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[Table of Contents](#)

[Table of Contents](#)

[Table of Contents](#)

Filed Pursuant to Rule 424(b)(5)
Registration No 333-233147

Prospectus supplement
(To prospectus dated August 15, 2019)



Replimune Group, Inc.

3,678,031 shares of common stock

Pre-funded warrants to purchase 2,200,000 shares of common stock

We are offering 3,678,031 shares of our common stock and, in lieu of common stock, pre-funded warrants to purchase 2,200,000 shares of our common stock pursuant to this prospectus supplement and the accompanying prospectus. The purchase price of each pre-funded warrant equals the price per share at which shares of our common stock are being sold to the public in this offering, minus \$0.0001, and the exercise price of each pre-funded warrant equals \$0.0001 per share. This prospectus supplement also relates to the offering of the shares of common stock issuable upon exercise of such pre-funded warrants.

Our common stock is listed on The Nasdaq Global Select Market, or Nasdaq, under the symbol "REPL." On November 13, 2019, the last reported sales price for our common stock on Nasdaq was \$13.61 per share. We do not intend to list the pre-funded warrants on Nasdaq, any other national securities exchange or any other nationally recognized trading system.

We are an "emerging growth company" under the federal securities laws and, as such, are subject to reduced public company reporting requirements. See "Prospectus supplement summary—Implications of being an emerging growth company."

Investing in our common stock involves significant risks. See "Risk factors" beginning on page S-12 of this prospectus supplement as well as the documents incorporated by reference into this prospectus supplement for a discussion of the factors you should consider before deciding to purchase our common stock.

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

	Per share	Per pre-funded warrant	Total
Public offering price	\$ 13.6100	\$ 13.6099	\$ 79,999,782
Underwriting discount ⁽¹⁾	\$ 0.8166	\$ 0.8166	\$ 4,800,000
Proceeds to Replimune Group, Inc. (before expenses)	\$ 12.7934	\$ 12.7933	\$ 75,199,782

(1) See "Underwriting" beginning on page S-26 of this prospectus supplement for additional information regarding total underwriting compensation.

Delivery of the shares of common stock and pre-funded warrants is expected to be made on or about November 18, 2019. We have granted the underwriters an option for a period of 30 days to purchase up to 881,704 additional shares of our common stock at the public offering price less the underwriting discount.

Joint Book-Running Managers

J.P. Morgan

SVB Leerink

BMO Capital Markets

Co-Lead Manager

Wedbush PacGrow

Co-Manager

Roth Capital Partners

The date of this prospectus supplement is November 14, 2019.

Table of contents

Prospectus supplement

About this prospectus supplement	S-1
Cautionary statements regarding forward-looking statements	S-3
Prospectus supplement summary	S-5
The offering	S-10
Risk factors	S-12
Use of proceeds	S-15
Dividend policy	S-16
Capitalization	S-17
Dilution	S-18
Description of pre-funded warrants	S-20
Material United States federal income tax considerations for non-U.S. holders	S-22
Underwriting	S-26
Selling restrictions	S-30
Legal matters	S-34
Experts	S-34
Where you can find more information	S-34
Incorporation by reference	S-35

Prospectus

About this prospectus	ii
Prospectus summary	1
Risk factors	4
Cautionary statement regarding forward-looking statements	4
Use of proceeds	6
Securities we may offer	6
Description of capital stock	7
Description of debt securities	12
Description of warrants	21
Description of units	23
Plan of distribution	24
Legal matters	27
Experts	27
Where you can find more information	27
Incorporation of certain information by reference	28

About this prospectus supplement

This prospectus supplement and the accompanying prospectus relate to an offering of our common stock and pre-funded warrants. Before buying any of the common stock or pre-funded warrants that we are offering, we urge you to carefully read this prospectus supplement and the accompanying prospectus, together with the information incorporated by reference as described under the headings "Where you can find more information" and "Incorporation by reference" in this prospectus supplement. These documents contain important information that you should consider when making your investment decision.

This document is in two parts. The first part is this prospectus supplement, which describes the terms of the offering of the securities offered hereby and also adds to and updates the information contained in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement and the accompanying prospectus. The second part is the accompanying prospectus, which provides more general information, some of which may not apply to this offering and some of which may have been supplemented or superseded by information in this prospectus supplement or documents incorporated or deemed to be incorporated by reference into this prospectus supplement that we filed with the Securities and Exchange Commission, or SEC, subsequent to the date of the prospectus. When we refer only to the "prospectus", we are referring to both parts combined. To the extent that there is any conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or any document incorporated by reference herein or therein, on the other hand, you should rely on the information in this prospectus supplement.

This prospectus supplement and the accompanying prospectus are part of a registration statement that we filed with the SEC, utilizing a "shelf" registration process. Such registration statement also includes exhibits that provide more detail on the matters discussed in this prospectus supplement and the accompanying prospectus. You should read this prospectus supplement, the accompanying prospectus, including the information incorporated by reference, the exhibits filed with the SEC, and any free writing prospectus that we have authorized for use in connection with this offering, in their entirety before making an investment decision.

We are responsible for the information contained in or incorporated by reference in this prospectus supplement and the accompanying prospectus and in any free writing prospectus we prepare or authorize. We have not, and the underwriters have not, authorized anyone to provide you with information different from that which is contained in or incorporated by reference in this prospectus supplement, the accompanying prospectus and in any free writing prospectus that we have authorized for use in connection with this offering and we take no responsibility for any other information others may give you. We are not, and the underwriters are not, making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information contained in this prospectus supplement is accurate as of the date on the front cover of this prospectus supplement only and that any information we have incorporated by reference or included in the accompanying prospectus is accurate only as of the date given in the document incorporated by reference or as of the date of the prospectus, as applicable, regardless of the time of delivery of this prospectus supplement, the accompanying prospectus, any related free writing prospectus, or any sale of our common stock or pre-funded warrants. Our business, financial condition, results of operations and prospects may have changed since that date.

For investors outside the United States: Neither we nor any of the underwriters have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons who come into possession of this prospectus in jurisdictions outside of the United States are required to inform themselves about and to observe any restrictions relating to this offering and the distribution of this prospectus outside of the United States.

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 into this prospectus supplement or the accompanying prospectus 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.

This prospectus supplement, the accompanying prospectus, any related free writing prospectus and the information incorporated herein and therein by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference into this prospectus are the property of their respective owners.

Unless the context otherwise requires, references in this prospectus to (i) "Replimune," the "Company," "we," "us" and "our" refer to Replimune Group, Inc. and its consolidated subsidiaries and (ii) a year are references to the applicable calendar year and not our fiscal year.

Cautionary statement regarding forward-looking statements

This prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein include "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities and Exchange Act of 1934, as amended, or the Exchange Act. Any statements, other than statements of historical facts, contained in this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein may be deemed to be forward-looking statements. In some cases, you can identify these forward-looking statements by the use of words such as "outlook," "believes," "expects," "potential," "continues," "may," "will," "should," "seeks," "approximately," "predicts," "intends," "plans," "estimates," "anticipates" or the negative version of these words or other comparable words. Such forward-looking statements are subject to various risks and uncertainties. Accordingly, there are or will be important factors that could cause actual outcomes or results to differ materially from those indicated in these statements. We believe these factors include, among other things:

- the timing, progress, and results of preclinical studies and clinical trials for RP1 or any of our other product candidates, including the timing of initiation and completion of studies or trials and related preparatory work and the period during which the results of the trials will become available;
- our ability to obtain additional funding as necessary;
- the timing, scope or likelihood of regulatory filings and approvals, including timing of our Biologics License Application and filing for, and final approval by the Food and Drug Administration, or the FDA, of, RP1 or any of our other product candidates;
- the timing, scope, or likelihood of foreign regulatory filings and approvals;
- our ability to develop our product candidates for use in combination with other checkpoint blockade therapies, including anti-PD-1;
- our ability to develop and advance any future product candidates into, and successfully complete, clinical trials;
- our expectations regarding the size of the patient populations for RP1 or our other product candidates if approved for commercial use;
- the costs and timing of operating our in-house manufacturing facility;
- our estimates regarding expenses and capital requirements;
- the implementation of our business model and our strategic plans for our business, RP1 and our other product candidates;
- the rate and degree of market acceptance and clinical utility of RP1 or our other product candidates;
- the potential benefits of and our ability to establish or maintain future collaborations or strategic relationships;
- our ability to retain the continued service of our key professionals and to identify, hire and retain additional qualified professionals;

- our intellectual property position, including the scope of protection we are able to establish and maintain for intellectual property rights covering RP1 and our other product candidates, claims others may make regarding rights in our intellectual property, and any potential infringement, misappropriation or other violation of any third-party intellectual property rights;
- our competitive position, and developments and projections relating to our competitors and our industry;
- negative developments in the field of immuno-oncology;
- the impact of laws and regulations;
- our ability to remediate the material weaknesses in internal control over financial reporting and to maintain effective internal control over financial reporting;
- our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups (JOBS) Act of 2012; and
- the other risks and uncertainties described under "Risk factors" of our Quarterly Report on Form 10-Q for the quarter ended September 30, 2019 and our subsequent filings which are incorporated by reference into this prospectus supplement.

The forward-looking statements made in this prospectus supplement, the accompanying prospectus and the documents that we incorporate by reference herein and therein relate only to events as of the date on which the statements are made. These factors should not be construed as exhaustive and should be read in conjunction with the other cautionary statements that are included in this prospectus supplement, the accompanying prospectus and the documents that we incorporate by reference herein and therein. Moreover, we operate in a competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this prospectus supplement, the accompanying prospectus and the documents that we incorporate by reference herein and therein. We undertake no obligation to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise, except to the extent required by applicable law. You should not rely on forward-looking statements as predictions of future events. 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.

Prospectus supplement summary

The following summary highlights selected information contained or incorporated by reference elsewhere in this prospectus supplement and the accompanying prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our securities, you should carefully read this entire prospectus supplement, including the information under the caption "Risk factors" beginning on page S-12 of this prospectus supplement and under similar headings in the other documents that are incorporated by reference into this prospectus supplement. You should also carefully read the other information incorporated by reference into this prospectus supplement, including our financial statements and the related notes, and the exhibits to the registration statement of which this prospectus supplement and the accompanying prospectus are a part.

Our company

Overview

We are a clinical-stage biotechnology company committed to applying our leading expertise in the field of oncolytic immunotherapy to transform the lives of cancer patients. We use our proprietary Immulytic platform to design and develop product candidates that are intended to maximally activate the immune system against cancer.

Oncolytic immunotherapy, which we intend to establish as the fourth cornerstone of cancer treatment, is an emerging class of cancer treatment that exploits the ability of certain viruses to selectively replicate in and directly kill tumors, as well as induce a potent, patient-specific, anti-tumor immune response. Such oncolytic, or "cancer killing," viruses have the potential to generate an immune response targeted to an individual patient's particular set of tumor antigens, including neo-antigens that are uniquely present in tumors. Our product candidates incorporate multiple mechanisms of action into a practical "off-the-shelf" approach that is intended to maximize the immune response against a patient's cancer and to offer significant advantages over personalized vaccine approaches. We believe that the bundling of multiple approaches for the treatment of cancer into single therapies will simplify the development path of our product candidates, while also improving patient outcomes at a lower cost to the healthcare system than the use of multiple different drugs.

The foundation of our Immulytic platform consists of a proprietary, engineered strain of herpes simplex virus 1, or HSV-1, that has been "armed" with a fusogenic protein intended to substantially increase anti-tumor activity. Our platform enables us to incorporate various genes whose expression is intended to augment the inherent properties of HSV-1 to both directly destroy tumor cells and induce an anti-tumor immune response. We believe our lead product candidate, RP1, will be effective at killing tumors and inducing immunogenic, or immune-stimulating, tumor cell death and that it will be highly synergistic with immune checkpoint blockade therapies.

We are conducting a Phase 1/2 clinical trial with RP1 in approximately 150 patients. We have completed enrollment of the Phase 1 dose escalation part of this clinical trial in which we assessed the safety and tolerability of RP1 administered alone in 22 patients with mixed advanced solid tumor types. Following the review of the data by the Safety Review Committee, or SRC, we have determined the dose regimen to be administered in the Phase 2 part of this clinical trial. We have also completed enrollment of the Phase 1 expansion cohort of 14 patients in which we assessed the safety and tolerability of RP1 administered in combination with an anti-PD-1 therapy at the determined Phase 2 dose level. On November 8, 2019, we presented the safety and initial efficacy data from the Phase 1 portion of this clinical trial at The Society

for Immunotherapy of Cancer, or SITC, including what we believe to be encouraging efficacy data in RP1's lead indications of cutaneous squamous cell carcinoma, or CSCC, and melanoma.

The Phase 2 part of this clinical trial is designed to assess the safety and efficacy of RP1 in combination with an anti-PD-1 therapy in four cohorts of approximately 30 patients with melanoma, non-melanoma skin cancers, bladder cancer and MSI-H/dMMR tumors. Following SRC review of the Phase 1 data to date, including data from the expansion cohort receiving RP1 in combination with anti-PD-1 therapy, we have opened enrollment in the United States and the United Kingdom in all four cohorts. In the Phase 2 part of the clinical trial, we are also evaluating efficacy as well as safety under the clinical trial protocol, primarily on the basis of the proportion of patients who have a response within each tumor type cohort. Responses are either defined as a partial response (a 30% or greater reduction in tumor size) or a complete response (a complete eradication of the disease). By the second half of 2020, we expect to have analyzed the data from all four cohorts and to determine whether to pursue further development in indications beyond the recently announced expanded programs in CSCC and melanoma.

This Phase 1/2 clinical trial is being conducted as a collaboration with Bristol-Myers Squibb Company, or BMS, under which it has granted us a non-exclusive, royalty-free license to, and is supplying at no cost, its anti-PD-1 therapy, nivolumab, for use in combination with RP1 in this clinical trial.

We have also entered into a collaboration agreement with Regeneron Pharmaceuticals, Inc., or Regeneron, under which we intend to conduct clinical development of our product candidates in combination with cemiplimab, an anti-PD-1 therapy developed by Regeneron. For each clinical trial conducted under this collaboration, Regeneron will fund one-half of the clinical trial costs, supply cemiplimab at no cost, and grant us a non-exclusive, royalty-free license to cemiplimab for use in the applicable clinical trial. The first clinical trial under this collaboration is a randomized, controlled Phase 2 clinical trial of RP1 in combination with cemiplimab, versus cemiplimab alone, in approximately 240 patients with CSCC. This clinical trial is currently underway in the United States and Australia. We recently disclosed what we believe to be encouraging initial data in this indication from the Phase 1/2 clinical trial being conducted in combination with nivolumab. If compelling clinical data are generated demonstrating the benefits of the combined treatment in this clinical trial, we believe the data from this Phase 2 clinical trial could support a filing with regulatory authorities for marketing approval. Recruitment into this controlled Phase 2 clinical trial is expected to take approximately eighteen to twenty four months and we expect to be in a position to report the primary endpoint readout in the first half of 2022.

After assessing the initial data from the Phase 1/2 clinical trial which we presented at SITC, we recently announced our intention to initiate two additional skin cancer clinical trials. Following evidence of activity as a monotherapy, in the first quarter of 2020 we intend to initiate a new potentially registrationable (in its own right or, subject to discussion with regulatory authorities, following enrollment of additional patients) Phase 1b clinical trial of single agent RP1 in solid organ transplant recipients with CSCC. We intend to enroll approximately 30 patients in this clinical trial to assess the safety and efficacy of RP1 in liver and kidney transplant recipients with recurrent CSCC. The protocol for this clinical trial has been accepted by the FDA and added to our Investigational New Drug application, or IND. Further, we plan to conduct a potentially registrationable (in its own right or, subject to discussion with regulatory authorities, following enrollment of additional patients) Phase 2 clinical trial in up to 150 patients with melanoma who have previously failed immune checkpoint blockade therapies. Subject to continued discussions with our collaboration partners and the FDA, these patients will either be enrolled into a new clinical trial, or as an expansion of our current clinical trial in combination with nivolumab. We expect to release data from this clinical trial in the second half of 2021. The Phase 1 part of our Phase 1/2 clinical trial with RP1 was conducted in a late stage patient group who had exhausted standard of care. We believe that the

melanoma data in this patient group when recombining RP1 with anti-PD-1 therapy was encouraging and has resulted in the decision to pursue this further study.

We are also developing additional product candidates, RP2 and RP3, built on our Immulytic platform, that are further engineered to enhance anti-tumor immune responses and intended to address additional tumor types. RP2 has been engineered to express an antibody-like molecule that blocks the activity of CTLA-4, a protein that inhibits the immune response to tumors. RP3 is engineered with the intent of not only blocking the activity of CTLA-4, but also to further stimulate an anti-tumor response through activation of the immune co-stimulatory pathways through expression of the ligands for CD40 and 4-1BB.

We initiated the Phase 1 clinical trial with RP2 in October 2019. The Phase 1 clinical trial of RP2 is also being conducted as a collaboration with BMS, under which BMS has granted us a non-exclusive, royalty-free license to, and will supply at no cost, nivolumab, for use in combination with RP2. We expect to release data from this Phase 1 clinical trial in the second half of 2020 and to potentially initiate a Phase 2 clinical trial of RP2 in 2021. We intend to file an IND and/or foreign equivalents for RP3 and, assuming regulatory clearance, enter clinical development during 2020. IND enabling studies are currently underway.

Recent Developments

As announced at SITC, the Phase 1 part of our Phase 1/2 clinical trial of RP1 enrolled 36 patients with advanced heavily pre-treated cancers who were refractory to available therapy. Treatment with RP1 alone was given up to five times at various dose levels injected into a single tumor to determine the recommended Phase 2 dose (N=22), following which RP1 was given up to eight times at the recommended dose in combination with nivolumab starting with the second dose of RP1 (N=14). Based on the data, which we believe showed a favorable safety profile for both RP1 alone and in combination with nivolumab, the RP1 dosing regimen moved forward into Phase 2 development with an initial dose of up to 10mL of 1×10^6 pfu/ml followed by subsequent doses of up to 10mL of 1×10^7 pfu/ml.

In the dose rising monotherapy part of the Phase 1/2 clinical trial, RP1 was associated with tumor destruction, including delayed systemic post-study tumor reduction of uninjected tumors without further therapy. In the combination portion of the Phase 1 part of the clinical trial, anti-tumor activity was observed in multiple patients with a variety of tumor types, particularly in CSCC and melanoma, but also in microsatellite instability high (MSI-H) colorectal cancer and esophageal cancer patients. Additionally, the first three of four patients with anti-CTLA-4 and anti-PD-1 refractory cutaneous melanoma treated with RP1 combined with nivolumab, two from the Phase 1 part of the clinical trial and one from the Phase 2 part of the clinical trial, are responding to therapy, and clinical activity has been seen in four of the first five patients treated with CSCC. Of what we believe to be of particular note, substantial tumor reduction was observed in a number of patients after just the first dose of RP1, but before the introduction of nivolumab two weeks later, and multiple examples of responses of uninjected tumors were seen.

We also recently announced that biomarker data further confirmed the mechanism of action of RP1 alone and in combination with nivolumab, suggesting that RP1 provides broad anti-tumor immune activation. These biomarkers included assessment of the levels of CD8+ T cells and PD-L1, increases of which were observed in serial tumor biopsies across tumor types. The kinetics of virus detection also suggested that robust virus replication in tumors occurs.

Further, we have obtained an occupancy certificate with respect to our manufacturing facility in Framingham, Massachusetts and expect that the facility will be operational in the first half of 2020.

Corporate information

The parent company of our group is Replimune Group, Inc., a Delaware corporation that was formed in July 2017. Prior to the corporate reorganization described below, the parent company of our group was Replimune Limited, a private company limited by shares incorporated in England and Wales (registered number 09496393), which was organized in March 2015.

In July 2017, all of the outstanding equity securities of Replimune Limited were exchanged for equity securities of Replimune Group, Inc., at the time, a newly formed Delaware corporation. After giving effect to the reorganization, Replimune Limited became a wholly owned subsidiary of Replimune Group, Inc.

Our principal executive office is located at 500 Unicorn Park, Woburn, MA 01801 and our telephone number is (781) 222-9600. Our website address is <https://www.replimune.com>. We do not incorporate the information on or accessible through our website into this prospectus supplement or the accompanying prospectus and you should not consider any information on, or that can be accessed through, our website as part of this prospectus supplement or the accompanying prospectus. Our fiscal year end is March 31.

We own various United Kingdom registered trademarks and United States federal trademark applications and unregistered trademarks, including our company name and the "Immulytic" platform name. All other trademarks, service marks and trade names used in this prospectus supplement and the accompanying prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the symbols ® and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Implications of being an emerging growth company

We are an "emerging growth company" as that term is used in the JOBS Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements. These reduced reporting requirements include reduced disclosure about our executive compensation arrangements and no non-binding advisory votes on executive compensation. We will remain an emerging growth company until the earlier of (1) March 31, 2024, and (2) the last day of the fiscal year (a) in which we have total annual gross revenue of at least \$1.07 billion, or (b) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior September 30th, and (3) the date on which we have issued more than \$1.0 billion in non-convertible debt during the prior three year period. References in this prospectus supplement and the accompanying prospectus to "emerging growth company" shall have the meaning ascribed to it in the JOBS Act.

An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- an exemption from the requirements to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirement to hold a nonbinding advisory vote on executive compensation and to obtain stockholder approval of any golden parachute payments not previously approved.

We may take advantage of these reduced reporting requirements until such time as we cease to be an emerging growth company.

We have elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus supplement and the accompanying prospectus form a part and may elect to take advantage of other reduced reporting requirements in future filings. As a result, the information that we provide to our stockholders may be different from the information that you might receive from other public reporting companies in which you hold equity interests.

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. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

The offering

Common stock we are offering: 3,678,031 shares

Pre-funded warrants offered by us: We are also offering, in lieu of common stock, pre-funded warrants to purchase 2,200,000 shares of our common stock. The purchase price of each pre-funded warrant will equal the price per share at which the shares of our common stock are being sold to the public in this offering, minus \$0.0001, and the exercise price of each pre-funded warrant is \$0.0001 per share. Each pre-funded warrant will be exercisable at any time after the date of issuance, subject to an ownership limitation. See "Description of pre-funded warrants." This prospectus supplement also relates to the offering of the shares of our common stock issuable upon exercise of the pre-funded warrants.

Underwriters' option to purchase additional shares: We have granted the underwriters an option for a period of 30 days, to purchase up to 881,704 additional shares of our common stock. The number of shares subject to the underwriters' option equals 15% of the total number of shares of common stock we are offering plus the shares of our common stock underlying the pre-funded warrants.

Common stock to be outstanding after giving effect to this offering: 35,397,377 shares (or 36,279,081 shares if the underwriters exercise their option to purchase additional shares in full).

Use of proceeds: The net proceeds from the sale of 3,678,031 shares of common stock at the public offering price of \$13.61 per share and pre-funded warrants to purchase 2,200,000 shares of common stock at the public offering price of \$13.6099 per pre-funded warrant (which equals the public offering price per share of our common stock less the \$0.0001 per share exercise price of each such pre-funded warrant) (and excluding shares of our common stock issued and any proceeds received upon exercise of the pre-funded warrants or any resulting accounting associated with the pre-funded warrants) will be approximately \$74.6 million, or approximately \$85.9 million if the underwriters exercise their option to purchase additional shares of common stock, in each case, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. We will receive nominal proceeds, if any, upon exercise of the pre-funded warrants.

We currently expect to use the net proceeds from this offering, together with our existing cash and cash equivalents and short-term investments, as follows:

- to fund the development of RP1 through the completion of the ongoing Phase 1/2 clinical trial in four solid tumor types;
- to fund our share of the costs of the Phase 2 clinical trial with RP1 in CSCC;
- to fund a clinical trial of RP1 in cutaneous melanoma in patients refractory to anti-PD-1 therapy;
- to fund a clinical trial in transplant patients that have developed CSCC;
- to fund initial clinical development with RP2 and RP3; and
- the remainder for general corporate purposes, including working capital requirements and operating expenses.

See "Use of proceeds" on page S-15.

Risk factors:

Investing in our common stock or pre-funded warrants involves significant risks. See "Risk factors" beginning on page S-12 of this prospectus supplement, as well as those risk factors that are incorporated by reference in this prospectus supplement and the accompanying prospectus, for a discussion of certain factors you should carefully consider before deciding to invest in shares of our common stock or pre-funded warrants.

Nasdaq Global Select Market symbol: "REPL"

The number of shares of our common stock to be outstanding after this offering, as set forth above, is based on 31,719,346 shares of our common stock outstanding as of September 30, 2019, which amount excludes:

- 4,739,336 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2019 at a weighted average exercise price of \$9.16 per share;
- 497,344 shares of our common stock issuable upon the exercise of warrants outstanding as of September 30, 2019, at an exercise price of \$1.01 per share;
- 2,492,426 shares of our common stock reserved for future issuance under our 2018 Omnibus Incentive Compensation Plan;
- 665,204 shares of our common stock reserved for future issuance under our Employee Stock Purchase Plan;
- 287,559 shares of our common stock sold pursuant to our ATM Program (as defined in "Underwriting") during the period from October 1 to November 8, 2019; and
- 2,200,000 shares of our common stock issuable upon the exercise of the pre-funded warrants offered hereby.

Unless otherwise indicated, all information in this prospectus supplement assumes no exercise by the underwriters of their option to purchase additional shares of our common stock, no exercise of the pre-funded warrants and no other exercises of outstanding options or warrants.

Risk factors

An investment in our common stock or pre-funded warrants involves a high degree of risk. Before deciding whether to invest in our common stock or pre-funded warrants, you should carefully consider the risks described below and discussed under the sections captioned "Risk Factors" contained in our most recent Quarterly Report on Form 10-Q, as well as in any of our subsequent Quarterly Reports on Form 10-Q, which are incorporated by reference herein in their entirety, together with other information in this prospectus supplement or the accompanying prospectus, the information and documents incorporated by reference in this prospectus supplement or the accompanying prospectus, and in any free writing prospectus that we have authorized for use in connection with this offering. If any of these risks actually occurs, our business, financial condition, results of operations or cash flow could be seriously harmed. This could cause the trading price of our common stock and the value of our pre-funded warrants to decline, resulting in a loss of all or part of your investment.

Risks related to this offering

Management will have broad discretion as to the use of the net proceeds from this offering, and may not use the proceeds effectively.

Our management will have broad discretion as to the application of the net proceeds from this offering and could use them in a manner that does not effectively maximize the potential of our clinical development programs and pipeline. Our management's use of the net proceeds from this offering may not increase the market value of our common stock. In fact, our failure to apply these funds effectively could have a material adverse effect on our business, delay the development of our product candidates, and cause the market value of our common stock to decline.

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

You will suffer immediate and substantial dilution in the as adjusted net tangible book value of the common stock you purchase in this offering. The public offering price per share of our common stock offered pursuant to this prospectus supplement is substantially higher than the net tangible book value per share. Accordingly, at the public offering price of \$13.61 per share, purchasers of common stock in this offering will experience immediate dilution of \$8.10 per share in as adjusted net tangible book value of the common stock. In addition, as of September 30, 2019, there were 4,739,336 shares subject to outstanding options at a weighted average exercise price per share of \$9.16 and 497,344 shares subject to outstanding warrants at a weighted average exercise price of \$1.01 per share. To the extent that additional shares of common stock are issued upon exercise of these outstanding warrants or options or the underwriters exercise their option to purchase additional shares of our common stock in connection with this offering, you will incur further dilution. Furthermore, if the pre-funded warrants offered hereby are exercised, you would experience further dilution. See "Dilution" for a more detailed discussion of the dilution you will incur if you purchase shares of common stock in this offering.

You may experience future dilution as a result of future equity offerings.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may not be the same as the prices per share in this offering. We may sell shares or other securities in any other offering, including under our ATM Program (as defined in "Underwriting"), at a price per share that is less than the prices per share paid by investors in this offering, and investors purchasing shares of our common stock or

other securities in the future could have rights superior to existing shareholders. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the prices per share paid by investors in this offering.

The price of our common stock may be volatile and fluctuate substantially, which could result in substantial losses for purchasers of our common stock in this offering.

Our stock price has been and is likely to be volatile. The stock market in general and the market for biopharmaceutical companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, you may not be able to sell your common stock at or above the price at which it was acquired. The market price for our common stock may be influenced by many factors, including:

- the success of competitive products or technologies;
- results of clinical trials of RP1 and our other product candidates or those of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to the development of RP1 and our other product candidates or clinical development programs;
- the results of our efforts to discover, develop, acquire or in-license additional product candidates or drugs;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors; and
- general economic, industry and market conditions.

The offering could negatively impact our ability to use our net operating losses and other tax attributes.

The ability to fully utilize our net operating loss, excess business interest carryforwards, and tax credit carryforwards will be limited under Section 382 of the Internal Revenue Code, if we were to undergo a change in ownership of more than 50% of our capital stock over a three-year period as measured under Section 382. The application of these rules is complex and generally focus on ownership changes involving shareholders owning directly or indirectly 5% or more of our common stock, subject to complex aggregation, segregation, and constructive ownership rules. The Section 382 limitations could come into play in the event of the sale of the company, significant new stock issuances or other transactions, including secondary market sales of our common stock.

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

There is no public trading market for the pre-funded warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the pre-funded warrants on any securities exchange or nationally recognized trading system, including the Nasdaq Global Select Market. Without an active market, the liquidity of the pre-funded warrants will be limited.

We may not receive any additional funds upon the exercise of the pre-funded warrants.

Each pre-funded warrant may be exercised by way of a cashless exercise, meaning that the holder may not pay a cash purchase price upon exercise, but instead would receive upon such exercise the net number of shares of our common stock determined according to the formula set forth in the pre-funded warrant. Accordingly, we may not receive any additional funds upon the exercise of the pre-funded warrants.

Holders of pre-funded warrants purchased in this offering will have no rights as holders of our common stock until such holders exercise their pre-funded warrants and acquire our common stock.

Until holders of pre-funded warrants acquire shares of our common stock upon exercise of the pre-funded warrants, holders of pre-funded warrants will have no rights with respect to the shares of our common stock underlying such pre-funded warrants including with respect to dividends and voting rights. Upon exercise of the pre-funded warrants, the holders will be entitled to exercise the rights of a holder of our common stock only as to matters for which the record date occurs after the exercise date.

Significant holders or beneficial holders of our common stock may not be permitted to exercise pre-funded warrants that they hold.

A holder of a pre-funded warrant will not be entitled to exercise any portion of any pre-funded warrant which, upon giving effect to such exercise, would cause (i) the aggregate number of shares of our common stock beneficially owned by the holder (together with its affiliates) to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, or (ii) the combined voting power of our securities beneficially owned by the holder (together with its affiliates) to exceed 9.99% of the combined voting power of all of our securities then outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrants. As a result, you may not be able to exercise your pre-funded warrants for shares of our common stock at a time when it would be financially beneficial for you to do so. In such circumstance you could seek to sell your pre-funded warrants to realize value, but you may be unable to do so in the absence of an established trading market for the pre-funded warrants.

Use of proceeds

We estimate that the net proceeds from the sale of 3,678,031 shares of common stock at the public offering price of \$13.61 per share and pre-funded warrants to purchase 2,200,000 shares of common stock at the public offering price of \$13.6099 per pre-funded warrant (which equals the public offering price per share of our common stock less the \$0.0001 per share exercise price of each such pre-funded warrant) (and excluding shares of our common stock issued and any proceeds received upon exercise of the pre-funded warrants or any resulting accounting associated with the pre-funded warrants) will be approximately \$74.6 million, or approximately \$85.9 million if the underwriters exercise their option to purchase additional shares of common stock in full, in each case, after deducting underwriting discounts and commissions and estimated offering expenses payable by us. We will receive nominal proceeds, if any, upon exercise of the pre-funded warrants.

We currently expect to use the net proceeds from this offering, together with our existing cash and cash equivalents and short-term investments, as follows:

- to fund the development of RP1 through the completion of the ongoing Phase 1/2 clinical trial in four solid tumor types;
- to fund our share of the costs of the Phase 2 clinical trial with RP1 in CSCC;
- to fund a clinical trial of RP1 in cutaneous melanoma in patients refractory to anti-PD-1 therapy;
- to fund a clinical trial in transplant patients that have developed CSCC;
- to fund initial clinical development with RP2 and RP3; and
- the remainder for general corporate purposes, including working capital requirements and operating expenses.

This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions. As of the date of this prospectus supplement, we cannot predict with certainty all of the particular uses for the net proceeds from this offering or the amounts that we will actually spend on the uses set forth above. The amount and timing of our actual expenditures depend on several factors, including the progress and results of our research and development efforts, the amount of cash used by our operations, and the other factors described under "Risk factors" herein, in the accompanying prospectus and the information incorporated by reference herein and therein. Pending application of the net proceeds, we may invest the net proceeds from this offering in short- and intermediate-term, interest-bearing obligations, investment-grade instruments, certificates of deposit or direct or guaranteed obligations of the U.S. government.

Dividend policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our common stock in the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, contractual restrictions, business prospects, general business conditions and other factors that our board of directors may deem relevant.

Capitalization

The following table sets forth our cash and cash equivalents and short-term investments and capitalization as of September 30, 2019 on:

- an actual basis; and
- on an as adjusted basis to give effect to our issuance of 3,678,031 shares of common stock at the public offering price of \$13.61 per share and pre-funded warrants to purchase 2,200,000 shares of common stock at the public offering price of \$13.6099 per pre-funded warrant (which equals the public offering price per share of our common stock less the \$0.0001 per share exercise price of each such pre-funded warrant) (and excluding shares of our common stock issued and any proceeds received upon exercise of the pre-funded warrants or any resulting accounting associated with the pre-funded warrants).

	As of September 30, 2019	
	Actual	As adjusted
	(\$ in thousands, except share and per share data)	
Cash and cash equivalents and short term investments	\$ 109,879	\$ 184,479
Total debt:		
Long-term debt, net of discount ⁽¹⁾	\$ 9,659	\$ 9,659
Stockholders' equity:		
Common stock, \$0.001 par value; 150,000,000 shares authorized as of September 30, 2019; 31,719,346 shares issued and outstanding as of September 30, 2019 and 35,397,377 shares issued and outstanding, as adjusted	32	35
Additional paid-in-capital	202,359	276,956
Accumulated deficit	(80,320)	(80,320)
Accumulated other comprehensive loss	(1,430)	(1,430)
Total stockholders' equity (deficit)	\$ 120,641	\$ 195,241
Total capitalization	\$ 130,300	\$ 204,900

(1) Reflects principal amount of our loan facility with Hercules Capital, Inc., net of unamortized discount, as of September 30, 2019.

Dilution

If you invest in our common stock, your ownership interest will be diluted to the extent of the difference between the price per share you pay in this offering and the net tangible book value per share of our common stock immediately after this offering. Our net tangible book value of our common stock as of September 30, 2019 was approximately \$120.6 million, or approximately \$3.80 per share of common stock based upon 31,719,346 shares outstanding. Net tangible book value per share is equal to our total tangible assets, less our total liabilities, divided by the total number of shares outstanding as of September 30, 2019.

After giving effect to the sale of 3,678,031 shares of common stock at the public offering price of \$13.61 per share and pre-funded warrants to purchase 2,200,000 shares of common stock at the public offering price of \$13.6099 per pre-funded warrant (which equals the public offering price per share of our common stock less the \$0.0001 per share exercise price of each such pre-funded warrant) (and excluding shares of our common stock issued and any proceeds received upon exercise of the pre-funded warrants or any resulting accounting associated with the pre-funded warrants), our as adjusted net tangible book value as of September 30, 2019 would have been approximately \$195.2 million, or \$5.51 per share of common stock. This represents an immediate increase in net tangible book value of \$1.71 per share to our existing stockholders and an immediate dilution in net tangible book value of \$8.10 per share to new investors in this offering.

If the underwriters exercise their option to purchase additional shares of common stock in this offering in full at the public offering price of \$13.61 per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, the as adjusted net tangible book value per share after this offering would be \$5.69 per share, and the decrease in dilution in as adjusted net tangible book value per share to new investors purchasing common stock in this offering would be \$7.92 per share.

If holders of pre-funded warrants exercise the pre-funded warrants in full, the as adjusted net tangible book value per share of common stock after giving effect to this offering (but not the exercise of the underwriters' option to purchase additional shares) would be \$5.19 per share, and the dilution in net tangible book value per share to investors purchasing common stock in this offering would be \$8.42 per share.

The following table illustrates this calculation on a per share basis assuming the underwriters do not exercise their option to purchase additional shares of common stock and the holders of pre-funded warrants do not exercise the pre-funded warrants.

Public offering price per share		\$ 13.61
Net tangible book value per share as of September 30, 2019	\$ 3.80	
Increase in net tangible book value per share attributable to the offering	1.71	
As adjusted net tangible book value per share after giving effect to this offering		5.51
Dilution per share to new investors participating in the offering		\$ 8.10

The number of shares of our common stock to be outstanding after this offering is based on 31,719,346 shares of our common stock outstanding as of September 30, 2019, which amount excludes:

- 4,739,336 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2019 at a weighted average exercise price of \$9.16 per share;

- 497,344 shares of our common stock issuable upon the exercise of warrants outstanding as of September 30, 2019, at an exercise price of \$1.01 per share;
- 2,492,426 shares of our common stock reserved for future issuance under our 2018 Omnibus Incentive Compensation Plan;
- 665,204 shares of our common stock reserved for future issuance under our Employee Stock Purchase Plan;
- 287,559 shares of our common stock sold pursuant to our ATM Program during the period from October 1 to November 8, 2019; and
- 2,200,000 shares of our common stock issuable upon the exercise of the pre-funded warrants offered hereby.

We may choose to raise additional capital through the sale of equity or convertible debt securities due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. New investors will experience further dilution if any of our outstanding options or warrants are exercised, new options are issued and exercised under our 2018 Omnibus Incentive Compensation Plan or Employee Stock Purchase Plan or we issue additional shares of common stock, other equity securities or convertible debt securities in the future. See "Risk factors—Risks Related to this Offering—If you purchase our common stock in this offering, you will incur immediate and substantial dilution in the book value of your shares."

Description of pre-funded warrants

The following is a brief summary of certain terms and conditions of the pre-funded warrants being offered by us. The following description is subject in all respects to the provisions contained in the pre-funded warrants.

Form

The pre-funded warrants will be issued as individual warrant agreements to each individual purchaser of a warrant. The form of pre-funded warrant will be filed as an exhibit to a Current Report on Form 8-K that we will file with the SEC.

Term

The pre-funded warrants do not expire.

Exercisability

The pre-funded warrants are exercisable at any time after their original issuance. The pre-funded warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice and by payment in full of the exercise price in immediately available funds for the number of shares of our common stock purchased upon such exercise. As an alternative to payment of the exercise price in immediately available funds, the holder may elect to exercise the pre-funded warrant through a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of our common stock determined according to the formula set forth in the pre-funded warrant. No fractional shares of our common stock will be issued in connection with the exercise of a pre-funded warrant. In lieu of fractional shares, we will pay the holder an amount in cash equal to the fractional amount multiplied by the last closing trading price of our common stock on the exercise date.

Exercise limitations

Under the pre-funded warrants, we may not effect the exercise of any pre-funded warrant, and a holder will not be entitled to exercise any portion of any pre-funded warrant, which, upon giving effect to such exercise, would cause (i) the aggregate number of shares of our common stock beneficially owned by the holder (together with its affiliates) to exceed 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, or (ii) the combined voting power of our securities beneficially owned by the holder (together with its affiliates) to exceed 9.99% of the combined voting power of all of our securities then outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrants. However, any holder may increase or decrease such percentage to any other percentage upon at least 61 days' prior notice from the holder to us.

Exercise price

The exercise price per whole share of our common stock purchasable upon the exercise of the pre-funded warrants is \$0.0001 per share of our common stock. The exercise price of the pre-funded warrants and the number of shares of our common stock issuable upon exercise of the pre-funded warrants is subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting our common stock and also upon any

distributions of assets, including cash, stock or other property to our stockholders. The exercise price will not be adjusted below the par value of our common stock.

Transferability

Subject to applicable laws, the pre-funded warrants may be offered for sale, sold, transferred or assigned without our consent. The pre-funded warrants will be held in definitive form by the warrant agent. The ownership of the pre-funded warrants and any transfers of the pre-funded warrants will be registered in a warrant register maintained by the warrant agent. We will initially act as warrant agent.

Exchange listing

We do not plan on applying to list the pre-funded warrants on The Nasdaq Global Select Market, any other national securities exchange or any other nationally recognized trading system.

Fundamental transactions

In the event of a fundamental transaction, as described in the pre-funded warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of more than 50% of our outstanding common stock, or any person or group becoming the beneficial owner of 50% of the voting power represented by our outstanding common stock, upon consummation of such a fundamental transaction, the holders of the pre-funded warrants will be entitled to receive upon exercise of the pre-funded warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the pre-funded warrants immediately prior to such fundamental transaction without regard to any limitations on exercise contained in the pre-funded warrants.

No rights as a stockholder

Except by virtue of such holder's ownership of shares of our common stock, the holder of a pre-funded warrant does not have the rights or privileges of a holder of our common stock, including any voting rights or the rights to receive dividends, until the holder exercises the pre-funded warrant.

Material United States federal income tax considerations for non-U.S. holders

The following discussion summarizes certain United States, or U.S., federal income tax considerations relevant to the acquisition, ownership and disposition of our common stock by Non-U.S. Holders (as defined below). This summary is based upon the provisions of the Internal Revenue Code of 1986, as amended or, the Code, Treasury regulations promulgated thereunder, administrative rulings and judicial decisions, all as in effect on the date hereof. These authorities may be changed, possibly retroactively, so as to result in U.S. federal income tax consequences different from those set forth below. We have not sought any ruling from the Internal Revenue Service, or IRS, with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS will agree with such statements and conclusions.

This summary also does not address the tax considerations arising under the laws of any non-U.S., state, or local jurisdiction or under U.S. federal gift and estate tax laws. In addition, this discussion does not address tax considerations applicable to a Non-U.S. Holder's particular circumstances or to Non-U.S. Holders that may be subject to special tax rules, including, without limitation:

- banks, insurance companies or other financial institutions;
- persons subject to the alternative minimum tax;
- tax-exempt organizations;
- controlled foreign corporations, passive foreign investment companies and corporations that accumulate earnings to avoid U.S. federal income tax;
- partnerships or other entities treated as partnerships for U.S. federal income tax purposes;
- dealers in securities or currencies;
- traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;
- persons that own, or are deemed to own, more than five percent of our common stock, except to the extent specifically set forth below;
- real estate investment trusts or regulated investment companies;
- certain former citizens or long-term residents of the U.S.;
- persons who hold our common stock as part of a straddle, hedge, conversion, constructive sale, or other integrated security transaction;
- accrual method taxpayers subject to special tax accounting rules as a result of their use of financial statements (pursuant to Section 451 of the Code); or
- persons who do not hold our common stock as a capital asset (within the meaning of Section 1221 of the Code).

If a partnership or entity classified as a partnership for U.S. federal income tax purposes holds our common stock, the tax treatment of a partner or such partnership generally will depend on the status of

the partner and upon the activities of the partnership. Accordingly, partnerships that hold our common stock, and partners in such partnerships, should consult their tax advisors.

You are urged to consult your tax advisor with respect to the application of the U.S. federal income tax laws to your particular situation, as well as any tax consequences of the purchase, ownership and disposition of our common stock arising under the U.S. federal estate or gift tax rules or under the laws of any state, local, non-U.S. or other taxing jurisdiction or under any applicable tax treaty.

For purposes of this summary, a "Non-U.S. Holder" means a beneficial owner of shares of our common stock (other than a partnership) that, for U.S. federal income tax purposes, is not (i) an individual that is a citizen or resident of the U.S.; (ii) a corporation or other entity treated as a corporation for U.S. federal income tax purposes that is created or organized under the laws of the U.S., any state thereof or the District of Columbia; (iii) an estate the income of which is subject to U.S. federal income taxation regardless of its source; or (iv) a trust if (A) a court within the U.S. is able to exercise primary control over its administration and one or more "United States persons" (as defined in the Code) have the authority to control all substantial decisions of such trust, or (B) the trust has made an election under the applicable Treasury regulations to be treated as a United States person.

Distributions

In general, if we make a distribution to a Non-U.S. Holder with respect to our common stock, it will constitute a dividend for U.S. federal income tax purposes to the extent paid out of our current or accumulated earnings and profits as determined under the Code. If the amount of a distribution exceeds our current and accumulated earnings and profits, such excess first will be treated as a tax-free return of capital to the extent of the Non-U.S. Holder's adjusted tax basis in our common stock and thereafter will be treated as capital gain subject to the tax treatment described below in "Sale or other disposition of common stock." Dividends paid to a Non-U.S. Holder that are not effectively connected with the Non-U.S. Holder's conduct of a trade or business within the U.S. will generally be subject to U.S. federal withholding tax at a rate of 30% of the gross amount of the dividends, unless such dividend is eligible for a reduced rate under an applicable income tax treaty. In order to obtain a reduced rate of withholding, a Non-U.S. Holder is generally required to provide to the applicable withholding agent an IRS Form W-8BEN or IRS Form W-8BEN-E (or other applicable form) properly certifying such Non-U.S. Holder's eligibility for the reduced rate. Non-U.S. Holders that do not timely provide the applicable withholding agent with the required certification, but that qualify for a reduced withholding rate, may obtain a refund of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS. Non-U.S. Holders should consult their tax advisors regarding their entitlement to benefits under an applicable income tax treaty and the timing and manner of claiming the benefits.

Dividends that are effectively connected with a Non-U.S. Holder's conduct of a trade or business in the U.S. (and, if an applicable income tax treaty so requires, are attributable to a permanent establishment or fixed base maintained by the Non-U.S. Holder in the U.S.) are taxed on a net-income basis at the regular graduated rates and in the manner applicable to United States persons. The Non-U.S. Holder is generally required to provide to the applicable withholding agent a properly executed IRS Form W-8ECI (or a suitable substitute form) in order to claim an exemption from, or reduction in, U.S. federal withholding. In addition, a "branch profits tax" may be imposed at a 30% rate (or a reduced rate under an applicable income tax treaty) on any effectively connected dividends received by a foreign corporation for the taxable year, as adjusted for certain items.

Sale or other taxable disposition of common stock

A Non-U.S. Holder generally will not be subject to U.S. federal income or withholding tax with respect to gain, if any, recognized on the sale or other taxable disposition of shares of our common stock unless (i) the gain is effectively connected with the conduct by such Non-U.S. Holder of a trade or business within the United States (and, if an applicable income tax treaty so requires, is attributable to a permanent establishment or fixed base maintained by the Non-U.S. Holder in the United States), (ii) in the case of an individual, such Non-U.S. Holder is present in the United States for 183 or more days in the taxable year of the disposition and certain other conditions are satisfied, or (iii) our common stock constitutes a U.S. real property interest by reason of our status as a U.S. real property holding corporation, or a USRPHC, under the Foreign Investment in Real Property Tax Act, or FIRPTA, for U.S. federal income tax purposes.

In the case described in (i) above, gain or loss recognized on the disposition of shares of our common stock generally will be subject to U.S. federal income taxation in the same manner as if such gain or loss were recognized by a United States person and, in the case of a Non-U.S. Holder that is a foreign corporation, may also be subject to the branch profits tax at a rate of 30%, or a lower applicable treaty branch profits tax rate.

In the case described in (ii) above, the Non-U.S. Holder will be subject to a 30% tax on any capital gain recognized on the disposition of shares of our common stock, after being offset by certain U.S.-source capital losses.

In the case described in (iii) above, a corporation is a USRPHC if the fair market value of its U.S. real property interests equals or exceeds 50 percent of the sum of the fair market value of its worldwide real property interests and its other assets used or held for use in a trade or business (all as determined for U.S. federal income tax purposes). We have not determined whether we are a USRPHC. If we were a USRPHC during the shorter of the five-year period preceding the disposition or the Non-U.S. Holder's holding period, Non-U.S. Holders owning (directly or indirectly) more than 5 percent of our common stock will be subject to different tax consequences and should consult their own tax advisers. FIRPTA will not, however, apply to gain realized on the sale or disposition of our common stock by a Non-U.S. Holder that owns, directly or indirectly at any time during the shorter of the five-year period preceding the date of disposition or the Non-U.S. Holder's holding period, 5 percent or less of our common stock so long as our common stock is "regularly traded on an established securities market" (such as the Nasdaq Global Select Market) as defined under applicable Treasury regulations.

If gain on the sale or other taxable disposition of our common stock were subject to taxation under FIRPTA, a Non-U.S. Holder generally would be subject to U.S. federal income tax on the gain realized on a disposition of our common stock at the graduated U.S. federal income tax rates applicable to United States persons, generally would be required to file a U.S. federal income tax return, and, if our common stock was not then publicly traded, and certain other conditions were met, the purchaser would be required to withhold 15% of the sales proceeds.

Information reporting and backup withholding

Information returns will be filed annually with the IRS in connection with any dividends paid on our common stock to a Non-U.S. Holder. Copies of these information returns may also be made available under the provisions of a specific tax treaty or other agreement to the tax authorities of the country in which the Non-U.S. Holder resides. Unless the Non-U.S. Holder complies with certification procedures to establish that it is not a United States person, information returns may be filed with the IRS in connection with the

proceeds from a sale or other disposition, and the Non-U.S. Holder may be subject to backup withholding (currently at a rate of 24%) on dividends paid on our common stock or on the proceeds from a sale or other disposition of shares of our common stock. The certification procedures required to claim a reduction or exemption from withholding tax on payments described above under "Distributions" will satisfy the certification requirements necessary to avoid backup withholding as well. Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be allowed as a refund or a credit against a Non-U.S. Holder's U.S. federal income tax liability provided the required information is timely furnished to the IRS.

Foreign Account Tax Compliance Act

Under the Foreign Account Tax Compliance Act, or FATCA, and additional guidance issued by the IRS, a U.S. federal withholding tax of 30% will generally apply to dividends paid on our common stock to (i) a foreign financial institution (as a beneficial owner or as an intermediary), unless such institution is subject to an agreement with the U.S. government (which may be in the form of compliance with an intergovernmental agreement with the U.S. government) to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which would include certain equity and debt holders of such institution, as well as certain account holders that are foreign entities with U.S. owners), or (ii) a foreign entity that is not a financial institution (as a beneficial owner or as an intermediary), unless such entity provides the withholding agent with a certification identifying the substantial U.S. owners of the entity, which generally includes any United States person who directly or indirectly owns more than 10% of the entity. While such withholding tax would have applied also to payments of gross proceeds from the sale or other disposition on or after January 1, 2019 of our common stock, recently proposed Treasury regulations eliminate such withholding on payments of gross proceeds entirely. Taxpayers generally may rely on these proposed Treasury regulations until final Treasury regulations are issued. Non-U.S. Holders are encouraged to consult with their tax advisors regarding the possible implications of the FATCA withholding rules on their investment in our common stock. If a dividend payment is both subject to withholding under FATCA and subject to the withholding tax discussed above under "Distributions," the withholding under FATCA may be credited against, and therefore reduce, such other withholding tax.

Pre-funded warrants

Although it is not entirely free from doubt, a pre-funded warrant should be treated as a share of our common stock for U.S. federal income tax purposes and a holder of a pre-funded warrant should generally be taxed in the same manner as a holder of common stock. Accordingly, no gain or loss should be recognized upon the exercise of a pre-funded warrant and, upon exercise, the holding period of a pre-funded warrant should carry over to the share of common stock received. Similarly, the tax basis of a pre-funded warrant should carry over to the share of common stock received upon exercise, increased by the exercise price of \$0.0001 per share. Each holder of pre-funded warrants should consult his, her or its own tax advisor regarding the risks associated with the acquisition of pre-funded warrants pursuant to this offering (including potential alternative characterizations).

Underwriting

We are offering the shares of common stock and pre-funded warrants described in this prospectus supplement through a number of underwriters. J.P. Morgan Securities LLC and SVB Leerink LLC are acting as book-running managers of the offering and as representatives of the underwriters. BMO Capital Markets Corp. is also acting as a book-running manager of the offering. We have entered into an underwriting agreement with the representatives. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus supplement, the number of shares of common stock and pre-funded warrants listed next to its name in the following table:

Name	Number of shares	Number of pre-funded warrants
J.P. Morgan Securities LLC	1,655,114	990,000
SVB Leerink LLC	1,066,629	638,000
BMO Capital Markets Corp.	551,705	330,000
Wedbush Securities Inc.	367,803	220,000
Roth Capital Partners, LLC	36,780	22,000
Total	3,678,031	2,200,000

The underwriters are committed to purchase all the common stock and pre-funded warrants offered by us if they purchase any shares or pre-funded warrants. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the common stock and pre-funded warrants directly to the public at the public offering prices set forth on the cover page of this prospectus supplement and, in the case of the common stock, to certain dealers at that price less a concession not in excess of \$0.48996 per share. After the offering of the shares to the public, the offering price and other selling terms may be changed by the underwriters. Sales of shares made outside of the United States may be made by affiliates of the underwriters. The offering of the shares by the underwriters is subject to receipt and acceptance and subject to the underwriters' right to reject any order in whole or in part.

The underwriters have an option to buy up to 881,704 additional shares of common stock from us to cover sales of shares by the underwriters that exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus supplement to exercise this option to purchase additional shares. If any shares are purchased with this option to purchase additional shares, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock, or the public offering price per pre-funded warrant less the amount paid by the underwriters to us per pre-funded warrant, as the case may be. The underwriting fee is \$0.8166 per share of common stock and per pre-funded warrant. The following table shows the per share and per pre-funded warrant and total underwriting discounts and commissions to be

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

	Without option to purchase additional shares exercised	With full option to purchase additional shares exercised
Per share of common stock	\$ 0.8166	0.8166
Per pre-funded warrant	0.8166	0.8166
Total	\$ 4,800,000	\$ 5,520,000

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately \$600,000. We have agreed to reimburse the underwriters for certain expenses related to clearance of this offering with the Financial Industry Regulatory Authority, Inc., or FINRA.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in this offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We have agreed that we will not (i) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase or otherwise dispose of, directly or indirectly, or file with the SEC a registration statement under the Securities Act relating to, any shares of our common stock or securities convertible into or exchangeable or exercisable for any shares of our common stock, or publicly disclose the intention to make any offer, sale, pledge, disposition or filing, or (ii) enter into any swap or other arrangement that transfers all or a portion of the economic consequences associated with the ownership of any shares of common stock or any such other securities (regardless of whether any of these transactions are to be settled by the delivery of shares of common stock or such other securities, in cash or otherwise), in each case without the prior written consent of J.P. Morgan Securities LLC and SVB Leerink LLC for a period of 90 days after the date of this prospectus supplement, subject to certain limited exceptions set forth in the underwriting agreement. The restrictions described in this paragraph will not apply to the exercise of the pre-funded warrants during the 90-day period following the date of this prospectus supplement.

Our directors, executive officers and stockholders holding approximately 18.7 million shares of our common stock and all outstanding warrants to acquire shares of our common stock as of November 11, 2019 have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which each of these persons or entities, with certain limited exceptions, for a period of 90 days after the date of this prospectus supplement, may not, without the prior written consent of J.P. Morgan Securities LLC and SVB Leerink LLC, (i) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such directors, executive officers, managers and members in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant) or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the

economic consequences of ownership of the common stock or such other securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of common stock or such other securities, in cash or otherwise, or (iii) make any demand for or exercise any right with respect to the registration of any shares of our common stock or any security convertible into or exercisable or exchangeable for our common stock.

We have agreed to indemnify the several underwriters against certain liabilities, including liabilities under the Securities Act.

Shares of our common stock are listed on the Nasdaq Global Select Market under the symbol "REPL." We do not intend to list the pre-funded warrants on the Nasdaq Global Select Market, any other nationally recognized securities exchange or any other nationally recognized trading system.

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress. These stabilizing transactions may include making short sales of the common stock, which involves the sale by the underwriters of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be "covered" shorts, which are short positions in an amount not greater than the underwriters' option to purchase additional shares referred to above, or may be "naked" shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their option to purchase additional shares, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the option to purchase additional shares. 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 common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of the common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of the common stock or preventing or retarding a decline in the market price of the common stock, and, as a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on Nasdaq, in the over-the-counter market or otherwise.

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus supplement in any jurisdiction where action for that purpose is required. The securities offered by this prospectus supplement may not be offered or sold, directly or indirectly, nor may this prospectus supplement or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction,

except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus supplement comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus supplement. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus supplement in any jurisdiction in which such an offer or a solicitation is unlawful.

Other relationships

The underwriters and their respective 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. Certain of the underwriters and their respective affiliates may in the future perform various financial advisory and investment banking services for us, for which they may receive customary fees and expenses.

In addition, in the ordinary course of business, the underwriters and their respective affiliates may make or hold a broad array of investments including serving as counterparties to certain derivative and hedging arrangements 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 our securities and/or instruments. The underwriters and their respective affiliates may also make investment recommendations 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.

The underwriters and their respective 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.

SVB Leerink LLC is the sales agent under an "at the market offering" sales program ("ATM Program") under which we may offer and sell our common stock having aggregate sales proceeds of up to \$75.0 million from time to time. We may not make sales of common stock under the ATM Program during the period of 90 days after the date of this prospectus supplement, in accordance with the lock-up restrictions described above.

Selling restrictions

Notice to prospective investors in the European Economic Area

In relation to each Member State of the European Economic Area (each a "Member State"), no shares of our common stock or pre-funded warrants have been offered or will be offered pursuant to this offering to the public in that Member State prior to the publication of a prospectus in relation to the shares of our common stock or pre-funded warrants which has been approved by the competent authority in that Member State or, where appropriate, approved in another Member State and notified to the competent authority in that Member State, all in accordance with the Prospectus Regulation, except that offers of shares of our common stock or pre-funded warrants may be made to the public in that Member State at any time under the following exemptions under the Prospectus Regulation:

- (a) to any legal entity which is a qualified investor as defined under the Prospectus Regulation;
- (b) to fewer than 150 natural or legal persons (other than qualified investors as defined under the Prospectus Regulation), subject to obtaining the prior consent of the underwriters; or
- (c) in any other circumstances falling within Article 1(4) of the Prospectus Regulation,

provided that no such offer of shares of our common stock or pre-funded warrants shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Regulation or supplement a prospectus pursuant to Article 23 of the Prospectus Regulation and each person who initially acquires any shares of our common stock or pre-funded warrants or to whom any offer is made will be deemed to have represented, acknowledged and agreed to and with each of the underwriters and the Company that it is a "qualified investor" within the meaning of Article 2(e) of the Prospectus Regulation. In the case of any shares of our common stock or pre-funded warrants being offered to a financial intermediary as that term is used in the Prospectus Regulation, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the shares of our common stock or pre-funded warrants acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any shares of our common stock or pre-funded warrants to the public other than their offer or resale in a Member State to qualified investors as so defined or in circumstances in which the prior consent of the underwriters have been obtained to each such proposed offer or resale.

For the purposes of this provision, the expression an "offer to the public" in relation to shares of our common stock or pre-funded warrants in any Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock or pre-funded warrants to be offered so as to enable an investor to decide to purchase or subscribe for any shares of our common stock or pre-funded warrants, and the expression "Prospectus Regulation" means Regulation (EU) 2017/1129.

Notice to prospective investors in the United Kingdom

In addition, in the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are "qualified investors" (as defined in the Prospectus Regulation) (i) who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (the "Order") and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2) (a) to (d) of the Order (all such persons

together being referred to as "relevant persons") or otherwise in circumstances which have not resulted and will not result in an offer to the public of the shares of our common stock or pre-funded warrants in the United Kingdom within the meaning of the Financial Services and Markets Act 2000.

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

Notice to prospective investors in Hong Kong

The shares of our common stock or pre-funded warrants have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong) (the "SFO") of Hong Kong and any rules made thereunder; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong (the "CO") or which do not constitute an offer to the public within the meaning of the CO. No advertisement, invitation or document relating to the shares of our common stock or pre-funded warrants has been or may be issued or has been or may be in the possession of any person for the purposes of issue, 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 to do so under the securities laws of Hong Kong) other than with respect to shares of our common stock or pre-funded warrants which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the SFO and any rules made thereunder.

Notice to prospective investors in Japan

The shares of our common stock or pre-funded warrants have not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Act. Accordingly, none of the shares of our common stock or pre-funded warrants nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit of, any "resident" of Japan (which term as used herein means 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 or for the benefit of a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other applicable laws, regulations and ministerial guidelines of Japan in effect at the relevant time.

Notice to prospective investors in Australia

This prospectus:

- does not constitute a disclosure document or a prospectus under Chapter 6D.2 of the Corporations Act 2001 (Cth) (the "Corporations Act");
- has not been, and will not be, lodged with the Australian Securities and Investments Commission ("ASIC"), as a disclosure document for the purposes of the Corporations Act and does not purport to include the information required of a disclosure document for the purposes of the Corporations Act; and
- may only be provided in Australia to select investors who are able to demonstrate that they fall within one or more of the categories of investors, available under section 708 of the Corporations Act ("Exempt Investors").

The shares of our common stock or pre-funded warrants may not be directly or indirectly offered for subscription or purchased or sold, and no invitations to subscribe for or buy the shares of our common stock or pre-funded warrants may be issued, and no draft or definitive offering memorandum, advertisement or other offering material relating to any shares of our common stock or pre-funded warrants may be distributed in Australia, except where disclosure to investors is not required under Chapter 6D of the Corporations Act or is otherwise in compliance with all applicable Australian laws and regulations. By submitting an application for the shares of our common stock or pre-funded warrants, you represent and warrant to us that you are an Exempt Investor.

As any offer of shares of our common stock or pre-funded warrants under this document will be made without disclosure in Australia under Chapter 6D.2 of the Corporations Act, the offer of those securities for resale in Australia within 12 months may, under section 707 of the Corporations Act, require disclosure to investors under Chapter 6D.2 if none of the exemptions in section 708 applies to that resale. By applying for the shares of our common stock or pre-funded warrants you undertake to us that you will not, for a period of 12 months from the date of issue of the shares of our common stock or pre-funded warrants, offer, transfer, assign or otherwise alienate those shares of our common stock or pre-funded warrants to investors in Australia except in circumstances where disclosure to investors is not required under Chapter 6D.2 of the Corporations Act or where a compliant disclosure document is prepared and lodged with ASIC.

Notice to prospective investors in the Dubai International Financial Centre ("DIFC")

This document relates to an Exempt Offer in accordance with the Markets Rules 2012 of the Dubai Financial Services Authority ("DFSA"). This document is intended for distribution only to persons of a type specified in the Markets Rules 2012 of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus supplement nor taken steps to verify the information set forth herein and has no responsibility for this document. The securities to which this document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of this document you should consult an authorized financial advisor.

In relation to its use in the DIFC, this document is strictly private and confidential and is being distributed to a limited number of investors and must not be provided to any person other than the original recipient, and may not be reproduced or used for any other purpose. The interests in the securities may not be offered or sold directly or indirectly to the public in the DIFC.

Notice to prospective investors in Switzerland

The shares of our common stock or pre-funded warrants may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange ("SIX") or on any other stock exchange or regulated trading facility in Switzerland. This document does not constitute a prospectus within the meaning of, and 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 document nor any other offering or marketing material relating to the shares of our common stock or pre-funded warrants or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

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

Notice to prospective investors in Canada

The shares of our common stock or pre-funded warrants 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 or pre-funded warrants must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

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

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

Notice to prospective investors in Israel

This document does not constitute a prospectus under the Israeli Securities Law, 5728-1968, and has not been filed with or approved by the Israel Securities Authority. In Israel, this prospectus is being distributed only to, and is directed only at, qualified investors listed in the first addendum, or the Addendum, to the Israeli Securities Law. Qualified investors may be required to submit written confirmation that they fall within the scope of the Addendum. In addition, we may distribute and direct this document in Israel, at our sole discretion, to investors who are not considered qualified investors, provided that the number of such investors in Israel shall be no greater than 35 in any 12-month period.

Legal matters

The validity of the shares of common stock and pre-funded warrants offered hereby will be passed upon for us by Morgan, Lewis & Bockius LLP. Certain legal matters in connection with this offering will be passed upon for the underwriters by Cravath, Swaine & Moore LLP.

Experts

The financial statements incorporated in this prospectus supplement by reference to the [Annual Report on Form 10-K for the year ended March 31, 2019](#) have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

Where you can find more information

We are subject to the information requirements of the Exchange Act, and in accordance with the Exchange Act, file annual, quarterly and special reports, proxy statements and other information with the SEC. These documents may be accessed through the SEC's electronic data gathering, analysis and retrieval system, or EDGAR, via electronic means, including the SEC's home page on the Internet (www.sec.gov). Our corporate website address is www.replimune.com. Information contained on or accessible through our website is not a part of this prospectus supplement, and the inclusion of our website address in this prospectus supplement is an inactive textual reference only.

This prospectus is part of the registration statement on Form S-3 we filed with the SEC under the Securities Act and does not contain all the information set forth in the registration statement. Whenever a reference is made in this prospectus to any of our contracts, agreements or other documents, the reference may not be complete and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference into this prospectus for a copy of such contract, agreement or other document.

Incorporation by reference

The SEC allows us to incorporate by reference into this prospectus supplement and the accompanying prospectus the information contained in documents that we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus. Information in this prospectus supplement supersedes information incorporated by reference that we filed with the SEC before the date of this prospectus supplement, while information that we file later with the SEC will automatically update and supersede prior information. Any information so updated and superseded shall not be deemed, except as so updated and superseded, to constitute a part of this prospectus supplement and the accompanying prospectus. We incorporate by reference the documents listed below and any future filings we will make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, after the date of the initial registration statement and prior to the effectiveness of the registration statement, and prior to the termination of the offering. Notwithstanding the foregoing, unless specifically stated to the contrary, none of the information that is not deemed "filed" with the SEC, including information furnished under Items 2.02 or 7.01 of any Current Report on Form 8-K, will be incorporated by reference into, or otherwise included in, this prospectus supplement:

1. our annual report on Form 10-K for the fiscal year ended March 31, 2019 filed with the SEC on [June 28, 2019](#), as amended by Amendment No. 1 thereto filed with the SEC on [July 29, 2019](#) (together, the "Form 10-K");
2. our quarterly reports on Form 10-Q filed with the SEC on [August 14, 2019](#) and [November 12, 2019](#) for the quarters ended June 30, 2019 and September 30, 2019, respectively;
3. our current reports on Form 8-K filed with the SEC on [June 13, 2019](#), [August 8, 2019](#), [September 10, 2019](#), [October 15, 2019](#) and [November 8, 2019](#) (other than with respect to item 7.01 thereof); and
4. [our description of our common stock contained in the registration statement on Form 8-A, filed on July 17, 2018, and all amendments and reports updating such description.](#)

We make available, free of charge, through our website at www.replimune.com under "Investor and Media" our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, the SEC maintains an Internet website that contains reports, proxy and information statements, and other information that we file with the SEC at www.sec.gov. You may also obtain, free of charge, a copy of any of these documents (other than exhibits to these documents unless the exhibits are specifically incorporated by reference into these documents or referred to in this prospectus supplement) by writing or calling us at the following address and telephone number:

Replimune Group, Inc.
Attention: Investor Relations
500 Unicorn Park
Woburn MA 01801
+1 (781) 222-9600

You should rely only on the information incorporated by reference or provided in this prospectus supplement and accompanying prospectus. We have not authorized anyone to provide you with different information. We are not making an offer of these securities in any state where the offer is not permitted. You should not assume that the information in this prospectus or in the documents incorporated by reference is accurate as of any date other than the date on the front of this prospectus supplement or those documents.



Up to \$250,000,000

Common Stock

Preferred Stock

Debt Securities

Warrants

Units

We may offer and sell from time to time our shares of common stock, shares of preferred stock, warrants, debt securities and rights to purchase common stock, preferred stock, debt securities or units, as well as units that include any of these securities. We may sell any combination of these securities in one or more offerings with an aggregate offering price of up to \$250,000,000.

This prospectus provides you with a general description of the securities we may offer. Each time we offer securities pursuant to this prospectus, we will provide a prospectus supplement containing specific terms of the particular offering together with this prospectus. You should read this prospectus and the applicable prospectus supplement carefully before you invest in any securities. The prospectus supplement also may add, update or change information contained in this prospectus. ***This prospectus may not be used to offer and sell securities unless accompanied by the applicable prospectus supplement.***

Our common stock is listed on the Nasdaq Global Select Market under the symbol "REPL." On August 7, 2019, the closing price of our common stock was \$10.66.

Investing in our securities involves significant risks. We strongly recommend that you read carefully the risks we describe in this prospectus and in any accompanying prospectus supplement, as well as the risk factors that are incorporated by reference into this prospectus from our filings made with the Securities and Exchange Commission. See "Risk Factors" on page 4 of this prospectus.

We may sell the securities directly or to or through underwriters or dealers, and also to other purchasers or through agents. The names of any underwriters or agents that are included in a sale of securities to you, and any applicable commissions or discounts, will be stated in an accompanying prospectus supplement.

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

The date of this prospectus is August 15, 2019.

Table of Contents

	<u>Page</u>
<u>ABOUT THIS PROSPECTUS</u>	<u>ii</u>
<u>PROSPECTUS SUMMARY</u>	<u>1</u>
<u>RISK FACTORS</u>	<u>4</u>
<u>CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS</u>	<u>4</u>
<u>USE OF PROCEEDS</u>	<u>6</u>
<u>SECURITIES WE MAY OFFER</u>	<u>6</u>
<u>DESCRIPTION OF CAPITAL STOCK</u>	<u>7</u>
<u>DESCRIPTION OF DEBT SECURITIES</u>	<u>12</u>
<u>DESCRIPTION OF WARRANTS</u>	<u>21</u>
<u>DESCRIPTION OF UNITS</u>	<u>23</u>
<u>PLAN OF DISTRIBUTION</u>	<u>24</u>
<u>LEGAL MATTERS</u>	<u>27</u>
<u>EXPERTS</u>	<u>27</u>
<u>WHERE YOU CAN FIND MORE INFORMATION</u>	<u>27</u>
<u>INCORPORATION OF CERTAIN INFORMATION BY REFERENCE</u>	<u>28</u>

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or SEC, using a "shelf" registration process. Under this shelf registration statement, we may sell common stock, preferred stock, various series of debt securities, or warrants to purchase any of such securities, either individually or in combination with other securities described in this prospectus, in one or more offerings from time to time. The maximum aggregate amount of the securities that we may offer pursuant to the registration statement of which this prospectus is a part is limited to \$250 million. This prospectus provides you with a general description of the securities we may offer.

Each time we sell any type or series of securities under this prospectus, we will provide a prospectus supplement that will include more 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 any of the information contained in this prospectus or in the documents we have incorporated by reference into this prospectus. This prospectus, together with the applicable prospectus supplement, any related free writing prospectus and the documents incorporated by reference into this prospectus and the applicable prospectus supplement, will include all material information relating to the applicable offering. Before buying any of the securities being offered, we urge you to carefully read this prospectus, the applicable prospectus supplement and any related free writing prospectuses we have authorized for use in connection with a specific offering, together with the additional information incorporated herein by reference as described under the heading "Incorporation of Certain Information by Reference."

This prospectus may not be used to consummate a sale of securities unless it is accompanied by an additional prospectus or prospectus supplement.

You should rely only on the information we have provided or incorporated by reference in this prospectus or any prospectus supplement. We have not authorized anyone to provide you with information different from that contained or incorporated by reference in this prospectus. No dealer, salesperson or other person is authorized to give any information or to represent anything not contained or incorporated by reference in this prospectus. You must not rely on any unauthorized information or representation. This prospectus is an offer to sell only the securities offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. The information appearing in this prospectus, any applicable prospectus supplement and any related free writing prospectus is accurate only as of the date on the front of the document and any information we have incorporated by reference is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus, the prospectus supplement or any related free writing prospectus, or the time of any sale of a security.

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 in the accompanying prospectus 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.

This prospectus includes 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 under the heading "Where You Can Find More Information."

Unless the context otherwise requires, references in this prospectus to (i) "Replimune," the "Company," "we," "us" and "our" refer to Replimune Group, Inc. and its consolidated subsidiaries and (ii) a year are references to the applicable calendar year and not our fiscal year.

PROSPECTUS SUMMARY

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

Our Company

We are a clinical-stage biotechnology company committed to applying our leading expertise in the field of oncolytic immunotherapy to transform the lives of cancer patients. We use our proprietary Immulytic platform to design and develop product candidates that are intended to maximally activate the immune system against cancer.

Oncolytic immunotherapy is an emerging class of cancer treatment that exploits the ability of certain viruses to selectively replicate in and directly kill tumors, as well as induce a potent, patient-specific, anti-tumor immune response. Such oncolytic, or "cancer killing," viruses have the potential to generate an immune response targeted to an individual patient's particular set of tumor antigens, including neo-antigens that are uniquely present in tumors. Our product candidates incorporate multiple mechanisms of action into a practical "off-the-shelf" approach that is intended to maximize the immune response against a patient's cancer and to offer significant advantages over personalized vaccine approaches. We believe that the bundling of multiple approaches for the treatment of cancer into single therapies will simplify the development path of our product candidates, while also improving patient outcomes at a lower cost to the healthcare system than the use of multiple different drugs.

The foundation of our Immulytic platform consists of a proprietary, engineered strain of herpes simplex virus 1, or HSV-1, that has been "armed" with a fusogenic protein intended to substantially increase anti-tumor activity. Our platform enables us to incorporate various genes whose expression is intended to augment the inherent properties of HSV-1 to both directly destroy tumor cells and induce an anti-tumor immune response. We believe our lead product candidate, RP1, will be effective at killing tumors and inducing immunogenic, or immune-stimulating, tumor cell death and that it will be highly synergistic with immune checkpoint blockade therapies.

We are conducting a Phase 1/2 clinical trial with RP1 in approximately 150 patients. We have completed enrollment of the Phase 1 dose escalation part of this clinical trial in which we are assessing the safety and tolerability of RP1 administered alone in 22 patients with mixed advanced solid tumor types, and following the review of the data by the Safety Review Committee, or SRC, have determined the dose regimen to be administered in the Phase 2 part of this clinical trial. We are completing the Phase 1 expansion cohort of approximately 12 patients in which we are assessing the safety and tolerability of RP1 administered in combination with an anti-PD1 therapy at the determined Phase 2 dose level.

The Phase 2 part of this clinical trial is designed to assess the safety and efficacy of RP1 in combination with an anti-PD1 therapy in four cohorts of approximately 30 patients with melanoma, non-melanoma skin cancers, bladder cancer and MSI-H/dMMR. Following SRC review of the Phase 1 data to date, including data from the expansion cohort receiving RP1 with anti-PD1 therapy, we have opened enrollment in the United States and the United Kingdom of the melanoma, non-melanoma skin cancer and bladder cancer Phase 2 cohorts, and will open enrollment of the MSI-H/dMMR Phase 2 cohort in September 2019, pending evaluation of a final MSI-H/dMMR patient in the Phase 1 expansion cohort. In the Phase 2 part of the clinical trial, we are also evaluating efficacy under the

clinical trial protocol, primarily on the basis of the proportion of patients who have a response within each tumor type cohort. Responses are either defined as a partial response (a 30% or greater reduction in tumor size) or a complete response (a complete eradication of the disease). We then intend to analyze each cohort's data to determine the indications that merit progressing into further clinical development.

This Phase 1/2 clinical trial is being conducted as a collaboration with Bristol-Myers Squibb Company, or BMS, under which it has granted us a non-exclusive, royalty-free license to, and is supplying at no cost, its anti-PD-1 therapy, nivolumab, for use in combination with RP1 in this clinical trial. BMS has no further development-related obligations under this collaboration.

We have also entered into a collaboration agreement with Regeneron Pharmaceuticals, Inc., or Regeneron, under which we intend to conduct clinical development of our product candidates in combination with cemiplimab, an anti-PD-1 therapy developed by Regeneron. For each clinical trial conducted under this collaboration, Regeneron will fund one-half of the clinical trial costs, supply cemiplimab at no cost, and grant us a non-exclusive, royalty-free license to cemiplimab for use in the applicable clinical trial. The first planned clinical trial under this collaboration is a randomized, controlled Phase 2 clinical trial of RP1 in combination with cemiplimab, versus cemiplimab alone, in approximately 240 patients with cutaneous squamous cell carcinoma. Initial study site activation is currently underway in the United States and Australia, with study initiation expected in August 2019. If compelling clinical data are generated demonstrating the benefits of the combined treatment, we believe the data from this Phase 2 clinical trial could support a filing with regulatory authorities for marketing approval.

We are also developing additional product candidates, RP2 and RP3, built on our Immulytic platform, that are further engineered to enhance anti-tumor immune responses and intended to address additional tumor types. RP2 has been engineered to express an antibody-like molecule that blocks the activity of CTLA-4, a protein that inhibits the immune response to tumors. RP3 is engineered with the intent of not only blocking the activity of CTLA-4, but also to further stimulate an anti-tumor response through activation of the immune co-stimulatory pathways through expression of the ligands for CD40 and 4-1BB.

We intend to initiate a Phase 1 clinical trial with RP2 alone and in combination with nivolumab in the third quarter of 2019, pending our response to questions from the U.S. Food and Drug Administration, or FDA, and the Medicines and Healthcare products Regulatory Agency, or MHRA, in the United Kingdom regarding certain Chemistry, Manufacturing, and Controls aspects of the clinical trial. The Phase 1 clinical trial of RP2 will also be conducted as a collaboration with BMS, under which it has granted us a non-exclusive, royalty-free license to, and will supply at no cost, nivolumab, for use in combination with RP2. BMS has no further development-related obligations under this collaboration.

We intend to file an IND and/or foreign equivalents for RP3 and, assuming regulatory clearance, enter clinical development during 2020. IND enabling studies are currently underway.

Corporate Information

The parent company of our group is Replimune Group, Inc., a Delaware corporation that was formed in July 2017. Prior to the corporate reorganization described below, the parent company of our group was Replimune Limited, a private company limited by shares incorporated in England and Wales (registered number 09496393), which was organized in March 2015.

In July 2017, all of the outstanding equity securities of Replimune Limited were exchanged for equity securities of Replimune Group, Inc., a newly formed Delaware corporation. As a result of the reorganization, Replimune Limited is a wholly owned subsidiary of Replimune Group, Inc.

Our principal executive office is located at 18 Commerce Way, Woburn, MA 01801 and our telephone number is (781) 222-9600. Our website address is <https://www.replimmune.com>. We do not incorporate the information on or accessible through our website into this prospectus and you should not consider any information on, or that can be accessed through, our website as part of this prospectus. Our fiscal year end is March 31.

We own various United Kingdom registered trademarks and United States federal trademark applications and unregistered trademarks, including our company name and the "Immulytic" platform name. All other trademarks, service marks and trade names used in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the symbols ® and ™, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Implications of Being an Emerging Growth Company

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups (JOBS) Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements. These reduced reporting requirements include reduced disclosure about our executive compensation arrangements and no non-binding advisory votes on executive compensation. We will remain an emerging growth company until the earlier of (1) March 31, 2024, and (2) the last day of the fiscal year (a) in which we have total annual gross revenue of at least \$1.07 billion, or (b) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior September 30th, and (3) the date on which we have issued more than \$1.0 billion in non-convertible debt during the prior three year period. We refer to the Jumpstart Our Business Startups Act of 2012 in this prospectus as the "JOBS Act," and references in this prospectus to "emerging growth company" shall have the meaning ascribed to it in the JOBS Act.

An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- an exemption from the requirements to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended;
- reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements; and
- exemptions from the requirement to hold a nonbinding advisory vote on executive compensation and to obtain stockholder approval of any golden parachute payments not previously approved.

We may take advantage of these reduced reporting requirements until such time as we cease to be an emerging growth company.

We have elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus forms a part and may elect to take advantage of other reduced reporting requirements in future filings. As a result, the information that we provide to our stockholders may be different from the information that you might receive from other public reporting companies in which you hold equity interests.

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. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

RISK FACTORS

Investing in our securities involves a high degree of risk. Before deciding whether to invest in our securities, you should carefully consider the risks described in the documents incorporated by reference in this prospectus and any applicable prospectus supplement and any related free writing prospectus, as well as other information we include or incorporate by reference into this prospectus and any applicable prospectus supplement, before making an investment decision. Our business, financial condition or results of operations could be materially adversely affected by any of these risks. The trading price of our securities could decline due to the occurrence of any of these risks, and you may lose all or part of your investment. This prospectus and the documents incorporated herein by reference also contain forward-looking statements that involve risks and uncertainties. Actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks described above and in the documents incorporated herein by reference, including in our most recent [annual report on Form 10-K](#) on file with the SEC and any amendments thereto reflected in subsequent filings with the SEC, all of which are incorporated by reference into this prospectus in their entirety, together with other information in this prospectus, the documents incorporated by reference and any free writing prospectus that we may authorize for use in connection with a specific offering.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the information incorporated by reference into this prospectus, contains, and any prospectus supplement may contain, forward-looking statements concerning our business, operations, development plans and financial performance and condition, as well as our plans, objectives and expectations for our business, operations, development plans and financial performance and condition. Any statements contained herein that are not statements of historical facts may be deemed to be forward-looking statements. In some cases, you can identify these forward-looking statements by the use of words such as "outlook," "believes," "expects," "potential," "continues," "may," "will," "should," "seeks," "approximately," "predicts," "intends," "plans," "estimates," "anticipates" or the negative version of these words or other comparable words. Such forward-looking statements are subject to various risks and uncertainties. Accordingly, there are or will be important factors that could cause actual outcomes or results to differ materially from those indicated in these statements. We believe these factors include, among other things:

- the timing, progress, and results of preclinical studies and clinical trials for RP1 or any of our other product candidates, including the timing of initiation and completion of studies or trials and related preparatory work and the period during which the results of the trials will become available;
- our ability to obtain additional funding as necessary;
- the timing, scope or likelihood of regulatory filings and approvals, including timing of our Biologics License Application, and filing for, and final approval by the FDA, of, RP1 or any of our other product candidates;
- the timing, scope, or likelihood of foreign regulatory filings and approvals;
- our ability to develop our product candidates for use in combination with other checkpoint blockade therapies, including anti-PD-1;
- our ability to develop and advance any future product candidates into, and successfully complete, clinical trials;
- our expectations regarding the size of the patient populations for RP1 or our other product candidates if approved for commercial use;

- the costs and timing of establishing, equipping, and operating our planned in-house manufacturing facility;
- our estimates regarding expenses and capital requirements;
- the implementation of our business model and our strategic plans for our business, RP1 and our other product candidates;
- the rate and degree of market acceptance and clinical utility of RP1 or our other product candidates;
- the potential benefits of and our ability to establish or maintain future collaborations or strategic relationships;
- our ability to retain the continued service of our key professionals and to identify, hire and retain additional qualified professionals;
- our intellectual property position, including the scope of protection we are able to establish and maintain for intellectual property rights covering RP1 and our other product candidates, claims others may make regarding rights in our intellectual property, and any potential infringement, misappropriation or other violation of any third-party intellectual property rights;
- our competitive position, and developments and projections relating to our competitors and our industry;
- negative developments in the field of immuno-oncology;
- the impact of laws and regulations;
- our ability to remediate the material weaknesses in internal control over financial reporting and to maintain effective internal control over financial reporting;
- our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act of 2012; and
- the other risks and uncertainties described under "Risk factors" of our [Annual Report on Form 10-K for the year ended March 31, 2019](#) and our subsequent filings which are incorporated by reference into this prospectus.

The forward-looking statements made in this prospectus and the documents that we incorporate by reference in this prospectus relate only to events as of the date on which the statements are made. These factors should not be construed as exhaustive and should be read in conjunction with the other cautionary statements that are included in this prospectus and the documents that we incorporate by reference in this prospectus. Moreover, we operate in a competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this prospectus and the documents that we incorporate by reference in this prospectus. We undertake no obligation to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise, except to the extent required by applicable law. You should not rely on forward-looking statements as predictions of future events. 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.

USE OF PROCEEDS

Except as described in any applicable prospectus supplement or in any related free writing prospectuses we may authorize for use in connection with a specific offering, we currently intend to use the net proceeds from the sale of the securities offered by us hereunder, if any, for working capital and general corporate purposes, including research and development expenses, and selling, general and administrative expenses. As of the date of this prospectus, we cannot specify with certainty all of the particular uses for the net proceeds to us from the sale of the securities offered by us hereunder. We will set forth in the applicable prospectus supplement or free writing prospectus our intended use for the net proceeds received from the sale of any securities sold pursuant to the prospectus supplement or free writing prospectus.

THE SECURITIES WE MAY OFFER

We may offer shares of our common stock and preferred stock, debt securities, in one or more series, as either senior or subordinated debt or as senior or subordinated convertible debt, various series of warrants to purchase common stock or preferred stock, units or any combination thereof from time to time in one or more offerings under this prospectus at prices and on terms to be determined at the time of any 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 or free writing prospectus, or both, that will describe the specific amounts, prices and other important terms of the securities.

DESCRIPTION OF CAPITAL STOCK

The following is a description of certain provisions of our certificate of incorporation and bylaws, and certain provisions of the Delaware General Corporation Law, or DGCL. The following description does not purport to be complete and is subject to, and qualified in its entirety by reference to, our certificate of incorporation and bylaws, each filed as exhibits to the registration statement of which this prospectus forms a part, and the terms and provisions of the DGCL. For more complete information, you should carefully review our certificate of incorporation and bylaws, which have been filed with the SEC as exhibits to our registration statement of which this prospectus forms a part and which may be obtained as described below under "Where You Can Find More Information."

Our authorized capital stock consists of 150 million shares of common stock, par value \$0.001 per share, and 10 million shares of preferred stock, par value \$0.001 per share, all of which shares are undesignated.

Common stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by our board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock.

Preferred stock

Pursuant to our certificate of incorporation, our board of directors has the authority, without further action by our stockholders, to issue up to 10 million shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions, as well as the number of shares constituting and the designation of any series, thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences or sinking fund terms any or all of which may be greater than the rights of common stock. The issuance of our preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action. There are currently no shares of preferred stock outstanding, and we have no present plan to issue any shares of preferred stock.

Anti-takeover effects of provisions of Delaware law and our certificate of incorporation and bylaws

Requirements for advance notification of stockholder meetings, nominations and proposals

Our certificate of incorporation provides that special meetings of the stockholders may be called only by or at the direction of our board of directors. Our bylaws prohibit the conduct of any business at a special meeting other than as specified in the notice for such meeting. These provisions may have the effect of deferring, delaying or discouraging hostile takeovers, or changes in control or management of our company.

Our bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board of directors or a committee of our board of directors. In order for any matter to be

"properly brought" before a meeting, a stockholder will have to comply with advance notice requirements and provide us with certain information. Additionally, vacancies and newly created directorships may be filled only by a vote of a majority of the directors then in office, even if less than a quorum, and not by the stockholders. Our bylaws allow the presiding officer at a meeting of the stockholders to adopt rules and regulations for the conduct of meetings which may have the effect of precluding the conduct of certain business at a meeting if the rules and regulations are not followed. These provisions may also defer, delay or discourage a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of our company.

Our certificate of incorporation provides that our board of directors is expressly authorized to adopt, amend or repeal our bylaws.

No cumulative voting

The DGCL provides that stockholders are not entitled to cumulate votes in the election of directors unless our certificate of incorporation provides otherwise. Our certificate of incorporation does not expressly provide for cumulative voting.

Amendments to certificate of incorporation and bylaws

The DGCL provides that, unless a corporation's certificate of incorporation provides otherwise, the affirmative vote of holders of shares constituting a majority of the votes of all shares entitled to vote may approve amendments to the certificate of incorporation.

Our certificate of incorporation and bylaws provide that the affirmative vote of holders of at least 75% of the outstanding shares of capital stock, voting together as a single class, and entitled to vote in the election of directors will be required to amend, alter, change or repeal certain provisions of our certificate of incorporation and bylaws. This requirement of a supermajority vote to approve amendments to our certificate of incorporation and bylaws could enable a minority of our stockholders to exercise veto power over such amendments.

Forum selection clause

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors or officers or other employees to us or our stockholders; (iii) any action asserting a claim against us or any director or officer or other employee of ours arising pursuant to any provision of the DGCL or our certificate of incorporation or bylaws; or (iv) any action asserting a claim against us or any director or officer or other employee of ours governed by the internal affairs doctrine. Our certificate of incorporation further provides that any person or entity that acquires any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions described above. Moreover, our certificate of incorporation currently provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. Following a November 2018 decision of the Delaware Court of Chancery, we understand that this provision is invalid. We do not intend to enforce this provision, and we have sought the approval of our shareholders at our 2019 annual meeting to amend our certificate of incorporation to remove this provision.

Staggered board

Our certificate of incorporation provides that our board of directors is divided into three classes of directors, with the directors in each class serving staggered three-year terms and with the number of directors in each class to be as nearly equal as possible.

Stockholder action by written consent

Pursuant to Section 228 of the DGCL, any action required to be taken at any annual or special meeting of the stockholders may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing, setting forth the action so taken, is signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares of our stock entitled to vote thereon were present and voted, unless the corporation's certificate of incorporation provides otherwise. Our certificate of incorporation prohibits the taking of any action of our stockholders by written consent without a meeting.

Delaware anti-takeover statute

We have not opted out of, and therefore are subject to, Section 203 of the DGCL. Section 203 provides that, subject to certain exceptions specified in the law, a publicly-held Delaware corporation shall not engage in certain "business combinations" with any "interested stockholder" for a three-year period after the date of the transaction in which the person became an interested stockholder unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned under employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the date of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66²/₃% of the outstanding voting stock which is not owned by the interested stockholder.

Generally, a business combination includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. An interested stockholder is a person who, together with affiliates and associates, owns or, within three years prior to the determination of interested stockholder status, did own 15% or more of a corporation's outstanding voting stock. Since Section 203 will apply to us, we expect that it would have an anti-takeover effect with respect to transactions our board of directors does not approve in advance. In such event, we would also anticipate that Section 203 could discourage attempts that might result in a premium over the market price for the shares of common stock held by stockholders.

Under certain circumstances, Section 203 makes it more difficult for a person who would be an "interested stockholder" to effect various business combinations with a corporation for a three-year period. The provisions of Section 203 may encourage companies interested in acquiring our company to negotiate in advance with our board of directors because the stockholder approval requirement would be avoided if our board of directors approves either the business combination or the transaction that

results in the stockholder becoming an interested stockholder. These provisions also may make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Authorized but unissued capital stock

The DGCL does not require stockholder approval for any issuance of authorized shares. However, the listing requirements of Nasdaq, which apply so long as our common stock remains listed on Nasdaq, require stockholder approval of certain issuances equal to or exceeding 20% of the then outstanding voting power or then outstanding number of shares of common stock. These additional shares may be used for a variety of corporate purposes, including future public offerings, to raise additional capital or to facilitate acquisitions.

One of the effects of the existence of unissued and unreserved common stock or preferred stock may be to enable our board of directors to issue shares to persons friendly to current management, which issuance could render more difficult or discourage an attempt to obtain control of our company by means of a merger, tender offer, proxy contest or otherwise, and thereby protect the continuity of our management and possibly deprive our investors of opportunities to sell their shares of common stock at prices higher than prevailing market prices.

Registration rights

The holders of approximately 19.2 million shares of our common stock, or their transferees, are entitled to registration rights with respect to the registration of the resale of such shares under the Securities Act pursuant to our amended and restated investors' rights agreement, by and among us and certain of our investors.

Limitations of liability and indemnification

Our certificate of incorporation limits the liability of directors to the fullest extent permitted by Delaware law. The effect of these provisions is to eliminate our rights and the rights of our stockholders, through stockholders' derivative suits on our behalf, to recover monetary damages from a director for breach of fiduciary duty as a director, including breaches resulting from grossly negligent behavior. However, exculpation does not apply to any director if the director has acted in bad faith, knowingly or intentionally violated the law, authorized illegal dividends or redemptions or derived an improper benefit from his or her actions as a director.

In addition, our certificate of incorporation and bylaws provide that we will indemnify our directors and officers to the fullest extent permitted by Delaware law. We also expect to continue to maintain directors' and officers' liability insurance. We believe that these indemnification provisions and insurance are useful to attract and retain qualified directors and executive officers.

The limitation of liability and indemnification provisions in our certificate of incorporation and bylaws may discourage stockholders from bringing a lawsuit against directors for breach of their fiduciary duty. These provisions may also have the effect of reducing the likelihood of derivative litigation against directors and officers, even though such an action, if successful, might otherwise benefit us and our stockholders.

In addition to the indemnification required in our certificate of incorporation and bylaws, we enter into indemnification agreements with each of our directors and executive officers. These agreements provide for the indemnification of our directors and executive officers for all reasonable expenses and liabilities incurred in connection with any action or proceeding brought against them by reason of the fact that they are or were our agents. We believe that these provisions and indemnification agreements, as well as maintaining directors' and officers' liability insurance, help to attract and retain qualified persons as directors and officers.

Market listing

Our common stock is listed on the Nasdaq Global Select Market under the symbol "REPL."

Transfer agent and registrar

The transfer agent and registrar for our common stock is Computershare Trust Company N.A.

DESCRIPTION OF DEBT SECURITIES

The following is a general description of the terms of debt securities we may issue from time to time unless we provide otherwise in the applicable prospectus supplement. Particular terms of any debt securities we offer will be described in the prospectus supplement relating to such debt securities.

As required by Federal law for all bonds and notes of companies that are publicly offered, any debt securities we issue will be governed by a document called an "indenture." We have summarized the general features of the debt securities to be governed by the indenture. The summary is not complete. An indenture is a contract between us and a financial institution acting as trustee on behalf of the holders of the debt securities, and is subject to and governed by the Trust Indenture Act of 1939, as amended, or the Trust Indenture Act. The trustee has two main roles. First, the trustee can enforce holders' rights against us if we default. There are some limitations on the extent to which the trustee acts on holders' behalf, described in the second paragraph under "Description of Debt Securities—Events of Default." Second, the trustee performs certain administrative duties, such as sending interest and principal payments to holders.

Because this section is a summary, it does not describe every aspect of any debt securities we may issue or the indenture governing any such debt securities. Particular terms of any debt securities we offer will be described in the prospectus supplement relating to such debt securities, and we urge you to read the applicable executed indenture, which will be filed with the SEC at the time of any offering of debt securities, because it, and not this description, will define the rights of holders of such debt securities.

A prospectus supplement will describe the particular terms of any series of debt securities we may issue, including some or all of the following:

- the designation or title of the series of debt securities;
- the total principal amount of the series of debt securities, the denominations in which the offered debt securities will be issued and whether the offering may be reopened for additional securities of that series and on what terms;
- the percentage of the principal amount at which the series of debt securities will be offered;
- the date or dates on which principal will be payable;
- the rate or rates (which may be either fixed or variable) and/or the method of determining such rate or rates of interest, if any;
- the date or dates from which any interest will accrue, or the method of determining such date or dates, and the date or dates on which any interest will be payable;
- the terms for redemption, extension or early repayment, if any;
- the currencies in which the series of debt securities are issued and payable;
- whether the amount of payments of principal, interest or premium, if any, on a series of debt securities will be determined with reference to an index, formula or other method and how these amounts will be determined;
- the place or places of payment, transfer, conversion and/or exchange of the debt securities;
- the provision for any sinking fund;
- any restrictive covenants;
- events of default;
- whether the series of debt securities are issuable in certificated form;

- any provisions for legal defeasance or covenant defeasance;
- whether and under what circumstances we will pay additional amounts in respect of any tax, assessment or governmental charge and, if so, whether we will have the option to redeem the debt securities rather than pay the additional amounts (and the terms of this option);
- any provisions for convertibility or exchangeability of the debt securities into or for any other securities;
- whether the debt securities are subject to subordination and the terms of such subordination;
- any listing of the debt securities on any securities exchange;
- whether the issuance of the debt securities may limit the incurrence of additional debt;
- if applicable, a discussion of material United States federal income tax considerations, including those related to original issue discount, if applicable; and
- any other material terms.

The debt securities may be secured or unsecured obligations. Unless the prospectus supplement states otherwise, principal, interest and premium, if any, will be paid by us in immediately available funds.

General

The indenture may provide that any debt securities proposed to be sold under this prospectus and the applicable prospectus supplement relating to such debt securities ("offered debt securities") and any debt securities issuable upon conversion or exchange of other offered securities ("underlying debt securities") may be issued under the indenture in one or more series.

For purposes of this prospectus, any reference to the payment of principal of, or interest or premium, if any, on, debt securities will include additional amounts if required by the terms of the debt securities.

Debt securities issued under an indenture, when a single trustee is acting for all debt securities issued under the indenture, are called the "indenture securities." The indenture may also provide that there may be more than one trustee thereunder, each with respect to one or more different series of securities issued thereunder. See "Description of Debt Securities—Resignation of Trustee" below. At a time when two or more trustees are acting under an indenture, each with respect to only certain series, the term "indenture securities" means the one or more series of debt securities with respect to which each respective trustee is acting. In the event that there is more than one trustee under an indenture, the powers and trust obligations of each trustee described in this prospectus will extend only to the one or more series of indenture securities for which it is trustee. If two or more trustees are acting under an indenture, then the indenture securities for which each trustee is acting would be treated as if issued under separate indentures.

We refer you to the applicable prospectus supplement relating to any debt securities we may issue from time to time for information with respect to any deletions from, modifications of or additions to the Events of Default or covenants that are described below, including any addition of a covenant or other provision providing event risk or similar protection, that will be applicable with respect to such debt securities.

We have the ability to issue indenture securities with terms different from those of indenture securities previously issued and, without the consent of the holders thereof, to reopen a previous issue of a series of indenture securities and issue additional indenture securities of that series unless the reopening was restricted when that series was created.

Conversion and Exchange

If any debt securities are convertible into or exchangeable for other securities, the related prospectus supplement will explain the terms and conditions of the conversion or exchange, including the conversion price or exchange ratio (or the calculation method), the conversion or exchange period (or how the period will be determined), if conversion or exchange will be mandatory or at the option of the holder or us, provisions for adjusting the conversion price or the exchange ratio and provisions affecting conversion or exchange in the event of the redemption of the underlying debt securities. These terms may also include provisions under which the number or amount of other securities to be received by the holders of the debt securities upon conversion or exchange would be calculated according to the market price of the other securities as of a time stated in the prospectus supplement.

Payment and Paying Agents

We will pay interest to the person listed in the applicable trustee's records as the owner of the debt security at the close of business on a particular day in advance of each due date for interest, even if that person no longer owns the debt security on the interest due date. That day, often approximately two weeks in advance of the interest due date, is called the "record date." Because we will pay all the interest for an interest period to the holders on the record date, holders buying and selling debt securities must work out between themselves the appropriate purchase price. The most common manner is to adjust the sales price of the debt securities to prorate interest fairly between buyer and seller based on their respective ownership periods within the particular interest period. This prorated interest amount is called "accrued interest."

Events of Default

Holders of debt securities of any series will have rights if an Event of Default occurs in respect of the debt securities of such series and is not cured, as described later in this subsection. The term "Event of Default" in respect of the debt securities of any series means any of the following:

- we do not pay the principal of, or any premium on, a debt security of the series on its due date;
- we do not pay interest on a debt security of the series within 30 days of its due date;
- we do not deposit any sinking fund payment in respect of debt securities of the series on its due date and we do not cure this default within five days;
- we remain in breach of a covenant in respect of debt securities of the series for 90 days after we receive a written notice of default stating we are in breach. The notice must be sent by either the trustee or holders of at least 25% of the principal amount of debt securities of the series;
- we file for bankruptcy or certain other events of bankruptcy, insolvency or reorganization occur; and
- any other Event of Default occurs in respect of debt securities of the series described in the prospectus supplement.

An Event of Default for a particular series of debt securities does not necessarily constitute an Event of Default for any other series of debt securities issued under the same or any other indenture. The trustee may withhold notice to the holders of debt securities of any default, except in the payment of principal, premium or interest, if it considers the withholding of notice to be in the best interests of the holders.

Remedies if an Event of Default Occurs

If an Event of Default has occurred and has not been cured or waived, the trustee or the holders of not less than 25% in principal amount of the debt securities of the affected series may declare the entire principal amount of all the debt securities of that series to be due and immediately payable. This is called a declaration of acceleration of maturity. A declaration of acceleration of maturity may be canceled by the holders of a majority in principal amount of the debt securities of the affected series if the default is cured or waived and certain other conditions are satisfied.

Except in cases of default, where the trustee has some special duties, the trustee typically is not required to take any action under an indenture at the request of any holders unless the holders offer the trustee reasonable protection from expenses and liability (called an "indemnity"). If reasonable indemnity is provided, the holders of a majority in principal amount of the outstanding debt securities of the relevant series may direct the time, method and place of conducting any lawsuit or other formal legal action seeking any remedy available to the trustee. The trustee may refuse to follow those directions in certain circumstances.

Before a holder is allowed to bypass the trustee and bring its own lawsuit or other formal legal action or take other steps to enforce its rights or protect its interests relating to any debt securities, the following must occur:

- the holder must give the trustee written notice that an Event of Default has occurred and remains uncured;
- the holders of at least 25% in principal amount of all outstanding debt securities of the relevant series must make a written request that the trustee take action because of the default and must offer reasonable indemnity to the trustee against the cost and other liabilities of taking that action;
- the trustee must not have taken action for 60 days after receipt of the above notice and offer of indemnity; and
- the holders of a majority in principal amount of the debt securities must not have given the trustee a direction inconsistent with the above notice during that 60-day period.

However, a holder is entitled at any time to bring a lawsuit for the payment of money due on its debt securities on or after the due date. Each year, we will furnish to each trustee a written statement of certain of our officers certifying that to their knowledge we are in compliance with the indenture and the debt securities, or else specifying any default.

Waiver of Default

The holders of a majority in principal amount of the relevant series of debt securities may waive a default for all such series of debt securities. If this happens, the default will be treated as if it had not occurred. No one can waive a payment default on a holder's debt security, however, without the holder's approval.

Merger or Consolidation

Under the terms of an indenture, we may be permitted to consolidate or merge with another entity. We may also be permitted to sell all or substantially all of our assets to another entity. However, typically we may not take any of these actions unless all the following conditions are met:

- if we do not survive such transaction or we convey, transfer or lease our properties and assets substantially as an entirety, the acquiring company must be a corporation, limited liability company, partnership or trust, or other corporate form, organized under the laws of any state of

the United States or the District of Columbia, and such company must agree to be legally responsible for our debt securities, and, if not already subject to the jurisdiction of any state of the United States or the District of Columbia, the new company must submit to such jurisdiction for all purposes with respect to the debt securities and appoint an agent for service of process;

- alternatively, we must be the surviving company;
- immediately after the transaction no Event of Default will exist;
- we must deliver certain certificates and documents to the trustee; and
- we must satisfy any other requirements specified in the prospectus supplement relating to a particular series of debt securities.

Modification or Waiver

There are three types of changes we may make to an indenture and the debt securities issued thereunder.

Changes Requiring Approval

First, there are changes that we may not be able to make to debt securities without specific approval of all of the holders. The following is a list of the types of changes that may require specific approval:

- change the stated maturity of the principal of or rate of interest on a debt security;
- reduce any amounts due on a debt security;
- reduce the amount of principal payable upon acceleration of the maturity of a security following a default;
- at any time after a change of control has occurred, reduce any premium payable upon a change of control;
- change the place or currency of payment on a debt security (except as otherwise described in the prospectus or prospectus supplement);
- impair the right of holders to sue for payment;
- adversely affect any right to convert or exchange a debt security in accordance with its terms;
- reduce the percentage of holders of debt securities whose consent is needed to modify or amend the indenture;
- reduce the percentage of holders of debt securities whose consent is needed to waive compliance with certain provisions of the indenture or to waive certain defaults;
- modify any other aspect of the provisions of the indenture dealing with supplemental indentures, modification and waiver of past defaults, changes to the quorum or voting requirements or the waiver of certain covenants; and
- change any obligation we have to pay additional amounts.

Changes Not Requiring Approval

The second type of change does not require any vote by the holders of the debt securities. This type is limited to clarifications and certain other changes that would not adversely affect holders of the outstanding debt securities in any material respect, including the addition of covenants and guarantees.

We also do not need any approval to make any change that affects only debt securities to be issued under the indenture after the change takes effect.

Changes Requiring Majority Approval

Any other change to the indenture and the debt securities may require the following approval:

- if the change affects only one series of debt securities, it must be approved by the holders of a majority in principal amount of that series; and
- if the change affects more than one series of debt securities issued under the same indenture, it must be approved by the holders of a majority in principal amount of all of the series affected by the change, with all affected series voting together as one class for this purpose.

The holders of a majority in principal amount of all of the series of debt securities issued under an indenture, voting together as one class for this purpose, may waive our compliance obligations with respect to some of our covenants in that indenture. However, we cannot obtain a waiver of a payment default or of any of the matters covered by the bullet points included above under "Description of Debt Securities—Modification or Waiver—Changes Requiring Approval."

Further Details Concerning Voting

When taking a vote on proposed changes to the indenture and the debt securities, we expect to use the following rules to decide how much principal to attribute to a debt security:

- for original issue discount securities, we will use the principal amount that would be due and payable on the voting date if the maturity of these debt securities were accelerated to that date because of a default;
- for debt securities whose principal amount is not known (for example, because it is based on an index), we will use a special rule for that debt security described in the related prospectus supplement; and
- for debt securities denominated in one or more foreign currencies, we will use the U.S. dollar equivalent.

Debt securities will not be considered outstanding, and therefore not eligible to vote, if we have deposited or set aside in trust money for their payment or redemption. Debt securities will also not be eligible to vote if they have been fully defeased as described later under "Description of Debt Securities—Defeasance—Legal Defeasance."

We generally will be entitled to set any day as a record date for the purpose of determining the holders of outstanding indenture securities that are entitled to vote or take other action under the indenture. If we set a record date for a vote or other action to be taken by holders of one or more series, that vote or action may be taken only by persons who are holders of outstanding indenture securities of those series on the record date and must be taken within 11 months following the record date.

Book-entry and other indirect holders will need to consult their banks or brokers for information on how approval may be granted or denied if we seek to change the indenture or the debt securities or request a waiver.

Defeasance

The following provisions will be applicable to each series of debt securities unless we state in the applicable prospectus supplement that the provisions of covenant defeasance and legal defeasance will not be applicable to that series.

Covenant Defeasance

We can make the deposit described below and be released from some of the restrictive covenants in the indenture under which the particular series was issued. This is called "covenant defeasance." In that event, the holders would lose the protection of those restrictive covenants but would gain the protection of having money and government securities set aside in trust to repay holders' debt securities. If applicable, a holder also would be released from the subordination provisions described under "Description of Debt Securities—Indenture Provisions—Subordination" below. In order to achieve covenant defeasance, we must do the following:

- If the debt securities of the particular series are denominated in U.S. dollars, we must deposit in trust for the benefit of all holders of such debt securities a combination of money and U.S. government or U.S. government agency notes or bonds that will generate enough cash to make interest, principal and any other payments on the debt securities on their various due dates;
- We may be required to deliver to the trustee a legal opinion of our counsel confirming that, under current U.S. Federal income tax law, we may make the above deposit without causing the holders to be taxed on the debt securities any differently than if we did not make the deposit and just repaid the debt securities ourselves at maturity; and
- We must deliver to the trustee certain documentation stating that all conditions precedent to covenant defeasance have been complied with.

If we accomplish covenant defeasance, holders can still look to us for repayment of the debt securities if there were a shortfall in the trust deposit or the trustee is prevented from making payment. In fact, if one of the remaining Events of Default occurred (such as our bankruptcy) and the debt securities became immediately due and payable, there might be a shortfall. Depending on the event causing the default, holders may not be able to obtain payment of the shortfall.

Legal Defeasance

As described below, we can legally release ourselves from all payment and other obligations on the debt securities of a particular series (called "legal defeasance"), (1) if there is a change in U.S. Federal tax law that allows us to effect the release without causing the holders to be taxed any differently than if the release had not occurred, and (2) if we put in place the following other arrangements for holders to be repaid:

- If the debt securities of the particular series are denominated in U.S. dollars, we must deposit in trust for the benefit of all holders of such debt securities a combination of money and U.S. government or U.S. government agency notes or bonds that will generate enough cash to make interest, principal and any other payments on the debt securities on their various due dates;
- We may be required to deliver to the trustee a legal opinion confirming that there has been a change in current U.S. Federal tax law or an Internal Revenue Service ruling that allows us to make the above deposit without causing the holders to be taxed on the debt securities any differently than if we did not make the deposit and just repaid the debt securities ourselves at maturity. Under current U.S. Federal tax law, the deposit and our legal release from the debt securities would be treated as though we paid each holder its share of the cash and notes or bonds at the time the cash and notes or bonds were deposited in trust in exchange for its debt securities and holders would recognize gain or loss on the debt securities at the time of the deposit; and
- We must deliver to the trustee a legal opinion and officers' certificate stating that all conditions precedent to legal defeasance have been complied with.

If we ever did accomplish legal defeasance, as described above, holders would have to rely solely on the trust deposit for repayment of the debt securities. Holders could not look to us for repayment in the unlikely event of any shortfall. Conversely, the trust deposit would most likely be protected from claims of our lenders and other creditors if we ever became bankrupt or insolvent. If applicable, holders would also be released from the subordination provisions described later under "Description of Debt Securities—Indenture Provisions—Subordination."

Resignation of Trustee

Each trustee may resign or be removed with respect to one or more series of indenture securities provided that a successor trustee is appointed to act with respect to such series. In the event that two or more persons are acting as trustee with respect to different series of indenture securities under the indenture, each of the trustees will be a trustee of a trust separate and apart from the trust administered by any other trustee.

Indenture Provisions—Subordination

Upon any distribution of our assets upon our dissolution, winding up, liquidation or reorganization, the payment of the principal of (and premium, if any) and interest on any indenture securities denominated as subordinated debt securities is to be subordinated to the extent provided in the indenture in right of payment to the prior payment in full of all Senior Indebtedness (defined below), but our obligation to holders to make payment of the principal of (and premium, if any) and interest on such subordinated debt securities will not otherwise be affected. In addition, no payment on account of principal (or premium, if any), interest or sinking fund, if any, may be made on such subordinated debt securities at any time unless full payment of all amounts due in respect of the principal (and premium, if any), interest and sinking fund, if any, on Senior Indebtedness has been made or duly provided for in money or money's worth.

In the event that, notwithstanding the foregoing, any payment from us is received by the trustee in respect of subordinated debt securities or by the holders of any of such subordinated debt securities before all Senior Indebtedness is paid in full, the payment or distribution must be paid over to the holders of the Senior Indebtedness or on their behalf for application to the payment of all the Senior Indebtedness remaining unpaid until all the Senior Indebtedness has been paid in full, after giving effect to any concurrent payment or distribution to the holders of the Senior Indebtedness. Subject to the payment in full of all Senior Indebtedness, the holders of such subordinated debt securities will be subrogated to the rights of the holders of the Senior Indebtedness to the extent of payments made to the holders of the Senior Indebtedness out of the distributive share of such subordinated debt securities.

By reason of this subordination, in the event of a distribution of our assets upon our insolvency, certain of our senior creditors may recover more, ratably, than holders of any subordinated debt securities. The related indenture will provide that these subordination provisions will not apply to money and securities held in trust under the defeasance provisions of the indenture.

"Senior Indebtedness" will be defined in an applicable indenture as the principal of (and premium, if any) and unpaid interest on:

- our indebtedness (including indebtedness of others guaranteed by us), whenever created, incurred, assumed or guaranteed, for money borrowed (other than indenture securities issued under the indenture and denominated as subordinated debt securities), unless in the instrument creating or evidencing the same or under which the same is outstanding it is provided that this indebtedness is not senior or prior in right of payment to the subordinated debt securities; and
- renewals, extensions, modifications and refinancings of any of such indebtedness.

The prospectus supplement accompanying any series of indenture securities denominated as subordinated debt securities will set forth the approximate amount of our Senior Indebtedness outstanding as of a recent date.

Trustee

We intend to name the indenture trustee for each series of indenture securities in the related prospectus supplement.

Certain Considerations Relating to Foreign Currencies

Debt securities denominated or payable in foreign currencies may entail significant risks. These risks include the possibility of significant fluctuations in the foreign currency markets, the imposition or modification of foreign exchange controls and potential illiquidity in the secondary market. These risks will vary depending upon the currency or currencies involved and will be more fully described in the applicable prospectus supplement.

DESCRIPTION OF WARRANTS

We may issue warrants for the purchase of shares of our common stock, shares of our preferred stock or debt securities. The following description sets forth certain general terms and provisions of the warrants that we may offer pursuant to this prospectus. The particular terms of the warrants and the extent, if any, to which the general terms and provisions may apply to the warrants so offered will be described in the applicable prospectus supplement.

Warrants may be issued independently or together with other securities and may be attached to or separate from any offered securities. Each series of warrants will be issued under a separate warrant agreement to be entered into between us and a bank or trust company, as warrant agent. The warrant agent will act solely as our agent in connection with the warrants and will not have any obligation or relationship of agency or trust for or with any holders or beneficial owners of warrants.

A copy of the forms of the warrant agreement and the warrant certificate relating to any particular issue of warrants will be filed with the SEC each time we issue warrants, and you should read those documents for provisions that may be important to you. For more information on how you can obtain copies of the forms of the warrant agreement and the related warrant certificate, see "Where You Can Find More Information."

Stock Warrants

The prospectus supplement relating to a particular issue of warrants to issue shares of our common stock or shares of our preferred stock will describe the terms of the common share warrants and preferred share warrants, including the following:

- the title of the warrants;
- the offering price for the warrants, if any;
- the aggregate number of the warrants;
- the designation and terms of the shares of common stock or shares of preferred stock that may be purchased upon exercise of the warrants;
- the terms for changes or adjustments to the exercise price of the warrants;
- if applicable, the designation and terms of the securities that the warrants are issued with and the number of warrants issued with each security;
- if applicable, the date from and after which the warrants and any securities issued with the warrants will be separately transferable;
- the number of shares of common stock or shares of preferred stock that may be purchased upon exercise of a warrant and the price at which the shares may be purchased upon exercise;
- the dates on which the right to exercise the warrants commence and expire;
- if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;
- the currency or currency units in which the offering price, if any, and the exercise price are payable;
- if applicable, a discussion of material United States federal income tax considerations;
- anti-dilution provisions of the warrants, if any;
- redemption or call provisions, if any, applicable to the warrants;

- any additional terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of the warrants; and
- any other information we think is important about the warrants.

Debt Warrants

The prospectus supplement relating to a particular issue of warrants to issue debt securities will describe the terms of those warrants, including the following:

- the title of the warrants;
- the offering price for the warrants, if any;
- the aggregate number of the warrants;
- the designation and terms of the debt securities purchasable upon exercise of the warrants;
- the terms for changes or adjustments to the exercise price of the warrants;
- if applicable, the designation and terms of the debt securities that the warrants are issued with and the number of warrants issued with each debt security;
- if applicable, the date from and after which the warrants and any debt securities issued with them will be separately transferable;
- the principal amount of debt securities that may be purchased upon exercise of a warrant and the price at which the debt securities may be purchased upon exercise;
- the dates on which the right to exercise the warrants will commence and expire;
- if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;
- whether the warrants represented by the warrant certificates or debt securities that may be issued upon exercise of the warrants will be issued in registered or bearer form;
- information relating to book-entry procedures, if any;
- the currency or currency units in which the offering price, if any, and the exercise price are payable;
- if applicable, a discussion of material United States federal income tax considerations;
- anti-dilution provisions of the warrants, if any;
- redemption or call provisions, if any, applicable to the warrants;
- any additional terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of the warrants; and
- any other information we think is important about the warrants.

Exercise of Warrants

Each warrant will entitle the holder of the warrant to purchase at the exercise price set forth in the applicable prospectus supplement the number of shares of common stock, shares of preferred stock or the principal amount of debt securities being offered. Holders may exercise warrants at any time up to the close of business on the expiration date set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants are void. Holders may exercise warrants as set forth in the prospectus supplement relating to the warrants being offered.

Until a holder exercises the warrants to purchase our shares of common stock, shares of preferred stock or debt securities, the holder will not have any rights as a holder of our shares of common stock, shares of preferred stock or debt securities, as the case may be, by virtue of ownership of warrants.

DESCRIPTION OF UNITS

We may issue, in one or more series, units consisting of common stock, preferred stock, or warrants for the purchase of common stock or preferred stock in any combination. We urge you to read the applicable prospectus supplement and any free writing prospectus that we may authorize to be provided to you related to the series of units being offered, as well as the complete unit agreement that contains the terms of the units. We will file as exhibits to the registration statement of which this prospectus is a part, or will incorporate by reference from reports that we file with the SEC, the form of unit agreement and any supplemental agreements that describe the terms of the series of units we are offering before the issuance of the related series of units.

Units may be issued under a unit agreement that we enter into with a unit agent. We will indicate the name and address of the unit agent, if applicable, in the prospectus supplement relating to the particular series of units being offered.

The applicable prospectus supplement may describe:

- the designation and terms of the units and of the securities composing the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities composing the units; and
- whether the units will be issued in fully registered or global form.

PLAN OF DISTRIBUTION

We may sell securities:

- through underwriters;
- through dealers;
- through agents;
- directly to purchasers;
- in "at the market offering," within the meaning of Rule 415(a)(4) of the Securities Act; or
- through a combination of any of these methods or any other method permitted by law.

In addition, we may issue the securities as a dividend or distribution or in a subscription rights offering to our existing security holders.

We may directly solicit offers to purchase securities, or agents may be designated to solicit such offers. In the prospectus supplement relating to such offering, we will name any agent that could be viewed as an underwriter under the Securities Act and describe any commissions that we must pay to any such agent. Any such agent will be acting on a best efforts basis for the period of its appointment or, if indicated in the applicable prospectus supplement, on a firm commitment basis. This prospectus may be used in connection with any offering of our securities through any of these methods or other methods described in the applicable prospectus supplement.

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

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

Each prospectus supplement will describe the method of distribution of the securities and any applicable restrictions. The prospectus supplement with respect to the securities of a particular series will describe the terms of the offering of the securities, including the following: at a fixed price, or prices, which may be changed from time to time;

- the name of the agent or any underwriters;
- the public offering or purchase price;
- any discounts and commissions to be allowed or paid to the agent or underwriters;
- all other items constituting underwriting compensation;
- any discounts and commissions to be allowed or paid to dealers; and
- any exchanges on which the securities will be listed.

If any underwriters or agents are used in the sale of the securities in respect of which this prospectus is delivered, we will enter into an underwriting agreement, sales agreement or other agreement with them at the time of sale to them, and we will set forth in the prospectus supplement relating to such offering the names of the underwriters or agents and the terms of the related agreement with them.

In connection with the offering of securities, we may grant to the underwriters an option to purchase additional securities with an additional underwriting commission, as may be set forth in any

accompanying prospectus supplement. If we grant any such option, the terms of such option will be set forth in the prospectus supplement for such securities.

If a dealer is used in the sale of the securities in respect of which the prospectus is delivered, we will sell such securities to the dealer, as principal. The dealer, who may be deemed to be an "underwriter" as that term is defined in the Securities Act, may then resell such securities to the public at varying prices to be determined by such dealer at the time of resale.

If we offer securities in a subscription rights offering to our existing security holders, we may enter into a standby underwriting agreement with dealers, acting as standby underwriters. We may pay the standby underwriters a commitment fee for the securities they commit to purchase on a standby basis. If we do not enter into a standby underwriting arrangement, we may retain a dealer-manager to manage a subscription rights offering for us.

Agents, underwriters, dealers and other persons may be entitled under agreements which they may enter into with us to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, and may be customers of, engage in transactions with or perform services for us in the ordinary course of business.

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

- the purchase by an institution of the securities covered under that contract shall not at the time of delivery be prohibited under the laws of the jurisdiction to which that institution is subject; and
- if the securities are also being sold to underwriters acting as principals for their own account, the underwriters shall have purchased such securities not sold for delayed delivery. The underwriters and other persons acting as our agents will not have any responsibility in respect of the validity or performance of delayed delivery contracts.

Offered securities may also be offered and sold, if so indicated in the prospectus supplement, in connection with a remarketing upon their purchase, in accordance with a redemption or repayment pursuant to their terms, or otherwise, by one or more remarketing firms, acting as principals for their own accounts or as agents for us. Any remarketing firm will be identified and the terms of its agreement, if any, with us and its compensation will be described in the applicable prospectus supplement. Remarketing firms may be deemed to be underwriters in connection with their remarketing of offered securities.

Certain agents, underwriters and dealers, and their associates and affiliates, may be customers of, have borrowing relationships with, engage in other transactions with, or perform services, including investment banking services, for us or one or more of our respective affiliates in the ordinary course of business.

In order to facilitate the offering of the securities, any underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the securities or any other securities the prices of which may be used to determine payments on such securities. Specifically, any underwriters may over allot in connection with the offering, creating a short position for their own accounts. In addition,

to cover overallocments or to stabilize the price of the securities or of any such other securities, the underwriters may bid for, and purchase, the securities or any such other securities in the open market. Finally, in any offering of the securities through a syndicate of underwriters, the underwriting syndicate may reclaim selling concessions allowed to an underwriter or a dealer for distributing the securities in the offering if the syndicate repurchases previously distributed securities in transactions to cover syndicate short positions, in stabilization transactions or otherwise. Any of these activities may stabilize or maintain the market price of the securities above independent market levels. Any such underwriters are not required to engage in these activities and may end any of these activities at any time.

We may engage in at the market offerings into an existing trading market in accordance with Rule 415(a)(4) under the Securities Act. In addition, we may enter into derivative transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. If the applicable prospectus supplement so indicates, in connection with those derivatives, the third parties may sell securities covered by this prospectus and the applicable prospectus supplement, including in short sale transactions. If so, the third party may use securities pledged by us or borrowed from us or others to settle those sales or to close out any related open borrowings of stock, and may use securities received from us in settlement of those derivatives to close out any related open borrowings of stock. The third party in such sale transactions will be an underwriter and, if not identified in this prospectus, will be named in the applicable prospectus supplement (or a post-effective amendment). In addition, we may otherwise loan or pledge securities to a financial institution or other third party that in turn may sell the securities short using this prospectus and an applicable prospectus supplement. Such financial institution or other third party may transfer its economic short position to investors in our securities or in connection with a concurrent offering of other securities.

Under Rule 15c6-1 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. The applicable prospectus supplement may provide that the original issue date for your securities may be more than two scheduled business days after the trade date for your securities. Accordingly, in such a case, if you wish to trade securities on any date prior to the second business day before the original issue date for your securities, you will be required, by virtue of the fact that your securities initially are expected to settle in more than two scheduled business days after the trade date for your securities, to make alternative settlement arrangements to prevent a failed settlement.

The securities may be new issues of securities and may have no established trading market. The securities may or may not be listed on a national securities exchange. We can make no assurance as to the liquidity of or the existence of trading markets for any of the securities.

In compliance with the guidelines of the Financial Industry Regulatory Authority, Inc., or FINRA, the aggregate maximum discount, commission or agency fees or other items constituting underwriting compensation to be received by any FINRA member or independent broker-dealer will not exceed 8% of the proceeds from any offering pursuant to this prospectus and any applicable prospectus supplement.

The specific terms of any lock-up provisions in respect of any given offering will be described in the applicable prospectus supplement.

The underwriters, dealers and agents may engage in transactions with us, or perform services for us, in the ordinary course of business for which they receive compensation.

The anticipated date of delivery of offered securities will be set forth in the applicable prospectus supplement relating to each offer.

LEGAL MATTERS

Certain legal matters, including the validity of the issuance of the securities offered, will be passed upon for us by Morgan, Lewis & Bockius LLP, Boston, Massachusetts. Additional legal matters may be passed upon by us or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

EXPERTS

The financial statements incorporated in this Prospectus by reference to the [Annual Report on Form 10-K for the year ended March 31, 2019](#) have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We are subject to the information requirements of the Exchange Act, and in accordance with the Exchange Act, file annual, quarterly and special reports, proxy statements and other information with the SEC. These documents may be accessed through the SEC's electronic data gathering, analysis and retrieval system, or EDGAR, via electronic means, including the SEC's home page on the Internet (www.sec.gov). Our corporate website address is www.replimune.com. Information contained on or accessible through our website is not a part of this prospectus, and the inclusion of our website address in this prospectus is an inactive textual reference only.

This prospectus is part of the registration statement on Form S-3 we filed with the SEC under the Securities Act and does not contain all the information set forth in the registration statement. Whenever a reference is made in this prospectus to any of our contracts, agreements or other documents, the reference may not be complete and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference into this prospectus for a copy of such contract, agreement or other document.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference into this prospectus the information contained in documents that we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus. Information in this prospectus supersedes information incorporated by reference that we filed with the SEC before the date of this prospectus, while information that we file later with the SEC will automatically update and supersede prior information. Any information so updated and superseded shall not be deemed, except as so updated and superseded, to constitute a part of this prospectus. We incorporate by reference the documents listed below and any future filings we will make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of the initial registration statement and prior to the effectiveness of the registration statement, and prior to the termination of the offering. Notwithstanding the foregoing, unless specifically stated to the contrary, none of the information that is not deemed "filed" with the SEC, including information furnished under Items 2.02 or 7.01 of any Current Report on Form 8-K, will be incorporated by reference into, or otherwise included in, this prospectus:

1. our annual report on Form 10-K for the fiscal year ended March 31, 2019 filed with the SEC on [June 28, 2019](#), as amended by Amendment No. 1 thereto filed with the SEC on [July 29, 2019](#) (together, the "Form 10-K");
2. [our current report on Form 8-K filed with the SEC on June 13, 2019](#); and
3. [our description of our common stock contained in the registration statement on Form 8-A, filed on July 17, 2018, and all amendments and reports updating such description.](#)

We make available, free of charge, through our website at www.replimune.com under "Investor and Media" our [annual reports on Form 10-K](#), [quarterly reports on Form 10-Q](#), [current reports on Form 8-K](#) and amendments to those reports filed or furnished pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. In addition, the SEC maintains an Internet website that contains reports, proxy and information statements, and other information that we file with the SEC at www.sec.gov. You may also obtain, free of charge, a copy of any of these documents (other than exhibits to these documents unless the exhibits are specifically incorporated by reference into these documents or referred to in this prospectus) by writing or calling us at the following address and telephone number:

Replimune Group, Inc.
Attention: Investor Relations
18 Commerce Way
Woburn MA 01801
+1-(781) 222-9600

You should rely only on the information incorporated by reference or provided in this prospectus or any prospectus supplement. We have not authorized anyone to provide you with different information. We are not making an offer of these securities in any state where the offer is not permitted. You should not assume that the information in this prospectus or in the documents incorporated by reference is accurate as of any date other than the date on the front of this prospectus or those documents.



3,678,031 shares of common stock
Pre-funded warrants to purchase
2,200,000 shares of common stock

Joint Book-Running Managers

J.P. Morgan

SVB Leerink

BMO Capital Markets

Co-Lead Manager

Wedbush PacGrow

Co-Manager

Roth Capital Partners

November 14, 2019
