goods or services, which include licenses and research and development materials and services, are distinct or whether they must be accounted for as part of a combined performance obligation. If the license is considered not to be distinct, the license would then be combined with other promised goods or services as a combined performance obligation. Certain contracts contain options to obtain future goods or services at a discount, which would not be provided without entering into the contract. These options are considered material rights, and therefore, are accounted for as separate performance obligations. The Company then determines the fair value to be allocated to this promised service.

The transaction price is determined based on the consideration to which the Company will be entitled. The consideration promised may include fixed amounts, variable amounts, or both. For milestone payments, the Company estimates the amount of variable consideration by using the most likely amount method. In making this assessment, the Company evaluates factors such as the clinical, commercial and other risks that must be overcome to achieve the milestone. The Company re-evaluates the probability of achievement of such variable consideration and any related constraints at each reporting period. The Company includes variable

consideration in the transaction price to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price among the performance obligations on a relative standalone selling price basis unless the transaction price is variable and meets the criteria to be allocated entirely to a performance obligation or to a distinct good or service that forms part of a single performance obligation.

The Company allocates the transaction price based on the estimated standalone selling price of the underlying performance obligations. The Company must develop assumptions that require judgment to determine the standalone selling price for each performance obligation identified in the contract. The Company utilizes key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs to complete the respective performance obligation. Certain variable consideration is allocated specifically to one or more performance obligations in a contract when the terms of the variable consideration relate to the satisfaction of the performance obligation and the resulting amounts allocated to each performance obligation are consistent with the amount the Company would expect to receive for each performance obligation. The transaction price is generally allocated to each separate performance obligation on a relative standalone selling price basis.

When a performance obligation is satisfied, revenue is recognized for the amount of the transaction price allocated to that performance obligation on a relative standalone selling price basis, which excludes estimates of variable consideration that are constrained. Significant management judgment is required in determining the level of effort required under an arrangement and the period over which the Company is expected to complete its performance obligations under an arrangement.

For performance obligations consisting of licenses and other promises, the Company utilizes judgment to assess whether the combined performance obligation is satisfied over time or at a point in time and the recognition pattern of non-refundable, up-front fees.

Contract liabilities

The Company records a contract liability, classified in deferred revenue on the condensed consolidated balance sheet, when it has received payment but has not yet satisfied the related performance obligations. In the event of an early termination of a contract with customer, any contract liabilities would be recognized in the period in which all Company obligations under the agreement have been fulfilled.

New Accounting Pronouncements

The following new accounting pronouncements were adopted by the Company on January 1, 2020:

In 2016, the Financial Accounting Standards Board (“FASB”) issued ASU 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* (“ASU 2016-13”), which amends the impairment model by requiring entities to use a forward-looking approach based on expected losses to estimate credit losses on certain types of financial instruments, including trade receivables and available-for-sale debt securities. The Company early adopted the standard on January 1, 2020. Based on the composition of the Company's investment portfolio, which includes only money market funds, and the insignificance of the Company's other financial assets, current market conditions, and historical credit loss activity, the adoption of this standard did not have a material impact on the Company's consolidated financial statements and related disclosures.

In 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement* (“ASU 2018-13”). The new standard requires public entities to disclose certain new information and modifies some disclosure requirements. The Company adopted the standard on the required effective date of January 1, 2020. This standard did not have a material impact on the Company's disclosures.

In 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40)*: *Customer’s Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* (“ASU 2018-15”). ASU 2018-15 requires a customer in a cloud computing arrangement that is a service contract to follow the internal-use software guidance in Accounting Standards Codification 350-40 to determine which implementation costs to defer and recognize as an asset. The Company adopted the standard on the required effective date of January 1, 2020. This standard did not have a material impact on the Company's consolidated financial statements and related disclosures.

The following new accounting pronouncements have been issued but are not yet effective:

In 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* ("ASU 2019-12"). ASU 2019-12 simplifies the accounting for income taxes and will be effective beginning after December 15, 2020. The Company is currently evaluating the impact of ASU 2019-12 in the consolidated financial statements, including accounting policies, processes, and systems.

3. Revenue

In May 2020, the Company entered into a material transfer agreement (the "MTA") with Shionogi & Co., Ltd. ("Shionogi") pursuant to which the Company agreed to transfer certain HSV-2 antigens from its GEN-003 program to Shionogi to evaluate the potential development of a novel HSV-2 vaccine. In connection with the agreement, the Company provided Shionogi with an option to negotiate an exclusive development and commercialization license for the HSV-2 antigens.

Under the terms of the MTA, Shionogi paid the Company a $2.0 million non-refundable, creditable (with respect to the up-front fee pursuant to a development and commercialization agreement) up-front fee and the Company could receive an additional payment if Shionogi elects to perform certain experiments. Prior to the expiration of the MTA, Shionogi has the option to negotiate a development and commercialization agreement. If executed, the terms of the development and commercialization agreement are expected to include an upfront payment, regulatory and sales milestones, and tiered royalties. Final terms of the development and commercialization agreement will be based on evaluation of the HSV-2 assets and overall diligence. If licensed, Shionogi will assume responsibility for global development and commercialization of an HSV-2 vaccine product.

Management evaluated the promised goods and services within the MTA and determined those which represented separate performance obligations. As a result, management concluded there were two separate performance obligations at the inception of the MTA: (i) a combined performance obligation consisting of a limited use research license and the delivery of the initial antigen materials and (ii) the right to negotiate a license prior to expiration of the MTA, which was deemed to be a material right. The Company determined that the exclusive limited use research license and the delivery of the initial antigen materials should be combined as they are not capable of being distinct. A third party would not be able to provide the initial antigen materials as it contains the Company's proprietary intellectual property and Shionogi could not benefit from the research license without the initial antigen materials. The Company determined that the option to negotiate the development and commercialization agreement prior to the expiration of the MTA is a material right. The $2.0 million upfront fee associated with the MTA is creditable against the upfront fee for the development and commercialization agreement and represents a discount that would otherwise not be available to the customer without entering into the MTA.

The Company estimated the standalone selling price of the initial antigen materials based on the expected cost plus a margin approach. The Company developed its standalone selling price for the material right by applying a probability-weighted likelihood that Shionogi will exercise its option to license the HSV-2 assets.

The transaction price was comprised of fixed consideration of $2.0 million. The fixed consideration was allocated to each of the performance obligations based on the relative standalone selling prices. The Company concluded the additional payment represents variable consideration and should be constrained, and therefore, did not allocate variable consideration to any of the performance obligations.

The amount allocated to the limited use research license and the delivery of the initial antigen materials, or $0.9 million, was recognized upon delivery of the materials to Shionogi in the second quarter of 2020. The amount allocated to the material right will be recognized upon either (i) the execution of a development and commercialization agreement or (ii) the termination of the MTA and is recorded as deferred revenue on the Company's condensed consolidated balance sheet.

4. Fair value of financial instruments

The Company has certain financial assets and liabilities recorded at fair value which have been classified as Level 1, 2 or 3 within the fair value hierarchy as described in the accounting standards for fair value measurements.

- Level 1—Fair values are determined by utilizing quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company has the ability to access;
- Level 2—Fair values are determined by utilizing quoted prices for similar assets and liabilities in active markets or other market observable inputs such as interest rates, yield curves and foreign currency spot rates; and
- Level 3—Prices or valuations that require inputs that are both significant to the fair value measurement and unobservable.

The Company's financial assets consist of cash equivalents and the Company's financial liabilities consist of a warrant liability.

The fair value of the Company's cash equivalents is determined using quoted prices in active markets. The Company's cash equivalents consist of money market funds that are classified as Level 1.

The fair value of the Company's warrant liability is determined using a Monte Carlo simulation. See **Note 9. Warrants** for assumptions used and methodologies utilized in calculating the estimated fair value. The Company's warrant liability is classified as Level 3.

The following table sets forth the Company's assets and liabilities that are measured at fair value on a recurring basis as of June 30, 2020 and December 31, 2019 (in thousands):

	Total	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
June 30, 2020				
Assets:				
Cash equivalents	$ 21,927	$ 21,927	$ —	$ —
Total assets	$ 21,927	$ 21,927	$ —	$ —
Liabilities:				
Warrant liability	$ 1,483	$ —	$ —	$ 1,483
Total liabilities	$ 1,483	$ —	$ —	$ 1,483
December 31, 2019				
Assets:				
Cash equivalents	$ 39,971	$ 39,971	$ —	$ —
Total assets	$ 39,971	$ 39,971	$ —	$ —
Liabilities:				
Warrant liability	$ 2,486	$ —	$ —	$ 2,486
Total liabilities	$ 2,486	$ —	$ —	$ 2,486

The following table reflects the change in the Company's Level 3 warrant liability (in thousands):

	Warrant Liability
Balance at December 31, 2019	$ 2,486
Change in fair value	(1,003)
Balance at June 30, 2020	$ 1,483

5. Accrued expenses and other current liabilities

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

	June 30, 2020	December 31, 2019
Research and development costs	$ 1,945	$ 1,607
Payroll and employee-related costs	1,351	2,245
Other current liabilities	775	759
Total	$ 4,071	$ 4,611

6. Commitments and contingencies

Operating leases

As of June 30, 2020, the Company has a lease for two floors of lab and office space in a multi-tenant building in Cambridge, Massachusetts. On January 1, 2019, the Company adopted ASU 2016-02, *Leases (Topic 842)*, ("ASC 842"), using the required retrospective approach and utilizing the effective date as the date of initial application. The Company's lease contains both an extension of an existing lease and an expansion for additional office and lab space. Both the extension and the expansion expire in February 2025. The Company's right to use and control the expansion space began in March 2020. As a result, the Company recognized an increase in the right of use ("ROU") assets of $5.9 million and associated lease liabilities of $5.8 million in the first quarter of 2020. The Company has the option to extend the lease term for an additional five years, which is not included in the Company's ROU assets and associated lease liabilities as of June 30, 2020.

For the three months ended June 30, 2020 and 2019 lease expense, net of sublease income, was $0.8 million and $0.3 million, respectively. For the six months ended June 30, 2020 and 2019 lease expense, net of sublease income, was $1.3 million and $0.7 million, respectively.

The weighted average remaining lease term and weighted average discount rate of the Company's operating leases are as follows:

	June 30, 2020	June 30, 2019
Weighted average remaining lease term in years	4.67	5.48
Weighted average discount rate	8.13%	8.31%

Finance lease

In December 2019, the Company entered into an agreement to lease lab equipment for a term of 15 months. The Company determined that the agreement qualifies as a finance lease based on the criteria that the Company holds the option to purchase the asset and is reasonably certain to exercise at the end of the lease term. The ROU asset and lease liability were calculated using an incremental borrowing rate of 7.95%. Lease payments on this lease began in January 2020.

The following table summarizes the presentation in the Company's consolidated balance sheets:

Leases (in thousands)	Classification	June 30, 2020	December 31, 2019
Assets			
Operating	Lease ROU asset	$ 11,175	$ 6,156
Finance	Lease ROU asset	90	150
Total lease assets		$ 11,265	$ 6,306
Liabilities			
Current			
Operating	Lease liabilities	$ 1,977	$ 990
Finance	Lease liabilities	76	127
Non-current			
Operating	Lease liabilities, net of current portion	9,473	5,373
Finance	Lease liabilities, net of current portion	—	22
Total lease liabilities		$ 11,526	$ 6,512

The minimum lease payments related to the Company's operating and finance leases in accordance with ASC 842 as of June 30, 2020 were as follows (in thousands):

	Operating leases	Finance lease	Total
2020	$ 1,406	$ 56	$ 1,462
2021	2,871	23	2,894
2022	2,943	—	2,943
2023	3,017	—	3,017
2024 and thereafter	3,609	—	3,609
Total lease payments	$ 13,846	$ 79	$ 13,925
Less imputed interest	(2,396)	(3)	(2,399)
Total	$ 11,450	$ 76	$ 11,526

At June 30, 2020 and December 31, 2019, the Company had an outstanding letter of credit of $0.6 million, with a financial institution related to a security deposit for the office and lab space lease, which is secured by cash on deposit and expires in February 2025.

Contractual obligations

The Company has entered into certain agreements with various contract research organizations (“CROs”) and contract manufacturing organizations (“CMOs”), which generally include cancellation clauses.

Harvard University License Agreement

The Company has an exclusive license agreement with Harvard University (“Harvard”), granting the Company an exclusive, worldwide, royalty-bearing, sublicensable license to three patent families, to develop, make, have made, use, market, offer for sale, sell, have sold and import licensed products and to perform licensed services related to the ATLAS discovery platform. The Company is also obligated to pay Harvard milestone payments up to $1.6 million in the aggregate upon the achievement of certain development and regulatory milestones. As of June 30, 2020, the Company has paid $0.3 million in aggregate milestone payments. The Company is obligated under this license agreement to use commercially reasonable efforts to develop, market and sell licensed products in compliance with an agreed upon development plan. In addition, the Company is obligated to achieve specified development milestones and in the event the Company is unable to meet its development milestones for any type of product or service, absent any reasonable proposed extension or amendment thereof, Harvard has the right, depending on the type of product or service, to terminate this agreement with respect to such products or to convert the license to a non-exclusive, non-sublicensable license with respect to such products and services.

Upon commercialization of our products covered by the licensed patent rights or discovered using the licensed methods, the Company is obligated to pay Harvard royalties on the net sales of such products and services sold by the Company, the Company's affiliates, and the Company's sublicensees. This royalty varies depending on the type of product or service but is in the low single digits. The sales-based royalty due by the Company’s sublicensees is the greater of the applicable royalty rate or a percentage in the high single digits or the low double digits of the royalties the Company receives from such sublicensee, depending on the type of product. Based on the type of commercialized product or service, royalties are payable until the expiration of the last-to-expire valid claim under the licensed patent rights or for a period of 10 years from first commercial sale of such product or service. The royalties payable to Harvard are subject to reduction, capped at a specified percentage, for any third-party payments required to be made. In addition to the royalty payments, if the Company receives any additional revenue (cash or non-cash) under any sublicense, the Company must pay Harvard a percentage of such revenue, excluding certain categories of payments, varying from the low single digits to up to the low double digits depending on the scope of the license that includes the sublicense.

The license agreement with Harvard will expire on a product-by-product or service-by-service and country-by-country basis until the expiration of the last-to-expire valid claim under the licensed patent rights. The Company may terminate the agreement at any time by giving Harvard advance written notice. Harvard may also terminate the agreement in the event of a material breach by the Company that remains uncured; in the event of our insolvency, bankruptcy, or similar circumstances; or if the Company challenges the validity of any patents licensed to us.

Oncovir License and Supply Agreement

In January 2018, the Company entered into a License and Supply Agreement with Oncovir, Inc. (“Oncovir”). The agreement provides the terms and conditions under which Oncovir will manufacture and supply an immunomodulator and vaccine adjuvant, Hiltonol® (poly-ICLC) (“Hiltonol”), to the Company for use in connection with the research, development, use, sale, manufacture, commercialization and marketing of products combining Hiltonol with the Company's technology (the “Combination Product”). Hiltonol is the adjuvant component of GEN-009, which will consist of synthetic long peptides or neoantigens identified using the Company's proprietary ATLAS platform, formulated with Hiltonol.

Oncovir granted the Company a non-exclusive, assignable, royalty-bearing worldwide license, with the right to grant sublicenses through one tier, to certain of Oncovir’s intellectual property in connection with the research, development, or commercialization of Combination Products, including the use of Hiltonol, but not the use of Hiltonol for manufacturing or the use or sale of Hiltonol alone. The license will become perpetual, fully paid-up, and royalty-free on the later of January 25, 2028 or the date on which the last valid claim of any patent licensed to the Company under the agreement expires.

Under this agreement, the Company is obligated to pay Oncovir low to mid six figure milestone payments upon the achievement of certain clinical trial milestones for each Combination Product and the first marketing approval for each Combination Product in certain territories, as well as tiered royalties in the low-single digits on a product-by-product basis based on the net sales of Combination Products.

The Company may terminate the agreement upon a decision to discontinue the development of the Combination Product or upon a determination by the Company or an applicable regulatory authority that Hiltonol or a Combination Product is not clinically safe or effective. The agreement may also be terminated by either party due to a material uncured breach by the other party, or due to the other party’s bankruptcy, insolvency, or dissolution.

7. Debt

In April 2018, the Company entered into an amended and restated loan and security agreement with Hercules Capital, Inc (“Hercules”), which was subsequently amended in November 2019 (as amended, the “2018 Term Loan”). The 2018 Term Loan provides a $14.0 million term loan. The 2018 Term Loan matures on May 1, 2021 and accrues interest at a floating rate per annum equal to the greater of (i) 8.00%, or (ii) the sum of 3.00% plus the prime rate. The 2018 Loan Agreement provides for interest-only payments until January 1, 2021. Thereafter, payments will include equal installments of principal and interest through maturity. The 2018 Term Loan may be prepaid subject to a prepayment charge. The Company is obligated to pay an additional end of term charge of $1.0 million at maturity.

The 2018 Term Loan is secured by a lien on substantially all assets of the Company, other than intellectual property. Hercules has a perfected first-priority security interest in certain cash, cash equivalents and investment accounts. The 2018 Term Loan contains non-financial covenants, representations and a Material Adverse Effect provision, as defined herein. There are no financial covenants. A “Material Adverse Effect” means a material adverse effect upon: (i) the business, operations, properties, assets or condition (financial or otherwise) of the Company; (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. As of June 30, 2020, the Company was in compliance with all covenants of the 2018 Term Loan. The 2018 Term Loan is automatically redeemable upon a change in control. At June 30, 2020, the entire debt balance is current based on the contractual payment terms.

In connection with the 2018 Term Loan, the Company issued common stock warrants to Hercules (the “Hercules Warrant”). See **Note 9. Warrants**.

As of June 30, 2020 and December 31, 2019, the Company had outstanding borrowings of $13.6 million and $13.4 million, respectively. Interest expense was $0.4 million for the three months ended June 30, 2020 and 2019, and $0.7 million and $0.9 million for the six months ended June 30, 2020 and 2019, respectively.

Future principal payments of $14.0 million, including the end of term charges, are due in 2021.

8. Stockholders' equity

Effective June 2, 2020, the Company increased the number of authorized shares of common stock from 85.0 million shares to 170.0 million shares.

2020 Private Placement

In July 2020, the Company entered into a private placement financing transaction in which the Company will issue approximately 21.4 million shares of its common stock (the "Shares"), approximately 12.2 million pre-funded warrants to purchase additional shares of its common stock (the "2020 Pre-Funded Warrant") and accompanying warrants (the "Closing Warrants" and together with the Shares and the 2020 Pre-Funded Warrants, the "Securities") to purchase approximately 33.6 million shares of its common stock (the "2020 Warrant Shares"). The Securities will be sold at a purchase price of $2.38 per unit for aggregate gross proceeds of approximately $80.0 million, before deducting fees to the placement agent and other offering expenses payable by the Company. The warrants will be exercisable immediately upon issuance, in whole or in part, at an exercise price of $2.25 per share and will have a four years term. The closing of the private placement financing is expected to occur on or about July 24, 2020.

Agreement with Lincoln Park Capital

In October 2019, the Company entered into a purchase agreement with Lincoln Park Capital ("LPC") pursuant to which LPC purchased $2.5 million of shares of the Company's common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, the Company has the right, at its sole discretion, to sell up to an additional $27.5 million of the Company's common stock based on prevailing market prices of its common stock at the time of each sale. In consideration for entering into the purchase agreement, the Company issued approximately 0.3 million shares of its common stock to LPC as a commitment fee. The purchase agreement limits the Company's sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on the date of the purchase agreement. The purchase agreement also prohibits the Company from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of the Company's common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of the Company's common stock. In the six months ended June 30, 2020, the Company sold approximately 1.5 million shares of common stock resulting in approximately $3.5 million of net proceeds. As of June 30, 2020, the Company had approximately $24.0 million remaining under its agreement with LPC.

At-the-market equity offering program

In 2015, the Company entered into an agreement, as amended, with Cowen and Company, LLC to establish an at-the-market equity offering program ("ATM") pursuant to which it was able to offer and sell up to $50.0 million of the Company's common stock at prevailing market prices. In the six months ended June 30, 2020, the Company sold approximately 1.0 million shares under the ATM program and received net proceeds of $2.7 million, after deducting commissions. Through June 30, 2020, the Company has sold an aggregate of approximately 1.5 million shares under the ATM and received approximately $6.7 million in net proceeds. As of June 30, 2020, the Company had approximately $43.1 million in gross proceeds remaining under the ATM.

2019 Public Offering

In June 2019, the Company entered into an underwriting agreement relating to the public offering of 10.5 million shares of the Company's common stock, at a price of $3.50 per share, for gross proceeds of approximately $36.8 million (the "2019 Public Offering"). The Company also granted the underwriters an option to purchase up to approximately an additional 1.6 million shares of common stock ("Overallotment Option"). The underwriters exercised this option in full. The Company received approximately $5.5 million in gross proceeds from the underwriter's exercise of the Overallotment Option. In connection with the 2019 Public Offering, inclusive of the Overallotment Option, the Company received net proceeds of $38.4 million.

2019 Private Placement

In February 2019, the Company completed a private placement (the "2019 Private Placement"). The Company issued approximately 3.2 million shares of common stock, prefunded warrants (the "2019 Pre-Funded Warrants") to purchase approximately 0.5 million shares of common stock (the "2019 Pre-Funded Warrant Shares"), and warrants (the "Private Placement Warrants") to purchase up to approximately 0.9 million shares of common stock (the "2019 Warrant Shares"). The shares of common stock, 2019 Pre-Funded Warrants and Private Placement Warrants (collectively, the "Units") were sold at a purchase price of $4.02 per Unit. The Company received net cash proceeds of approximately $13.8 million from the sale of the shares of common stock, 2019 Pre-Funded Warrants and Private Placement Warrants. See **Note 9. Warrants**.

The Company had the option to issue additional shares of common stock in a second closing (the “Second Closing”) for gross proceeds of up to $24.2 million. The occurrence of the Second Closing was conditioned on top-line results from Part A of the Company's Phase 1/2a clinical trial for GEN-009 and a decision by the Company's board of directors to proceed with the Second Closing. In June 2019, the Company announced top-line results from this trial but elected not to proceed with the Second Closing. In lieu of the Second Closing, the Company proceeded with the 2019 Public Offering.

9. Warrants

As of June 30, 2020, the Company had the following potentially issuable shares of common stock related to unexercised warrants outstanding (shares in thousands):

	Shares	Exercise price	Expiration date	Classification
Hercules Warrant	41	$ 6.80	Q2 2023	Equity
2018 Public Offering Warrants	3,617	$ 9.60	Q1 2023	Liability
Private Placement Warrants	933	$ 4.52	Q1 2024	Equity
2019 Pre-Funded Warrants	531	$ 0.08	Q1 2039	Equity
	5,122			

Hercules Warrant

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 Company determined that the Hercules Warrant should be equity classified in accordance with ASC 480, *Distinguishing Liabilities from Equity* (“ASC 480”) for all periods presented.

2018 Public Offering Warrants

In January 2018, the Company entered into two underwriting agreements, the first relating to the public offering of approximately 6.7 million shares of the Company’s common stock, par value $0.001 per share, and accompanying warrants to purchase up to approximately 3.3 million shares of common stock (“2018 Public Offering Warrants”). 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. 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 2018 Public Offering Warrants, the Company will be obligated to use its best efforts to ensure that the holders of the 2018 Public Offering 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 2018 Public Offering 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 2018 Public Offering 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.

The Company determined that the 2018 Public Offering Warrants should be liability classified in accordance with ASC 480. As the 2018 Public Offering Warrants are liability-classified, the Company remeasures the fair value at each reporting date. The Company initially recorded the 2018 Public Offering Warrants at their estimated fair value of approximately $18.2 million. In connection with the Company's remeasurement of the 2018 Public Offering Warrants to fair value, the Company recorded income of $0.2 million and $3.9 million for the three months ended June 30, 2020 and 2019, respectively, and income of $1.0 million and expense of $1.9 million for the six months ended June 30, 2020 and 2019, respectively. The fair value of the warrant liability is approximately $1.5 million and $2.5 million as of June 30, 2020 and December 31, 2019, respectively.

The following table details the assumptions used in the Monte Carlo simulation models used to estimate the fair value of the Warrant Liability as of June 30, 2020 and December 31, 2019, respectively:

	June 30, 2020	December 31, 2019
Stock price	$ 2.30	$ 2.07
Volatility	50.0% - 88.3%	50.0% - 116.6%
Remaining term (years)	2.5	3.1
Expected dividend yield	—	—
Risk-free rate	0.2%	1.6%
Annual acquisition event probability	30.0%	20.0%

Private Placement and 2019 Pre-Funded Warrants

The exercise price of the warrants is subject to appropriate adjustment in the event of stock dividends, subdivisions, stock splits, stock combinations, reclassifications, reorganizations or a change of control affecting our common stock. The Company determined that the Private Placement Warrants and the 2019 Pre-Funded Warrants should be equity classified in accordance with ASC 480 for all periods presented. The Company also determined that the 2019 Pre-Funded Warrants should be included in the determination of basic earnings per share in accordance with ASC 260, *Earnings per Share*.

10. Stock and employee benefit plans

In June 2020, the Company's stockholders approved an increase of 2.8 million of shares to the Company's Amended and Restated 2014 Equity Incentive Plan. As of June 30, 2020, there were approximately 2.4 million shares remaining for future issuance.

The Company issues stock options and restricted stock units ("RSUs") to employees, which generally vest ratably over a four year service period. The Company measures the fair value of stock options on the date of grant using the Black-Scholes option pricing model. The Company measures the fair value of RSUs on the date of grant using the underlying common stock fair value.

Stock-based compensation expense

Total stock-based compensation expense recognized for stock options and RSUs is as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Research and development	$ 218	$ 170	$ 378	$ 352
General and administrative	268	304	492	551
Total	$ 486	$ 474	$ 870	$ 903

Stock options

The following table summarizes stock option activity (in thousands):

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value
Outstanding at December 31, 2019	1,323	$ 11.65		$ —
Granted	1,268	$ 2.06		
Exercised	—	$ —		
Forfeited/cancelled	(76)	$ 3.80		
Outstanding at June 30, 2020	2,515	$ 7.04	8.08	$ 456
Exercisable at June 30, 2020	685	$ 16.96	6.37	$ 18

RSUs

The following table summarizes RSU activity (shares in thousands):

	Shares	Weighted-Average Grant Date Fair Value
Outstanding as of December 31, 2019	—	$ —
Granted	554	$ 2.05
Vested	—	$ —
Forfeited/cancelled	(21)	$ 1.66
Outstanding as of June 30, 2020	533	$ 2.07

Employee stock purchase plan

In February 2014, the Company's board of directors adopted the 2014 Employee Stock Purchase Plan and subsequently amended the plan in June 2018 (the "ESPP"). The ESPP authorizes the issuance of up to approximately 0.3 million shares of common stock to participating eligible employees and provides for two six-month offering periods. As of June 30, 2020, there were approximately 0.2 million shares remaining for future issuance under the plan.

11. Net loss per share

Basic and diluted net loss per share was calculated as follows for the three and six months ended June 30, 2020 and 2019:

	Three months ended June 30,		Six months ended June 30,	
	2020	2019	2020	2019
Basic net loss per share:				
Numerator:				
Net loss (in thousands)	$ (11,321)	$ (6,495)	$ (24,174)	$ (22,062)
Denominator:				
Weighted average common stock outstanding - basic (in thousands)	29,142	15,344	28,642	14,035
Dilutive effect of shares of common stock equivalents resulting from common stock options and restricted stock units	—	—	—	—
Weighted average common stock outstanding – diluted	29,142	15,344	28,642	14,035
Net loss per share - basic and diluted	$ (0.39)	$ (0.42)	$ (0.84)	$ (1.57)

The following common stock equivalents outstanding as of June 30, 2020 and 2019, 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,	
	2020	2019
Warrants	4,591	4,600
Stock options	2,515	1,285
RSUs	533	—
Total	7,639	5,885

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 immunotherapies using our ATLAS™ proprietary discovery platform. The ATLAS platform profiles each patient's $CD4^+$ and $CD8^+$ T cell immune responses to every potential target or "antigen" in that patient's tumor. We believe that this approach optimizes antigen selection for immunotherapies such as cancer vaccines and cellular therapies by identifying the antigens to which the patient can respond. Consequently, we believe that ATLAS could lead to more immunogenic and efficacious cancer immunotherapies.

Our most advanced program is GEN-009, a personalized neoantigen cancer vaccine, for which we are conducting a Phase 1/2a clinical trial. The GEN-009 program uses ATLAS to identify neoantigens, or immunogenic tumor mutations unique to each patient, for inclusion in each patient's GEN-009 vaccine. We are also advancing GEN-011, a neoantigen-specific adoptive T cell therapy program that also relies on ATLAS. In June 2020, we submitted an Investigational New Drug ("IND") application to support the initiation of a Phase 1/2 clinical trial. We have received verbal notification from the U.S. Food and Drug Administration ("FDA") that the agency has completed its review of our IND application for GEN-011. In this verbal feedback, the FDA informed us that it is placing the IND on clinical hold until it receives additional information pertaining to certain third-party reagents used in the GEN-011 manufacturing process. These reagents are not a component of the final cell therapy product. We expect to receive official written communication from the FDA regarding the hold and the FDA's position in the near future and plan to work with the FDA to resolve their questions as quickly as possible.

ATLAS Platform

Harnessing and directing the T cell arm of the immune system to kill tumor cells is increasingly viewed as having potential in the treatment of many cancers. This approach has been effective against hematologic malignancies and, more recently, certain solid tumors. Vaccines or cellular therapies employing this approach must target specific differences from normal tissue present in a tumor, such as antigens arising from genetic mutations. However, the discovery of optimal antigens for such immunotherapies has been particularly challenging for two reasons. First, the genetic diversity of human T cell responses means that effective antigens vary from person to person. Second, the number of candidate antigens can be very large, with up to thousands of candidates per patient in some cancers. An effective antigen selection system must therefore account both for each patient's tumor and for their T cell repertoire.

ATLAS achieves effective antigen selection by employing components of the T cell arm of the human immune system from each patient. Using ATLAS, we can measure each patient's T cell responses to a comprehensive set of candidate neoantigens, tumor-associated antigens and tumor-associated viral antigens for their own cancer, allowing us to select those targets associated with the anti-tumor T cell responses that may kill that individual's cancer. We believe that ATLAS represents the most comprehensive and accurate system for antigen discovery. Further, we believe ATLAS identifies a novel candidate antigen profile, that of inhibitory T cell responses. Previously, all candidate antigens were thought either to be targets of effective anti-tumor responses (stimulatory), or irrelevant. However, using ATLAS, we have identified inhibitory antigens we call Inhibigens™, which are shown to promote tumor progression in preclinical studies. We have also discovered that an antigen can be stimulatory in one patient and inhibitory in another, reinforcing the importance of selecting each patient's potentially immunogenic antigens.

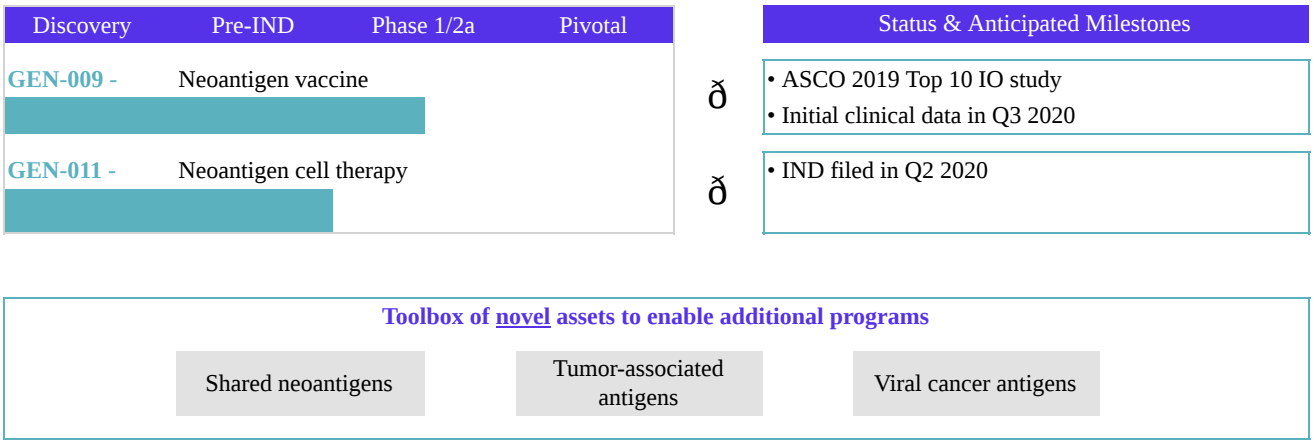
The ATLAS portfolio comprises seven patent families and potentially two additional patent families. The first two families are comprised of issued U.S. patents, with patent terms until at least 2031 and 2030, as well as granted foreign patents and pending U.S. and foreign applications. The third family is directed to ATLAS-based methods for cancer diagnosis, prognosis and patient selection, as well as related compositions. This patent family is comprised of pending applications in eleven foreign jurisdictions and a pending U.S. application. Patents issuing from these applications are expected to have a patent term until at least March 2038. The four further families currently comprise PCT applications and are directed to various methods using ATLAS-identified antigens, to dose regimen for GEN-009, and to our cell-based therapy GEN-011.

Our Immuno-Oncology Programs

Our cancer immunotherapies include a vaccine that is designed to educate T cells to recognize and attack specific cancer targets, and a cellular therapy intended to introduce T cells that have been educated to attack these targets. We believe that neoantigen vaccines could be used in combination with existing treatment approaches for cancer to potentially direct and enhance an individual's

T cell response to his or her cancer, thereby potentially effecting better clinical outcomes. We also believe that isolating and expanding T cell populations targeting specific neoantigens through adoptive cell therapy could provide meaningful clinical benefit.

The following describes our active immuno-oncology programs in development:



Our lead program, GEN-009, is an adjuvanted neoantigen peptide vaccine candidate. Using ATLAS to identify specific neoantigens, we manufacture a personalized vaccine for each patient using only those neoantigens determined by ATLAS to be stimulatory to that patient's anti-tumor immune responses. We are currently conducting a Phase 1/2a clinical trial for GEN-009 across a range of solid tumor types:

- Part A of the trial is assessing the safety and immunogenicity of GEN-009 as monotherapy in certain cancer patients with no evidence of disease; and
- Part B of the trial, for which we have commenced dosing patients, is designed to assess the safety, immunogenicity, and preliminary antitumor activity of GEN-009 in combination with ICI therapy in patients with advanced or metastatic tumors.

The patients in Part A of the trial had little to no detectable tumor at the time of vaccination with GEN-009, but were still at risk of relapse. In the data from the eight dosed patients we observed the following:

- 100% of patients had measurable $CD4^+$ and $CD8^+$ T cell responses to their GEN-009 vaccine;
- Responses were detected against 99% of the administered vaccine neoantigens (N=88 administered antigens), a response rate in excess of that which has been reported previously in response to candidate neoantigen vaccines;
- GEN-009 elicited $CD8^+$ T cell responses *ex vivo*, which is a measure of T cell effector function, for 41% of vaccine neoantigens and $CD4^+$ T cell responses to 51% of neoantigens;
- GEN-009 elicited broad immune responses using an *in vitro* stimulation assay, which is a measure of central memory responses, with 87% of neoantigens eliciting a $CD4^+$ response and 57% of neoantigens eliciting a $CD8^+$ response;
- GEN-009 was well tolerated, with no dose-limiting toxicities observed; and
- Through July 7, 2020, only one of the eight vaccinated patients has developed a recurrent tumor.

We believe the above data confirms the potential antigen selection advantages of ATLAS.

In the fourth quarter of 2019, we began dosing patients for Part B of our GEN-009 study. We anticipate reporting these preliminary clinical results in the third quarter of 2020. We believe that the current patients enrolled are sufficient to determine whether a preliminary clinical signal can be seen, therefore, we have paused enrollment in our GEN-009 Part B trial. Upon review of the preliminary clinical results, we will consider whether it is appropriate to continue the study.

We also are advancing GEN-011, an adoptive T cell therapy specific for neoantigens identified by ATLAS. Adoptive T cell therapies offer an alternative treatment in solid tumors. GEN-011 extracts and specifically expands ATLAS-identified neoantigen-specific T cells from each patient's peripheral blood. In June 2020, we submitted an IND application to support the initiation of a Phase 1/2 clinical trial. We have received verbal notification from the FDA that the agency has completed its review of our IND application for GEN-011. In this verbal feedback, the FDA informed us that it is placing the IND on clinical hold until it receives additional information pertaining to certain third-party reagents used in the GEN-011 manufacturing process. These reagents are not a component of the final cell therapy product. We expect to receive official written communication from the FDA regarding the hold and the FDA's position in the near future and plan to work with the FDA to resolve their questions as quickly as possible. Although

we plan to work with the FDA to resolve their questions as quickly as possible, we cannot provide any assurance that we will be able to resolve the clinical hold on a timely basis or at all.

We continue to conduct research, principally to explore Inhibigen™ biology and ways to further strengthen ATLAS. We also continue to explore additional program opportunities. The COVID-19 pandemic has affected our ability to continue such efforts, however, so we cannot provide specific timelines for these efforts to translate into new clinical candidates, which might include non-personalized cancer immunotherapies targeting shared neoantigens, non-mutated tumor-associated antigens, cancers of viral origin such as cancers driven by Epstein-Barr virus infection and Inhibigens™.

Business Update Regarding COVID-19

The current COVID-19 pandemic has presented a substantial public health and economic challenge around the world and is affecting our employees, patients, communities and business operations, as well as the U.S. economy and financial markets. The full extent to which the COVID-19 pandemic will directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain and cannot be accurately predicted, including new information that may emerge concerning COVID-19, the actions taken to contain it or treat its impact and the economic impact on local, regional, national and international markets.

To date, we have been able to continue our operations and do not anticipate any material interruptions, for the foreseeable future. However, we are continuing to assess the potential impact of the COVID-19 pandemic on our business and operations, including our expenses, supply chain and pre-clinical and clinical trials. Our office-based employees have been working from home since mid-March 2020 and will continue to do so for the foreseeable future.

Our third-party contract manufacturing partners continue to operate their manufacturing facilities at or near normal levels. While we currently do not anticipate any interruptions in our supply chain, it is possible that the COVID-19 pandemic and response efforts may have an impact in the future on our and/or our third-party suppliers and contract manufacturing partners' ability to manufacture our products or the products of our partners.

Financing and business operations

We commenced business operations in August 2006. We have financed our operations primarily through the issuance of our equity securities, debt financings, and amounts received through grants. As of June 30, 2020, we had received an aggregate of $405.9 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, 2020, our cash and cash equivalents were $22.1 million.

Since inception, we have incurred significant operating losses. 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.

We have not generated any revenues from product sales to date and we do not expect to generate revenues from product sales for the foreseeable future. Our revenues for the three and six months ended June 30, 2020 were from the material transfer agreement (“MTA”) with a strategic partner, Shionogi & Co. Ltd (“Shionogi”). See “Note 3 – Revenue” to the notes to the unaudited condensed consolidated financial statements in this Quarterly Report on Form 10-Q.

In July 2020, we entered into a private placement financing transaction in which we will issue shares of our common stock, pre-funded warrants and warrants to purchase our common stock for aggregate gross cash proceeds of approximately $80.0 million, before deducting fees to the placement agent and other offering expenses payable by us. The closing of the private placement financing is expected to occur on or about July 24, 2020.

In the six months ended June 30, 2020, we sold approximately 1.0 million shares under our ATM program and received net proceeds of $2.7 million, after deducting commissions. For the six months ended June 30, 2019, we sold no shares under the ATM program. As of June 30, 2020, we had approximately $43.1 million in gross proceeds remaining under the ATM.

In October 2019, we entered into a purchase agreement with Lincoln Park Capital (“LPC”) pursuant to which LPC purchased $2.5 million of shares of our common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, we have the right, at our sole discretion, to sell up to an additional $27.5 million of our common stock based on prevailing market prices of our common stock at the time of each sale. In consideration for entering into the purchase agreement, we issued approximately 0.3 million shares of our common stock to LPC as a commitment fee. The purchase agreement limits our sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on

the date of the purchase agreement. The purchase agreement also prohibits us from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of our common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of our common stock. In the six months ended June 30, 2020, we sold 1.5 million shares of common stock to LPC, for net proceeds of approximately $3.5 million. As of June 30, 2020, we had approximately $24.0 million remaining under our agreement with LPC.

In June 2019, we completed an underwritten public offering in which we sold 10.5 million shares of our common stock at a price of $3.50 per share, for gross proceeds of approximately $36.8 million. We also granted the underwriters an option to purchase up to approximately an additional 1.6 million shares of common stock. The underwriters exercised this option in full. This generated additional gross proceeds of $5.5 million. We incurred approximately $3.9 million of offering-related expenses, resulting in total net proceeds of $38.4 million.

In February 2019, we completed a private placement financing transaction in which we issued shares of our common stock, pre-funded warrants to purchase shares of our common stock, and warrants to purchase shares of our common stock for gross cash proceeds of $15.0 million. We incurred $1.2 million of offering-related expenses, resulting in total net proceeds of approximately $13.8 million.

As reflected in our consolidated financial statements, we used cash to fund operating activities of $23.7 million for the six months ended June 30, 2020 and had $22.1 million available in cash and cash equivalents at June 30, 2020. In addition, our net losses were $11.3 million for the six months ended June 30, 2020, and we had an accumulated deficit of $355.1 million. We anticipate that we will continue to incur significant operating losses for the foreseeable future as we continue to develop our product candidates. Until such time, if ever, as we attempt to generate substantial product revenue and achieve profitability, we expect to finance our cash needs through a combination of equity offerings and strategic transactions, and other sources of funding. If we are unable to raise additional funds when needed, we may be required to implement cost reduction strategies, including ceasing development of GEN-009, GEN-011, and other corporate programs and activities. In July 2020, we entered into a private placement financing transaction in which we will issue shares of our common stock, pre-funded warrants and warrants to purchase our common stock for aggregate gross cash proceeds of approximately $80.0 million, before deducting fees to the placement agent and other offering expenses payable by us. The closing of the private placement financing is expected to occur on or about July 24, 2020. The proceeds from this financing combined with our available cash and cash equivalents at June 30, 2020 are expected to fund operations to mid-2022.

Costs related to clinical trials can be unpredictable and there can be no guarantee that our current balances of cash and cash equivalents combined with proceeds received from other sources, will be sufficient to fund our trials 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, GEN-011 or any other product candidate. Accordingly, we will be required to obtain further funding through public or private equity offerings, collaboration and licensing arrangements, or other sources. Adequate additional financing may not be available to us on acceptable terms, or at all, which could result in a decision to pause or delay development or advancement of clinical trials for one or more of our product candidates. Similarly, we may decide to pause or delay development or advancement of clinical trials for one or more of our product candidates if we believe that such development or advancement is imprudent or impractical.

Financial Overview

Revenues

We have not generated any revenues from product sales to date and we do not expect to generate revenues from product sales for the foreseeable future. Our revenue was derived from the MTA with Shionogi. For additional information about our revenue recognition policy, see “Note 2-Summary of significant accounting policies” to the notes to the unaudited condensed consolidated financial statements in this Quarterly Report on Form 10-Q.

Research and development expenses

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

- salary and related expenses;
- 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 as incurred. Nonrefundable advanced payments for goods and services that will be used in future research and development activities are expensed when the activity has been performed or when the goods have been received.

The following table identifies research and development expenses for our product candidates as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Phase 1/2a programs	3,616	$ 4,588	8,409	9,308
Discovery and pre-IND	3,536	1,253	7,345	2,041
Other research and development	1,435	1,008	2,820	1,960
Total research and development	$ 8,587	$ 6,849	$ 18,574	$ 13,309

Phase 1/2a programs are Phase 1 or Phase 2 development activities. Discovery and pre-IND includes costs incurred to support our discovery research and translational science efforts up to the initiation of Phase 1 development. Other research and development include costs that are not specifically allocated to active product candidates, including facilities costs, depreciation expense, and other costs.

General and administrative expenses

General and administrative expenses consist primarily of salaries and related expenses for personnel in executive and other administrative functions. Other general and administrative expenses include facility costs, corporate and intellectual property legal expenses, accounting services, and professional fees associated with consulting.

Other expense

Other expense consists of the change in warrant liability, interest expense, net of interest income, gains and losses on sale and disposal of assets, gains and losses on foreign currency, and other expense for miscellaneous items, such as the transaction 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 U.S. GAAP requires us to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. On an ongoing basis, management makes estimates and exercises judgement in revenue recognition, prepaid and accrued research and development expenses and the fair value of our warrant liability. 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. These critical accounting policies are described in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2019, and there have been no changes to such policies, except for our policy related to revenue recognition noted below. It is important that the discussion of our operating results that follow 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 13, 2020.

Revenue Recognition

In applying ASC Topic 606 *Revenue from Contracts with Customers*, management must develop assumptions that require judgment to determine the standalone selling price for each performance obligation identified in the contract. We utilize key assumptions to determine the standalone selling price, which may include other comparable transactions, pricing considered in negotiating the transaction and the estimated costs to complete the respective performance obligation. We also utilize judgement in assessing whether or not variable consideration is constrained or if it can be allocated specifically to one or more performance obligations in the arrangement.

When a performance obligation is satisfied, revenue is recognized for the amount of the transaction price that is allocated to that performance obligation on a relative standalone selling price basis, excluding estimates of variable consideration that are

constrained. For performance obligations consisting of licenses and other promises, we utilize judgment to assess whether the combined performance obligation is satisfied over time or at a point in time and the recognition pattern for the portion of the transaction price allocated to the performance obligation.

Results of Operations

Comparison of the three months ended June 30, 2020 and 2019

	Three Months Ended June 30,		Increase
(in thousands)	**2020**	**2019**	**(Decrease)**
License revenue	$ 906	$ —	$ 906
Operating expenses:			
Research and development	8,587	6,849	1,738
General and administrative	3,480	3,217	263
Total operating expenses	12,067	10,066	2,001
Loss from operations	(11,161)	(10,066)	1,095
Other income (expense):			
Change in fair value of warrants	222	3,870	3,648
Interest expense, net	(365)	(299)	(66)
Other expense	(17)	—	(17)
Total other income	(160)	3,571	(3,731)
Net loss	$ (11,321)	$ (6,495)	$ (4,826)

License revenue

The $0.9 million increase in revenue in the three months ended June 30, 2020 compared to the three months ended June 30, 2019 relates to revenue recognized in connection with the MTA with Shionogi executed in the second quarter of 2020.

Research and development expenses

Research and development expenses increased $1.7 million in the three months ended June 30, 2020, as compared to the three months ended June 30, 2019. The increase was largely due to an increase in headcount-related costs of approximately $1.0 million, external manufacturing costs of approximately $0.5 million, and clinical trial costs of approximately $0.5 million.

General and administrative expenses

General and administrative expenses increased $0.3 million in the three months ended June 30, 2020, as compared to the three months ended June 30, 2019. The increase was primarily due to an increase in rent and rent-related expense of approximately $0.7 million, partially offset by a decrease in headcount-related costs of approximately $0.6 million.

Change in fair value of warrants

Change in fair value of warrants reflects the non-cash change in the fair value of the 2018 Public Offering Warrants, which were recorded at their fair value on the date of issuance and are remeasured at the end of each reporting period. The decrease in the change in the fair value of warrants was primarily the result of an increase in our stock price in the three months ended June 30, 2020 as compared to a decrease in our stock price in the three months ended June 30, 2019.

Interest expense, net

Interest expense, net, consists primarily of interest expense on our long-term debt facilities, offset by interest earned on our cash equivalents.

Comparison of the six months ended June 30, 2020 and 2019

(in thousands)	Six Months Ended June 30, 2020	Six Months Ended June 30, 2019	Increase (Decrease)
License revenue	$ 906	$ —	$ 906
Operating expenses:			
Research and development	18,574	13,309	5,265
General and administrative	6,868	6,234	634
Total operating expenses	25,442	19,543	5,899
Loss from operations	(24,536)	(19,543)	4,993
Other income (expense):			
Change in fair value of warrants	1,003	(1,917)	2,920
Interest expense, net	(624)	(601)	(23)
Other income (expense)	(17)	(1)	(16)
Total other income	362	(2,519)	2,881
Net loss	$ (24,174)	$ (22,062)	$ 2,112

License revenue

The $0.9 million increase in revenue in the six months ended June 30, 2020 compared to the six months ended June 30, 2019 relates to revenue recognized in connection with the MTA with Shionogi executed in the second quarter of 2020.

Research and development expenses

Research and development expenses increased $5.3 million in the six months ended June 30, 2020, as compared to the six months ended June 30, 2019. The increase was largely due to an increase in external manufacturing costs of approximately $2.8 million, headcount-related costs of approximately $1.6 million, and clinical trial costs of approximately $0.8 million.

General and administrative expenses

General and administrative expenses increased $0.6 million in the six months ended June 30, 2020, as compared to the six months ended June 30, 2019. The increase was primarily due to an increase in rent and rent-related expense of approximately $0.9 million, partially offset by a decrease in headcount-related costs of approximately $0.8 million.

Change in fair value of warrants

Change in fair value of warrants reflects the non-cash change in the fair value of the 2018 Public Offering Warrants, which were recorded at their fair value on the date of issuance and are remeasured at the end of each reporting period. The increase in the change in the fair value of warrants was primarily the result of a less significant increase in our stock price in the six months ended June 30, 2020 as compared to the six months ended June 30, 2019.

Interest expense, net

Interest expense, net, consists primarily of interest expense on our long-term debt facilities, offset by interest earned on our cash equivalents.

Liquidity and Capital Resources

Overview

Since our inception in 2006, we have funded operations primarily through proceeds from public issuances of common stock, our long-term debt and private placements of our common stock.

As of June 30, 2020, we had approximately $22.1 million in cash and cash equivalents.

In April 2018, we entered into an amended and restated loan and security agreement with Hercules Capital, Inc. ("Hercules"), which was subsequently amended in November 2019 (as amended, the "2018 Term Loan"). The 2018 Term Loan provides a $14.0 million term 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) 8.00% or (ii) the sum of 3.00% plus the prime rate. The 2018 Term Loan provides for interest-only payments until January 1, 2021. Thereafter, payments will include equal installments of principal and interest through maturity. The 2018 Term Loan may be prepaid subject to a prepayment charge. We are also obligated to pay an end of term charge of $1.0 million at maturity. As of June 30, 2020, we had outstanding borrowings of $13.6 million.

We have not generated any revenues from product sales to date and we do not expect to generate revenues from product sales for the foreseeable future. Our revenues for the three and six months ended June 30, 2020 and 2019 were primarily from the MTA with Shionogi.

In July 2020, we entered into a private placement financing transaction in which we will issue approximately 21.4 million shares of our common stock (the "Shares"), approximately 12.2 million pre-funded warrants to purchase additional shares of our common stock (the "2020 Pre-Funded Warrant") and accompanying warrants (the "Closing Warrants" and together with the Shares and the 2020 Pre-Funded Warrants, the "Securities") to purchase approximately 33.6 million shares of our common stock (the "2020 Warrant Shares"). The Securities will be sold at a purchase price of $2.38 per unit for aggregate gross cash proceeds of approximately $80.0 million, before deducting fees to the placement agent and other offering expenses payable by us. The closing of the private placement financing is expected to occur on or about July 24, 2020.

In the six months ended June 30, 2020, we sold approximately 1.0 million shares under our ATM program and received net proceeds of $2.7 million, after deducting commissions. For the six months ended June 30, 2019, we sold no shares under the ATM program. As of June 30, 2020, we had approximately $43.1 million in gross proceeds remaining under the ATM.

In October 2019, we entered into a purchase agreement with LPC pursuant to which LPC purchased $2.5 million of shares of our common stock at a purchase price of $2.587 per share. In addition, for a period of 30 months, we have the right, at our sole discretion, to sell up to an additional $27.5 million of our common stock based on prevailing market prices of our common stock at the time of each sale. In consideration for entering into the purchase agreement, we issued approximately 0.3 million shares of our common stock to LPC as a commitment fee. The purchase agreement limits our sales of shares of common stock to LPC to approximately 5.2 million shares of common stock, representing 19.99% of the shares of common stock outstanding on the date of the purchase agreement. The purchase agreement also prohibits us from directing LPC to purchase any shares of common stock if those shares, when aggregated with all other shares of our common stock then beneficially owned by LPC and its affiliates, would result in LPC and its affiliates having beneficial ownership, at any single point in time, of more than 9.99% of the then total outstanding shares of our common stock. In the six months ended June 30, 2020, we sold approximately 1.5 million shares of common stock to LPC, for net proceeds of approximately $3.5 million. As of June 30, 2020, we had approximately $24.0 million remaining under our agreement with LPC.

In June 2019, we entered into an underwriting agreement relating to the underwritten public offering of 10.5 million shares of our common stock, par value $0.001 per share, at a price to the public of $3.50 per share, for gross proceeds of approximately $36.8 million (the "2019 Public Offering"). We also granted the underwriters an option to purchase up to an additional approximately 1.6 million shares of common stock. In June 2019, the underwriters exercised this option in full. We received approximately $5.5 million in gross proceeds from the underwriter's exercise of the Overallotment Option. In connection with the 2019 Public Offering, inclusive of the Overallotment Option, we incurred approximately $3.9 million of offering-related expenses, resulting in total net proceeds of $38.4 million.

In February 2019, we completed a private placement financing transaction (the "2019 Private Placement"). We issued approximately 3.2 million shares (the "Shares") of common stock, prefunded warrants (the "2019 Pre-Funded Warrants") to purchase approximately 0.5 million shares of common stock (the "2019 Pre-Funded Warrant Shares"), and warrants (the "Private Placement Warrants") to purchase up to approximately 0.9 million shares of common stock (the "2019 Warrant Shares"). The Shares, 2019 Pre-Funded Warrants and Private Placement Warrants (collectively, the "Units") were sold at a purchase price of $4.02 per Unit. We received net cash proceeds of approximately $13.8 million for the purchase of the Shares, 2019 Pre-Funded Warrant Shares and 2019 Warrant Shares.

Cash Flows

The following table summarizes our sources and uses of cash for the six months ended June 30, 2020 and 2019 (in thousands):

	Six Months Ended June 30,	
	2020	2019
Net cash used in operating activities	$ (23,712)	$ (17,942)
Net cash used in investing activities	(528)	(635)
Net cash provided by financing activities	6,221	50,886
Net (decrease) increase in cash and cash equivalents	$ (18,019)	$ 32,309

Operating Activities

Net cash used in operating activities increased $5.8 million for the six months ended June 30, 2020 compared to the six months ended June 30, 2019. The increase in cash used in operations is mainly due to an increase in our research and development expenses due to the advancement of GEN-009 and GEN-011.

Investing activities

Net cash used by investing activities was for the purchases of property and equipment in both periods ending June 30, 2020 and 2019, respectively.

Financing Activities

Net cash provided by financing activities decreased $44.7 million for the six months ended June 30, 2020 compared to the six months ended June 30, 2019. In the six months ended June 30, 2020, we sold shares of common stock to LPC, for net proceeds of approximately $3.5 million and we sold shares under our ATM program and received net proceeds of approximately $2.7 million. In the six months ended June 30, 2019, the 2019 Private Placement generated net proceeds of $13.8 million and the 2019 Public Offering generated net proceeds of $38.4 million, offset by the repayment of long-term debt of $1.4 million.

Operating Capital Requirements

Our primary uses of capital are for salaries and related expenses for personnel, manufacturing costs for preclinical and clinical materials, third-party clinical trial services, laboratory and related supplies, 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 in addition to the proceeds from the July 2020 private placement financing transaction of our common stock, pre-funded warrants and warrants to purchase our common stock are sufficient to support our operations to mid-2022. 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 coupled with the global economic uncertainty that has arisen with the outbreak of the coronavirus, or referred to as COVID-19, 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 and GEN-011;
- the progress, timing, and costs of manufacturing GEN-009 and GEN-011 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 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 payments, 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;
- the extent to which we in-license or acquire other products and technologies;
- the receipt of marketing approval;
- the costs of commercialization activities for GEN-009, GEN-011 and other product candidates, if we receive marketing approval, including the costs and timing of establishing product sales, marketing, distribution, and manufacturing capabilities; and
- revenue received from commercial sales of our product candidates.

We will need to obtain substantial additional funding in order to complete clinical trials and receive regulatory approval for GEN-009, GEN-011 and our other product candidates. 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, GEN-011 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-009, GEN-011 or our other product candidates that we otherwise would seek to develop or commercialize ourselves.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements.

Item 3. Quantitative and Qualitative Disclosures about Market Risk

We had cash and cash equivalents of approximately $22.1 million as of June 30, 2020. The primary objectives of our investment activities are to preserve principal, provide liquidity and maximize income without significantly increasing risk. Our primary exposure to market risk relates to fluctuations in interest rates, which are affected by changes in the general level of U.S. interest rates, including interest rate changes resulting from the impact of the COVID-19 pandemic. Given the short-term nature of our cash and cash equivalents, we believe that a sudden change in market interest rates would not be expected to have a material impact on our financial condition and/or results of operations. We do not own any derivative financial instruments.

We do not believe that our cash, cash equivalents and marketable securities have significant risk of default or illiquidity. While we believe our cash and cash equivalents do not contain excessive risk, we cannot provide absolute assurance that in the future our investments will not be subject to adverse changes in market value. In addition, we maintain significant amounts of cash, cash equivalents and marketable securities at one or more financial institutions that are in excess of federally insured limits.

Inflation generally affects us by increasing our cost of labor and clinical trial costs. We do not believe that inflation had a material effect on our results of operations during the six months ended June 30, 2020.

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 Exchange Act of 1934, as amended, 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, 2020 (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended). 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, 2020, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control Over Financial Reporting

During the three months ended June 30, 2020, 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, as amended, 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. 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.

Item 1A. Risk Factors

There have been no material changes from the risk factors set forth in the Company's Annual Report Form 10-K for the year ended December 31, 2019 and the Company's Quarterly Report Form 10-Q for the quarter ended March 31, 2020.

Item 6. Exhibits

Exhibit Number	Exhibit
3.1	Fifth Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on February 12, 2014)
3.2	Certificate of Amendment to the Amended and Restated Certificate of Incorporation (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)
3.3	Certificate of Amendment to the Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on May 21, 2019)
3.4	Certificate of Amendment to Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K, File No. 001-36289, filed on June 2, 2020)
3.5*	Certificate of Correction to the Certificate of Amendment to the Restated Certificate of Incorporation of Genocea Biosciences, Inc.
31.1	Certification pursuant to Section 302 of Sarbanes Oxley Act of 2002 by Chief Executive Officer
31.2	Certification pursuant to Section 302 of Sarbanes Oxley Act of 2002 by Chief Financial Officer
32.1	Certification of periodic financial report pursuant to Section 906 of Sarbanes Oxley Act of 2002 by Chief Executive Officer
32.2	Certification of periodic financial report pursuant to Section 906 of Sarbanes Oxley Act of 2002 by Chief Financial Officer
101.INS*	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)
101.SCH*	Inline XBRL Taxonomy Extension Schema Document.
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE*	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104*	Cover Page Interactive Date File (formatted as Inline XBRL with applicable taxonomy extension information contained in Exhibits 101)

*Filed herewith

SIGNATURES

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

Genocea Biosciences, Inc.

Date: July 23, 2020

By: /s/ WILLIAM D. CLARK

William D. Clark

President and Chief Executive Officer and Director

(Principal Executive Officer)

Date: July 23, 2020

By: /s/ DIANTHA DUVALL

Diantha Duvall

Chief Financial Officer

(Principal Financial and Accounting Officer)

STATE OF DELAWARE

CERTIFICATE OF CORRECTION OF

GENOCEA BIOSCIENCES, INC.

Genocea Biosciences, Inc., a corporation duly organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the "Corporation"), does hereby certify as follows:

FIRST: The name of the corporation is Genocea Biosciences, Inc.

SECOND: A Certificate of Amendment to the Restated Certificate of Incorporation (the "Certificate") was filed with the Secretary of State of the State of Delaware on June 2, 2020 and said Certificate requires correction as permitted by Section 103 of the General Corporation Law of the State of Delaware.

THIRD: The inaccuracy of defect of said Certificate is that the Certificate inaccurately states the number of authorized shares and of those shares, the number of which are Common Stock.

FOURTH: Article Four, of the Certificate should read as follows:

"FOURTH: The Restated Certificate of Incorporation is hereby amended by deleting subsection (a) of Article IV "Capitalization" and replacing it as follows:

"(a) Authorized Shares. The total number of shares of stock which the Corporation shall have authority to issue is 195,000,000, consisting of 170,000,000 shares of common stock, par value $0.001 per share ("Common Stock"), and 25,000,000 shares of preferred stock, par value $0.001 per share ("Preferred Stock"). Such stock may be issued from time to time by the Corporation for such consideration as may be fixed by the board of directors of the Corporation (the "Board of Directors")."

[*Signature page follows*]

IN WITNESS WHEREOF, this Certificate of Correction to the Certificate of Amendment to the Restated Certificate of Incorporation of the Corporation has been executed by a duly authorized officer of this Corporation as of this 23rd day of June, 2020.

/s/ Diantha Duvall
Name: Diantha Duvall
Title: Chief Financial Officer

Exhibit 31.1

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 and Chief Executive Officer and Director, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Genocea 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 and Chief Executive Officer and Director
(Principal Executive Officer)

Date: July 23, 2020

Exhibit 31.2

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, Diantha Duvall, Chief Financial Officer (Principal Financial and Accounting Officer), certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Genocea 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/ DIANTHA DUVALL

Diantha Duvall

Chief Financial Officer (Principal Financial and Accounting Officer)

Date: July 23, 2020

Exhibit 32.1

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, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, the undersigned, William D. Clark, as the President and Chief Executive Officer and Directorof 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 and Chief Executive Officer and Director
(Principal Executive Officer)

Date: July 23, 2020

* 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.

Exhibit 32.2

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, 2020 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, the undersigned, Diantha Duvall, as the Chief Financial Officer of the Company, do hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of 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/ DIANTHA DUVALL

Diantha Duvall

Chief Financial Officer (Principal Financial and Accounting Officer)

Date: July 23, 2020

*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.