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Filed pursuant to Rule 424(b)(4)

Registration No. 333-232023

PROSPECTUS

10,500,000 Shares

**Common Stock**

We are offering 10,500,000 shares of our common stock in this offering.

Our common stock is listed on The Nasdaq Capital Market under the symbol “GNCA”. On June 19, 2019, the last sale price on our common stock was \$3.85 per share.

We are an “emerging growth company” as that term is used in the Jumpstart Our Business Startups Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements for this prospectus and future filings. See “Summary—Implications of Being an Emerging Growth Company.”

Investing in our common stock involves risk. See “Risk Factors” beginning on page 7.

	<u>Per share</u>	<u>Total</u>
Public Offering Price	\$ 3.50	\$ 36,750,000
Underwriting Discounts and Commissions(1)	\$ 0.21	\$ 2,205,000
Proceeds to Genocea (before expenses)	\$ 3.29	\$ 34,545,000

(1) We refer you to “Underwriting” beginning on page 28 for additional information regarding underwriting compensation.

We have granted the underwriters an option to purchase up to 1,575,000 additional shares of common stock at the public offering price less the underwriting discount. The underwriters can exercise this option at any time within 30 days after the date of this prospectus.

Certain of our existing stockholders and their affiliated entities, including holders of more than 5% of our common stock, have agreed to purchase an aggregate of approximately 6.8 million shares of our common stock in this offering at the public offering price. The underwriters will receive the same underwriting discount on any shares purchased by these existing stockholders as they will on any other shares sold to the public in this offering.

The underwriters expect to deliver the shares of common stock to investors on or about June 24, 2019 through the book entry facilities of The Depository Trust Company.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed on the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

Joint Book-Running Managers

SVB Leerink

Stifel

Co-Managers

Baird

Needham & Company

The date of this prospectus is June 19, 2019

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You should rely only on the information contained in this prospectus or contained in any free writing prospectus filed with the Securities and Exchange Commission. Neither we nor the underwriters have authorized anyone to provide you with additional information or information different from that contained in this prospectus or in any free writing prospectus filed with the Securities and Exchange Commission. We are offering to sell, and seeking offers to buy, our common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus, or of any sale of our common stock.

For investors outside the United States: We have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of our common stock and the distribution of this prospectus outside the United States.

SUMMARY

This summary highlights information contained in other parts of this prospectus or incorporated by reference into this prospectus from our Annual Report on Form 10-K for the year ended December 31, 2018, our Quarterly Report on Form 10-Q for the quarter ended March 31, 2019 and our other filings with the Securities and Exchange Commission (the "SEC") listed in the section of this prospectus entitled "Incorporation of Documents By Reference" and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should also consider, among other things, the matters described under "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations," appearing elsewhere in this prospectus, in our Annual Report on Form 10-K for the year ended December 31, 2018 or in our Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, incorporated by reference herein. Unless the context requires otherwise, references in this prospectus to "Genocea", "we", "us" and "our" refer to Genocea Biosciences, Inc.

Overview

We are a biopharmaceutical company that discovers and develops novel cancer immunotherapies using the 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 cancer vaccines and cellular therapies, because it identifies antigens to which a patient's T cells already mount anti-tumor responses. 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, as well as GEN-010, a next-generation neoantigen vaccine program.

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, and this approach has shown efficacy in hematologic malignancies. Vaccines or cellular therapies employing this approach must target specific differences from normal tissue present in a tumor, such as genetic mutations. However, the discovery of such antigens 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.

We have designed the ATLAS platform to overcome these antigen discovery challenges. We believe that ATLAS represents the most comprehensive, accurate, and high-throughput system for antigen discovery in the biopharmaceutical industry. ATLAS employs components of the T cell arm of the human immune system from each patient that it profiles in a laboratory setting. Using ATLAS, we measure that patient's T cell responses to an extensive set of candidate neoantigens, tumor-associated antigens or tumor-associated viral antigens for any individual's cancer, allowing us to select those targets associated with the anti-tumor T cell responses that may kill that individual's cancer.

Using ATLAS, we have profiled CD4⁺ and CD8⁺ T cell responses to more than 2,500 potential neoantigens to date. The T cell responses we have seen appear to challenge previous assumptions in the field - specifically, that all neoantigens are "good neoantigens," or stimulatory to the immune system. At the meeting of the Society for Immunotherapy of Cancer in November 2018, we presented data from

preclinical research in which “inhibitory” neoantigens were observed to promote tumor progression, suggesting that a patient's ratio of stimulatory to inhibitory neoantigens may be predictive of their response to immunotherapies. We are not aware of another platform capable of this comprehensive neoantigen profiling.

The ATLAS portfolio currently includes three patent families, one of which is specifically directed to ATLAS-based methods for cancer diagnosis, prognosis and patient selection, as well as related compositions. This patent family currently comprises a pending PCT application and a pending U.S. application. Patents issuing from these applications are expected to have a patent term until at least March 2038.

Our Immuno-Oncology Programs

Our cancer immunotherapies consist of vaccines that are designed to educate T cells to recognize and attack specific targets, as well as cellular therapies intended to introduce T cells that have been educated to attack these targets, thereby killing

cancer cells. We are developing personalized cancer vaccines using our proprietary ATLAS platform to identify patient-specific neoantigens that are associated with that individual's pre-existing immune responses to a tumor.

Data published in recent years indicate that an individual's response to neoantigens drives the efficacy of immune checkpoint inhibitor, or ICI, therapy and that it is possible to vaccinate an individual against his or her own neoantigens. We believe that neoantigen vaccines could be used in combination with existing treatment approaches for cancer, including ICI therapy, to potentially direct and enhance an individual's T cell response to his or her cancer, thereby potentially effecting better clinical outcomes. Data also support the potential of isolating and expanding T cell populations targeting specific neoantigens for therapeutic benefit.

Our lead immuno-oncology program, GEN-009, is an adjuvanted neoantigen peptide vaccine candidate. Using ATLAS to identify specific neoantigens, we then manufacture a personalized vaccine for each patient using only those neoantigens determined by ATLAS to be stimulatory to that patient's immune system.

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

Program	Description	Stage of Development	Next Milestone(s)	Anticipated Timeline for Next Milestone(s)
GEN-009	First generation neoantigen cancer vaccine	Phase 1/2a	Additional monotherapy results from Part A of clinical trial	Fourth quarter of 2019
			Clinical efficacy data from Part B of clinical trial	Mid-2020
GEN-011	Adoptive T cell therapy	Preclinical	IND filing	First half of 2020
GEN-010	Second generation neoantigen cancer vaccine	Preclinical	Select delivery technology platform	Ongoing

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, which we expect to initiate in the second half of 2019, 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 solid tumors.

At the Annual Meeting of the American Society of Clinical Oncology in June 2019, we presented the first peer-reviewed data from Part A of the ongoing clinical trial. In the data from the first five evaluable patients:

- 100% of patients had measurable CD4⁺ and CD8⁺ T cell responses to their GEN-009 vaccine;
- Responses were detected for 91% of the administered vaccine neoantigens (N=5), which is significantly higher results than first-generation target prediction methods;

- GEN-009 elicited CD8⁺ T cell responses *ex vivo*, which is a measure of effector function, for 47% of vaccine neoantigens (N=5);
- GEN-009 elicited broad immune responses using a 10-day *in vitro stimulation* assay, which is a measure of central memory, with 86% of neoantigens eliciting a CD4⁺ response (N=5) and 33% of neoantigens eliciting a CD8⁺ response (N=2); and
- GEN-009 was well tolerated, with no dose-limiting toxicities observed.

We currently anticipate reporting the first GEN-009 clinical efficacy data from Part B of the trial in mid-2020.

In addition to GEN-009, we also are advancing preclinical work on GEN-011, an adoptive T cell therapy to neoantigens identified by ATLAS, for which we expect to file an Investigational New Drug Application, or IND, with the U.S. Food and Drug Administration, or FDA, in the first half of 2020, with preliminary clinical efficacy data anticipated in the second half of 2020.

We also continue to explore GEN-010, our vaccine candidate employing next-generation antigen delivery technology, which we may advance to provide an opportunity for better immunogenicity and/or efficiency of production.

In addition, we are using ATLAS to pursue discovery of novel candidate antigens for non-personalized cancer immunotherapies. Such programs could target shared neoantigens, non-mutated, shared tumor-associated antigens, and cancers of viral origin such as cancers driven by Epstein-Barr Virus infection.

Our Strengths

We offer a differentiated and rational approach to neoantigen selection through our proprietary ATLAS platform. ATLAS is a real-time test of T cells from each individual's immune system designed to determine what tumor mutations are recognized by T cells in each patient. Using ATLAS, we believe that we can both optimize neoantigens for inclusion in our immunotherapies and exclude inhibitory antigens that appear to exert an immunosuppressive effect on the patient. We are advancing complementary programs built from insights derived from using our ATLAS platform, including GEN-009, our neoantigen vaccine candidate for which we are conducting a Phase 1/2a clinical trial across a variety of solid tumor types, and GEN-011, our neoantigen-specific adoptive T cell therapy, for which we intend to file an IND in the first half of 2020. Key aspects of our strengths are highlighted below:

- **We are a clinical-stage cancer immunotherapy company focused on the discovery and development of T cell vaccines.** Recent studies from academia and industry have shown that neoantigen-based vaccines can stimulate an efficacious anti-tumor immune response that can prolong melanoma remission. A neoantigen vaccine to amplify responses to therapeutic levels against multiple neoantigens may lead to clinical responses by killing tumor cells and preventing tumor escape via immuno-editing, or the elimination of cancer cells that display only a single neoantigen, while leaving behind cells that do not express that antigen.
- **ATLAS provides us an advantage in identifying and validating vaccine antigens that generate a strong cellular immune response.** The ATLAS platform places us in an advantageous position by allowing identification of neoantigens for which CD8⁺ and/or CD4⁺ T cell responses exist in a patient, thereby bypassing the uncertainty of predictive algorithms that cannot determine whether a patient's immune system can actually respond to a particular neoantigen. Immuno-profiling studies have shown that traditional predictive algorithms failed to predict many of the true neoantigens identified by ATLAS, which has been validated in the screening of around 200 cancer patients.
- **Strong management team, advisors, and investors.** We believe that we are a leader in the field of T cell-related immunotherapy discovery and development. Our management and scientific teams possess considerable experience in oncology, immunology, and vaccinology, spanning research, manufacturing, clinical development, and regulatory affairs.

Our Strategy

Our goal is to become a leading cancer immune therapeutics company focused on the discovery and development of personalized cancer immunotherapies using our proprietary ATLAS vaccine discovery platform. We believe that using ATLAS to identify neoantigens could lead to more immunogenic and efficacious cancer vaccines and immunotherapies. Key elements of our strategy are to:

- **Continue to advance our lead neoantigen cancer vaccine candidate, GEN-009.** GEN-009 is a personalized cancer vaccine that uses our proprietary ATLAS platform to ensure the vaccine targets the right neoantigens in each person, for which we have currently evaluating the safety,

immunogenicity, and efficacy in a Phase 1/2a clinical trial. We reported the first immunogenicity data available from the trial in June 2019 and expect preliminary clinical efficacy data in mid-2020.

- **Advance GEN-011 into an IND application and explore proprietary vaccine modalities for GEN-010.** Our second product candidate, GEN-011, is a neoantigen adoptive T cell therapy program. We are using ATLAS to identify patient-specific neoantigens that stimulate a patient's immune system. Isolating the T cells that are activated by those neoantigens allows us to expand the patient's own autologous T cells to create a cell-based therapeutic. We are currently conducting preclinical studies of GEN-011 with an aim of filing an IND to begin clinical study in the United States in the first half of 2020. Additionally, we expect to advance GEN-010, our novel neoantigen cancer vaccine program.
- **Utilize ATLAS, our antigen discovery platform, to support development of additional cancer immunotherapies.** We are currently exploring a variety of partnership opportunities both to accelerate development of GEN-009, GEN-011, GEN-010, and our shared antigen vaccine programs, as well as to expand the applications for our ATLAS technology. For example, in May 2019, we entered into a research collaboration with Iovance Biotherapeutics, Inc. to assess the potential utility of ATLAS in the development of next-generation tumor-infiltrating lymphocyte therapies. Through these

collaborations, we intend to allow access to our ATLAS platform and intellectual property, in exchange for potential upfront payments, development and commercial milestones, and royalties, to third parties developing cancer immunotherapies in areas that are not competitive with our product candidates.

Participation in This Offering By Existing Stockholders

In February 2019, we entered into a subscription agreement with certain investors pursuant to which we offered, in an unregistered offering, shares of our common stock and warrants to purchase shares of our common stock in two closings. The first closing occurred in February 2019, in which we sold shares and warrants for net proceeds of approximately \$14.0 million. The occurrence of the second closing, at which we could sell additional shares and warrants for gross proceeds of up to \$24.2 million, was at our option, and was contingent upon the receipt of top-line results from Part A of our Phase 1/2a clinical trial for GEN-009. In June 2019, we announced top-line results from this trial and elected not to proceed with a potential second closing under the subscription agreement. In lieu of a second closing under the subscription agreement, these investors have agreed to purchase an aggregate of approximately 6.8 million shares of our common stock in this offering at the public offering price per share and on the same terms as the other purchasers in this offering.

Risks Associated with Our Business

Our business is subject to numerous risks and uncertainties, including those highlighted in the section entitled “Risk Factors” immediately following this prospectus summary. These risks include, among others, the following:

- We have incurred significant losses since our founding in 2006 and anticipate that we will continue to incur significant losses for the foreseeable future and may never achieve or maintain profitability.
- We will require substantial additional financing to achieve our goals, and a failure to obtain this necessary capital when needed would force us to delay, limit, reduce or terminate our product development or commercialization efforts.
- We cannot be certain that we will be successful in advancing GEN-009, our lead product candidate, through clinical development, obtaining regulatory approval for it, or commercializing it or any of our future product candidates.
- Because our active product candidate is in an early stage of clinical development, there is a high risk of failure, and we may never succeed in developing marketable products or generating product revenue.
- We may find it difficult to enroll patients in our clinical trials, which could delay or prevent clinical trials of our product candidates.
- Our active development product, GEN-009, includes a novel vaccine adjuvant and our other current and potential future product candidates may include one or more novel adjuvants, which may make it difficult for us to predict the time and cost of product development as well as the requirements the FDA or other regulatory agencies may impose to demonstrate the safety of such product candidates.
- We rely on third parties to conduct non-clinical studies and clinical trials for our product candidates, including our active clinical development product, GEN-009, and any other current or future product candidates, and if they do not properly and successfully perform their obligations to us, we may not be able to obtain regulatory approvals for our product candidates.
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If we are unable to obtain or protect intellectual property rights related to our product candidates, we may not be able to compete effectively in our markets.

- Our level of indebtedness and debt service obligations could adversely affect our financial condition and may make it more difficult for us to fund our operations.
- Our largest stockholder, New Enterprise Associates, could exert significant influence over us and could limit your ability to influence the outcome of key transactions, including any change of control.

Implications of Being an Emerging Growth Company

We are an “emerging growth company” as defined in the Jumpstart Our Business Startups Act of 2012. We will remain an emerging growth company until December 31, 2019. We refer to the Jumpstart Our Business Startups Act of 2012 in this prospectus as the “JOBS Act,” and references in this prospectus to “emerging growth company” shall have the meaning ascribed to it in the JOBS Act.

As an emerging growth company, we may take advantage of specified reduced disclosure and other requirements that are otherwise applicable, in general, to public companies that are not emerging growth companies. These provisions include:

- reduced disclosure about our executive compensation arrangements;
- exemption from the non-binding shareholder advisory votes on executive compensation or golden parachute arrangements;
- exemption from the auditor attestation requirement in the assessment of our internal control over financial reporting; and
- reduced disclosure of financial information in this prospectus and the documents incorporated by reference into this prospectus, such as being permitted to include only two years of audited financial information and two years of selected financial information in addition to any required unaudited interim financial statements, with correspondingly reduced “Management’s Discussion and Analysis of Financial Condition and Results of Operations” disclosure.

We may choose to take advantage of some, but not all, of the available exemptions. We have taken advantage of some reduced reporting burdens in this prospectus and the documents incorporated by reference into this prospectus. Accordingly, the information contained herein may be different than the information you receive from other public companies in which you hold stock. The JOBS Act permits an emerging growth company to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. We have irrevocably elected not to avail ourselves of this extended transition period and, as a result, we will adopt new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-emerging growth companies.

Corporate Information

We were incorporated in the state of Delaware in August 2006 as Genoccea, Inc., and we subsequently changed our name to Genoccea Biosciences, Inc. Our principal executive offices are located at 100 Acorn Park Drive, Cambridge, MA 02140, and our telephone number is (617) 876-8191. Our website address is: www.genoccea.com. We have included our website address as a factual reference and do not intend it to be an active link to our website. The information that can be accessed through our website is not part of this prospectus, and investors should not rely on any such information in deciding whether to purchase our common stock.

Genoccea® and the Genoccea logo are our registered trademarks. The other trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners.

THE OFFERING

Common stock we are offering	10,500,000 shares
Common stock outstanding after this offering	24,549,181 shares (or 26,124,181 shares if the underwriters exercise their option to purchase additional shares in full)
Option to purchase additional shares	The underwriters have a 30-day option to purchase a total of 1,575,000 additional shares of common stock.
Use of proceeds	The net proceeds from this offering will be approximately \$32.7 million, or approximately \$37.9 million if the underwriters exercise their option to purchase 1,575,000 additional shares in full, at the public offering price of \$3.50 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. We intend to use the net proceeds from this offering, together with our existing cash and cash equivalents, to conduct additional clinical trials evaluating the efficacy of GEN-009; to file an IND and commence clinical development to determine the clinical efficacy of GEN-011; to further preclinical development of GEN-010; and to further invest in ATLAS and related research programs.
Risk factors	See “Use of Proceeds.” See “Risk Factors” beginning on page 7 and the other information included and incorporated by reference in this prospectus for a discussion of factors you should carefully consider before deciding to invest in our common stock.
Nasdaq Capital Market Symbol	“GNCA”

In this prospectus, unless otherwise indicated, the amount of shares of common stock outstanding and the other information based thereon is based on 14,049,181 shares of common stock outstanding as of March 31, 2019 and does not reflect:

- 1,303,407 shares of common stock issuable upon exercise of stock options outstanding at March 31, 2019 at a weighted-average exercise price of \$12.88;
- 5,131,398 shares of common stock issuable upon exercise of warrants outstanding at March 31, 2019 at a weighted-average exercise price of \$7.77;
- 204,375 shares of common stock issuable upon conversion of preferred stock outstanding at March 31, 2019;
- 271,743 shares of common stock reserved for future issuance under our 2014 Amended and Restated Equity Incentive Plan as of March 31, 2019; and
- 289,085 shares of common stock reserved for future issuance under our 2014 Employee Stock Purchase Plan as of March 31, 2019.

Unless otherwise indicated, all information in this prospectus reflects or assumes the following:

- a one-for-eight reverse stock split of our common stock that we effected on May 22, 2019;
- no exercise of stock options or warrants or conversion of preferred stock after March 31, 2019; and

- no exercise by the underwriters of their option to purchase up to 1,575,000 additional shares of common stock in this offering.

RISK FACTORS

Investing in our common stock involves a high degree of risk. Before investing in our common stock, you should consider carefully the risks described below, together with the other information contained in this prospectus and incorporated by reference in this prospectus, including the risk factors incorporated by reference from our Annual Report on Form 10-K for the year ended December 31, 2018 and other filings we make with the SEC. We believe the risks described below and incorporated by reference herein are the risks that are material to us as of the date of this prospectus. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business.

Additional Risks Related to This Offering

We may allocate the net proceeds from this offering in ways that you and other stockholders may not approve.

We intend to use the net proceeds from this offering, together with our existing cash and cash equivalents, to conduct additional clinical trials evaluating the efficacy of GEN-009; to file an IND and commence clinical development to determine the clinical efficacy of GEN-011; to further preclinical development of GEN-010; and to further invest in ATLAS and related research programs. This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development efforts, the status of and results from clinical trials, as well as any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. Because of the number and variability of factors that will determine our use of the proceeds from this offering, their ultimate use may vary substantially from their currently intended use. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering and could spend the proceeds in ways that do not necessarily improve our operating results or enhance the value of our common stock. See "Use of Proceeds."

If you purchase our common stock in this offering, you will incur immediate and substantial dilution in the book value of your shares.

The public offering price of our common stock is substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our net tangible book value per share after this offering. After giving effect to the sale of 10,500,000 shares of our common stock in this offering based on the public offering price of \$3.50 per share, less the underwriting discounts and commissions, and estimated offering expenses payable by us and based on a net tangible book value per share of our common stock of \$0.35 as of March 31, 2019, if you purchase shares in this offering, you will suffer immediate and substantial dilution of \$1.96 per share in the net tangible book value of common stock purchased. To the extent shares are issued under outstanding options, warrants or preferred stock or we sell additional equity or convertible debt securities in the future, you will incur further dilution. See "Dilution" for a more detailed description of the dilution to new investors in the offering.

Investors in this offering may experience future dilution.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into, or exchangeable for, our common stock at prices that may not be the same as the price per share in this offering. We cannot assure you that we will be able to sell shares of our common stock or other related securities in any other offering at a price per share that is equal to or greater than the price per share paid by investors in this offering. If the price per share at which we sell additional shares of our common stock or related securities in future transactions is less than the price per share in this offering, investors who purchase our common stock in this offering will suffer a dilution in their investment.

A significant portion of our total outstanding shares may be sold into the market at any time, which could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock.

Upon the completion of this offering, approximately 4.8 million shares of our common stock beneficially owned by our officers and directors will be subject to lock-up agreements with the underwriters that prohibit, subject to certain exceptions, the disposal or pledge of, or the hedging against, any of their common stock or securities convertible into or exchangeable for shares of common stock for a period of 90 days after the date of this prospectus. However, all of the shares sold in this offering and the

remaining shares of our common stock outstanding prior to this offering will not be subject to lock-up agreements with the underwriters and, except to the extent such shares are held by our affiliates, will be freely tradable. The market price of our common stock could decline as a result of sales by our stockholders in the market following completion of this offering or the perception that these sales could occur. These factors could also make it difficult for us to raise additional capital by selling stock.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference into this prospectus contain forward-looking statements. 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. In particular, you should consider the numerous risks described in this prospectus and in our Annual Report on Form 10-K for the year ended December 31, 2018 incorporated by reference in this prospectus.

The forward-looking statements in this prospectus include, among other things, statements about:

- our estimates regarding the timing and amount of funds we require to conduct clinical trials for GEN-009, to file our IND 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 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 strategy.

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.

You should read this prospectus, other documents incorporated by reference herein and the documents that we have filed as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements represent our views as of the date of this prospectus. We anticipate that subsequent events and developments will cause our views to change. However, while we may elect to update these forward-looking statements at some point in the future, we have no current intention of doing so except to the extent required by applicable law. You should, therefore, not rely on these forward-looking statements as representing our views as of any date subsequent to the date of this prospectus.

This prospectus and the other documents incorporated by reference herein include 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.

USE OF PROCEEDS

The net proceeds of the sale of shares of common stock in this offering will be approximately \$32.7 million at the public offering price of \$3.50 per share after deducting underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise their option to purchase additional share of common stock in full, we estimate that the net proceeds will be approximately \$37.9 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

As of March 31, 2019, we had cash and cash equivalents of \$29.0 million. We intend to use the net proceeds from this offering, together with our existing cash and cash equivalents, to conduct additional clinical trials evaluating the efficacy of GEN-009; to file an IND and commence clinical development to determine the clinical efficacy of GEN-011; to further preclinical development of GEN-010; and to further invest in ATLAS and related research programs. The remainder will be used for other general corporate purposes.

Our expected use of net proceeds from this offering represents our current intentions based upon our present plans and business condition, which could change in the future as our plans and business conditions evolve. As of the date of this prospectus, we cannot predict with certainty all of the particular uses for the net proceeds to be received upon the completion of this offering or the amounts that we will actually spend on the uses set forth above. We may also use a portion of the net proceeds to in-license, acquire or invest in complementary technologies, products or assets, although we have no current agreements, arrangements or commitments with respect to any potential acquisition, investment or license as of the date of this prospectus. We believe that our cash, cash equivalents and investments, together with the net proceeds from this offering, will fund our operations into the first quarter of 2021. However, we have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect.

The amount and timing of our actual expenditures will depend upon numerous factors, including the results of our research and development efforts, the timing and success of non-clinical studies, our ongoing clinical trials or clinical trials we may commence in the future and the timing of regulatory submissions. As a result, our management will have broad discretion over the use of the net proceeds from this offering.

Pending the use of the proceeds from this offering, we intend to invest the net proceeds in short-term, interest-bearing, investment-grade securities, certificates of deposit or government securities.

MARKET PRICE OF OUR COMMON STOCK

Our common stock is listed on The Nasdaq Capital Market under the symbol “GNCA.” On June 19, 2019, the closing price for our common stock as reported on The Nasdaq Capital Market was \$3.85 per share. As of June 19, 2019, we had 17 holders of record of our common stock.

DIVIDEND POLICY

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings, if any, to fund the development and expansion of our business and we do not anticipate paying any cash dividends in the foreseeable future. Any future determination to pay dividends will be made at the discretion of our board of directors. Additionally, our ability to pay dividends on our common stock is limited by restrictions under the terms of the agreements governing our secured credit facility with Hercules Capital, Inc. Payment of future cash dividends, if any, will be at the discretion of the board of directors after taking into account various factors, including our financial condition, operating results, current and anticipated cash needs, the requirements of current or then-existing debt instruments and other factors the board of directors deems relevant.

CAPITALIZATION

Effective May 22, 2019, we effected a reverse stock split of our issued and outstanding common stock, par value \$0.001 per share, at a ratio of one-for-eight, and decreased the number of authorized shares of common stock from 250,000,000 shares to 85,000,000 shares. The share numbers below reflect the reverse stock split.

The following table sets forth our cash and cash equivalents and capitalization as of March 31, 2019:

- on an actual basis; and
- on an as adjusted basis to give further effect to the sale of shares of our common stock offered in this offering at the public offering price of \$3.50 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

	As of March 31, 2019	
(in thousands, except per share data)	Actual	As Adjusted
	(unaudited)	
Cash and cash equivalents	\$ 29,038	\$ 61,758
Long-term debt, including current portion and discount	14,122	14,122
Stockholders equity:		
Preferred stock, \$0.001 par value; 25,000,000 shares authorized, 1,635 shares issued and outstanding, actual and as adjusted	701	701
Common stock, \$0.001 par value; 85,000,000 shares authorized, 14,049,181 shares issued and outstanding, actual; 24,549,181 shares issued and outstanding, as adjusted	112	123
Additional paid-in capital	312,993	345,702
Accumulated deficit	(307,571)	(307,571)
Total stockholders' equity	6,235	38,955
Total capitalization	\$ 20,357	\$ 53,077

You should read this information together with our unaudited financial statements and related notes and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, which are incorporated by reference into this prospectus.

The table above does not include:

- 1,303,407 shares of common stock issuable upon exercise of stock options outstanding at March 31, 2019 at a weighted-average exercise price of \$12.88;
- 5,131,398 shares of common stock issuable upon exercise of warrants outstanding at March 31, 2019 at a weighted-average exercise price of \$7.77;
- 204,375 shares of common stock issuable upon conversion of preferred stock outstanding at March 31, 2019;
- 271,743 shares of common stock reserved for future issuance under our 2014 Amended and Restated Equity Incentive Plan as of March 31, 2019; and
- 289,085 shares of common stock reserved for future issuance under our 2014 Employee Stock Purchase Plan as of March 31, 2019.

DILUTION

If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the public offering price per share of our common stock and the as adjusted net tangible book value per share of our common stock after this offering.

Our historical net tangible book value as of March 31, 2019 was \$5.0 million, or \$0.35 per share of our common stock. Historical net tangible book value per share represents the amount of our total tangible assets less total liabilities, divided by 14,049,181 shares of our common stock outstanding, after giving effect to our reverse stock split effected on May 22, 2019.

After giving effect to the sale of 10,500,000 shares of common stock by us, at the public offering price of \$3.50 per share, less the underwriting discounts and commissions and estimated offering expenses payable by us, our as adjusted net tangible book value will be approximately \$37.7 million, or approximately \$1.54 per share, after this offering. This represents an immediate increase in net tangible book value per share of \$1.19 to existing stockholders and immediate dilution of \$1.96 in net tangible book value per share to new investors purchasing common stock in this offering.

Dilution per share to new investors is determined by subtracting as adjusted net tangible book value per share after this offering from the public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis.

Public offering price per share		\$ 3.50
Net tangible book value per share as of March 31, 2019	\$ 0.35	
Increase in net tangible book value per share attributable to new investors	<u>\$ 1.19</u>	
As adjusted net tangible book value per share after this offering		<u>\$ 1.54</u>
Dilution per share to new investors		<u>\$ 1.96</u>

If the underwriters exercise their option to purchase additional shares or if any additional shares are issued under outstanding options, warrants or preferred stock, you will experience further dilution.

The number of shares of our common stock to be outstanding upon completion of this offering as reflected in the foregoing dilution calculations excludes:

- 1,303,407 shares of common stock issuable upon exercise of stock options outstanding at March 31, 2019 at a weighted-average exercise price of \$12.88;
- 5,131,398 shares of common stock issuable upon exercise of warrants outstanding at March 31, 2019 at a weighted-average exercise price of \$7.77;
- 204,375 shares of common stock issuable upon conversion of preferred stock outstanding at March 31, 2019;
- 271,743 shares of common stock reserved for future issuance under our 2014 Amended and Restated Equity Incentive Plan as of March 31, 2019; and
- 289,085 shares of common stock reserved for future issuance under our 2014 Employee Stock Purchase Plan as of March 31, 2019.

PRINCIPAL STOCKHOLDERS

The following table sets forth information relating to the beneficial ownership of our common stock as of May 31, 2019 by: each person, or group of affiliated persons, known by us to beneficially own more than 5% of our outstanding shares of common stock; each of our directors; each of our named executive officers; and all directors and executive officers as a group.

The number of shares beneficially owned by each entity, person, director or executive officer is determined in accordance with the rules of the SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Under such rules, beneficial ownership includes any shares over which the individual has sole or shared voting power or investment power as well as any shares that the individual has the right to acquire within 60 days of May 31, 2019 through the exercise of any stock options, warrants or other rights. Except as otherwise indicated, and subject to applicable community property laws, the persons named in the table have sole voting and investment power with respect to all shares of common stock held by that person.

The percentage of shares beneficially owned is computed on the basis of 14,050,250 shares of our common stock outstanding as of May 31, 2019. Shares of our common stock that a person has the right to acquire within 60 days of May 31, 2019 are deemed outstanding for purposes of computing the percentage ownership of the person holding such rights, but are not deemed outstanding for purposes of computing the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers as a group. Unless otherwise indicated below, the address for each beneficial owner listed is c/o Genocea Biosciences, Inc., Cambridge Discovery Park, 100 Acorn Park Drive, Cambridge, MA 02140.

Holders of more than 5% of our common stock and their affiliated entities have agreed to purchase an aggregate of approximately 6.1 million shares of our common stock in this offering at the public offering price. The following table does not reflect any such purchases by these existing stockholders or their affiliated entities.

Name and Address of Beneficial Owned	Number of Shares Beneficially Owned	Percentage of Shares Beneficially Owned	
		Before Offering	After Offering
5% or greater stockholders:			
New Enterprise Associates 16, L.P. (1) 1954 Greenspring Drive, Suite 600 Timonium, MD 21093	6,241,918	39.20%	23.62%
S.R. One, Limited (2) 980 Great West Road Brentford, Middlesex, TW8 9GS England	1,819,627	12.67%	7.32%
BVF Partners L.P. (3) 44 Montgomery Street, 40th Floor San Francisco, CA 94104	1,450,799	9.99%	7.96%
Vivo Opportunity , LLC (4) 505 Hamilton Avenue, Suite 2017 Palo Alto, CA 94301	1,423,236	9.99%	7.25%
Directors and Named Executive Officers:			
William Clark (5)	203,456	1.43%	*
Jessica Baker Flechtner, Ph.D. (6)	54,561	*	*
Pamela Carroll, Ph.D. (7)	15,849	*	*
Kenneth Bate (8)	11,267	*	*
Ali Behbahani, M.D. (9)	3,125	*	*
Katrine Bosley (10)	18,514	*	*
Ronald Cooper (11)	10,625	*	*
Michael Higgins (12)	10,636	*	*
Howard Mayer, M.D. (13)	7,709	*	*
George Siber, M.D. (14)	38,662	*	*
All executive officers and directors as a group (15 persons) (15)	402,708	2.80%	1.62%

(1) Based on a Schedule 13D filed with the SEC on February 14, 2019, consisting of 4,368,534 shares of common stock and warrants to purchase 1,873,384 shares of common stock. NEA Partners 16, L.P. (“NEA Partners 16”) is the sole general partner of NEA 16. NEA 16 GP, LLC (“NEA 16 LLC”) is the sole general partner of NEA Partners 16. The individual managers of NEA 16 LLC are Peter J. Barris, Forest Baskett, Ali Behbahani, Carmen Chang, Anthony A. Florence, Jr., Mohamad H. Makhzoumi, Joshua Makower, David M. Mott, Scott D. Sandell, Peter W. Sonsini and Paul Walker (collectively, the “Managers”). The Managers share voting and dispositive power with regard to the shares held directly by NEA 16.

(2) Based on a Schedule 13D filed with the SEC on February 25, 2019, consisting of 1,508,743 shares of common stock and 310,884 shares of common stock issuable upon the exercise of warrants. These shares and warrants are held directly by S.R. One, Limited, an indirect wholly-owned subsidiary of GlaxoSmithKline plc.

- (3) Based on a Schedule 13G filed with the SEC on February 14, 2019, which discloses shares as of December 31, 2018, and securities purchased in connection with a private placement in February 2019. Consists of 472,236 shares of common stock held of record by Biotechnology Value Fund, L.P. (“BVF”), 365,519 shares of common stock held of record by Biotechnology Value Fund II, L.P. (“BVF2”), 73,929 shares of common stock held of record by Biotechnology Value Trading Fund OS LP (“Trading Fund OS”), and 66,848 shares of common stock held of record by the Partners Managed Accounts (“Managed Accounts”). Also includes 472,267 shares of common stock issuable upon exercise of warrants held by the above referenced BVF entities. Excludes 589,102 shares of common stock issuable upon the exercise of

warrants, which are not exercisable within 60 days of May 31, 2019 by virtue of the beneficial ownership limitation described below. The number of shares of common stock into which the warrants are convertible is limited to that number of shares of common stock which would result in the stockholders, together with its affiliates, having an aggregate beneficial ownership of no more than 9.99% of the total issued and outstanding shares of common stock. This beneficial ownership limitation may be increased or decreased to an amount not to exceed 19.99% of the number of shares of common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of warrants.

- (4) Based on a Schedule 13G filed with the SEC on January 26, 2018, consisting of 1,022,500 shares of common stock, 204,375 shares of common stock upon conversion of 1,635 shares of Series A convertible preferred stock held of record by Vivo Opportunity Fund, L.P., and 196,361 shares of common stock issuable upon exercise of 392,722 warrants. Excludes 417,077 shares of common stock issuable upon the exercise of warrants, which are not exercisable within 60 days of May 31, 2019 by virtue of the beneficial ownership limitation described below. Vivo Opportunity, LLC is the general partner of Vivo Opportunity Fund, L.P. The voting members of Vivo Opportunity, LLC are Frank Kung, Albert Cha, Shan Fu, Gaurav Aggarwal and Michael Chang, none of whom has individual voting or investment power with respect to these shares of common stock and each of whom disclaims beneficial ownership of such shares of common stock. The number of shares of common stock into which the Series A convertible preferred stock are convertible is limited to that number of shares of common stock which would result in the stockholder, together with its affiliates, having an aggregate beneficial ownership of no more than 9.99% of the total issued and outstanding shares of common stock. The number of shares of common stock issuable upon exercise of warrants is limited to that number of shares of common stock which would result in the stockholder, together with its affiliates, having an aggregate beneficial ownership of no more than 4.99% to the total issued and outstanding shares of common stock. This beneficial ownership limitation may be increased or decreased to an amount not to exceed 9.99% of the number of shares of common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of the warrants.
- (5) Consisting of 14,992 shares of common stock and 188,464 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (6) Consisting of 2,099 shares of common stock and 52,462 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (7) Consisting of 1,450 shares of common stock and 14,399 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (8) Consisting of 11,267 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (9) Consisting of 3,125 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (10) Consisting of 3,887 shares of common stock and 14,627 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (11) Consisting of 10,625 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (12) Consisting of 10,636 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (13) Consisting of 7,709 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.
- (14)

Consisting of 20,678 shares of common stock and 17,984 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.

- (15) Consisting of 50,841 shares of common stock and 351,867 shares of common stock that can be acquired upon the exercise of options within 60 days of May 31, 2019.

DESCRIPTION OF CAPITAL STOCK

General

The following description of our capital stock is intended as a summary only and is qualified in its entirety by reference to our fifth amended and restated certificate of incorporation, as amended, our amended and restated by-laws and the applicable provisions of the Delaware General Corporation Law. We refer in this section to our fifth amended and restated certificate of incorporation, as amended, as our certificate of incorporation, and we refer to our amended and restated by-laws as our by-laws. As of the date of this prospectus, our authorized capital stock consists of 85,000,000 shares of our common stock, par value \$0.001 per share and 25,000,000 shares of our preferred stock, par value \$0.001 per share.

As of March 31, 2019, after giving effect to the reverse stock split effected on May 22, 2019, we had issued and outstanding:

- 14,049,181 shares of our common stock;
- 1,635 shares of our preferred stock;
- options to purchase a total of 1,303,407 shares of our common stock with a weighted average exercise price of \$12.88 per share; and
- 5,131,398 shares of common stock issuable upon the exercise of warrants outstanding at a weighted-average exercise price of \$7.77 per share.

As of March 31, 2019, we had 23 holders of record of our common stock and one holder of record of our preferred stock.

Common Stock

Dividend Rights. Subject to preferences that may apply to shares of preferred stock outstanding at the time, holders of outstanding shares of common stock are entitled to receive dividends out of assets legally available at the times and in the amounts as the board of directors may from time to time determine.

Conversion or Redemption Rights. Our common stock is neither convertible nor redeemable.

Liquidation Rights. Upon our liquidation, dissolution or winding up, the holders of our common stock are entitled to receive pro rata our assets which are legally available for distribution, after payment of all debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then-outstanding shares of preferred stock.

Rights and Preferences. Holders of common stock have no preemptive, conversion or subscription rights and there are no redemption or sinking fund provisions applicable to the common stock. The rights, preferences and privileges of the holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate in the future.

Preferred Stock

Our board of directors have the authority, without further action by our stockholders, to issue up to 25,000,000 shares of preferred stock in one or more series, to establish from time to time the number of shares to be included in each such series, to fix the rights, preferences and privileges of the shares of each wholly unissued series and any qualifications, limitations or restrictions thereon, and to increase or decrease the number of shares of any such series, but not below the number of shares of such series then outstanding.

Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control of us and may adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. It is not possible to state the actual effect of the issuance of any shares of preferred stock on the rights of holders of common stock until the board of directors determines the specific rights attached to that preferred stock.

Our board of directors has designated 1,635 of the 25,000,000 authorized shares of preferred stock as Series A preferred stock. The Series A preferred stock ranks pari passu on an as-converted to common stock basis with all of our common stock as to distributions of assets upon our liquidation, dissolution or winding up, whether voluntarily or involuntarily, or a “Fundamental Transaction,” as defined in the Series A preferred stock certificate of designation (the “Certificate of Designation”). Each share of our Series A preferred stock is convertible into 204,375 shares of our common stock (subject to adjustment as provided in the Certificate of Designation) at any time at the option of the holders at a conversion price of \$8.00 per share, provided that the holders will be prohibited from converting Series A preferred stock into shares of our common stock if, as a result of such conversion, a holder, together with its affiliates, would own more than 9.99% of the total number of shares of our common stock then issued and outstanding.

Shares of Series A preferred stock generally have no voting rights, except as required by law and except that the consent of holders of a majority of the outstanding Series A preferred stock will be required to amend the terms of the Series A preferred stock. Shares of Series A preferred stock are entitled to receive dividends equal, on an as-converted to common stock basis, to and in the same form as dividends actually paid on shares of common stock when, as and if such dividends are paid on shares of common stock. We are not obligated to redeem or repurchase any shares of Series A preferred stock. Shares of Series A preferred stock are not otherwise entitled to any redemption rights, or mandatory sinking fund or analogous fund provisions.

Warrants

As of March 31, 2019, we had the following warrants outstanding:

- warrants exercisable for an aggregate of 9,216 shares of our common stock at an exercise price of \$65.92 per share that expire on November 20, 2019 and may be exercised at any time and from time to time, in whole or in part.
- warrants exercisable for an aggregate of 3,616,944 shares of our common stock at an exercise price of \$9.60 per share that expire on January 18, 2023 and may be exercised at any time and from time to time, in whole or in part.
- warrants exercisable for an aggregate of 41,177 shares of our common stock at an exercise price of \$6.80 per share that expire on April 24, 2023 and may be exercised at any time and from time to time, in whole or in part.
- warrants exercisable for an aggregate of 932,812 shares of our common stock at an exercise price of \$4.52 per share that expire on February 14, 2024 and may be exercised at any time and from time to time, in whole or in part.
- warrants exercisable for an aggregate of 531,250 shares of our common stock for which the aggregate exercise price was partially paid by the holders of the warrants on or prior to the date of issuance, which warrants expire on February 14, 2039 and may be exercised at any time and from time to time, in whole or in part, by payment of the remaining aggregate exercise price.

Each of the foregoing warrants have a net exercise provision under which their holders may, in lieu of payment of the exercise price in cash, surrender the warrant and receive a net amount of shares based on the fair market value of our stock at the time of exercise of the warrants after deduction of the aggregate exercise price. These warrants contain provisions for adjustment of the exercise price and number of shares issuable upon the exercise of warrants in the event of certain stock dividends, stock splits, reorganizations, reclassifications and consolidations.

Except for the right to participate in certain dividends and distributions and as otherwise provided in the warrants or by virtue of such holder’s ownership of our common stock, the holders of the warrants do not have the rights or privileges of holders of our common stock, including any voting rights, until they exercise their warrants.

Our warrant agent is Computershare Trust Company, N.A.

Registration Rights

We are party to an amended and restated registration rights agreement with the holders of approximately 0.2 million shares of our common stock.

Demand Registration Rights

Under the amended and restated registration rights agreement, holders of registrable shares can demand that we file a registration statement or request that their shares be included on a registration statement that we are otherwise filing, in either case, registering the resale of their shares of common stock. These registration rights are subject to conditions and limitations, including the right, in certain circumstances, of the underwriters of an offering to limit the number of shares included in such

registration and our right, in certain circumstances, not to effect a requested registration within 90 days before or 180 days following our filing of a registration statement pertaining to an underwritten public offering of securities for our account.

Piggyback Registration Rights

If we propose to register any of our securities under the Securities Act of 1933, as amended, or the Securities Act, for our own account or the account of any other holder, the holders of registrable shares are entitled to notice of such registration and to request that we include registrable shares for resale on such registration statement, subject to the right of any underwriter to limit the number of shares included in such registration. These registration rights have been waived in connection with this offering.

Expenses of Registration; Indemnification

We will pay all expenses relating to any registration, other than underwriting discounts and commissions, subject to specified conditions and limitations.

The amended and restated registration rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders, in the event of misstatements or omissions in the registration statement attributable to us except in the event of fraud and they are obligated to indemnify us for misstatements or omissions attributable to them.

Termination of Registration Rights

The registration rights granted to any holder of registrable shares will terminate when all such holder's registrable securities have been sold or may be distributed without volume limitation or other restrictions on transfer under Rule 144 of the Securities Act.

Anti-Takeover Effects of Our Certificate of Incorporation and Our By-Laws

Our certificate of incorporation and by-laws contain certain provisions that are intended to enhance the likelihood of continuity and stability in the composition of the board of directors and which may have the effect of delaying, deferring or preventing a future takeover or change in control of the company unless such takeover or change in control is approved by the board of directors.

These provisions include:

Classified Board. Our certificate of incorporation provides that our board of directors is divided into three classes of directors, with the classes as nearly equal in number as possible. As a result, approximately one-third of our board of directors will be elected each year. The classification of directors will have the effect of making it more difficult for stockholders to change the composition of our board. Our certificate of incorporation also provides that, subject to any rights of holders of preferred stock to elect additional directors under specified circumstances, the number of directors will be fixed exclusively pursuant to a resolution adopted by our board of directors.

Action by Written Consent; Special Meetings of Stockholders. Our certificate of incorporation provides that stockholder action can be taken only at an annual or special meeting of stockholders and cannot be taken by written consent in lieu of a meeting. Our certificate of incorporation and the by-laws also provide that, except as otherwise required by law, special meetings of the stockholders can be called only by or at the direction of the board of directors pursuant to a resolution adopted by a majority of the total number of directors. Except as described above, stockholders are not be permitted to call a special meeting or to require the board of directors to call a special meeting.

Removal of Directors. Our certificate of incorporation provides that our directors may be removed only for cause by the affirmative vote of at least 75% of the voting power of our outstanding shares of capital stock, voting together as a single class. This requirement of a supermajority vote to remove directors could enable a minority of our stockholders to prevent a change in the composition of our board.

Advance Notice Procedures. Our by-laws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to the board of directors. Stockholders at an annual meeting are only be able to consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of the board of directors or by a stockholder who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given our Secretary timely written notice, in

proper form, of the stockholder's intention to bring that business before the meeting. Although the by-laws do not give the board of directors the power to approve or disapprove stockholder nominations of candidates or proposals regarding other business to be conducted at a special or annual meeting, the by-laws may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control of the company.

Super Majority Approval Requirements. The Delaware General Corporation Law generally provides that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or by-laws, unless either a corporation's certificate of incorporation or by-laws requires a greater percentage. Our certificate of incorporation and by-laws provide that the affirmative vote of holders of at least 75% of the total votes eligible to be cast in the election of directors is required to amend, alter, change or repeal the by-laws. This requirement of a supermajority vote to approve amendments to our by-laws could enable a minority of our stockholders to exercise veto power over any such amendments.

Authorized but Unissued Shares. Our authorized but unissued shares of common stock and preferred stock are available for future issuance, including this offering, without stockholder approval. These additional shares may be utilized for a variety of corporate purposes, including future public offerings to raise additional capital, corporate acquisitions and employee benefit plans. The existence of authorized but unissued shares of common stock and preferred stock could render more difficult or discourage an attempt to obtain control of a majority of our common stock by means of a proxy contest, tender offer, merger or otherwise.

Exclusive Forum. Our certificate of incorporation provides that, subject to limited exceptions, the state or federal courts located in the State of Delaware are the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our by-laws, or (iv) any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our certificate of incorporation described above. Although we believe these provisions benefit us by providing increased consistency in the application of Delaware law for the specified types of actions and proceedings, the provisions may have the effect of discouraging lawsuits against our directors and officers. The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with one or more actions or proceedings described above, a court could find the choice of forum provisions contained in our certificate of incorporation to be inapplicable or unenforceable.

Section 203 of the Delaware General Corporation Law

We are subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly-held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger, asset or stock sale or other transaction resulting in a financial benefit to the interested stockholder. An "interested stockholder" is a person who, together with affiliates and associates, owns, or did own within three years prior to the determination of interested stockholder status, 15% or more of the corporation's voting stock.

Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions: before the stockholder became interested, the board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder; upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances; or at or after the time the stockholder became interested, the business combination was approved by the board of directors of the corporation and authorized at an annual or special

meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

A Delaware corporation may “opt out” of these provisions with an express provision in its original certificate of incorporation or an express provision in its certificate of incorporation or by-laws resulting from a stockholders' amendment approved by at least a majority of the outstanding voting shares. We have not opted out of these provisions. As a result, mergers or other takeover or change in control attempts of us may be discouraged or prevented.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A. The transfer agent and registrar's address is 144 Fernwood Ave, Edison, New Jersey 08837.

Listing

Our common stock is listed on The Nasdaq Capital Market under the symbol "GNCA".

SHARES ELIGIBLE FOR FUTURE SALE

We cannot predict the effect, if any, that future sales of shares of common stock, or the availability for future sales of shares of common stock, will have on the market price of shares of our common stock prevailing from time to time. The sale of substantial amounts of shares of our common stock in the public market, or the perception that such sales could occur, could harm the prevailing market price of shares of our common stock.

Upon completion of this offering, we will have a total of 24,549,181 shares of our common stock outstanding (or 26,124,181 shares of common stock if the underwriters exercise in full their option to purchase additional shares of common stock), based upon 14,049,181 shares of our common stock that were outstanding at March 31, 2019, after giving effect to the reverse stock split effected on May 22, 2019.

Of those shares, we expect that 20.1 million shares, including the shares sold in this offering, will be freely tradeable without restriction under the Securities Act by persons other than our “affiliates.” Under the Securities Act, an “affiliate” of an issuer is a person who directly or indirectly controls, is controlled by or is under common control with that issuer.

In addition, 1,575,150 shares of common stock may be granted under the Amended and Restated 2014 Equity Incentive Plan, which amount includes 1,303,407 shares subject to options outstanding as of March 31, 2019.

356,995 shares of our outstanding common stock will be “restricted securities” under Rule 144 promulgated under the Securities Act. Of these shares, 50,841 shares will be subject to a 90-day lock-up period under the lock-up agreements entered into in connection with this offering, as further described below. Upon expiration of the lock-up period, these restricted securities may be sold in the public market only if registered or pursuant to an exemption from registration, such as Rule 144.

Our amended and restated certificate of incorporation authorizes us to issue additional shares of common stock and options, rights and warrants relating to common stock for the consideration and on the terms and conditions established by our board of directors in its sole discretion. In accordance with the Delaware General Corporation Law and the provisions of our amended and restated certificate of incorporation, we may also issue preferred stock that has designations, preferences, rights, powers and duties that are different from, and may be senior to, those applicable to shares of common stock. See “Description of Capital Stock.”

Lock-up Agreements

In connection with this offering, we, our directors, our executive officers and certain stockholders beneficially owning approximately 42.0% of our shares of common stock outstanding as of May 31, 2019, have agreed with the underwriters not to dispose of or hedge any shares of our common stock or securities convertible into or exchangeable for shares of common stock during the period from the date of the lock-up agreement continuing through the date 90 days after the date of this prospectus, except with the prior written consent of SVB Leerink LLC and Stifel, Nicolaus & Company, Incorporated, the representatives of the underwriters. The representatives of the underwriters have advised us that they have no current intent or arrangement to release any of the shares subject to the lock-up agreements prior to the expiration of the lock-up period.

The lock-up agreements do not contain any pre-established conditions to the waiver by SVB Leerink LLC and Stifel, Nicolaus & Company, Incorporated on behalf of the underwriters of any terms of the lock-up agreements. Any determination to release shares subject to the lock-up agreements would be based on a number of factors at the time of determination, including but not necessarily limited to the market price of the common stock, the liquidity of the trading market for the common stock, general market conditions, the number of shares proposed to be sold, contractual obligations to release certain shares subject to the lock-up agreements in the event any such shares are released, subject to certain specific limitations and thresholds, and the timing, purpose and terms of the proposed sale.

Following the lock-up periods set forth in the agreements described above, and assuming that the representatives of the underwriters do not release any parties from these agreements, all of the shares of our common stock that are

restricted securities or are held by our affiliates as of the date of this prospectus will be eligible for sale in the public market in compliance with Rule 144 under the Securities Act.

Rule 144

In general, under Rule 144 a person (or persons whose shares are aggregated) who may be deemed our affiliate is entitled to sell within any three-month period a number of restricted securities that does not exceed the greater of 1% of the then outstanding shares of common stock and the average weekly trading volume during the four calendar weeks preceding each such sale, provided

that at least six months has elapsed since such shares of common stock were acquired from us or any affiliate of ours and certain manner of sale, notice requirements and requirements as to availability of current public information about us are satisfied.

Any person who is deemed to be our affiliate must also comply with such provisions of Rule 144 (other than the six-month holding period requirement) in order to sell shares of common stock which are not restricted securities (such as shares of common stock acquired by affiliates through purchases in the open market following this offering).

A person who is not our affiliate, and who has not been our affiliate at any time during the 90 days preceding any sale, is entitled to sell shares of common stock (i) subject only to the requirements as to availability of current public information about us, provided that a period of at least six months has elapsed since the shares of common stock were acquired from us or any affiliate of ours, and (ii) without regard to the requirements as to availability of current public information about us or any other requirement of Rule 144, provided that at least one year has elapsed since the shares of common stock were acquired from us or any affiliate of ours.

Registration Rights

The holders of 0.2 million shares of our common stock are entitled to specified rights with respect to the registration of the offer and sale of their shares under the Securities Act. Registration of the offer and sale of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act immediately upon the effectiveness of the registration. See the section of this prospectus titled "Description of Capital Stock-Registration Rights" for additional information.

Stock Options and Form S-8 Registration Statement

As of May 31, 2019, we had outstanding options to purchase an aggregate of 1,288,590 shares of our common stock, of which options to purchase 349,244 shares were vested. We have filed a registration statement on Form S-8 under the Securities Act to register all of the shares of our common stock subject to outstanding options and other awards issuable pursuant to our equity plans. Accordingly, shares of our common stock registered under the registration statements will be available for sale in the open market, subject to Rule 144 volume limitations applicable to affiliates, and subject to any vesting restrictions and lock-up agreements applicable to these shares.

MATERIAL UNITED STATES FEDERAL INCOME AND ESTATE TAX CONSIDERATIONS FOR NON-U.S. HOLDERS

The following discussion summarizes certain material United States federal income and estate tax considerations relating to the purchase, ownership, and disposition of shares of our common stock by a non-U.S. holder (as defined below) that acquires our common stock in this offering and holds it as a capital asset within the meaning of Section 1221 of the Internal Revenue Code of 1986, as amended, or the Code. This discussion is based on the tax laws of the United States, including the Code, U.S. Treasury regulations promulgated or proposed thereunder, and administrative and judicial interpretations thereof, all as in effect on the date of this prospectus. These tax laws are subject to change, possibly with retroactive effect, and subject to differing interpretations that could affect the tax consequences described herein.

For purposes of this summary, a “Non-U.S. Holder” means a person (other than a partnership or any other entity or arrangement treated as a partnership for United States federal income tax purposes) that is not for U.S. federal income tax purposes any of the following:

- an individual citizen or resident of the United States;
- a corporation (or any other entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person.

This summary does not address all aspects of U.S. federal taxes, including the alternative minimum tax, or the Medicare tax on net investment income, and does not address any foreign, state, local or other tax considerations that may be relevant to Non-U.S. Holders in light of their personal circumstances. In addition, this discussion does not address all aspects of United States federal income and estate taxation that may be applicable to non-U.S. holders in light of their particular circumstances or status, including, for example, including a holder that is a U.S. expatriate, “controlled foreign corporation,” “passive foreign investment company,” “real estate investment trust,” “regulated investment company,” a person who has a functional currency other than the U.S. dollar, person that owns, or has owned, actually or constructively, more than 5% of our common stock, a person who acquired our common stock as compensation for services, a person required to recognize any items of gross income with respect to our common stock being taken into account in an applicable financial statement, financial institutions, banks, investment funds, broker-dealers or traders in securities, insurance companies, partnerships or other pass-through entities, corporations that accumulate earnings to avoid U.S. federal income tax, certain United States expatriates, tax-exempt organizations, pension plans, persons in special situations, such as those that have elected to mark securities to market or that hold shares of our common stock as part of a straddle, hedge or other integrated investment, and foreign governments or agencies.

If a partnership (including any entity or arrangement treated as a partnership for United States federal income tax purposes) purchases, owns, or disposes of our common stock, the tax treatment of a person treated as a partner in the partnership for United States federal income tax purposes generally will depend on the status of the partner and the activities of the partnership. Partnerships (and other entities or arrangements so treated for United States federal income tax purposes) and their partners should consult their own tax advisors.

THIS SUMMARY IS FOR GENERAL INFORMATION ONLY AND IS NOT INTENDED TO BE TAX ADVICE. NON-U.S. HOLDERS ARE URGED TO CONSULT THEIR TAX ADVISORS CONCERNING THE U.S. FEDERAL INCOME AND ESTATE TAXATION, STATE, LOCAL AND NON-U.S. TAXATION AND OTHER TAX CONSEQUENCES TO THEM OF THE PURCHASE, OWNERSHIP AND DISPOSITION OF OUR COMMON STOCK.

Distributions on Our Common Stock

As discussed under “Dividend Policy” above, we do not anticipate paying any cash dividends in the foreseeable future. If we do make a distribution of cash or property with respect to our common stock, any such distribution generally will constitute a dividend for United States federal income tax purposes to the extent of our current or accumulated earnings and profits, as determined under United States federal income tax principles. Subject to the discussion below under “FATCA Withholding” and “Information Reporting and Backup Withholding,” any such dividend paid to a non-U.S. holder generally will be subject to withholding tax at a 30% rate or at a lower rate under an applicable income tax treaty between the United States and the non-U.S. holder’s country of residence. In order to receive a reduced treaty withholding tax rate and to avoid backup withholding, as

described below, a non-U.S. holder must furnish to us or our paying agent a properly executed Internal Revenue Service Form W-8BEN or Form W-8BEN-E (or other applicable form) prior to payment of the dividend, certifying under penalties of perjury that the non-U.S. holder is entitled to a reduction in withholding under an applicable income tax treaty. A non-U.S. holder that holds our common stock through a financial institution or other agent will be required to provide appropriate documentation to the financial institution or other agent, which then will be required to provide certification to us or our paying agent either directly or through other intermediaries. A non-U.S. holder that is eligible for a reduced rate of withholding tax pursuant to an income tax treaty may obtain a refund of any excess amounts withheld by filing a refund claim with the Internal Revenue Service.

A non-U.S. holder is exempt from the withholding tax described above if the dividend is “effectively connected” with the conduct of a trade or business in the United States of the non-U.S. holder (and, if an applicable income tax treaty so provides, attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States) and the non-U.S. holder furnishes to us or our paying agent an Internal Revenue Service Form W-8ECI (or applicable successor form), certifying under penalties of perjury that the dividend is effectively connected with the non-U.S. holder’s conduct of a trade or business in the United States (and, if an applicable income tax treaty so provides, attributable to a permanent establishment or fixed base maintained in the United States). “Effectively connected” dividends will generally be subject to United States federal income tax at the graduated rates that also apply to U.S. persons. A corporate non-U.S. holder may, under certain circumstances, be subject to an additional branch profits tax at a 30% rate (or at a lower rate under an applicable income tax treaty) with respect to its “effectively connected” dividends.

Any distribution in excess of our current or accumulated earnings and profits will be treated, first, as a tax-free return of the non-U.S. holder’s capital, up to the holder’s adjusted tax basis in shares of our common stock, and thereafter, as capital gain subject to the tax treatment described below in “Gain on Sale, Exchange or Other Taxable Disposition.”

Gain on Sale, Exchange or Other Taxable Disposition

Subject to the discussion below under “FATCA Withholding” and “Information Reporting and Backup Withholding”, a non-U.S. holder generally will not be subject to United States federal income tax or withholding tax on gain realized upon a sale, exchange or other taxable disposition of shares of our common stock (including a redemption, but only if the redemption would be treated as a sale or exchange rather than a distribution for United States federal income tax purposes) unless:

- the gain is “effectively connected” with the conduct of a trade or business of the non-U.S. holder in the United States (and, if required by an applicable income tax treaty, attributable to a permanent establishment or fixed base maintained in the United States), in which case the non-U.S. holder generally will be subject to United States federal income tax on a net income basis with respect to such gain in the same manner as if such holder were a resident of the United States and, if the non-U.S. holder is a corporation for United States federal income tax purposes, will be subject to an additional “branch profits tax” at a 30% rate (or at a lower rate under an applicable income tax treaty);
- the non-U.S. holder is an individual who is present in the United States for 183 or more days in the taxable year of the disposition and meets certain other conditions, in which case the non-U.S. holder generally will be subject to United States federal income tax at a 30% rate (or at a lower rate under an applicable income tax treaty) on the gain derived from the sale, which gain may be offset by U.S.-source capital losses for the year; or
- we are or have been a “United States real property holding corporation” (“USRPHC”) at any time within the shorter of the five-year period preceding the disposition and the non-U.S. holder’s holding period for our common stock (the “relevant period”) and the non-U.S. holder (i) disposes of our common stock during a calendar year when our common stock is no longer regularly traded on an established securities market or (ii) owned (directly, indirectly and constructively) more than 5% of our common stock at any time during the relevant period, in which case such a non-U.S. holder will be subject to tax on the gain on the disposition of shares of our common stock generally as if the gain were effectively connected with the conduct of a trade or business in the United States, except that the “branch profits tax” will not apply. We believe we currently are not, and we do not anticipate becoming, a USRPHC for United States federal income tax purposes. Generally, a corporation is a USRPHC only if the fair market value of its United States real property interests (as defined in the Code) equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests and

its other assets used or held for use in a trade or business. If we are a USRPHC and our common stock is not regularly traded on an established securities market, a non-U.S. holder's proceeds received on the disposition of common stock will also generally be subject to withholding at a rate of 15%. Non-U.S. holders should consult their own tax advisors about the consequences that could result if we are, or become, a USRPHC.

FATCA Withholding

Sections 1471 through 1474 of the Code and related Treasury Regulations, together with other Treasury Department or IRS guidance issued thereunder (“FATCA”) impose a 30% withholding tax on certain payments unless:

- the foreign entity (i) is a “foreign financial institution” (as defined under FATCA) that undertakes specified due diligence, reporting, withholding and certification obligations or (ii) in the case of a foreign financial institution that is a resident in a jurisdiction that has entered into an intergovernmental agreement with the United States relating to FATCA, complies with the diligence and reporting requirements of the intergovernmental agreement and local implementing rules;
- the foreign entity is a “non-financial foreign entity” (as defined under FATCA) and identifies certain of its U.S. investors or that it does not have such U.S. investors, generally on Internal Revenue Service Form W-8BEN-E; or
- the foreign entity otherwise is exempted from withholding under FATCA.

Withholding under FATCA generally applies to payments of dividends on our common stock and, after December 31, 2018, to payments of gross proceeds from a sale or other disposition of our common stock. Withholding agents may, however, rely on recently proposed Treasury Regulations that, finalized in their current form, would no longer require FATCA withholding on payments of gross proceeds.

An intergovernmental agreement between the United States and an applicable foreign country where a foreign entity is a resident may modify the requirements under FATCA in the previous paragraph and, under certain circumstances, can eliminate FATCA withholding tax. Under certain circumstances, a non-U.S. holder will be eligible for refunds or credits of withholding taxes imposed under FATCA by filing a United States federal income tax return. Prospective investors should consult their tax advisors regarding the effect of FATCA on their ownership and disposition of our common stock.

Information Reporting and Backup Withholding

Except as described below, a non-U.S. holder generally will be exempt from backup withholding and information reporting requirements with respect to dividend payments and the payment of the proceeds from the sale of shares or our common stock effected at a United States office of a broker, as long as the payor or broker does not have actual knowledge or reason to know that the holder is a United States person and has furnished to the payor or broker:

- a valid Internal Revenue Service Form W-8BEN or Form W-8BEN-E on which the non-U.S. holder certifies, under penalties of perjury, that it is a non-United States person; or
- other documentation upon which it may rely to treat the payments as made to a non-United States person in accordance with Treasury regulations, or the non-U.S. holder otherwise establishes an exemption.

However, we must report annually to the Internal Revenue Service and to non-U.S. holders the amount of dividends paid to non-U.S. holders and the tax withheld with respect to such dividends, regardless of whether withholding was required. Copies of the information returns reporting such dividends and withholding may also be made available to the tax authorities in the country in which the respective non-U.S. holder resides under the provisions of an applicable income tax treaty.

Payment of the proceeds from the sale of our common stock effected at a foreign office of a broker generally will not be subject to information reporting or backup withholding. However, a sale of our common stock by a non-U.S. holder that is effected at a foreign office of a broker will be subject to information reporting and backup withholding if:

- the proceeds are transferred to an account maintained by the non-U.S. holder in the United States;
- the payment of proceeds or the confirmation of the sale is mailed to the non-U.S. holder at a United States address; or
- the sale has some other specified connection with the United States as provided in the Treasury regulations,

unless the broker does not have actual knowledge or reason to know that the holder is a United States person and the documentation requirements described above are met or the non-U.S. holder otherwise establishes an exemption.

In addition, a sale of shares of our common stock will be subject to information reporting if it is effected at a foreign office of a broker that is:

- a United States person under Section 7701(a)(30) of the Code;
- a “controlled foreign corporation” for United States federal income tax purposes;

- a foreign person 50% or more of whose gross income is effectively connected with the conduct of a United States trade or business for a specified three-year period (or such part of such period as the person has been in existence); or
- a foreign partnership, if at any time during its tax year (a) one or more of its partners are “U.S. persons”, as defined in the Treasury regulations, who in the aggregate hold more than 50% of the income or capital interest in the partnership, or (b) such foreign partnership is engaged in the conduct of a trade or business in the United States,

unless the broker does not have actual knowledge or reason to know that the holder is a United States person and the documentation requirements described above are met or an exemption is otherwise established. Backup withholding will apply if the sale is subject to information reporting and the broker has actual knowledge that the holder is a United States person.

Backup withholding is not an additional tax. A non-U.S. holder generally may obtain a refund of any amounts withheld under the backup withholding rules that exceed the non-U.S. holder’s income tax liability by filing a refund claim with the Internal Revenue Service.

Federal Estate Tax

The estates of nonresident alien decedents generally are subject to United States federal estate tax on property with a United States situs. Because we are a United States corporation, our common stock will be United States situs property and therefore will be included in the taxable estate of a nonresident alien decedent at the time of the decedent’s death, unless an applicable estate tax treaty between the United States and the decedent’s country of residence provides otherwise. An estate tax credit is available to reduce the net tax liability of a nonresident alien’s estate, but the estate tax credit for a nonresident alien is generally much smaller than the applicable credit for computing the estate tax of a United States resident. Nonresident aliens should consult their personal tax advisors regarding the United States federal estate tax consequences of owning our common stock.

UNDERWRITING

SVB Leerink LLC and Stifel, Nicolaus & Company, Incorporated are acting as representatives of each of the underwriters named below and as joint bookrunning managers for this offering. Subject to the terms and conditions set forth in the underwriting agreement among us and the underwriters, we have agreed to sell to the underwriters, and each of the underwriters has agreed, severally and not jointly, to purchase from us, the number of shares of common stock set forth opposite its name below.

Underwriter	Number of Shares
SVB Leerink LLC	5,250,000
Stifel, Nicolaus & Company, Incorporated	3,990,000
Robert W. Baird & Co. Incorporated	630,000
Needham & Company, LLC	630,000
Total	10,500,000

Subject to the terms and conditions set forth in the underwriting agreement, the underwriters have agreed, severally and not jointly, to purchase all of the shares sold under the underwriting agreement if any of the shares are purchased. If an underwriter defaults, the underwriting agreement provides that the purchase commitments of the non-defaulting underwriters may be increased or the underwriting agreement may be terminated.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the underwriters may be required to make in respect of those liabilities.

The underwriters are offering the shares, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by their counsel, including the validity of the shares, and subject to other conditions contained in the underwriting agreement, such as the receipt by the underwriters of officers' certificates and legal opinions. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Commissions and Discounts

The representatives have advised us that the underwriters propose initially to offer the shares to the public at the public offering price set forth on the cover page of this prospectus and to dealers at that price less a concession not in excess of \$0.126 per share. After the initial offering of the shares, the public offering price, concession or any other term of this offering may be changed by the representatives.

The following table shows the public offering price, underwriting discounts and commissions and proceeds, before expenses, to us. The information assumes either no exercise or full exercise by the underwriters of their option to purchase additional shares of our common stock.

	Per Share	Total	
		Without Option	With Option
Public offering price	\$ 3.50	\$ 36,750,000	\$ 42,262,500
Underwriting discounts and commissions	\$ 0.21	\$ 2,205,000	\$ 2,535,750
Proceeds, before expenses, to us	\$ 3.29	\$ 34,545,000	\$ 39,726,750

We estimate expenses payable by us in connection with this offering, other than the underwriting discounts and commissions referred to above, will be approximately \$1.8 million. We also have agreed to reimburse the underwriters for up to \$30,000 for their FINRA counsel fee. In accordance with FINRA Rule 5110, this reimbursed fee is deemed underwriting compensation for this offering.

Option to Purchase Additional Shares

We have granted an option to the underwriters, exercisable for 30 days after the date of this prospectus, to purchase up to 1,575,000 additional shares at the public offering price, less underwriting discounts and commissions. If the underwriters exercise this option, each underwriter will be obligated, subject to the conditions contained in the underwriting agreement, to purchase a number of additional shares proportionate to that underwriter's initial amount reflected in the above table.

No Sales of Similar Securities

We, our executive officers and directors and certain of our other existing security holders have agreed not to sell or transfer any common stock or securities convertible into or exchangeable or exercisable for common stock, for 90 days after the date of this prospectus without first obtaining the written consent of SVB Leerink LLC and Stifel, Nicolaus & Company, Incorporated on behalf of the underwriters. Specifically, we and these other persons have agreed, with certain limited exceptions, not to directly or indirectly:

- offer, sell, contract to sell, pledge or otherwise dispose of (or enter into any transaction which is designed to, or might reasonably be expected to, result in the disposition (whether by actual disposition or effective economic disposition due to cash settlement or otherwise)), directly or indirectly, including the filing (or participation in the filing) of a registration statement with the SEC in respect of, or establish or increase a put equivalent position or liquidate or decrease a call equivalent position within the meaning of Section 16 of the Exchange Act, any shares of common stock, options or warrants to acquire shares of common stock, or securities exchangeable or exercisable for or convertible into shares of common stock currently or hereafter owned either of record or beneficially; or
- publicly announce an intention to do any of the foregoing for a period of 90 days after the date of this prospectus.

The lock-up provisions apply to common stock and to securities convertible into or exchangeable or exercisable for common stock. They also apply to common stock owned now or acquired later by the person executing the lock-up agreement or for which the person executing the lock-up agreement later acquires the power of disposition.

Nasdaq Capital Market Listing

Our common stock is listed on the Nasdaq Capital Market under the symbol “GNCA.”

Price Stabilization, Short Positions and Penalty Bids

Until the distribution of the shares is completed, SEC rules may limit underwriters and selling group members from bidding for and purchasing our common stock. However, the representatives may engage in transactions that stabilize the price of the common stock, such as bids or purchases to peg, fix or maintain that price.

In connection with this offering, the underwriters may purchase and sell our common stock in the open market. These transactions may include short sales, purchases on the open market to cover positions created by short sales and stabilizing transactions. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in this offering. “Covered” short sales are sales made in an amount not greater than the underwriters’ option to purchase additional shares described above. The underwriters may close out any covered short position by either exercising their option to purchase additional shares or purchasing shares in the open market. In determining the source of shares to close out the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the option to purchase additional shares granted to them under the underwriting agreement described above. “Naked” short sales are sales in excess of such option. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering. Stabilizing transactions consist of various bids for or purchases of shares of common stock made by the underwriters in the open market prior to the closing of this offering.

The underwriters may also impose a penalty bid. This occurs when a particular underwriter repays to the underwriters a portion of the underwriting discount received by it because the representatives have repurchased shares sold by or for the account of such underwriter in stabilizing or short covering transactions.

Similar to other purchase transactions, the underwriters’ purchases to cover the syndicate short sales may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the

market price of our common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. The underwriters may conduct these transactions on the Nasdaq Capital Market, in the over-the-counter market or otherwise.

Neither we nor any of the underwriters make any representation or prediction as to the direction or magnitude of any

effect that the transactions described above may have on the price of our common stock. In addition, neither we nor any of the underwriters make any representation that the representatives will engage in these transactions or that these transactions, once commenced, will not be discontinued without notice.

The underwriters may also engage in passive market making transactions in our common stock on the Nasdaq Capital Market in accordance with Rule 103 of Regulation M during a period before the commencement of offers or sales of shares of our common stock in this offering and extending through the completion of distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

Electronic Distribution

In connection with this offering, certain of the underwriters or securities dealers may distribute prospectuses by electronic means, such as e-mail.

Other Relationships

The underwriters and certain of their affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. Some of the underwriters and certain of their affiliates may in the future engage in investment banking and other commercial dealings in the ordinary course of business with us and our affiliates, for which they may in the future receive customary fees, commissions and expenses.

In addition, in the ordinary course of their business activities, the underwriters and their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers. Such investments and securities activities may involve securities and/or instruments of ours or our affiliates. The underwriters and their affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or financial instruments and may hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Selling Restrictions

Notice to Prospective Investors in the European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a "Relevant Member State"), with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, no offer of shares may be made to the public in that Relevant Member State other than:

- A. to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- B. to fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives; or
- C. in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares shall require the Company or the representatives to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive.

Each person in a Relevant Member State who initially acquires any shares or to whom any offer is made will be deemed to have represented, acknowledged and agreed that it is a "qualified investor" within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the Prospectus Directive. In the case of any shares being

offered to a financial intermediary as that term is used in Article 3(2) of the Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the shares acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any shares to the public other than their offer or resale in a Relevant Member State to qualified investors as so defined or in circumstances in which the prior consent of the representatives has been obtained to each such proposed offer or resale.

We, the representatives and each of our and the representatives' affiliates will rely upon the truth and accuracy of the

foregoing representations, acknowledgements and agreements.

This prospectus has been prepared on the basis that any offer of shares in any Relevant Member State will be made pursuant to an exemption under the Prospectus Directive from the requirement to publish a prospectus for offers of shares. Accordingly, any person making or intending to make an offer in that Relevant Member State of shares which are the subject of the offering contemplated in this prospectus may only do so in circumstances in which no obligation arises for the company or any of the underwriters to publish a prospectus pursuant to Article 3 of the Prospectus Directive in relation to such offer. Neither we nor the underwriters have authorized, nor do they authorize, the making of any offer of shares in circumstances in which an obligation arises for the company or the underwriters to publish a prospectus for such offer.

For the purpose of the above provisions, the expression “an offer to the public” in relation to any shares in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the shares to be offered so as to enable an investor to decide to purchase or subscribe the shares, as the same may be varied in the Relevant Member State by any measure implementing the Prospectus Directive in the Relevant Member State and the expression “Prospectus Directive” means Directive 2003/71/EC (including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member States) and includes any relevant implementing measure in the Relevant Member State and the expression “2010 PD Amending Directive” means Directive 2010/73/EU.

MiFID II Product Governance

Any person offering, selling or recommending the shares (a “distributor”) should take into consideration the manufacturers’ target market assessment; however, a distributor subject to MiFID II is responsible for undertaking its own target market assessment in respect of the shares (by either adopting or refining the manufacturers’ target market assessment) and determining appropriate distribution channels.

Notice to Prospective Investors in the United Kingdom

In addition, in the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are “qualified investors” (as defined in the Prospectus Directive) (i) who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the “Order”) and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2) (a) to (d) of the Order (all such persons together being referred to as “relevant persons”) or otherwise in circumstances which have not resulted and will not result in an offer to the public of the shares in the United Kingdom within the meaning of the Financial Services and Markets Act 2000.

Any person in the United Kingdom that is not a relevant person should not act or rely on the information included in this document or use it as basis for taking any action. In the United Kingdom, any investment or investment activity that this document relates to may be made or taken exclusively by relevant persons.

Notice to Prospective Investors in Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser’s province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser’s province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

LEGAL MATTERS

The validity of the issuance of our common stock offered in this prospectus will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. Cooley LLP is acting as counsel for the underwriters in connection with this offering.

EXPERTS

The financial statements of Genocea Biosciences, Inc. appearing in Genocea Biosciences, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2018 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in its report thereon, included therein, and incorporated herein by reference. Such financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock offered hereby. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules filed therewith. For further information with respect to us and the common stock offered hereby, reference is made to the registration statement and the exhibits and schedules filed therewith. Statements contained in this prospectus regarding the contents of any contract or any other document that is filed as an exhibit to the registration statement are not necessarily complete, and each such statement is qualified in all respects by reference to the full text of such contract or other document filed as an exhibit to the registration statement.

We are subject to the information and periodic reporting requirements of the Exchange Act and, in accordance therewith, file periodic reports, proxy statements and other information with the SEC. The SEC maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC. The address is www.sec.gov.

We also maintain a website at <http://www.genocea.com> and make available free of charge through this website our Annual Report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the SEC. The information contained on, or that can be accessed through, our website is not a part of this prospectus. The reference to our web address does not constitute incorporation by reference of the information contained in, or that can be accessed through, our website.

INCORPORATION OF DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" information from other documents that we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus.

Information in this prospectus supersedes information incorporated by reference that we filed with the SEC prior to the date of this prospectus.

We are incorporating by reference into this prospectus and the registration statement of which this prospectus is a part the filings listed below and any additional documents that we may file with the SEC (File No. 001-36289) pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the date we file this prospectus and prior to the termination of the offering, except we are not incorporating by reference any information furnished (but not filed) under Item 2.02 or Item 7.01 of any Current Report on Form 8-K and corresponding information furnished under Item 9.01 as an exhibit thereto:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, filed on February 28, 2019;

- our Quarterly Report on Form 10-Q for the quarter ended March 31, 2019, filed on April 30, 2019;
- the information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2018 from our definitive proxy statement on Schedule 14A, filed on March 29, 2019; and
- our Current Reports on Form 8-K filed on February 12, 2019, February 28, 2019 (with respect to Item 5.02 contained therein) and May 21, 2019.

Any statement contained in a document incorporated or deemed to be incorporated by reference in this prospectus will be deemed modified, superseded or replaced for purposes of this prospectus to the extent that a statement contained in this prospectus modifies, supersedes or replaces such statement.

You may request, orally or in writing, a copy of any or all of the documents incorporated herein by reference. These documents will be provided to you at no cost, by contacting: Investor Relations, Genoclea Biosciences, Inc. 100 Acorn Park Drive, Cambridge, Massachusetts 02140, (617) 876-8191 email address: ir@genoclea.com. In addition, copies of any or all of the documents incorporated herein by reference may be accessed at our website at www.genoclea.com. The information contained in, or accessible through, our website does not constitute part of this prospectus.

10,500,000 Shares

Common Stock



PROSPECTUS

June 19, 2019

SVB Leerink

Stifel

Baird

Needham & Company