GLYCOMIMETICS INC
Form 424B5
June 16, 2016

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Filed Pursuant to Rule 424(b)(5)
Registration No. 333-202808

The information in this preliminary prospectus supplement is not complete and may be changed. A registration statement relating to these securities has been filed with the Securities and Exchange Commission and is effective. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell these securities and they are not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED JUNE 16, 2016

Preliminary Prospectus Supplement
(To Prospectus dated March 24, 2015)

Shares

Common Stock

We are offering shares of our common stock. Our common stock is listed on The NASDAQ Global Market under the symbol "GLYC." The last reported sale price of our common stock on The NASDAQ Global Market on June 15, 2016 was $7.33 per share.

Investing in our common stock involves a high degree of risk. See "Risk Factors" beginning on page S-10 of this prospectus supplement, page 6 of the accompanying prospectus and under similar headings in the documents incorporated by reference into this prospectus supplement and the accompanying prospectus.

We are an "emerging growth company" under applicable Securities and Exchange Commission rules and are eligible for reduced public company disclosure requirements. See "Prospectus Supplement Summary Implications of Being an Emerging Growth Company."

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	TOTAL
Public Offering Price	$	$
Underwriting Discounts and Commissions[(1)]	$	$
Proceeds to GlycoMimetics, Inc. before expenses	$	$

(1) We have agreed to reimburse the underwriters for certain expenses. See "Underwriting" beginning on page S-18 of this prospectus supplement for additional information regarding underwriter compensation.

Delivery of the shares of common stock is expected to be made on or about , 2016. We have granted the underwriters an option for a period of 30 days to purchase up to an additional shares of our common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be $ and the total proceeds to us, before expenses, will be $.

Joint Book-Running Managers

Jefferies **Cowen and Company**

Prospectus Supplement dated June , 2016

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PROSPECTUS SUPPLEMENT

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is part of a "shelf" registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or the SEC, and is in two parts. The first part is this prospectus supplement, which describes the specific terms of this common stock offering and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference herein. The second part, the accompanying prospectus, provides more general information. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement and the information contained in the accompanying prospectus or any document incorporated by reference therein filed prior to the date of this prospectus supplement, you should rely on the information in this prospectus supplement; provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in the accompanying prospectus the statement in the document having the later date modifies or supersedes the earlier statement.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

We have not authorized anyone to provide any information other than that contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus supplement and the accompanying prospectus do not constitute an offer to sell, or a solicitation of an offer to purchase, the securities offered by this prospectus supplement and the accompanying prospectus in any jurisdiction to or from any person to whom or from whom it is unlawful to make such offer or solicitation of an offer in such jurisdiction. The information contained in this prospectus supplement or the accompanying prospectus, or incorporated by reference herein or therein is accurate only as of the respective dates thereof, regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or of any sale of our common stock. It is important for you to read and consider all information contained in this prospectus supplement and the accompanying prospectus, including the documents incorporated by reference herein and therein, in making your investment decision. You should also read and consider the information in the documents to which we have referred you in the sections entitled "Where You Can Find More Information" and "Incorporation of Certain Information by Reference" in this prospectus supplement and in the accompanying prospectus.

We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the accompanying prospectus and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement and the accompanying prospectus must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement and the accompanying prospectus outside the United States. This prospectus supplement and the accompanying prospectus do not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus supplement and the accompanying prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

Unless otherwise stated, all references in this prospectus supplement and the accompanying prospectus to "we," "us," "our," "GlycoMimetics," "company" and similar designations refer, collectively, to GlycoMimetics, Inc., a Delaware corporation.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical fact, contained in this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein, including statements regarding our strategy, future operations, future financial position, future revenue, 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.

The forward-looking statements in this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein include, among other things, statements about:

- our plans to develop and commercialize our glycomimetic drug candidates;
- our ongoing and planned clinical trials for our drug candidates GMI-1271 and GMI-1359, including the timing of initiation of and enrollment in the trials, the timing of availability of data from the trials and the anticipated results of the trials;
- our ability to achieve anticipated milestones under our collaboration with Pfizer for our drug candidate rivipansel;
- the timing of and our ability to obtain and maintain regulatory approvals for our drug candidates;
- the clinical utility of our drug candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position;
- our ability to identify additional drug candidates with significant commercial potential that are consistent with our commercial objectives;
- our estimates regarding future revenues, expenses and needs for additional financing; and
- our expectations related to the use of proceeds for this offering.

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. We have included important factors in the cautionary statements included in this prospectus supplement, particularly in the "Risk Factors" section, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

You should read this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights selected information contained elsewhere in this prospectus supplement and the accompanying prospectus and in the documents we incorporate by reference. This summary does not contain all of the information you should consider before investing in our common stock. You should read this entire prospectus supplement and the accompanying prospectus carefully, especially the risks of investing in our common stock discussed under "Risk Factors" beginning on page S-10 of this prospectus supplement and in Part I, Item 1A "Risk Factors" of our Annual Report on Form 10-K filed with the SEC on February 29, 2016, which is incorporated by reference in this prospectus supplement, along with our consolidated financial statements and notes to those consolidated financial statements and the other information incorporated by reference in this prospectus supplement and the accompanying prospectus, before making an investment decision.

Company Overview

We are a clinical-stage biotechnology company focused on the discovery and development of novel glycomimetic drugs to address unmet medical needs resulting from diseases in which carbohydrate biology plays a key role. Glycomimetics are molecules that mimic the structure of carbohydrates involved in important biological processes. Using our expertise in carbohydrate chemistry and knowledge of carbohydrate biology, we are developing a pipeline of proprietary glycomimetics that inhibit disease-related functions of carbohydrates, such as the roles they play in inflammation, cancer and infection. We believe this represents an innovative approach to drug discovery to treat a wide range of diseases.

We are focusing our initial efforts on drug candidates for rare diseases that we believe will qualify for orphan drug designation. Our first drug candidate, rivipansel, is being developed for the treatment of vaso-occlusive crisis, or VOC, a debilitating and painful condition that occurs periodically throughout the life of a person with sickle cell disease. We have entered into a collaboration with Pfizer Inc. for the further development and potential commercialization of rivipansel worldwide. Rivipansel has received fast track designation from the U.S. Food and Drug Administration, or FDA, as well as orphan drug designation from the FDA in the United States and from the European Medicines Agency in the European Union. We believe the clinical progress of rivipansel provides evidence of the significant potential of our lead program and our proprietary glycomimetics platform. Building on our experience with rivipansel, we are developing our second glycomimetic drug candidate, GMI-1271, to be used in combination with chemotherapy to treat either acute myeloid leukemia, or AML, or multiple myeloma, or MM, both of which are life-threatening hematologic cancers, and potentially other hematologic cancers as well. We have retained the worldwide development and commercialization rights to all of our drug candidates other than rivipansel.

Our proprietary glycomimetics platform is based on our expertise in carbohydrate chemistry and our understanding of the role carbohydrates play in key biological processes. Most human proteins are modified by the addition of complex carbohydrates to the surface of the proteins. The addition of these carbohydrate structures affects the functions of these proteins and their interactions with other molecules. Our initial research and development efforts have focused on drug candidates targeting selectins, which are proteins that serve as adhesion molecules and bind to carbohydrates that are involved in the inflammatory component and progression of a wide range of diseases, including hematologic disorders, cancer and cardiovascular disease. For example, we believe that members of the selectin family play a key role in the onset and progression of VOC. Inhibiting specific carbohydrates from binding to selectins has long been viewed as a potentially attractive approach for therapeutic intervention. The ability to successfully develop drug-like compounds that inhibit binding with selectins, known as selectin antagonists, has been limited by the complexities of carbohydrate chemistry. We believe our expertise in carbohydrate chemistry and our understanding of carbohydrate-protein binding interactions enable us to design selectin antagonists and other glycomimetics that inhibit the disease-related functions of certain carbohydrates. We believe this expertise and knowledge enable us to develop novel drug candidates to address unmet medical needs.

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Our intellectual property portfolio includes ownership of, or exclusive rights to, issued patents and pending patent applications claiming fundamental features of glycomimetic therapeutics, as well as those claiming methods of use for and chemical modifications of our drug candidates. Given the importance of our intellectual property portfolio to our business operations, we intend to vigorously enforce our rights and defend against challenges that have arisen or may arise in this area. Our issued patents directed to rivipansel and methods of use are expected to expire between 2023 and 2030. We have a U.S. patent covering GMI-1271 that is expected to expire in 2032. In addition, we have several pending patent applications covering GMI-1271 and methods of using it, the last expiring of which, if issued, is predicted to expire in 2034.

Our Drug Candidates

We have discovered our drug candidates internally through a rational drug design approach that couples our expertise in carbohydrate chemistry with our knowledge of carbohydrate biology. We are actively developing glycomimetic drug candidates based on this expertise.

Rivipansel Targeting Selectins to Treat VOC

We are developing rivipansel to treat VOC, with the goal of reducing duration of VOC episodes, length of hospital stay and use of opioid analgesics for pain management. In our completed Phase 2 clinical trial, patients treated with rivipansel plus the standard of care achieved improvement in these endpoints, in each case as compared to patients receiving placebo plus the standard of care.

Sickle cell disease is a genetic disease that, according to the U.S. Centers for Disease Control and Prevention, or CDC, affects millions of people throughout the world, including an estimated 90,000 to 100,000 people in the United States. VOC is one of the most severe complications of sickle cell disease. VOC episodes are typically characterized by excruciating musculoskeletal pain, visceral pain and pain in

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other locations, and occur periodically throughout the life of a person with sickle cell disease. The CDC estimates that VOC resulted in approximately 73,000 hospitalizations in the United States in 2010. According to the National Hospital Discharge Survey conducted by the National Center for Health Statistics, these hospitalizations have an average duration of approximately six days. The standard of care in the United States for people experiencing VOC is to manage its symptoms, which typically includes hospitalization, narcotic pain management and hydration. There are no approved therapies that interrupt VOC once it has started or that treat the underlying cause of the pain.

Among both adults and children with sickle cell disease, VOC is the most common reason for seeking medical attention resulting in hospitalization. VOC affects multiple organ systems and may result in significant clinical complications. Most sickle cell disease-related deaths occur during acute VOC and are due to infection, acute chest syndrome, stroke or multi-organ failure. We believe that rivipansel, if approved, would be the first drug to interrupt the underlying cause of VOC, thereby potentially reducing the use of narcotics for pain management and enabling patients to leave the hospital more quickly.

We have completed four clinical trials of rivipansel involving a total of 163 subjects. In April 2013, we completed a Phase 2 clinical trial in which 76 patients hospitalized for VOC, ranging from 12 to 60 years old, were treated with the standard of care plus either rivipansel or placebo. In this trial, patients treated with rivipansel experienced reductions in the time to reach resolution of VOC, length of hospital stay and use of opioid analgesics for pain management, in each case as compared to patients receiving placebo. This improvement was seen in both adult and pediatric patients. Adverse event rates and severity were comparable between those treated with rivipansel and those receiving placebo.

We entered into a license agreement in October 2011 with Pfizer, under which Pfizer has rights to develop and commercialize rivipansel for all indications worldwide. Following the completion of our Phase 2 clinical trial, Pfizer is now responsible for the further clinical development, regulatory approval and potential commercialization of rivipansel. Under the Pfizer agreement, we received an upfront payment of $22.5 million from Pfizer. We are also eligible to receive payments of up to $115.0 million upon the achievement of specified development milestones, including the dosing of the first patients in Phase 3 clinical trials for up to two indications and the first commercial sale of a licensed product in the United States and selected European countries for up to two indications, up to $70.0 million upon the achievement of specified regulatory milestones, including the acceptance of our filings for review by regulatory authorities in the United States and Europe for up to two indications, and up to $135.0 million upon the achievement of specified levels of annual net sales of licensed products. We are also eligible to receive tiered royalties, with percentages ranging from the low double digits to the low teens, based on net sales of rivipansel worldwide, subject to reductions in specified circumstances.

The first potential milestone payment under the Pfizer agreement was $35.0 million upon the initiation of dosing of the first patient in a Phase 3 trial of rivipansel by Pfizer. Under the collaboration, Pfizer made a $15.0 million non-refundable milestone payment to us in May 2014, and the dosing of the first patient in the Phase 3 clinical trial triggered the remaining $20.0 million milestone payment to us, which we received in August 2015.

Under a separate research agreement with the University of Basel, we have agreed to pay 10% of any future milestone payments and royalties we may receive from Pfizer with respect to rivipansel.

GMI-1271 Targeting the Bone Marrow Microenvironment to Treat Hematologic Cancers

We are developing a pipeline of other drug candidates based on our expertise in carbohydrate chemistry, including compounds that are designed to be specific to particular selectins. We are developing GMI-1271, a specific E-selectin inhibitor, to be used in combination with chemotherapy to treat patients with AML, MM and potentially other hematologic cancers.

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E-selectin plays a critical role in binding cancer cells within vascular niches in the bone marrow, which prevents the cells from entering circulation where they can be more readily killed by chemotherapy. In animal studies, GMI-1271 mobilized AML and MM cancer cells out of the bone marrow, making them more sensitive to chemotherapy. In both the AML and MM studies, the combination of GMI-1271 with chemotherapy resulted in improved survival rates for the treated animals, compared to chemotherapy alone. In other animal studies, GMI-1271 appeared to also protect normal cells from some of the side effects of chemotherapy. Common side effects of chemotherapy include bone marrow toxicity resulting in neutropenia, which is an abnormally low number of neutrophils, the white blood cells that serve as the primary defense against infection, and mucositis, which is the inflammation and sloughing of the mucous membranes lining the digestive tract. Animals treated with GMI-1271 and chemotherapy had less severe neutropenia and mucositis and lower bone marrow toxicity as compared to animals treated with chemotherapy alone. We believe that treatment with GMI-1271 results in lower bone marrow toxicity due to its inhibition of E-selectin, which makes stem cells in the bone marrow divide less frequently, thereby protecting them from chemotherapy agents that target rapidly dividing cells.

Acute Myeloid Leukemia

AML is a cancer of the blood and bone marrow. The accumulation of cancer cells in the bone marrow potentially inhibits the production of mature blood cells, such as red blood cells, white blood cells and platelets. It is the most common form of acute leukemia among adults and accounts for the largest number of annual deaths from leukemias in the United States. The National Cancer Institute estimates that in the United States in 2016 there will be approximately 20,000 new cases of AML diagnosed and approximately 10,000 deaths resulting from the disease. Approximately 300,000 patients in the world are diagnosed with AML annually.

AML is more commonly present in elderly patients, with a median age at diagnosis of 67 years. In a review published in the *Journal of Clinical Oncology*, the median overall survival of patients 60 years old or older was 8.7 months. The overall five-year relative survival rate for all AML patients is approximately 26%, and only 5% for patients over 65 years old at diagnosis.

A number of published studies indicate that only some AML patients who receive chemotherapy achieve a complete remission, which is defined as the disappearance of all signs of AML, and that most of those with a complete remission will eventually relapse. Patients who do not enter remission are referred to as refractory, meaning that they are resistant to the chemotherapy treatment.

In August 2014, we completed a Phase 1 trial of GMI-1271 in healthy volunteers. The single-site Phase 1 trial was a randomized, double-blind, placebo-controlled, single ascending intravenous dose trial. In the trial, we evaluated the safety, tolerability and pharmacokinetics of GMI-1271. Twenty-eight healthy adult subjects were enrolled in cohorts to receive study drug at three dose levels. In the trial, we observed that the subjects tolerated GMI-1271 well, and that the pharmacokinetics for GMI-1271 were as predicted based on preclinical data.

Following the completion of the Phase 1 trial, in May 2015 we commenced a multinational, Phase 1/2, open-label trial of GMI-1271 as an adjunct to standard chemotherapy in patients with AML. This trial in males and females with AML is being conducted at a number of academic institutions in the United States, Ireland and Australia.

The trial consists of two parts. In the Phase 1 portion, which we recently completed, escalation testing was performed to determine a recommended GMI-1271 dose in combination with standard chemotherapy. The primary objective of this portion of the trial was to evaluate the safety of GMI-1271 in combination with chemotherapy. Secondary objectives were to characterize pharmacokinetics, or PK, pharmacodynamics, or PD, and to observe anti-leukemic activity. There were a total of 19 patients enrolled and dosed with a single cycle of treatment with GMI-1271 and chemotherapy in the Phase 1 portion of the trial. The patients

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ranged from 26 to 77 years of age, with a median of 51 years. Patients had relapsed or refractory AML and other risk factors indicating poor prognosis.

In the Phase 1 portion of the trial, the combination of GMI-1271 and chemotherapy was well-tolerated, with no dose-limiting toxicities observed and no mortality reported during the treatment phase of 44 days. Serious adverse events, including sepsis, pneumonia, device-related infection, enterocolitis, hypernatremia and adjustment disorder, were observed in five patients, with all such events resolving during the treatment phase. Fourteen of the 19 patients were reported to have no mucositis after chemotherapy was completed, which often develops following treatment with this intensive therapy.

In terms of efficacy, eight of the 19 patients achieved complete remission, with a full bone marrow response, or CR, and full blood count recovery. One additional patient achieved CR but with an incomplete blood count recovery prior to receiving a hematopoietic stem cell transplant, or HSCT, a response referred to as CRi. The total of nine patients achieving remission represents an overall response rate of 47%. Standard chemotherapy regimens for relapsed/refractory AML patients typically have remission rates of between 25-30%. One additional patient achieved a status known as morphologic leukemia-free state. Five patients proceeded to receiving an HSCT.

PK data showed a dose-dependent increase in plasma concentrations of GMI-1271 that were above levels associated with anti-leukemic activity in animal models of AML. In addition, biomarker analysis showed a biological effect of GMI-1271 at all dose levels.

With an optimal dose of 10 mg/kg having been determined, in June 2016 we dosed the first patient in the Phase 2 portion of the trial. In this portion of the trial, dose-expansion testing will be conducted to obtain additional safety and efficacy data in defined sub-populations of AML, including patients over 60 years of age with newly diagnosed AML. We expect to enroll a total of approximately 50 patients in the Phase 2 portion of the trial. Unlike in the Phase 1 portion, some of the patients in the Phase 2 portion may be treated with multiple cycles of GMI-1271.

Multiple Myeloma

MM is a cancer of the blood and bone marrow that affects a type of white blood cell that normally helps a person fight infections by making antibodies that recognize and attack germs. MM causes cancer cells to accumulate in the bone marrow, where they crowd out healthy blood cells. MM is the most frequent tumor that occurs primarily in bone and is the second most common hematologic cancer in the United States and Europe. MM accounts for 10% to 15% of hematologic cancers and 20% of deaths from these cancers. The National Cancer Institute estimates that in the United States in 2016 there will be approximately 30,000 new cases of MM diagnosed and over 12,000 deaths resulting from the disease. In the European Union, in 2012, 39,000 new cases of MM were diagnosed and 24,000 deaths occurred. MM is rare in individuals younger than 40 years old and the median age at diagnosis is approximately 70 years. More than 35% of patients are over 70 years of age, making treatment with chemotherapy more complicated due to fewer treatment options being available, patients being ineligible for transplant, and decreased ability to tolerate sustained chemotherapy due to poor general health.

Despite the fact that recent treatment options for MM have led to improved response rates and increased short-term survival, responses are transient and most patients with MM will ultimately relapse and succumb to their cancer. MM is not considered curable with current approaches. The 5-year overall survival rate for all patients in the United States is less than 50%. Although second and later remissions can be achieved with additional treatment, tumors typically recur more aggressively after each relapse, leading to decreased duration of response and ultimately culminating in the development of treatment-refractory disease. Median survival for treatment-refractory disease typically ranges from five months for event-free survival and to nine months for overall survival and responses to treatment are characteristically short, most likely due to resistant disease. This loss of response complicates therapy of patients in later-line treatment, shortens survival and results in high mortality rates.

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In December 2015, at the annual meeting of the American Society of Hematology, or ASH, we presented preclinical data suggesting that GMI-1271 could reverse resistance of certain chemotherapies seen in MM. We have initiated preparations for a Phase 1 multiple dose-escalation clinical trial in defined populations of patients with MM. In this trial we plan to evaluate GMI-1271 as an adjunct to bortezomib, another therapy approved to treat MM. We have received approval for a Clinical Trial Application from the Health Products Regulatory Authority in Ireland and plan to initiate a trial in patients with MM in the second half of 2016.

Other Indications

In December 2013, researchers at the University of Michigan received a grant from the National Heart Lung and Blood Institute to evaluate GMI-1271 as a potential treatment for venous thromboembolic disease, or VTE, a serious blood clotting disorder. VTE, which can occur after a major operation or severe illness, such as a heart attack, stroke or some cancers, refers to both pulmonary embolism and deep vein thrombosis, or DVT, which is the formation of blood clots in large veins, primarily in the legs. The clots become dangerous when they break loose and can affect blood flow to the heart and lungs. Because GMI-1271, as an E-selectin antagonist, also inhibits the activation of processes leading to thrombosis, we believe that it has therapeutic potential to decrease thrombosis and its inflammatory effects.

The University of Michigan began dosing healthy volunteers in a Phase 1 randomized, partially blinded, active placebo-controlled trial in December 2014. The primary objective of the trial was to evaluate the safety and pharmacokinetic profile of GMI-1271 in a single ascending dose in healthy volunteers. The secondary objectives included evaluation of the incidence of bleeding and other adverse events and evaluation of the effects of GMI-1271 on biomarkers of coagulation, cell adhesion and leukocyte and platelet activation. The single ascending dose-escalation clinical trial in 24 healthy volunteers was completed in October 2015 and the trial has been extended to include a multiple ascending dose-escalation in eight healthy volunteers. We expect that results from this trial will be available in the third quarter of 2016. We also plan to initiate a Phase 2 clinical trial in patients with DVT in the second half of 2016.

Other Drug Candidates

GMI-1359 Targeting E-Selectin and CXCR4

The chemokine CXCR4 has emerged as an important pro-inflammatory cytokine that is involved in cell migration throughout the body. Like E-selectin, tumor cells may also use the CXCR4 cellular pathway, contributing to chemoresistance, metastatic disease and ultimately decreased survival.

We have designed a family of small molecule drug candidates that simultaneously inhibit both E-selectin and CXCR4. We have selected one of these compounds, GMI-1359, to be developed further as part of an IND-enabling nonclinical program. Since E-selectin and CXCR4 are both adhesion molecules that keep cancer cells in the bone marrow, we believe that targeting both E-selectin and CXCR4 with a single compound could improve efficacy in the treatment of cancers that affect the bone marrow such as AML and MM, as compared to targeting CXCR4 alone. GMI-1359 is currently undergoing testing in preclinical models from which we intend to select a target clinical indication, likely in oncology. We received pre-IND guidance from the FDA in October 2015 and we plan to submit an Investigational New Drug application, or IND, for GMI-1359 for the treatment of hematologic malignancies in the third quarter of 2016. We also plan to initiate a Phase 1 single-dose escalation trial in healthy volunteers in the fourth quarter of 2016. In December 2015 at the ASH annual meeting, we presented preclinical data suggesting that GMI-1359 enhanced the ability of chemotherapy to target and improve survival from a high-risk form of mutated AML.

Galectin Inhibitors

Galectin-3 and galectin-9 are proteins that are known to play critical roles in many pathological processes, including checkpoints in T-cell exhaustion during cancer immunotherapy, chemotherapy resistance, fibrosis and cardiovascular disease. Using our glycomimetics platform, we have designed galectin-3 and galectin-9

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inhibitors that specifically block the binding of galectin-3 and galectin-9 to carbohydrate structures. We plan to optimize these compounds and conduct preclinical experiments in 2016 to further characterize the effects of galectin-3 and galectin-9 inhibitors on immune processes and anti-fibrotic activity.

Risks Associated With Our Business

Our business is subject to a number of risks of which you should be aware before making an investment decision. These risks are discussed more fully in the "Risk Factors" section of this prospectus supplement immediately following this prospectus supplement summary and in Part I, Item 1A "Risk Factors" of our Annual Report on Form 10-K filed with the SEC on February 29, 2016, which is incorporated by reference in this prospectus supplement. These risks include the following:

- We have incurred significant losses since our inception. We expect to incur losses over the next several years and may never achieve or maintain profitability.
- We will need substantial additional funding to pursue our business objectives. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our drug development programs or potential commercialization efforts.
- Our research and development is focused on discovering and developing novel glycomimetic drugs, and we are taking an innovative approach to discovering and developing drugs, which may never lead to marketable drugs.
- We are very early in our development efforts and have only two drug candidates that are in clinical trials. All of our other drug candidates are still in preclinical development. If we or our collaborators are unable to commercialize our drug candidates or experience significant delays in doing so, our business will be materially harmed.
- Our success is highly dependent on our existing collaboration with Pfizer, and future collaborations may also be important to us. If we are unable to maintain any of these collaborations, or if these collaborations are not successful, our business could be adversely affected.
- Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.
- We face substantial competition, which may result in others discovering, developing or commercializing drugs before or more successfully than we do.

Company Information

We were incorporated under the laws of the State of Delaware in April 2003 and commenced operations in May 2003. Our principal executive offices are located at 9708 Medical Center Drive, Rockville, Maryland 20850 and our telephone number is (240) 243-1201.

Available Information

Our website address is www.glycomimetics.com. The information contained on, or that can be accessed through, our website is not a part of this prospectus supplement. We have included our website address in this prospectus supplement solely as an inactive textual reference.

"GlycoMimetics," the GlycoMimetics logo and other trademarks or service marks of GlycoMimetics, Inc. appearing in this prospectus supplement are the property of GlycoMimetics, Inc. The other trademarks, trade names and service marks appearing in this prospectus supplement are the property of their respective owners.

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Implications of Being an Emerging Growth Company

As a company with less than $1 billion in revenue during our last fiscal year, we qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We will remain an "emerging growth company" until the earliest of (i) the last day of the fiscal year in which we have total annual gross revenues of $1 billion or more; (ii) December 31, 2019; (iii) the date on which we have issued more than $1 billion in nonconvertible debt during the previous three years; or (iv) the date on which we are deemed to be a large accelerated filer under the rules of the SEC based on the market value of our common stock held by non-affiliates.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

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THE OFFERING

Common Stock offered by GlycoMimetics	shares
Common Stock to be outstanding after this offering	shares (or shares if the underwriters exercise in full their option to purchase additional shares)
Option to purchase additional shares	We have granted the underwriters an option to purchase up to an additional shares of our common stock from us. The underwriters can exercise this option, in whole or in part, at any time within 30 days from the date of this prospectus supplement.
Use of Proceeds	We estimate that the net proceeds to us from this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, will be approximately $ million, or approximately $ million if the underwriters exercise their option to purchase additional shares from us in full. We plan to use the net proceeds from this offering to conduct planned clinical trials of GMI-1271, to fund the research and development of our preclinical pipeline, including drug discovery, and for working capital and other general corporate purposes. See "Use of Proceeds" on page S-12 of this prospectus supplement.
Risk Factors	You should read the "Risk Factors" section of this prospectus supplement beginning on page S-10, page 6 of the accompanying prospectus and Part I, Item 1A "Risk Factors" of our Annual Report on Form 10-K filed with the SEC on February 29, 2016, which is incorporated by reference, for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
NASDAQ Global Market symbol	GLYC

The number of shares of our common stock to be outstanding after this offering is based on 19,280,690 shares of our common stock outstanding as of March 31, 2016 and excludes:

- 578,687 shares of our common stock issuable upon exercise of warrants outstanding as of March 31, 2016, at a weighted average exercise price of $0.40 per share;
- 2,733,339 shares of our common stock issuable upon the exercise of stock options as of March 31, 2016, at a weighted average exercise price of $5.77 per share;
- 19,333 shares of common stock issuable upon the vesting of restricted stock units outstanding as of March 31, 2016;
- 2,417 shares of vested but unsettled restricted stock units outstanding as of March 31, 2016; and
- an aggregate of 673,713 shares of common stock available for future issuance under our equity incentive and employee stock purchase plans as of March 31, 2016.

Unless otherwise indicated, all information in this prospectus supplement assumes no exercise of the outstanding options and warrants described above and no exercise by the underwriters of their option to purchase additional shares of our common stock.

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RISK FACTORS

Investing in our common stock involves a high degree of risk. Before you decide to invest in our common stock, you should carefully consider the risks and uncertainties described below together with all other information contained in this prospectus supplement, the accompanying prospectus and in our filings with the SEC that we have incorporated by reference in this prospectus supplement and the accompanying prospectus. If any of the following risks actually occurs, our business, prospects, operating results and financial condition could suffer materially. In such event, the trading price of our common stock could decline and you might lose all or part of your investment.

Risks Related to this Offering

Raising additional capital, including as a result of this offering, may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our drug candidates.

Until such time, if ever, as we can generate substantial revenue from the sale of our drugs, we expect to finance our cash needs through a combination of equity offerings, debt financings and license and development agreements. We do not currently have any committed external source of funds other than possible milestone payments and possible royalties under our license agreement with Pfizer. To the extent that we raise additional capital through the sale of equity securities, including from this offering, or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may be required to relinquish valuable rights to our research programs or drug candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings or other arrangements with third parties when needed, we may be required to delay, limit, reduce or terminate our drug development or future commercialization efforts or grant rights to third parties to develop and market drug candidates that we would otherwise prefer to develop and market ourselves.

After this offering, our executive officers and directors and their affiliates, if they choose to act together, will continue to have the ability to significantly influence all matters submitted to stockholders for approval.

Upon the completion of this offering, our executive officers and directors and their affiliates will beneficially own, in the aggregate, shares representing approximately % of our common stock, assuming no exercise by the underwriters of their option to purchase additional shares and no exercise of options and warrants outstanding as of March 31, 2016. Further, funds controlled by one investor, New Enterprise Associates, or NEA, will beneficially own approximately % of our common stock. As a result, following this offering, if these stockholders were to choose to act together, they would be able to significantly influence all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would significantly influence the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of ownership control may delay, defer or prevent a change in control of our company, entrench our management and board of directors, or impede a merger, consolidation, takeover or other business combination involving us that other stockholders may desire.

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If you purchase shares of common stock in this offering, you will suffer immediate dilution of your investment.

The price of our common stock in this offering is substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our net tangible book value per share after this offering. To the extent outstanding options are exercised, you will incur further dilution. Based on our net tangible book value as of March 31, 2016, you will experience immediate dilution of $ per share, representing the difference between our as adjusted net tangible book value per share after giving effect to this offering and the public offering price.

We have broad discretion over the use of our cash and cash equivalents, including the net proceeds we receive in this offering, and may not use them effectively.

Our management has broad discretion to use our cash and cash equivalents, including the net proceeds we receive in this offering, to fund our operations and could spend these funds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use to fund operations, we may invest our cash and cash equivalents in a manner that does not produce income or that loses value.

A significant portion of our total outstanding shares are eligible to be sold into the market in the near future, 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, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. Upon completion of this offering, based on our shares outstanding as of March 31, 2016, we will have shares of common stock outstanding, assuming no exercise of the underwriters' option to purchase additional shares of common stock. Of these shares, are subject to a contractual lock-up with the underwriters for this offering for a period of 90 days following this offering. These shares can be sold, subject to any applicable volume limitations under federal securities laws, after the earlier of the expiration of, or release from, the 90-day lock-up period. The balance of our outstanding shares of common stock, including any shares purchased in this offering, may be resold into the public market immediately without restriction, unless owned or purchased by our affiliates. Moreover, after this offering, some of the holders of our common stock will have the right, subject to specified conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders.

As of March 31, 2016, there were approximately 3.4 million shares subject to outstanding options and restricted stock awards or that are otherwise issuable under our equity compensation plans, all of which shares we have registered under the Securities Act of 1933, as amended, on a registration statement on Form S-8. These shares can be freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements described above, to the extent applicable.

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USE OF PROCEEDS

We estimate that the net proceeds to us from our issuance and sale of shares of our common stock in this offering will be approximately $ million, or approximately $ million if the underwriters exercise in full their option to purchase up to additional shares of common stock, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

We intend to use the net proceeds from this offering to conduct planned clinical trials of GMI-1271, to fund the research and development of our preclinical pipeline, including drug discovery, and for working capital and other general corporate purposes.

This expected use of our net proceeds from this offering represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our drug candidate development, the status of and results from clinical trials, as well as any collaborations that we may enter into with third parties for our drug 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 investors will be relying on the judgment of our management regarding the application of the net proceeds from this offering. The timing and amount of our actual expenditures will be based on many factors, including cash flows from operations and the anticipated growth of our business. Pending these uses, we plan to invest these net proceeds in short-term, interest bearing obligations, investment-grade instruments, certificates of deposit or direct or guaranteed obligations of the United States. The goal with respect to the investment of these net proceeds is capital preservation and liquidity so that such funds are readily available to fund our operations.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain earnings, if any, to finance the growth and development of our business. We do not expect to pay any cash dividends on our common stock in the foreseeable future. Payment of future dividends, if any, will be at the discretion of our board of directors and will depend on our financial condition, results of operations, capital requirements, restrictions contained in future financing instruments, provisions of applicable law and other factors the board deems relevant.

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DILUTION

If you invest in our common stock in this offering, your interest will be diluted immediately to the extent of the difference between the public offering price per share you will pay in this offering and the as adjusted net tangible book value per share of our common stock after this offering. Our historical net tangible book value as of March 31, 2016 was $34.8 million, or $1.80 per share of common stock. Historical net tangible book value per share represents the amount of our total tangible assets less total liabilities, divided by the number of shares of our common stock outstanding on March 31, 2016.

After giving effect to our issuance and sale of shares of common stock in this offering at the public offering price of $ per share, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of March 31, 2016 would have been $ million, or $ per share. This represents an immediate increase in as adjusted net tangible book value per share of $ to existing stockholders and immediate dilution of $ in as adjusted net tangible book value per share to new investors purchasing common stock in this offering. Dilution per share to new investors is determined by subtracting as adjusted net tangible book value per share after this offering from the public offering price per share paid by new investors. The following table illustrates this per share dilution to the new investors purchasing shares of common stock in this offering without giving effect to the option to purchase additional shares granted to the underwriters:

Public offering price per share		$
Net tangible book value per share as of March 31, 2016	$ 1.80	
Increase per share attributable to sale of shares of common stock in this offering		
As adjusted net tangible book value per share after this offering		$
Dilution per share to new investors		$

If the underwriters exercise their option to purchase additional shares in full, the as adjusted net tangible book value will increase to $ per share, representing an immediate increase to existing stockholders of $ per share and an immediate dilution of $ per share to new investors.

The above discussion and table are based on 19,280,690 shares of our common stock outstanding as of March 31, 2016 and exclude:

- 578,687 shares of our common stock issuable upon exercise of warrants outstanding as of March 31, 2016, at a weighted average exercise price of $0.40 per share;
- 2,733,339 shares of our common stock issuable upon the exercise of stock options as of March 31, 2016, at a weighted average exercise price of $5.77 per share;
- 19,333 shares of common stock issuable upon the vesting of restricted stock units outstanding as of March 31, 2016;
- 2,417 shares of vested but unsettled restricted stock units outstanding as of March 31, 2016; and
- an aggregate of 673,713 shares of common stock available for future issuance under our equity incentive and employee stock purchase plans as of March 31, 2016.

To the extent that any options or warrants are exercised, new options are issued under our equity incentive plan or we otherwise issue additional shares of common stock in the future at a price less than the public offering price, there may be further dilution to new investors purchasing

common stock in this offering.

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MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS

The following is a general discussion of the material U.S. federal income tax considerations applicable to non-U.S. holders (as defined herein) with respect to their ownership and disposition of shares of our common stock issued pursuant to this offering. All prospective non-U.S. holders of our common stock should consult their own tax advisors with respect to the U.S. federal, state, local and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock. In general, a non-U.S. holder means a beneficial owner of our common stock (other than a partnership or an entity or arrangement treated as a partnership for U.S. federal income tax purposes) that is not, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation, or an entity treated as a corporation for U.S. federal income tax purposes, 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;
- an estate, the income of which is subject to U.S. federal income tax regardless of its source; or
- a trust if (1) a U.S. court can 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.

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 U.S. Treasury Regulations promulgated thereunder, published administrative pronouncements and rulings of the U.S. Internal Revenue Service, which we refer to as the IRS, and judicial decisions, all as in effect as of the date of this prospectus. These authorities are subject to change and to differing interpretation, possibly with retroactive effect. Any change or differing interpretation could alter the tax consequences to non-U.S. holders described in this prospectus.

We assume in this discussion that a non-U.S. holder holds shares of our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, for investment). This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder's individual circumstances, nor does it address any estate or gift tax consequences, or any aspects of U.S. state, local or non-U.S. taxes. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as holders that own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below), corporations that accumulate earnings to avoid U.S. federal income tax, tax-exempt organizations, banks, financial institutions, insurance companies, brokers, dealers or traders in securities, commodities or currencies, tax-qualified retirement plans, holders subject to the alternative minimum tax or the Medicare contribution tax, holders who hold or receive our common stock pursuant to the exercise of employee stock options or otherwise as compensation, holders holding our common stock as part of a hedge, straddle or other risk reduction strategy, conversion transaction or other integrated investment, holders deemed to sell our common stock under the constructive sale provisions of the Code, controlled foreign corporations, passive foreign investment companies and certain former U.S. citizens or long-term residents.

In addition, this discussion does not address the tax treatment of partnerships (or entities or arrangements that are treated as partnerships for U.S. federal income tax purposes) or persons that hold their common stock through such partnerships. If a partnership, including any entity or arrangement treated as a partnership for U.S. federal income tax purposes, holds shares of our common stock, the U.S. federal income tax treatment of a partner in such partnership will generally depend upon the status of the partner and the activities of the partnership. Such partners and partnerships should consult their own tax advisors regarding the tax consequences of the purchase, ownership and disposition of our common stock.

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There can be no assurance that a court or the IRS will not challenge one or more of the tax consequences described herein, and we have not obtained, nor do we intend to obtain, a ruling with respect to the U.S. federal income tax consequences to a non-U.S. holder of the purchase, ownership or disposition of our common stock.

Distributions on Our Common Stock

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 holder's adjusted tax basis in the common stock. Any remaining excess will be treated as capital gain from the sale or exchange of such common stock, subject to the tax treatment described below in "Gain on Sale, Exchange or Other Disposition of Our Common Stock." Any such distribution will also be subject to the discussion below under the heading "Foreign Accounts."

Dividends paid to a non-U.S. holder will generally be subject to withholding of U.S. federal income 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.

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. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to U.S. 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, under certain circumstances, 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.

To claim a reduction or exemption from withholding, a non-U.S. holder of our common stock generally will be required to provide (a) a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) and satisfy applicable certification and other requirements to claim the benefit of an applicable income tax treaty between the United States and such holder's country of residence, or (b) a properly executed IRS Form W-8ECI stating that dividends are not subject to withholding because they are effectively connected with such non-U.S. holder's conduct of a trade or business within the United States. Non-U.S. holders are urged to consult their 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 obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for refund with the IRS.

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

Subject to the discussion below regarding backup withholding and foreign accounts, 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 disposition of shares of our common stock unless:

- the gain is effectively connected with a U.S. trade or business of the non-U.S. holder and, if an applicable income tax treaty so provides, is attributable to a permanent establishment or a fixed base maintained in the United States by such non-U.S. holder, in which case the non-U.S. holder generally will be taxed at the graduated U.S. federal income tax rates applicable to U.S. 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" also may apply;

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- 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 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) on the net gain derived from the disposition, which may be offset by U.S. source capital losses of the non-U.S. holder, if any (even though the individual is not considered a resident of the United States); or

- our common stock constitutes a U.S. real property interest because we are, or have been, at any time during the five-year period preceding such disposition (or the non-U.S. holder's holding period, if shorter) a "U.S. real property holding corporation." 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. Even if we are or become a U.S. real property holding corporation, provided that our common stock is regularly traded, as defined by applicable Treasury Regulations, on an established securities market, our common stock will be treated as a U.S. real property interest only with respect to a non-U.S. holder that holds more than 5% of our outstanding common stock, directly or indirectly, actually or constructively, during the shorter of the 5-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. In such case, such 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 U.S. persons (as defined in the Code). No assurance can be provided that our common stock will continue to 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 dividends on our common stock paid to such holder and the tax withheld, if any, with respect to such dividends. Non-U.S. holders will have to comply with specific certification procedures to establish that the holder is not a U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock. A non-U.S. holder generally will not be subject to U.S. backup withholding with respect to payments of dividends on our common stock if it certifies its non-U.S. status by providing a valid IRS Form W-8BEN or W-8BEN-E (or successor form) or W-8ECI, or otherwise establishes an exemption; provided we do not have actual knowledge or reason to know such non-U.S. holder is a U.S. person, as defined in the Code. Dividends paid to non-U.S. holders subject to the U.S. withholding tax, as described above in "Distributions on Our Common Stock," generally will be exempt from U.S. backup withholding.

Information reporting and backup withholding will generally apply to the proceeds of a disposition of our common stock 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.

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Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder may be allowed as a credit against the non-U.S. holder's U.S. federal income tax liability, if any, and may entitle such holder to a refund, provided that the required information is timely furnished to the IRS.

Foreign Accounts

The Code generally imposes a U.S. federal withholding tax of 30% on dividends and the gross proceeds of a disposition of our common stock paid to a "foreign financial institution" (as specifically defined for this purpose), unless such institution enters into an agreement with the U.S. government to, among other things, withhold on certain payments and to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which includes certain equity and debt holders of such institution, as well as certain account holders that are foreign entities with U.S. owners) or otherwise qualifies for an exemption from these rules. A U.S. federal withholding tax of 30% also applies to dividends and will apply to the gross proceeds of a disposition of our common stock paid to a non-financial foreign entity (as defined in the Code), unless such entity provides the withholding agent with either a certification that it does not have any substantial direct or indirect U.S. owners or provides information regarding substantial direct and indirect U.S. owners of the entity, or otherwise qualifies for an exemption from these rules. The withholding provisions described above currently apply to dividends paid on our common stock and will generally apply with respect to gross proceeds of a sale or other disposition of our common stock on or after January 1, 2017. Under certain circumstances, a non-U.S. holder might be eligible for refunds or credits of such taxes. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph.

EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE PARTICULAR U.S. FEDERAL, STATE AND LOCAL AND NON-U.S. TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAWS.

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UNDERWRITING

Subject to the terms and conditions set forth in the underwriting agreement, dated June , 2016, among us and Jefferies LLC and Cowen and Company, LLC, as the representatives of the underwriters named below and the joint book-running managers of this offering, we have agreed to sell to the underwriters, and each of the underwriters has agreed, severally and not jointly, to purchase from us, the respective number of shares of common stock shown opposite its name below:

Underwriters	Number of Shares
Jefferies LLC	
Cowen and Company, LLC	
Total	

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 if any of them are purchased. If an underwriter defaults, the underwriting agreement provides that the purchase commitments of the nondefaulting underwriters may be increased or the underwriting agreement may be terminated. 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 have advised us that, following the completion of this offering, they currently intend to make a market in the common stock as permitted by applicable laws and regulations. However, the underwriters are not obligated to do so, and the underwriters may discontinue any market-making activities at any time without notice in their sole discretion. Accordingly, no assurance can be given as to the liquidity of the trading market for the common stock, that you will be able to sell any of the common stock held by you at a particular time or that the prices that you receive when you sell will be favorable.

The underwriters are offering the shares of common stock subject to their acceptance of the shares of common stock from us and subject to prior sale. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part. In addition, the underwriters have advised us that they do not intend to confirm sales to any account over which they exercise discretionary authority.

Commission and Expenses

The underwriters have advised us that they propose to offer the shares of common stock 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 $ per share of common stock. After the offering, the public offering price and concession to dealers may be reduced by the representatives. No such reduction will change the amount of proceeds to be received by us as set forth on the cover page of this prospectus supplement.

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

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amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Per Share		Total	
	Without Option to Purchase Additional Shares	With Option to Purchase Additional Shares	Without Option to Purchase Additional Shares	With Option to Purchase Additional Shares
Public offering price	$	$	$	$
Underwriting discounts and commissions paid by us	$	$	$	$
Proceeds to us, before expenses	$	$	$	$

We estimate expenses payable by us in connection with this offering, other than the underwriting discounts and commissions referred to above, will be approximately $. We have also agreed to reimburse the underwriters for certain of their expenses in an amount up to $ in the aggregate.

Listing

Our common stock is listed on The NASDAQ Global Market under the trading symbol "GLYC."

Option to Purchase Additional Shares

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 additional 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. If the underwriters exercise this option, each underwriter will be obligated, subject to specified conditions, to purchase a number of additional shares of common stock proportionate to that underwriter's initial purchase commitment as indicated in the table above.

No Sales of Similar Securities

We, each of our executive officers and directors and an existing stockholder have agreed, subject to specified exceptions, not to directly or indirectly:

- sell, offer to sell, contract to sell or lend any shares or related securities currently or hereafter owned either of record or beneficially (as defined in Rule 13d-3 under the Securities Exchange Act of 1934, as amended, or the Exchange Act), or
- effect any short sale, or establish or increase any "put equivalent position" (as defined in Rule 16a-1(h) under the Exchange Act) or liquidate or decrease any "call equivalent position" (as defined in Rule 16a-1(b) under the Exchange Act) of any shares or related securities, or
- pledge, hypothecate or grant any security interest in any shares or related securities, or
- in any other way transfer or dispose of any shares or related securities, or
- enter into any swap, hedge or similar arrangement or agreement that transfers, in whole or in part, the economic risk of ownership of any shares or related securities, regardless of whether any such transaction is to be settled in securities, in cash or otherwise, or
-

publicly announce the 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 Jefferies LLC and Cowen and Company, LLC.

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This restriction terminates after the close of trading of the common stock on and including the 90th day after the date of this prospectus supplement. Jefferies LLC and Cowen and Company, LLC may, in their 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. There are no existing agreements between the underwriters and any of our stockholders who will execute a lock-up agreement, providing consent to the sale of shares prior to the expiration of the lock-up period.

Stabilization

The underwriters have advised us that they, pursuant to Regulation M under the Exchange Act, 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 underwriters' option to purchase additional shares of our common stock in this offering. The underwriters may close out any covered short position by either exercising their 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 underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the option to purchase additional shares.

"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 underwriters 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 any of the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of our common stock. The underwriters are not obligated to engage in these activities and, if commenced, any of the activities may be discontinued at any time.

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.

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Electronic Distribution

A prospectus supplement and the accompanying 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 or their affiliates. In those cases, prospective investors may view offering terms online and may be allowed to place orders online. The underwriters may agree with us to allocate a specific number of shares of common stock 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 this prospectus supplement and the accompanying prospectus in electronic format, the information on the underwriters' web sites and any information contained in any other web site maintained by any of the underwriters is not part of this prospectus supplement or the accompanying prospectus, has not been approved and/or endorsed by us or the underwriters and 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 various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. The underwriters and certain of their affiliates have, from time to time, performed, and may in the future perform, various commercial and investment banking and financial advisory services for us and our affiliates, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and certain of their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments issued by us and our affiliates. If the underwriters or their respective affiliates have a lending relationship with us, they routinely hedge their credit exposure to us consistent with their customary risk management policies. The underwriters and their respective affiliates may hedge such exposure by entering into transactions which consist of either the purchase of credit default swaps or the creation of short positions in our securities or the securities of our affiliates, including potentially the common stock offered hereby. Any such short positions could adversely affect future trading prices of the common stock offered hereby. The underwriters and certain of their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/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 and/or short positions in such securities and instruments.

Disclaimers About Non-U.S. Jurisdictions

Australia

This prospectus supplement 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 supplement in Australia:

A.

You confirm and warrant that you are either:

§

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

§

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

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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 supplement is void and incapable of acceptance.

B. You warrant and agree that you will not offer any of the shares issued to you pursuant to this prospectus supplement for resale in Australia within 12 months of those shares being issued unless any such resale offer is exempt from the requirement to issue a disclosure document under section 708 of the Corporations Act.

Canada

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

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

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

European Economic Area

In relation to each member state of the European Economic Area which has implemented the Prospectus Directive, each, a Relevant Member State, with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State, which is referred to as the Relevant Implementation Date, no offer of any securities which are the subject of the offering contemplated by this prospectus supplement 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:

a) to any legal entity which is a "qualified investor" as defined in the Prospectus Directive;

b) 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

c) to 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.

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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 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 supplement has not been registered with the Registrar of Companies in Hong Kong. Accordingly, this prospectus supplement 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 supplement 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.

Israel

In the State of Israel this prospectus supplement shall not be regarded as an offer to the public to purchase shares of common stock under the Israeli Securities Law, 5728-1968, which requires a prospectus to be published and authorized by the Israel Securities Authority, if it complies with certain provisions of Section 15 of the Israeli Securities Law, 5728-1968, including, inter alia, if: (i) the offer is made, distributed or directed to not more than 35 investors, subject to certain conditions (the "Addressed Investors"); or (ii) the offer is made, distributed or directed to certain qualified investors defined in the First Addendum of the Israeli Securities Law, 5728-1968, subject to certain conditions (the "Qualified Investors"). The Qualified Investors shall not be taken into account in the count of the Addressed Investors and may be offered to purchase securities in addition to the 35 Addressed Investors. The Company has not and will not take any action that would require it to publish a prospectus in accordance with and subject to the Israeli Securities Law, 5728-1968. The Company and the underwriters have not and will not distribute this prospectus supplement or make, distribute or direct an offer to subscribe for our common stock to any person within the State of Israel, other than to Qualified Investors and up to 35 Addressed Investors.

Qualified Investors may have to submit written evidence that they meet the definitions set out in of the First Addendum to the Israeli Securities Law, 5728-1968. In particular, we may request, as a condition to be offered common stock, that Qualified Investors will each represent, warrant and certify to us and/or to

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anyone acting on our behalf: (i) that it is an investor falling within one of the categories listed in the First Addendum to the Israeli Securities Law, 5728-1968; (ii) which of the categories listed in the First Addendum to the Israeli Securities Law, 5728-1968 regarding Qualified Investors is applicable to it; (iii) that it will abide by all provisions set forth in the Israeli Securities Law, 5728-1968 and the regulations promulgated thereunder in connection with the offer to be issued common stock; (iv) that the shares of common stock that it will be issued are, subject to exemptions available under the Israeli Securities Law, 5728-1968: (a) for its own account; (b) for investment purposes only; and (c) not issued with a view to resale within the State of Israel, other than in accordance with the provisions of the Israeli Securities Law, 5728-1968; and (v) that it is willing to provide further evidence of its Qualified Investor status. Addressed Investors may have to submit written evidence in respect of their identity and may have to sign and submit a declaration containing, inter alia, the Addressed Investor's name, address and passport number or Israeli identification number.

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 underwriters 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 supplement has not been and will not be lodged or registered with the Monetary Authority of Singapore. Accordingly, this prospectus supplement 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)

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

b)

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:

i.

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

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exchange of securities or other assets, and further for corporations, in accordance with the conditions, specified in Section 275 of the SFA;

ii. where no consideration is given for the transfer; or

iii. where the transfer is by operation of law.

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 supplement 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 supplement 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 supplement 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 supplement will not be filed with, and the offer of securities will not be supervised by, the Swiss Financial Market Supervisory Authority 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.

United Kingdom

This prospectus supplement is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors within the meaning of Article 2(1)(e) of 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, which is referred to 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 being referred to as a relevant person.

This prospectus supplement 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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LEGAL MATTERS

The validity of the shares of common stock offered hereby will be passed upon for us by Cooley LLP, Reston, Virginia. Certain legal matters in connection with this offering will be passed upon for the underwriters by Latham & Watkins LLP, San Diego, California.

EXPERTS

The financial statements of GlycoMimetics, Inc. incorporated by reference in GlycoMimetics, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2015 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon incorporated by reference therein, and incorporated herein by reference. Such financial statements have been incorporated herein by reference, in reliance upon such report, given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at http://www.sec.gov. Copies of certain information filed by us with the SEC are also available on our website at http://www.glycomimetics.com. Our website is not a part of this prospectus supplement and is not incorporated by reference in this prospectus supplement. You may also read and copy any document we file with the SEC at the SEC's Public Reference Room, 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room.

This prospectus supplement is part of a registration statement that we filed with the SEC. The registration statement contains more information than this prospectus supplement and the accompanying prospectus regarding us and the securities, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's internet site.

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INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference in this prospectus supplement and the accompanying prospectus much of the information we file with the SEC, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference in this prospectus supplement and the accompanying prospectus is considered to be part of this prospectus supplement and the accompanying prospectus. Because we are incorporating by reference future filings with the SEC, this prospectus supplement and the accompanying prospectus is continually updated and those future filings may modify or supersede some of the information included or incorporated in this prospectus supplement and the accompanying prospectus. This means that you must look at all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus supplement, the accompanying prospectus or any document previously incorporated by reference have been modified or superseded. This prospectus supplement and the accompanying prospectus incorporate by reference the documents listed below (File No. 001-36177) and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (in each case, other than those documents or the portions of those documents not deemed to be filed) until the offering of the securities under the registration statement is terminated or completed:

- Our Annual Report on Form 10-K for the fiscal year ended December 31, 2015, filed on February 29, 2016;
- Our Current Report on Form 8-K filed on March 1, 2016;
- Our Current Report on Form 8-K filed on March 21, 2016;
- Our Current Report on Form 8-K filed on March 29, 2016;
- The information specifically incorporated by reference from our Definitive Proxy Statement on Schedule 14A (other than information furnished rather than filed), filed with the SEC on April 11, 2016;
- Our Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2016, filed on May 4, 2016;
- Our Current Report on Form 8-K filed on May 18, 2016;
- Our Current Report on Form 8-K filed on June 2, 2016; and
- The description of our common stock contained in our Registration Statement on Form 8-A filed on November 5, 2013, 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 or phone number:

9708 Medical Center Drive
Rockville, Maryland 20850
Attn: Investor Relations
(240) 243-1201

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PROSPECTUS

$150,000,000

Common Stock
Preferred Stock
Debt Securities
Warrants

From time to time, we may offer up to $150,000,000 of any combination of the securities described in this prospectus. We may also offer securities as may be issuable upon conversion, redemption, repurchase, exchange or exercise of any securities registered hereunder, including any applicable antidilution provisions.

This prospectus provides a general description of the securities we may offer. Each time we offer securities, we will provide specific terms of the securities offered in a supplement to this prospectus. We may also authorize one or more free writing prospectuses to be provided to you in connection with these offerings. The prospectus supplement and any related free writing prospectus may also add, update or change information contained in this prospectus. You should carefully read this prospectus, the applicable prospectus supplement and any related free writing prospectus, as well as any documents incorporated by reference, before you invest in any of the securities being offered.

This prospectus may not be used to consummate a sale of any securities unless accompanied by a prospectus supplement.

Our common stock is traded on the Nasdaq Global Market under the symbol "GLYC." On March 16, 2015, the last reported sales price of our common stock was $8.21 per share. The applicable prospectus supplement will contain information, where applicable, as to any other listing on the Nasdaq Global Market or any securities market or other exchange of the securities, if any, covered by the prospectus supplement.

We will sell these securities directly to investors, through agents designated from time to time or to or through underwriters or dealers, on a continuous or delayed basis. For additional information on the methods of sale, you should refer to the section entitled "Plan of Distribution" in this prospectus. If any agents or underwriters are involved in the sale of any securities with respect to which this prospectus is being delivered, the names of such agents or underwriters and any applicable fees, commissions, discounts or over-allotment options will be set forth in a prospectus supplement. The price to the public of such securities and the net proceeds we expect to receive from such sale will also be set forth in a prospectus supplement.

Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading "Risk Factors" contained in the applicable prospectus supplement and any related free writing prospectus, 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 DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The date of this prospectus is March 24, 2015.

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ABOUT THIS PROSPECTUS

This prospectus is a part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or SEC, utilizing a "shelf" registration process. Under this shelf registration process, we may sell any combination of the securities described in this prospectus in one or more offerings up to a total dollar amount of $150,000,000. This prospectus provides you with a general description of the securities we may offer.

Each time we sell securities under this prospectus, we will provide a prospectus supplement that will contain specific information about the terms of that offering. We may also authorize one or more free writing prospectuses to be provided to you that may contain material information relating to these offerings. The prospectus supplement and any related free writing prospectus that we may authorize to be provided to you may also add, update or change information contained in this prospectus or in any documents that we have incorporated by reference into this prospectus. You should read this prospectus, any applicable prospectus supplement and any related free writing prospectus, together with the information incorporated herein by reference as described under the heading "Incorporation of Certain Information By Reference," before investing in any of the securities offered.

THIS PROSPECTUS MAY NOT BE USED TO CONSUMMATE A SALE OF SECURITIES UNLESS IT IS ACCOMPANIED BY A PROSPECTUS SUPPLEMENT.

You should rely only on the information that we have provided or incorporated by reference in this prospectus, any applicable prospectus supplement and any related free writing prospectus that we may authorize to be provided to you. We have not authorized any dealer, salesman or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus, any applicable prospectus supplement or any related free writing prospectus that we may authorize to be provided to you. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus, any applicable prospectus supplement or any related free writing prospectus. This prospectus, any applicable supplement to this prospectus or any related free writing 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, any applicable supplement to this prospectus or any related free writing 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, any applicable prospectus supplement or any related free writing prospectus 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, any applicable prospectus supplement or any related free writing prospectus is delivered, or securities are sold, on a later date.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under the heading "Where You Can Find More Information."

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SUMMARY

This summary highlights selected information from this prospectus and does not contain all of the information that you need to consider in making your investment decision. You should carefully read the entire prospectus, the applicable prospectus supplement and any related free writing prospectus, including the risks of investing in our securities discussed under the heading "Risk Factors" contained in the applicable prospectus supplement and any related free writing prospectus, and under similar headings in the other documents that are incorporated by reference into this prospectus. You should also carefully read the information incorporated by reference into this prospectus, including our financial statements, and the exhibits to the registration statement of which this prospectus is a part.

Unless the context indicates otherwise, as used in this prospectus, the terms "GlycoMimetics," "the Company," "we," "us" and "our" refer to GlycoMimetics, Inc., a Delaware corporation. We use GlycoMimetics and the GlycoMimetics logo as trademarks in the United States and other countries. All other trademarks or trade names referred to in this prospectus are the property of their respective owners.

Our Company

We are a clinical stage biotechnology company focused on the discovery and development of novel glycomimetic drugs to address unmet medical needs resulting from diseases in which carbohydrate biology plays a key role. Glycomimetics are molecules that mimic the structure of carbohydrates involved in important biological processes. Using our expertise in carbohydrate chemistry and knowledge of carbohydrate biology, we are developing a pipeline of proprietary glycomimetics that inhibit disease-related functions of carbohydrates, such as the roles they play in inflammation, cancer and infection. We believe this represents an innovative approach to drug discovery to treat a wide range of diseases.

We are focusing our initial efforts on drug candidates for rare diseases that we believe will qualify for orphan drug designation. We are developing our lead drug candidate, rivipansel, formerly known as GMI-1070, for the treatment of vaso-occlusive crisis, or VOC, a debilitating and painful condition that occurs periodically throughout the life of a person with sickle cell disease. We have entered into a collaboration with Pfizer Inc. for the further development and potential commercialization of rivipansel worldwide. Rivipansel has received fast track designation from the U.S. Food and Drug Administration, or FDA, as well as orphan drug designation from the FDA in the United States and from the European Medicines Agency, or EMA, in the European Union, or EU. We believe the clinical progress of rivipansel provides evidence of the significant potential of our lead program and our proprietary glycomimetics platform. Building on our experience with rivipansel, we are developing our second most advanced drug candidate, GMI-1271, to be used in combination with chemotherapy to treat acute myeloid leukemia, or AML, a life-threatening hematologic cancer, and potentially other hematologic cancers.

Our proprietary glycomimetics platform is based on our expertise in carbohydrate chemistry and our understanding of the role carbohydrates play in key biological processes. Most human proteins are modified by the addition of complex carbohydrates to the surface of the proteins. The addition of these carbohydrate structures affects the functions of these proteins and their interactions with other molecules. Our initial research and development efforts have focused on drug candidates targeting selectins, which are proteins that serve as adhesion molecules and bind to carbohydrates that are involved in the inflammatory component and progression of a wide range of diseases, including hematologic disorders, cancer and cardiovascular disease. For example, we believe that members of the selectin family play a key role in the onset and progression of VOC. Inhibiting specific carbohydrates from binding to selectins has long been viewed as a potentially attractive approach for therapeutic intervention. The ability to successfully develop drug-like compounds that inhibit binding with selectins,

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known as selectin antagonists, has been limited by the complexities of carbohydrate chemistry. We believe our expertise in carbohydrate chemistry and our understanding of carbohydrate-protein binding interactions enable us to design selectin antagonists and other glycomimetics that inhibit the disease-related functions of certain carbohydrates. We believe this expertise and knowledge enable us to develop novel drug candidates to address unmet medical needs.

We are developing our lead drug candidate, rivipansel, to treat VOC. Rivipansel is a glycomimetic drug candidate that acts as a pan-selectin antagonist, meaning it binds to all three members of the selectin family, E-, P- and L-selectin. We believe that rivipansel, by acting as a pan-selectin antagonist, inhibits the role that selectins play in VOC.

Sickle cell disease is a genetic disease that, according to the U.S. Centers for Disease Control and Prevention, or CDC, affects millions of people throughout the world, including an estimated 90,000 to 100,000 people in the United States. VOC is one of the most severe complications of sickle cell disease. It can result in acute ischemic tissue injury at one or more sites, with inflammation and pain of varying degrees of severity. The standard of care in the United States for people experiencing VOC is to manage its symptoms, which typically includes hospitalization, narcotic pain management and hydration. There are no approved therapies that interrupt VOC once it has started or that treat the underlying cause of the pain. Hydroxyurea is a generic drug that is approved for the prevention of VOC, but it is not effective in the acute setting to relieve symptoms or resolve an ongoing VOC episode. In addition, hydroxyurea is not suitable for all patients and can have significant toxicities and side effects. According to the CDC, there were approximately 73,000 hospitalizations related to VOC in the United States in 2010. We believe that rivipansel, if approved, would be the first drug to interrupt the underlying cause of VOC, thereby potentially reducing the use of narcotics for pain management and enabling patients to leave the hospital more quickly.

We have completed four clinical trials of rivipansel involving a total of 163 subjects. In April 2013, we completed a Phase 2 clinical trial in which 76 patients hospitalized for VOC, ranging from 12 to 60 years old, were treated with the standard of care plus either rivipansel or placebo. In this trial, patients treated with rivipansel experienced reductions in the time to reach resolution of VOC, length of hospital stay and use of opioid analgesics for pain management, in each case as compared to patients receiving placebo. This improvement was seen in both adult and pediatric patients. Adverse event rates and severity were comparable between those treated with rivipansel and those receiving placebo.

We entered into a license agreement in October 2011 with Pfizer, under which Pfizer has rights to develop and commercialize rivipansel for all indications worldwide. Following the completion of our Phase 2 clinical trial, Pfizer is now responsible for the further clinical development, regulatory approval and potential commercialization of rivipansel. Under the Pfizer agreement, we received an upfront payment of $22.5 million from Pfizer. We are also eligible to receive payments of up to $115.0 million upon the achievement of specified development milestones, including the dosing of the first patients in Phase 3 clinical trials for up to two indications and the first commercial sale of a licensed product in the United States and selected European countries for up to two indications, up to $70.0 million upon the achievement of specified regulatory milestones, including the acceptance of our filings for review by regulatory authorities in the United States and Europe for up to two indications, and up to $135.0 million upon the achievement of specified levels of annual net sales of licensed products. We are also eligible to receive tiered royalties, with percentages ranging from the low double digits to the low teens, based on net sales of rivipansel worldwide, subject to reductions in specified circumstances. The first potential milestone payment under the Pfizer agreement was $35.0 million upon the initiation of dosing of the first patient in a Phase 3 trial of rivipansel by Pfizer. Under the collaboration, Pfizer made a $15.0 million non-refundable payment to us in May 2014, and the dosing of the first patient in the Phase 3 clinical trial will trigger the remaining $20.0 million milestone payment.

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In September 2014, we were informed by Pfizer that initiation of the Phase 3 clinical trial with rivipansel will be significantly delayed due to a manufacturing development issue impacting formulated drug supply. Pfizer advised us that the issue is under review and noted that upon identifying the specific cause and planned remedy of the manufacturing issue, they will inform us regarding a more specific timeframe for commencing the Phase 3 trial. Although Pfizer has taken and is taking a number of steps to prepare for Phase 3 initiation, including written agreement with the FDA under a special protocol assessment, or SPA, on the design of the planned Phase 3 trial, there can be no assurance that the conditions to Pfizer's obligation to make the remaining $20.0 million milestone payment to us under the agreement will be satisfied.

Under a separate research agreement with the University of Basel, we have agreed to pay 10% of any future milestone payments and royalties we may receive from Pfizer with respect to rivipansel. As of December 31, 2014, we accrued $1.5 million that is payable to the University, which is equal to 10% of the $15.0 million non-refundable milestone payment we received from Pfizer in May 2014.

We are developing a pipeline of other drug candidates based on our expertise in carbohydrate chemistry, including compounds that are designed to be specific to particular selectins. We are developing GMI-1271, a specific E-selectin inhibitor, to be used in combination with chemotherapy to treat patients with AML and potentially other hematologic cancers. E-selectin plays a critical role in binding cancer cells within vascular niches in the bone marrow, which prevents the cells from entering circulation where they can be more readily killed by chemotherapy. In animal studies, GMI-1271 mobilized AML cancer cells out of the bone marrow, making them more sensitive to chemotherapy. In these studies, tumor burden was significantly reduced in the animals treated with a combination of chemotherapy and GMI-1271 as compared to animals treated with chemotherapy alone. In addition, the combination of GMI-1271 with chemotherapy resulted in improved survival rates for the treated animals, compared to chemotherapy alone. In other animal studies, GMI-1271 appeared to also protect normal cells from some of the side effects of chemotherapy. Common side effects of chemotherapy include bone marrow toxicity resulting in neutropenia, which is an abnormally low number of neutrophils, the white blood cells that serve as the primary defense against infection, and mucositis, which is the inflammation and sloughing of the mucous membranes lining the digestive tract. Animals treated with GMI-1271 and chemotherapy had less severe neutropenia and mucositis and lower bone marrow toxicity as compared to animals treated with chemotherapy alone. We believe that treatment with GMI-1271 results in lower bone marrow toxicity due to its inhibition of E-selectin, which makes stem cells in the bone marrow divide less frequently, thereby protecting them from chemotherapy agents that target rapidly dividing cells. In December 2014, we presented preclinical data on GMI-1271 at the annual meeting of the American Society of Hematology. Based on our preclinical studies, we believe GMI-1271 may improve chemotherapy response rates, duration of remission and, ultimately, survival in patients with hematologic cancers like AML.

We held a pre-IND meeting with the FDA in November 2013 and filed an IND for GMI-1271 in February 2014. Following acceptance of the IND, we completed a Phase 1 single dose-escalation clinical trial in 28 healthy volunteers in August 2014. We have initiated preparations for a Phase 1/2 multiple dose-escalation clinical trial in defined populations of patients with AML, and we expect the patient recruitment for this trial to begin in the first quarter of 2015.

We have an additional drug candidate, GMI-1359, that simultaneously targets both E-selectin and a chemokine receptor known as CXCR4. GMI-1359 is currently undergoing testing in preclinical models from which we intend to select a target clinical indication, mostly likely in oncology.

In addition to our programs described above, we are also advancing other preclinical-stage programs. These programs include a small-molecule glycomimetic compound, GMI-1051, that inhibits virulence factors and which we believe may be used for the treatment of Pseudomonas aeruginosa; a small-molecule glycomimetic compound that inhibits the protein galectin-3 that we believe may be used

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for the treatment of fibrosis, cancer and cardiovascular disease; and a small-molecule glycomimetic compound that inhibits the proteins galectin-1, -3 and -9 that we believe may be used for the treatment of cancer.

We have retained the worldwide development and commercialization rights to all of our drug candidates other than rivipansel.

Our intellectual property portfolio includes ownership of, or exclusive rights to, issued patents and pending patent applications claiming fundamental features of glycomimetic therapeutics, as well as those claiming methods of use for and chemical modifications of our drug candidates. Given the importance of our intellectual property portfolio to our business operations, we intend to vigorously enforce our rights and defend against challenges that have arisen or may arise in this area. Our issued patents directed to rivipansel and methods of use are expected to expire between 2023 and 2030, and our patent applications directed to GMI-1271, if issued, are expected to expire between 2032 and 2033.

Corporate Information

We were incorporated under the laws of the State of Delaware in April 2003 and commenced operations in May 2003. Our principal executive offices are located at 401 Professional Drive, Suite 250, Gaithersburg, Maryland 20879. Our telephone number is (240) 243-1201. Our website is located at http://www.glycomimetics.com. We do not incorporate by reference into this prospectus the information on, or accessible through, our website, and you should not consider it as part of this prospectus.

The Securities We May Offer

We may offer shares of our common stock and preferred stock, various series of debt securities and warrants to purchase any of such securities, with a total value of up to $150,000,000 from time to time under this prospectus, together with any applicable prospectus supplement and any related free writing prospectus, at prices and on terms to be determined by market conditions at the time of the offering. This prospectus provides you with a general description of the securities we may offer. Each time we offer a type or series of securities under this prospectus, we will provide a prospectus supplement that will describe the specific amounts, prices and other important terms of the securities, including, to the extent applicable:

- designation or classification;
- aggregate principal amount or aggregate offering price;
- maturity, if applicable;
- original issue discount, if any;
- rates and times of payment of interest or dividends, if any;
- redemption, conversion, exchange or sinking fund terms, if any;
- conversion or exchange prices or rates, if any, and, if applicable, any provisions for changes to or adjustments in the conversion or exchange prices or rates and in the securities or other property receivable upon conversion or exchange;
- ranking;

restrictive covenants, if any;

voting or other rights, if any; and

important United States federal income tax considerations.