

As filed with the Securities and Exchange Commission on April 28, 2011  
Registration No. 333-\_\_\_\_\_

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

FORM S-8  
REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

**PLURISTEM THERAPEUTICS INC.**

(Exact name of registrant as specified in its charter)

**Nevada**  
(State or other jurisdiction of incorporation or organization)

**98-0351734**  
(I.R.S. Employer Identification No.)

**MATAM Advanced Technology Park, Building No. 20, Haifa, Israel** **31905**  
(Address of Principal Executive Offices) (Zip Code)

**Pluristem Therapeutics Inc. Amended and Restated 2005 Stock Option Plan**  
(Full title of the plan)

Nevada Agency and Transfer Company  
50 West Liberty Street, Suite 880  
**Reno, NV 89501**  
(Name and address of agent for service)

**(775) 322-0626**  
(Telephone number, including area code, of agent for service)

Copy to:  
**Howard E. Berkenblit**  
**Zysman, Aharoni, Gayer and Sullivan & Worcester LLP**  
One Post Office Square  
Boston, Massachusetts 02110  
Telephone: (617) 338-2800  
Fax: (617) 338-2880

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   
Non-accelerated filer   
(Do not check if a smaller reporting company)

Accelerated filer   
Smaller reporting company

**CALCULATION OF REGISTRATION FEE**

<b>Title of securities to be registered</b>	<b>Amount to be registered (1)</b>	<b>Proposed maximum offering price per share</b>	<b>Proposed maximum aggregate offering price</b>	<b>Amount of registration fee</b>
Common Stock, \$0.00001 par value	4,242,223	\$ 2.68(2)	\$ 11,369,157(2)	\$ 1319.96
Common Stock, \$0.00001 par value	1,126,626	\$ 0.00001(3)	\$ 11.27	\$ 0.01
<b>Total</b>	<b>5,368,849</b>	<b>-</b>	<b>-</b>	<b>\$ 1319.97</b>

(1) In accordance with Rule 416(a) under the Securities Act of 1933, as amended (the “**Securities Act**”), this Registration Statement shall be deemed to cover an indeterminate number of additional securities that may from time to time be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.

(2) Estimated in accordance with Rules 457(h)(1) and 457(c) promulgated under the Securities Act, solely for the purpose of calculating the registration fee, based on \$2.68, the average of the high and low prices of the Common Stock on the Nasdaq Capital Market on April 27, 2011.

(3) Calculated in accordance with Rule 457(h)(1) promulgated under the Securities Act, based on the purchase price of outstanding restricted stock units.

**EXPLANATORY NOTE**

On October 20, 2009, Pluristem Therapeutics Inc. (the “**Company**” or the “**Registrant**”) filed a Registration Statement on Form S-8 (File No. 333-162577) (the “**Original Registration Statement**”) with the U.S. Securities and Exchange Commission (the “**Commission**”) to register an aggregate of 4,697,328 shares of common stock of the Company that may be issued pursuant to the Company’s Amended and Restated 2005 Stock Option Plan (the “**Plan**”).

Pursuant to the Plan, as amended, the number of shares of common stock of the Company made available under the Plan, shall be automatically increased to be equal to 16% of the number of shares of common stock issued and outstanding of the Company on a fully diluted basis immediately prior to the grant of securities.

The Company is filing this Registration Statement on Form S-8 to register an additional 5,368,849 shares of common stock of the Company, which may be issued in connection with securities awards which have been granted or may hereafter be granted under the Plan.

Pursuant to General Instruction E to Form S-8, the contents of the Original Registration Statement are incorporated by reference, except as revised herein.

**PART I**

**INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS**

All information required by Part I to be contained in the prospectus is omitted from this Registration Statement in accordance with Rule 428 and the introductory note to Part I of Form S-8, in each case under the Securities Act.

**PART II**

**INFORMATION REQUIRED IN THE REGISTRATION STATEMENT**

**Item 3. Incorporation of Documents by Reference.**

The following additional documents, which have been filed by the Company with the Commission under the Securities Exchange Act of 1934 (the “**Exchange Act**”), are incorporated by reference in and made a part of this Registration Statement, as of their respective dates:

(a) Annual Report on Form 10-K for the fiscal year ended June 30, 2010 filed with the Commission on September 21, 2010;

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(b) Quarterly Reports on Form 10-Q for the period ended September 30, 2010 filed with the Commission on November 8, 2010 and for the period ended December 31, 2010 filed with the Commission on February 2, 2011;

(c) Current Reports on Form 8-K filed on October 12, 2010, October 18, 2010, December 13, 2010, January 18, 2011, January 27, 2011, March 1, 2011, April 6, 2011 and April 15, 2011; and

(d) The description of the Company's common stock contained in the Registration Statement on Form 8-A filed on December 10, 2007 under the Exchange Act, including any amendment or report filed or to be filed for the purpose of updating such description.

All documents filed after the date of this Registration Statement pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act and prior to the filing of a post-effective amendment that indicates that all shares of common stock offered hereunder have been sold or that deregisters all shares of common stock remaining unsold shall be deemed to be incorporated by reference herein and to be a part hereof from the date of the filing of such reports and documents. Unless expressly incorporated into this Registration Statement, a report furnished but not filed on Form 8-K shall not be incorporated by reference into this Registration Statement. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this Registration Statement to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Registration Statement.

**Item 8. Exhibits.**

<b><u>Exhibit No.</u></b>	<b><u>Description</u></b>
4.1	Composite Copy of the Company's Articles of Incorporation, as amended on December 22, 2009 (incorporated by reference to Exhibit 3.1 of the Company's Quarterly Report on Form 10-Q filed with the Commission February 11, 2010).
4.2	Amended By-laws of the Company (incorporated by reference to Exhibit 3.1 of the Company's Current Report on Form 8-K filed with the Commission January 22, 2007).
5.1 *	Opinion of Zysman, Aharoni, Gayer and Sullivan & Worcester LLP.
23.1 *	Consent of Zysman, Aharoni, Gayer and Sullivan & Worcester LLP (contained in the opinion of Zysman, Aharoni, Gayer and Sullivan & Worcester LLP filed herewith as Exhibit 5.1).
23.2 *	Consent of Kost Forer Gabbay & Kasirer, a member of Ernst & Young Global.
24	Powers of Attorney (included in the signature page to this Registration Statement).
99.1	The Company's Amended and Restated 2005 Stock Option Plan (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed with the Commission on January 23, 2009).

\* Filed herewith.

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## SIGNATURES

Pursuant to the requirements of the Securities Act, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement on Form S-8 to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Haifa, Israel, on April 28, 2011.

### PLURISTEM THERAPEUTICS INC.

By: /s/ Yaky Yanay  
Yaky Yanay  
Secretary and Chief Financial Officer

### POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Pluristem Therapeutics Inc. hereby constitute and appoint Zami Aberman and Yaky Yanay, and each of them singly, our true and lawful attorneys-in-fact, with full power to them in any and all capacities, to sign any and all amendments to this Registration Statement on Form S-8 (including any post-effective amendments thereto), and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
<u>/s/ Zami Aberman</u> Zami Aberman	Chief Executive Officer, Director and Chairman of the Board (Principal Executive Officer)	April 28, 2011
<u>/s/ Yaky Yanay</u> Yaky Yanay	Secretary and Chief Financial Officer (Principal Financial and Accounting Officer)	April 28, 2011
<u>/s/ Israel Ben-Yoram</u> Israel Ben-Yoram	Director	April 28, 2011

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<u>/s/ Isaac Braun</u> Isaac Braun	Director	April 28, 2011
<u>/s/ Mark Germain</u> Mark Germain	Director	April 28, 2011
<u>/s/ Hava Meretzky</u> Hava Meretzky	Director	April 28, 2011
Shai Pines	Director	
<u>/s/ Nachum Rosman</u> Nachum Rosman	Director	April 28, 2011
<u>/s/ Doron Shorrer</u> Doron Shorrer	Director	April 28, 2011

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Letterhead of Zysman, Aharoni, Gayer and Sullivan & Worcester LLP

April 28, 2011

Pluristem Therapeutics Inc.  
MATAM Advanced Technology Park,  
Building No. 20, Haifa,  
Israel 31905

**Re: Registration of Shares under the Pluristem Therapeutics Inc. Amended and Restated 2005 Stock Option Plan**

Dear Ladies and Gentlemen:

In connection with the registration under the Securities Act of 1933, as amended (the "Act"), by Pluristem Therapeutic Inc., a Nevada corporation (the "Company"), of 5,368,849 shares of its common stock, par value \$.00001 per share ("Common Stock"), that are to be issued under the Company's Amended and Restated 2005 Stock Option Plan (the "Plan"), including shares of common stock issuable upon the exercise of options and vesting and exercise of restricted stock units ("RSUs") granted and to be granted pursuant to the provisions of the Plan (all such shares issued or to be issued hereunder referred to herein as, the "Registered Shares"), the following opinion is furnished to you to be filed with the Securities and Exchange Commission (the "Commission") as Exhibit 5.1 to the Company's Registration statement on Form S-8 (the "Registration Statement") under the Act.

We have acted as counsel to the Company in connection with the Registration Statement and we have examined originals or copies, certified or otherwise identified to our satisfaction, of the Registration Statement, the Articles of Incorporation of the Company, as currently in effect, the Amended By-laws of the Company, as currently in effect, the minute books and corporate records of the Company, and such other documents as we have considered necessary and appropriate in order to furnish the opinion hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents. For purposes of our opinion, we have examined an official compilation of "Title 7 – Business Associations; Securities; Commodities, Chapter – 78 – Private Corporations" of the Nevada Revised Statutes. Such examination was limited to the provisions of such statute only, and did not include any annotations or commentary related thereto. Other than such examination and our examination of the documents indicated above, we have made no other examination in connection with this opinion.

Based on and subject to the foregoing, we are of the opinion that, when issued in accordance with the terms of the Plan and the options RSUs or other rights granted thereunder, the Registered Shares will be duly authorized, validly issued, fully paid and nonassessable by the Company.

We hereby consent to the filing of this opinion as an exhibit to the Registration Statement and to the reference to our firm in the Prospectus forming a part of the Registration Statement. In giving such consent, we do not thereby admit that we come within the category of persons whose consent is required under Section 7 of the Act or the rules and regulations of the Commission promulgated thereunder.

Very truly yours,

/S/ ZYSMAN, AHARONI, GAYER AND SULLIVAN & WORCESTER LLP

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**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in the registration statement on Form S-8 pertaining to the Pluristem Therapeutics Inc. (the "Company") Amended and Restated 2005 Stock Option Plan, of our report dated September 20, 2010, with respect to the Company's consolidated financial statements included in its Annual Report on Form 10-K for the year ended June 30, 2010, filed with the Securities and Exchange Commission.

/s/ Kost Forer Gabbay & Kasierer

KOST, FORER, GABBAY and KASIERER  
A member of Ernst & Young Global

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Haifa, Israel  
April 28, 2011