Filed Pursuant to Rule 424(b)(5)
Registration Statement No. 333-266668

PROSPECTUS SUPPLEMENT
(To Prospectus dated August 15, 2022)

$100,000,000

Common Stock

We have entered into a sales agreement (the "sales agreement") with Cowen and Company, LLC ("Cowen"), relating to shares of our common stock offered by this prospectus supplement. In accordance with the terms of the sales agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to $100,000,000 from time to time through Cowen acting as our agent.

Our common stock is traded on The Nasdaq Global Select Market under the symbol "RLYB." On August 5, 2022, the last reported sale price of our common stock was $11.25 per share.

Sales of our common stock, if any, under this prospectus supplement and the accompanying prospectus will be made in sales deemed to be "at the market offerings" as defined in Rule 415(a)(4) promulgated under the Securities Act of 1933, as amended (the "Securities Act"). Cowen is not required to sell any specific amount of securities, but will act as our sales agent using commercially reasonable efforts consistent with its normal trading and sales practices, on mutually agreed terms between Cowen and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

The compensation to Cowen for sales of common stock sold pursuant to the sales agreement will be equal to 3.0% of the gross proceeds of any shares of common stock sold under the sales agreement. In connection with the sale of the common stock on our behalf, Cowen will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of Cowen will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to Cowen with respect to certain liabilities, including liabilities under the Securities Act or the Securities Exchange Act of 1934, as amended (the "Exchange Act").

Our business and an investment in our common stock involve significant risks. These risks are described under the caption "Risk Factors" beginning on page S-5 of this prospectus supplement and in the documents incorporated by reference into this prospectus supplement and the accompanying prospectus.

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

Cowen

August 15, 2022

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PROSPECTUS SUPPLEMENT

PROSPECTUS

ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is the prospectus supplement, which describes the specific terms of this offering and certain other matters relating to us and our business. The second part, the accompanying prospectus, contains and incorporates by reference important business and financial information about us, a description of our common stock and certain other information about us and this offering. This prospectus supplement and the accompanying prospectus are part of a registration statement that we filed with the Securities and Exchange Commission (the "SEC"). By using a shelf registration statement, we may, from time to time, sell any combination of the securities described in the accompanying prospectus in one or more offerings, up to a total dollar amount of $300,000,000. Under this prospectus supplement, we may offer shares of our common stock having an aggregate offering price of up to $100,000,000 from time to time at prices and on terms to be determined by the market conditions at the time of the offering. The $100,000,000 of shares of common stock that may be sold under this prospectus supplement are included in the $300,000,000 of securities that may be sold under the registration statement. You should read carefully this prospectus supplement, the accompanying prospectus and any free writing prospectus, together with the additional information incorporated by reference in this prospectus supplement described below under "Where You Can Find More Information" before making an investment in our common stock.

You should rely only on the information contained or incorporated by reference in this prospectus supplement, the accompanying prospectus and in any free writing prospectuses we may provide to you in connection with this offering. We have not, and Cowen has not, authorized anyone to give you any additional information different from that contained in this prospectus supplement, the accompanying prospectus or any free writing prospectus provided in connection with this offering. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the accompanying prospectus and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement and the accompanying prospectus must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement outside the United States. This prospectus supplement and the accompanying prospectus are not an offer to sell or solicitation of an offer to buy our securities in any circumstances under which or jurisdiction in which the offer or solicitation is unlawful.

Unless the context otherwise indicates, the terms "Rallybio," "Company," "we," "us," and "our" as used in this prospectus supplement refer to Rallybio Corporation and its subsidiaries.

SUMMARY

The following is a summary of selected information contained elsewhere or incorporated by reference in this prospectus supplement and the accompanying prospectus. It does not contain all of the information that you should consider before buying our common stock. You should read this entire prospectus supplement and the accompanying prospectus carefully, as well as any documents incorporated by reference into this prospectus supplement or the accompanying prospectus, and any free writing prospectus we have prepared, including the material referenced under the heading "Risk Factors".

Overview

We are a clinical-stage biotechnology company built around a team of seasoned industry experts with a shared purpose and a track record of success in discovering, developing, manufacturing and delivering therapies that meaningfully improve the lives of patients suffering from severe and rare diseases. Our mission at Rallybio is aligned with our expertise, and we believe we have assembled the best people, partners and science to forge new paths to life-changing therapies. Since our launch in January 2018, we have acquired a portfolio of promising product candidates and we are focused on further expanding our portfolio with the goal of making a profound impact on the lives of even more patients. We are drawing on our decades of knowledge and experience with a determination to tackle the undone, the too difficult, the inaccessible – and change the odds for rare disease patients.

Our most advanced program is for the prevention of fetal and neonatal alloimmune thrombocytopenia ("FNAIT"), a potentially life-threatening rare hematological disease that impacts fetuses and newborns. We are evaluating RLYB211, a polyclonal anti-HPA-1a antibody, in a Phase 1/2 clinical trial, which we believe has established proof of concept for RLYB211 and provides support for our proposed mechanism of action. Our lead product candidate is RLYB212, a monoclonal anti-HPA-1a antibody. We submitted a clinical trial application ("CTA") for RLYB212 in July 2021 and initiated a Phase 1 first-in-human trial in Germany in the fourth quarter of 2021. In January 2022, we announced that the first subjects were dosed in the Phase 1 study of RLYB212. This ongoing single-blind, placebo-controlled Phase 1 study is designed to evaluate the safety and pharmacokinetic ("PK") of single and repeat subcutaneous doses of RLYB212 in HPA-1a negative healthy subjects.

In August 2022, we announced that the clinical data from our ongoing Phase 1b proof-of-concept study of subcutaneous RLYB212 shows rapid and complete elimination of transfused HPA-1a positive platelets. These data are consistent with the projected effective therapeutic target concentrations of RLYB212 required to prevent maternal alloimmunization and FNAIT. In order to further characterize the advantages associated with subcutaneous dosing, we are amending the protocol to expand the dose range of RLYB212. This amendment will provide a broader range of PK and pharmacodynamics ("PD") data to inform decision-making as we seek to select dosing for a future registrational study. We expect to discuss the preliminary platelet elimination data by the end of the third quarter of 2022 as planned and to release proof-of-concept data in the first quarter of 2023.

Additionally, in the third quarter of 2021, we initiated a FNAIT natural history alloimmunization study. This prospective, non-interventional, multinational natural history study is designed to screen up to 30,000 expectant mothers presenting at Gestation Week 10 to 14 prenatal visit to determine the frequency of women at higher FNAIT risk among expectant mothers of different racial and ethnic characteristics, as well as the frequency of HPA-1a alloimmunization and pregnancy outcomes among these women. We expect that data from this study will contribute to a control dataset for a future single-arm Phase 2/3 registration trial for RLYB212. The FNAIT natural history study will operationalize de novo the laboratory test paradigm for FNAIT risk and generate FNAIT laboratory test performance data for future regulatory discussions. Screening of expectant mothers is currently underway.

We are also focused on developing therapies that address diseases of complement dysregulation, including paroxysmal nocturnal hemoglobinuria ("PNH"), generalized myasthenia gravis ("gMG"), and ophthalmic disorders. RLYB116 is a novel, potentially long-acting, subcutaneously administered inhibitor of complement factor 5 ("C5") in development for the treatment of patients with PNH and gMG. We received approval in the fourth quarter of 2021 for a Human Research Ethics Committee ("HREC") submission to support the Phase 1 trial of RLYB116 in healthy participants and in the first quarter of 2022, we initiated the Phase 1 trial in Australia. The single-blind, placebo-controlled dose escalation study is designed to evaluate the safety, PK, and pharmacodynamics of single dose RLYB116 in healthy volunteers and remains on track, with initial data expected for the 30 mg dose in the fourth quarter of 2022. RLYB114 is a pegylated C5 inhibitor in preclinical development for the treatment of complement-mediated ophthalmic diseases.

In May 2022, we obtained worldwide exclusive rights to Sanofi's KY1066, now referred to as RLYB331, a preclinical potentially first-in-class antibody. We believe RLYB331 has the potential to address a significant unmet need for patients with severe anemias with ineffective erythropoiesis and iron overload, including beta thalassemia and a subset of myelodysplastic syndromes. Currently these patients are underserved by the existing standard of care. RLYB331 is a monoclonal antibody that inhibits Matriptase-2 ("MTP-2"). The inhibition of MTP-2 significantly increases levels of hepcidin, decreases iron load and treats ineffective erythropoiesis. We are conducting IND-enabling activities for RLYB331 to support transition of the asset into clinical development.

Additionally, in collaboration with Exscientia Limited ("Exscientia"), we have two discovery-stage programs focused on the identification of small molecule therapeutics for patients with rare metabolic diseases. Rallybio, together with its partner Exscientia, continues to work toward the selection of a development candidate to advance into the clinic targeting ENPP1 for the treatment of patients with hypophosphatasia ("HPP"). Investigational new drug enabling studies are expected to commence in the second half of 2022.

Since inception, we have devoted substantially all of our resources to raising capital, organizing and staffing our company, business planning, conducting discovery and research activities, acquiring or discovering product candidates, establishing and protecting our intellectual property portfolio, developing and progressing our product candidates, preparing for clinical trials and establishing arrangements with third parties for the manufacture of our product candidates and component materials, including activities relating to our preclinical development and manufacturing activities for each of our five programs. We do not have any product candidates approved for sale and have not generated any revenue from product sales. Since our inception, we have funded our operations primarily through equity financings.

Implications of Being an Emerging Growth Company and a Smaller Reporting Company

We are an "emerging growth company," as defined in the Jumpstart Our Business Act of 2012. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year following the fifth anniversary of our initial public offering, (2) the last day of the fiscal year in which we have total annual gross revenue of at least $1.07 billion, (3) the last day of the fiscal year 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 last business day of our second fiscal quarter, and (4) the date on which we have issued more than $1.07 billion in non-convertible debt during the prior three-year period. For so long as we remain an emerging growth company, we are permitted and intend to rely on exemptions from certain disclosure and other requirements that are applicable to other public companies that are not emerging growth companies. Accordingly, the information contained or incorporated by reference herein may be different than the information you receive from other public companies in which you hold stock.

We are also a "smaller reporting company" as defined in Item 10(f)(1) of Regulation S-K. We may continue to be a smaller reporting company even after we are no longer an emerging growth company. Smaller reporting companies may take advantage of certain scaled disclosure obligations. We will remain a smaller reporting company until the last day of the fiscal year in which (1) the aggregate value of our voting and non-voting common stock held by non-affiliates equaled or exceeded $250 million on the last business day of our second fiscal quarter, or (2) our annual revenues equaled or exceeded $100 million during such completed fiscal year and the value of our voting and non-voting common stock held by non-affiliates equaled or exceeded $700 million measured on the last business day of our second fiscal quarter.

Corporate Information and Reorganization

Our predecessor, Rallybio Holdings, LLC ("Rallybio Holdings"), was formed in Delaware in March 2018. In June 2021, Rallybio IPD, LLC, which was formed in May 2020, was converted from a Delaware limited liability company into a Delaware Corporation and was renamed Rallybio Corporation. On June 30, 2021, prior to our initial public offering, we completed a liquidation and corporate reorganization (the "Reorganization"), whereby Rallybio Holdings liquidated and the unitholders of Rallybio Holdings became the holders of common stock of Rallybio Corporation. Rallybio Corporation became the operating entity, with four direct, wholly-owned subsidiaries.

Our principal executive offices are located at 234 Church Street, Suite 1020, New Haven, CT 06510 and our telephone number is (203) 859-3820. Our corporate website address is www.rallybio.com. Information contained on or accessible through our website is not part of this prospectus supplement or the accompanying prospectus.

THE OFFERING

Common stock offered by us	Shares of common stock having an aggregate offering price of up to $100,000,000.
Common stock to be outstanding after this offering	Up to 41,019,859 shares, assuming sales at a price of $11.25 per share, which was the closing price on The Nasdaq Global Select Market on August 5, 2022. Actual number of shares issued will vary depending on the price at which shares may be sold from time to time under this offering.
Manner of offering	"At the market offering" that may be made from time to time through our agent, Cowen. See "Plan of Distribution" on page S-11.
Use of proceeds	If we issue and sell all of the shares of our common stock pursuant to this prospectus supplement, we anticipate our net proceeds, after deducting estimated commissions and expenses payable by us, will be approximately $96,685,000. We intend to use any net proceeds from this offering primarily for research and development expenditures, preclinical and clinical development and commercialization of our product candidates, the acquisition or in-licensing of products or product candidates, business or technologies, or collaborations, and general corporate purposes. See "Use of Proceeds" on page S-8.
Risk factors	See "Risk Factors" beginning on page S-5 of this prospectus supplement for a discussion of factors that you should read and consider before investing in our securities.
Nasdaq Global Select Market ticker symbol	"RLYB"

The number of shares of our common stock that will be outstanding immediately after this offering as shown above is based on 32,130,970 shares outstanding as of June 30, 2022 and excludes, each as of June 30, 2022:

- 249,700 shares of common stock issuable upon the exercise of outstanding stock options under the Rallybio Corporation 2021 Equity Incentive Plan (the "2021 Plan") at a weighted-average exercise price of $13.44 per share;
- 87,000 shares of common stock issuable upon the vesting of restricted stock units under the 2021 Plan;
- 1,826,218 shares of common stock reserved for future issuance under our 2021 Plan; and
- 612,633 shares of common stock reserved for future issuance under the Rallybio Corporation 2021 Employee Stock Purchase Plan (the "2021 ESPP").

RISK FACTORS

Investing in our securities involves a high degree of risk. You should carefully consider the risks and uncertainties described under "Item 1A. Risk Factors" in our most recent Annual Report on Form 10-K, as amended and revised or supplemented by any subsequent Quarterly Report on Form 10-Q and Current Reports on Form 8-K, as filed with the SEC and incorporated by reference in this prospectus supplement and the accompanying prospectus and the "Risk Factors" section in this prospectus supplement. If any of the events or developments described therein or below were to occur, our business, prospects, operating results and financial condition could suffer materially, the trading price of our common stock could decline, and you could lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business.

Risks related to this offering

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively

We cannot specify with certainty the particular uses of the net proceeds we will receive from this offering. Our management will have broad discretion in the application of the net proceeds, including for any of the purposes described in "Use of Proceeds." Accordingly, you will have to rely upon the judgment of our management with respect to the use of the proceeds, with only limited information concerning management's specific intentions. Our management may spend a portion or all of the net proceeds from this offering in ways that our stockholders may not desire or that may not yield a favorable return. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development efforts and the status of and results from preclinical and clinical trials, as well as any third party intellectual property or other assets that we may opportunistically identify and seek to license or acquire or any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. Because the number and variability of factors that will determine our use of any proceeds from this offering, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could harm our business, financial condition, results of operations and prospects. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value.

You may experience immediate and substantial dilution in the book value per share of the common stock you purchase.

Because the prices per share at which shares of our common stock are sold in this offering may be substantially higher than the book value per share of our common stock, you may suffer immediate and substantial dilution in the net tangible book value of the common stock you purchase in this offering. The shares sold in this offering, if any, will be sold from time to time at various prices. If we sell shares in this offering at a price that is higher than the book value per share of our common stock, investors in this offering will experience dilution.

We plan to sell shares of our common stock 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 the offering described in this prospectus supplement at different times will likely pay different prices and may experience different outcomes in their investment results. We will have discretion, subject to the effect of market conditions, to vary the timing, prices, and numbers of shares sold in this offering. Investors may experience a decline in the value of their shares of our common stock.

The actual number of shares we will issue under the sales agreement, at any one time or in total, is uncertain.

Subject to certain limitations in the sales agreement and compliance with applicable law, we have the discretion to deliver a placement notice to Cowen at any time throughout the term of the sales agreement. The number of shares that are sold by Cowen after delivering a placement notice will fluctuate based on the market price of the common shares during the sales period and limits we set with Cowen. Because the price per share of each share sold will fluctuate based on the market price of our common stock during the sales period, it is not possible at this stage to predict the number of shares that will be ultimately issued.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and any information incorporated by reference into this prospectus supplement or the accompanying prospectus may contain forward-looking statements that are based on management's beliefs and assumptions and on information then currently available to management. All statements other than statements of historical facts contained in this prospectus supplement, the accompanying prospectus and any information incorporated by reference into this prospectus supplement or the accompanying prospectus are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "expect," "plan," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential" or "continue" or the negative of these terms or other similar expressions, although not all forward-looking statements contain these words. Forward-looking statements include, but are not limited to, statements concerning:

- the initiation, timing, progress, results, and cost of our research and development programs, and our current and future preclinical and clinical studies, including statements regarding the timing of initiation and completion of our clinical trials for RLYB211, RLYB212, RLYB116, and RLYB331, and the natural history study for our FNAIT prevention program, and related preparatory work, and the period during which the results of the trials will become available;
- the success, cost and timing of our clinical development of our product candidates, including RLYB212, RLYB116 and RLYB114;
- our ability to initiate, recruit and enroll patients in and conduct our clinical trials at the pace that we project;
- our ability to obtain and maintain regulatory approval of our product candidates, and any related restrictions, limitations or warnings in the label of any of our product candidates, if approved;
- our ability to compete with companies currently marketing or engaged in the development of treatments for diseases that our product candidates are designed to target, including PNH and gMG;
- our reliance on third parties to conduct our clinical trials;
- our reliance on third parties to manufacture drug substance for use in our clinical trials;
- the size and growth potential of the markets for RLYB212, RLYB116, RLYB114 and any of our current product candidates or other product candidates we may identify and pursue, and our ability to serve those markets;
- our ability to expand our pipeline through collaborations, partnerships and other transactions with third parties;
- our ability to identify and advance through clinical development any additional product candidates;
- the commercialization of our current product candidates and any other product candidates we may identify and pursue, if approved, including our ability to successfully build commercial infrastructure or enter into collaborations with third parties to market our current product candidates and any other product candidates we may identify and pursue;
- our ability to retain and recruit key personnel;
- our ability to obtain and maintain adequate intellectual property rights;
- our expectations regarding government and third-party payor coverage and reimbursement;
- our estimates of our expenses, ongoing losses, capital requirements and our needs for or ability to obtain additional financing;
- our expected uses of the net proceeds from our initial public offering or any subsequent offerings;
- the potential benefits of strategic collaboration agreements, our ability to enter into strategic collaborations or arrangements, including potential business development opportunities and potential licensing partnerships, and our ability to attract collaborators with development, regulatory and commercialization expertise;
- our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act of 2012;
- our financial performance;
- developments and projections relating to our competitors or our industry; and
- other risks and uncertainties, including those listed under the section titled "Risk Factors."

The forward-looking statements in this prospectus supplement and any information incorporated by reference into this prospectus supplement are only predictions and are based largely on our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. These forward-looking statements included in this prospectus supplement speak only as of the date of this prospectus supplement and are subject to a number of known and unknown risks, uncertainties and assumptions, including the risk factors and cautionary statements described in other documents that we file from time to time with the SEC, specifically under “Item 1A. Risk Factors” and elsewhere in our most recent Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q and our Current Reports on Form 8-K. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified and some of which are beyond our control, you should not rely on these forward-looking statements as guarantees of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Moreover, we operate in an evolving environment. New risks and uncertainties may emerge from time to time, and it is not possible for management to predict all risks and uncertainties. Except as required by applicable law, we are not obligated to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

USE OF PROCEEDS

If we issue and sell all of the shares of our common stock pursuant to this prospectus supplement, we anticipate that the net proceeds we will receive from this offering will be approximately $96,685,000, after deducting the estimated offering commissions and expenses payable by us. The amount of any proceeds we receive from this offering will depend upon the number of shares of our common stock sold and the market prices at which they are sold. There can be no assurance that we will be able to sell any shares under or fully utilize the sales agreement with Cowen as a source of financing.

We currently estimate that we will use any net proceeds from this offering as follows:

- research and development expenditures, preclinical and clinical development and commercialization of our product candidates, the acquisition or in-licensing of products or product candidates, business or technologies, or collaborations; and
- the remainder for working capital and other general corporate purposes.

This expected use of the net proceeds from this offering represents our intentions based upon our current plans and business conditions. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development efforts and the status of and results from preclinical and clinical trials, as well as any third party intellectual property or other assets that we may opportunistically identify and seek to license or acquire or any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering.

Pending the uses described above, we plan to invest the net proceeds from this offering in short-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 (deficit) as of June 30, 2022 was approximately $147.9 million, or $4.60 per share of common stock. Our net tangible book value (deficit) is the amount of our total tangible assets less our total liabilities and the carrying value of our preferred stock, which is not included within stockholders' equity (deficit). Net tangible book value (deficit) per share represents net tangible book value (deficit) divided by the 32,130,970 shares of common stock outstanding as of June 30, 2022.

The following table illustrates this dilution on a per share basis:

Offering price per share		$11.25(1)
Net tangible book value per share as of June 30, 2022	$4.60	
Increase in net tangible book value per share attributable to the offering	$1.36	
As-adjusted net tangible book value per share after giving effect to the offering		$ 5.96
Dilution in net tangible book value per share to new investors		$ 5.29

(1) Assuming a purchase price of $11.25, the closing price per share of our common stock on August 5, 2022.

The table and discussion above are based on the number of shares of our common stock outstanding on June 30, 2022, and exclude:

- 249,700 shares of common stock issuable upon the exercise of outstanding stock options under the 2021 Plan, at a weighted-average exercise price of $13.44 per share;
- 87,000 shares of common stock issuable upon the vesting of restricted stock units under the 2021 Plan;
- 1,826,218 shares of common stock reserved for future issuance under the 2021 Plan; and
- 612,633 shares of common stock reserved for future issuance under the 2021 ESPP.

To the extent that outstanding stock options are exercised, new stock options are issued, or we issue additional shares of common stock in the future, there will be further dilution to investors. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our capital stock. We intend to retain future earnings, if any, to finance the operation and expansion of our business and do not anticipate paying any cash dividends in the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our board of directors after considering our financial condition, results of operations, capital requirements, business prospects and other factors our board of directors deems relevant, and subject to the restrictions contained in any future financing instruments. Our ability to pay cash dividends on our capital stock in the future may also be limited by the terms of any preferred securities we may issue or agreements governing any indebtedness we may incur.

PLAN OF DISTRIBUTION

We have entered into a sales agreement with Cowen, under which we may issue and sell from time to time up to $100,000,000 of our common stock through Cowen as our sales agent. Sales of our common stock, if any, will be made at market prices 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 The Nasdaq Global Select Market or any other trading market for our common stock. If authorized by us in writing, Cowen may purchase shares of our common stock as principal.

Cowen 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 Cowen. We will designate the maximum amount of common stock to be sold through Cowen on a daily basis or otherwise determine such maximum amount together with Cowen. Subject to the terms and conditions of the sales agreement, Cowen will use its commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us. We may instruct Cowen not to sell common stock if the sales cannot be effected at or above the price designated by us in any such instruction. Cowen or we may suspend the offering of our common stock being made through Cowen under the sales agreement upon proper notice to the other party. Cowen and we each have the right, by giving written notice as specified in the sales agreement, to terminate the sales agreement in each party's sole discretion at any time.

The aggregate compensation payable to Cowen as sales agent will be equal to 3.0% of the gross sales price of the shares sold through it pursuant to the sales agreement. We have also agreed to reimburse Cowen up to $75,000 of Cowen's actual outside legal expenses incurred by Cowen in connection with this offering. We estimate that the total expenses of the offering payable by us, excluding commissions payable to Cowen under the sales agreement, will be approximately $315,000.

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, will equal our net proceeds for the sale of such common stock.

Cowen will provide written confirmation to us following the close of trading on The Nasdaq Global Select Market on each day in which common stock is sold through it as sales agent under the sales agreement. Each confirmation will include the number of shares of common stock sold through it as sales agent on that day, the volume weighted-average price of the shares sold, the percentage of the daily trading volume and the net proceeds to us.

We will report at least quarterly the number of shares of common stock sold through Cowen under the sales agreement, the net proceeds to us and the compensation paid by us to Cowen in connection with the sales of common stock.

Settlement for sales of common stock will occur, unless the parties agree otherwise, on the second business day that is also a trading day following the date on which any sales were made in return for payment of the net proceeds to us. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

In connection with the sales of our common stock on our behalf, Cowen may be deemed to be an "underwriter" within the meaning of the Securities Act, and the compensation paid to Cowen may be deemed to be underwriting commissions or discounts. We have agreed in the sales agreement to provide indemnification and contribution to Cowen against certain liabilities, including liabilities under the Securities Act. As sales agent, Cowen will not engage in any transactions that stabilizes our common stock.

Our common stock is listed on The Nasdaq Global Select Market and trades under the symbol "RLYB." The transfer agent of our common stock is Computershare Trust Company, N.A.

Cowen and/or its affiliates have provided, and may in the future provide, various investment banking and other financial services for us for which services they have received and, may in the future receive, customary fees.

EXPERTS

The financial statements of Rallybio Corporation as of December 31, 2021 and 2020, and for each of the two years in the period ended December 31, 2021, incorporated by reference in this Prospectus, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report. Such financial statements are incorporated by reference in reliance upon the report of such firm given their authority as experts in accounting and auditing.

LEGAL MATTERS

The validity of the issuance of the securities offered pursuant to this prospectus supplement will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. Cowen and Company, LLC is being represented in connection with this offering by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., New York, New York.

WHERE YOU CAN FIND MORE INFORMATION

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

We are required to file annual and quarterly reports, current reports, proxy statements, and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.rallybio.com as soon as reasonably practicable after filing such documents with the SEC. The information contained on our website is not part of this prospectus supplement or the accompanying prospectus. You can read our SEC filings, including the registration statement, on the SEC's website at www.sec.gov.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" certain information into this prospectus supplement and the accompanying prospectus the information we file with it, which means that we can disclose important information about us by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus, and information in documents that we file later with the SEC will automatically update and supersede information in this prospectus supplement and the accompanying prospectus. We incorporate by reference into this prospectus supplement and the accompanying prospectus the documents listed below and any future filings, including all filings made after the date of the filing of the registration statement of which this prospectus supplement and the accompanying prospectus are part and prior to the effectiveness of such registration statement, made by us with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, except for information "furnished" under Items 2.02, 7.01 or 9.01 on Form 8-K or other information "furnished" to the SEC which is not deemed filed and not incorporated in this prospectus supplement or the accompanying prospectus, in each case, until the offering described under this prospectus supplement is termination or completed:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the SEC on March 15, 2022;
- our Quarterly Reports on Form 10-Q for the periods ended March 31, 2022 and June 30, 2022, as filed with the SEC on May 10, 2022 and August 8, 2022, respectively;
- our Current Reports on Form 8-K, as filed with the SEC on April 4, 2022 (only with respect to Item 5.02), May 10, 2022 (only with respect to Items 1.01 and 8.01 and Exhibit 99.2), May 27, 2022, June 2, 2022 and August 2, 2022 (only with respect to Item 5.02);
- portions of the Definitive Proxy Statement on Schedule 14A, as filed with the SEC on April 25, 2022, that are incorporated by reference into Part III of our Annual Report on Form 10-K for the year December 31, 2021, as filed with the SEC on March 15, 2022; and
- the description of capital stock contained in the Registration Statement on Form 8-A, as filed with the SEC on July 29, 2021, as supplemented by the description of capital stock filed contained in Exhibit 4.3 to our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the SEC on March 15, 2022, including any amendment or report filed for the purpose of updating such description.

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

Upon request, either orally or in writing, we will provide, without charge, to each person, including any beneficial owner, to whom a copy of this prospectus supplement and the accompanying prospectus is delivered, a copy of the documents incorporated by reference into this prospectus supplement and the accompanying prospectus but not delivered with the prospectus. You may request a copy of these filings and any exhibits we have specifically incorporated by reference as an exhibit in this prospectus supplement, at no cost, by writing to us at the following address: Rallybio Corporation, 234 Church Street, Suite 1020, New Haven CT, 06510, United States, Attention: Investor Relations, or via telephone at (203) 859-3820.

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

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PROSPECTUS

$300,000,000

Rallybio Corporation

Common Stock

Preferred Stock

Warrants

Units

We may offer and sell common stock, preferred stock, warrants, or units, described in this prospectus from time to time in one or more transactions.

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

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

General Information

Our common stock is traded on The Nasdaq Global Select Market under the symbol "RLYB." On August 5, 2022, the closing price of our common stock was $11.25 per share.

We have not yet determined whether the other securities that may be offered by this prospectus will be listed on any exchange, interdealer quotation system or over-the-counter market. If we decide to seek the listing of any such securities upon issuance, the prospectus supplement relating to those securities will disclose the exchange, quotation system or market on which those securities will be listed.

Investing in our securities involves certain risks. See "Risk Factors" beginning on page 4 of this prospectus for a discussion of the factors you should carefully consider before deciding to purchase our securities.

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, 2022.

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ABOUT THIS PROSPECTUS

This prospectus is part of a shelf registration statement that we filed with the Securities and Exchange Commission (the "SEC"). By using a shelf registration statement, we may, from time to time, sell any combination of the securities described in this prospectus in one or more offerings, up to a total dollar amount of $300,000,000. This prospectus provides you with a general description of the securities we may offer. Each time we sell securities, we will provide a prospectus supplement and, if necessary, a free writing prospectus, that will contain specific information about the terms of that offering. The prospectus supplement and, if necessary, a free writing prospectus, may also add to, update or change information contained in this prospectus. Accordingly, to the extent inconsistent, the information in this prospectus will be deemed to be modified or superseded by any inconsistent information contained in a prospectus supplement or a free writing prospectus. You should read carefully this prospectus, the applicable prospectus supplement and any free writing prospectus, together with the additional information incorporated by reference in this prospectus described below under "Where You Can Find More Information" before making an investment in our securities.

We have not authorized anyone to give you any additional information different from that contained in this prospectus, any accompanying prospectus supplement or any free writing prospectus provided in connection with an offering. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you.

You should assume that the information appearing in this prospectus, any prospectus supplement, 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 since that date.

This prospectus is not an offer to sell or solicitation of an offer to buy our securities in any circumstances under which or jurisdiction in which the offer or solicitation is unlawful. Unless the context otherwise indicates, the terms "Rallybio," "Company," "we," "us," and "our" as used in this prospectus refer to Rallybio Corporation and its subsidiaries. The phrase "this prospectus" refers to this prospectus and any applicable prospectus supplement, unless the context otherwise requires.

TRADEMARKS

We use Rallybio as a trademark in the United States and/or in other countries. This prospectus and documents incorporated by reference herein and therein contain references to our trademark and to those belonging to other entities, including Affibody®. Solely for convenience, trademarks and trade names referred to in this prospectus and documents incorporated by reference herein and therein, including logos, artwork and other visual displays, may appear without the ® or TM symbols, but such references are not intended to indicate in any way that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other entities' trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other entity.

MARKET AND INDUSTRY DATA

Unless otherwise indicated, information contained in this prospectus, and documents incorporated by reference herein and therein, concerning our industry and the markets in which we operate, including our general expectations, market position and market opportunity, is based on our management's estimates and research, as well as industry and general publications and research and studies conducted by third parties. We believe that the information from these third-party publications, research and studies included in this prospectus, and documents incorporated by reference herein and therein, is reliable. Management's estimates are derived from publicly available information, their knowledge of our industry and their assumptions based on such information and knowledge, which we believe to be reasonable. This data involves a number of assumptions and limitations which are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in "Risk Factors." These and other factors could cause our future performance to differ materially from our assumptions and estimates.

SUMMARY

The following is a summary of selected information contained elsewhere or incorporated by reference in this prospectus. It does not contain all of the information that you should consider before buying our securities. You should read this entire prospectus carefully, the documents incorporated by reference into this prospectus, and any free writing prospectus we have prepared, including the material referenced under the heading "Risk Factors".

Overview

We are a clinical-stage biotechnology company built around a team of seasoned industry experts with a shared purpose and a track record of success in discovering, developing, manufacturing and delivering therapies that meaningfully improve the lives of patients suffering from severe and rare diseases. Our mission at Rallybio is aligned with our expertise, and we believe we have assembled the best people, partners and science to forge new paths to life-changing therapies. Since our launch in January 2018, we have acquired a portfolio of promising product candidates and we are focused on further expanding our portfolio with the goal of making a profound impact on the lives of even more patients. We are drawing on our decades of knowledge and experience with a determination to tackle the undone, the too difficult, the inaccessible – and change the odds for rare disease patients.

Our most advanced program is for the prevention of fetal and neonatal alloimmune thrombocytopenia ("FNAIT"), a potentially life-threatening rare hematological disease that impacts fetuses and newborns. We are evaluating RLYB211, a polyclonal anti-HPA-1a antibody, in a Phase 1/2 clinical trial, which we believe has established proof of concept for RLYB211 and provides support for our proposed mechanism of action. Our lead product candidate is RLYB212, a monoclonal anti-HPA-1a antibody. We submitted a clinical trial application ("CTA") for RLYB212 in July 2021 and initiated a Phase 1 first-in-human trial in Germany in the fourth quarter of 2021. In January 2022, we announced that the first subjects were dosed in the Phase 1 study of RLYB212. This ongoing single-blind, placebo-controlled Phase 1 study is designed to evaluate the safety and pharmacokinetic ("PK") of single and repeat subcutaneous doses of RLYB212 in HPA-1a negative healthy subjects.

In August 2022, we announced that the clinical data from our ongoing Phase 1b proof-of-concept study of subcutaneous RLYB212 shows rapid and complete elimination of transfused HPA-1a positive platelets. These data are consistent with the projected effective therapeutic target concentrations of RLYB212 required to prevent maternal alloimmunization and FNAIT. In order to further characterize the advantages associated with subcutaneous dosing, we are amending the protocol to expand the dose range of RLYB212. This amendment will provide a broader range of PK and pharmacodynamics ("PD") data to inform decision-making as we seek to select dosing for a future registrational study. We expect to discuss the preliminary platelet elimination data by the end of the third quarter of 2022 as planned and to release proof-of-concept data in the first quarter of 2023.

Additionally, in the third quarter of 2021, we initiated a FNAIT natural history alloimmunization study. This prospective, non-interventional, multinational natural history study is designed to screen up to 30,000 expectant mothers presenting at Gestation Week 10 to 14 prenatal visit to determine the frequency of women at higher FNAIT risk among expectant mothers of different racial and ethnic characteristics, as well as the frequency of HPA-1a alloimmunization and pregnancy outcomes among these women. We expect that data from this study will contribute to a control dataset for a future single-arm Phase 2/3 registration trial for RLYB212. The FNAIT natural history study will operationalize de novo the laboratory test paradigm for FNAIT risk and generate FNAIT laboratory test performance data for future regulatory discussions. Screening of expectant mothers is currently underway.

We are also focused on developing therapies that address diseases of complement dysregulation, including paroxysmal nocturnal hemoglobinuria ("PNH"), generalized myasthenia gravis ("gMG"), and ophthalmic disorders. RLYB116 is a novel, potentially long-acting, subcutaneously administered inhibitor of complement factor 5 ("C5") in development for the treatment of patients with PNH and gMG. We received approval in the fourth quarter of 2021 for a Human Research Ethics Committee ("HREC") submission to support the Phase 1 trial of RLYB116 in healthy participants and in the first quarter of 2022, we initiated the Phase 1 trial in Australia. The single-blind, placebo-controlled dose escalation study is designed to evaluate the safety, PK, and pharmacodynamics of single dose RLYB116 in healthy volunteers and remains on track, with initial data expected for the 30 mg dose in the fourth quarter of 2022. RLYB114 is a pegylated C5 inhibitor in preclinical development for the treatment of complement-mediated ophthalmic diseases.

In May 2022, we obtained worldwide exclusive rights to Sanofi's KY1066, now referred to as RLYB331, a preclinical potentially first-in-class antibody. We believe RLYB331 has the potential to address a significant unmet need for patients with severe anemias with ineffective erythropoiesis and iron overload, including beta thalassemia and a subset of myelodysplastic syndromes. Currently these patients are underserved by the existing standard of care. RLYB331 is a monoclonal antibody that inhibits Matriptase-2 ("MTP-2"). The inhibition of MTP-2 significantly increases levels of hepcidin, decreases iron load and treats ineffective erythropoiesis. We are conducting IND-enabling activities for RLYB331 to support transition of the asset into clinical development.

Additionally, in collaboration with Exscientia Limited ("Exscientia"), we have two discovery-stage programs focused on the identification of small molecule therapeutics for patients with rare metabolic diseases. Rallybio, together with its partner Exscientia, continues to work toward the selection of a development candidate to advance into the clinic targeting ENPP1 for the treatment of patients with hypophosphatasia ("HPP"). Investigational new drug enabling studies are expected to commence in the second half of 2022.

Since inception, we have devoted substantially all of our resources to raising capital, organizing and staffing our company, business planning, conducting discovery and research activities, acquiring or discovering product candidates, establishing and protecting our intellectual property portfolio, developing and progressing our product candidates, preparing for clinical trials and establishing arrangements with third parties for the manufacture of our product candidates and component materials, including activities relating to our preclinical development and manufacturing activities for each of our five programs. We do not have any product candidates approved for sale and have not generated any revenue from product sales. Since our inception, we have funded our operations primarily through equity financings.

Corporate Information and Reorganization

Our predecessor, Rallybio Holdings, LLC ("Rallybio Holdings"), was formed in Delaware in March 2018. In June 2021, Rallybio IPD, LLC, which was formed in May 2020, was converted from a Delaware limited liability company into a Delaware Corporation and was renamed Rallybio Corporation. On June 30, 2021, prior to our initial public offering, we completed a liquidation and corporate reorganization (the "Reorganization"), whereby Rallybio Holdings liquidated and the unitholders of Rallybio Holdings became the holders of common stock of Rallybio Corporation. Rallybio Corporation became the operating entity, with four direct, wholly-owned subsidiaries.

Our principal executive offices are located at 234 Church Street, Suite 1020, New Haven, CT 06510 and our telephone number is (203) 859-3820. Our corporate website address is www.rallybio.com. Information contained on or accessible through our website is not part of this prospectus or any prospectus supplement.

RISK FACTORS

Investing in our securities involves a high degree of risk. You should carefully consider the risks and uncertainties described under "Item 1A. Risk Factors" in our most recent Annual Report on Form 10-K, as amended and revised or supplemented by any subsequent Quarterly Reports on Form 10-Q, each of which is on file with the SEC and incorporated by reference in this prospectus. If any of the events or developments described therein were to occur, our business, prospects, operating results and financial condition could suffer materially, the trading price of our common stock or other securities could decline, and you could lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business.

USE OF PROCEEDS

Except as otherwise provided in a prospectus supplement in connection with an offering of securities pursuant to this prospectus, we currently intend to use the net proceeds from the sale of any securities offered by us under this prospectus primarily for general corporate purposes. General corporate purposes may include, without limitation, research and development expenditures, preclinical and clinical development and commercialization of our product candidates, the acquisition or in-licensing of products or product candidates, business or technologies, collaborations, working capital and capital expenditures. We may temporarily invest the net proceeds we receive in short-term, interest-bearing obligations, investment-grade instruments, certificates of deposit or direct or guaranteed obligations of the U.S. government and its agencies.

We have not determined the amount of net proceeds to be used specifically for such purposes. As a result, management will have broad discretion in the application of the net proceeds we may receive, and investors will be relying on the judgment of our management regarding the application of our net proceeds. Additional information on the use of net proceeds we receive from the sale of securities covered by this prospectus may be set forth in the prospectus supplement relating to the specific offering.

GENERAL DESCRIPTION OF SECURITIES

We may offer under this prospectus:

- common stock;
- preferred stock;
- warrants to acquire common stock or preferred stock; or
- any combination of the foregoing, either individually or as units consisting or two or more securities.

The following description of the terms of these securities sets forth some of the general terms and provisions of securities that may be offered. The particular terms of securities offered by any prospectus supplement and the extent, if any, to which the general terms set forth below do not apply to those securities, will be described in the related prospectus supplement. In addition, if we offer securities as units, the terms of the units will be described in the applicable prospectus supplement. If the information contained in the prospectus supplement differs from the following description, you should rely on the information in the prospectus supplement.

Whenever references are made in this prospectus to information that will be included in a prospectus supplement, to the extent permitted by applicable law, rules or regulations, we may instead include such information or add, update or change the information contained in this prospectus by means of a post-effective amendment to the registration statement of which this prospectus is a part, through filings we make with the SEC that are incorporated by reference in this prospectus or by any other method as may be permitted under applicable law, rules or regulations.

DESCRIPTION OF COMMON STOCK

The following description of our common stock and certain provisions of our amended and restated certificate of incorporation and amended and restated bylaws is a summary and is qualified by reference to our amended and restated certificate of incorporation and our amended and restated bylaws, copies of which are included as exhibits to the registration statement on Form S-3 of which this prospectus is a part. Please refer to "Where You Can Find More Information" below for directions on obtaining these documents.

General

Under the terms of our amended and restated certificate of incorporation, our board of directors is authorized to issue up to 200,000,000 shares of our common stock, par value $0.0001 per share. As of June 30, 2022, we had 32,130,970 shares of common stock outstanding.

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined, in an uncontested election, by a majority of the votes cast by the stockholders entitled to vote on the election and, in a contested election, by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of any series of preferred stock that we may designate and issue in the future.

In the event of our liquidation or dissolution, the holders of common stock are entitled to receive an amount of our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock. Holders of common stock have no preemptive, subscription, redemption or conversion rights. Our outstanding shares of common stock are validly issued, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Anti-takeover Effects of Our Certificate of Incorporation and Our Bylaws

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

These provisions include:

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

Action by written consent; special meetings of stockholders. Our amended and restated certificate of incorporation provides that stockholder action can be taken only at an annual or special meeting of stockholders and cannot be taken by written consent in lieu of a meeting. Our amended and restated certificate of incorporation and our amended and restated bylaws also provide that, except as otherwise required by law, special meetings of the stockholders can only be called pursuant to a resolution adopted by a majority of our board of directors. Except as described above, stockholders will not be permitted to call a special meeting or to require our board of directors to call a special meeting.

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

Advance notice procedures. Our amended and restated bylaws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors. Stockholders at an annual meeting will only be able to consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors or by a stockholder who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given our Secretary timely written notice, in proper form, of the stockholder's intention to bring that business before the meeting. Although our amended and restated bylaws do not give our board of directors the power to approve or disapprove stockholder nominations of candidates or proposals regarding other business to be conducted at a special or annual meeting, our amended and restated bylaws may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control of us.

Supermajority approval requirements. The Delaware General Corporation Law (the "DGCL") generally provides that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws, unless either a corporation's certificate of incorporation or bylaws requires a greater percentage. Our amended and restated certificate of incorporation and our amended and restated bylaws provide that the affirmative vote of holders of at least 75% of the total votes eligible to be cast in the election of directors will be required to amend, alter, change or repeal specified provisions. This requirement of a supermajority vote to approve amendments to our amended and restated certificate of incorporation and our amended and restated bylaws could enable a minority of our stockholders to exercise veto power over any such amendments.

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

Exclusive forum. Our amended and restated certificate of incorporation provides that, subject to limited exceptions, the state or federal courts within the State of Delaware will be exclusive forums for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws, (4) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws or (5) any other action asserting a claim against us that is governed by the internal affairs doctrine; provided that, the exclusive forum provision does not apply to suits brought to enforce any liability or duty created by the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or to any claim for which the federal courts have exclusive jurisdiction. Our amended and restated certificate of incorporation also provides that, unless we consent in writing to the selection of an alternative forum, the U.S. federal district courts shall be the exclusive forum for the resolution of any claims arising under the Securities Act of 1933, as amended (the "Securities Act"). Although we believe these provisions benefit us by providing increased consistency in the application of Delaware and certain federal securities law, these provisions may have the effect of discouraging lawsuits against our directors and officers.

Section 203 of the DGCL

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

Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions: before the stockholder became interested, the corporation's board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder; upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances; or at or after the time the stockholder became interested, the business combination was approved by the board of directors of the corporation and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

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

Registration Rights

The Registration Rights Agreement, by and among Rallybio Corporation and the stockholders party thereto, dated as of July 28, 2021 (the "Registration Rights Agreement") grants the parties thereto certain registration rights in respect of the "registrable securities" held by them, which securities include (i) the shares of our common stock held by such stockholders following the Reorganization and prior to the consummation of our initial public offering and (ii) any common stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clause (i) above. The registration of shares of our common stock pursuant to the exercise of these registration rights would enable the holders thereof to sell such shares without restriction under the Securities Act when the applicable registration statement is declared effective. Under the Registration Rights Agreement, we will pay all expenses relating to such registrations, including the fees of one counsel for the participating holders, and the holders will pay all underwriting discounts and commissions relating to the sale of their shares. The Registration Rights Agreement also includes customary indemnification and procedural terms.

As of August 5, 2022, holders of 22,634,614 shares of our common stock are entitled to such registration rights pursuant to the Registration Rights Agreement. As to any particular registrable securities, such securities shall cease to be registrable securities when (w) a registration statement with respect to the sale of such securities shall have become effective under the Securities Act and such securities shall have been disposed of in accordance with such registration statement, (x) such holder is able to immediately sell such securities under Rule 144, promulgated under the Securities Act, or Rule 144, without any restrictions on transfer (including without application of paragraphs (c), (e), (f) and (h) of Rule 144), (y) such securities shall have been transferred pursuant to Rule 144, or (z) such securities shall have ceased to be outstanding.

Demand Registration Rights

Holders of at least 30% of the registrable securities then outstanding may request that we file a registration statement on Form S-1 with respect to at least 20% of the registrable securities then outstanding, if the aggregate offering price of the registrable securities requested to be registered would exceed $20 million.

Holders of not less than 25% of the registrable shares then outstanding may request that we file a registration statement on Form S-3 with respect to such holders' registrable securities then outstanding, if the aggregate offering price of the registrable securities requested to be registered would exceed $3 million.

Piggyback Registration Rights

In the event that we propose to register any of our securities under the Securities Act, either for our own account or for the account of other security holders, the stockholders party to the Investor Rights Agreement will be entitled to certain "piggyback" registration rights allowing them to include their registrable securities in such registration, subject to certain marketing and other limitations. As a result, whenever we propose to file a registration statement under the Securities Act other than with respect to a demand registration or a registration statement on Form S-4 or S-8, these holders will be entitled to notice of the registration and will have the right to include their registrable securities in the registration subject to certain limitations.

Transfer Agent and Registrar

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

DESCRIPTION OF PREFERRED STOCK

Under the terms of our amended and restated certificate of incorporation, our board of directors is authorized to issue up to 50,000,000 shares of our preferred stock, par value $0.0001 per share, in one or more series without stockholder approval. As of June 30, 2022, we had no shares of preferred stock outstanding. The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock.

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

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

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

DESCRIPTION OF WARRANTS

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

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

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

DESCRIPTION OF UNITS

The following is a general description of the terms of the units we may offer from time to time. Particular terms of the units will be described in the applicable unit agreements and the applicable prospectus supplement for the units. We urge you to read the applicable prospectus supplement related to the units that we may sell under this prospectus, as well as the complete unit agreements that will contain the terms of any units.

We may issue units consisting of any combination of the other types of securities offered under this prospectus in one or more series. We may evidence each series of units by unit certificates that we will issue under a separate agreement. We may issue units directly or under a unit agreement to be entered into between us and a unit agent. We will name any unit agent in the applicable prospectus supplement. Any unit agent will act solely as our agent in connection with the units of a particular series and will not assume any obligation or relationship of agency or trust for or with any holders or beneficial owners of units.

Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time, or at any time before a specified date. We may issue units in such amounts and in such numerous distinct series as we determine.

To the extent appropriate, the applicable prospectus supplement will contain, where applicable, the following terms and other information relating to the units:

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

PLAN OF DISTRIBUTION

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

- to or through underwriters or dealers;
- through one or more agents;
- as part of a collaboration with a third party;
- as part of an acquisition or merger with a third party;
- directly to purchasers or to a single purchaser;
- in "at the market offerings," within the meaning of Rule 415(a)(4) of the Securities Act to or through a market maker or into an existing trading market, or an exchange or otherwise; or
- any other method permitted pursuant to applicable law and described in an applicable prospectus supplement.

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

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

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

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

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

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

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

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

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

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

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

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

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

LEGAL MATTERS

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

EXPERTS

The financial statements of Rallybio Corporation incorporated by reference in this prospectus, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report. Such financial statements are incorporated by reference in reliance upon the report of such firm, given their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

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

We are required to file annual and quarterly reports, current reports, proxy statements, and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.rallybio.com as soon as reasonably practicable after filing such documents with the SEC. The information contained on our website is not part of this prospectus. You can read our SEC filings, including the registration statement, on the SEC's website at www.sec.gov.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" certain information into this prospectus, which means that we can disclose important information about us by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be a part of this prospectus, and information in documents that we file later with the SEC will automatically update and supersede information in this prospectus. We incorporate by reference into this prospectus the documents listed below and any future filings, including all filings made after the date of the filing of the registration statement of which this prospectus is part and prior to the effectiveness of such registration statement, made by us with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, except for information "furnished" under Items 2.02, 7.01 or 9.01 on Form 8-K or other information "furnished" to the SEC which is not deemed filed and not incorporated in this prospectus, in each case, until the offering described under the registration statement is terminated or completed:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the SEC on March 15, 2022;
- our Quarterly Reports on Form 10-Q for the periods ended March 31, 2022 and June 30, 2022, as filed with the SEC on May 10, 2022 and August 8, 2022, respectively;
- our Current Reports on Form 8-K, as filed with the SEC on April 4, 2022 (only with respect to Item 5.02), May 10, 2022 (only with respect to Items 1.01 and 8.01 and Exhibit 99.2), May 27, 2022, June 2, 2022 and August 2, 2022 (only with respect to Item 5.02);
- portions of the Definitive Proxy Statement on Schedule 14A, as filed with the SEC on April 25, 2022, that are incorporated by reference into Part III of our Annual Report on Form 10-K for the year December 31, 2021, as filed with the SEC on March 15, 2022; and
- the description of capital stock contained in the Registration Statement on Form 8-A, as filed with the SEC on July 29, 2021, as supplemented by the description of capital stock filed contained in Exhibit 4.3 to our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as filed with the SEC on March 15, 2022, including any amendment or report filed for the purpose of updating such description.

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

Upon request, either orally or in writing, we will provide, without charge, to each person, including any beneficial owner, to whom a copy of this prospectus is delivered, a copy of the documents incorporated by reference into this prospectus but not delivered with the prospectus. You may request a copy of these filings and any exhibits we have specifically incorporated by reference as an exhibit in this prospectus, at no cost, by writing to us at the following address: Rallybio Corporation, 234 Church Street, Suite 1020, New Haven CT, 06510, United States, Attention: Investor Relations, or via telephone at (203) 859-3820.

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

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Common Stock

PROSPECTUS SUPPLEMENT

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August 15, 2022