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

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**POST-EFFECTIVE AMENDMENT NO. 1  
TO  
FORM S-1  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

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**KemPharm, Inc.**

(Exact name of registrant as specified in its charter)

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Delaware  
(State or other jurisdiction of  
incorporation or organization)

2834  
(Primary Standard Industrial  
Classification Code Number)

20-5894398  
(I.R.S. Employer  
Identification Number)

2656 Crosspark Road, Suite 100  
Coralville, IA 52241  
(319) 665-2575

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

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Travis C. Mickle, Ph.D.  
President and Chief Executive Officer  
KemPharm, Inc.  
2656 Crosspark Road, Suite 100  
Coralville, IA 52241  
(319) 665-2575

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

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*Copies to:*

James C. T. Linfield  
Brent B. Siler  
Matthew P. Dubofsky  
Cooley LLP  
380 Interlocken Crescent, Suite 900  
Broomfield, CO 80021  
(720) 566-4000

Gordon K. Johnson  
Chief Operating Officer and Chief Financial Officer  
KemPharm, Inc.  
2656 Crosspark Road, Suite 100  
Coralville, IA 52241  
(319) 665-2575

David W. Pollak  
Morgan, Lewis & Bockius LLP  
101 Park Avenue  
New York, NY 10178  
(212) 309-6058

**Approximate date of commencement of proposed sale to the public:** As soon as practicable after the effective date of this registration statement.

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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, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) 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 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 post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration number of the earlier effective registration statement for the same offering.  File No. 333-202660

**This Registration Statement shall become effective upon filing in accordance with Rule 462(d) under the Securities Act of 1933.**

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**EXPLANATORY NOTE**

This Post-Effective Amendment No. 1 to the Registration Statement on Form S-1 (File No. 333-202660) is filed pursuant to Rule 462(d) solely to add an updated Exhibit 5.1 with respect to such Registration Statement.

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**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 16. Exhibits and Financial Statement Schedules.**

The exhibits to the registration statement are listed in the Exhibit Index attached hereto and are incorporated by reference herein.

**SIGNATURES**

Pursuant to the requirements of the Securities Act, the Registrant has duly caused this Post-Effective No. 1 to the Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Coralville, State of Iowa, on the 16th day of April, 2015.

KEMPHARM, INC.

By: /s/ Travis C. Mickle  
 Travis C. Mickle, Ph.D.  
 President and Chief Executive Officer

Pursuant to the requirements of the Securities Act, this Post-Effective No. 1 to the Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Travis C. Mickle</u> Travis C. Mickle, Ph.D.	President, Chief Executive Officer and Director <i>(Principal Executive Officer)</i>	April 16, 2015
<u>/s/ Gordon K. Johnson</u> Gordon K. Johnson	Chief Operating Officer and Chief Financial Officer <i>(Principal Financial Officer)</i>	April 16, 2015
<u>/s/ R. LaDuane Clifton</u> R. LaDuane Clifton, CPA	Vice President of Finance and Corporate Controller <i>(Principal Accounting Officer)</i>	April 16, 2015
<u>*</u> Danny L. Thompson	Director	April 16, 2015
<u>*</u> Matthew R. Plooster	Director	April 16, 2015
<u>*</u> Richard W. Pascoe	Director	April 16, 2015
<u>*</u> Joseph B. Saluri	Director	April 16, 2015
<u>*</u> David S. Tierney	Director	April 16, 2015
* By: <u>/s/ Travis C. Mickle</u> Travis C. Mickle <i>Attorney-in-Fact</i>		April 16, 2015

## EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Description of Document</u>
1.1#	Form of Underwriting Agreement.
2.1*#	Asset Purchase Agreement, by and between Shire LLC and Travis C. Mickle, Ph.D. and the Registrant, dated as of March 21, 2012.
3.1#	Amended and Restated Certificate of Incorporation, as amended, as currently in effect.
3.2#	Certificate of Amendment of Certificate of Incorporation, as currently in effect.
3.3#	Form of Amended and Restated Certificate of Incorporation to be effective upon completion of this offering.
3.4#	Amended and Restated Bylaws, as amended to date and currently in effect.
3.5#	Form of Amended and Restated Bylaws to be effective upon completion of this offering.
4.1	Reference is made to exhibits 3.1 through 3.5.
4.2#	Specimen stock certificate evidencing shares of Common Stock.
5.1	Opinion of Cooley LLP as to legality.
10.1*#	Material Supply Agreement, by and between the Registrant and Johnson Matthey Inc., dated as of November 2, 2009.
10.2#	Facility Agreement, by and between the Registrant and Deerfield Private Design Fund III, L.P., dated as of June 2, 2014.
10.2.1#	First Amendment To Facility Agreement, Senior Secured Convertible Note And Warrant, by and between the Registrant and Deerfield Private Design Fund III, L.P., dated as of March 6, 2015.
10.3#	Amended and Restated Investors' Rights Agreement, dated as of February 19, 2015, by and among the Registrant and certain of its stockholders.
10.4#	Senior Secured Convertible Note issued to Deerfield Private Design Fund III, L.P., dated as of June 2, 2014.
10.5#	Warrant to Purchase Shares of Series D Preferred Stock issued to Deerfield Private Design Fund III, L.P., dated as of June 2, 2014.
10.6#	Warrant to Purchase Shares of Common Stock issued to the Virginia Tech Foundation, Inc., dated as of September 8, 2009.
10.7#	Form of Stock Purchase Warrant to purchase shares of Series D Convertible Preferred Stock issued in bridge financing, along with a schedule of warrant holders.
10.8.1#	Form of Common Stock Purchase Warrants issued by KemPharm, Inc., an Iowa corporation, along with a schedule of warrant holders.
10.8.2#	Form of Common Stock Purchase Warrants issued by KemPharm, Inc., a Delaware corporation, along with a schedule of warrant holders.
10.9#	Lease Agreement, by and between the Registrant and the Board of Regents, State of Iowa for the Use and Benefit of the University of Iowa, dated as of September 6, 2013.
10.10*#	Agreement to Terminate CLA, by and between MonoSol Rx, LLC and the Registrant, dated as of March 20, 2012.
10.11+#	Incentive Stock Plan, as amended to date.
10.12+#	Form of Incentive Stock Option Agreement under Incentive Stock Plan.
10.13+#	Form of Nonqualified Stock Option Agreement under Incentive Stock Plan.
10.14+#	Form of 2014 Equity Incentive Plan.

<u>Exhibit Number</u>	<u>Description of Document</u>
10.15+#	Form of Stock Option Grant Notice and Stock Option Agreement under 2014 Equity Incentive Plan.
10.16+#	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under 2014 Equity Incentive Plan.
10.17+#	Form of Indemnification Agreement with the Registrant's directors and executive officers.
10.18+#	Employment Agreement by and between the Registrant and Gordon K. Johnson, dated as of July 10, 2013.
10.19+#	Employment Agreement by and between the Registrant and Travis C. Mickle, Ph.D., dated as of May 30, 2014.
10.20+#	Employment Agreement by and between the Registrant and Christal M.M. Mickle, dated as of May 30, 2014.
10.21#	Board of Directors Services Agreement by and between Registrant and Richard W. Pascoe, dated as of January 1, 2014.
10.22#	Board of Directors Services Agreement by and between Registrant and Joseph B. Saluri, dated as of January 1, 2014.
10.23#	Non-Employee Director Cash Stipend Compensation Policy to be effective upon the completion of this offering.
23.1#	Consent of Ernst & Young LLP, independent registered public accounting firm.
23.2	Consent of Cooley LLP (included in Exhibit 5.1).
24.1#	Power of Attorney (included on signature page).

# Previously filed.

+ Indicates management contract or compensatory plan.

\* Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment and have been separately filed with the Securities and Exchange Commission.



James C. T. Linfield  
+1 720 566 4010  
linfieldjct@cooley.com

April 16, 2015

KemPharm, Inc.  
2656 Crosspark Road, Suite 100  
Coralville, IA 52241

Ladies and Gentlemen:

You have requested our opinion, as counsel to KemPharm, Inc., a Delaware corporation (the "**Company**"), in connection with the filing by the Company of a Registration Statement (No. 333-202660) on Form S-1 (the "**Registration Statement**") with the Securities and Exchange Commission, including a related prospectus filed with the Registration Statement (the "**Prospectus**"), covering an underwritten public offering of up to 5,854,545 shares (the "**Shares**") of the Company's common stock, par value \$0.0001, including up to 763,636 Shares that may be sold pursuant to the exercise of an option to purchase additional shares. All of the Shares are to be sold by the Company as described in the Registration Statement and the Prospectus.

In connection with this opinion, we have examined and relied upon (a) the Registration Statement and the Prospectus, (b) the Company's Amended and Restated Certificate of Incorporation, as amended, and Amended and Restated Bylaws, as currently in effect, (c) the Company's Amended and Restated Certificate of Incorporation, filed as Exhibit 3.3 to the Registration Statement, and the Company's Amended and Restated Bylaws, filed as Exhibit 3.5 to the Registration Statement, each of which is to be in effect immediately following the closing of the offering contemplated by the Registration Statement, and (d) the originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. We have undertaken no independent verification with respect to such matters. We have assumed the genuineness and authenticity of all documents submitted to us as originals, and the conformity to originals of all documents submitted to us as copies and the due execution and delivery of all documents where due execution and delivery are a prerequisite to the effectiveness thereof. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not sought independently to verify such matters. Our opinion is expressed only with respect to the General Corporation Law of the State of Delaware. We express no opinion as to whether the laws of any particular jurisdiction are applicable to the subject matter hereof. We are not rendering any opinion as to compliance with any federal or state antifraud law, rule or regulation relating to securities, or to the sale or issuance thereof.

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares, when sold and issued against payment therefor as described in the Registration Statement and the Prospectus, will be validly issued, fully paid and non-assessable.

We consent to the reference to our firm under the caption "Legal Matters" in the Prospectus included in the Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement.

Sincerely,

Cooley LLP

By: /s/ James C. T. Linfield  
James C. T. Linfield, Partner

380 INTERLOCKEN CRESCENT, SUITE 900, BROOMFIELD, CO 80021-8023 T: (720) 566-4000 F: (720) 566-4099 WWW.COOLEY.COM