

Kindred Biosciences, Inc.
Form FWP
December 10, 2013

Filed Pursuant to Rule 433

Issuer Free Writing Prospectus dated December 10, 2013

Relating to Preliminary Prospectus dated December 9, 2013

Registration No. 333-192242

KINDRED BIOSCIENCES, INC.

On December 9, 2013, Kindred Biosciences, Inc. filed Amendment No. 4 to its Registration Statement on Form S-1 (Registration No. 333-192242) (the "Registration Statement") to update and supplement certain disclosures that had been provided in its preliminary prospectus dated December 2, 2013 (referred to herein as the "Initial Preliminary Prospectus"). This free writing prospectus summarizes the supplements to the Initial Preliminary Prospectus that appear in the most recent preliminary prospectus included in Amendment No. 4 to the Registration Statement (the "Preliminary Prospectus"). These changes primarily reflect the addition of another underwriter, the terms of the directed share program and the inclusion of additional disclosure regarding the company's regulatory pathway. A copy of the Preliminary Prospectus is included in Amendment No. 4 to the Registration Statement and can be accessed through the following link: <http://www.sec.gov/Archives/edgar/data/1561743/000119312513466944/d626380ds1a.htm>

You should read the entire Preliminary Prospectus carefully, especially the "Risk Factors" section and the consolidated financial statements and related notes, together with this free writing prospectus, before deciding to invest in our common stock. Unless the context indicates otherwise, as used in this free writing prospectus, the terms "our," "us" and "issuer" refer to Kindred Biosciences, Inc.

Underwriters: BMO Capital Markets Corp.

Guggenheim Securities, LLC

Roth Capital Partners, LLC

Directed Share Program: At our request, the underwriters have reserved up to 5% of the shares to be offered in this offering for sale at the initial public offering price to certain of our directors, officers, existing stockholders, employees, business associates and related persons. Any directed shares not purchased will be offered by the underwriters to the general public on the same basis as all other shares offered

Risk Factor: We have revised the following risk factor on page 16 of the Preliminary Prospectus to read in its entirety as follows:

The development of our biologic product candidates is dependent upon relatively novel technologies and uncertain regulatory pathways.

We plan to develop biologics, including animal antibodies, for pets. Identification, optimization, and manufacture of therapeutic animal biologics is a relatively new field in which unanticipated difficulties or challenges could arise, and we expect the discovery, development, manufacturing and sale of biologic products to be a long, expensive and uncertain process. While many biologics have been approved for use in humans, apart from vaccines, relatively few recombinant proteins or antibodies have been approved for use in animals. There are unique risks and uncertainties

with biologics, the development, manufacturing, and sale of which are subject to regulations that are often more complex and extensive than the regulations applicable to other small molecule products. We may be unable to identify biologics suitable for development or to achieve the potency and stability required for use in pets. In particular, canine, feline, and equine antibodies represent new types of product candidates that may be difficult to develop successfully.

In some cases, it may be unclear whether our product candidates meet the definition of a biological product subject to regulation by the USDA or a drug subject to regulation by the FDA. The USDA's Center for Veterinary Biologics and the FDA's Center for Veterinary Medicine have a memorandum of understanding concerning their joint responsibilities for resolving jurisdictional issues over products of this nature. Under the memorandum of understanding, animal products are to be regulated by the USDA as

biologics, if they are intended for use to diagnose, cure, mitigate, treat, or prevent disease in animals and they work primarily through an immune process, or by the FDA as drugs, if they are intended for use in the diagnosis, cure, mitigation, treatment, or prevention of animal disease if the primary mechanism of action is not immunological or is undefined.

Although we believe that most of our current animal biologics will be regulated by the USDA based on their mechanisms of action, the USDA and the FDA may not agree with our assessment, or disputes may arise between the USDA and the FDA over regulatory jurisdiction for one or more of such biologics. If so, the development of our biologics may be delayed while any such disputes are adjudicated by the agencies. Furthermore, if the agencies were to determine that one or more of our animal biologics will be regulated by the FDA instead of the USDA, the time and cost of developing such biologics may be longer and more expensive than we currently anticipate, and we may determine to discontinue development of such biologics. It is also possible that the USDA's regulatory standards for novel biologics may be more difficult to satisfy than we anticipate.

Because the regulatory standards for pet biologics are often less stringent than for small molecule animal drugs, we believe that some veterinarians prefer to see further efficacy data before making a new biologic product purchasing decision. Accordingly, we may also find it necessary to conduct additional studies of our biologic product candidates in order to achieve commercial success.

Additional Disclosure:

We also revised the language on pages 3 and 65 under the heading "Product Pipeline" in the Preliminary Prospectus to include the following language:

The USDA's Center for Veterinary Biologics and the FDA's Center for Veterinary Medicine have a memorandum of understanding under which animal products are to be regulated by the USDA as biologics, if they are intended for use to diagnose, cure, mitigate, treat, or prevent disease in animals and they work primarily through an immune process, or by the FDA as drugs, if they are intended for use in the diagnosis, cure, mitigation, treatment, or prevention of animal disease if the primary mechanism of action is not immunological or is undefined. Although we believe that most of our current animal biologics will be regulated by the USDA based on their mechanisms of action, it is possible that the agencies may determine that one or more of our animal biologics will be regulated by the FDA instead of the USDA.

We also revised the language on page 84 under the heading "Regulatory Process at the USDA" in the Preliminary Prospectus to include the following language:

In some cases, it may be unclear whether our product candidates meet the definition of a biological product subject to regulation by the USDA or a drug subject to regulation by the FDA. The USDA's Center for Veterinary Biologics and the FDA's Center for Veterinary Medicine have a memorandum of understanding concerning their joint responsibilities for resolving jurisdictional issues over products of this nature. Under the memorandum of understanding, animal products are to be

regulated by the USDA as biologics, if they are intended for use to diagnose, cure, mitigate, treat, or prevent disease in animals and they work primarily through an immune process, or by the FDA as drugs, if they are intended for use in the diagnosis, cure, mitigation, treatment, or prevention of animal disease if the primary mechanism of action is not immunological or is undefined.

The issuer has filed a registration statement (including a prospectus) with the Securities and Exchange Commission (the SEC) for the offering to which this communication relates. Before you invest, you should read the prospectus in that registration statement and other documents the issuer has filed with the SEC for more complete information about the issuer and this offering. You may get these documents for free by visiting EDGAR on the SEC web site at www.sec.gov. Alternatively, the issuer, any underwriter or any dealer participating in this offering will arrange to send you the prospectus if you request it from: BMO Capital Markets Corp. at 3 Times Square, 27th Floor, New York, NY 10036, Attention Equity Syndicate Department, by telephone at (800) 414-3627 or by email to bmoprospectus@bmo.com and from Guggenheim Securities, LLC at 330 Madison, 8th Floor, New York, NY 10017, Attention Equity Syndicate Department, by telephone at (212) 518-9349 or by email to GSEquityProspectusDelivery@guggenheimpartners.com.