GENOCEA BIOSCIENCES, INC.
Form 424B2
January 18, 2018
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Filed Pursuant to Rule 424b(2)
Registration No. 333-203981

PROSPECTUS SUPPLEMENT
(To Prospectus dated May 14, 2015)

53,365,000 Shares of Common Stock
53,365,000 Class A Warrants to Purchase up to 26,682,500 Shares of Common Stock

We are offering 53,365,000 shares of our common stock and 53,365,000 Class A warrants to purchase up to 26,682,500 shares of our common stock. Two Class A warrants will entitle the holder thereof to purchase one share of our common stock at an exercise price of $1.20 per share. Each Class A warrant, or warrant, will be exercisable at any time on or after the date of issuance at the option of the holder and will expire five years from the date of issuance. Notwithstanding the foregoing, the holder will be prohibited from exercising such warrants into shares of our common stock if, as a result of such exercise, the holder, together with its affiliates, would own more than 4.99% of the total number of shares of our common stock then issued and outstanding, provided that this limitation on exercise shall not be applicable to any holder, together with its affiliates, who owns 10.0% or more of our common stock immediately prior to the exercise of each warrant (without giving effect to any shares of common stock underlying each warrant). A holder may increase or decrease this beneficial ownership limitation to an amount not to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of each warrant. The shares of common stock and warrants will be issued separately but can only be purchased together in this offering. We refer to the shares of common stock issued in this offering and the warrants to purchase common stock issued in this offering, collectively, as the securities. The shares of common stock issuable from time to time upon exercise of the warrants are also being offered pursuant to this prospectus supplement and the accompanying prospectus.

Our common stock is listed on The NASDAQ Global Market under the symbol “GNCA.” On January 12, 2018, the last reported sale price of our common stock on The NASDAQ Global Market was $1.13 per share. There is no established trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to list the warrants on The NASDAQ Global Market, any other national securities exchange or any other nationally recognized trading system.

Concurrently with this offering of common stock and Class A warrants and pursuant to a separate prospectus supplement, we are offering 1,635 shares of our Series A convertible preferred stock and 1,635,000 Class A warrants to purchase up to 817,500 shares of our common stock (and the common stock issuable from time to time upon exercise of each of the Class A warrants).

We are an “emerging growth company” as defined under the federal securities laws and, as such, we may elect to comply with certain reduced public company reporting requirements.

Investing in our securities involves a high degree of risk. Please read “Risk Factors” beginning on page S-8 of this prospectus supplement and in the documents incorporated by reference into this prospectus supplement.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement or the accompanying prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	PER SHARE	PER WARRANT	TOTAL

Public offering price	$0.99	$ 0.01	$53,365,000
Underwriting discounts and commissions[(1)]	$0.0693	$ 0.007	$3,201,900
Proceeds to us (before expenses)	$0.93	$ 0.003	$50,163,100

(1) See "Underwriting" beginning on page S-20 for a description of the compensation payable to the underwriters. The above summary of offering proceeds to Genocea Biosciences, Inc. (before expenses) does not give effect to any exercise of the warrants being issued in this offering. We have also granted the underwriters an option for a period of 30 days to purchase up to 8,004,750 additional shares of our common stock and/or 8,004,750 warrants to purchase up to 4,002,375 additional shares of common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be $3,682,185, and the total proceeds to us, before expenses, will be $57,687,565. The underwriter expects to deliver the shares of common stock and accompanying warrants against payment on or about January 19, 2018.

Sole Book-Running Manager

Cantor

Lead Managers

Needham & Company

Baird

Co- Manager

H.C. Wainwright & Co.

The date of this prospectus supplement is January 17, 2018

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus relate to part of a registration statement that we filed with the Securities and Exchange Commission, or SEC, using a shelf registration process. Both this prospectus supplement and the accompanying prospectus include or incorporate by reference important information about us, our securities and other information you should know before investing. You should read this prospectus supplement, the accompanying prospectus, the additional information described under "Where You Can Find More Information" in the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering before making an investment decision.

We have not authorized any dealer, agent or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus supplement, the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus supplement or the accompanying prospectus or any free writing prospectus that we have authorized for use in connection with this offering. This prospectus supplement and the accompanying prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus supplement and the accompanying prospectus constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. You should not assume that the information contained in this prospectus supplement, the accompanying prospectus or any free writing prospectus that we have authorized for use in connection with this offering is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference into this prospectus supplement or the accompanying prospectus is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus supplement and any accompanying prospectus is delivered or securities are sold on a later date.

This prospectus supplement may add to, update or change the information in the accompanying prospectus. If information in this prospectus supplement is inconsistent with information in the accompanying prospectus, this prospectus supplement will apply and will supersede that information in the accompanying prospectus.

Unless otherwise indicated or unless the context requires otherwise, all references in this prospectus supplement to "Genocea," "we," "us" and "our" refer to Genocea Biosciences, Inc. and, where applicable, its consolidated subsidiaries.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights selected information included or incorporated by reference in this prospectus supplement and the accompanying prospectus and does not contain all of the information that may be important to you. You should carefully review this entire prospectus supplement and the accompanying prospectus, including the risk factors and financial statements included and incorporated by reference in this prospectus supplement and the accompanying prospectus.

Overview

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

In September 2017, we announced a strategic shift to immuno-oncology and a focus on the development of neoantigen cancer vaccines. Currently, all of our research programs and product candidates in active development are at the preclinical stage. Our most advanced program is our preclinical immuno-oncology program, GEN-009, a neoantigen cancer vaccine. The GEN-009 program uses ATLAS to identify patient neoantigens, or newly formed antigens unique to each patient, that are associated with that individual's tumor. We are also exploring partnering opportunities in the development of cancer vaccines targeting tumor-associated antigens and a vaccine targeting cancers caused by Epstein-Barr Virus, or EBV.

We have one Phase 3-ready product candidate, GEN-003, an investigational immunotherapy for the treatment of genital herpes. In September 2017, we announced that we are exploring strategic alternatives to maximize value for GEN-003 through sale, partnership or other means. Consequently, substantially all GEN-003 spending and activities were ceased and we reduced our workforce by approximately 40 percent. We continue to believe that GEN-003 could address unmet medical needs of genital herpes patients.

Our Immuno-Oncology Program

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

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

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

We anticipate filing a personalized cancer vaccine investigational new drug, or IND, application with the FDA in early 2018 for GEN-009. We plan to initiate a Phase 1/2a clinical trial for GEN-009 in a range of tumor types in subjects with no evidence of disease but a high risk of relapse in the first half of 2018. We expect to report initial immunogenicity data from this trial in the first half of 2019.

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

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

ATLAS Platform

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

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

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

Our Product Candidate Pipeline

The following table describes our current development programs:

Vaccine Candidate	Program	Stage of Development	Next Milestone	Anticipated Timeline
GEN-009	Neoantigen cancer vaccine	Pre-clinical	File IND; commence Phase 1/2a clinical proof of concept trial	Early 2018; first half 2018
GEN-010	Second generation neoantigen cancer vaccine	Pre-clinical	Select delivery technology platform	Ongoing
GEN-007	Epstein-Barr Virus	Research	Select antigen candidates	Ongoing, exploring partnering opportunities
GEN-006	Immuno-oncology -Tumor associated antigen vaccine	Research	Select antigen candidates	Ongoing, exploring partnering opportunities

Our Team

Our management and scientific teams possess considerable experience in vaccine and anti-infective research, manufacturing, clinical development and regulatory matters. We have also assembled a team of leading advisors, led by George Siber, M.D., to guide the further development of our programs. Previously, Dr. Siber was the Chief Scientific Officer of Wyeth Vaccines, where he led the development of several first-in-class vaccines including Prevnar. He is also an inventor of Respigam and Cytogam, antibodies to treat and protect against respiratory syncytial virus and cytomegalovirus, respectively. Dr. Siber is one of our directors and chairs our Scientific Advisory Board.

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Our Strategy

Our objective is to be the leading T cell vaccine and immunotherapy company. Key components of our strategy are:

- Continue to advance our lead immuno-oncology program, GEN-009. GEN-009 is a neoantigen cancer vaccine that leverages our ATLAS platform to identify patient neoantigens that are associated with that individual's tumor and direct a patient's immune system to attack their tumor. We anticipate filing an IND application with the FDA in early 2018 for GEN-009. We plan to initiate a Phase 1/2a clinical proof of concept trial for GEN-009 in a range of tumor types in the first half of 2018 and expect to report initial immunogenicity data in the first half of 2019.
- Utilize ATLAS to develop cancer vaccines. Guided by our initial research on GEN-009, our clinical results on GEN-003 and our belief in the ATLAS platform, we are focused on combining our antigen selection and vaccine development expertise with that of leading cancer innovators to unlock new targets in immuno-oncology. In addition to GEN-009, our other potential cancer vaccines will be designed to educate T cells to recognize and attack specific targets and thereby kill cancers. We are pursuing business development partnerships in support of this aspect of our strategy.

Recent Developments

We are currently finalizing our financial results for the fiscal year ended December 31, 2017. While complete financial information and operating data are not available, based on information currently available, we estimate that as of December 31, 2017, we had approximately $12.3 million of cash and cash equivalents. These preliminary estimates have been prepared by, and are the responsibility of, our management. Our independent registered public accounting firm, Ernst & Young LLP, has not audited or reviewed, and does not express an opinion with respect to these estimates. Our actual cash and cash equivalents as of December 31, 2017 may differ from these estimates due to the completion of our closing procedures with respect to the fiscal year ended December 31, 2017, final adjustments and other developments that may arise between now and the time the financial results for the fiscal year are finalized. We expect to complete our closing procedures with respect to the fiscal year ended December 31, 2017 after this offering is consummated. Accordingly, our financial statements as of and for the fiscal year ended December 31, 2017 will not be available until after this offering is completed.

Corporate Information

We were incorporated in the state of Delaware in August 2006 as Genocea, Inc., and we subsequently changed our name to Genocea Biosciences, Inc. Our principal executive offices are located at Cambridge Discovery Park, 100 Acorn Park Drive, 5th Floor, Cambridge, Massachusetts 02140, and our telephone number is (617) 876-8191. Our Internet website is www.genocea.com. We make available free of charge through our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. We have included our website address in this prospectus supplement solely as an inactive textual reference. The information on, or that can be accessed through, our website is not part of this prospectus supplement, and you should not rely on any such information in making the decision whether to purchase our securities.

Genocea® and the Genocea logo are our registered trademarks. The other trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners. We do not intend our use or display of other companies' trade names, trademarks, or service marks to imply a relationship with, or endorsement or sponsorship of us by, these other companies.

Concurrent Offering of Series A Convertible Preferred Stock and Class A Warrants to Purchase Common Stock

Concurrently with this offering of common stock and Class A warrants, we are offering 1,635 shares of our Series A convertible preferred stock and 1,635,000 Class A warrants to purchase up to 817,500 shares of our common stock (and the common stock issuable from time to time upon exercise of the warrants), which we refer to as the Concurrent Offering. The Class A warrants sold in the Concurrent Offering will have the same terms as the Class A warrants sold in this offering. The

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Concurrent Offering is being conducted as a separate public offering by means of a separate prospectus supplement. This offering is not contingent upon the completion of the Concurrent Offering and the Concurrent Offering is not contingent upon the completion of this offering. We cannot assure you that either or both of the offerings will be completed.

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THE OFFERING

Common stock offered by us	53,365,000 shares
Warrants offered by us	We are offering 53,365,000 warrants to purchase 26,682,500 shares of our common stock. Two warrants will entitle the holder thereof to purchase one share of our common stock at an exercise price of $1.20 per share. Each warrant will be exercisable at any time on or after the date of issuance at the option of the holder and will expire five years from the date of issuance. Notwithstanding the foregoing, the holder will be prohibited from exercising such warrants into shares of our common stock if, as a result of such exercise, the holder, together with its affiliates, would own more than 4.99% of the total number of shares of our common stock then issued and outstanding, provided that this limitation on exercise shall not be applicable to any holder, together with its affiliates, who owns 10.0% or more of our common stock immediately prior to the exercise of each warrant (without giving effect to any shares of common stock underlying each warrant). A holder may increase or decrease this beneficial ownership limitation to an amount not to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of each warrant. This prospectus supplement also relates to the offering of the shares of common stock issuable upon exercise of the warrants. There is currently no market for the warrants and none is expected to develop after this offering. We do not intend to list the warrants on any national securities exchange or other trading market. See “Description of Securities” for additional information.
Underwriters’ option	The underwriters have an option for a period of 30 days to purchase 8,004,750 additional shares of our common stock and/or 8,004,750 warrants to purchase 4,002,375 additional shares of our common stock.
Common stock to be outstanding after this offering	82,069,164 shares (assuming none of the warrants issued in this offering are exercised and 108,751,664 shares if the warrants are exercised in full). If the underwriters’ option to purchase additional shares and warrants is exercised in full, the total number of shares of common stock outstanding immediately after this offering would be 90,073,914 shares (assuming none of the warrants are exercised and 120,758,789 shares if all of the warrants in this offering are exercised in full). If the underwriters’ option to purchase additional shares and warrants is exercised in full and the shares of Series A convertible preferred stock offered in the Concurrent Offering are converted to common stock, the total number of shares of common stock outstanding immediately after this offering would be 91,708,914 shares (assuming none of the warrants issued in the Concurrent Offering are exercised in full and 123,211,289 shares assuming the warrants issued in the Concurrent Offering are exercised).
Use of Proceeds	We intend to use the net proceeds from this offering and the Concurrent Offering primarily to: (1) support the ongoing development of our GEN-009 program, including filing an IND with the FDA and commencing a Phase 1/2a clinical proof of concept trial and (2) the balance for working capital and other general corporate purposes.

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Risk Factors	See "Risk Factors" beginning on page S-8 and other information included or incorporated by reference in this prospectus supplement and the accompanying prospectus for a discussion of factors you should carefully consider before deciding to invest in our securities.
NASDAQ Global Market symbol	GNCA
Board Representation	In connection with the offering, we intend to elect one representative from an investor, New Enterprise Associates, or NEA, to serve as a member of our board of directors. We will not be undertaking any ongoing obligation to continue to nominate NEA's representative on our board of directors.
Concurrent Offering	Concurrently with this offering, we are offering 1,635 shares of our Series A convertible preferred stock and 1,635,000 Class A warrants to purchase up to 817,500 shares of our common stock (and the common stock issuable from time to time upon exercise of the warrants). The Class A warrants sold in the Concurrent Offering will have the same terms as the Class A warrants sold in this offering. The Concurrent Offering is being conducted as a separate public offering by means of a separate prospectus supplement. This offering is not contingent upon the completion of the Concurrent Offering and the Concurrent Offering is not contingent upon the completion of this offering.

The number of shares of our common stock to be outstanding after this offering as reflected above is based on 28,704,164 actual shares of our common stock outstanding as of September 30, 2017.

The number of shares of our common stock to be outstanding after this offering as reflected above excludes:

- 4,399,940 shares of common stock issuable upon exercise of stock options outstanding at September 30, 2017 at a weighted-average exercise price of $5.68 per share;
- 77,603 shares of common stock issuable upon the exercise of warrants outstanding at September 30, 2017 at a weighted-average exercise price of $8.21 per share;
- 843,305 shares of common stock reserved for future issuance under our 2014 Equity Incentive Plan; and
- 30,741 shares of common stock reserved for future issuance under our 2014 Employee Stock Purchase Plan.

Except as otherwise indicated herein, all information in this prospectus supplement, including the number of shares of common stock that will be outstanding after this offering, does not assume or give effect to the exercise of options or warrants outstanding as of September 30, 2017, does not include 30,734 shares issued since September 30, 2017, and does not assume or give effect to the exercise of the underwriters' option to purchase additional shares of common stock and warrants in this offering.

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RISK FACTORS

An investment in our securities involves significant risks. For a discussion of the factors that you should carefully consider before deciding to purchase any of our securities, please review the risk factors below and those included in the documents incorporated by reference in this prospectus supplement, including Item 1A. Risk Factors included in our Quarterly Report on Form 10-Q for the quarter ended September 30, 2017. In addition, please read "Forward-Looking Statements" in this prospectus supplement, where we describe additional uncertainties associated with our business and the forward-looking statements included or incorporated by reference in this prospectus supplement and the accompanying prospectus. Please note that additional risks not currently known to us or that we currently deem immaterial may also impair our business and operations.

Additional Risks Related to This Offering

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

We currently intend to use the net proceeds of this offering and the Concurrent Offering to support the ongoing development of our GEN-009 program, including filing an IND with the FDA and commencing a Phase 1/2a clinical proof of concept trial, advance business development partnering opportunities to develop cancer vaccines, and the balance for working capital and other general corporate purposes. This expected use of the net proceeds from this offering and the Concurrent 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 the Concurrent 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 securities in this offering, you will incur immediate and substantial dilution in your investment.

Since the price per share of our common stock being offered in this offering may be higher than the net tangible book value per share of our common stock, you will experience dilution to the extent of the difference between the offering price per share of common stock you purchase in this offering and the net tangible book value per share of our common stock after this offering. After giving effect to the sale of 53,365,000 shares of common stock in this offering at a public offering price of $1.00 per share and attributing no value to the accompanying warrants, less the estimated 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 $0.12 as of September 30, 2017, if you purchase securities in this offering, you will suffer immediate and substantial dilution of $0.35 per share of common stock in the net tangible book value of common stock purchased. In the event warrants are exercised by holders, you will experience additional dilution to the extent that the exercise price of those warrants is higher than the book value per share of our common stock. To the extent that the underwriters exercise their option to purchase additional shares of common stock and warrants in this offering, shares of our common stock are issued upon the conversion of Series A convertible preferred stock or upon the exercise of Class A warrants to purchase common stock to be sold pursuant to the Concurrent Offering, shares of our common stock are issued under outstanding options, restricted stock units or the warrants issued to Hercules Technology Growth Capital, Inc., or future sales are made pursuant to our equity sales agreement with Cowen and Company, LLC, 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 of common stock in this offering, including pursuant to the Concurrent Offering. If the price per share at which we sell additional shares of our common stock or related securities in future transactions, including the Concurrent Offering, is less than the price per

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share of common stock in this offering, investors who purchase our common stock in this offering will suffer a dilution in their investment.

The warrants contain provisions that may lead to adjustments of the exercise price with respect to future issuances by the Company of securities, including its common stock or convertible securities. Any adjustments could further impact the dilution from future offerings of securities.

The warrants may never have any value.

The warrants in this offering have an exercise price of $1.20 per share of common stock and will expire five years from the date of issuance. In the event our price per share of common stock in this offering does not exceed the per share exercise price of the warrants during the period when the warrants are exercisable, the warrants will not have any value. Additionally, a holder of warrants will be prohibited from exercising warrants into shares of our common stock if, as a result of such exercise, the holder, together with its affiliates, would own more than 4.99% of the total number of shares of our common stock then issued and outstanding, provided that this limitation on exercise shall not be applicable to any holder, together with its affiliates, who owns 10.0% or more of our common stock immediately following the issuance of each warrant (without giving effect to any shares of common stock underlying each warrant). A holder may increase or decrease this beneficial ownership limitation to an amount not to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of each warrant.

There is no public market for the warrants being offered in this offering.

There is no established public trading market for the warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the warrants on any national securities exchange or other trading market. Without an active market, the liquidity of the warrants will be limited.

Holders of our warrants will have no rights as a common stockholder until such holders exercise their warrants and acquire our common stock.

Until you acquire shares of our common stock upon exercise of your warrants, you will have no rights with respect to the shares of our common stock underlying such warrants. Upon exercise of your warrants, you will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

A significant portion of our total outstanding shares of common stock 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 of common stock intend to sell shares of common stock, could reduce the market price of our common stock.

Upon the completion of this offering, approximately 2,168,900 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 supplement. 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 of common stock 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.

We do not expect to pay any cash dividends in the foreseeable future.

We do not anticipate declaring or paying in the foreseeable future any dividends on our common stock. We intend to retain all available funds and any future earnings to support our operations and to finance the growth and development of our

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business, including through our clinical development programs. As a result, capital appreciation, if any, of our common stock will be stockholders' sole source of gain, if any, for the foreseeable future.

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

On December 22, 2017, President Trump signed into law new legislation that significantly revises the Internal Revenue Code of 1986, as amended. The newly enacted federal income tax law, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income in respect of net operating losses generated during or after 2018 and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the newly enacted federal tax law. The impact of this tax reform on holders of our common stock is also uncertain and could be adverse. We urge you to consult with your legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

Our effective tax rate may fluctuate, and we may incur obligations in tax jurisdictions in excess of accrued amounts.

We are currently subject to taxation in the United States and Massachusetts. In preparing our financial statements, we estimate the amount of tax that will become payable in each of such places. Nevertheless, our effective tax rate may be different than experienced in the past due to numerous factors, including passage of the newly enacted federal income tax law, changes in the mix of our profitability from state to state, the results of examinations and audits of our tax filings, our inability to secure or sustain acceptable agreements with tax authorities, changes in accounting for income taxes and changes in tax laws. Any of these factors could cause us to experience an effective tax rate significantly different from previous periods or our current expectations and may result in tax obligations in excess of amounts accrued in our financial statements.

Our ability to use net operating losses to offset future taxable income may be subject to limitations.

As of December 31, 2016, we had federal net operating loss carryforwards, or NOLs, of $136.6 million and state NOLs of $121.2 million. The federal and state NOLs will begin to expire, if not utilized, beginning in 2027 and 2030, respectively. These NOLs could expire unused and be unavailable to offset future income tax liabilities. Under the newly enacted federal income tax law, federal NOLs incurred in 2018 and in future years may be carried forward indefinitely, but the deductibility of such federal NOLs is limited. It is uncertain if and to what extent various states will conform to the newly enacted federal tax law. In addition, under Section 382 of the Internal Revenue Code of 1986, as amended, and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation's ability to use its pre-change NOLs and other pre-change tax attributes to offset its post-change income or taxes may be limited. Our existing NOLs are subject to limitations arising from previous ownership changes, and if we undergo an ownership change in connection any follow-on offerings of our common or preferred stock, our ability to utilize NOLs could be further limited by Section 382 of the Code. Our NOLs may also be impaired under state law. Accordingly, we may not be able to utilize a material portion of our NOLs. Furthermore, our ability to utilize our NOLs is conditioned upon our attaining profitability and generating U.S. federal taxable income. We have incurred net losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future; thus, we do not know whether or when we will generate the U.S. federal taxable income necessary to utilize our NOLs. Our NOLs have been fully offset by a valuation allowance due to uncertainties surrounding our ability to realize these tax benefits.

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FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the other documents we have filed with the SEC that are incorporated by reference herein contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “project,” “target,” “potential,” “will,” “would,” “could,” “should,” “continue,” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. In particular, you should consider the numerous risks described in our Quarterly Report on Form 10-Q for the quarter ended September 30, 2017 incorporated by reference in this prospectus, and in the “Risk Factors” section in this prospectus supplement.

Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. You should not rely upon forward-looking statements as predictions of future events. Unless required by law, we will not undertake and we specifically disclaim any obligation to release publicly the result of any revisions which may be made to any forward-looking statements to reflect events or circumstances after the date of such statements or to reflect the occurrence of events, whether or not anticipated. In that respect, we wish to caution readers not to place undue reliance on any such forward-looking statements, which speak only as of the date they are made.

This prospectus supplement, the accompanying prospectus and the other documents we have filed with the SEC that 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.

In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus supplement, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

The risks and uncertainties regarding our forward-looking statements include, among other things:

- our estimates regarding the timing and amount of funds we require to file our IND and initiate clinical trials for GEN-009 and to continue our investments in immuno-oncology;
- our estimate for when we will require additional funding;
- our plans to commercialize GEN-009 and our other product candidates;
- the timing of, and our ability to, obtain and maintain regulatory approvals for our product candidates;
- the rate and degree of market acceptance and clinical utility of any approved product candidate;
- the potential benefits of strategic partnership agreements and our ability to enter into strategic partnership arrangements;
- our ability to quickly and efficiently identify and develop product candidates;

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- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position;
- the successful completion of the Concurrent Offering; and
- our estimates regarding expenses, future revenues, capital requirements, the sufficiency of our current and expected cash resources and our need for additional financing.

You should read this prospectus supplement, the accompanying prospectus, the documents that we have incorporated by reference herein and therein and the documents we have filed as exhibits to the registration statement, of which this prospectus supplement is a part, completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of our forward-looking statements by these cautionary statements.

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USE OF PROCEEDS

We estimate that the net proceeds we will receive from this offering will be approximately $50.0 million, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us. This amount does not include the proceeds that we may receive in connection with any exercise of the warrants issued in this offering. If the underwriters exercise their option to purchase additional shares of common stock and warrants in full, we estimate that the net proceeds from this offering will be approximately $57.5 million. In addition, we estimate that the net proceeds we will receive from the Concurrent Offering will be approximately $1.4 million, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us. This offering is not contingent upon the completion of the Concurrent Offering and the Concurrent Offering is not contingent upon the completion of this offering. We cannot assure you that either or both of the offerings will be completed.

We intend to use the net proceeds from this offering and the Concurrent Offering to support the ongoing development of our GEN-009 program, including filing an IND with the FDA and commencing a Phase 1/2a clinical proof of concept trial, and for working capital and general corporate purposes.

We believe that the net proceeds from this offering and the Concurrent Offering, together with our existing cash and cash equivalents, allows us to advance our research and development programs as follows:

- GEN-009:
  - To file an IND with the FDA in early 2018;
  - To commence a Phase 1/2a clinical trial in the first half of 2018; and
  - To report first immunogenicity data from this trial in the first half of 2019.

Our expected use of the net proceeds from this offering and the Concurrent 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. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering and the Concurrent Offering. We have no current understandings, agreements or commitments for any material acquisitions or licenses of any compounds, product candidates or technology.

Pending our use of the net proceeds from this offering and the Concurrent Offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.

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PRICE RANGE OF OUR COMMON STOCK

Our common stock has been publicly traded on The NASDAQ Global Market under the symbol “GNCA” since our initial public offering on February 5, 2014. Prior to our initial public offering, there was no public market for our common stock. The following table sets forth, for the periods indicated, the high and low sale prices of our common stock as reported by The NASDAQ Global Market.

	HIGH	LOW
2018		
First Quarter (through January 12, 2018)	$1.26	$1.03
2017		
Fourth Quarter	$2.15	$1.01
Third Quarter	$6.78	$1.13
Second Quarter	$7.29	$4.92
First Quarter	$6.20	$4.01
2016		
Fourth Quarter	$5.22	$3.28
Third Quarter	$6.39	$3.86
Second Quarter	$7.74	$3.35
First Quarter	$8.07	$2.56

On January 12, 2018, the last reported sale price of our common stock on The NASDAQ Global Market was $1.13. As of January 15, 2018, there were 28,734,898 shares of our common stock outstanding held by approximately 19 holders of record.

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DILUTION

If you invest in our securities 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 accompanying warrants and the pro forma net tangible book value per share of our common stock after this offering. For the purpose of this calculation, the entire purchase price for the shares of common stock and accompanying warrants is being allocated to the shares of common stock, and the shares issuable upon exercise of the accompanying warrants have not been included.

Our historical net tangible book value as of September 30, 2017 was $3.3 million, or $0.12 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 28,704,164 shares of our common stock outstanding.

After giving effect to the sale of the shares of common stock offered in this prospectus supplement at a public offering price of $1.00 per share and attributing no value to the accompanying warrants, less the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering, our pro forma net tangible book value as of September 30, 2017 would have been approximately $53.2 million, or approximately $0.65 per share. This represents an immediate increase in pro forma net tangible book value per share of $0.53 to existing stockholders and immediate dilution of $0.35 in pro forma net tangible book value per share to new investors purchasing securities in this offering.

Dilution per share to new investors is determined by subtracting pro forma 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		$1.00
Net tangible book value per share as of September 30, 2017	$0.12	
Increase in net tangible book value per share attributable to new investors	$0.53	
Pro forma net tangible book value per share after this offering		$0.65
Dilution per share to new investors		$0.35

The above illustration of dilution per share to investors participating in this offering assumes no exercise of the warrants offered hereby or the effect of the sale of Series A convertible preferred stock under the Concurrent Offering or exercise of the Class A warrants to purchase shares of our common stock under the Concurrent Offering. The exercise of the warrants offered in this offering or the sale of Series A convertible preferred stock or exercise of Class A warrants to purchase shares of our common stock under the Concurrent Offering having an exercise price less than the offering price will increase dilution to new investors. Investors that acquire common stock upon the exercise of the warrants offered hereby or the sale of Series A convertible preferred stock or exercise of Class A warrants under the Concurrent Offering may experience dilution depending on our net tangible book value (deficit) at the time of exercise.

If the underwriters exercise their option to purchase additional shares of common stock and warrants in full in this offering and giving effect to the sale of Series A preferred stock under the Concurrent Offering, our as adjusted net tangible book value will increase to $0.68 per share, representing an immediate increase in net tangible book value to existing stockholders of $0.03 per share and immediate dilution in net tangible book value of $0.32 per share to new investors.

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

- 26,682,500 shares of common stock issuable upon the exercise of the warrants offered hereby;
- 817,500 shares of common stock reserved for issuance upon exercise of the Class A warrants being offered by us in connection with the Concurrent Offering;

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- 4,399,940 shares of common stock issuable upon exercise of stock options outstanding at September 30, 2017 at a weighted-average exercise price of $5.68 per share;
- 77,603 shares of common stock issuable upon the exercise of warrants outstanding at September 30, 2017 at a weighted-average exercise price of $8.21 per share;
- 843,305 shares of common stock reserved for future issuance under our 2014 Equity Incentive Plan; and
- 30,741 shares of common stock reserved for future issuance under our 2014 Employee Stock Purchase Plan.

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CONCURRENT OFFERING OF SERIES A CONVERTIBLE PREFERRED STOCK AND CLASS A WARRANTS TO PURCHASE COMMON STOCK

In the Concurrent Offering, we are offering 1,635 shares of our Series A convertible preferred stock and 1,635,000 Class A warrants to purchase up to 817,500 shares of our common stock. Each Series A convertible preferred stock share will be convertible by the holder thereof into 1,000 shares of common stock. Two Class A warrants will entitle the holder thereof to purchase one share of our common stock at an exercise price of $1.20 per share.

Each share of Series A convertible preferred stock is convertible at any time at the option of the holder, provided that the holder will be prohibited from converting Series A convertible preferred stock into shares of our common stock if, as a result of such conversion, the holder, together with its affiliates, would own more than 9.99% of the total number of shares of our common stock then issued and outstanding. Our Series A convertible preferred stock will rank 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 voluntary or involuntary. Shares of Series A convertible preferred stock will generally have no voting rights, expect as required by law and expect 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 convertible preferred stock.

The Class A warrants sold in the Concurrent Offering will have the same terms as the Class A warrants sold in this offering.

Through this offering and the Concurrent Offering, we intend to raise gross proceeds of approximately $55.0 million (excluding the proceeds, if any, from the exercise of the warrants issued pursuant to this offering or the Concurrent Offering). This offering is not contingent upon the Concurrent Offering and the Concurrent Offering is not contingent upon this offering. We cannot assure you that the Concurrent Offering will be completed.

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DESCRIPTION OF SECURITIES

In this offering, we are offering 53,365,000 shares of common stock and warrants to purchase up to 26,682,500 shares of common stock. We have granted the underwriters an option for a period of 30 days to purchase up to 8,004,750 additional shares of our common stock and/or 8,004,750 warrants to purchase up to 4,002,375 additional shares of common stock. Two warrants entitle the holder thereof to purchase one share of common stock at an initial exercise price of $1.20 per share. This prospectus supplement also relates to the offering of shares of common stock upon the exercise, if any, of the warrants issued in this offering. The shares of common stock and warrants will be issued separately but can only be purchased together in this offering.

Common Stock

The material terms and provisions of our common stock are described under the caption “Description of Common Stock” starting on page 13 of the accompanying prospectus. Our common stock is listed on The NASDAQ Global Market under the symbol “GNCA.” Our transfer agent is Computershare Trust Company, N.A.

Warrants

The material terms and provisions of the 53,365,000 warrants to purchase 26,682,500 shares of common stock being offered pursuant to this prospectus supplement and the accompanying prospectus are summarized below. We have granted the underwriters an option for a period of 30 days to purchase up to 8,004,750 warrants to purchase up to 4,002,375 additional shares of common stock. This summary is subject to and qualified in its entirety by the Class A form of warrant, which will be provided to the investors in this offering and will be filed with the SEC as an exhibit to a Current Report on Form 8-K in connection with this offering.

Exercisability. The holder may exercise the warrants at any time or from time to time during the period beginning on the date of issuance and expiring on the fifth-year anniversary of such issuance date. Notwithstanding the foregoing, the holder will be prohibited from exercising such warrants into shares of our common stock if, as a result of such exercise, the holder, together with its affiliates, would own more than 4.99% of the total number of shares of our common stock then issued and outstanding, provided that this limitation on exercise shall not be applicable to any holder, together with its affiliates, who owns 10.0% or more of our common stock immediately prior to the exercise of each warrant (without giving effect to any shares of common stock underlying each warrant). A holder may increase or decrease this beneficial ownership limitation to an amount not to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the issuance of shares of common stock issuable upon exercise of each warrant. The warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our common stock purchased upon such exercise (except in the case of a cashless exercise as discussed below).

Exercise Price. The exercise price upon exercise of each warrant is $1.20 per share of common stock being purchased. The exercise price of the warrants is subject to appropriate adjustment in the event of stock dividends, subdivisions, stock splits, stock combinations, reclassifications or reorganizations affecting our common stock.

Payment of Exercise Price. The warrant holders have the option to provide payment of the exercise price of the shares being acquired upon exercise of the warrants (i) by wire transfer or cashier’s check, or (ii) by cashless exercise.

Transferability. Subject to applicable laws and the restriction on transfer set forth in the Warrant Agreement, the warrants may be transferred at the option of the holders upon surrender of the warrants to the warrant agent together with the appropriate instruments of transfer.

Exchange Listing. We do not plan on making an application to list the warrants on The NASDAQ Global Market, any national securities exchange or other nationally recognized trading system. We expect the common stock issuable upon exercise of the warrants will be listed on The NASDAQ Global Market.

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Acquisition Transactions. In the event of an "Acquisition," as defined in the warrants generally to include a merger or consolidation resulting in the sale of 50% or more of the voting securities of the Company, the sale of all or substantially all of the assets or voting securities of the Company, or other change of control transaction, as defined in the warrants, we will be obligated to use our best efforts to ensure that the warrant holders receive new warrants from the surviving or acquiring entity (the "Acquiror"), with the value of the new warrants to purchase shares in the Acquirer, as determined in accordance with the "Black-Scholes Option Pricing Formula," as defined in the warrants as applicable to the Acquiror's shares, that is equivalent to the aggregate value of the warrants held by each warrant holder, as determined in accordance with the "Black-Scholes Option Pricing Formula," as defined in the warrants as applicable to our shares. The new warrants to purchase shares in the Acquirer shall have the same expiration date as the Class A Warrants and a strike price that is based on the proportion of the value of the Acquiror's stock to our common stock. If we are unable, despite our best efforts, to cause the Acquirer to issue new warrants in the Acquisition as described above, then, if our stockholders are to receive cash in the Acquisition, we will cash out the warrant holders' warrants for an amount per warrant that is calculated in accordance with "Black-Scholes Option Pricing Formula," and, if our stockholders are to receive stock in the Acquisition, we will issue shares of our common stock to each warrant holder with an aggregate value equal to the value of the warrant calculated in accordance with the "Black-Scholes Option Pricing Formula." We will not effect an Acquisition unless the Acquiror assumes in writing our obligations to holders of warrants as set forth in the warrants.

Events of Failure. In the event that we fail to timely deliver shares of common stock to any warrant holder, we are required to make whole any warrant holder who purchases shares of common stock to deliver in satisfaction of a sale by such warrant holder of shares of common stock issuable upon an exercise of the warrants that the warrant holder anticipated receiving from the Company, as described in the warrants.

Rights as a Stockholder. 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.

Waivers and Amendments. Any term of the warrants may be amended or waived with our written consent and the written consent of the holder of such warrant.

No Fractional Shares. No fractional shares or scrip representing fractional shares shall be issued upon the exercise of the warrants. As to any fraction of a share which the holder would otherwise be entitled to purchase upon such exercise, we shall cause the warrant agent to, at our option, pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the exercise price of the warrant per whole share or round such fractional share up to the nearest whole share.

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

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UNDERWRITING

Subject to the terms and conditions set forth in the underwriting agreement, dated January 17, 2018, between us and Cantor Fitzgerald & Co., or Cantor, as representative of the several underwriters named below, of the Representative, and the sole book-running manager of this offering, we have agreed to sell to the underwriters, and each of the underwriters has agreed severally and jointly, to purchase from us, the shares of common stock and accompanying warrants showed opposite its name below.

Underwriters	Number of Shares to be Purchased	Number of Warrants to be Purchased	Number of Shares Underlying Warrants
Cantor Fitzgerald & Co.	32,019,000	32,019,000	16,009,500
Needham & Company, LLC	8,538,400	8,538,400	4,269,200
Robert W. Baird & Co. Incorporated	8,538,400	8,538,400	4,269,200
H.C. Wainwright & Co., LLC	4,269,200	4,269,200	2,134,600
Total	53,365,000	53,365,000	26,682,500

The underwriting agreement provides that the obligations of the several underwriters are subject to certain conditions precedent such as the receipt by the underwriters of officers' certificates and legal opinions and approval of certain legal matters by their counsel. The underwriting agreement provides that the underwriters will purchase all of the shares of common stock and accompanying warrants if any of them are purchased. We have agreed to indemnify the underwriters and certain of their controlling persons against certain liabilities, including liabilities under the Securities Act, and to contribute to payments that the underwriters may be required to make in respect of those liabilities.

The underwriters are offering the shares of common stock and accompanying warrants, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by its counsel and other conditions specified in the underwriting agreement. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Option to Purchase Additional Shares and Warrants

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus supplement, to purchase, from time to time, in whole or in part, up to an aggregate of 8,004,750 shares of common stock and/or 8,004,750 warrants to purchase up to an aggregate of 4,002,375 shares of common stock from us at the public offering price set forth on the cover page of this prospectus supplement, less underwriting discounts and commissions.

Commission and Expenses

The underwriters have advised us that they propose to offer the shares of common stock and accompanying warrants to the public at the public offering price set forth on the cover page of this prospectus supplement and to certain dealers, which may include the underwriters, at that price less a concession not in excess of $0.036 per share of common stock and accompanying warrant. After the offering, the underwriters may change the offering price and other selling terms.

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The following table shows the public offering price, the underwriting discounts and commissions that we are to pay the underwriters and the proceeds, before expenses, to us in connection with this offering. Such amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares and warrants.

	Per Share and Accompanying Warrant		Total	
	Without Option to Purchase Additional Shares and Accompanying Warrants	With Option to Purchase Additional Shares and Accompanying Warrants	Without Option to Purchase Additional Shares and Accompanying Warrants	With Option to Purchase Additional Shares and Accompanying Warrants
Public offering price	$ 1.00	$ 1.00	$53,365,000	$ 61,369,750
Underwriting discounts and commissions	$ 0.06	$ 0.06	$3,201,900	$ 3,682,185
Proceeds to us, before expenses	$ 0.94	$ 0.94	$50,163,100	$ 57,687,565

We estimate expenses payable by us in connection with this offering, other than the underwriting discounts and commissions referred to above, will be approximately $175,000. We have also agreed to reimburse the underwriters for up to $15,000 for their FINRA counsel's fees and expenses, which reimbursed fee is deemed underwriting compensation for this offering by FINRA.

Listing

Our common stock is listed on The NASDAQ Global Market under the trading symbol "GNCA". There is no established public trading market for the warrants and we do not expect a market to develop. In addition, we do not intend to apply for listing of the warrants on any securities exchange or recognized trading system. The warrants will be issued in book-entry form pursuant to a warrant agreement between us and Computershare Trust Company, N.A., as warrant agent.

No Sales of Similar Securities

We, our officers and our directors have agreed, subject to certain specified exceptions, not to directly or indirectly, for a period of 90 days after the date of the underwriting agreement:

- 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) by us), 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 supplement without the prior written consent of Cantor.

In addition, we and each such person agrees that, without the prior written consent of Cantor, we or such other person will not, during the restricted period, make any demand for, or exercise any right with respect to, the registration of any shares of common stock or any security convertible into or exercisable or exchangeable for common stock. Cantor may, in its sole discretion and at any time or from time to time before the termination of the 90-day period release all or any portion of the securities subject to lock-up agreements.

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Stabilization

The underwriters have advised us that they, pursuant to Regulation M under the Securities Exchange Act of 1934, as amended, may engage in short sale transactions, stabilizing transactions, syndicate covering transactions or the imposition of penalty bids in connection with this offering. These activities may have the effect of stabilizing or maintaining the market price of the common stock at a level above that which might otherwise prevail in the open market. Establishing short sales positions may involve either “covered” short sales or “naked” short sales.

“Covered” short sales are sales made in an amount not greater than the underwriter's option to purchase additional shares of our common stock in this offering. The underwriters may close out any covered short position by either exercising its option to purchase additional shares of our common stock or purchasing shares of our common stock in the open market. In determining the source of shares to close out the covered short position, the underwriter will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which it may purchase shares through the option to purchase additional shares.

“Naked” short sales are sales in excess of the option to purchase additional shares of our common stock. 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 the shares of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering.

A stabilizing bid is a bid for the purchase of shares of common stock on behalf of the underwriters for the purpose of fixing or maintaining the price of the common stock. A syndicate covering transaction is the bid for or the purchase of shares of common stock on behalf of the underwriters to reduce a short position incurred by the underwriters in connection with the offering. 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. A penalty bid is an arrangement permitting the underwriter to reclaim the selling concession otherwise accruing to a syndicate member in connection with the offering if the common stock originally sold by such syndicate member are purchased in a syndicate covering transaction and therefore have not been effectively placed by such syndicate member.

Neither we nor 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. The underwriters are not obligated to engage in these activities and, if commenced, may end any of these activities at any time.

Passive Market Making

The underwriters may also engage in passive market making transactions in our common stock on The NASDAQ Global 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. Passive market making may cause the price of our common stock to be higher than the price that otherwise would exist in the open market in the absence of those transactions. The underwriters are not required to engage in passive market making and, if commenced, may end passive market making activities at any time.

Electronic Distribution

A prospectus in electronic format may be made available by e-mail or on the web sites or through online services maintained by one or more of the underwriters, selling group members (if any) or their affiliates. The underwriters may agree with us to allocate a specific number of securities for sale to online brokerage account holders. Any such allocation for online distributions will be made by the underwriters on the same basis as other allocations. Other than the prospectus in electronic format, the information on the underwriters’ web site and any information contained in any other web site maintained by the underwriters are not part of this prospectus supplement, has not been approved and endorsed by us or the underwriters and

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should not be relied upon by investors.

Other Activities and Relationships

The underwriters and certain of their affiliates are full service financial institutions engaged in a wide range of activities for their own accounts and the accounts of customers, which may include, among other things, corporate finance, mergers and acquisitions, merchant banking, equity and fixed income sales, trading and research, derivatives, foreign exchange, futures, asset management, custody, clearance and securities lending. The underwriters and certain of their affiliates have, from time to time, performed, and may in the future perform, various investment banking and financial advisory services for us and our affiliates, for which they received or will receive customary fees and expenses.

In addition, in the ordinary course of its business, the underwriters and their affiliates may, directly or indirectly, hold long or short positions, trade and otherwise conduct such activities in or with respect to debt or equity securities and/or bank debt of, and/or derivative products. Such investment and securities activities may involve our securities and instruments. The underwriters and their affiliates may also make investment recommendations or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long or short positions in such securities and instruments.

Stamp Taxes

If you purchase securities offered in this prospectus supplement, you may be required to pay stamp taxes and other charges under the laws and practices of the country of purchase, in addition to the offering price listed on the cover page of this prospectus supplement.

Notice to Investors

Canada

This prospectus supplement constitutes an “exempt offering document” as defined in and for the purposes of applicable Canadian securities laws. No prospectus has been filed with any securities commission or similar regulatory authority in Canada in connection with the offer and sale of the securities. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon this prospectus supplement or on the merits of the securities and any representation to the contrary is an offence.

Canadian investors are advised that this prospectus supplement has been prepared in reliance on section 3A.3 of National Instrument 33-105 Underwriting Conflicts, or NI 33-105. Pursuant to section 3A.3 of NI 33-105, this prospectus supplement is exempt from the requirement that the Company and the underwriter(s) provide investors with certain conflicts of interest disclosure pertaining to “connected issuer” and/or “related issuer” relationships that may exist between the Company and the underwriter(s) as would otherwise be required pursuant to subsection 2.1(1) of NI 33-105.

Resale Restrictions

The offer and sale of the securities in Canada is being made on a private placement basis only and is exempt from the requirement that the Company prepares and files a prospectus under applicable Canadian securities laws. Any resale of the securities acquired by a Canadian investor in this offering must be made in accordance with applicable Canadian securities laws, which may vary depending on the relevant jurisdiction, and which may require resales to be made in accordance with Canadian prospectus requirements, pursuant to a statutory exemption from the prospectus requirements, in a transaction exempt from the prospectus requirements or otherwise under a discretionary exemption from the prospectus requirements granted by the applicable local Canadian securities regulatory authority. These resale restrictions may under certain circumstances apply to resales of the securities outside of Canada.

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Representations of Purchasers

Each Canadian investor who purchases the securities will be deemed to have represented to the Company and the underwriter(s) that the investor (i) is purchasing the securities as principal, or is deemed to be purchasing as principal in accordance with applicable Canadian securities laws, for investment only and not with a view to resale or redistribution; (ii) is an "accredited investor" as such term is defined in section 1.1 of National Instrument 45-106 Prospectus Exemptions, or NI 45-106, or, in Ontario, as such term is defined in section 73.3(1) of the Securities Act (Ontario); and (iii) is a "permitted client" as such term is defined in section 1.1 of National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations.

Taxation and Eligibility for Investment

Any discussion of taxation and related matters contained in this prospectus supplement does not purport to be a comprehensive description of all of the tax considerations that may be relevant to a Canadian investor when deciding to purchase the securities and, in particular, does not address any Canadian tax considerations. No representation or warranty is hereby made as to the tax consequences to a resident, or deemed resident, of Canada of an investment in the securities or with respect to the eligibility of the securities for investment by such investor under relevant Canadian federal and provincial legislation and regulations.

Rights of Action for Damages or Rescission

Securities legislation in certain of the Canadian jurisdictions provides certain purchasers of securities pursuant to an offering memorandum (such as this prospectus supplement), including where the distribution involves an "eligible foreign security" as such term is defined in Ontario Securities Commission Rule 45-501 Ontario Prospectus and Registration Exemptions and in Multilateral Instrument 45-107 Listing Representation and Statutory Rights of Action Disclosure Exemptions, as applicable, with a remedy for damages or rescission, or both, in addition to any other rights they may have at law, where the offering memorandum, or other offering document that constitutes an offering memorandum, and any amendment thereto, contains a "misrepresentation" as defined under applicable Canadian securities laws. These remedies, or notice with respect to these remedies, must be exercised or delivered, as the case may be, by the purchaser within the time limits prescribed under, and are subject to limitations and defences under, applicable Canadian securities legislation. In addition, these remedies are in addition to and without derogation from any other right or remedy available at law to the investor.

Language of Documents

Upon receipt of this document, each Canadian investor hereby confirms that it has expressly requested that all documents evidencing or relating in any way to the sale of the securities described herein (including for greater certainty any purchase confirmation or any notice) be drawn up in the English language only. Par la réception de ce document, chaque investisseur Canadien confirme par les présentes qu'il a expressément exigé que tous les documents faisant foi ou se rapportant de quelque manière que ce soit à la vente des valeurs mobilières décrites aux présentes (incluant, pour plus de certitude, toute confirmation d'achat ou tout avis) soient rédigés en anglais seulement.

Australia

This prospectus is not a disclosure document for the purposes of Australia's Corporations Act 2001 (Cth) of Australia, or Corporations Act, has not been lodged with the Australian Securities & Investments Commission and is only directed to the categories of exempt persons set out below. Accordingly, if you receive this prospectus in Australia:

You confirm and warrant that you are either:

- a "sophisticated investor" under section 708(8)(a) or (b) of the Corporations Act;
- a "sophisticated investor" under section 708(8)(c) or (d) of the Corporations Act and that you have provided an accountant's certificate to the company which complies with the requirements of section 708(8)(c)(i) or (ii) of the

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Corporations Act and related regulations before the offer has been made; or

- a "professional investor" within the meaning of section 708(11)(a) or (b) of the Corporations Act.

To the extent that you are unable to confirm or warrant that you are an exempt sophisticated investor or professional investor under the Corporations Act any offer made to you under this prospectus is void and incapable of acceptance. You warrant and agree that you will not offer any of the securities issued to you pursuant to this prospectus for resale in Australia within 12 months of those securities being issued unless any such resale offer is exempt from the requirement to issue a disclosure document under section 708 of the Corporations Act.

European Economic Area

In relation to each member state of the European Economic Area which has implemented the Prospectus Directive, each referred to herein as a Relevant Member State, with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, referred to herein as the Relevant Implementation Date, no offer of any securities which are the subject of the offering contemplated by this prospectus has been or will be made to the public in that Relevant Member State other than any offer where a prospectus has been or will be published in relation to such securities that has been approved by the competent authority in that Relevant Member State or, where appropriate, approved in another Relevant Member State and notified to the relevant competent authority in that Relevant Member State in accordance with the Prospectus Directive, except that with effect from and including the Relevant Implementation Date, an offer of such securities may be made to the public in that Relevant Member State:

- to any legal entity which is a "qualified investor" as defined in the Prospectus Directive;
- to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 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 of the underwriters for any such offer; or
- in any other circumstances falling within Article 3(2) of the Prospectus Directive,

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

For the purposes of this provision, the expression an "offer to the public" in relation to any securities 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 securities to be offered so as to enable an investor to decide to purchase or subscribe the securities, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State and the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

Hong Kong

No securities have been offered or sold, and no securities may be offered or sold, in Hong Kong, by means of any document, other than to persons whose ordinary business is to buy or sell shares or debentures, whether as principal or agent; or to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance; or in other circumstances which do not result in the document being a "prospectus" as defined in the Companies Ordinance (Cap. 32) of Hong Kong or which do not constitute an offer to the public within the meaning of the Companies Ordinance (Cap.32) of Hong Kong. No document, invitation or advertisement relating to the securities has been issued or may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong

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Kong (except if permitted under the securities laws of Hong Kong) other than with respect to securities which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong and any rules made under that Ordinance.

This prospectus has not been registered with the Registrar of Companies in Hong Kong. Accordingly, this prospectus may not be issued, circulated or distributed in Hong Kong, and the securities may not be offered for subscription to members of the public in Hong Kong. Each person acquiring the securities will be required, and is deemed by the acquisition of the securities, to confirm that he is aware of the restriction on offers of the securities described in this prospectus and the relevant offering documents and that he is not acquiring, and has not been offered any securities in circumstances that contravene any such restrictions.

Japan

The offering has not been and will not be registered under the Financial Instruments and Exchange Law of Japan (Law No. 25 of 1948 of Japan, as amended), or FIEL, and the Initial Purchaser will not offer or sell any securities, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means, unless otherwise provided herein, any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the FIEL and any other applicable laws, regulations and ministerial guidelines of Japan.

Singapore

This prospectus has not been and will not be lodged or registered with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or the invitation for subscription or purchase of the securities may not be issued, circulated or distributed, nor may the securities be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to the public or any member of the public in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or the SFA, (ii) to a relevant person as defined under Section 275(2), or any person pursuant to Section 275(1A) of the SFA, and in accordance with the conditions, specified in Section 275 of the SFA, or (iii) otherwise pursuant to, and in accordance with the conditions of any other applicable provision of the SFA.

Where the securities are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

- a corporation (which is not an accredited investor as defined under Section 4A of the SFA) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or
- a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary is an accredited investor, shares, debentures and units of shares and debentures of that corporation or the beneficiaries' rights and interest in that trust shall not be transferable for six months after that corporation or that trust has acquired the Offer Shares under Section 275 of the SFA except:

to an institutional investor under Section 274 of the SFA or to a relevant person defined in Section 275(2) of the SFA, or to any person pursuant to an offer that is made on terms that such shares, debentures and units of shares and debentures of that corporation or such rights and interest in that trust are acquired at a consideration of not less than $200,000 (or its equivalent in a foreign currency) for each transaction, whether such amount is to be paid for in cash or by exchange of securities or other assets, and further for corporations, in accordance with the conditions, specified in Section 275 of the SFA;

where no consideration is given for the transfer; or

where the transfer is by operation of law.

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Switzerland

The securities may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or SIX, or on any other stock exchange or regulated trading facility in Switzerland. This prospectus has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this prospectus nor any other offering or marketing material relating to the securities or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this prospectus nor any other offering or marketing material relating to the offering, the Company or the securities have been or will be filed with or approved by any Swiss regulatory authority. In particular, this prospectus will not be filed with, and the offer of securities will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA, or FINMA, and the offer of securities has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or CISA. The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of securities.

Israel

This document does not constitute a prospectus under the Israeli Securities Law, 5728-1968, or the Securities Law, and has not been filed with or approved by the Israel Securities Authority. In the State of Israel, this document is being distributed only to, and is directed only at, and any offer of the shares is directed only at, investors listed in the first addendum, or the Addendum, to the Israeli Securities Law, consisting primarily of joint investment in trust funds, provident funds, insurance companies, banks, portfolio managers, investment advisors, members of the Tel Aviv Stock Exchange, underwriters, venture capital funds, entities with equity in excess of NIS 50 million and “qualified individuals”, each as defined in the Addendum (as it may be amended from time to time), collectively referred to as qualified investors (in each case purchasing for their own account or, where permitted under the Addendum, for the accounts of their clients who are investors listed in the Addendum). Qualified investors will be required to submit written confirmation that they fall within the scope of the Addendum, are aware of the meaning of same and agree to it.

United Kingdom

This prospectus is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors (as defined in the Prospectus Directive) that are also (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended, referred to herein as the Order, and/or (ii) high net worth entities falling within Article 49(2)(a) to (d) of the Order and other persons to whom it may lawfully be communicated. Each such person is referred to herein as a Relevant Person.

This prospectus and its contents are confidential and should not be distributed, published or reproduced (in whole or in part) or disclosed by recipients to any other persons in the United Kingdom. Any person in the United Kingdom that is not a Relevant Person should not act or rely on this document or any of its contents.

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MATERIAL U.S. FEDERAL INCOME AND ESTATE TAX CONSIDERATIONS

The following is a general discussion of the material U.S. federal income and estate tax considerations applicable to the ownership and disposition of shares of our common stock and warrants acquired in this offering. This discussion is for general information only and is not tax advice. Accordingly, all prospective holders of our common stock and warrants should consult their own tax advisors with respect to the U.S. federal, state, local, estate and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock and warrants. This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus supplement, all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any change could alter the tax consequences described in this prospectus supplement. We assume in this discussion that each holder holds shares of our common stock and warrants as capital assets within the meaning of Section 1221 of the Code (generally property held for investment).

This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular holder in light of that holder's individual circumstances, does not address the alternative minimum or Medicare contribution taxes, and does not address any aspects of U.S. state, local or non-U.S. taxes or, except as specifically provided below, any U.S. federal taxes other than income tax. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address aspects of U.S. federal income taxation that may be applicable to investors that are subject to special tax rules, including without limitation:

- insurance companies;
- tax-exempt organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- real estate investment trusts;
- pension plans, individual retirement accounts and other tax deferred accounts;
- persons that mark their securities to market;
- controlled foreign corporations;
- passive foreign investment companies;
- “dual resident” corporations;
- persons that receive our common stock or warrants as compensation for the performance of services;
- owners that hold our common stock or warrants as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- owners that own, or are deemed to own, more than 5% of our common stock (except to the extent specifically set forth below);
- persons that have a functional currency other than the U.S. dollar; and
- certain U.S. expatriates.

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In addition, this discussion does not address the tax treatment of partnerships or other pass-through entities or arrangements for U.S. federal income tax purposes, or persons who hold our common stock or warrants through partnerships or other pass-through entities or arrangements for U.S. federal income tax purposes. A partner in a partnership or other pass-through entity or arrangement that will hold our common stock or warrants should consult his, her or its own tax advisor regarding the tax consequences of acquiring, holding and disposing of our common stock or warrants through a partnership or other pass-through entity or arrangement, as applicable.

There can be no assurance that the Internal Revenue Service, which we refer to as the IRS, will not challenge one or more of the tax consequences described herein. We have not obtained, nor do we intend to obtain, a ruling from the IRS with respect to the U.S. federal income tax consequences of the purchase, ownership or disposition of our common stock or warrants.

Allocation of Purchase Price Between Common Stock and Warrants to Purchase Our Common Stock

Two warrants will entitle the holder thereof to purchase one share of our common stock at an exercise price of $1.20 per share. The purchase price paid for a share of common stock and associated warrant must be allocated between the share of common stock and warrant based on the relative fair market value of each. This allocation will establish a holder's initial tax basis for U.S. federal income tax purposes in their shares of common stock and warrants. We will complete this determination following the closing of the offering based on the relative values of the warrants and of our common stock. A holder's allocation of purchase price between common stock and warrants is not binding on the IRS or the courts, and no assurance can be given that the IRS or the courts will agree with a holder's allocation. Accordingly, each prospective holder should consult their own tax advisor with respect to the risks associated with an allocation of the purchase price between our common stock and warrants.

U.S. Holders

This section applies to you if you are a “U.S. holder”. For purposes of this discussion, a “U.S. holder” means a beneficial owner of our common stock and warrants who is for U.S. federal income tax purposes: (i) an individual who is a citizen or resident of the United States; (ii) a corporation, or any other organization taxable as a corporation, created or organized in the United States or under the laws of the United States or of any state thereof or the District of Columbia; (iii) an estate, the income of which is subject to U.S. federal income tax regardless of its source; or (iv) a trust if (1) a U.S. court is able to exercise primary supervision over the trust's administration and one or more U.S. persons have the authority to control all of the trust's substantial decisions or (2) the trust has a valid election in effect under applicable U.S. Treasury Regulations to be treated as a U.S. person.

Distributions on Our Common Stock and Warrants

Distributions, if any, on our common stock generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the U.S. holder's investment, up to such U.S. holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in “—Sale, Exchange or Other Taxable Disposition of Our Common Stock or Warrants”. Dividends paid by us will generally be eligible for the reduced rates of tax for qualified dividend income allowed to individual U.S. holders and for the dividends received deduction allowed to corporate U.S. holders, in each case assuming that certain holding period and other requirements are satisfied.

While it is not free from doubt, we expect that cash distributions paid on the warrants, on an “as-converted” basis, if any, are subject to the same tax consequences as described in the preceding paragraph for the common stock; however, distributions received in respect of a warrant may not qualify for the lower tax rates applicable to qualified dividend income. U.S. holders should consult their own tax advisors regarding the proper treatment of any distributions paid on the warrants.

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Conversion of Warrants into Our Common Stock

Except as discussed below with respect to the cashless exercise of a warrant, a U.S. holder will not recognize gain or loss on the conversion of warrants into our common stock. A U.S. holder's tax basis in the common stock received upon a conversion will equal the sum of (i) the initial tax basis of the warrants converted and (ii) price paid upon exercise. The U.S. holder's holding period for the common stock received upon exercise of the warrants will begin on the date following the date of exercise of the warrants and will not include the period during which the U.S. holder held the warrants.

The tax consequences of a cashless exercise of a warrant are not clear under current U.S. tax law. A cashless exercise may be tax-free (except with respect to any cash received in lieu of fractional shares), either because the exercise is not a realization event or because the exercise is treated as a recapitalization for U.S. federal income tax purposes. In this case, a U.S. holder's basis in the common stock received would equal the U.S. holder's basis in the warrant. If the cashless exercise were treated as a recapitalization, the holding period of the common stock would include the holding period of the warrant. If the cashless exercise were otherwise treated as not being a gain realization event, the holding period in the shares of our common stock might be treated as commencing on the date following the date of exercise (or possibly the date of exercise) of the warrant. We expect to treat such an exchange as a tax-free recapitalization for U.S. federal income tax purposes.

It is possible that a cashless exercise could be treated in part as a taxable exchange in which gain or loss would be recognized with respect to the warrants surrendered to pay the exercise price for warrants converted into common stock. In that event, a U.S. holder could be deemed to have surrendered only those warrants used to satisfy the exercise price for an amount equal to the aggregate fair market value of the exercise price of the total number of warrants to be exercised. The U.S. holder would recognize capital gain or loss in an amount equal to the difference between the amount deemed realized and the U.S. holder's tax basis in the warrants surrendered to pay the exercise price. In this case, a U.S. holder's tax basis in the common stock received would equal the sum of the U.S. holder's initial investment in the converted warrants (i.e., the portion of the U.S. holder's purchase price for the shares of common stock that is allocated to the warrants, as described above under “—Allocation of Purchase Price between Common Stock and Warrants to Purchase Our Common Stock”) plus the amount of gain recognized in the exchange. A U.S. holder's holding period for the common stock would commence on the date following the date of exercise.

Due to the absence of authority on the U.S. federal income tax treatment of a cashless exercise, there can be no assurance which, if any, of the alternative tax consequences and holding periods described above would be adopted by the IRS or a court of law. Accordingly, U.S. holders should consult their own tax advisors regarding the tax consequences of a cashless exercise.

If a warrant is allowed to lapse unexercised, a U.S. holder generally will recognize a capital loss equal to such holder's tax basis in the warrant. Such loss will be long-term capital loss if the warrant has been held for more than one year as of the date the warrant lapsed and will otherwise be short-term capital loss. The deductibility of capital losses is subject to certain limitations.

Sale, Exchange or Other Taxable Disposition of Our Common Stock or Warrants

Upon the sale, exchange, or other taxable disposition of our common stock or warrants, a U.S. holder will recognize gain or loss equal to the difference between the amount realized upon the disposition and the U.S. holder's tax basis in the common stock or warrants sold or exchanged. Any gain or loss generally will be capital gain or loss, and will be long-term capital gain or loss if the U.S. holder's holding period for the common stock or warrants exceeded one year at the time of the disposition. Certain U.S. holders (including individuals) are currently eligible for preferential rates of U.S. federal income taxation in respect of long-term capital gains. The deductibility of capital losses is subject to significant limitations.

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Information Reporting and Backup Withholding

In general, information reporting requirements may apply to dividends paid to a U.S. holder on our common stock or the warrants, and to the proceeds of the sale, exchange or other disposition of our common stock and warrants, unless the U.S. holder is an exempt recipient. Backup withholding may apply to such payments if the U.S. holder fails to provide a taxpayer identification number, a certification of exempt status or has been notified by the IRS that it is subject to backup withholding (and such notification has not been withdrawn). Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against a U.S. holder's U.S. federal income tax liability provided the required information is timely furnished to the IRS.

Non-U.S. Holders

This section applies to you if you are a “non-U.S. holder”. For purposes of this discussion, a “non-U.S. holder” means a person who is not a U.S. holder (as defined above under “U.S. Holders”).

Distributions on Our Common Stock and Warrants

Distributions, if any, on our common stock generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such non-U.S. holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in “—Gain on Sale, Exchange or Other Taxable Disposition of Our Common Stock or Warrants”.

Subject to the discussions below regarding backup withholding and the Foreign Account Tax Compliance Act, or FATCA, dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a rate of 30% of the gross amount or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence, unless such dividends are effectively connected with a trade or business conducted by a non U.S. holder within the U.S (as discussed below). A non-U.S. holder of our common stock or warrants who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form), as applicable, and satisfy applicable certification and other requirements. Non-U.S. holders are urged to consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may be able to obtain a refund or credit of any excess amounts withheld by timely filing the required information with the IRS.

Subject to the discussions below regarding backup withholding and FATCA, dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States and, if an applicable income tax treaty so provides, that are attributable to a “permanent establishment” or a “fixed base” maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the non-U.S. holder satisfies applicable certification and disclosure requirements. U.S. effectively connected income, net of specified deductions and credits, is generally taxed at the same graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also be subject to an additional “branch profits tax” at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

While it is not free from doubt, we expect that cash distributions paid on the warrants, on an “as-converted” basis, if any, are subject to the same tax consequences as described in the third preceding paragraph for the common stock.

Non-U.S. holders should consult their own tax advisors regarding the proper treatment of any distributions paid on the warrants.

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Conversion of Warrants into Our Common Stock

The U.S. federal income tax treatment of a non-U.S. holder's exercise of a warrant, or the lapse of a warrant held by a non-U.S. holder, generally will correspond to the U.S. federal income tax treatment of the exercise or lapse of a warrant by a U.S. Holder, as described under "—U.S. Holders-Conversion of Warrants into Common Stock" above; provided, however, that any gain recognized on an exercise of a warrant will generally be subject to U.S. federal income tax only in the circumstances described under "—Gain on Sale, Exchange or Other Taxable Disposition of Our Common Stock or Warrants" below and a non-U.S. holder generally will not recognize a capital loss on the lapse or expiration of a warrant unless such non-U.S. holder is otherwise subject to U.S. federal income tax.

Gain on Sale, Exchange or Other Taxable Disposition of Our Common Stock or Warrants

Subject to the discussions below regarding backup withholding and FATCA, in general, a non-U.S. holder will not be subject to any U.S. federal income tax on any gain realized upon such holder's sale, exchange or other taxable disposition of shares of our common stock or warrants unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a U.S. trade or business and, if an applicable income tax treaty so provides, is attributable to a "permanent establishment" or a "fixed base" maintained by such non-U.S. holder in the United States, in which case the non-U.S. holder generally will be taxed on such gain at the graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code) and, if the non-U.S. holder is a foreign corporation, the branch profits tax described above in "—Distributions on Our Common Stock and Warrants" also may apply to such gain;
- the non-U.S. holder is a nonresident alien individual who is present in the United States for 183 days or more in the taxable year of the taxable disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence) on the net gain derived from the taxable disposition, which may be offset by certain U.S. source capital losses of the non-U.S. holder, if any; or
- we are, or have been, at any time during the five-year period preceding such taxable disposition (or the non-U.S. holder's holding period, if shorter) a "U.S. real property holding corporation," unless, with respect to a dispositon of our common stock, our common stock is regularly traded on an established securities market and the non-U.S. holder holds no more than 5% of our outstanding common stock, directly or indirectly, during the shorter of the five-year period ending on the date of the taxable disposition or the period that the non-U.S. holder held our common stock. If we are determined to be a U.S. real property holding corporation and the foregoing exception does not apply, then a purchaser must withhold 15% of the proceeds payable to a non-U.S. holder from a sale of our common stock or warrants, and the non-U.S. holder generally will be taxed on its net gain derived from the disposition at the graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code). Generally, a corporation is a U.S. real property holding corporation only if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rules described above.

Backup Withholding and Information Reporting

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions paid on our common stock or warrants to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a United States person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock or warrants. Dividends paid to non-U.S. holders subject to the U.S. withholding tax, as described above in "—Distributions on Our Common Stock and Warrants," generally will be exempt from U.S. backup withholding.

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Information reporting and backup withholding generally will apply to the proceeds of a disposition of our common stock and warrants by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is filed with the IRS.

Withholding and Information Reporting Requirements—FATCA

FATCA may impose a U.S. federal withholding tax at a rate of 30% on payments of dividends on, or gross proceeds from the sale or other disposition of, our common stock or warrants paid to certain foreign entities, unless (i) if the foreign entity is a “foreign financial institution,” such foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a “foreign financial institution,” such foreign entity either certifies that it does not have any “substantial United States owners” (as defined in the Code) or furnishes identifying information regarding each substantial United States owner, or (iii) the foreign entity otherwise qualifies from an exemption these rules. Under applicable U.S. Treasury Regulations, withholding under FATCA currently applies to payments of dividends paid on our common stock or deemed paid on the warrants and is scheduled to apply to gross proceeds from a sale or other disposition of our common stock or warrants made on or after January 1, 2019. A Non-U.S. holder that is not subject to FATCA withholding generally may certify its exempt status by furnishing a properly executed IRS Form W-8BEN or Form W-8BEN-E (or successor form), as applicable. Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of the tax. Certain intergovernmental agreements between the United States and other countries may modify these rules. Non-U.S. holders should consult their own tax advisors regarding the possible implications of this legislation on their investment in our common stock and the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.

Federal estate taxes

Shares of our common stock and warrants held (or treated as held) by an individual who is not a United States citizen or resident (as specifically determined for United States federal estate tax purposes) at the time of such individual’s death generally will be included in the holder’s gross estate for United States federal estate tax purposes, unless an applicable estate tax or other treaty provides otherwise, and, therefore, may be subject to United States federal estate tax.

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LEGAL MATTERS

The validity of the securities offered hereby is being passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. Cooley, LLP, New York, New York will pass upon certain legal matters relating to this offering for the underwriters.

EXPERTS

The financial statements of Genocea Biosciences, Inc. appearing in Genocea Biosciences, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2016, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their 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.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" into this prospectus supplement the information 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 supplement, and information in documents that we file later with the SEC will automatically update and supersede information in this prospectus supplement. We incorporate by reference into this prospectus supplement the documents listed below and any future filings made by us with the SEC under Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, except for information "furnished" under Items 2.02, 7.01 or 9.01 on Form 8-K or other information "furnished" to the SEC which is not deemed filed and not incorporated in this prospectus supplement, until the termination of the offering of securities described in the applicable prospectus supplement. We hereby incorporate by reference the following documents:

- Our Annual Report on Form 10-K for the year ended December 31, 2016 as filed with the SEC on February 17, 2017;
- Our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2017, as filed with the SEC on May 5, 2017, June 30, 2017, as filed with the SEC on August 9, 2017 and September 30, 2017, as filed with the SEC on November 3, 2017;
- Our Current Reports on Form 8-K filed with the SEC on March 6, 2017, April 17, 2017, June 15, 2017, September 25, 2017 and December 1, 2017; and
- Description of our common stock, which is contained in the Registration Statement on Form 8-A, as filed with the SEC on January 30, 2014, as supplemented by the Description of Common Stock found on page 13 of the accompanying prospectus and including any amendments or reports filed for the purpose of updating such description.

You may request a copy of these filings, at no cost, by writing or telephoning us at the following address:

Investor Relations
100 Acorn Park Drive, 5th Floor,
Cambridge, Massachusetts 02140,
(617) 876-8191
email address: ir@genocea.com

Copies of these filings are also available, without charge, on the SEC's website at www.sec.gov and on our website at www.genocea.com as soon as reasonably practicable after they are filed electronically with the SEC. The information contained on our website is not a part of this prospectus supplement.

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PROSPECTUS
$250,000,000
Common Stock
Preferred Stock
Warrants

We may offer and sell from time to time, in one or more series or issuances and on terms that we will determine at the time of the offering, any combination of the securities described in this prospectus, up to an aggregate amount of $250.0 million.

We will provide specific terms of any offering in a supplement to this prospectus. Any prospectus supplement may also add, update, or change information contained in this prospectus. You should carefully read this prospectus and the applicable prospectus supplement as well as the documents incorporated or deemed to be incorporated by reference in this prospectus before you purchase any of the securities offered hereby.

These securities may be offered and sold in the same offering or in separate offerings; to or through underwriters, dealers, and agents; or directly to purchasers. The names of any underwriters, dealers, or agents involved in the sale of our securities and their compensation will be described in the applicable prospectus supplement.

Our common stock is traded on The NASDAQ Global Market under the symbol “GNCA.” On May 6, 2015, the closing price of our common stock was $9.81.

Investing in our securities involves risks. See “Risk Factors” on page 6, and any applicable prospectus supplement, and under similar headings in the other documents that are incorporated by reference into this prospectus.

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

Prospectus dated May 14, 2015

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You should rely only on the information contained in, or incorporated by reference into, this prospectus. We have not authorized anyone to give you information different from that contained in this prospectus. We are not making an offer to sell these securities in any jurisdiction where the offer is not permitted. The information contained in this prospectus is accurate only as of the date on the front cover of this prospectus, regardless of when this prospectus is delivered or when any sale of our securities occurs. Our business, financial condition, results of operations and prospects may have changed since that date.

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ABOUT THIS PROSPECTUS

This prospectus is a part of a registration statement that we filed with the Securities and Exchange Commission (the "SEC") using a "shelf" registration process. Under this shelf registration process, we may offer to sell any combination of the securities described in this prospectus in one or more offerings up to a total dollar amount of $250.0 million. Each time we sell securities under this shelf registration, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement may also add, update or change information contained in this prospectus. You should read both this prospectus and the applicable prospectus supplement, including all documents incorporated herein by reference, together with additional information described under "Where You Can Find More Information" below.

This prospectus does not include all of the information that is in the registration statement. We omitted certain parts of the registration statement from this prospectus as permitted by the SEC. We refer you to the registration statement and its exhibits for additional information about us and the securities that may be sold under this prospectus.

We have not authorized any dealer, agent or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus and any accompanying prospectus supplement. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus or an accompanying prospectus supplement. This prospectus and the accompanying prospectus supplement, if any, do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus and the accompanying prospectus supplement constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. You should not assume that the information contained in this prospectus and the accompanying prospectus supplement, if any, is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus and any accompanying prospectus supplement is delivered or securities are sold on a later date.

"Genocea," the "Company," "we," "us," "our" and similar names refer to Genocea Biosciences, Inc. unless we state otherwise the context otherwise requires.

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SUMMARY

This summary highlights selected information contained elsewhere or incorporated by reference in this prospectus. The summary may not contain all the information that you should consider before investing in our common stock. You should read the entire prospectus carefully, including "Risk Factors" contained in this prospectus and the documents incorporated by reference herein, before making an investment decision.

Overview

We are a biopharmaceutical company that discovers and develops novel vaccines and immunotherapies to address diseases with significant unmet needs. We use our proprietary discovery platform, ATLAS, to rapidly design vaccines and immunotherapies that act, in part, through T cell (or cellular) immune responses, in contrast to approved vaccines and immunotherapies, which are designed to act primarily through B cell (or antibody) immune responses. We believe that by harnessing T cells we can develop first-in-class vaccines and immunotherapies to address diseases where T cells are central to the control of the disease.

We have two product candidates in Phase 2 clinical development: GEN-003, an immunotherapy for the treatment of genital herpes and GEN-004, a universal vaccine for the prevention of pneumococcal infections. We also have product candidates in pre-clinical development for diseases including genital herpes, chlamydia and malaria.

GEN-003—Phase 2 immunotherapy for genital herpes

Our lead program is GEN-003, a Phase 2 candidate therapeutic vaccine, or immunotherapy, that we are developing to treat genital herpes infections. Data from our double-blind, placebo-controlled, dose-escalating Phase 1/2a trial for GEN-003 represented the first reported instance of a therapeutic vaccine working against an infectious disease.

Final analysis of the data from the Phase 1/2a trial showed that, for the best performing 30µg dose group, there was a sustained reduction in the viral shedding rate. After completion of dosing for this group, the viral shedding rate fell by 52% versus baseline and, at six months after the final dose, the shedding rate remained at 40% below baseline. At 12 months, the viral shedding rate returned to baseline for this dose group. The reduction in the genital lesion rate after completion of the third dose was greatest for the 30µg dose group at 48%. After six months, the reduction from baseline in genital lesion rate for this dose group was 65% and, after 12 months, the genital lesion rate was 42% lower than baseline. GEN-003 was safe and well tolerated over the 12 months of this trial. We believe the six-month duration of reduced viral shedding and genital lesion rates may be clinically meaningful.

Having identified a dose that, according to company-sponsored market research, delivers clinically meaningful efficacy in magnitude and durability, we are now conducting a 310-subject Phase 2 dose optimization trial. The objective of this trial is to test six combinations of proteins and adjuvant, including the best-performing 30µg per protein / 50µg of adjuvant dose from the Phase 1/2a trial, to determine the optimal dose for future trials. This trial is fully enrolled and we expect to announce top-line data from this trial late in the second quarter of 2015. If GEN-003 successfully completes clinical development and is approved, we believe it would represent an important new treatment option for patients with genital herpes.

GEN-004—Phase 2 universal vaccine for the prevention of pneumococcal infections

We are also developing a second T cell-stimulating vaccine candidate, GEN-004, a potential universal Streptococcus pneumoniae, or pneumococcus, vaccine to protect against the leading cause of infectious disease mortality worldwide. GEN-004 is designed to stimulate T helper 17 (TH17) cells, a rare cell type that provides immunity at epithelial and mucosal surfaces, in the nasopharynx to prevent colonization by pneumococcus.

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In June 2014, we announced top-line data from a Phase 1 clinical trial for GEN-004. This trial met its safety, tolerability and immunogenicity goals including measurable increases in the blood of TH17 cells. We initiated a 98-subject Phase 2a trial in September 2014 to demonstrate that GEN-004 can reduce the frequency, magnitude or duration of colonization of pneumococcus in the nasopharynx in healthy adults. This trial is fully enrolled and we expect to announce top-line data from this trial in the fourth quarter of 2015.

ATLAS Platform

Vaccines represent a major healthcare success story, having eradicated or significantly reduced the global prevalence of many infectious diseases. To date, all approved vaccines have been developed primarily to elicit B cell responses. However, there remain many infections for which no effective vaccines or only partially effective vaccines exist. A major reason is that the organisms that cause these infections largely evade the antibody immune response generated by B cells, which can generally only address pathogens in the bloodstream. Such organisms may reside in host cells or mucosal surfaces of the nose and throat. To address these pathogens, vaccines targeting responses from the T cell arm of the immune system may present the solution.

We believe T cell target discovery has been particularly challenging for two reasons. First, the diversity of human T cell responses contrasts with the generally uniform B cell responses in humans. Second, the number of candidate targets for T cell responses can be exponentially greater than for B cell responses. These complexities represent fundamental barriers that traditional vaccine discovery tools, which rely largely on empirically selecting the potential targets from the proteins of a pathogen and iteratively testing them in animal models, have not been able to address.

We have designed the ATLAS platform to overcome these T cell target discovery challenges. We believe ATLAS represents the most comprehensive high throughput system for T cell vaccine and immunotherapy discovery in the biopharmaceutical industry. ATLAS is designed to mimic the T cell arm of the human immune system in a laboratory setting. Using ATLAS, we are able to measure T cell responses to the entire set of protein targets for a specific pathogen in blood samples from large, genetically diverse populations, allowing us to identify vaccine and immunotherapy targets associated with protective T cell responses to disease. By comparing antigens identified in individuals who naturally control their infection with those who do not, we can select the antigens that may have the best likelihood of inducing protective T cell immune responses.

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

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Our Product Candidate Pipeline

The following table describes our current development programs:

Vaccine Candidate	Program	Stage of Development	Next Milestone	Anticipated Timeline
GEN-003	Genital herpes Therapeutic	Phase 2	Top-line data from Phase 2 dose optimization trial	Late second quarter of 2015
GEN-004	Pneumococcus Prophylaxis	Phase 2a	Top-line data from Phase 2a trial	Fourth quarter of 2015
GEN-001	Chlamydia Prophylaxis	Pre-clinical	File investigational new drug application (or IND)	2017
GEN-002	HSV-2 Prophylaxis	Pre-clinical	File IND	2017
GEN-005	Malaria Prophylaxis	Research	Initiate pre-clinical studies	Second half of 2015

Our Team

Our management and scientific teams possess considerable experience in vaccine and anti-infective research, manufacturing, clinical development and regulatory matters. We have also assembled a team of leading advisors, led by George Siber, M.D., to guide the further development of our programs. Previously, Dr. Siber was the Chief Scientific Officer of Wyeth Vaccines, where he led the development of several first-in-class vaccines including Prevnar. He is also an inventor of Respigam and Cytogam, antibodies to treat and protect against respiratory syncytial virus and cytomegalovirus, respectively. Dr. Siber is one of our directors and chairs our Scientific Advisory Board.

Our Strategy

Our objective is to be the leading T cell vaccine and immunotherapy company. Key components of our strategy are:

- Continue to rapidly advance our lead vaccine candidate, GEN-003. GEN-003 is a potential first-in-class therapeutic vaccine candidate we are developing to treat genital herpes infections, for which we are currently conducting a Phase 2 trial to optimize the vaccine dose. Top-line data from this trial is expected late in the second quarter of 2015. We intend to commence a Phase 2b trial in the second half of 2015 to optimize the dosing regimen. We retain all rights to GEN-003 and plan to advance this program through regulatory approval and, if approved, commercialize this vaccine through a focused commercial effort in the United States. Outside the United States, we intend to evaluate partnerships for GEN-003 opportunistically.
- Continue to rapidly advance GEN-004. Our second clinical-stage product candidate is GEN-004, a vaccine candidate designed to prevent infections caused by all strains of pneumococcus. We are currently conducting a Phase 2a clinical trial to seek to demonstrate that GEN-004 can reduce colonization of pneumococcus in the nasopharynx in healthy adults. Top-line data from this trial is expected in the fourth quarter of 2015. We believe this trial could provide the first evidence in humans that a T cell vaccine, with potential to become a universal vaccine, can reduce colonization by pneumococcus. We intend to commence a further Phase 1/2 trial of GEN-004 in toddlers in 2016. We retain all rights to this program, other than certain rights we have granted in developing countries, and intend to evaluate partnerships for GEN-004 opportunistically.

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- Advance our discovery stage and non-clinical novel vaccine programs. We expect similarly to advance our novel non-clinical prophylactic vaccine and immunotherapy programs against chlamydia, HSV-2 and malaria through human proof of concept. We will seek partnerships opportunistically for late-stage development and commercialization of such programs.

- Utilize ATLAS, our vaccine discovery platform, to develop additional T cell vaccine candidates. We intend to continue to use ATLAS to discover and advance novel T cell vaccines. Since we begin our vaccine candidate discovery process by profiling human populations exposed to a pathogen, and use these subjects' own cells to comprehensively screen the entire proteome of the pathogens, we believe we have a better chance of identifying vaccines likely to protect against pathogens of interest. We intend to opportunistically expand our pipeline using ATLAS to discover T cell vaccines against pathogens for which B cell vaccines are ineffective or non-existent. We will also continue to investigate, either alone or through partnerships, the applicability of ATLAS to cancer immunotherapies.

Corporate Information

We were incorporated in the state of Delaware in August 2006 as Genocea, Inc., and we subsequently changed our name to Genocea Biosciences, Inc. Our principal executive offices are located at Cambridge Discovery Park, 100 Acorn Park Drive, 5th Floor, Cambridge, Massachusetts 02140, and our telephone number is (617) 876-8191. Our Internet website is www.genocea.com. We have included our website address in this prospectus solely as an inactive textual reference. The information on, or that can be accessed through, our website is not part of this prospectus, and you should not rely on any such information in making the decision whether to purchase our common stock.

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

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RISK FACTORS

Investing in our securities involves a high degree of risk. See "Item 1A—Risk Factors" in our most recent Annual Report on Form 10-K and in any subsequent Quarterly Report on Form 10-Q incorporated by reference in this prospectus, in any other documents we file with the SEC that are deemed incorporated by reference into this prospectus and the "Risk Factors" section in the applicable prospectus supplement for a discussion of the factors you should carefully consider before deciding to purchase our securities. Before you invest in our securities, you should carefully consider these risks as well as other information we include or incorporate by reference into this prospectus and the applicable prospectus supplement. The risks and uncertainties we have described are not the only ones facing our company. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our business operations. The occurrence of any of these risks might cause you to lose all or part of your investment in the offered securities. The discussion of risks includes or refers to forward-looking statements; you should read the explanation of the qualifications and limitations on such forward-looking statements discussed elsewhere in this prospectus.

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FORWARD-LOOKING STATEMENTS

This prospectus, any prospectus supplement and the other documents we have filed with the SEC that are incorporated herein by reference, contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, including statements regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “proje “potential,” “will,” “would,” “could,” “should,” “continue,” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. In particular, you should consider the numerous risks described in our Annual Report on Form 10-K for the year ended December 31, 2014 and any subsequent Quarterly Reports on Form 10-Q, each incorporated by reference in this prospectus, and in the “Risk Factors” section in the applicable prospectus supplement. See “Where You Can Find More Information.”

Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. You should not rely upon forward-looking statements as predictions of future events. Unless required by law, we will not undertake and we specifically disclaim any obligation to release publicly the result of any revisions which may be made to any forward-looking statements to reflect events or circumstances after the date of such statements or to reflect the occurrence of events, whether or not anticipated. In that respect, we wish to caution readers not to place undue reliance on any such forward-looking statements, which speak only as of the date they are made.

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.

These risks and uncertainties include, among other things:

- risks related to our ability to progress any product candidates in preclinical or clinical trials;
- risks related to the scope, rate and progress of our preclinical studies and clinical trials and other research and development activities;
- the uncertainty of clinical trial results and the fact that current results may not be predictive of future results, even if the data from preclinical studies or clinical trials is positive;
- risks that our product candidates may not prove to be safe and efficacious;
- the risk that we may not be able to enter into future collaborations with industry partners and the government and the terms, timing and success of any such collaboration;
- risks relating to the cost of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights;
- risks related to the competition for clinical resources and patient enrollment from drug candidates in development by other companies with greater resources and visibility;

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- risks related to the rate of cash utilized by us in our business and the period for which existing cash will be able to fund such operation; and
- risks related to our ability to obtain adequate financing in the future through product licensing, co-promotional arrangements, public or private equity or debt financing or otherwise; general business conditions; competition; business abilities and judgment of personnel; and the availability of qualified personnel.

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USE OF PROCEEDS

Except as otherwise provided in the applicable prospectus supplement, we intend to use the net proceeds we receive from our sale of the securities covered by this prospectus primarily for preclinical and clinical development of our lead product candidates, discovery, research and development of other product candidates and other corporate purposes. Additional information on the use of net proceeds we receive from the sale of securities covered by this prospectus may be set forth in the prospectus supplement relating to the specific offering.

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RATIO OF COMBINED FIXED CHARGES AND PREFERRED STOCK DIVIDENDS TO EARNINGS

The following table sets forth our historical ratios of earnings to fixed charges and preferred stock dividends for the periods indicated. You should read this table in conjunction with the financial statements and notes incorporated by reference in this prospectus.

	Year Ended December 31,				Three Months Ended March 31, 2015
	2011	2012	2013	2014	
Ratio of combined fixed charges and preferred stock dividends to earnings(1)	—	—	—	—	—

(1) Earnings were inadequate to cover fixed charges and preferred dividends for the years ended December 31, 2011, 2012, 2013 and 2014 by $16.3 million, $15.1 million, $22.4 million and $35.5 million, respectively, and for the three months ended March 31, 2015, by $12.1 million.

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PLAN OF DISTRIBUTION

We may sell securities in any of the ways described below or in any combination:

- to or through underwriters or dealers;
- through one or more agents;
- directly to purchasers or to a single purchaser; or
- in "at the market offerings", within the meaning of Rule 415(a)(4) of the Securities Act of 1933, as amended (the "Securities Act") to or through a market maker or into an existing trading market, or an exchange or otherwise.

The distribution of the securities by us may be effected from time to time in one or more transactions:

- at a fixed price, or prices, which may be changed from time to time;
- at market prices prevailing at the time of sale;
- at prices related to such prevailing market prices; or
- at negotiated prices.

Each prospectus supplement will describe the method of distribution of the securities and any applicable restrictions.

The prospectus supplement will describe the terms of the offering of the securities, including the following:

- the name or names of any underwriters, dealers or agents and the amounts of securities underwritten or purchased by each of them;
- the public offering price of the securities and the proceeds to us and any discounts, commissions or concessions allowed or reallowed or paid to dealers; and
- any securities exchanges on which the securities may be listed.

Any offering price and any discounts or concessions allowed or reallowed or paid to dealers will be specified in the applicable prospectus supplement and may be changed from time to time.

Only the agents or underwriters named in each prospectus supplement are agents or underwriters in connection with the securities being offered thereby.

We may authorize underwriters, dealers or other persons acting as our agents to solicit offers by certain institutions to purchase securities from us pursuant to delayed delivery contracts providing for payment and delivery on the date stated in each applicable prospectus supplement. Each contract will be for an amount not less than, and the aggregate amount of securities sold pursuant to such contracts shall not be less nor more than, the respective amounts stated in each applicable prospectus supplement. Institutions with whom the contracts, when authorized, may be made include commercial and savings banks, insurance companies, pension funds, investment companies, educational and charitable institutions and other institutions, but shall in all cases be subject to our approval. Delayed delivery contracts will be subject only to those conditions set forth in each applicable prospectus supplement, and each prospectus supplement will set forth any commissions we pay for solicitation of these contracts.

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Agents, underwriters and other third parties described above may be entitled to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, or to contribution from us with respect to payments which the agents, underwriters or other third parties may be required to make in respect thereof. Agents, underwriters and such other third parties may be customers of, engage in transactions with, or perform services for us in the ordinary course of business. We may also use underwriters or such other third parties with whom we have a material relationship. We will describe the nature of any such relationship in the applicable prospectus supplement.

One or more firms, referred to as "remarketing firms," may also offer or sell the securities, if a prospectus supplement so indicates, in connection with a remarketing arrangement upon their purchase. Remarketing firms will act as principals for their own accounts or as our agents. These remarketing firms will offer or sell the securities in accordance with the terms of the securities. Each prospectus supplement will identify and describe any remarketing firm and the terms of its agreement, if any, with us and will describe the remarketing firm's compensation. Remarketing firms may be deemed to be underwriters in connection with the securities they remarket. Remarketing firms may be entitled under agreements that may be entered into with us to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, and may be customers of, engage in transactions with or perform services for us in the ordinary course of business.

Certain underwriters may use this prospectus and any accompanying prospectus supplement for offers and sales related to market-making transactions in the securities. These underwriters may act as principal or agent in these transactions, and the sales will be made at prices related to prevailing market prices at the time of sale. Any underwriters involved in the sale of the securities may qualify as "underwriters" within the meaning of Section 2(a)(11) of the Securities Act. In addition, the underwriters' commissions, discounts or concessions may qualify as underwriters' compensation under the Securities Act and the rules of the Financial Industry Regulatory Authority.

Our common stock is listed on The NASDAQ Global Market. Underwriters may make a market in our common stock, but will not be obligated to do so and may discontinue any market making at any time without notice. We can make no assurance as to the development, maintenance or liquidity of any trading market for the securities.

Certain persons participating in an offering may engage in overallotment, stabilizing transactions, short covering transactions and penalty bids in accordance with rules and regulations under the Securities Exchange Act of 1934, as amended (the "Exchange Act"). Overallotment involves sales in excess of the offering size, which create a short position. Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum. Short covering transactions involve purchases of the securities in the open market after the distribution is completed to cover short positions. Penalty bids permit the underwriters to reclaim a selling concession from a dealer when the securities originally sold by the dealer are purchased in a short covering transaction to cover short positions. Those activities may cause the price of the securities to be higher than it would otherwise be. If commenced, the underwriters may discontinue any of the activities at any time.

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DESCRIPTION OF COMMON STOCK

The following summary of the terms of our common stock does not purport to be complete and is qualified in its entirety by reference to our fifth amended and restated certificate of incorporation and amended and restated by-laws, both of which are on file with the SEC as exhibits to previous filings, 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 our certificate of incorporation, and we refer to our amended and restated by-laws as our by-laws.

General

Our authorized capital stock consists of 175,000,000 shares of our common stock, par value $0.001 per share. As of March 31, 2015, we had 24,137,395 shares of common stock outstanding.

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

In the event of our liquidation, dissolution or winding up, the holders of common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock. Holders of common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of 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 and issue in the future.

Delaware Anti-Takeover Law and Certain Charter and Bylaw Provisions

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.

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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.

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. Our board of directors currently consists of six members.

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 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

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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 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.

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 Global Market under the symbol "GNCA."

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DESCRIPTION OF PREFERRED STOCK

Under the terms of our certificate of incorporation, our board of directors is authorized to issue up to 25,000,000 shares of our preferred stock, par value $0.001 per share, in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock. No shares of preferred stock are currently outstanding. It is not possible to state the actual effect of the issuance of any shares of preferred stock upon the rights of the holders of common stock until the board of directors determines the specific rights of the holders of preferred stock. However, effects of the issuance of preferred stock include restricting dividends on common stock, diluting the voting power of common stock, impairing the liquidation rights of common stock, and making it more difficult for a third party to acquire us, which could have the effect of discouraging a third party from acquiring, or deterring a third party from paying a premium to acquire, a majority of our outstanding voting stock.

If we offer a specific class or series of preferred stock under this prospectus, we will describe the terms of the preferred stock in the prospectus supplement for such offering and will file a copy of the certificate establishing the terms of the preferred stock with the SEC. To the extent required, this description will include:

- the title and stated value;
- the number of shares offered, the liquidation preference per share and the purchase price;
- the dividend rate(s), period(s) and/or payment date(s), or method(s) of calculation for such dividends;
- whether dividends will be cumulative or non-cumulative and, if cumulative, the date from which dividends will accumulate;
- the procedures for any auction and remarketing, if any;
- the provisions for a sinking fund, if any;
- the provisions for redemption, if applicable;
- any listing of the preferred stock on any securities exchange or market;
- whether the preferred stock will be convertible into our common stock, and, if applicable, the conversion price (or how it will be calculated) and conversion period;
- voting rights, if any, of the preferred stock;
- a discussion of any material U.S. federal income tax considerations applicable to the preferred stock;
- the relative ranking and preferences of the preferred stock as to dividend rights and rights upon liquidation, dissolution or winding up of the affairs of the Company; and
- any material limitations on issuance of any class or series of preferred stock ranking senior to or on a parity with the series of preferred stock as to dividend rights and rights upon liquidation, dissolution or winding up of the Company.

The preferred stock offered by this prospectus, when issued, will not have, or be subject to, any preemptive or similar rights.

Transfer Agent and Registrar

The transfer agent and registrar for any series or class of preferred stock will be set forth in each applicable prospectus supplement.

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DESCRIPTION OF WARRANTS

We may issue warrants to purchase shares of our common stock or preferred stock in one or more series together with other securities or separately, as described in each applicable prospectus supplement. Below is a description of certain general terms and provisions of the warrants that we may offer. Particular terms of the warrants will be described in the applicable warrant agreements and the applicable prospectus supplement for the warrants.

The applicable prospectus supplement will contain, where applicable, the following terms of and other information relating to the warrants:

- the specific designation and aggregate number of, and the price at which we will issue, the warrants;
- the currency or currency units in which the offering price, if any, and the exercise price are payable;
- the designation, amount and terms of the securities purchasable upon exercise of the warrants;
- if applicable, the exercise price for shares of our common stock and the number of shares of common stock to be received upon exercise of the warrants;
- if applicable, the exercise price for shares of our preferred stock, the number of shares of preferred stock to be received upon exercise, and a description of that class or series of our preferred stock;
- the date on which the right to exercise the warrants will begin and the date on which that right will expire or, if the warrants may not be continuously exercised throughout that period, the specific date or dates on which the warrants may be exercised;
- whether the warrants will be issued in fully registered form or bearer form, in definitive or global form or in any combination of these forms, although, in any case, the form of a warrant included in a unit will correspond to the form of the unit and of any security included in that unit;
- any applicable material U.S. federal income tax consequences;
- the identity of the warrant agent for the warrants and of any other depositaries, execution or paying agents, transfer agents, registrars or other agents;
- the proposed listing, if any, of the warrants or any securities purchasable upon exercise of the warrants on any securities exchange;
- if applicable, the date from and after which the warrants and the common stock and/or preferred stock will be separately transferable;
- if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;
- information with respect to book-entry procedures, if any;
- the anti-dilution provisions of the warrants, if any;
- any redemption or call provisions;
- whether the warrants are to be sold separately or with other securities as parts of units; and
- any additional terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of the warrants.

Transfer Agent and Registrar

The transfer agent and registrar for any warrants will be set forth in the applicable prospectus supplement.

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DESCRIPTION OF UNITS

We may issue units consisting of any combination of the other types of securities offered under this prospectus in one or more series. We may evidence each series of units by unit certificates that we will issue under a separate agreement. We may enter into unit agreements with a unit agent. Each unit agent will be a bank or trust company that we select. We will indicate the name and address of the unit agent in the applicable prospectus supplement relating to a particular series of units.

The following description, together with the additional information included in any applicable prospectus supplement, summarizes the general features of the units that we may offer under this prospectus. You should read any prospectus supplement and any free writing prospectus that we may authorize to be provided to you related to the series of units being offered, as well as the complete unit agreements that contain the terms of the units. Specific unit agreements will contain additional important terms and provisions and we will file as an exhibit to the registration statement of which this prospectus is a part, or will incorporate by reference from another report that we file with the SEC, the form of each unit agreement relating to units offered under this prospectus.

If we offer any units, certain terms of that series of units will be described in the applicable prospectus supplement, including, without limitation, the following, as applicable:

- the title of the series of units;
- identification and description of the separate constituent securities comprising the units;
- the price or prices at which the units will be issued;
- the date, if any, on and after which the constituent securities comprising the units will be separately transferable;
- a discussion of certain United States federal income tax considerations applicable to the units; and
- any other terms of the units and their constituent securities.

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WHERE YOU CAN FIND MORE INFORMATION

We have filed a registration statement on Form S-3 with the SEC for the securities offered by this prospectus. This prospectus does not include all of the information contained in the registration statement. You should refer to the registration statement and its exhibits for additional information.

We are required to file annual and quarterly reports, current reports, proxy statements, and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.genocea.com as soon as reasonably practicable after filing such documents with the SEC. The information contained on our website is not part of this prospectus. You can read our SEC filings, including the registration statement, on the SEC's website at http://www.sec.gov. You also may read and copy any document we file with the SEC at its public reference facility at:

Public Reference Room
100 F Street N.E.
Washington, DC 20549.

Please call the SEC at 1-800-732-0330 for further information on the operation of the public reference facilities.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" into this prospectus the information 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, and information in documents that we file later with the SEC will automatically update and supersede information in this prospectus. We incorporate by reference into this prospectus the documents listed below and any future filings made by us with the SEC under Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, except for information "furnished" under Items 2.02, 7.01 or 9.01 on Form 8-K or other information "furnished" to the SEC which is not deemed filed and not incorporated in this prospectus, until the termination of the offering of securities described in the applicable prospectus supplement. We hereby incorporate by reference the following documents:

- Our Annual Report on Form 10-K for the year ended December 31, 2014, as filed with the SEC on February 27, 2015;
- The information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2014 from our definitive proxy statement on Schedule 14A, as filed with the SEC on April 16, 2015;
- Our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2015, as filed with the SEC on May 8, 2015;
- Our Current Reports on Form 8-K filed with the SEC on February 27, 2015 and March 12, 2015; and
- Description of our common stock contained in our Registration Statement on Form 8-A, as filed with the SEC on January 30, 2014, including any amendment or report filed for the purpose of updating such description.

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.

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You may request a copy of these filings, at no cost, by writing or telephoning us at the following address:
Investor Relations
100 Acorn Park Drive, 5th Floor,
Cambridge, Massachusetts 02140,
(617) 876-8191
email address: ir@genocea.com
Copies of these filings are also available, without charge, on the SEC's website at www.sec.gov and on our website at www.genocea.com as soon as reasonably practicable after they are filed electronically with the SEC. The information contained on our website is not a part of this prospectus.

LEGAL MATTERS

The validity of the issuance of the securities offered pursuant to this prospectus will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. The validity of any securities will be passed upon for any underwriters or agents by counsel that we will name in the applicable prospectus supplement.

EXPERTS

The financial statements of Genocea Biosciences, Inc. appearing in Genocea Biosciences, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2014, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their 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.

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53,365,000 Shares of Common Stock
53,365,000 Class A Warrants to Purchase up to 26,682,500 Shares of Common Stock

PROSPECTUS SUPPLEMENT

Sole Book-Running Manager
Cantor
Lead Managers
Needham & Company
Baird
Co- Manager
H.C. Wainwright & Co.
January 17, 2018