Kindred Biosciences, Inc.
Form 424B5
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Registration No. 333-201553

PROSPECTUS SUPPLEMENT
(To Prospectus dated January 30, 2015)
$30,000,000
KINDRED BIOSCIENCES, INC.
Common Stock

We have entered into an At Market Issuance Sales Agreement, or the sales agreement, with FBR Capital Markets & Co., or FBR, acting as our distribution agent, dated December 19, 2016, relating to the sale of our common stock offered by this prospectus supplement and the accompanying prospectus. In accordance with the terms of the sales agreement, we may offer and sell shares of our common stock, $0.0001 par value per share, under this prospectus supplement and the accompanying prospectus having an aggregate offering price of up to $30,000,000 from time to time through FBR acting as our agent.

Our common stock is listed on The NASDAQ Capital Market under the symbol “KIN.” On December 16, 2016, the last reported sale price of our common stock on The NASDAQ Capital Market was $5.00 per share.

Sales of our common stock, if any, under this prospectus supplement and the accompanying prospectus may be made in sales deemed to be an “at the market offering” as defined in Rule 415 under the Securities Act of 1933, as amended, or the Securities Act, including sales made directly on or through The NASDAQ Capital Market, the existing trading market for our common stock, sales made to or through a market maker other than on an exchange or otherwise, in negotiated transactions at market prices prevailing at the time of sale or at prices related to such prevailing market prices, and/or any other method permitted by law. FBR is not required to sell any specific number or dollar amount of shares of common stock, but will act as our distribution agent using commercially reasonable efforts consistent with its normal trading and sales practices. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

FBR is entitled to compensation at a commission rate equal to 3.0% of the gross proceeds of any shares of common stock sold under the sales agreement. See “Plan of Distribution” on page S-9 for additional information regarding the compensation to be paid to FBR. In connection with the sale of the common stock on our behalf, FBR may be deemed to be an “underwriter” within the meaning of the Securities Act and FBR’s compensation may be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to FBR with respect to certain liabilities, including liabilities under the Securities Act.

Investing in our common stock involves a high degree of risk. Before investing in our common stock, please read the “Risk Factors” section on page S-6 of this prospectus supplement and the corresponding sections in the accompanying prospectus and in our Annual Report on Form 10-K for the year ended December 31, 2015, as well as our subsequent filings with the Securities and Exchange Commission, or the SEC, under the Securities Exchange Act of 1934, as amended, or the Exchange Act, which are incorporated by reference into this prospectus supplement.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement or the accompanying prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

FBR

The date of this prospectus supplement is December 19, 2016.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus relate to the offering of our common stock. Before purchasing any of the common stock that we are offering, you should carefully read this prospectus supplement and the accompanying prospectus, together with the information incorporated by reference into this prospectus supplement and the accompanying prospectus as described under the headings "Where You Can Find More Information" and "Incorporation of Certain Information by Reference" on page S-10. These documents contain important information that you should consider when making your investment decision.

This prospectus supplement and the accompanying prospectus form part of a registration statement on Form S-3 that we filed with the SEC using 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," 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 into this prospectus supplement or the accompanying prospectus, 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. If any statement in this prospectus supplement or the accompanying prospectus is inconsistent with a statement in another document having a later date, for example, a document incorporated by reference into this prospectus supplement, the statement in the document having the later date will be deemed to modify or supersede the earlier statement.

Unless the context otherwise requires, the terms "Kindred," "the Company," "our company," "we," "us," and "our" refer to Kindred Biosciences, Inc., a Delaware corporation, including, where appropriate, our wholly owned subsidiary, KindredBio Equine, Inc. When we refer to "you," we mean the purchaser or potential purchaser of the shares of common stock offered by this prospectus supplement and the accompanying prospectus.

You should rely only on the information contained in or incorporated by reference into this prospectus supplement, the accompanying prospectus and any free writing prospectus that we may authorize for use in connection with this offering. We have not, and FBR has not, authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. Neither we nor FBR is offering to sell, or seeking offers to buy, our common stock in any jurisdiction where the offer or sale is not permitted. The distribution of this prospectus supplement and the offering of our common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement must inform themselves about, and observe any restrictions relating to, the offering of our common stock and the distribution of this prospectus supplement outside the United States. This prospectus supplement does not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any common stock offered by this prospectus supplement by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference into this prospectus supplement and the accompanying prospectus and any free writing prospectus that we may authorize for use in connection with this offering is accurate only as of the date of those respective documents. Our business, financial condition, results of operations and prospects may have changed since those dates.

This prospectus supplement, the accompanying prospectus and the documents incorporated by reference into this prospectus supplement and the accompanying prospectus contain summaries of certain provisions contained in some of the documents described herein and therein, 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 such documents have been or will be filed as exhibits to the registration statement of which this prospectus supplement

and the accompanying prospectus are a part or as exhibits to documents incorporated by reference herein or therein, and you may obtain copies of those documents as described below under the headings “Where You Can Find More Information” and “Incorporation of Certain Information by Reference” on page S-10. We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference into this prospectus supplement or the accompanying prospectus were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to the agreement, and should not be deemed to be a representation, warranty or covenant to you.

Unless otherwise indicated, information contained in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference into this prospectus supplement and the accompanying prospectus and any free writing prospectus that we may authorize for use in connection with this offering concerning our industry and the markets in which we operate, including our general expectations and market opportunity, is based on information from our own management estimates and research, as well as from industry and general publications and research, surveys and studies conducted by third parties. Management estimates are derived from publicly available information, our knowledge of our industry and assumptions based on such information and knowledge. We believe such estimates to be reasonable, but we have not independently verified the accuracy of information obtained from third parties. In addition, assumptions and estimates of our and our industry’s future performance are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in “Risk Factors” in this prospectus supplement on page S-6, in the accompanying prospectus and in our Annual Report on Form 10-K for the fiscal year ended December 31, 2015 which is incorporated by reference into this prospectus supplement and the accompanying prospectus. These and other important factors could cause our future performance to differ materially from our assumptions and estimates. See “Special Note Regarding Forward-Looking Statements” below.

Kindred Biosciences, Kindred Bio and “Best Medicines for Our Best Friends” are three of our trademarks that are used in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference into this prospectus and the accompanying prospectus. This prospectus supplement, the accompanying prospectus and the documents incorporated by reference also include trademarks, tradenames and service marks that are the property of other organizations. Solely for convenience, trademarks and tradenames referred to in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference sometimes appear without the ® and ™ symbols, 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 trademarks and tradenames.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus, the documents incorporated by reference into this prospectus supplement and the accompanying prospectus and any free writing prospectus that we may authorize for use in connection with this offering contain forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act. All statements other than statements of historical fact contained in or incorporated by reference into this prospectus supplement, the accompanying prospectus and any free writing prospectus that we may authorize for use in connection with this offering, including statements regarding our expectations about the trials, regulatory approval, manufacturing, distribution and commercialization of our current and future product candidates and statements regarding our anticipated revenues, expenses, margins, profits, use of cash, financial position, business strategy and plans and objectives for future operations, are forward-looking statements. In many cases, you can identify forward-looking statements by terms such as “may,” “should,” “expects,” “plans,” “anticipates,” “could,” “intends,” “target,” “projects,” “contemplates,” “believes,” “estimates,” “predicts,” “potential” or “conti negative of these terms or other similar expressions.

These forward-looking statements are based on our current expectations. These statements are not promises or guarantees, but involve known and unknown risks, uncertainties and other important factors that may cause our actual results to be materially different from any future results expressed or implied by the forward-looking statements, and you are cautioned not to place undue reliance on these forward-looking statements.

These risks and uncertainties include, but are not limited to, the following:

- our limited operating history and expectations of losses for the foreseeable future;
- the absence of revenue from our product candidates for the foreseeable future;
- our potential inability to obtain any necessary additional financing;
- our substantial dependence on the success of our lead product candidates, which may not be successfully commercialized even if they are approved for marketing;
- the effect of competition;
- our potential inability to obtain regulatory approval for our existing or future product candidates;
- our dependence on third parties to conduct some of our development activities;
- our dependence upon third-party manufacturers for supplies of our product candidates;
- uncertainties regarding the outcomes of trials pertaining to our product candidates;
- our potential failure to attract and retain senior management and key scientific personnel;
- uncertainty about our ability to develop a satisfactory sales organization;
- our significant costs of operating as a public company;
- our potential inability to obtain patent protection and other intellectual property protection for our product candidates;
- potential claims by third parties alleging our infringement of their patents and other intellectual property rights;
- our potential failure to comply with regulatory requirements, which are subject to change on an ongoing basis;
- the potential volatility of our stock price; and
- the significant control over our business by our principal stockholders and management.

For a further description of these risks and uncertainties and other risks and uncertainties that we face, please see the "Risk Factors" sections that are contained in this prospectus supplement on page S-6, in the accompanying prospectus and in our filings with the SEC that are incorporated by reference into this prospectus supplement and the accompanying prospectus, including, without limitation, the "Risk Factors" sections of our most recently filed Annual Report on Form 10-K and Quarterly Report on Form 10-Q.

Each forward-looking statement is based on information available to us as of the date of the document in which the forward-looking statement is contained. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise, except as otherwise required by law.

All forward-looking statements that are made by us in this prospectus supplement, in the accompanying prospectus, in the documents incorporated by reference into this prospectus supplement and the accompanying prospectus and in any free writing prospectus that we may authorize for use in connection with this offering are qualified by these cautionary statements.

PROSPECTUS SUPPLEMENT SUMMARY

The following summary highlights selected information about us, this offering and information contained elsewhere in or incorporated by reference into this prospectus supplement or the accompanying prospectus. This summary does not contain all of the information that may be important to you. Before purchasing any of the common stock that we are offering, you should carefully read in their entirety this prospectus supplement and the accompanying prospectus, including the documents incorporated by reference into this prospectus supplement and the accompanying prospectus, and any free writing prospectus that we may authorize for use in this offering. In particular, you should carefully review the "Risk Factors" sections that are contained in this prospectus supplement on page S-6, in the accompanying prospectus and in our filings with the SEC that are incorporated by reference into this prospectus supplement and the accompanying prospectus, including, without limitation, the "Risk Factors" sections of our most recently filed Annual Report on Form 10-K and Quarterly Report on Form 10-Q.

Our Company

We are an early stage biopharmaceutical company focused on saving and improving the lives of pets. Our mission is to bring to our pets the same kinds of safe and effective medicines that our human family members enjoy. Our core strategy is to identify compounds and targets that have already demonstrated safety and efficacy in humans and to develop therapeutics based on these validated compounds and targets for pets, primarily dogs, cats and horses. We believe this approach will lead to shorter development times and higher approval rates than pursuing new, non-validated compounds and targets. We have submitted all major technical sections of the New Animal Drug Application to the Food and Drug Administration for two product candidates. In addition, we have multiple other product candidates, including several biologics, in various stages of development. We believe there are significant unmet medical needs for pets, and that the pet therapeutics segment of the animal health industry is likely to grow substantially as new therapeutics are identified, developed and marketed specifically for pets.

We were incorporated on September 25, 2012. Our principal executive offices are located at 1555 Bayshore Highway, Suite 200, Burlingame, California 94010, and our telephone number is (650) 701-7901. Our website address is www.kindredbio.com. The information contained on, or accessible through, our website is not incorporated by reference into this prospectus supplement or the accompanying prospectus, and you should not consider it to be a part of this prospectus supplement or the accompanying prospectus. Our website address is included as an inactive textual reference only.

The Offering

Issuer	Kindred Biosciences, Inc.
Securities Offered	Shares of our common stock having an aggregate offering price of up to $30,000,000.
Manner of Offering	"At the market offering" that may be made from time to time by our distribution agent, FBR Capital Markets & Co., or FBR. See "Plan of Distribution" on page S-9 of this prospectus supplement.
Use of Proceeds	We intend to use the net proceeds of this offering for the development of our therapeutic candidates, the expansion of our commercial infrastructure in anticipation of future product approvals and launches and for other general corporate and working capital purposes. See "Use of Proceeds" on page S-7 of this prospectus supplement.
Risk Factors	Investing in our common stock involves a high degree of risk. Before investing in our common stock, please read the "Risk Factors" section on page S-6 of this prospectus supplement and the corresponding sections in the accompanying prospectus and in our Annual Report on Form 10-K for the year ended December 31, 2015, as well as our subsequent filings with the SEC, which are incorporated herein by reference.
NASDAQ Symbol	"KIN."

RISK FACTORS

An investment in our common stock involves a high degree of risk. Before purchasing any of the common stock that we are offering, you should carefully read in their entirety this prospectus supplement and the accompanying prospectus, including the documents incorporated by reference into this prospectus supplement and the accompanying prospectus, and any free writing prospectus that we may authorize for use in this offering. In particular, you should carefully review the risks described below and in the "Risk Factors" sections that are contained in the accompanying prospectus and in our filings with the SEC that are incorporated by reference into this prospectus supplement and the accompanying prospectus, including, without limitation, the "Risk Factors" sections of our most recently filed Annual Report on Form 10-K and Quarterly Report on Form 10-Q 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 materially and adversely affected. This could cause the market price of our common stock to decline, resulting in a loss of all or part of your investment.

Risks Related to This Offering

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

We intend to use the net proceeds of this offering for the development of our therapeutic candidates, the expansion of our commercial infrastructure in anticipation of future product approvals and launches and for other general corporate and working capital purposes. We may also use a portion of the net proceeds of this offering to acquire other products or businesses, although we are not currently a party to an agreement regarding any such acquisition. However, our management will have broad discretion in the application of the net proceeds from this offering and will have the right to use the net proceeds for purposes that differ substantially from our current plans. Management may spend the net proceeds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by management to apply these funds effectively could result in financial losses that could have a material and adverse effect on our business and cause the price of our common stock to decline.

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

The price per share of our common stock being offered may be higher than the net tangible book value per share of our outstanding common stock prior to this offering. Assuming that an aggregate of 6,000,000 shares of our common stock are sold at a price of $5.00 per share, the last reported sale price of our common stock on The NASDAQ Capital Market on December 16, 2016, for aggregate gross proceeds of approximately $30,000,000, and after deducting commissions and estimated offering expenses payable by us, new investors in this offering will incur immediate dilution of $1.47 per share, representing the difference between the assumed offering price and our as adjusted net tangible book value as of September 30, 2016. For a more detailed discussion of the foregoing, see the section entitled "Dilution" on page S-8. To the extent outstanding stock options are exercised, there may be further dilution to new investors.

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

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may not be the same as the price per share in this offering. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be lower than the price per share paid by investors in this offering.

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.

USE OF PROCEEDS

We may issue and sell shares of our common stock having aggregate gross proceeds of up to $30,000,000 from time to time. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions paid to FBR and proceeds to us, if any, are not determinable at this time. We estimate that the net proceeds from the sale of the shares of common stock that we are offering may be up to approximately $28,980,000, after deducting commissions payable to FBR and estimated offering expenses payable by us.

We intend to use the net proceeds of this offering for the development of our therapeutic candidates, the expansion of our commercial infrastructure in anticipation of future product approvals and launches and for other general corporate and working capital purposes. We may also use a portion of the net proceeds of this offering to acquire other products or businesses, although we are not currently a party to an agreement regarding any such acquisition.

We have not determined the amounts we plan to spend in any of the areas identified above or the timing of these expenditures. As a result, our management will have broad discretion to allocate the net proceeds to us from this offering, and investors will be relying on the judgment of our management regarding the application of the proceeds from this offering. We reserve the right to change the use of these proceeds as a result of certain contingencies such as competitive developments, the results of our commercialization efforts, acquisition and investment opportunities and other factors. Pending use of the proceeds as described above, we intend to invest the net proceeds of this offering in short-term, interest-bearing, investment-grade securities or certificates of deposit.

PRICE RANGE OF OUR COMMON STOCK

Since December 12, 2013, our common stock has been traded on The NASDAQ Capital Market under the symbol “KIN.” Prior to December 12, 2013, there was no public trading market for our common stock. The following table sets forth the high and low sale prices for our common stock for the periods indicated as reported on The NASDAQ Capital Market.

	High	Low
Fiscal Year Ending December 31, 2016		
First Quarter	$ 4.13	$ 2.90
Second Quarter	$ 4.29	$ 3.12
Third Quarter	$ 5.43	$ 3.53
Fourth Quarter (through December 16, 2016)	$ 5.65	$ 3.90
Fiscal Year Ended December 31, 2015		
First Quarter	$ 7.88	$ 6.12
Second Quarter	$ 7.91	$ 6.15
Third Quarter	$ 7.35	$ 4.18
Fourth Quarter	$ 6.38	$ 3.15
Fiscal Year Ended December 31, 2014		
First Quarter	$26.99	$ 9.99
Second Quarter	$21.31	$13.93
Third Quarter	$19.70	$ 9.25
Fourth Quarter	$10.07	$ 5.98

On December 16, 2016, the last reported sale price of our common stock on The NASDAQ Capital Market was $5.00. As of December 16, 2016, there were 19,916,290 shares of our common stock outstanding held by approximately 25 holders of record. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our common stock. We intend to retain any future earnings and do not expect to pay any dividends in the foreseeable future. Any future determination to declare cash dividends will be made at the discretion of our board of directors, subject to applicable laws, and will depend on a number of factors, including our financial condition, results of operations, capital requirements, contractual restrictions, general business conditions and other factors that our board of directors may deem relevant.

DILUTION

If you invest in our common stock in this offering, your ownership 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.

As of September 30, 2016, we had a net tangible book value of $62,532,000, or $3.14 per share of common stock. Our net tangible book value per share represents total tangible assets less total liabilities, divided by the number of shares of common stock outstanding at September 30, 2016.

After giving effect to the issuance and sale by us of our common stock in the aggregate amount of $30,000,000 at an assumed public offering price of $5.00 per share, the last reported sale price of our common stock on The NASDAQ Capital Market on December 16, 2016, and after deducting commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of September 30, 2016 would have been approximately $28,980,000, or approximately $3.53 per share. This amount represents an immediate increase in net tangible book value of approximately $0.39 per share to our existing stockholders and an immediate dilution in as adjusted net tangible book value of approximately $1.47 per share to new investors in this offering.

The following table illustrates this calculation on a per share basis. The as adjusted information is illustrative only and will adjust based on the actual public offering price, the actual number of shares sold and other terms of the offering determined at the time shares of our common stock are sold pursuant to this prospectus supplement. The as adjusted information assumes that all of our common stock in the aggregate amount of $30,000,000 is sold at the assumed public offering price of $5.00 per share. The shares sold in this offering, if any, will be sold from time to time at various prices.

Assumed public offering price per share	$5.00
Net tangible book value per share as of September 30, 2016	$3.14
Increase in net tangible book value per share attributable to this offering	$0.39
As adjusted net tangible book value per share after this offering	$3.53
Dilution per share to new investors participating in this offering	$1.47

The above discussion and table are based on 19,891,407 shares of our common stock outstanding as of September 30, 2016 and do not give effect to the exercise of any outstanding stock options. To the extent that stock options are exercised or to the extent that other stock awards are made under our employee stock plans, there may be further dilution to new investors. As of September 30, 2016, there were 3,573,955 shares of our common stock issuable upon the exercise of stock options at a weighted average exercise price of $6.35 per share.

PLAN OF DISTRIBUTION

We have entered into a sales agreement with FBR under which we may offer and sell shares of our common stock from time to time through FBR, acting as our agent. Sales of shares of our common stock, if any, under this prospectus supplement and the accompanying prospectus may be made in negotiated transactions or transactions that are deemed to be "at the market offerings" as defined in Rule 415 under the Securities Act, including, without limitation, sales made directly on or through The NASDAQ Capital Market, the existing trading market for our common stock, sales made to or through a market maker other than on an exchange or otherwise, in negotiated transactions at market prices prevailing at the time of sale or at prices related to such prevailing prices, and/or any other method permitted by law.

FBR will offer our common stock subject to the terms and conditions of the sales agreement as agreed upon by us and FBR. We will designate the number of shares which we desire to sell, the time period during which sales are requested to be made, any limitation on the number of shares that may be sold in one day and any minimum price below which sales may not be made. Subject to the terms and conditions of the sales agreement, FBR will use its commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us. FBR or we may suspend the offering of our common stock being made through FBR under the sales agreement upon proper notice to the other party.

Under the terms of the sales agreement, we may also sell our common stock to FBR, as principal for its own account, at a price negotiated at the time of sale. If we sell shares in this manner, we will enter into a separate agreement setting forth the terms of such transaction, and we will describe the agreement in a separate prospectus supplement or pricing supplement.

FBR will receive commissions for its services in acting as agent in the sale of our common stock at a rate equal to 3.0% of the gross proceeds of any shares of common stock sold under the sales agreement, plus any brokerage commissions. We estimate that the total expenses for this offering, excluding commissions payable to FBR under the sales agreement, will be approximately $120,000. We have agreed to reimburse FBR for its reasonable out-of-pocket expenses, including attorneys' fees, in an amount not to exceed $25,000, which amount is included in the estimated total expenses for this offering.

Settlement for sales of common stock will occur on the third business day following the date on which any sales are made, or on another date that is agreed upon by us and FBR in connection with a particular transaction, 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 sale of the common stock on our behalf, FBR may be deemed to be an underwriter within the meaning of the Securities Act, and FBR's compensation may be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to FBR against certain civil liabilities, including liabilities under the Securities Act.

This offering will terminate upon the earlier of (1) the issuance and sale of all shares of our common stock covered by this prospectus supplement and (2) the termination of the sales agreement as permitted therein.

FBR and its affiliates may in the future provide various investment banking and other financial services for us and our affiliates, for which services it may in the future receive customary fees. To the extent required by Regulation M, FBR will not engage in any market making activities involving our common stock while the offering is ongoing under this prospectus supplement.

This summary of the material provisions of the sales agreement does not purport to be a complete statement of its terms and conditions. A copy of the sales agreement has been filed with the SEC on a Current Report on Form 8-K.

LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus supplement has been passed upon for us by TroyGould PC, Los Angeles, California. As of the date of this prospectus supplement, certain attorneys who are employed by TroyGould PC beneficially owned, in the aggregate, less than one percent of the outstanding shares of our common stock. Duane Morris LLP, Newark, New Jersey, is counsel for FBR in connection with this offering.

EXPERTS

The financial statements of Kindred Biosciences, Inc. as of December 31, 2015 and 2014, and for each of the three years in the period ended December 31, 2015, that are incorporated by reference into this prospectus supplement, have been so incorporated in reliance upon the report of KMJ Corbin & Company LLP, an independent registered public accounting firm, incorporated by reference herein, given upon the authority of said firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file reports, proxy statements and other information with the SEC. Information filed with the SEC by us can be inspected and copied at the Public Reference Room maintained by the SEC at 100 F Street, N.E., Washington, D.C. 20549. You may also obtain copies of this information by mail from the Public Reference Section of the SEC at prescribed rates. Further information on the operation of the SEC's Public Reference Room in Washington, D.C. can be obtained by calling the SEC at 1-800-SEC-0330. The SEC also maintains a website that contains reports, proxy and information statements and other information about issuers, such as us, who file electronically with the SEC. The address of that website is http://www.sec.gov.

Our website address is www.kindredbio.com. The information contained on, or accessible through, our website is not incorporated by reference into this prospectus supplement or the accompanying prospectus, and you should not consider it to be a part of this prospectus supplement or the accompanying prospectus.

This prospectus supplement and the accompanying prospectus are part of a registration statement on Form S-3 that we filed with the SEC and do not contain all of the information in the registration statement. The full registration statement may be obtained from the SEC or us, as provided below. Other documents establishing the terms of the offered common stock are or may be filed as exhibits to the registration statement. Statements in this prospectus supplement or in the accompanying prospectus about these documents are summaries, and each statement is qualified in all respects by reference to the document to which it refers. You should refer to the actual documents for a more complete description of the relevant matters. You may inspect a copy of the registration statement at the SEC's Public Reference Room in Washington, D.C. or through the SEC's website, as provided above.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC's rules allow us to "incorporate by reference" information into this prospectus supplement and the accompanying prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is deemed to be part of this prospectus supplement and the accompanying prospectus, and subsequent information that we file with the SEC will automatically update and supersede that information. Any statement contained in a previously filed document incorporated by reference will be deemed to be modified or superseded 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 or replaces that statement.

We incorporate by reference the following documents or information previously filed by us with the SEC:

- Our Annual Report on Form 10-K for the year ended December 31, 2015, filed with the SEC on March 4, 2016;
- Our Quarterly Reports on Form 10-Q for the three months ended March 31, 2016, June 30, 2016 and September 30, 2016, filed with the SEC on May 5, 2016, August 8, 2016 and November 7, 2016, respectively;
- Our Current Reports on Form 8-K filed with the SEC on January 11, 2016, March 2, 2016, April 5, 2016, May 5, 2016, May 16, 2016, May 27, 2016, August 8, 2016, November 7, 2016, December 7, 2016 and December 19, 2016, respectively;
- Our Definitive Proxy Statement on Schedule 14A, filed with the SEC on April 8, 2016; 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 December 6, 2013, and any amendment or report subsequently filed for the purpose of updating such description.

We also incorporate by reference into this prospectus supplement and the accompanying prospectus all reports and other documents that we subsequently file with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act between the date of this prospectus supplement and the termination of the offering of the common stock described in this prospectus supplement. We are not, however, incorporating by reference any documents or portions thereof, whether specifically listed above or filed in the future, that are not deemed “filed” with the SEC, including any information furnished pursuant to Item 2.02 or 7.01 of Form 8-K or related exhibits furnished pursuant to Item 9.01 of Form 8-K. The reports and documents specifically listed above or filed in the future (excluding any information furnished to, rather than filed with, the SEC) are deemed to be part of this prospectus supplement and the accompanying prospectus from the date of the filing of each such report or document.

You may request a free copy of any of the documents incorporated by reference into this prospectus supplement and the accompanying prospectus by writing or telephoning us at the following address:
Kindred Biosciences, Inc.
1555 Bayshore Highway, Suite 200
Burlingame, California 94010
(650) 701-7901
Attention: Vice President of Finance

Exhibits to the filings will not be sent, however, unless those exhibits have specifically been incorporated by reference into this prospectus supplement and the accompanying prospectus.

PROSPECTUS

KindredBio
"Best Medicines for Our Best Friends"
KINDRED BIOSCIENCES, INC.
$150,000,000
Common Stock
Preferred Stock
Warrants
Units

From time to time and in one or more offerings, we may sell up to $150,000,000 in the aggregate of any or all of the securities identified above, either individually or in any combination. We will provide the specific terms of each offering, including the price and the type and amount of securities offered, in a supplement to this prospectus. We may also authorize one or more free writing prospectuses to be provided to you in connection with these offerings. The prospectus supplement and any related free writing prospectus may also add, update or change information contained in this prospectus. You should carefully read this prospectus, the applicable prospectus supplement and any related free writing prospectus, as well as any documents incorporated by reference, before buying any of the securities being offered.

We may offer and sell the securities described in this prospectus and any prospectus supplement to or through one or more underwriters, dealers and agents, or directly to purchasers, or through a combination of these methods. If any underwriters, dealers or agents are involved in the sale of any of the securities, their names and any applicable purchase price, fee, commission or discount arrangement between or among them will be set forth, or will be calculable from the information set forth, in the applicable prospectus supplement. See the sections of this prospectus entitled “About this Prospectus” and “Plan of Distribution” for more information. No securities may be sold without delivery of this prospectus and the applicable prospectus supplement.

Investing in our securities involves risks. See the “Risk Factors” on page 3 of this prospectus and in any similar section contained in the applicable prospectus supplement concerning factors you should consider before investing in our securities.

Our common stock is listed on The NASDAQ Capital Market under the symbol “KIN.” On January 14, 2015, the last reported sale price of our common stock on The NASDAQ Capital Market was $7.35 per share.

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 January 30, 2015.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission (the "SEC"), utilizing a "shelf" registration process. Under this shelf registration statement, we may, from time to time, sell any or all of the securities identified above, either individually or in any combination, and in one or more offerings, for total gross proceeds of up to $150,000,000. This prospectus provides you with a general description of the securities we may offer.

Each time we offer a type or series of securities under this prospectus, we will provide a prospectus supplement that will contain more specific information about the terms of the offered securities. We also may authorize one or more free writing prospectuses to be provided to you that may contain material information relating to these offerings. We also may add, update or change, in the prospectus supplement and in any related free writing prospectus that we may authorize to be provided to you, any of the information contained in this prospectus or in the documents that we have incorporated by reference into this prospectus. We urge you to read carefully this prospectus, any applicable prospectus supplement and any related free writing prospectus, together with the information incorporated herein by reference as described under the section entitled "Where You Can Find More Information," in this prospectus before buying any of the securities being offered. THIS PROSPECTUS MAY NOT BE USED TO CONSUMMATE A SALE OF SECURITIES UNLESS IT IS ACCOMPANIED BY A PROSPECTUS SUPPLEMENT.

You should rely only on the information that we have provided or incorporated by reference in this prospectus, any applicable prospectus supplement and any related free writing prospectus that we may authorize to be provided to you. We have not authorized any other person to provide you with different information. No dealer, salesperson or other person is authorized to give any information or to represent anything not contained in this prospectus, any applicable prospectus supplement or any related free writing prospectus that we may authorize to be provided to you. You must not rely on any unauthorized information or representation. This prospectus, any applicable supplement to this prospectus or any related free writing prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus, any applicable supplement to this prospectus or any related free writing prospectus constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

You should assume that the information appearing in this prospectus, any applicable prospectus supplement or any related free writing prospectus is accurate only as of the date on the front of the document and that any information we have incorporated by reference is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus, any applicable prospectus supplement or any related free writing prospectus, or any sale of a security. Our business, financial condition, results of operations and prospectus may have changed since those dates.

When we refer to "KindredBio," "we," "our," "us" and the "Company" in this prospectus, we mean Kindred Biosciences, Inc., unless otherwise specified.

WHERE YOU CAN FIND MORE INFORMATION; INCORPORATION BY REFERENCE

Available Information

We file reports, proxy statements and other information with the SEC. Information filed with the SEC by us can be inspected and copied at the Public Reference Room maintained by the SEC at 100 F Street, N.E., Washington, D.C. 20549. You may also obtain copies of this information by mail from the Public Reference Section of the SEC at prescribed rates. Further information on the operation of the SEC's Public Reference Room in Washington, D.C. can be obtained by calling the SEC at 1-800-SEC-0330. The SEC also maintains a web site that contains reports, proxy and information statements and other information about issuers, such as us, who file electronically with the SEC. The address of that website is http://www.sec.gov.

Our web site address is www.kindredbio.com. The information on our web site, however, is not, and should not be deemed to be, a part of this prospectus.

This prospectus and any prospectus supplement are part of a registration statement that we filed with the SEC and do not contain all of the information in the registration statement. The full registration statement may be obtained from the SEC or us, as provided below. Other documents establishing the terms of the offered securities are or may be filed as exhibits to the registration statement. Statements in this prospectus or any prospectus supplement about these documents are summaries, and each statement is qualified in all respects by reference to the document to which it refers. You should refer to the actual documents for a more complete description of the relevant matters. You may inspect a copy of the registration statement at the SEC's Public Reference Room in Washington, D.C. or through the SEC's website, as provided above.

Incorporation by Reference

The SEC's rules allow us to "incorporate by reference" information into this prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is deemed to be part of this prospectus, and subsequent information that we file with the SEC will automatically update and supersede that information. Any statement contained in a previously filed document incorporated by reference will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus modifies or replaces that statement.

We incorporate by reference into this prospectus the documents listed in the following paragraph that we have filed with the SEC pursuant to the Securities Exchange Act of 1934, as amended (the "Exchange Act"). We are not, however, incorporating by reference any documents or portions thereof, whether specifically listed below or filed in the future, that are not deemed "filed" with the SEC, including, without limitation, our Compensation Committee report and performance graph and any information furnished pursuant to Item 2.02 or 7.01 of Form 8-K or related exhibits furnished pursuant to Item 9.01 of Form 8-K.

This prospectus and any accompanying prospectus supplement incorporate by reference the documents set forth below that have previously been filed by us with the SEC:

- Our Annual Report on Form 10-K for the year ended December 31, 2013, filed with the SEC on March 14, 2014, as amended by Amendment No. 1 on Form 10-K/A filed with the SEC on March 17, 2014 and Amendment No. 2 on Form 10-K/A filed with the SEC on April 24, 2014;
- Our Quarterly Report on Form 10-Q for the three months ended March 31, 2014, filed with the SEC on May 14, 2014;
- Our Quarterly Report on Form 10-Q for the three and six months ended June 30, 2014, filed with the SEC on August 13, 2014;
- Our Quarterly Report on Form 10-Q for the three and nine months ended September 30, 2014, filed with the SEC on November 13, 2014;
- Our Definitive Proxy Statement on Schedule 14A, filed with the SEC on October 14, 2014;
- Our Current Reports on Form 8-K filed with the SEC on March 10, 2014, March 18, 2014, April 3, 2014, May 12, 2014, August 13, 2014, August 20, 2014, September 3, 2014, September 24, 2014, November 13, 2014 and December 3, 2014; 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 December 6, 2013, and any amendment or report subsequently filed for the purpose of updating such description.

Each document that we subsequently file with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the termination of this offering, including all such documents we may file with the SEC after the date of the initial registration statement and prior to the effectiveness of the registration statement, but excluding any information furnished to, rather than filed with, the SEC, will also be incorporated by reference into this prospectus and deemed to be part of this prospectus from the date of the filing of each such document.

You may request a free copy of any of the documents incorporated by reference in this prospectus (other than exhibits, unless they are specifically incorporated by reference in the documents) by writing or telephoning us at the following address:

Kindred Biosciences, Inc.
1555 Bayshore Highway, Suite 200
Burlingame, California 94010
(650) 701-7901
Attention: VP Finance

Exhibits to the filings will not be sent, however, unless those exhibits have specifically been incorporated by reference in this prospectus and any accompanying prospectus supplement.

THE COMPANY

We are a pet therapeutics company focused on licensing, developing and commercializing innovative biopharmaceutical products for cats, dogs and horses. Our core strategy is to identify compounds and targets that have already demonstrated safety and efficacy in humans and to develop therapeutics based on these validated compounds and targets for pets. We believe this approach will lead to shorter development times and higher approval rates than pursuing new, non-validated compounds and targets. We have a product candidate that is in a pivotal field efficacy trial, or pivotal trial, and currently anticipate obtaining approval as early as 2016 for that product. In addition, we have multiple other product candidates, including several biologics, in various stages of development for multiple additional indications for various diseases in cats, dogs and horses. We believe there are significant unmet medical needs for pets, and that the pet therapeutics segment of the animal health industry is likely to grow substantially as new therapeutics are identified, developed and marketed specifically for pets. Our therapeutic candidates are designed to enable veterinarians and pet owners to manage pets' medical needs safely and effectively, potentially resulting in longer and improved quality of life for pets.

We were incorporated on September 25, 2012 under the laws of the State of Delaware.

Our principal executive offices are located at 1555 Bayshore Highway, Suite 200, Burlingame, California 94010, and our telephone number is (650) 701-7901.

RISK FACTORS

Investment in any securities offered pursuant to this prospectus and the applicable prospectus supplement involves risks. You should carefully consider the risk factors in our Annual Report on Form 10-K for the year ended December 31, 2013 incorporated herein by reference, any amendment or update thereto reflected in subsequent filings with the SEC, and all other information contained or incorporated by reference into this prospectus, as updated by our subsequent filings under the Exchange Act, and the risk factors and other information contained in the applicable prospectus supplement before acquiring any of such securities. The occurrence of any of these risks might cause you to lose all or part of your investment in the offered securities.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference in this prospectus and any prospectus supplement or free writing prospectus include forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Exchange Act. All statements,

other than statements of historical fact, that address activities, events or developments that we expect, believe or anticipate will or may occur in the future are forward-looking statements including, in particular, the statements about our plans, objectives, strategies and prospects regarding, among other things, our financial condition, operating results and business.

We have identified some of these forward-looking statements with words like “believe,” “may,” “will,” “should,” “could,” “expect,” “intend,” “plan,” “predict,” “anticipate,” “estimate,” “continue” or other words and terms of similar meaning and the future dates. These forward-looking statements are based on current expectations about future events affecting us and are subject to uncertainties and factors relating to our operations and business environment, all of which are difficult to predict and many of which are beyond our control and could cause our actual results to differ materially from those matters expressed or implied by our forward-looking statements. Forward-looking statements are only predictions or statements of current plans and can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties, including the risks described under the heading “Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2013, which is incorporated herein by reference in its entirety, any amendment or update thereto reflected in subsequent filings with the SEC, and all other annual, quarterly and other reports that we file with the SEC after the date of this prospectus and that also are incorporated herein by reference. Such risks and uncertainties are not exclusive and further information concerning us and our business, including factors that potentially could materially affect our financial results or condition, may emerge from time to time. We assume no obligation to update, amend or clarify forward-looking statements to reflect actual results or changes in factors or assumptions affecting such forward-looking statements, except as otherwise required by law. We advise you, however, to consult any further disclosures we make on related subjects in our future annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K that we file with or furnish to the SEC.

USE OF PROCEEDS

Except as described in any prospectus supplement, we currently intend to use the net proceeds from the sale of the securities offered by this prospectus for research and development, commercialization, manufacturing and general corporate purposes. We may also use a portion of the net proceeds to acquire or invest in businesses, products and technologies that are complementary to our own. Pending these uses, the net proceeds will be invested in investment-grade, interest-bearing securities.

RATIO OF EARNINGS TO FIXED CHARGES

The following table sets forth the historical ratios of earnings to fixed charges for KindredBio for the periods indicated.

	Fiscal Year Ended December 31, 2012 (X)	Fiscal Year Ended December 31, 2013	Nine Months Ended September 30, 2014
Ratio of earnings to fixed charges	—	—	—
Deficiency of earnings available to cover fixed charges	(a)	(b)	(c)

(X) From inception (September 25, 2012) through December 31, 2012.

(a) Earnings for the fiscal year ended December 31, 2012 were inadequate to cover fixed charges. The coverage deficiency was approximately $120,000.

(b) Earnings in fiscal year ended December 31, 2013 were inadequate to cover fixed charges. The coverage deficiency was approximately $4.2 million.

(c) Earnings in the nine months ended September 30, 2014 were inadequate to cover fixed charges. The coverage deficiency was approximately $20.3 million.

The ratios above were computed by dividing earnings by fixed charges. For this purpose, earnings is calculated as follows: (i) adding (a) pre-tax income (loss) from operations; (b) fixed charges; (c) amortization of capitalized interest; and (ii) then subtracting from such sum (a) interest capitalized.

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Fixed charges consist of interest expense and that portion of rental expense associated with certain facility and equipment leases considered to be a reasonable estimate of the interest factor.

DESCRIPTION OF CAPITAL STOCK

General

Our authorized capital stock consists of 100,000,000 shares of common stock, par value $0.0001 per share, and 10,000,000 shares of preferred stock, par value $0.0001 per share. The following description of our capital stock and provisions of our amended and restated certificate of incorporation and amended and restated bylaws are summaries and are qualified in their entirety by reference to the complete text of those documents. Copies of the documents have been filed with the SEC as exhibits to our registration statement, of which this prospectus forms a part.

Common Stock

As of December 31, 2014, there were 19,724,482 shares of our common stock outstanding and held of record by approximately 32 stockholders.

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 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 that 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 proportionately 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, and the shares offered by us pursuant to this prospectus will be, when issued and paid for, 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.

Preferred Stock

As of December 31, 2014, there were no shares of our preferred stock outstanding.

Our board of directors is authorized, subject to any limitations prescribed by law, without further vote or action by the stockholders, to issue from time to time any of our authorized shares of preferred stock. Each such series of preferred stock shall have such number of shares, designations, preferences, voting powers, qualifications, and special or relative rights or privileges as shall be determined by our board of directors, which may include, among others, dividend rights, voting rights, liquidation preferences, conversion rights and preemptive rights.

The authority possessed by our board to issue preferred stock could potentially be used to discourage attempts by third parties to obtain control of our company through a merger, tender offer, proxy contest or otherwise by making such attempts more difficult or more costly. Our board may issue preferred stock with voting rights or conversion rights that, if exercised, could adversely affect the voting power of the holders of common stock. We have no current agreements or understandings with respect to the issuance of preferred stock.

Options

As of December 31, 2014, options to purchase an aggregate of 2,329,415 shares of our common stock at a weighted average exercise price of $7.5971 per share were outstanding.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

Certain provisions of Delaware law and our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could have the effect of delaying or discouraging another party from acquiring control of us. These provisions, which are summarized below, are expected to discourage certain types of coercive takeover practices and inadequate takeover bids. These provisions are also designed in part to encourage anyone seeking to acquire control of us to first negotiate with our board of directors. We believe that the advantages gained by protecting our ability to negotiate with any unsolicited and potentially unfriendly acquirer outweigh the disadvantages of discouraging such proposals, including those priced above the then-current market value of our common stock, because, among other reasons, the negotiation of such proposals could improve their terms.

Certificate of Incorporation and Bylaws

Our amended and restated certificate of incorporation and amended and restated bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 10,000,000 shares of undesignated preferred stock;
- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, the Chairman of the Board, the Chief Executive Officer or the President;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that directors may be removed only for cause and only by the affirmative vote of the holders of at least two-thirds in voting power of the outstanding stock entitled to vote;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- establish that our board of directors is divided into three classes, Class I, Class II, and Class III, with each class serving staggered terms;
- specify that no stockholder is permitted to cumulate votes at any election of the board of directors; and
- require a super majority of votes to amend certain of the above-mentioned provisions.

Our amended and restated bylaws also provide that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum 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 director, officer or other employee of the company to us or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, or (4) any action asserting a claim governed by the internal affairs doctrine. Our amended and restated bylaws further provide that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock is deemed to have notice of and consented to the foregoing provision.

Delaware Anti-Takeover Statute

We are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. In general, Section 203 prohibits a publicly-held Delaware corporation from engaging, under

certain circumstances, in a business combination with an interested stockholder for a period of three years following the date the person became an interested stockholder unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon completion of the transaction that 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, but not for determining the outstanding voting stock owned by the interested stockholder, (1) shares owned by persons who are directors and also officers of the corporation, and (2) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- at or subsequent to the date of the transaction, the business combination is approved by the board of directors of the corporation and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66-2/3% of the outstanding voting stock which is not owned by the interested stockholder.

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

The provisions of Delaware law and our amended and restated certificate of incorporation and amended and restated bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC.

NASDAQ Capital Market

Our common stock is listed on The NASDAQ Capital Market under the symbol "KIN."

DESCRIPTION OF WARRANTS

We may issue warrants for the purchase of shares of our common stock or preferred stock. We may issue warrants independently or together with other securities, and the warrants may be attached to or separate from any offered securities. Each series of warrants will be issued under a separate warrant agreement to be entered into between us and the investors or a warrant agent. The following summary of material provisions of the warrants and warrant agreements are subject to, and qualified in their entirety by reference to, all the provisions of the warrant agreement and warrant certificate applicable to a particular series of warrants. The terms of any warrants offered under a prospectus supplement may differ from the terms described below. We urge you to read the applicable prospectus supplement and any related free writing prospectus, as well as the complete warrant agreements and warrant certificates that contain the terms of the warrants.

The particular terms of any issue of warrants will be described in the prospectus supplement relating to the issue. Those terms may include:

- the number of shares of common stock or preferred stock purchasable upon the exercise of warrants to purchase such shares and the price at which such number of shares may be purchased upon such exercise;
- the designation, stated value and terms (including, without limitation, liquidation, dividend, conversion and voting rights) of the series of preferred stock purchasable upon exercise of warrants to purchase preferred stock;
- the terms of any rights to redeem or call the warrants;
- the date on which the right to exercise the warrants will commence and the date on which the right will expire;
- United States Federal income tax consequences applicable to the warrants; and
- any additional material terms of the warrants, including terms, procedures, and limitations relating to the exchange, exercise and settlement of the warrants.

Each warrant will entitle its holder to purchase the number of shares of preferred stock or common stock at the exercise price set forth in, or calculable as set forth in, the applicable prospectus supplement. Unless we otherwise specify in the applicable prospectus supplement, holders of the warrants may exercise the warrants at any time up to the specified time on the expiration date that we set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

A holder of warrant certificates may exchange them for new warrant certificates of different denominations, present them for registration of transfer and exercise them at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement. Until any warrants to purchase common stock or preferred stock are exercised, the holders of the warrants will not have any rights of holders of the underlying common stock or preferred stock, including any rights to receive dividends or payments upon any liquidation, dissolution or winding up on the common stock or preferred stock, if any.

DESCRIPTION OF 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 enter into unit agreements with a unit agent. Each unit agent will be a bank or trust company that we select. We will indicate the name and address of the unit agent in the applicable prospectus supplement relating to a particular series of units.

The following description, together with the additional information included in any applicable prospectus supplement, summarizes the general features of the units that we may offer under this prospectus. You should read any prospectus supplement and any free writing prospectus that we may authorize to be provided to you related to the series of units being offered, as well as the complete unit agreements that contain the terms of the units. Specific unit agreements will contain additional important terms and provisions and we will file each unit agreement as an exhibit to the registration statement of which this prospectus is a part, or will incorporate by reference from another report that we file with the SEC, the form of each unit agreement relating to units offered under this prospectus.

If we offer any units, certain terms of that series of units will be described in the applicable prospectus supplement, including, without limitation, the following, as applicable:

- 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 United States federal income tax considerations applicable to the units; and
- any other material terms of the units and their constituent securities.

PLAN OF DISTRIBUTION

We may sell the securities offered by this prospectus from time to time pursuant to underwritten public offerings, negotiated transactions, block trades or a combination of these methods or through underwriters or dealers, through agents and/or directly to one or more purchasers. The securities may be distributed from time to time in one or more transactions:

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

Each time that we sell securities offered by this prospectus, we will provide a prospectus supplement or supplements that will describe the method of distribution and set forth the terms and conditions of the offering of such securities, including the offering price of the securities and the proceeds to us.

Offers to purchase the securities being offered by this prospectus may be solicited directly. Agents may also be designated to solicit offers to purchase the securities from time to time. Any agent involved in the offer or sale of our securities will be identified in a prospectus supplement.

If a dealer is utilized in the sale of the securities being offered by this prospectus, the securities will be sold to the dealer, as principal. The dealer may then resell the securities to the public at varying prices to be determined by the dealer at the time of resale.

If an underwriter is utilized in the sale of the securities being offered by this prospectus, an underwriting agreement will be executed with the underwriter at the time of sale and the name of any underwriter will be provided in the prospectus supplement that the underwriter will use to make resales of the securities to the public. In connection with the sale of the securities, we, or the purchasers of securities for whom the underwriter may act as agent, may compensate the underwriter in the form of underwriting discounts or commissions. The underwriter may sell the securities to or through dealers, and those dealers may receive compensation in the form of discounts, concessions or commissions from the underwriters and/or commissions from the purchasers for which they may act as agent. Unless otherwise indicated in a prospectus supplement, an agent will be acting on a best efforts basis and a dealer will purchase securities as a principal, and may then resell the securities at varying prices to be determined by the dealer.

Any compensation paid to underwriters, dealers or agents in connection with the offering of the securities, and any discounts, concessions or commissions allowed by underwriters to participating dealers will be provided in the applicable prospectus supplement. Underwriters, dealers and agents participating in the distribution of the securities may be deemed to be underwriters within the meaning of the Securities Act, and any discounts and commissions received by them and any profit realized by them on resale of the securities may be deemed to be underwriting discounts and commissions. We may enter into agreements to indemnify underwriters, dealers and agents against civil liabilities, including liabilities under the Securities Act, or to contribute to payments they may be required to make in respect thereof and to reimburse those persons for certain expenses.

Any common stock will be listed on The NASDAQ Capital Market, but any other securities may or may not be listed on a national securities exchange. To facilitate the offering of securities, certain persons participating in the

offering may engage in transactions that stabilize, maintain or otherwise affect the price of the securities. This may include over-allotments or short sales of the securities, which involve the sale by persons participating in the offering of more securities than were sold to them. In these circumstances, these persons would cover such over-allotments or short positions by making purchases in the open market or by exercising their over-allotment option, if any. In addition, these persons may stabilize or maintain the price of the securities by bidding for or purchasing securities in the open market or by imposing penalty bids, whereby selling concessions allowed to dealers participating in the offering may be reclaimed if securities sold by them are repurchased in connection with stabilization transactions. The effect of these transactions may be to stabilize or maintain the market price of the securities at a level above that which might otherwise prevail in the open market. These transactions may be discontinued at any time.

If indicated in the applicable prospectus supplement, underwriters or other persons acting as agents may be authorized to solicit offers by institutions or other suitable purchasers to purchase the securities at the public offering price set forth in the prospectus supplement, pursuant to delayed delivery contracts providing for payment and delivery on the date or dates stated in the prospectus supplement. These purchasers may include, among others, commercial and savings banks, insurance companies, pension funds, investment companies and educational and charitable institutions. Delayed delivery contracts will be subject to the condition that the purchase of the securities covered by the delayed delivery contracts will not at the time of delivery be prohibited under the laws of any jurisdiction in the United States to which the purchaser is subject. The underwriters and agents will not have any responsibility with respect to the validity or performance of these contracts.

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

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

In compliance with the guidelines of the Financial Industry Regulatory Authority, Inc. (“ FINRA”), the maximum consideration or discount to be received by any FINRA member or independent broker dealer may not exceed 8% of the aggregate proceeds of the offering.

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

LEGAL MATTERS

TroyGould PC, Los Angeles, California, has issued an opinion regarding certain legal matters relating to the issuance of the securities offered by this prospectus. As of January 15, 2015, TroyGould PC and certain of its attorneys beneficially owned, in the aggregate, less than one percent of our common stock. Additional legal matters may be passed upon for us, any underwriters, dealers or agents by counsel that we will name in the applicable prospectus supplement.

EXPERTS

The financial statements of Kindred Biosciences, Inc. incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2013 have been so incorporated in reliance on the report of KMJ Corbin & Company LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

$30,000,000

KINDRED BIOSCIENCES, INC.

Common Stock

PROSPECTUS SUPPLEMENT

FBR

December 19, 2016