

Ignyta, Inc.
Form S-3
October 02, 2015
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As filed with the Securities and Exchange Commission on October 2, 2015

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form S-3
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

IGNYTA, INC.
(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

45-3174872
(I.R.S. Employer
Identification Number)

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1111 Flintkote Avenue

San Diego, California 92121

(858) 255-5959

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Jonathan E. Lim, M.D.

President and Chief Executive Officer

1111 Flintkote Avenue

San Diego, California 92121

(858) 255-5959

(Address, including zip code, and telephone number, including area code, of agent for service)

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General Counsel and Secretary

Ignyta, Inc.

1111 Flintkote Avenue

San Diego, California 92121

(858) 255-5959

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box. "

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box. x

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. "

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. "

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective on filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box. "

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box. "

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of large accelerated filer, accelerated filer and smaller reporting company in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer " Accelerated filer x
 Non-accelerated filer " (Do not check if a smaller reporting company) Smaller reporting company "

CALCULATION OF REGISTRATION FEE

| Title of each class of securities to be registered | Number of Shares to be Registered (1) | Proposed | Proposed | Amount of registration fee |
|--|---------------------------------------|--------------------------------------|----------------------------------|----------------------------|
| | | Maximum Offering Price Per Share (2) | Maximum Aggregate Offering Price | |
| Common Stock, \$0.0001 per share | 3,000,000 | \$8.59 | \$25,770,000 | \$2,595.04 |

(1) This Registration Statement registers 3,000,000 shares of common stock. Pursuant to Rule 416(a) under the Securities Act of 1933, as amended (the Securities Act), this Registration Statement is also registering an indeterminate number of shares of common stock that may be issued as a result of stock split, dividends or similar transactions.

(2) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(c) of the Securities Act based upon the average of the high and low prices of the Registrant's common stock as reported on the Nasdaq Capital Market on September 30, 2015.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

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The information in this prospectus is not complete and may be changed. These securities may not be sold until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell nor does it seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to Completion, dated October 2, 2015.

PROSPECTUS

IGNYTA, INC.

3,000,000 Shares of Common Stock

This prospectus relates solely to the resale or other disposition by the selling stockholder identified in the prospectus of up to 3,000,000 shares of our common stock issued by us to the selling stockholder on March 17, 2015 pursuant to the transactions described in Description of Asset Purchase Agreement and Subscription Agreement.

The selling stockholder, or its pledgees, donees, transferees or other successors-in-interest, may, from time to time, sell, transfer, or otherwise dispose of any or all of its shares through public or private transactions at prevailing market prices, at prices related to prevailing market prices or at privately negotiated prices. However, without our consent, the selling stockholder may not sell any shares offered in the prospectus until the earlier of March 17, 2016 and our change of control.

We are not selling any common stock under this prospectus, and will not receive any proceeds from the sale of the shares. The selling stockholder will sell the shares in accordance with the Plan of Distribution set forth in this prospectus. The selling stockholder will bear all commissions and discounts, if any, attributable to the sales of shares. We will bear all costs, expenses and fees in connection with the registration of the shares.

Any brokers or dealers participating in any sales of common stock offered by the selling stockholder may act either as principals or agents, may use block trades to position and resell the shares of common stock, and may be deemed to be underwriters within the meaning of the Securities Act of 1933, as amended, or the Securities Act. Commissions received by any broker-dealer may be deemed to be underwriting commissions under the Securities Act. See Plan of Distribution.

INVESTING IN OUR COMMON STOCK INVOLVES RISKS. YOU SHOULD CONSIDER THE RISKS THAT WE HAVE DESCRIBED IN RISK FACTORS ON PAGE 8, AS UPDATED IN ANY FUTURE FILINGS MADE WITH THE SECURITIES AND EXCHANGE COMMISSION THAT ARE INCORPORATED BY REFERENCE IN THIS PROSPECTUS, BEFORE INVESTING IN OUR COMMON STOCK.

Our common stock is listed on the Nasdaq Capital Market under the symbol RXDX. On October 1, 2015, the last reported sale price of our common stock on the Nasdaq Capital Market was \$8.20 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 , 2015.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the U.S. Securities and Exchange Commission, or the SEC, using a shelf registration process, pursuant to which a selling stockholder may from time to time offer to sell shares of common stock in one or more offerings. In some cases, the selling stockholder will also be required to provide a prospectus supplement containing specific information about the selling stockholder and the terms on which it is offering and selling our common stock. We may also authorize one or more free writing prospectuses to be provided to you that may contain material information relating to those offerings. Before purchasing any securities, you should carefully read this prospectus, any applicable prospectus supplement and any related free writing prospectus, together with the additional information described under the heading **Where You Can Find More Information; Incorporation by Reference**. The prospectus supplement and any related free writing prospectus may also add, update or change information contained in this prospectus with respect to that offering. If there is any inconsistency between the information in this prospectus, any applicable prospectus supplement and any related free writing prospectus, you should rely on the prospectus supplement and any related free writing prospectus.

Neither we nor the selling stockholders have authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. The selling stockholders will not make an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus, any applicable prospectus supplement and any related free writing prospectus is accurate only as of the date on its respective cover, and that any information incorporated by reference is accurate only as of the date of the document incorporated by reference, unless we indicate otherwise. Our business, financial condition, results of operations and prospects may have changed since those dates.

When we refer to **Ignyta**, **we**, **our**, **us** and the **Company** in this prospectus, we mean Ignyta, Inc., unless otherwise specified. When we refer to **you**, we mean the holders of the applicable series of securities.

We have registered trademarks for Ignyta[®], the Ignyta word mark and teardrop design, Methylome[®], and Trailblaze[®], and have pending trademark applications for Ignyta, the Ignyta word mark and teardrop design, the Ignyta teardrop design, Methylome, Oncolome, Pharos, Trailblaze and Trailblaze Pharos . All other trademarks, trade names and service marks appearing in this prospectus or the documents incorporated by reference herein are the property of their respective owners. Use or display by us of other parties' trademarks, trade dress or products is not intended to and does not imply a relationship with, or endorsements or sponsorship of, us by the trademark or trade dress owner. Solely for convenience, trademarks and tradenames referred to in this prospectus 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.

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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 Room 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.ignyta.com. The information on our web site, however, is not, and should not be deemed to be, a part of this prospectus.

This prospectus, any prospectus supplement and any related free writing prospectus 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. Statements in this prospectus, any prospectus supplement or any related free writing 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 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 our documents listed below and any future filings made by us with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, which we refer to as the Exchange Act, in this prospectus, between the date of this prospectus and the termination of the offering of the securities described in this prospectus. 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 our Compensation Committee report and performance graph or any information furnished pursuant to Items 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 with the SEC:

Our Annual Report on Form 10-K for the year ended December 31, 2014, filed with the SEC on March 12, 2015.

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Our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2015 and June 30, 2015, filed with the SEC on May 11, 2015 and August 10, 2015, respectively.

Our Definitive Proxy Statement on Schedule 14A, filed with the SEC on April 30, 2015.

Our Current Reports on Form 8-K and Form 8-K/A filed with the SEC on January 9, 2015, February 2, 2015, February 17, 2015, March 2, 2015, March 17, 2015, June 9, 2015, June 12, 2015, July 22, 2015, September 2, 2015, September 17, 2015 and September 30, 2015.

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The description of our Common Stock contained in our registration statement on Form 8-A, filed with the SEC on March 11, 2014, and any amendment or report filed with the SEC for the purpose of updating the description.

All reports and other documents we subsequently file 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 such reports and documents.

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:

Ignyta, Inc.

Attn: Corporate Secretary

11111 Flintkote Avenue

San Diego, California 92121

(858) 255-5959

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.

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THE COMPANY

We are a precision oncology biotechnology company dedicated to discovering or acquiring, then developing and commercializing, targeted new drugs for cancer patients whose tumors harbor specific molecular alterations, as well as novel chemotherapeutics that can potentially provide additional benefit to cancer patients. We are pursuing an integrated therapeutic and diagnostic, or Rx/Dx, strategy, where we anticipate pairing our product candidates with biomarker-based companion diagnostics, developed by us or by third parties with which we may partner, that are designed to identify the patients who are most likely to benefit from the precisely targeted drugs we develop.

Our current development plans focus on our pipeline of product candidates:

entrectinib, formerly called RXDX-101, a small molecule tyrosine kinase inhibitor directed to the Trk family tyrosine kinase receptors (TrkA, TrkB and TrkC), ROS1 and ALK proteins, which is in two Phase I clinical studies and one Phase II clinical study in molecularly defined patient populations for the treatment of solid tumors;

RXDX-105, a small molecule inhibitor of RET, BRAF and EGFR kinases that is currently in a Phase I/II clinical trial for the treatment of solid tumors;

RXDX-107, a small molecule nanoformulation of a modified bendamustine that is currently in a Phase I/Ib clinical study for the treatment of solid tumors;

RXDX-106, a small molecule, pseudo-irreversible inhibitor of TAM (Tyro-3, Axl and Mer) and cMET kinases that is in late preclinical development;

RXDX-103, a small molecule inhibitor of the cell division cycle 7-related, or Cdc7, protein kinase that is currently at the development candidate stage; and

RXDX-108, a small molecule inhibitor of the atypical kinase PKC δ that is in preclinical studies. We also have rights to next generation PKC δ inhibitors in addition to the lead compound.

A kinase is a type of enzyme that catalyzes the transfer of phosphate groups from high-energy, phosphate-donating molecules to specific other molecules, called substrates. Tyrosine kinases transfer phosphate groups from adenosine triphosphate, or ATP, to cellular proteins and can function as an on/off switch for cellular functions, including cancer signaling. Cell division is partly driven by protein kinases that regulate progression through the various phases of the cell division cycle.

We acquired exclusive global development and marketing rights to entrectinib under a license agreement with Nerviano Medical Sciences S.r.l., or NMS, that became effective in November 2013, we acquired exclusive global development and marketing rights to RXDX-103 under a license agreement with NMS that became effective in August 2014, and we acquired our RXDX-105, RXDX-107, RXDX-106 and RXDX-108 development programs in an asset purchase transaction with Cephalon, Inc., an indirect wholly-owned subsidiary of Teva Pharmaceutical

Industries Ltd., or Teva, in March 2015. We are also pursuing our Spark discovery-stage programs, which are programs directed to emerging oncology targets identified through the mining of proprietary and publicly available tumor samples.

We currently pursue a two-pronged strategy to leverage the biomarker insights that we have gained, as well as the knowledge of cancer biology of our management and drug discovery team. In the first case, when we identify a molecular alteration that is driving the growth of tumors in cancers of interest and if there is already a company(ies) developing a product candidate(s) that targets that specific driver, we plan to seek to in-license what we believe to be the most promising or most advanced product candidate(s) available for licensing. This approach is exemplified by our in-licenses of entrectinib from NMS in November 2013 and RXDX-103 from NMS in August 2014. We believe that entrectinib is one of the most clinically advanced inhibitors of TrkA, TrkB and TrkC, three targets that we believe to be activating alterations in several cancers with a substantial unmet

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medical need. Entrectinib also has been observed to have potent activity against ROS1, another cancer target against which there are no approved products, and ALK, a clinically and commercially validated oncology target. A variation on this approach would be to in-license a promising product candidate that has not been developed as a specifically-targeted agent, and then utilize the expertise of our team to identify specific patient-selection hypotheses using biomarkers.

In the second case, when we identify an activating molecular alteration that drives the growth of tumors in cancers of interest and there is no known company(ies) developing a suitable product candidate(s) that targets that specific driver, we plan to seek to initiate target validation and drug discovery activities against that molecular target. This approach is exemplified by our Spark programs. To date, we have identified multiple molecular targets that appear to be commonly altered in different cancer tissues. We have prioritized several of these targets and have initiated target validation and drug discovery activities against some of them.

We may also, from time to time, become aware of available oncology assets that we believe we could optimally position using our Rx/Dx expertise. These assets may have been developed without a biomarker strategy, failed in clinical trials due to lack of sufficient efficacy or been deprioritized for strategic reasons. This approach is exemplified by the acquisition of our RXDX-105, RXDX-107, RXDX-106 and RXDX-108 development programs from Teva in March 2015.

Our ability to identify innovative cancer targets and develop drugs against them is enabled by, and dependent on, a set of essential capabilities and the experience of our drug discovery and management team. Key aspects of our core drug discovery capabilities include the ability to perform x-ray crystallography on protein targets, conduct in silico structure-based drug design and run virtual chemistry screens. Once compounds with activity against our target have been identified by those or other tests and procedures, our drug discovery and scientific team further pursues the drug development process. The members of our team have significant experience in medicinal chemistry, lead optimization, ADME & PK (the study of absorption, distribution, metabolism, excretion, and pharmacokinetics), preclinical development and clinical development, and have collectively led or contributed to the development of multiple drugs approved by the U.S. Food and Drug Administration, including several cancer therapeutics. In addition, we have a laboratory registered under the Clinical Laboratory Improvement Amendments of 1988. Our personnel can use their expertise and our laboratory facilities to develop biomarker-based molecular assays to precisely define the patient populations in which we would test our product candidates, screen patients for enrollment in our clinical trials and potentially perform commercial companion diagnostic testing should any of our product candidates obtain marketing approval.

Since inception, our operations have focused on organizing and staffing our company, business planning, raising capital, assembling our core capabilities in genetic and epigenetic based biomarker and drug target discovery, identifying potential product candidates and developing such candidates. Our product candidate development operations include preparing, managing and conducting preclinical and clinical studies and trials, preparing regulatory submissions relating to those product candidates and establishing and managing relationships with third parties in connection with all of those activities. We expect that in the future our operations may also, if regulatory approval is obtained, include pursuing the commercialization of our product candidates.

We were incorporated under the laws of the State of Delaware on August 29, 2011 with the name NexDx, Inc. We changed our name to Ignyta, Inc. on October 8, 2012. On October 31, 2013, we merged with and into a wholly-owned subsidiary of Ignyta, Inc., or Parent, a Nevada corporation previously named Infinity Oil & Gas Company We changed our name to Ignyta Operating, Inc. in connection with the closing of the merger. On October 31, 2013, prior to the closing of the merger, (i) all then-outstanding shares of each series of our preferred stock were voluntarily converted by the holders thereof into shares of our common stock in accordance with our certificate of incorporation,

and (ii) we effected a three-to-one reverse stock split of our issued and outstanding shares of capital stock. On May 20, 2013, we completed our acquisition of Actogene Oncology, Inc., or Actogene, which merged with and into our company on that date.

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On June 12, 2014, we merged with and into Parent, with Ignyta surviving the merger, resulting in our reincorporation from Nevada to Delaware. In connection with this merger, each share of Parent common stock was converted into one share of Ignyta common stock, and we changed our name to Ignyta, Inc. Our principal executive offices are located at 11111 Flintkote Avenue, San Diego, California 92121, and our telephone number is (858) 255-5959.

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THE OFFERING

| | |
|---|--|
| Common stock offered by the selling stockholder | 3,000,000 shares. |
| Use of proceeds | We will not receive any proceeds from the sale or other disposition of the shares of common stock offered hereby. |
| Risk Factors | Investing in our common stock involves a high degree of risk. See Risk Factors beginning on page 8 of this prospectus. |
| Nasdaq Capital Market symbol | RXDX |

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RISK FACTORS

Investment in any securities offered pursuant to this prospectus, any applicable prospectus supplement and any related free writing prospectus involves risks. You should carefully consider the risk factors incorporated by reference to our most recent Annual Report on Form 10-K and any subsequent Quarterly Reports on Form 10-Q or Current Reports on Form 8-K we file after the date of this prospectus, 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 any applicable prospectus supplement and any related free writing prospectus 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.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference herein contain forward-looking statements. All statements other than statements of historical facts contained in this prospectus and the documents incorporated by reference herein are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. This prospectus and the documents incorporated by reference herein also contain estimates and other statistical data made by independent parties and by us relating to market size and growth and other data about our industry. This data involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. In addition, projections, assumptions and estimates of our future performance and the future performance of the markets in which we operate are necessarily subject to a high degree of uncertainty and risk.

In some cases, you can identify forward-looking statements by terms such as may, will, should, expect, plan, anticipate, could, intend, target, project, contemplates, believes, estimates, predicts, potential or negative of these terms or other similar expressions. The forward-looking statements in this prospectus and the documents incorporated by reference herein are only predictions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. These forward-looking statements speak only as of the date of this prospectus and are subject to a number of risks, uncertainties and assumptions, including those under Risk Factors and elsewhere in this prospectus. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Moreover, we operate in an evolving environment. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained in this prospectus or the documents incorporated by reference herein, whether as a result of any new information, future events, changed circumstances or otherwise.

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DESCRIPTION OF ASSET PURCHASE AGREEMENT AND SUBSCRIPTION AGREEMENT

Asset Purchase Agreement

On March 17, 2015, we entered into an Asset Purchase Agreement with Cephalon, Inc., an indirect wholly-owned subsidiary of Teva Pharmaceutical Industries Ltd., pursuant to which we purchased certain assets relating to four oncology research and development programs:

RXDX-105, a small molecule inhibitor of RET, BRAF and EGFR kinases that is currently in a Phase I/II clinical trial for the treatment of solid tumors;

RXDX-107, a small molecule nanoformulation of a modified bendamustine with potential activity in solid tumors that is in late preclinical development;

RXDX-106, a small molecule, pseudo-irreversible inhibitor of TAM (Tyro-3, Axl and Mer) and cMET kinases that is in late preclinical development; and

RXDX-108, a small molecule inhibitor of the atypical kinase PKC δ that is in preclinical studies. We also have rights to next generation PKC δ inhibitors in addition to the lead compound.

Under the Asset Purchase Agreement, we acquired Cephalon's right, title and interest in and to certain intellectual property, compounds, products, contracts, books and records, data and inventory related to these programs, and assumed related liabilities. In partial consideration for assets purchased under the Asset Purchase Agreement, we issued to Cephalon 1,500,000 unregistered shares of our common stock, paid to Cephalon approximately \$852,000 in cash for product inventory, and assumed the related liabilities.

Subscription Agreement

In March 2015 we issued an aggregate of 4,158,750 shares of our common stock in a registered direct offering to certain investors. Pursuant to the registered direct offering, we entered into a subscription agreement with Cephalon, pursuant to which we agreed to sell to Cephalon an aggregate of 1,500,000 shares of our common stock. The closing of the offering occurred on March 17, 2015. The offer and sale of the shares sold to Cephalon in the registered direct offering was made pursuant to our shelf registration statement on Form S-3 (SEC File No. 333-202403), which became effective on March 13, 2015, and a prospectus supplement thereto dated March 17, 2015.

Registration Rights Agreement

In connection with the Asset Purchase Agreement and registered direct offering, we also entered into a Registration Rights Agreement with Cephalon pursuant to which we agreed to register the shares of our common stock issued to Cephalon. Under the terms of the Registration Rights Agreement, we are required to use best efforts to file a registration statement with the SEC on or before December 17, 2015 and to cause such registration statement to be declared effective by the SEC within 90 days after the date the registration statement is filed. We have agreed to other customary obligations regarding registration, including matters relating to indemnification, maintenance of the registration statement and payment of certain expenses.

Market Stand-Off

The Asset Purchase Agreement provides that Cephalon will not, without our prior written consent, offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of any of shares of our common stock, until the earlier of March 17, 2016 and our change of control. Thus, unless we waive this restriction, the shares offered by this prospectus by the selling stockholder cannot be sold until the earlier of March 17, 2016 and our change of control, which we refer to as the restricted period. In addition, under the Asset Purchase Agreement, during the restricted period Cephalon may not, without our consent, purchase or otherwise acquire any additional shares of our common stock or our other equity securities, other than those acquired directly from us or in any future underwritten offerings we may conduct.

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USE OF PROCEEDS

We are registering the shares of our common stock covered by this prospectus pursuant to registration rights granted to the selling stockholder in the Registration Rights Agreement. We are not selling any securities under this prospectus and will not receive any proceeds from the sale or other disposition of the shares covered hereby.

We have agreed to pay all costs relating to the registration of the shares of our common stock covered by this prospectus.

Table of Contents**SELLING STOCKHOLDER**

We have prepared this prospectus to allow the selling stockholder or its pledgees, donees, transferees or other successors-in-interest to sell or otherwise dispose of, from time to time, up to an aggregate of 3,000,000 shares of our common stock. The table below presents information regarding the selling stockholder, the shares of common stock beneficially owned by it, the shares of common stock that it may sell or otherwise dispose of from time to time under this prospectus and the number and percentage of our common stock the selling stockholder will own assuming all of the shares covered by this prospectus are sold by the selling stockholder.

We do not know whether, when or in what amounts the selling stockholder may sell or otherwise dispose of the shares of common stock covered hereby. However, without our consent, the selling stockholder may not sell any shares offered in the prospectus until the earlier of March 17, 2016 and our change of control. The selling stockholder might not sell or dispose of any or all of the shares covered by this prospectus or, subject to the foregoing restrictions, may sell or dispose of some or all of the shares other than pursuant to this prospectus. Because the selling stockholder may not sell or otherwise dispose of some or all of the shares covered by this prospectus and because there are currently no agreements, arrangements or understandings with respect to the sale or other disposition of any of the shares, we cannot estimate the number of the shares that will be held by the selling stockholder after completion of the offering. However, for purposes of this table, we have assumed that all of the shares of common stock covered by this prospectus will be sold by the selling stockholder and that any other shares of our common stock beneficially owned by the selling stockholder will continue to be beneficially owned.

The information in the table is based on 29,619,706 shares outstanding as of September 30, 2015 and was prepared based on information supplied to us by the selling stockholder. Beneficial ownership is determined in accordance with Section 13(d) of the Exchange Act and generally includes voting or investment power with respect to securities and including any securities that grant the selling stockholder the right to acquire shares of common stock within 60 days of September 30, 2015. Other than the transactions referred to herein and in documents filed by us with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, the selling stockholder has not within the past three years had any position, office or other material relationship with us or any of our subsidiaries other than as a holder of our securities.

| Name of Selling Stockholder⁽¹⁾ | Number of Shares Beneficially Owned Prior to the Offering | Number of Shares Offered Hereby | Number of Shares Beneficially Owned After the Offering | Percent of Class Beneficially Owned After the Offering |
|--|--|--|---|---|
| Cephalon, Inc. ⁽²⁾ | 3,000,000 | 3,000,000 | | |

(1) Additional information concerning the named selling stockholder or pledgees, donees, transferees or other successors-in-interest of the stockholder may be set forth in a prospectus supplement to this prospectus.

- (2) The address of Cephalon, Inc. is 1090 Horsham Road, North Wales, PA 19454. We issued 1,500,000 shares of our common stock to Cephalon in partial consideration of the assets purchased under the Asset Purchase Agreement, and an additional 1,500,000 shares of our common stock to Cephalon in a registered direct offering of shares of our common stock. See Description of Asset Purchase Agreement and Subscription Agreement.

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PLAN OF DISTRIBUTION

The selling stockholder, including its pledgees, donees, transferees or other successors-in-interest, may from time to time offer some or all of the shares of common stock covered by this prospectus, subject to the restrictions set forth in

Description of Asset Purchase Agreement and Registration Rights Agreement Market Stand-Off. To the extent required, this prospectus and any free writing prospectus may be amended and supplemented from time to time to describe a specific plan of distribution.

The selling stockholder will not pay any of the costs, expenses and fees in connection with the registration and sale of the shares covered by this prospectus, but it will pay any and all underwriting discounts, selling commissions and stock transfer taxes, if any, attributable to sales of the shares. We will not receive any proceeds from the sale of the shares of our common stock covered hereby.

The selling stockholder may sell the shares of common stock covered by this prospectus from time to time, and may also decide not to sell all or any of the shares of common stock that it is allowed to sell under this prospectus. The selling stockholder will act independently of us in making decisions regarding the timing, manner and size of each sale. These dispositions may be at prevailing market prices, at prices related to prevailing market prices, or at privately negotiated prices. Sales may be made by the selling stockholder in one or more types of transactions, which may include:

purchases by underwriters, dealers and agents who may receive compensation in the form of underwriting discounts, concessions or commissions from the selling stockholder and/or the purchasers of the shares of common stock for whom they may act as agent;

one or more block transactions, including transactions in which the broker-dealer so engaged will attempt to sell the shares of common stock as agent but may position and resell a portion of the block as principal to facilitate the transaction, or in crosses, in which the same broker acts as an agent on both sides of the trade;

ordinary brokerage transactions or transactions in which a broker-dealer solicits purchasers;

purchases by a broker-dealer or market maker, as principal, and resale by the broker-dealer for its account;

the pledge of shares of common stock for any loan or obligation, including pledges to brokers or dealers who may from time to time effect distributions of shares of common stock;

short sales or transactions to cover short sales relating to the shares of common stock;

one or more exchanges or over-the-counter market transactions;

through distribution by a selling stockholder or its successor in interest to its members, general or limited partners or shareholders (or their respective members, general or limited partners or shareholders);

public or privately negotiated transactions;

the writing of options or other hedging transactions, whether the options are listed on an options exchange or otherwise;

distributions to creditors and equity holders of the selling stockholders;

trading plans entered into by the selling stockholder pursuant to Rule 10b5-1 under the Exchange Act; and

any combination of the foregoing, or any other available means allowable under applicable law.

The selling stockholder may also resell all or a portion of its common stock in open market transactions in reliance upon Rule 144 under the Securities Act provided it meets the criteria and conforms to the requirements of Rule 144.

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The selling stockholder may enter into sale, forward-sale and derivative transactions with third parties, or may sell securities not covered by this prospectus to third parties in privately negotiated transactions. If the applicable prospectus supplement or related free writing prospectus indicates, in connection with those sale, forward-sale or derivative transactions, the third parties may sell securities covered by this prospectus, the applicable prospectus supplement or any related free writing prospectus, including in short sale transactions and by issuing securities that are not covered by this prospectus but are exchangeable for or represent beneficial interests in the common stock. The third parties also may use shares received under those sale, forward-sale or derivative arrangements or shares pledged by the selling stockholder or borrowed from the selling stockholders or others to settle such third-party sales or to close out any related open borrowings of common stock. The third parties may deliver this prospectus in connection with any such transactions. Any third party in such sale transactions will be an underwriter and will be identified in the applicable prospectus supplement (or a post-effective amendment to the registration statement of which this prospectus is a part).

In addition, the selling stockholder may engage in hedging transactions with broker-dealers in connection with distributions of common stock or otherwise. In those transactions, broker-dealers may engage in short sales of securities in the course of hedging the positions they assume with the selling stockholder. The selling stockholder may also sell securities short and redeliver securities to close out such short positions. The selling stockholder may also enter into option or other transactions with broker-dealers which require the delivery of securities to the broker-dealer. The broker-dealer may then resell or otherwise transfer such securities pursuant to this prospectus. The selling stockholder also may loan or pledge shares, and the borrower or pledgee may sell or otherwise transfer the common stock so loaned or pledged pursuant to this prospectus. Such borrower or pledgee also may transfer those shares of common stock to investors in our securities or the selling stockholder's securities or in connection with the offering of other securities not covered by this prospectus.

The selling stockholder also may transfer or donate the shares of common stock in other circumstances, in which case the transferees, donees, pledgees or other successors in interest will be the selling beneficial owners for purposes of this prospectus and may, subject to the transfer restrictions, sell the shares of common stock from time to time under this prospectus after we have filed a post-effective amendment to the registration statement, of which this prospectus forms a part, or a prospectus supplement under applicable provisions of the Securities Act supplementing or amending this list of selling stockholders to include the pledgee, donee, transferee or other successors in interest as selling stockholders under this prospectus.

To the extent necessary, we may amend or supplement this prospectus from time to time to describe a specific plan of distribution. We will file a supplement to this prospectus, if required, upon being notified by the selling stockholder that any material arrangement has been entered into with a broker-dealer for the sale of shares through a block trade, offering or a purchase by a broker or dealer. The applicable prospectus supplement will set forth the specific terms of the offering of securities, including:

the number of shares of common stock offered;

the price of such common stock;

the proceeds to the selling stockholders from the sale of such common stock;

the names of the underwriters or agents, if any;

any underwriting discounts, agency fees or other compensation to underwriters or agents; and

any discounts or concessions allowed or paid to dealers.

In connection with sales of common stock covered hereby, any underwriter, broker-dealer or agent and any other participating broker-dealer that executes sales for the selling stockholder may be deemed to be an underwriter within the meaning of the Securities Act. Accordingly, any compensation earned by such underwriter, broker-dealer or agent may be deemed to be underwriting discounts and commissions.

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We and the selling stockholder have agreed to indemnify each other against certain liabilities, including liabilities under the Securities Act. In addition, we or the selling stockholder may agree to indemnify any underwriters, broker-dealers and agents against or contribute to any payments the underwriters, broker-dealers or agents may be required to make with respect to, civil liabilities, including liabilities under the Securities Act. Underwriters, broker-dealers and agents and their affiliates are permitted to be customers of, engage in transactions with, or perform services for us and our affiliates or the selling stockholder or its affiliates in the ordinary course of business.

We are required to pay certain fees and expenses incident to the registration of the shares of common stock. See Use of Proceeds. We have also agreed to indemnify the selling stockholder against certain losses, claims, damages and liabilities, including liabilities under the Securities Act, relating to the registration statement and prospectus and any supplements or amendments thereof.

If the selling stockholder uses this prospectus for any sale of the shares of common stock, it will be subject to the prospectus delivery requirements of the Securities Act.

We have agreed with the selling stockholder to use our best efforts to keep the registration statement, of which this prospectus constitutes a part, effective until the sale of all shares of common stock registered in the registration statement, of which this prospectus is a part. There can be no assurance that the selling stockholder will sell any or all of the shares of common stock registered pursuant to the registration statement.

The provisions of Regulation M of the Exchange Act and the rules and regulations thereunder, which provisions may limit the timing of purchases and sales of any of the common stock by the selling stockholder may also apply to sales of shares of all common stock by and the activities of the selling stockholder. Regulation M may also restrict the ability of any person engaged in the distribution of the common stock to engage in market-making activities with respect to the common stock. These restrictions may affect the marketability of such common stock.

To the extent permitted by applicable law, this plan of distribution may be modified in a prospectus supplement or otherwise.

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LEGAL MATTERS

Latham & Watkins LLP, San Diego, California, will pass upon certain legal matters relating to the issuance and sale of the securities offered hereby on behalf of Ignyta, Inc. Additional legal matters may be passed upon for us or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

EXPERTS

The financial statements of Ignyta, Inc. incorporated by reference in Ignyta, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2014 have been audited by Mayer Hoffman McCann P.C., independent registered public accounting firm, as set forth in their report thereon incorporated by reference therein, and incorporated herein by reference. Such financial statements are, and audited financial statements to be included in subsequently filed documents will be, incorporated herein in reliance upon the reports of Mayer Hoffman McCann P.C. pertaining to such financial statements as of the respective dates (to the extent covered by consents filed with the Securities and Exchange Commission) given on the authority of such firm as experts in accounting and auditing.

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PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. *Other Expenses of Issuance and Distribution*

The following is an estimate of the expenses that we may incur in connection with the securities being registered hereby. All amounts are estimates except the SEC registration fee and the FINRA filing fee.

| | |
|------------------------------|------------------|
| SEC registration fee | \$ 2,595 |
| Printing expenses | \$ 5,000 |
| Legal fees and expenses | \$ 20,000 |
| Accounting fees and expenses | \$ 5,000 |
| Total | \$ 32,595 |

Item 15. *Indemnification of Directors and Officers*

Subsection (a) of Section 145 of the General Corporation Law of the State of Delaware, or the DGCL, empowers a corporation to indemnify any person who was or is a party or who is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe the person's conduct was unlawful.

Subsection (b) of Section 145 empowers a corporation to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person acted in any of the capacities set forth above, against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Section 145 further provides that to the extent a director or officer of a corporation has been successful on the merits or otherwise in the defense of any action, suit or proceeding referred to in subsections (a) and (b) of Section 145, or in defense of any claim, issue or matter therein, such person shall be indemnified against expenses (including attorneys

fees) actually and reasonably incurred by such person in connection therewith; that indemnification provided for by Section 145 shall not be deemed exclusive of any other rights to which the indemnified party may be entitled; and the indemnification provided for by Section 145 shall, unless otherwise provided when authorized or ratified, continue as to a person who has ceased to be a director, officer, employee or agent and shall inure to the benefit of such person's heirs, executors and administrators. Section 145 also empowers the corporation to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity, or arising out of his status

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as such, whether or not the corporation would have the power to indemnify such person against such liabilities under Section 145.

Section 102(b)(7) of the DGCL provides that a corporation's certificate of incorporation may contain a provision eliminating or limiting the personal liability of a director to the corporation or its stockholders for monetary damages for breach of fiduciary duty as a director, provided that such provision shall not eliminate or limit the liability of a director (i) for any breach of the director's duty of loyalty to the corporation or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the DGCL, or (iv) for any transaction from which the director derived an improper personal benefit.

Our second amended and restated certificate of incorporation and our amended and restated bylaws provide that we will indemnify our directors and officers to the fullest extent permitted by the Delaware General Corporation Law, which prohibits our second amended and restated certificate of incorporation from limiting the liability of our directors for the following:

any breach of the director's duty of loyalty to us or our stockholders;

acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law;

unlawful payment of dividends or unlawful stock repurchases or redemptions; or

any transaction from which the director derived an improper benefit.

Our second amended and restated certificate of incorporation and our amended and restated bylaws also provide that if Delaware law is amended to authorize corporate action further eliminating or limiting the personal liability of a director, then the liability of our directors will be eliminated or limited to the fullest extent permitted by Delaware law, as so amended. This limitation of liability does not apply to liabilities arising under the federal securities laws and does not affect the availability of equitable remedies such as injunctive relief or rescission.

Our second amended and restated certificate of incorporation and our amended and restated bylaws also provide that we shall have the power to indemnify our employees and agents to the fullest extent permitted by law. Our amended and restated bylaws also permit us to secure insurance on behalf of any officer, director, employee or other agent for any liability arising out of his or her actions in this capacity, regardless of whether our amended and restated bylaws would permit indemnification. We have obtained directors' and officers' liability insurance.

We have entered into separate indemnification agreements with our directors and executive officers, in addition to indemnification provided for in our second amended and restated certificate of incorporation and amended and restated bylaws. These agreements, among other things, provide for indemnification of our directors and executive officers for expenses, judgments, fines and settlement amounts incurred by this person in any action or proceeding arising out of this person's services as a director or executive officer or at our request. We believe that these provisions in our second amended and restated certificate of incorporation and amended and restated bylaws and indemnification agreements are necessary to attract and retain qualified persons as directors and executive officers. The above description of the indemnification provisions of our second amended and restated certificate of incorporation, our amended and restated bylaws and our indemnification agreements is not complete and is qualified in its entirety by

reference to these documents.

Item 16. Exhibits

(a) Exhibits

A list of exhibits filed with this registration statement on Form S-3 is set forth on the Exhibit Index and is incorporated herein by reference.

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Item 17. Undertakings

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 percent change in the maximum aggregate offering price set forth in the Calculation of Registration Fee table in the effective registration statement; and

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

provided, however, that paragraphs (a)(1)(i), (a)(1)(ii), and (a)(1)(iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is a part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:

(A) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(B) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. *Provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into

the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

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(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities:

The undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

Table of Contents**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of San Diego, State of California, on the 2nd day of October, 2015.

IGNYTA, INC.

By: /s/ Jonathan E. Lim, M.D.
Jonathan E. Lim, M.D.
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Jonathan E. Lim and Jacob Chacko, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to file and sign any and all amendments, including post-effective amendments and any registration statement for the same offering that is to be effective under Rule 462(b) of the Securities Act, to this registration statement, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or their substitute or substitutes may lawfully do or cause to be done by virtue hereof. This power of attorney shall be governed by and construed with the laws of the State of Delaware and applicable federal securities laws.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

| SIGNATURE | TITLE | DATE |
|---|--|-----------------|
| /s/ JONATHAN E. LIM, M.D. Jonathan E. Lim, M.D. | President, Chief Executive Officer and Chairman of the Board (<i>Principal Executive Officer</i>) | October 2, 2015 |
| /s/ Jacob Chacko, M.D. Jacob Chacko, M.D. | Chief Financial Officer (<i>Principal Financial and Accounting Officer</i>) | October 2, 2015 |
| /s/ James Bristol, Ph.D. James Bristol, Ph.D. | Director | October 2, 2015 |
| /s/ Alexander Casdin | Director | October 2, 2015 |

Alexander Casdin

/s/ Heinrich Dreismann, Ph.D.

Director

October 2, 2015

Heinrich Dreismann, Ph.D.

/s/ James Freddo, M.D.

Director

October 2, 2015

James Freddo, M.D.

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| Exhibit | |
|----------------|---|
| Number | Description |
| 2.1 | Agreement and Plan of Reorganization, dated May 7, 2013, by and between Ignyta, Inc. and Actogene Oncology, Inc. (incorporated by reference to Exhibit 2.1 to the Company's Current Report on Form 8-K filed with the SEC on November 1, 2013). |
| 2.2 | Agreement and Plan of Merger and Reorganization, dated October 31, 2013, by and among Ignyta, Inc. (then known as Infinity Oil & Gas Company), IGAS Acquisition Corp., and Ignyta, Inc. (then known as Ignyta Operating, Inc.) (incorporated by reference to Exhibit 2.2 to the Company's Current Report on Form 8-K filed with the SEC on November 1, 2013). |
| 2.3 | Agreement and Plan of Merger, dated June 12, 2014, by and among Ignyta, Inc. (then known as Ignyta Operating, Inc.), and its parent entity Ignyta, Inc. (incorporated by reference to Exhibit 2.1 to the Company's Report on Form 8-K12B filed with the SEC on June 13, 2014). |
| 3.1 | Second Amended and Restated Certificate of Incorporation of Ignyta, Inc. (incorporated by reference to Exhibit 3.1 to the Company's Report on Form 8-K12B filed with the SEC on June 13, 2014). |
| 3.2 | Amended and Restated Bylaws of Ignyta, Inc. (incorporated by reference to Exhibit 3.2 to the Company's Report on Form 8-K12B filed with the SEC on June 13, 2014). |
| 4.1 | Form of Common Stock certificate (incorporated by reference to Exhibit 4.1 to the Company's Report on Form 8-K12B filed with the SEC on June 13, 2014). |
| 4.2 | Warrant to Purchase Stock, issued to Silicon Valley Bank on June 25, 2012 (incorporated by reference to Exhibit 10.5 to the Company's Current Report on Form 8-K filed with the SEC on November 1, 2013). |
| 4.3 | Warrant to Purchase Stock, issued to Silicon Valley Bank on February 27, 2013 (incorporated by reference to Exhibit 10.6 to the Company's Current Report on Form 8-K filed with the SEC on November 1, 2013). |
| 4.4 | Warrant to Purchase Common Stock, dated November 6, 2013, issued to Nerviano Medical Sciences S.r.l. (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed with the SEC on November 7, 2013). |
| 4.5 | Warrant to Purchase Stock, issued to Silicon Valley Bank on September 30, 2014 (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed with the SEC on October 1, 2014). |
| 4.6 | Warrant to Purchase Stock, issued to Life Science Loans, LLC on September 30, 2014 (incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed with the SEC on October 1, 2014). |
| 4.7 | Registration Rights Agreement, dated March 17, 2015, by and between Ignyta, Inc. and Cephalon, Inc. (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed with the SEC on March 17, 2015). |
| 5.1 | Opinion of Latham & Watkins LLP. |

- 23.1 Consent of Latham & Watkins LLP (included in Exhibit 5.1).
- 23.2 Consent of Mayer Hoffman McCann P.C., independent registered public accounting firm.
- 24.1 Powers of Attorney (incorporated by reference to the signature page hereto).