Filed pursuant to Rule 424(b)(5)
Registration No. 333-244386

Prospectus Supplement dated November 5, 2020
(To Prospectus dated August 26, 2020)

Up to $62,500,000

Common Stock

This prospectus supplement dated November 5, 2020, or this prospectus supplement, supplements the accompanying sales agreement prospectus dated August 26, 2020 contained in our Registration Statement on Form S-3 (Registration No. 333-244386) that we filed with the Securities and Exchange Commission on August 11, 2020, or the prospectus. This prospectus supplement should be read in conjunction with the prospectus, and is qualified by reference thereto, except to the extent that the information herein amends or supersedes the information contained in the prospectus. This prospectus supplement is not complete without, and may only be delivered or utilized in connection with, the prospectus, and any future amendments or supplements thereto. This prospectus supplement supplements or amends only those sections of the prospectus identified in this prospectus supplement; all other sections of the prospectus remain as is.

The prospectus relates to the offering, issuance and sale by us of shares of our common stock, $0.001 par value per share, or our Common Stock, that may be issued and sold from time to time under a sales agreement, or the Sales Agreement, that we entered into with SVB Leerink LLC, or the Agent, on August 11, 2020. As previously disclosed, on October 21, 2020 we and the Agent entered into Amendment No. 1 to the Sales Agreement, pursuant to which we and the Agent agreed to reduce the maximum aggregate offering price of our Common Stock under the Sales Agreement from $75,000,000 to $62,500,000. As of the date of the filing of this prospectus supplement, we have not sold any shares of our Common Stock covered by the prospectus pursuant to the Sales Agreement. References in this prospectus supplement to the Sales Agreement refer to the foregoing sales agreement, as amended.

We are filing this prospectus supplement to supplement and amend, as of November 5, 2020, the prospectus to reduce the maximum aggregate offering price of our Common Stock that may be offered, issued and sold under the Sales Agreement. Accordingly, we may offer and sell shares of our Common Stock having a maximum aggregate offering price of up to $62,500,000 from time to time through the Agent, acting as our sales agent or principal in accordance with the Sales Agreement.

Sales of our Common Stock, if any, under the prospectus, as amended or supplemented by this prospectus supplement, may be made in sales deemed to be “at the market offerings” as defined in Rule 415(a) promulgated under the Securities Act of 1933, as amended, or the Securities Act, including sales made directly on or through the Nasdaq Global Select Market or any other existing trading market for our Common Stock. We may not make sales of Common Stock under the prospectus, as amended or supplemented by this prospectus supplement, during the period of 60 days after the date of our prospectus supplement dated October 21, 2020 without the prior written consent of J.P. Morgan Securities LLC and SVB Leerink LLC, in accordance with the lock-up restrictions described in the prospectus supplement dated October 21, 2020. The Agent will use commercially reasonable efforts to sell on our behalf all of the shares of Common Stock requested to be sold by us under the Sales Agreement, consistent with its normal trading and sales practices, on terms mutually agreed between the Agent and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

The Agent will be entitled to compensation at a commission rate of 3.0% of the gross sales price per share sold pursuant to the terms of the Sales Agreement. See “Plan of Distribution” beginning on page 15 of the prospectus for additional information regarding the compensation to be paid to the Agent. In connection with the sale of the Common Stock on our behalf, the Agent will be deemed to be an “underwriter” within the meaning of the Securities Act and the compensation of the Agent will be deemed to be underwriting commissions or discounts. We also have agreed to provide indemnification and contribution to the Agent with respect to certain liabilities, including liabilities under the Securities Act and the Securities Exchange Act of 1934, as amended.

Our Common Stock is listed on the Nasdaq Global Select Market under the symbol “REPL.” On November 4, 2020, the closing price of our Common Stock was $47.27.

Investing in our Common Stock involves significant risks. See “Risk Factors” beginning on page 6 of the prospectus and in the documents incorporated by reference in the prospectus 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 or the prospectus. Any representation to the contrary is a criminal offense.

SVB Leerink

The date of this prospectus supplement is November 5, 2020.

Prospectus

Up to $75,000,000

Common Stock

We have entered into a Sales Agreement with SVB Leerink LLC, or the Agent, dated August 11, 2020, relating to the sale of shares of our common stock, $0.001 par value per share, or Common Stock, offered by this prospectus. References in this prospectus to the Sales Agreement refer to the foregoing sales agreement. In accordance with the terms of such sales agreement, we may offer and sell shares of our Common Stock having an aggregate offering price of up to $75,000,000 from time to time through the Agent, acting as our sales agent or principal. This offering supersedes and replaces the program we commenced on August 8, 2019.

Sales of our Common Stock, if any, under this prospectus may be made in sales deemed to be "at the market offerings" as defined in Rule 415(a) promulgated under the Securities Act of 1933, as amended, or the Securities Act, including sales made directly on or through the Nasdaq Global Select Market or any other existing trading market for our Common Stock. The Agent will use commercially reasonable efforts to sell on our behalf all of the shares of Common Stock requested to be sold by us under the Sales Agreement, consistent with its normal trading and sales practices, on terms mutually agreed between the Agent and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

The Agent will be entitled to compensation at a commission rate of 3.0% of the gross sales price per share sold pursuant to the terms of the Sales Agreement. See "Plan of Distribution" beginning on page 15 for additional information regarding the compensation to be paid to the Agent. In connection with the sale of the Common Stock on our behalf, the Agent will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of the Agent will be deemed to be underwriting commissions or discounts. We also have agreed to provide indemnification and contribution to the Agent with respect to certain liabilities, including liabilities under the Securities Act and the Securities Exchange Act of 1934, as amended, or the Exchange Act.

Our Common Stock is listed on the Nasdaq Global Select Market under the symbol "REPL." On August 10, 2020, the closing price of our Common Stock was $24.51.

Investing in our Common Stock involves significant risks. See "Risk Factors" beginning on page 6 of this prospectus and in the documents incorporated by reference in this prospectus 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. Any representation to the contrary is a criminal offense.

SVB Leerink

The date of this prospectus is August 26, 2020.

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Prospectus

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 the SEC, using a "shelf" registration process. Under this shelf registration process, we may from time to time sell the securities described in this prospectus in one or more offerings for an aggregate initial offering price of up to $75,000,000. You should read this prospectus together with the additional information described under the heading "Where You Can Find More Information" beginning on page 17 of this prospectus.

This prospectus describes the terms of this offering of Common Stock and also adds to and updates information contained in the documents incorporated by reference into this prospectus. To the extent there is a conflict between the information contained in this prospectus, on the one hand, and the information contained in any document incorporated by reference into this prospectus that was filed with the SEC before the date of this prospectus, on the other hand, you should rely on the information in this prospectus. If any statement in one of these documents is inconsistent with a statement in another document having a later date — for example, a document incorporated by reference into this prospectus — the statement in the document having the later date modifies or supersedes the earlier statement.

You should rely only on the information contained in or incorporated by reference in this prospectus or in any related free writing prospectus filed by us with the SEC. We have not, and the Agent has not, authorized anyone to provide you with different information. This prospectus and any related free writing prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the securities described in this prospectus and any related free writing prospectus or an offer to sell or the solicitation of an offer to buy such securities in any circumstances in which such offer or solicitation is unlawful. You should assume that the information appearing in this prospectus, the documents incorporated by reference and any related free writing prospectus is accurate only as of their respective dates. Our business, financial condition, results of operations and prospects may have changed materially since those dates.

We take no responsibility for, and can provide no assurances as to the reliability of, any information not contained in this prospectus or any related free writing prospectus that we may authorize to be provided to you. 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. You should assume that the information in this prospectus or any related free writing prospectus is accurate only as of the date on the front of the document and that any information 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 or any related free writing prospectus, or any sale of a security.

For investors outside the United States: neither we, nor the Agent, 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. You are required to inform yourselves about, and to observe any restrictions relating to, this offering and the distribution of this prospectus.

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.

MARKET DATA

This prospectus and the documents incorporated by reference herein include market and industry data and forecasts concerning our business and the markets for certain cancers, including data regarding the estimated size of those markets and the incidence and prevalence of certain medical conditions, that we have derived from independent consultant reports, publicly available information, various industry, medical and general publications, other published industry sources, government data and our internal data and estimates. Independent consultant reports, industry publications and other published industry sources generally indicate that the information contained therein was obtained from sources believed to be reliable. Our internal data and estimates are based upon information obtained from trade and business organizations and other contacts in the markets in which we operate and our management's understanding of industry conditions.

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

General

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 second cornerstone of immune-based cancer treatment, is an emerging class of immuno-oncology therapy, alongside checkpoint blockade, 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 glycoprotein intended to substantially increase anti-tumor activity. Our Immulytic platform enables us to incorporate various genes into HSV-1 that are intended to further augment the inherent properties of HSV-1 in order to both directly destroy tumor cells and induce an anti-tumor immune response. We currently have three product candidates in our development pipeline, RP1, our lead product candidate, and additionally RP2 and RP3.

We are currently conducting a number of clinical trials of RP1, both as a monotherapy and in combination with anti-PD-1 therapy, with a focus on immune-responsive tumors. We are conducting a randomized, controlled Phase 2 clinical trial of RP1 in approximately 240 patients with cutaneous squamous cell carcinoma, or CSCC, RP1's lead indication. This registration-directed clinical trial is evaluating RP1 in combination with cemiplimab, an anti-PD-1 therapy developed by Regeneron Pharmaceuticals, Inc., or Regeneron, versus cemiplimab alone. Regeneron has granted to us a non-exclusive royalty-free license to cemiplimab for use in this trial, is funding one-half of the clinical trial costs, and is supplying cemiplimab at no cost to us. 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 Phase 2 clinical trial is expected to take approximately eighteen to twenty-four months and we expect the primary data readout from the clinical trial in 2022. We have also opened for enrollment a Phase 1b clinical trial of single agent RP1 in solid organ transplant recipients with CSCC, which we believe to be potentially registrational (in its own right or, subject to discussion with regulatory authorities, following enrollment of additional patients). 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.

We have entered into 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 a multi-cohort clinical trial. We are currently enrolling a 125-patient extension cohort of RP1 combined with nivolumab in anti-PD-1 refractory cutaneous melanoma. We initiated this cohort after completing enrollment in a prior Phase 2 cohort in the same clinical trial of approximately 30 patients with melanoma. The data generated in the melanoma cohort demonstrated that RP1 combined with nivolumab has the potential to treat anti-PD-1 refractory melanoma. We also believe this cohort to be potentially registrational (in its own right or, subject to discussion with regulatory authorities, following enrollment of additional patients).

We continue to enroll patients in other Phase 2 cohorts of approximately 30 patients each, testing RP1 in combination with nivolumab in non-melanoma skin cancers and microsatellite instability high, or MSI-H/dMMR, tumors under our collaboration with BMS. Due in part to the impact of the COVID-19 coronavirus, or COVID-19, we expect that the non-melanoma skin cancer cohort to be fully accrued by the end of 2020. Similarly, it is likely that accumulating sufficient data to inform a decision as to whether to pursue MSI-H/dMMR tumors into registration-directed development will be delayed into 2021. In addition, as a result of changes in the competitive landscape, we recently announced our intention to replace a 30 patient bladder cancer cohort with a cohort of patients with anti-PD-1 refractory non-small cell lung cancer. We intend to initiate enrollment into this cohort later this year.

We are also developing additional product candidates, RP2 and RP3, that have been further engineered to enhance anti-tumor immune responses and are intended to address additional tumor types. In addition to the expression of GALV-GP R(-) and human GM-CSF, RP2 has been engineered to express an antibody-like molecule intended to block the activity of CTLA-4, a protein that inhibits the immune response to tumors. RP3 has been engineered with the intent 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 a Phase 1 clinical trial of 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 initial safety and efficacy data from this Phase 1 clinical trial in the second half of 2020. Based on the data generated to date, we have decided to amend the protocol to allow for an expansion of the second part of this clinical trial (of RP2 combined with nivolumab) from 12 to 30 patients.

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

Recent Developments

During the quarter ended June 30, 2020, we announced interim data from the Phase 2 part of our Phase 1/2 clinical trial of RP1 in which we are assessing the safety and efficacy of RP1 in combination with nivolumab in cohorts of approximately 30 patients. We announced that four of seven evaluable CSCC patients in the 30-patient non-melanoma skin cancer cohort have ongoing complete responses and six of the seven evaluable patients have either an ongoing complete response or an ongoing partial response. We continue to believe this interim data demonstrates that RP1 in combination with nivolumab is well-tolerated, demonstrates immune activation and continues to drive deep and durable responses in patients with CSCC. Of particular note, we observed clear differentiation in the number of complete responses in patients with advanced CSCC who were treated with RP1 in combination with nivolumab as compared to the number of complete responses which we believe would be expected in patients if they were treated with nivolumab alone.

We have enrolled and treated 36 melanoma patients, including the six melanoma patients enrolled into the Phase 1 expansion cohort of RP1 combined with nivolumab. 16 patients with anti-PD-1 refractory cutaneous melanoma have been treated, as have an additional 20 patients with anti-PD-1 naïve cutaneous melanoma, uveal melanoma (all anti-PD-1 refractory), and mucosal melanoma (anti-PD-1 naïve or refractory). Five of the 16 anti-PD-1 refractory cutaneous melanoma patients at the data cut-off date met the formal definition of response, with an additional two patients remaining on treatment with the opportunity for response. Accordingly, we will observe a final response rate from this cohort of at least 31%. Four of

eight anti-PD-1 naïve cutaneous melanoma patients met the formal definition of response at the data cut-off date, with an additional two patients continuing on treatment with the opportunity for response. Additionally, two of the six mucosal melanoma patients met the formal definition of response at the data cut-off date, and two of the six uveal melanoma patients are on study with the opportunity of response, with one such uveal melanoma patient demonstrating a 27.3% reduction in target disease burden as of the last CT scan in April 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., 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 500 University 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 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 and Smaller Reporting Company

We are an “emerging growth company” as that term is used in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, 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, (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 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.

Additionally, we are also a "smaller reporting company," as defined in Regulation S-K. We will remain a smaller reporting company if we have (i) less than $250 million in market value of our shares held by non-affiliates as of the last business day of our second fiscal quarter or (ii) less than $100 million of annual revenues in our most recent fiscal year completed before the last business day of our second fiscal quarter and less than $700 million in market value of our shares held by non-affiliates as of the last business day of our second fiscal quarter. If we are a smaller reporting company at the time we cease to be an emerging growth company, we may continue to rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. Specifically, as a smaller reporting company we may choose to present only the two most recent fiscal years of audited financial statements in our Annual Report on Form 10-K and, similar to emerging growth companies, smaller reporting companies have reduced disclosure obligations regarding executive compensation.

THE OFFERING

Common Stock offered by us:	Shares of Common Stock having an aggregate offering price of up to $75,000,000.
Common Stock to be outstanding after this offering:	Up to 43,340,395 shares, assuming sales of 3,059,975 shares of Common Stock in this offering at an offering price of $24.51 per share, which was the last reported sale price of our Common Stock on the Nasdaq Global Select Market on August 10, 2020. The actual number of shares issued will vary depending on how many shares of our Common Stock we choose to sell and the prices at which such sales occur.
Manner of offering:	"At the market offering" that may be made from time to time through the Agent. See "Plan of Distribution" beginning on page 15 of this prospectus.
Use of proceeds:	Our management will retain broad discretion regarding the allocation and use of the net proceeds from this offering. We currently expect to use the net proceeds from this offering together with our existing cash and cash equivalents and short-term investments, to fund the development of RP1 through the completion of our ongoing clinical trials in RP1, to fund clinical development with RP2 and RP3 and for general corporate purposes, including working capital requirements and operating expenses. See "Use of Proceeds" on page 10.
Risk factors:	Investing in our Common Stock involves significant risks. See "Risk Factors" beginning on page 6 of this prospectus and the other information included in, or incorporated by reference into, this prospectus for a discussion of certain factors you should carefully consider before deciding to invest in shares of our Common Stock.
Nasdaq Global Select Market symbol:	"REPL"

The number of shares of Common Stock to be outstanding after this offering, as set forth above, is based on 40,280,420 shares of Common Stock outstanding as of June 30, 2020, which amount excludes:

- 6,510,522 shares of our Common Stock issuable upon the exercise of stock options outstanding as of June 30, 2020 at a weighted average exercise price of $9.90 per share;
- 497,344 shares of our Common Stock issuable upon the exercise of warrants outstanding as of June 30, 2020, at an exercise price of $1.01 per share;
- 3,721,738 shares of our common stock issuable upon the exercise of existing pre-funded warrants outstanding as of June 30, 2020, at an exercise price of $0.0001 per share;
- 1,909,204 shares of our Common Stock reserved for future issuance under our 2018 Omnibus Incentive Compensation Plan; and
- 1,031,868 shares of our Common Stock reserved for future issuance under our Employee Stock Purchase Plan.

RISK FACTORS

An investment in our Common Stock involves a high degree of risk. Before deciding whether to invest in our Common Stock, you should carefully consider the risks described below and discussed under the sections captioned "Risk Factors" contained in our most recent Annual Report on Form 10-K, 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, the information and documents incorporated by reference in this 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 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.

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 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 our Common Stock, in future transactions may be higher or lower than the prices per share paid by investors in this offering.

It is not possible to predict the aggregate proceeds resulting from sales of our Common Stock made under the Sales Agreement.

Subject to certain limitations in the Sales Agreement and compliance with applicable law, we have the discretion to deliver a placement notice to the Agent at any time throughout the term of the Sales Agreement. The number of shares of our Common Stock that are sold through the Agent after delivering a placement notice will fluctuate based on a number of factors, including the market price of our Common Stock during the sales period, the limits we set with the Agent in any applicable placement notice, and the demand for our Common Stock during the sales period. Because the price per share of our Common Stock will fluctuate during the sales period, it is not currently possible to predict the aggregate proceeds to be raised in connection with those sales.

The shares of our Common Stock offered hereby will be sold in "at the market" offerings, and investors who buy shares of our Common Stock at different times will likely pay different prices.

Investors who purchase shares of our Common Stock in this offering at different times will likely pay different prices, and so may experience different levels of dilution and different outcomes in their investment results. We will have discretion, subject to market demand, to vary the timing, prices, and numbers of shares of our Common Stock sold in this offering. In addition, subject to the final determination by our board of directors or a committee thereof, there is no minimum or maximum sales price for shares of our Common Stock to be sold in this offering. Investors may experience a decline in the value of the shares of our Common Stock they purchase in this offering as a result of sales made at prices lower than the prices they paid.

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;
- political and economic instability, including the impact of COVID-19, the possibility of an economic recession, international hostilities, acts of terrorism and governmental restrictions, inflation, trade relationships and military and political alliances; 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 carryforwards, excess business interest carryforwards, and tax credit carryforwards will be limited under Section 382 of the Internal Revenue Code of 1986, as amended, 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 stockholders 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.

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the information incorporated by reference into this prospectus, contains "forward-looking statements" within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act. Any statements, other than statements of historical facts, contained in this prospectus and the information incorporated by reference herein 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 U.S. Food and Drug Administration 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 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;
- the impact of the COVID-19 coronavirus, or COVID-19, as a global pandemic and related public health issues;
- 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 JOBS Act; and
- the other risks and uncertainties described under "Risk factors" of our Annual Report on Form 10-K for the year ended March 31, 2020, our quarterly report on Form 10-Q for the quarter ended June 30, 2020 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

We may issue and sell shares of our Common Stock having aggregate sales proceeds of up to $75,000,000 from time to time. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time.

We will retain broad discretion over the use of the net proceeds from the sale of the securities offered hereby. We currently expect to use the net proceeds from this offering together with our existing cash and cash equivalents and short-term investments, to fund the development of RP1 through the completion of our ongoing clinical trials in RP1, to fund clinical development with RP2 and RP3 and 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 amounts and timing of our actual expenditures will depend on numerous 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” in this prospectus and the information incorporated by reference herein. We may find it necessary or advisable to use the net proceeds for other purposes, and we will have broad discretion in the application of the net proceeds. 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.

DILUTION

If you invest in our Common Stock, your 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 June 30, 2020 was approximately $277.8 million, or approximately $6.90 per share of Common Stock based upon 40,280,420 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 June 30, 2020.

After giving effect to the sale of our Common Stock in the aggregate amount of $75,000,000 at an assumed offering price of $24.51 per share, the last reported sale price of our Common Stock on the Nasdaq Global Select Market on August 10, 2020, and after deducting commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2020 would have been approximately $350.4 million, or $8.08 per share of Common Stock. This represents an immediate increase in net tangible book value of $1.18 per share to our existing stockholders and an immediate dilution in as adjusted net tangible book value of $16.43 per share to new investors in this offering. Dilution per share to new investors participating in this offering is determined by subtracting as adjusted net tangible book value per share after this offering from the price per share paid by new investors. The following table illustrates this calculation on a per share basis. The as adjusted information is illustrative only and will adjust based on the actual prices to the public, the actual number of shares sold and other terms of the offering determined at the times shares of our Common Stock are sold pursuant to this prospectus. The shares sold in this offering, if any, will be sold from time to time at various prices.

Assumed offering price per share		$24.51
Net tangible book value per share as June 30, 2020	$6.90	
Increase in net tangible book value per share attributable to the offering	1.18	
As adjusted net tangible book value per share after giving effect to this offering		8.08
Dilution per share to new investors participating in the offering		$16.43

The number of shares of Common Stock to be outstanding after this offering, as set forth above, is based on 40,280,420 shares of Common Stock outstanding as of June 30, 2020, which amount excludes:

- 6,510,522 shares of our Common Stock issuable upon the exercise of stock options outstanding as of June 30, 2020 at a weighted average exercise price of $9.90 per share;
- 497,344 shares of our Common Stock issuable upon the exercise of warrants outstanding as of June 30, 2020, at an exercise price of $1.01 per share;
- 3,721,738 shares of our common stock issuable upon the exercise of existing pre-funded warrants outstanding as of June 30, 2020, at an exercise price of $0.0001 per share;
- 1,909,204 shares of our Common Stock reserved for future issuance under our 2018 Omnibus Incentive Compensation Plan; and
- 1,031,868 shares of our Common Stock reserved for future issuance under our Employee Stock Purchase Plan.

To the extent outstanding warrants or options are exercised at prices per share that are less than the prices paid by investors in this offering, or shares of Common Stock issued upon the vesting of outstanding restricted stock units, there will be further dilution to investors. In addition, to the extent that we issue additional equity securities in connection with future capital raising activities, our then-existing stockholders may experience dilution.

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 5% 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 U.S. 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 Taxable 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 U.S. 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% 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% 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% 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 the common stock at the graduated U.S. federal income tax rates applicable to U.S. 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 U.S. 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.

PLAN OF DISTRIBUTION

On August 11, 2020, we entered into a sales agreement, or Sales Agreement, with SVB Leerink LLC, or the Agent, under which we may issue and sell shares of our Common Stock having an aggregate gross sales price of up to $75,000,000 from time to time through the Agent. The Sales Agreement has been filed as an exhibit to our registration statement on Form S-3 of which this prospectus forms a part.

Sales of our Common Stock, if any, will be made by any method that is deemed to be an "at-the-market offering" as defined in Rule 415 under the Securities Act, including sales made directly on or through the Nasdaq Global Select Market, on or through any other existing trading market for our Common Stock or to or through a market maker. The Agent will offer our Common Stock subject to the terms and conditions of the Sales Agreement on a daily basis or as otherwise agreed upon by us and the Agent. We will designate the maximum number or amount of our Common Stock to be sold through the Agent on a daily basis or otherwise determine such maximum number or amount together with the Agent. We may instruct the Agent not to sell our Common Stock if the sales cannot be effected at or above the price designated by us from time to time. We or the Agent may suspend the offering of our Common Stock upon proper notice to the other party.

We will pay the Agent a commission, in cash, for their services in acting as agent in the sale of our Common Stock. The Agent will be entitled to compensation at a fixed commission rate of 3.0% of the gross proceeds from each sale of our Common Stock. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time. We have also agreed to reimburse the Agent for certain specified expenses, including the fees and disbursements of their legal counsel in an amount not to exceed $50,000, plus an additional amount of up to $15,000 in connection with determining our compliance with the rules and regulations of the Financial Industry Regulatory Authority, Inc., or FINRA. In accordance with FINRA Rule 5110, these reimbursed fees and expenses are deemed sales compensation to the Agent in connection with this offering. We estimate that the total expenses for the offering, excluding compensation and reimbursements payable to the Agent under the terms of the Sales Agreement, will be approximately $125,000.

The remaining sales proceeds, after deducting any expenses payable by us and any transaction fees imposed by any governmental, regulatory or self-regulatory organization in connection with the sales of our Common Stock, will equal our net proceeds for the sale of such Common Stock. The Agent will provide written confirmation to us no later than the next succeeding trading day on The Nasdaq Global Select Market after each day on which Common Stock is sold through it as sales agent under the Sales Agreement. Each confirmation will include the number or amount of shares sold through it as sales agent on that day, the volume-weighted average price of the shares sold and the net proceeds to us from such sales. We will report at least quarterly the number of shares of Common Stock sold through the Agent under the Sales Agreement, the net proceeds to us and the compensation paid by us to the Agent in connection with the sales of Common Stock during the relevant period.

Settlement for sales of Common Stock will occur on the second trading day following the date on which any sales are made, or on some other date that is agreed upon by us and the Agent in connection with a particular transaction, in return for payment of the net proceeds to us. Sales of our Common Stock as contemplated in this prospectus will be settled through the facilities of The Depository Trust Company or by such other means as we and the Agent may agree upon. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

Subject to the terms and conditions of the Sales Agreement, the Agent will use its commercially reasonable efforts, consistent with its normal sales practices and applicable state and federal laws, rules and regulations and the rules of The Nasdaq Global Select Market to sell on our behalf all of the Common Stock requested to be sold by us. In connection with the sale of the Common Stock on our behalf, the Agent will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of the Agent will be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to the Agent against certain civil liabilities, including liabilities under the Securities Act.

The offering of our Common Stock pursuant to the Sales Agreement will terminate upon the termination of the Sales Agreement as permitted therein. We and the Agent may each terminate the Sales

Agreement at any time upon ten days' prior notice in each party's sole discretion. The Agent may terminate the Sales Agreement at any time in certain circumstances, including the occurrence of a material and adverse change in our business or financial condition that makes it impractical or inadvisable to market our Common Stock or to enforce contracts for the sale of our Common Stock.

The Agent and its affiliates have provided, and may in the future provide, various investment banking, commercial banking and other financial services for us and our affiliates, for which services they may in the future receive customary fees. As sales agent, SVB Leerink LLC will not engage in any transactions that stabilize our Common Stock. Our Common Stock is listed on The Nasdaq Global Select Market and trades under the symbol "REPL." The transfer agent of our Common Stock is Computershare Trust Company N.A.

This prospectus in electronic format may be made available on a website maintained by the Agent and the Agent may distribute this prospectus electronically.

LEGAL MATTERS

The validity of the securities offered hereby will be passed upon by Morgan, Lewis & Bockius LLP, Boston, Massachusetts. The Agent is being represented in connection with this offering by Cravath, Swaine & Moore LLP, New York, New York.

EXPERTS

The financial statements incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended March 31, 2020 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, 2020, filed with the SEC on June 3, 2020;
2. our quarterly report on Form 10-Q for the three months ended June 30, 2020, filed with the SEC on August 7, 2020;
3. our Current Reports on Form 8-K filed with the SEC on April 6, 2020 (other than with respect to Item 7.01 thereof), June 3, 2020 (other than with respect to Items 2.02 and 7.01 thereof), June 8, 2020, June 10, 2020, July 1, 2020, and July 22, 2020;
4. the portions of our Definitive Proxy Statement on Schedule 14A, filed with the SEC on July 29, 2020, that are incorporated by reference into our Annual Report on Form 10-K for the fiscal year ended March 31, 2020; and
5. 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. Information contained on our website is not incorporated by reference into this prospectus. 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
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 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: