

Recro Pharma, Inc.
Form 424B5
December 29, 2017
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Filed Pursuant to Rule 424(b)(5)
Registration No. 333-218487

PROSPECTUS SUPPLEMENT

To Prospectus dated June 12, 2017

\$40,000,000

Common Stock

We have entered into a certain Sales Agreement, or sales agreement, with Cowen and Company, LLC, or Cowen, relating to shares of our common stock offered by this prospectus supplement and the accompanying base prospectus. 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 \$40,000,000 from time to time through Cowen acting as agent.

Our common stock is traded on The Nasdaq Capital Market, under the symbol REPH. On December 28, 2017, the last reported sale price of our common stock was \$9.45 per share.

Sales of our common stock, if any, under this prospectus supplement may be made in sales deemed to be at the market offerings as defined in Rule 415 promulgated under the Securities Act of 1933, as amended, or the Securities Act. Cowen is not required to sell any specific number or dollar amount of securities, but will act as a 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 an amount 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 Exchange Act of 1934, as amended, or the Exchange Act.

We are an emerging growth company as defined by the Jumpstart Our Business Startups Act of 2012 and, as such, we are eligible for reduced public company reporting requirements. Please see Prospectus Supplement Summary Implications of Being an Emerging Growth Company.

Investing in our common stock involves a high degree of risk. See Risk Factors beginning on page S-5 of this prospectus supplement, page 4 of the accompanying prospectus and under similar headings 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 DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS

A CRIMINAL OFFENSE.

Cowen

December 29, 2017

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus form part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or SEC, utilizing a shelf registration process. This document contains two parts. The first part consists of this prospectus supplement, which provides you with specific information about this offering. The second part, the accompanying prospectus, provides more general information, some of which may not apply to this offering. Generally, when we refer only to the prospectus supplement, we are referring to both parts combined. This prospectus supplement may add, update or change information contained in the accompanying prospectus. To the extent that any statement we make in this prospectus supplement is inconsistent with statements made in the accompanying prospectus or any documents incorporated by reference herein or therein, the statements made in this prospectus supplement will be deemed to modify or supersede those made in the accompanying prospectus and such documents incorporated by reference herein and therein. You should read this prospectus supplement and the accompanying prospectus, including the information incorporated by reference herein and therein, and any related free writing prospectus that we have authorized for use in connection with this offering.

You should rely only on the information that we have included or incorporated by reference in this prospectus supplement, the accompanying prospectus and any related free writing prospectus that we may authorize to be provided to you. We have not authorized any dealer, salesman or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or any related free writing prospectus that we may authorize to be provided to you. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or any related free writing prospectus. This prospectus supplement, the accompanying prospectus and any related free writing prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus supplement, the accompanying prospectus or any related free writing prospectus constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

You should not assume that the information contained in this prospectus supplement, the accompanying prospectus or any related free writing prospectus is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference herein or therein is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus supplement, the accompanying prospectus or any related free writing prospectus is delivered, or securities are sold, on a later date.

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

Solely for convenience, tradenames referred to in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference appear without the ® symbol, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or that the applicable owner will not assert its rights, to these tradenames.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights information contained in other parts of this prospectus supplement and the accompanying prospectus and in the documents we incorporate by reference. Because it is only a summary, it does not contain all of the information that you should consider before investing in shares of our common stock and it is qualified in its entirety by, and should be read in conjunction with, the more detailed information appearing elsewhere in this prospectus supplement, the accompanying prospectus, any applicable free writing prospectus and the documents incorporated by reference herein and therein. You should read all such documents carefully, especially the risk factors and our consolidated financial statements and the related notes included or incorporated by reference herein or therein, before deciding to buy shares of our common stock. Unless the context requires otherwise, references in this prospectus supplement to Recro, we, us and our refer to Recro Pharma, Inc. and our subsidiaries.

Overview

We are a specialty pharmaceutical company that operates through two business divisions: an Acute Care division and a revenue-generating contract development and manufacturing, or CDMO, division. We believe that we can bring valuable therapeutic options for patients, prescribers and payors, such as our lead product candidate, injectable meloxicam, and other products, to the hospital and related markets. We believe we can create value for our shareholders through the development, approval and commercialization of our pipeline assets as well as through the ongoing contributions of our cash-flow positive CDMO division. In addition to our pipeline, we are always evaluating acquisition and in-licensing opportunities that can contribute additional revenue and cash flow.

Acute Care

Our Acute Care division is primarily focused on developing innovative products for commercialization in hospital and other acute care settings. Our lead product candidate, intravenous, or IV, meloxicam, has successfully completed two pivotal Phase III clinical trials, a large Phase III safety trial and other safety studies for the management of moderate to severe pain. We believe that IV meloxicam compares favorably to competitive therapies in onset of pain relief, duration of pain relief, extent of pain relief and time to peak analgesic effect and that it has been well tolerated. Overall, we enrolled a total of approximately 1,100 patients in our Phase III program. At the end of July 2017, we submitted a new drug application, or NDA, to the United States Food and Drug Administration, or FDA, for IV meloxicam 30mg for the management of moderate to severe pain. The FDA has accepted the NDA for review and set a PDUFA date of May 26, 2018. We believe injectable meloxicam, as a non-opioid product, will overcome many of the issues associated with commonly prescribed opioid therapeutics, including respiratory depression and constipation, along with excessive nausea and vomiting, as well having no addiction potential while maintaining analgesic, or pain relieving, effects.

Our pipeline also includes other early-stage product candidates. Dex-IN, a proprietary intranasal formulation of dexmedetomidine, is in a class of drugs called alpha-2 adrenergic agonists. We are exploring Dex-IN for use in treatment of peri-procedural pain. In addition to Dex-IN, we are also developing two novel neuromuscular blocking agents, or NMBs, and a proprietary chemical reversal agent for use with the NMBs.

CDMO

Our CDMO division leverages our formulation expertise to develop and manufacture pharmaceutical products using our proprietary delivery technologies for commercial partners who commercialize or plan to commercialize these products. These collaborations result in revenue streams including royalties, profit sharing, research and development and manufacturing, which support continued operations for our CDMO division and have contributed funds to be used

in our research and development and pre-commercialization activities in our Acute

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Care division. We operate a 97,000 square-foot, DEA-licensed manufacturing facility in Gainesville, Georgia, and we currently develop and/or manufacture the following key products with our commercial partners: Ritalin LA[®], Focalin XR[®], Verelan PM[®], generic Verapamil sustained release and Zohydro ER[®], as well as development stage products.

Recent Developments

Credit Agreement

On November 17, 2017, we entered into a \$100 million Credit Agreement by and among us, certain of our subsidiaries named as guarantors therein, Athyrium Opportunities III Acquisition LP, in its capacity as the administrative agent, or Athyrium, and the lenders named therein, referred to herein as the Credit Agreement. The Credit Agreement provides for a term loan in the original principal amount of \$60 million, or the Term A Loan, which was funded at closing. Pursuant to the terms of the Credit Agreement, there are two additional tranches of term loans, each in an aggregate original principal amount of \$20 million. The first additional tranche, the Term B Loan, may be drawn upon on or before December 31, 2018 provided that we receive regulatory approval of IV meloxicam and will have at least \$20 million in unrestricted cash after payment of the milestone payment due to Alkermes plc, or Alkermes, upon such approval. The second additional tranche, the Term C Loan, may be drawn upon at any time on or prior to March 31, 2020 provided that the Term B Loan has been drawn upon and net sales of IV meloxicam achieve at least \$20 million for the most recent trailing twelve month period. The maturity date of the Credit Agreement is November 17, 2022. The Term A Loan, Term B Loan and Term C Loan are referred to herein as the Term Loans.

The Term Loans will bear interest at a rate equal to the three-month LIBOR rate, with a 1% floor plus 9.75% per annum, with quarterly, interest-only payments until the maturity date, on which the unpaid principal amount of the Term Loans is due and payable.

We used proceeds from the Term A Loan to (i) repay in full all outstanding indebtedness under our existing credit facility with OrbiMed Royalty Opportunities II, LP of approximately \$31.7 million, which included the remaining debt principal balance of \$27.3 million and early termination charges of \$4.4 million and (ii) pay transaction fees associated with the Credit Agreement of approximately \$4.4 million. Remaining and additional proceeds of the Term Loans will be used to pay a \$45 million milestone due to Alkermes upon the approval of IV meloxicam by the FDA under the terms of the Purchase and Sale Agreement pursuant to which we acquired the rights to IV meloxicam from Alkermes and to contribute toward funding working capital.

Pursuant to the Credit Agreement, we issued warrants to each of Athyrium and one of its affiliates, to purchase an aggregate of 348,664 shares of our common stock, at a price equal to \$8.6043, per share, subject to certain adjustments as specified therein. The warrants are exercisable until November 17, 2024.

Our entry into the Credit Agreement and termination of our existing credit agreement is referred to herein as the Refinancing.

Corporate Information

We were incorporated under the laws of the Commonwealth of Pennsylvania in November 2007. Our principal executive offices are located at 490 Lapp Road, Malvern, PA 19355, and our telephone number is (484) 395-2470.

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Available Information

Our website address is *www.recropharma.com*. The information contained in, or accessible through, our website does not constitute part of this prospectus supplement. We make available free of charge on our website our annual, quarterly and current reports, including amendments to such reports, as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the SEC. Information contained on our website is not incorporated by reference into this prospectus supplement or the accompanying prospectus, and you should not consider information contained on our website as part of this prospectus supplement or the accompanying prospectus.

Implications of Being an Emerging Growth Company

We are an emerging growth company, as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We will remain an emerging growth company until the earliest of (1) the beginning of the first fiscal year following the fifth anniversary of our initial public offering, or January 1, 2020, (2) the beginning of the first fiscal year after our annual gross revenue is \$1.0 billion or more, (3) the date on which we have, during the previous three-year period, issued more than \$1.0 billion in non-convertible debt securities and (4) as of the end of any fiscal year in which the market value of our common stock held by non-affiliates exceeded \$700 million as of the end of the second quarter of that fiscal year.

For as long as we remain an emerging growth company, we may take advantage of certain exemptions from various reporting requirements that are applicable to public companies that are not emerging growth companies including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation and financial statements in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote to approve executive compensation and shareholder approval of any golden parachute payments not previously approved. We will take advantage of these reporting exemptions until we are no longer an emerging growth company.

The JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. We have irrevocably elected not to avail ourselves of this exemption and, therefore, we are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

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THE OFFERING

Common stock offered by us	Shares of our common stock having an aggregate offering price of up to \$40,000,000.
Manner of Offering	At the market offerings that may be made from time to time through our sales agent, Cowen. See Plan of Distribution on page S-17 of this prospectus supplement.
Use of proceeds	We currently intend to use the net proceeds from this offering for preparatory commercial and phase IIIB program activities for IV meloxicam, pipeline development activities, and general corporate purposes. See Use of Proceeds.
Risk Factors	An investment in our common stock involves a high degree of risk. See Risk Factors beginning on page S-5 of this prospectus supplement and page 4 of the accompanying prospectus and the similarly titled sections in the documents incorporated by reference into this prospectus supplement.
NASDAQ Capital Market symbol	REPH

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RISK FACTORS

*An investment in our common stock involves a high degree of risk. Before deciding whether to invest in our common stock, you should carefully consider the risks described below and those discussed under the Section captioned **Risk Factors** contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, as updated by our subsequent filings under the Exchange Act, which are incorporated by reference in this prospectus supplement and the accompanying prospectus, together with other information in this prospectus supplement, the accompanying prospectus, the information and documents incorporated by reference herein and therein, and in any free writing prospectus that we have authorized for use in connection with this offering. If any of these risks actually occurs, our business, financial condition, results of operations or cash flow could be harmed. This could cause the trading price of our common stock to decline, resulting in a loss of all or part of your investment.*

Risks Related to This Offering

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

Our management will have broad discretion with respect to the use of proceeds of this offering, including for any of the purposes described in the section of this prospectus supplement entitled **Use of Proceeds**. You will be relying on the judgment of our management regarding the application of the proceeds of this offering. The results and effectiveness of the use of proceeds are uncertain, and we could spend the proceeds in ways that you do not agree with or that do not improve our results of operations or enhance the value of our common stock. Our failure to apply these funds effectively could harm our business, delay the development of our product candidates and cause the price of our common stock to decline.

You will experience immediate dilution in the book value per share of the common stock purchased in the offering.

The shares sold in this offering, if any, will be sold from time to time at various prices. However, we expect that the offering price of our common stock will be substantially higher than the net tangible book value per share of our outstanding common stock. Assuming that an aggregate of 4,232,804 shares of our common stock are sold at an offering price of \$9.45 per share, the last reported sale price of our common stock on The Nasdaq Capital Market on December 28, 2017, for aggregate proceeds of approximately \$40,000,000, and after deducting commissions and estimated offering expenses payable by us you will experience immediate dilution of \$7.69 per share representing the difference between the pro forma as adjusted net tangible book value of \$1.76 per share of our common stock as of September 30, 2017 after giving effect to this offering and the assumed offering price. The exercise of outstanding stock options and warrants may result in further dilution of your investment. See section titled **Dilution** below for a more detailed discussion of the dilution you will incur if you purchase shares in this offering.

Issuances of shares of common stock or securities convertible into or exercisable for shares of common stock following this offering, as well as the exercise of options and warrants outstanding, will dilute your ownership interests and may adversely affect the future market price of our common stock.

As a development stage company we will need additional capital to fund the development and commercialization of our product candidates. We may seek additional capital through a combination of private and public equity offerings, debt financings, strategic partnerships and alliances and licensing arrangements, which may cause your ownership interest to be diluted. In addition, we have a significant number of options and warrants to purchase shares or our common stock outstanding. If these securities are exercised, you may incur further dilution. Moreover, to the extent that we issue additional options or warrants to purchase, or securities convertible into or exchangeable for, shares of

our common stock in the future and those options, warrants or other securities are exercised, converted or exchanged, shareholders may experience further dilution.

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A substantial number of shares of common stock may be sold in the market following this offering, which may depress the market price for our common stock.

Sales of a substantial number of shares of our common stock in the public market following this offering could cause the market price of our common stock to decline. A substantial majority of the outstanding shares of our common stock are, and the shares of common stock sold in this offering upon issuance will be, freely tradable without restriction or further registration under the Securities Act of 1933, as amended.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein and therein contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, included in this prospectus supplement, the accompanying prospectus or the documents incorporated herein or therein by reference regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. The words anticipate, believe, estimate, expect, intend, may, plan, predict, project, will, would and similar are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

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

our estimates regarding expenses, future revenue, capital requirements and timing and availability of and the need for additional financing;

our ability to obtain and maintain regulatory approval of injectable meloxicam and our product candidates, and the labeling under any approval that we may obtain;

the results, timing and outcome of our clinical trials of injectable meloxicam or our other product candidates, and any future clinical and preclinical studies;

our ability to successfully commercialize injectable meloxicam or our other product candidates, upon regulatory approval;

our ability to comply with the legal and regulatory frameworks applicable to our business and other regulatory developments in the United States and foreign countries;

our ability to raise future financing and attain profitability for continued development of our business and our product candidates and to meet required debt payments, and any milestone payments owing to Alkermes, or our other licensing and collaboration partners;

our ability to operate under increased leverage and associated lending covenants;

the performance of third-parties upon which we depend, including third-party contract research organizations, or CROs, and third-party suppliers and manufacturers;

our ability to obtain patent protection and defend our intellectual property rights against third parties;

our ability to maintain our relationships and contracts with our key commercial partners;

our ability to recruit or retain key scientific, technical, commercial, and management personnel or to retain our executive officers;

our ability to comply with stringent U.S. and foreign government regulation in the manufacture of pharmaceutical products, including Good Manufacturing Practice, or cGMP, compliance and U.S. Drug Enforcement Agency, or DEA, compliance; and

the effects of changes in our effective tax rate due to changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities and changes in the tax laws.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this prospectus, particularly under Risk Factors, that we believe could cause actual results or events to differ materially from the forward-looking

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statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures, collaborations or investments we may make.

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

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USE OF PROCEEDS

We may issue and sell shares of our common stock having aggregate sale proceeds of up to \$40,000,000 from time to time. Because there is no minimum offering amount required to be sold in connection with this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time.

We intend to use the net proceeds of the proposed offering for preparatory commercial and phase IIIB program activities for IV meloxicam, pipeline development activities, and general corporate purposes.

These expected uses represent our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development, the status of and results from clinical trials, as well as any new collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs. As a result, our management will have broad discretion in the application of the net proceeds from this offering, and investors will be relying on the judgment of our management regarding the application of the net proceeds from this offering. Pending application of the net proceeds as described above, we intend to invest the net proceeds of this offering in short-term, investment-grade, interest-bearing securities.

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Our common stock has been listed on The Nasdaq Capital Market under the symbol REPH since our initial public offering on March 12, 2014. Prior to that time, there was no public market for our common stock. The following table sets forth the high and low sale prices per share for our common stock on The Nasdaq Capital Market for the periods indicated:

	HIGH	LOW
2017		
First Quarter	\$ 8.88	\$ 6.80
Second Quarter	\$ 8.94	\$ 5.81
Third Quarter	\$ 9.21	\$ 6.68
Fourth Quarter (through December 28, 2017)	\$ 10.59	\$ 8.19
2016		
First Quarter	\$ 9.20	\$ 5.59
Second Quarter	\$ 8.78	\$ 5.95
Third Quarter	\$ 12.50	\$ 7.51
Fourth Quarter	\$ 10.17	\$ 5.89
2015		
First Quarter	\$ 9.93	\$ 2.80
Second Quarter	\$ 15.40	\$ 6.56
Third Quarter	\$ 18.30	\$ 11.06
Fourth Quarter	\$ 12.86	\$ 7.58

On December 28, 2017, the closing price of our common stock as reported by The Nasdaq Capital Market was \$9.45 per share. As of December 28, 2017, there were approximately 8 holders of record of our common stock. We believe that the number of beneficial owners of our common stock at that date was substantially greater.

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DIVIDEND POLICY

We have never declared or paid any cash dividends on our common stock and our ability to pay cash dividends is currently restricted by the terms of our credit facility with Athyrium Opportunities. We do not anticipate paying cash dividends on our common stock in the foreseeable future. Payment of future dividends, if any, on our common stock will be at the discretion of our board of directors after taking into account various factors, including our financial condition, operating results, anticipated cash needs and plans for expansion.

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If you invest in our common stock, your interest will be immediately diluted to the extent of the difference between the public offering price per share and the as adjusted net tangible book value per share of our common stock after this offering. Net tangible book value per share represents our total tangible assets less total liabilities, divided by the number of shares of our common stock outstanding.

As of September 30, 2017, our net tangible book value was \$7.7 million, or \$0.40 per share of common stock, and our pro forma net tangible book value was \$2.5 million, or \$0.13 per share, giving effect to the Refinancing.

After giving effect to the sale of our common stock in the aggregate amount of approximately \$40,000,000 at an assumed offering price of \$9.45 per share, the last reported sale price of our common stock on The Nasdaq Capital Market on December 28, 2017, and after deducting commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of September 30, 2017 would have been \$41.0 million, or \$1.76 per share of common stock. This represents an immediate increase in as adjusted net tangible book value to existing shareholders of \$1.63 per share and an immediate dilution to new investors purchasing common stock in this offering of \$7.69 per share.

The following table illustrates this per share dilution to the new investors purchasing shares of common stock in this offering:

Assumed public offering price per share	\$ 9.45
Net tangible book value per share at September 30, 2017	\$ 0.40
Pro forma decrease in net tangible book value per share attributable to the Refinancing	\$ (0.27)
Pro forma net tangible book value per share at September 30, 2017	\$ 0.13
Increase in net tangible book value per share attributable to new investors purchasing shares in this offering	\$ 1.63
Pro forma as adjusted net tangible book value per share after this offering	\$ 1.76
Dilution per share to new investors in this offering	\$ 7.69

The table above assumes for illustrative purposes that an aggregate of 4,232,804 shares of our common stock are sold during the term of the sales agreement with Cowen at a price of \$9.45 per share, the last reported sale price of our common stock on The Nasdaq Capital Market on December 28, 2017, for aggregate gross proceeds of approximately \$40,000,000. The shares subject to the sales agreement with Cowen are being sold from time to time at various prices.

The information discussed above is illustrative only and will adjust based on the actual public offering price and would also be affected by any securities sold by us, pursuant to the accompanying base prospectus. An increase of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$10.45 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$40,000,000 is sold at that price, would increase our pro forma adjusted net tangible book value per share after the offering to \$1.79 per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$8.66 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$8.45 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$40,000,000 during the term of the sales agreement

with Cowen is sold at that price, would decrease our pro forma adjusted net tangible book value per share after the offering to \$1.72 per share and would decrease the dilution in net tangible book value per share to new investors in this offering to \$6.73 per share, after deducting commissions and estimated aggregate offering expenses payable by us.

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The foregoing table and calculations are based on 19,060,260 shares of our common stock outstanding as of September 30, 2017, and excludes:

3,568,020 shares of our common stock issuable upon the exercise of stock options outstanding as of September 30, 2017 at a weighted-average exercise price of \$7.14 per share;

359,993 shares of our common stock issuable upon the vesting and settlement of restricted stock units outstanding as of September 30, 2017;

174 shares of our common stock available for future issuance as of September 30, 2017 under our 2008 Stock Option Plan;

296,453 shares of our common stock available for future issuance as of September 30, 2017 under our Amended and Restated Equity Incentive Plan and 956,341 shares of our common stock made available for future issuance under our Amended and Restated Equity Incentive Plan on December 1, 2017, pursuant to the evergreen provision of the Amended and Restated Equity Incentive Plan; and

784,928 shares of our common stock issuable upon the exercise of outstanding warrants as of September 30, 2017 with a weighted average exercise price of \$12.05 per share and 348,664 shares of our common stock issuable upon the exercise of warrants issued after September 30, 2017 with a weighted average exercise price of \$8.6043 per share.

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DESCRIPTION OF CAPITAL STOCK

The following description of our capital stock and provisions of our articles of incorporation, bylaws and the Pennsylvania Business Corporation law are summaries and are qualified in their entirety by reference to the articles of incorporation and the bylaws. We have filed copies of these documents with the SEC as exhibits to our registration statement, of which this prospectus supplement forms a part.

Pursuant to our Second Amended and Restated Articles of Incorporation, our authorized capital stock consists of 50,000,000 shares of common stock, par value of \$0.01 per share, and 10,000,000 shares of preferred stock, par value \$0.01 per share, to be designated from time to time by our board of directors.

Common Stock

As of December 28, 2017, there were 19,127,435 shares of our common stock issued and outstanding. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of shareholders, including the election of directors, and do not have cumulative voting rights. Accordingly, the holders of a majority of the outstanding shares of common stock in person or represented by proxies in any election of directors can elect all of the directors standing for election, if they so choose, other than any directors that holders of any preferred stock that we may issue may be entitled to elect.

Subject to preferences that may be applicable to any then-outstanding shares of preferred stock, holders of our common stock are entitled to receive ratably dividends when, as, and if declared by our board of directors out of funds legally available therefor, subject to any preferential dividend rights of outstanding preferred stock. In the event of our liquidation, dissolution, or winding up, holders of our common stock will be entitled to ratably receive the net assets of our company available after the payments of all debts and other liabilities and subject to the prior rights of the holders of any then-outstanding shares of preferred stock.

Holders of our common stock have no preemptive, subscription, redemption or conversion rights. All outstanding shares of our common stock are, and the common stock to be outstanding upon completion of this offering will be, duly authorized, validly issued, fully paid and non-assessable. The rights and privileges of the holders of the 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.

Preferred Stock

Our board of directors has the authority, without further action by our shareholders, to issue up to 10,000,000 shares of preferred stock in one or more series, to establish from time to time the number of shares to be included in each such series, to fix the dividend, voting and other rights, preferences and privileges of the shares of each wholly unissued series and any qualifications, limitations or restrictions thereon, and to increase or decrease the number of shares of any such series, but not below the number of shares of such series then outstanding. Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in our control and may adversely affect the market price of the common stock and the voting and other rights of the holders of our common stock. We have no current plans to issue any shares of preferred stock.

Common Stock Warrants

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We issued to the representatives of the underwriters in our initial public offering, or IPO, warrants to purchase up to 150,000 shares of our common stock, with a per share exercise price equal to \$12.00, or 150% of the public offering price, or IPO warrants, of which 140,000 are currently outstanding. The IPO warrants are exercisable by

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the underwriters at any time, in whole or in part, during the four-year period commencing one year after the closing of our IPO.

In connection with our acquisition of IV meloxicam and our CDMO business from Alkermes, we issued to Alkermes a seven-year warrant to purchase an aggregate of 350,000 shares of our common stock, with an exercise price of \$19.46 per share. We issued to OrbiMed Royalty Opportunities, II, LP, or OrbiMed, the lender under our former senior secured credit facility, a seven-year warrant to purchase an aggregate of 294,928 shares of our common stock, with an exercise price of \$3.28 per share, subject to certain adjustments.

In addition, in connection with the Refinancing we issued to each of Athyrium Opportunities III Acquisition LP and its affiliate, Athyrium Opportunities II Acquisition LP seven-year warrants to purchase an aggregate of 348,664 shares of our common stock, with an exercise price of \$8.6043, per share, subject to certain adjustments. We also granted piggyback registration rights to each of Athyrium Opportunities III Acquisition LP and its affiliate, Athyrium Opportunities II Acquisition LP to register the common stock subject to such warrants in the event we file a registration statement with the SEC under the Securities Act covering our equity securities, subject to the terms and conditions included in the warrants.

Anti-Takeover Effects of Pennsylvania Law and Our Articles of Incorporation and Bylaws

Pennsylvania Anti-Takeover Law

Provisions of the Pennsylvania Business Corporation Law of 1988, or the PBCL, applicable to us provide, among other things, that:

we may not engage in a business combination with an interested shareholder, generally defined as a holder of 20% of a corporation's voting stock, during the five-year period after the interested shareholder became such except under certain specified circumstances;

holders of our common stock may object to a control transaction involving us (a control transaction is defined as the acquisition by a person or group of persons acting in concert of at least 20% of the outstanding voting stock of a corporation), and demand that they be paid a cash payment for the fair value of their shares from the controlling person or group ;

holders of control shares will not be entitled to voting rights with respect to any shares in excess of specified thresholds, including 20% voting control, until the voting rights associated with such shares are restored by the affirmative vote of a majority of disinterested shares and the outstanding voting shares of the Company; and

any profit, as defined, realized by any person or group who is or was a controlling person or group with respect to us from the disposition of any equity securities of within 18 months after the person or group became a controlling person or group shall belong to and be recoverable by us.

Pennsylvania-chartered corporations may exempt themselves from these and other anti-takeover provisions. Our articles of incorporation do not provide for exemption from the applicability of these or other anti-takeover provisions

in the PBCL.

The provisions noted above may have the effect of discouraging a future takeover attempt that is not approved by our board of directors but which individual shareholders may consider to be in their best interests or in which shareholders may receive a substantial premium for their shares over the then current market price. As a result, shareholders who might wish to participate in such a transaction may not have an opportunity to do so. The provisions may make the removal of our board of directors or management more difficult. Furthermore, such provisions could result our company being deemed less attractive to a potential acquiror and/or could result in our shareholders receiving a lesser amount of consideration for their shares of our common stock than otherwise could have been available either in the market generally and/or in a takeover.

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Articles of Incorporation and Bylaws

Provisions of our articles of incorporation and bylaws may delay or discourage transactions involving an actual or potential change of control or change in our management, including transactions in which shareholders might otherwise receive a premium for their shares, or transactions that our shareholders might otherwise deem to be in their best interests. Therefore, these provisions could adversely affect the price of our common stock. Among other things, our articles of incorporation and bylaws:

divide our board of directors into three classes with staggered three-year terms;

provide that a special meeting of shareholders may be called only by a majority of our board of directors;

establish advance notice procedures with respect to shareholder proposals to be brought before a shareholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of the board of directors or a committee of the board of directors;

provide that shareholders may only act at a duly organized meeting; and

provide that members of our board of directors may be removed from office by our shareholders only for cause by the affirmative vote of 75% of the total voting power of all shares entitled to vote generally in the election of directors.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Broadridge Corporate Issuer Solutions, Inc.

Stock Market Listing

Our shares of common stock are listed for trading on The Nasdaq Capital Market under the symbol REPH.

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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 \$40,000,000 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. 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 equals 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 \$50,000 of Cowen's actual outside legal expenses incurred by Cowen in connection with this offering, and for certain other expenses, including Cowen's FINRA counsel fees in an amount up to \$12,500. We estimate that the total expenses of the offering payable by us, excluding commissions payable to Cowen under the sales agreement, will be approximately \$0.3 million.

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 Capital 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 will be deemed to be an underwriter within the meaning of the Securities Act, and the compensation paid to Cowen will 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 Capital Market and trades under the symbol REPH. The transfer agent of our common stock is Broadridge Corporate Issuer Solutions, Inc.

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.

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LEGAL MATTERS

The validity of the common stock being offered in this offering will be passed upon for us by Pepper Hamilton LLP. Cowen is being represented by Duane Morris LLP in connection with this offering.

EXPERTS

The consolidated financial statements of Recro Pharma, Inc. and subsidiaries as of December 31, 2016 and 2015, and for the years then ended, have been incorporated by reference herein in reliance upon the report of KPMG LLP, independent registered public accounting firm, incorporated by reference herein, and upon the authority of said firm as experts in accounting and auditing.

The audited combined historical financial statements of DARA included on page 6 of Recro Pharma, Inc.'s Current Report on Form 8-K/A dated June 2, 2015 have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION; INCORPORATION BY REFERENCE

Available Information

We file annual, quarterly and current reports, proxy statements and other information with the SEC. You may read and copy any document we file with the SEC at the SEC's public reference room at 100 F Street NE, Room 1580, Washington, D.C. 20549. You may obtain information on the operation of the SEC's public reference facilities by calling the SEC at 1-800-SEC-0330. You can request copies of these documents, upon payment of a duplicating fee, by writing to the SEC at its principal office at 100 F Street NE, Room 1580, Washington, D.C. 20549-1004. The SEC maintains an Internet website at <http://www.sec.gov> that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our SEC filings are accessible through the Internet at that website. Our reports on Forms 10-K, 10-Q and 8-K, and amendments to those reports, are also available for download, free of charge, as soon as reasonably practicable after these reports are filed with the SEC, at our website at www.recropharma.com. The content contained in, or that can be accessed through, our website is not a part of this prospectus.

This prospectus supplement and the accompanying prospectus do not contain all of the information set forth in the registration statement and the exhibits to the registration statement or the documents incorporated by reference herein and therein. For further information with respect to us and the securities that we are offering under this prospectus supplement, we refer you to the registration statement and the exhibits and schedules filed as a part of the registration statement and the documents incorporated by reference herein and therein. You should rely only on the information contained in this prospectus supplement or the accompanying prospectus or incorporated by reference herein or therein.

Incorporation by Reference

The SEC allows us to incorporate by reference information into this prospectus supplement, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The SEC file number for the documents incorporated by reference in this prospectus is 001-36329. The documents incorporated by reference into this prospectus supplement contain important information that you should read about us.

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The following documents are incorporated by reference into this document:

our Annual Report on Form 10-K for the fiscal year ended December 31, 2016 filed with the SEC on March 9, 2017;

our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2017, June 30, 2017 and September 30, 2017, filed with the SEC on May 11, 2017, August 11, 2017 and November 9, 2017, respectively;

those portions of our Definitive Proxy Statement on Schedule 14A for our 2017 Annual Meeting of Shareholders filed with the SEC on March 28, 2017 that are incorporated by reference into our Annual Report on Form 10-K for the fiscal year ended December 31, 2016;

our Current Reports on Form 8-K (other than portions thereof furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits accompanying such reports that relate to such items) filed with the SEC on January 6, 2017, February 27, 2017, March 6, 2017, March 7, 2017, April 5, 2017, May 9, 2017, May 18, 2017, June 8, 2017, June 9, 2017, July 5, 2017, July 18, 2017, July 20, 2017, July 31, 2017, August 17, 2017, August 21, 2017, September 5, 2017, September 19, 2017, September 28, 2017, October 5, 2017, October 11, 2017, November 14, 2017, November 20, 2017, November 28, 2017 and December 29, 2017; and

the description of our common stock, which is registered under Section 12 of the Exchange Act, in our registration statement on Form 8-A, filed with the SEC on June 23, 2014, including any amendments or reports filed for the purpose of updating such description.

We also incorporate by reference into this prospectus all documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) that are filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus supplement but prior to the termination of the offering. These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as proxy statements.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference into this document will be deemed to be modified or superseded for purposes of the document to the extent that a statement contained in this document or any other subsequently filed document that is deemed to be incorporated by reference into this document modifies or supersedes the statement.

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PROSPECTUS

\$100,000,000

Common Stock

Preferred Stock

Debt Securities

Warrants

Units

Subscription Rights

We may offer to the public from time to time in one or more series or issuances:

shares of our common stock, par value \$0.01 per share;