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

SCHEDULE 14A

Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934 (Amendment No.)

Filed by the Registrant x

Filed by a Party other than the Registrant o

Check the appropriate box:

- o Preliminary Proxy Statement
- o Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))
- x Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material Pursuant to §240.14a-12

Cyclacel Pharmaceuticals, Inc.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

Payment of Filing Fee (Check the appropriate box):

- x No fee required.
- o Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.
 - (1) Title of each class of securities to which transaction applies:
 - (2) Aggregate number of securities to which transaction applies:
 - (3) Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (set forth the amount on which the filing fee is calculated and state how it was determined):
 - (4) Proposed maximum aggregate value of transaction:
 - (5) Total fee paid:
- o Fee paid previously with preliminary materials.
- Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.
 - (1) Amount Previously Paid:
 - (2) Form, Schedule or Registration Statement No.:
 - (3) Filing Party:
 - (4) Date Filed:

Table of Contents

Cyclacel Pharmaceuticals, Inc. 200 Connell Drive, Suite 1500 Berkeley Heights, New Jersey 07922 United States of America

April 3, 2013

Dear Stockholder,

You are cordially invited to attend the 2013 Annual Meeting of the Stockholders of Cyclacel Pharmaceuticals, Inc. (the "Company") to be held at 10:00 a.m., E.D.T, on May 22, 2013, at our corporate headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922. The attached Notice of Annual Meeting and proxy statement describe the business we will conduct at the annual meeting and provide information about us that the holders of our common stock (the "Common Stock") and holders of our 6% Convertible Exchangeable Preferred Stock (the "Preferred Stock") should consider when voting.

At the annual meeting, we will ask our holders of Common Stock to:

- 1. re-elect Sir John Banham, nominee for Class 1 director, to our Board of Directors;
- 2. ratify the selection of Ernst & Young LLP as our independent registered public accounting firm for our fiscal year ending December 31, 2013;
- 3. approve the compensation of our named executive officers, as disclosed in this proxy statement; and
- 4. vote on the frequency of holding an advisory vote on the compensation of our named executive officers.

The Board of Directors recommends the approval of each of these proposals and a vote for a frequency of voting on executive compensation every two years.

Also at the annual meeting, the holders of our Preferred Stock may re-elect Gregory T. Hradsky, nominee for Class 1 director, to fill the directorship on our Board of Directors that has been created pursuant to the terms of the Certificate of the Powers, Designations, Preferences and Rights governing the Preferred Stock. The Board of Directors makes no recommendation with respect to this proposal.

Such other business will be transacted as may properly come before the annual meeting and at any adjournments or postponements thereof.

Under Securities and Exchange Commission rules that allow companies to furnish proxy materials to stockholders over the Internet, we have elected to deliver our proxy materials to the majority of our stockholders over the Internet. This delivery process allows us to provide stockholders with the information they need, while at the same time conserving natural resources and lowering the cost of delivery. On or about April 5, 2013, we began mailing to our stockholders a Notice of Internet Availability of Proxy Materials (the "Notice") containing instructions on how to access our proxy statement for our 2013 Annual Meeting of Stockholders and our 2012 annual report to stockholders. The Notice also provides instructions on how to vote online or by telephone and includes instructions on how to receive a paper copy of the proxy materials by mail.

We hope you will be able to attend the annual meeting. Whether you plan to attend the annual meeting or not, it is important that you cast your vote either in person or by proxy. **You may vote over the Internet as well as by telephone or by mail**. Therefore, when you have finished reading the proxy statement, you are urged to vote in accordance with the instructions set forth in this proxy statement. We encourage you to vote by proxy so that your shares will be represented and voted at the annual meeting, whether or not you can attend.

If you wish to attend the annual meeting in person, you will need to register with us in advance. You can register by contacting our investor relations office by no later than May 15, 2013, by e-mail to ir@cyclacel.com, fax at (866) 271-3466, mail at Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922 or telephone at (908) 517-7330.

Thank you for your ongoing support of Cyclacel Pharmaceuticals, Inc. We look forward seeing you at the annual meeting.

Sincerely,

/s/ Spiro Rombotis

Spiro Rombotis

President and Chief Executive Officer

Table of Contents

Cyclacel Pharmaceuticals, Inc. 200 Connell Drive, Suite 1500 Berkeley Heights, New Jersey 07922 United States of America

April 3, 2013

NOTICE OF 2013 ANNUAL MEETING OF STOCKHOLDERS

TIME: 10:00 a.m., E.D.T

DATE: May 22, 2013

PLACE: 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922

PURPOSES:

For the holders of our common stock ("Common Stock") to:

- 1. re-elect Sir John Banham as a Class 1 director to serve a three-year term expiring at the annual meeting in 2016;
- 2. ratify the appointment of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2013;
 - 3. approve the compensation of our named executive officers, as disclosed in this proxy statement; and
 - 4. vote on the frequency of holding an advisory vote on the compensation of our named executive officers.

Also at the annual meeting, the holders of our 6% Convertible Exchangeable Preferred Stock ("**Preferred Stock**") may re-elect Gregory T. Hradsky, nominee for Class 1 director, to fill the directorship on our Board of Directors that has been created pursuant to the terms of the Certificate of the Powers,

Designations, Preferences and Rights governing the Preferred Stock.

In addition, the Company will transact any other business that may properly be presented before the annual meeting or at any adjournment or postponement thereof.

WHO MAY VOTE?

You may vote if you were the record holder of our Common Stock or Preferred Stock at the close of business on April 1, 2013. A list of stockholders of record will be available at the annual meeting and during the ten days prior to the annual meeting at the office of our Secretary at the above address.

The presence, in person or by proxy, of the holders of a majority of the issued and outstanding shares of Common Stock entitled to vote at the annual meeting is required to constitute a quorum for the proposals to be voted on by the holders of our Common Stock. The presence, in person or by proxy, of the holders of a majority of the issued and outstanding shares of Preferred Stock entitled to vote at the annual meeting is required to constitute a quorum for the proposal to be voted on by the holders of our Preferred Stock.

All stockholders are cordially invited to attend the annual meeting. Whether you plan to attend the annual meeting or not, we urge you to vote by following the instructions in the Notice of Internet Availability of Proxy Materials that you previously received and submit your proxy by the Internet, telephone or mail in order to ensure the presence of a quorum. You may change or revoke your proxy at any time before it is voted at the meeting.

If you plan to attend the annual meeting, you must register in advance by contacting our investor relations office by e-mail to ir@cyclacel.com, fax at (866) 271-3466, mail to Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922 or telephone at (908) 517-7330. Only record and beneficial owners will be permitted to register. Requests for registration will be processed in the order in which they are received and must be requested by no later than May 15, 2013. Please note that seating is limited and registration of stockholders will be accepted on a first-come, first-served basis. On the day of the annual meeting, each stockholder will be required to present a valid picture identification such as a driver's license or passport. Seating will begin at 9:00 a.m. and the meeting will begin at 10:00 a.m.

BY ORDER OF THE BOARD OF DIRECTORS

/s/ Paul McBarron

Paul McBarron, Secretary

Table of Contents

TABLE OF CONTENTS

| | TABLE OF CONTENTS | |
|---|--|------|
| | | Page |
| IMPORTANT NOTICE REGARD HELD ON MAY 22, 2013 | DING THE AVAILAB ILITY OF PROXY MATERIALS FOR THE STOCKHOLDER MEETING TO BE | 2 |
| IMPORTANT INFORMATION A | ABOUT THE ANNUAL MEETING | 3 |
| SECURITY OWNERSHIP OF C | ERTAIN BENEFICIAL OWNERS AND MANAGEMENT | 12 |
| MANAGEMENT AND CORPOR | RATE GOVERNANCE | 15 |
| EXECUTIVE AND DIRECTOR | <u>COMPENSATION</u> | 21 |
| REPORT OF AUDIT COMMITT | <u>TEE</u> | 35 |
| CERTAIN RELATIONSHIPS AN | ND RELATED PERSON TRANSACTIONS | 37 |
| PROPOSALS TO BE VOTED U | PON BY HOLDERS OF COMMON STOCK | 38 |
| PROPOSAL 1: | ELECTION OF CLASS 1 DIRECTOR | 38 |
| PROPOSAL 2: | RATIFICATION OF APPOINTMENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM BY HOLDERS OF COMMON STOCK | 39 |
| PROPOSAL 3: | ADVISORY VOTE ON APPROVAL OF EXECUTIVE COMPENSATION AS DISCLOSED IN THIS PROXY STATEMENT | 41 |
| PROPOSAL 4: | ADVISORY VOTE ON APPROVAL OF THE FREQUENCY OF HOLDING AN ADVISORY VOTE ON THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS | 43 |
| PROPOSAL TO BE VOTED UP | ON BY HOLDERS OF PREFERRED STOCK | 45 |
| PROPOSAL 1: | ELECTION OF CLASS 1 DIRECTOR | 45 |
| CODE OF CONDUCT AND ETH | HICS | 46 |
| OTHER MATTERS | | 46 |

i

Table of Contents

Cyclacel Pharmaceuticals, Inc. 200 Connell Drive, Suite 1500 Berkeley Heights, New Jersey 07922 United States of America

PROXY STATEMENT FOR THE CYCLACEL PHARMACEUTICALS, INC. 2013 ANNUAL MEETING OF STOCKHOLDERS TO BE HELD ON MAY 22, 2013

This proxy statement, along with the accompanying notice of 2013 annual meeting of stockholders, contains information about the 2013 annual meeting of stockholders of Cyclacel Pharmaceuticals, Inc., including any adjournments or postponements of the annual meeting. We are holding the annual meeting at 10:00 a.m., E.D.T, on May 22, 2013 at our corporate headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922.

In this proxy statement, we refer to Cyclacel Pharmaceuticals, Inc. as "Cyclacel," "the Company," "we" and "us."

This proxy statement relates to the solicitation of proxies by our Board of Directors for use at the annual meeting.

On or about April 5, 2013, we began sending the Important Notice Regarding the Availability of Proxy Materials to all stockholders entitled to vote at the annual meeting.

Table of Contents

IMPORTANT NOTICE REGARDING THE AVAILABILITY OF PROXY MATERIALS FOR THE STOCKHOLDER MEETING TO BE HELD ON MAY 22, 2013

This proxy statement and our 2012 annual report to stockholders are available for viewing, printing and downloading at www.proxyvote.com. To view these materials, please have your 12-digit control number(s) available that appears on your Notice or proxy card. On this website, you can also elect to receive future distributions of our proxy statements and annual reports to stockholders by electronic delivery.

Additionally, you can find a copy of our Annual Report on Form 10-K, which includes our financial statements, for the fiscal year ended December 31, 2012 on the website of the Securities and Exchange Commission, or the SEC, at www.sec.gov, or in the "SEC Filings" section of the "Investors & Media" section of our website at www.cyclacel.com. You may also obtain a printed copy of our Annual Report on Form 10-K, including our financial statements, free of charge, from us by sending a written request to: Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922, attention: Secretary. Exhibits will be provided upon written request and payment of an appropriate processing fee.

2

Table of Contents

IMPORTANT INFORMATION ABOUT THE ANNUAL MEETING

Why is the Company Soliciting my Proxy?

The Board of Directors of Cyclacel is soliciting your proxy to vote at the 2013 annual meeting of stockholders, and any adjournments or postponements of the meeting, which we refer to as the annual meeting, to be held at 10:00 a.m., E.D.T, on May 22, 2013 at our corporate headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922. The proxy statement, along with the accompanying Notice of Annual Meeting of Stockholders, summarizes the purposes of the meeting and the information you need to know to vote at the annual meeting.

We have made available to you on the Internet or have sent you this proxy statement, the Notice of Annual Meeting of Stockholders, the proxy card or cards and a copy of our Annual Report on Form 10-K for the fiscal year ended 2012 because you owned shares of Cyclacel common stock ("Common Stock") or 6% Convertible Exchangeable Preferred Stock ("Preferred Stock") on the record date. The Company intends to commence distribution of the Important Notice Regarding the Availability of Proxy Materials, which we refer to throughout this proxy statement as the Notice, and, if applicable, the proxy materials, to stockholders on or about April 5, 2013.

Who Can Vote at the Annual Meeting?

Only stockholders who owned our Common Stock or Preferred Stock at the close of business on April 1, 2013 are entitled to vote at the annual meeting. On this record date, there were 10,831,779 shares of our Common Stock issued and outstanding and entitled to vote on the proposals submitted to the holders of our Common Stock, and there were 420,862 shares of our Preferred Stock issued and outstanding and entitled to vote on the proposal submitted to the holders of our Preferred Stock.

You do not need to attend the annual meeting to vote your shares. Shares represented by valid proxies, received in time for the annual meeting and not revoked prior to the annual meeting, will be voted at the annual meeting. For instructions on how to change or revoke your proxy, see "May I Change or Revoke My Proxy?" below.

For the ten-day period immediately prior to the annual meeting, the list of the stockholders of record entitled to vote at the annual meeting will be available for inspection at our offices at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922, by stockholders for such purposes as are set forth in the General Corporation Law of the State of Delaware. Such list will also be available for inspection at the annual meeting.

What Proposals Can I Vote on as a Holder of Preferred Stock?

The holders of Preferred Stock are currently entitled to vote and elect Gregory T. Hradsky, the nominee for Class 1 director, to fill one of the two directorships created on the Company's Board of Directors by virtue of the terms of the Company's Certificate of the Powers, Designations, Preferences and Rights governing the Preferred Stock (the "Certificate"). We refer to this proposal as the "Preferred Director Election Proposal."

3

Table of Contents

Pursuant to the terms of the Certificate, holders of the Preferred Stock are entitled to receive, when, as and if declared by the Board of Directors, out of the funds of the Company legally available therefor, cash dividends payable in equal quarterly installments on each of February 1, May 1, August 1 and November 1. The Certificate further provides that, if the Company is in arrears in an aggregate amount equal to at least six quarterly dividends (whether or not consecutive), the number of members of the Company's Board of Directors will be increased by two, effective as of the time of election of such directors, and the holders of Preferred Stock, voting separately as a class, will have the right to vote and elect such two additional directors. This right accrued to the holders of our Preferred Stock as of August 2, 2010. The Company is still in arrears in an aggregate amount in excess of six quarterly dividends on the Preferred Stock.

In light of the arrearage on the dividends, the holders of Preferred Stock have a continuing right to elect two directors on the Company's Board of Directors. Mr. Hradsky's term, as a Class 1 director, is expiring at the Company's 2013 annual meeting. We have not received any other nominations for a Class 1 director by the holders of the Preferred Stock. If elected, Mr. Hradsky would continue to serve as a Class 1 director until the earlier of (a) the 2016 annual meeting of stockholders, and his successor is duly elected and qualified, and (b) such time as all accrued and unpaid dividends on the Preferred Stock have been declared and paid or set apart for payment.

How Many Votes Do I Have?

Each share of Cyclacel Common Stock that you own entitles you to one vote with respect to each of the proposals presented in the proxy statement. Each share of Cyclacel Preferred Stock that you own entitles you to one vote with respect to the Preferred Director Election Proposal.

How Do I Vote?

Whether you plan to attend the annual meeting or not, we urge you to vote by proxy. If you vote by proxy, the individuals named on the proxy card applicable to your class of stock, or your "proxies," will vote your shares in the manner you indicate. You may specify whether your shares: should be voted for or withheld for the nominee for director; should be voted for, against or abstained with respect to the ratification of the appointment of the Company's independent registered public accounts; should be voted for, against or abstained with respect to the compensation of our named executive officers as set forth in this proxy statement; and should be voted for one year, two years, three years or abstain with respect to the frequency of voting on the compensation of our named executive officers. Voting by proxy will not affect your right to attend the annual meeting. If your shares are registered directly in your name through our transfer agent, American Stock Transfer and Trust Company, or you have stock certificates registered in your name, you may submit a proxy to vote:

• **By Internet or by telephone.** Follow the instructions attached to the proxy card applicable to your class of stock to submit a proxy to vote by Internet or telephone.

4

Table of Contents

- **By mail.** Complete and mail the enclosed proxy card applicable to your class of stock in the enclosed postage prepaid envelope. Your proxy will be voted in accordance with your instructions. If you sign the proxy card but do not specify how you want your shares voted, they will be voted as recommended by our Board of Directors.
- **In person at the meeting.** If you attend the annual meeting, you may deliver your completed proxy card in person or you may vote by completing a ballot, which will be available at the annual meeting. You are required to register in advance of the annual meeting if you plan to attend the annual meeting in person. If you wish to register in advance of the annual meeting, please contact our investor relations office by no later than May 15, 2013, by e-mail to ir@cyclacel.com, fax at (866) 271-3466, mail to Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922 or telephone at (908) 517-7330.

Telephone and Internet voting facilities for all stockholders of record will be available 24-hours a day and will close at 11:59 p.m., E.D.T, on May 21, 2013.

If your shares are held in "street name" (held in the name of a bank, broker or other nominee who is the holder of record), you must provide the bank, broker or other nominee with instructions on how to vote your shares and can do so as follows:

- · **By Internet or by telephone.** Follow the instructions you receive from the record holder to vote by Internet or telephone.
- · **By mail.** You should receive instructions from the record holder explaining how to vote your shares.
- **In person at the meeting.** Contact the broker, bank or other nominee who holds your shares to obtain a broker's proxy card and bring it with you to the annual meeting. You will not be able to vote at the annual meeting unless you have a proxy card from your broker, bank or other nominee.

How Does the Board of Directors Recommend That I Vote on the Proposals?

The Board of Directors recommends that you vote as follows:

- · As a holder of Common Stock, "FOR" the re-election of Sir John Banham, nominee for Class 1 director;
- · As a holder of Common Stock, "**FOR**" ratification of the selection of our independent registered public accounting firm for the fiscal year ending December 31, 2013;
- · As a holder of Common Stock, "**FOR**" the compensation of our named executive officers, as disclosed in this proxy statement;

5

Table of Contents

- · As a holder of Common Stock, "FOR" holding an advisory vote on the compensation of our named executive officers every two years; and
- · As a holder of Preferred Stock, "NO RECOMMENDATION" on whether to vote in favor of or withhold your vote on the re-election of Gregory T. Hradsky as a Class 1 director.

If any other matter is properly presented at the annual meeting, your proxy provides that your shares will be voted by the proxy holder listed on the proxy card in accordance with his or her best judgment. We know of no matters that need to be acted on at the annual meeting, other than those described in this proxy statement.

May I Change or Revoke My Proxy?

If you submit a proxy, you may change or revoke it at any time before the annual meeting. You may change or revoke your proxy in any one of the following ways:

- By submitting a new proxy card with a date later than your previously delivered proxy and submitting it as instructed above or by providing written notice of revocation to us before the annual meeting at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922, Attention: Paul McBarron, Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary;
- · By submitting a later proxy by Internet or by telephone as instructed above; or
- · By attending the annual meeting in person and voting in person. Attending the annual meeting in person will not, in and of itself, change or revoke a previously submitted proxy unless you specifically request it or vote by ballot at the annual meeting.

Your most current proxy card or proxy submission by telephone or Internet is the one that will be counted.

What if I Receive More Than One Proxy Card?

Separate proxy cards are being sent to holders of Common Stock and Preferred Stock. If you hold only shares of Common Stock, you will receive only the proxy card for holders of Common Stock. If you hold only shares of Preferred Stock, you will receive only the proxy card for holders of Preferred Stock. If you hold both shares of Common Stock and Preferred Stock, you will receive both proxy cards, and you should complete both proxy cards if you wish to vote your respective interests in both the Common Stock and Preferred Stock.

In addition, you may receive more than one proxy card or voting instruction form if you hold shares of our Common Stock or Preferred Stock in more than one account, which may be in registered form or held in street name. Please vote in the manner described under "How Do I Vote?" for each account to ensure that all of your shares are voted.

6

Table of Contents

Will My Shares be Voted if I Do Not Vote?

If your shares are registered in your name, they will not be voted if you do not return your proxy card by mail or vote by Internet, telephone or at the annual meeting, as described above under "How Do I Vote?"

If your shares are held in street name and you do not provide voting instructions to the broker, bank or other nominee who holds your shares as described above under "How Do I Vote?," the bank, broker or other nominee that holds your shares has the authority to vote your unvoted shares of Common Stock on Proposal 2 even if it does not receive instructions from you. We encourage you to provide voting instructions. This ensures your shares will be voted at the annual meeting in the manner you desire. However, your broker, bank or other nominee cannot vote your shares on Proposals 1, 3 and 4 or the Preferred Director Election Proposal if it has not received instructions from you because such matters are considered non-routine under applicable law. When your broker, bank or other nominee does not vote on a matter for which it does not have discretionary voting authority, this is referred to as a "broker non-vote."

What Vote is Required to Approve Each Proposal and How are Votes Counted?

Proposal 1: Holders of Common Stock To Elect Sir John Banham as Class 1 Director

The nominee for director who receives the most votes (also known as a "plurality" of the votes cast) will be elected. This year, there is only one nominee for Class 1 director to be elected by the holders of Common Stock. You may either vote FOR the nominee or WITHHOLD your vote from the

Proposal 2: Holders of Common Stock To Ratify Selection of Our Independent Registered Public Accounting Firm

nominee. Votes that are withheld will not be included in the vote tally for the election of directors. Brokerage firms do not have authority to vote customers' unvoted shares held by the firms in street name for the election of directors. As a result, any shares not voted by a customer will be treated as a broker non-vote. Such broker non-votes will have no effect on the results of this vote.

The affirmative vote of a majority of the shares of Common Stock cast for this proposal is required to ratify the selection of our independent registered public accounting firm. Abstentions will have no effect on this proposal. Brokerage firms have authority to vote customers' unvoted shares held by the firms in street name on this proposal. If a broker does not exercise this authority, such broker non-votes will have no effect on the results of this vote. We are not required to obtain the approval of our holders of Common Stock to select our independent registered public accounting firm. However, if our holders of Common Stock do not ratify the selection of Ernst & Young LLP as our independent registered public accounting firm for the year ending December 31, 2013, the Audit Committee of our Board of Directors will reconsider its selection.

7

Table of Contents

Proposal 3: Holders of Common Stock to Approve an Advisory Vote on the Compensation of our Named Executive Officers The affirmative vote of a majority of the votes present or represented by proxy and entitled to vote at the annual meeting is required to approve, on an advisory basis, the compensation of our named executive officers, as described in this proxy statement. Abstentions will be treated as votes against this proposal. Brokerage firms do not have authority to vote customers' unvoted shares held by the firms in street name on this proposal. As a result, any shares not voted by a customer will be treated as a broker non-vote. Such broker non-votes will have no effect on the results of this vote. Although the advisory vote is non-binding, the Compensation Committee and the Board of Directors will review the voting results and take them into consideration when making future decisions regarding executive compensation.

Proposal 4: Holders of Common Stock to Approve an Advisory Vote on the Frequency of Holding an Advisory Vote on the Compensation of our Named Executive Officers

The frequency of holding an advisory vote on the compensation of our named executive officers — every year, every two years or every three years — receiving the majority of votes cast will be the frequency approved by our stockholders. Brokerage firms do not have authority to vote customers' unvoted shares held by the firms in street name on this proposal. As a result, any shares not voted by a customer will be treated as a broker non-vote. Such broker non-votes, as well as abstentions, will have no effect on the results of this vote. Although the advisory vote is non-binding, the Compensation Committee and the Board of Directors will review the voting results and take them into consideration when making future decisions regarding the frequency of holding an advisory vote on the compensation of our named executive officers.

Preferred Director Election Proposal

The nominee for director who receives the most votes (also known as a "plurality" of the votes cast) will be elected. This year, there is only one nominee for Class 1 director to be elected by the holders of Preferred Stock. You may either vote FOR the nominee or WITHHOLD your vote from the nominee. Votes that are withheld will not be included in the vote tally for the election of directors. Brokerage firms do not have authority to vote customers' unvoted shares held by the firms in street name for the election of directors. As a result, any shares not voted by a customer will be treated as a broker non-vote. Such broker non-votes will have no effect on the results of this vote.

8

Table of Contents

Is Voting Confidential?

We will keep all of the proxies, ballots and voting tabulations private. We only let our Inspector of Election, a representative of Broadridge Financial Solutions, Inc., examine these documents. Management will not know how you voted on a specific proposal unless it is necessary to meet legal requirements. Broadridge, however, will forward to management any written comments you make, on the proxy card or elsewhere.

Where can I find the voting results of the Annual Meeting?

The preliminary voting results will be announced at the annual meeting, and we will publish preliminary, or final, results, if available, in a Current Report on Form 8-K within four business days of the annual meeting. If final results are unavailable at the time we file the Form 8-K, then we will file an amended report on Form 8-K to disclose the final voting results within four business days after the final voting results are known. In addition, we are required to file on a Current Report on Form 8-K no later than the earlier of one hundred fifty calendar days after the annual meeting or sixty calendar days prior to the deadline for submission of stockholder proposals set forth on page 15 of this proxy statement under the heading "Stockholder Proposals and Nominations for Director" our decision on how frequently we will include a stockholder vote on the compensation of our named executive officers in our proxy materials.

What Are the Costs of Soliciting these Proxies?

The solicitation of proxies in the enclosed form is made on behalf of the Board of Directors. The entire cost of soliciting these proxies, including the costs of preparing, printing and mailing this proxy statement and accompanying materials, will be borne by us. We have engaged Morrow & Co., LLC, 470 West Ave., Stamford, Connecticut 06902, to assist us with the solicitation of proxies with respect to Proposals 1 through and including 4 for a fee of \$5,500, plus expenses. In addition, proxies may be solicited personally, by telephone or otherwise, by our officers, directors and employees, none of whom will receive any compensation for these services. We will ask banks, brokers and other nominees to forward these proxy materials to their principals and obtain authority to execute proxies. We will then reimburse such parties for their reasonable expenses incurred in connection with these activities.

What Constitutes a Quorum for the Annual Meeting?

The presence, in person or by proxy, of the holders of a majority of the issued and outstanding shares of our Common Stock entitled to vote at the meeting is necessary to constitute a quorum at the annual meeting.

With respect to the Preferred Director Election Proposal, the presence, in person or by proxy, of the holders of a majority of the issued and outstanding shares of our Preferred Stock entitled to vote at the meeting is necessary to constitute a quorum at the annual meeting.

9

Table of Contents

Votes of stockholders of record who are present at the annual meeting in person or by proxy, abstention, and broker non-votes are counted for purposes of determining whether a quorum exists as to each class of capital stock. Broker non-votes will be counted for purposes of determining whether a quorum exists with respect to all of the Common Stock Proposals, but will not be counted with respect to the Preferred Director Election Proposal.

What Dissenters' Rights Do I Have?

Under Delaware law, none of our stockholders are entitled to rights of appraisal on any proposal referred to herein.

Attending the Annual Meeting

The annual meeting will be held at 10:00 a.m., E.D.T, on May 22, 2013, at our corporate headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922. When you arrive at our corporate headquarters, signs will direct you to the appropriate meeting room. You need not attend the annual meeting in order to vote.

If you plan to attend the meeting, you must register in advance by no later than May 15, 2013. Registration will be granted only to record and beneficial owners. You may register by contacting our investor relations office by e-mail to ir@cyclacel.com, fax at (866) 271-3466, mail at Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922 or telephone at (908) 517-7330. When contacting us, please provide the class of shares you hold and the name under which you hold shares of record or the evidence of your beneficial ownership of shares described below.

Please note that if you hold your shares in "street name" (that is, through a broker, bank or other nominee), you will need to send a written request for registration either by regular mail, fax or e-mail, along with proof of share ownership, such as a copy of the portion of your voting instruction form showing your name and address, a bank or brokerage firm account statement or a letter from the broker, bank or nominee holding your shares, confirming ownership. Requests for registration will be processed in the order in which they are received and must be requested no later than May 15, 2013. Please note that seating is limited and requests for registration will be accepted on a first-come, first-served basis. On the day of the annual meeting, each stockholder will be required to present a valid picture identification such as a driver's license or passport. Seating will begin at 9:00 A.M. and the meeting will begin at 10:00 a.m.

Householding of Annual Disclosure Documents

SEC rules concerning the delivery of annual disclosure documents allow us or your broker to send a single Notice or, if applicable, a single set of our proxy materials to any household at which two or more of our stockholders reside, if we or your broker believe that the stockholders are members of the same family. This practice, referred to as "householding," benefits both you and us. It reduces the volume of duplicate information received at your household and helps us to reduce our expenses. The rule applies to our Notices, annual reports, proxy statements and information statements. Once you receive notice from your broker or from us that communications to your address will be "householded," the practice will continue until you are otherwise notified or until you revoke your consent to the practice. Stockholders who participate in householding will continue to have access to and utilize separate proxy voting instructions.

10

Table of Contents

If your household received a single Notice or, if applicable, a single set of proxy materials this year, but you would prefer to receive your own copy, please contact Broadridge Financial Solutions, Inc., by calling their toll free number, 1-888-237-1900.

If you do not wish to participate in "householding" and would like to receive your own Notice or, if applicable, set of our annual disclosure documents in future years, follow the instructions described below. Conversely, if you share an address with another holder of our Common Stock or Preferred Stock and together both of you would like to receive only a single Notice or, if applicable, set of our annual disclosure documents, follow these instructions:

- · If your shares are registered in your own name, please contact Broadridge Financial Solutions, Inc., and inform them of your request by calling them at 1-888-237-1900 or writing them at 51 Mercedes Way, Edgewood, New York11717.
- · If a broker, bank or other nominee holds your shares, please contact the broker, bank or other nominee directly and inform them of your request. Be sure to include your name, the name of your brokerage firm and your account number.

Electronic Delivery of Company Stockholder Communications

Most stockholders can elect to view future proxy statements and annual reports over the Internet instead of receiving paper copies in the mail.

You can choose this option and save the cost of producing and mailing these documents by:

- · following the instructions provided on your proxy card or voter instruction form;
- · following the instructions provided when you submit a proxy to vote over the Internet; or
- · going to www.proxyvote.com and following the instructions provided.

11

Table of Contents

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following table sets forth certain information with respect to the beneficial ownership of our Common Stock and Preferred Stock as of April 1, 2013 for (a) the executive officers named in the Summary Compensation Table on page 21 of this proxy statement, (b) each of our directors and director nominees, (c) all of our current directors and executive officers as a group, and (d) each stockholder known by us to own beneficially more than 5% of our Common Stock or Preferred Stock, relying solely upon the amounts and percentages disclosed in their public filings.

Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to the securities. We deem shares of Common Stock that may be acquired by an individual or group within 60 days of April 1, 2013 pursuant to the exercise of options or warrants to be outstanding for the purpose of computing the percentage ownership of such individual or group, but are not deemed to be outstanding for the purpose of computing the percentage ownership of any other person shown in the table. Except as indicated in footnotes to this table, we believe that the stockholders named in this table have sole voting and investment power with respect to all shares of stock shown to be beneficially owned by them based on information provided to us by these stockholders.

Percentage of ownership of Common Stock is based on 10,831,779 shares of Common Stock outstanding as of April 1, 2013. Percentage of ownership of Preferred Stock is based on 420,862 shares of Preferred Stock outstanding as of April 1, 2013.

The address for each of the directors and named executive officers is c/o Cyclacel Pharmaceuticals, Inc., 200 Connell Drive Suite 1500, Berkeley Heights, New Jersey 07922. Addresses of other beneficial owners are noted in the table.

| | Number of Shares of Common Stock Beneficially Owned(1) | Percentage of Common Stock Owned | Number of Shares of Preferred Stock Beneficially Owned(1) | Percentage of Preferred Stock Owned |
|--|--|--|---|---|
| <u>Directors, Director Nominees and Executive Officers</u> | | · | | |
| Dr. Nicholas Bacopoulos (2) | 13,011 | * | 0 | 0% |
| Sir John Banham(3) | 25,060 | * | 0 | 0% |
| Dr. Judy Chiao(4) | 64,939 | * | 0 | 0% |
| Dr. Christopher Henney(5) | 43,619 | * | 0 | 0% |
| Paul McBarron(6) | 97,436 | * | 0 | 0% |
| Spiro Rombotis(7) | 182,582 | 1.7% | 1,600 | * |
| Dr. David U'Prichard(8) | 43,211 | * | 0 | 0% |
| Lloyd Sems | 894 | * | 0 | 0% |
| Gregory T. Hradsky | 894 | * | 0 | 0% |
| Executive officers and directors as a group (9 persons) | | | | |
| (9) | 471,646 | 4.4% | 0 | 0% |
| 5% or more stockholders | | | | |
| Redmile Group, LLC(10) | 672,680 | 6.2% | 0 | 0% |
| Jeremy C. Green(10) | 672,680 | 6.2% | 0 | 0% |
| Tang Capital Partners, LP(11) | 765,198 | 7.1% | 0 | 0% |
| Kevin C. Tang(11) | 765,198 | 7.1% | 0 | 0% |
| Tang Capital Management, LLC(11) | 765,198 | 7.1% | 0 | 0% |
| | | | | |

^{*} Represents beneficial ownership of less than 1% of the outstanding shares of our Common Stock.

Table of Contents

- (1) Beneficial ownership is determined in accordance with the rules of the SEC and generally includes voting or investment power with respect to securities. Beneficial ownership also includes shares of Common Stock subject to options and warrants currently exercisable or convertible, or exercisable or convertible within 60 days of April 1, 2013. Except as indicated by footnote, to our knowledge, all persons named in the table above have sole voting and investment power with respect to all shares of Common Stock shown as beneficially owned.
- (2) Includes options to purchase 12,654 shares of Common Stock that are exercisable within 60 days of April 1, 2013.
- (3) Includes options to purchase 19,797 shares of Common Stock that are exercisable within 60 days of April 1, 2013.
- (4) Includes options to purchase 48,819 shares of Common Stock that are exercisable within 60 days of April 1, 2013. Also includes 4,162 restricted stock units.
- (5) Includes options to purchase 42,596 shares of Common Stock that are exercisable within 60 days of April 1, 2013.
- (6) Includes options to purchase 65,574 shares of Common Stock that are exercisable within 60 days of April 1, 2013.
- (7) Does not include 1,600 shares of Preferred Stock. Includes 110,702 shares of Common Stock and options to purchase 71,880 shares of Common Stock that are exercisable within 60 days of April 1, 2013. Of the shares of Common Stock reported, 142 shares are held indirectly by Mr. Rombotis through his IRA account. Does not include 171,162 shares of Common Stock beneficially owned by Kalliopi Rombotis, Mr. Rombotis' mother. Mr. Rombotis disclaims beneficial ownership of the foregoing shares.
- (8) Includes options to purchase 39,596 shares of Common Stock that are exercisable within 60 days of April 1, 2013.
- (9) See footnotes (2)-(8).
- (10) Based on a Schedule 13G filed jointly by Jeremy C. Green and Redmile Group, LLC ("**Redmile**") with the SEC on February 14, 2013, which reported ownership as of December 31, 2012. These securities are owned by certain investment limited partnerships for which Redmile serves as general partner and investment manager. Redmile, as the investment manager and general partner of those investment limited partnerships, and Mr. Green, as managing member and owner of Redmile, may therefore be deemed to beneficially own the securities owned by such investment limited partnerships insofar as they may be deemed to have the power to direct the voting or disposition of those securities. Redmile and Mr. Green, however, disclaim beneficial ownership of the securities, except to the extent of his or its pecuniary interests therein. The principal business address of each beneficial owner is 100 Pine Street, Suite 1925, San Francisco, California, 94111.

13

Table of Contents

(11) Based solely on a Schedule 13G/A filed on March 27, 2013, which reported ownership as of March 27, 2013. Tang Capital Partners is the beneficial owner of 765,198 shares of the Company's common stock and shares voting and dispositive power over such shares with Tang Capital Management and Kevin C. Tang. Tang Capital Management, as the general partner of Tang Capital Partners, may be deemed to beneficially own the shares of the Issuer's Common Stock beneficially owned by Tang Capital Partners. Kevin C. Tang, as the manager of Tang Capital Management, may be deemed to beneficially own the shares of the Issuer's Common Stock beneficially owned by Tang Capital Partners. Mr. Tang disclaims beneficial ownership of all shares reported herein except to the extent of his pecuniary interest therein. The principal business address of each beneficial owner is 4747 Executive Drive, Suite 510, San Diego, CA 92121.

14

Table of Contents

MANAGEMENT AND CORPORATE GOVERNANCE

The Board of Directors

The following table sets forth certain information regarding our executive officers and directors as of December 31, 2012.

| Name | Age | Position |
|-------------------------|-----|--|
| Spiro Rombotis | 54 | President and Chief Executive Officer; Class 2 Director |
| Paul McBarron | 52 | Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary; Class 3 Director |
| Dr. Nicholas Bacopoulos | 63 | Class 3 Director |
| Sir John Banham | 72 | Class 1 Director Nominee |
| Dr. Christopher Henney | 71 | Vice Chairman; Class 3 Director |
| Daniel K. Spiegelman(1) | 54 | Class 1 Director |
| Dr. David U'Prichard | 64 | Chairman of the Board of Directors; Class 2 Director |

| Gregory T. Hradsky | 52 | Class 1 Director on behalf of our holders of Preferred Stock |
|--------------------|----|--|
| | | |
| Lloyd Sems | 41 | Class 2 Director on behalf of our holders of Preferred Stock |
| | | |

⁽¹⁾ Mr. Spiegelman resigned on June 6, 2012.

Common Stock Nominee for Class 1 Director (Terms to Expire in 2016)

Sir John Banham. Sir John Banham is currently the Chairman of Sultan Scientific Limited, and senior non-executive director of Invesco Limited. He is past Director General of the Confederation of British Industry (CBI) and past Chairman of Johnson Matthey Plc, Whitbread plc, Geest plc, ECI Partners LLP, Tarmac plc and Kingfisher plc. His public sector appointments comprise first Controller of the Audit Commission and first Chairman of the Local Government Commission for England. He was formerly Honorary Treasurer of the United Kingdom's Cancer Research Campaign prior to its merger with Imperial Cancer Research. He is a graduate of Cambridge University in Natural Sciences and has honorary degrees from a number of British universities.

Preferred Stock Nominee for Class 1 Director (Terms to Expire in 2016)

Gregory T. Hradsky. Mr. Hradsky has served as a director of the Company and on behalf of holders of the Preferred Stock since May 2011. Mr. Hradsky has been an independent financial consultant since February 2006. He has served on the board of directors of Costar Technologies, Inc. since June 2008 where he is Chairman of the Audit Committee. Between May 2003 and February 2006, Mr. Hradsky was a Vice President of Avenue Capital Group, a global investment firm, where he managed a portfolio of distressed securities, post-reorganization equities and other investments. From 1999 until 2003, Mr. Hradsky was the founder and Managing Partner of Bellport Capital, an investment firm specializing in distressed securities. Prior to that, Mr. Hradsky was a Managing Director and Head of the Distressed Securities Group at UBS Securities LLC from 1993 until 1998. Mr. Hradsky joined UBS in 1991 as a research analyst focusing on distressed credits. Prior to UBS, Mr. Hradsky was a member of the Distressed Securities Group and the High Yield Research Department at the First Boston Corporation from 1988-1991. He began his career at T. Rowe Price Associates in 1983 and worked in the Fixed Income Department until 1986. Mr. Hradsky has a B.A. from Loyola College in Maryland and an M.B.A. from the Wharton School of the University of Pennsylvania.

15

Table of Contents

Continuing Class 2 Directors (Terms to Expire in 2014)

Spiro Rombotis. Mr. Rombotis joined Cyclacel in August 1997 as our first Chief Executive Officer and has over 30 years of experience with pharmaceutical and biotechnology companies. He was previously Vice President of International Operations and Business Development; Managing Director, Europe; and Director, Japanese joint venture, at The Liposome Company, Inc. He also served as Vice President of Pharmaceuticals for Central and Eastern Europe and as Director of International Marketing at Bristol-Myers Squibb Company. He was Head of European Marketing and Sales, Head of Corporate Development and one of the first employees of Centocor, Inc. and worked in Business Development at Novartis AG. He holds a B.A. from Williams College and an M.B.A. and Master's degree in Hospital Management with honors, from the Kellogg Graduate School of Management, where he serves on the Kellogg Biotech Advisory Board. He also serves on the Board of Trustees of BioNJ, the biotechnology industry trade group in New Jersey.

Lloyd Sems. Mr. Sems currently serves as President of Sems Capital, LLC and Capital Edge, LLC, both of which he founded in October 2003. Previously, Mr. Sems served as Director of Research and Portfolio Manager for Watchpoint Asset Management. Mr. Sems holds a Bachelor of Science degree in Business Administration and Finance from Albright College. Mr. Sems served on the boards of EMAK Worldwide, Inc. (EMAK) from February 2010 to April 2010 and Sport-Haley Holdings (SPOR) from April 2009 to December 2012. He currently serves as a director of Selectica, Inc. (SLTC) which he joined in June 2008.

David U'Prichard, Ph.D. Dr. U'Prichard joined the Board of Directors of Cyclacel in May 2004. He is currently President of Druid Consulting LLC, a pharmaceutical and biotechnology-consulting firm, providing customized services to life sciences clients in the United States and Europe, and a founding partner of Druid BioVentures LLP. Dr. U'Prichard is also part-time Chief Scientific Officer and board member of BioMotiv, LLC which is the for profit operating company arm of The Harrington Discovery and Development Project (Cleveland, OH), a national initiative to accelerate new drug development inspired by physician-scientists. Previously, he was Chief Executive Officer of 3-Dimensional Pharmaceuticals, Inc. from 1999 to 2003. In addition, he held a variety of positions within the pharmaceutical and biotechnology industries, including, President and Chairman of Research and Development for SmithKline Beecham Pharmaceuticals; Executive Vice President and International Research Director, and a Member of the Board of Management of Zeneca Pharmaceuticals; General Manager, Research Department, ICI Pharmaceuticals, and Vice President Biomedical Research, ICI Pharmaceuticals; and Senior Vice President and Scientific Director for Nova Pharmaceutical Corporation. He is currently a director of Life Technologies, Inc. and Iroko Pharmaceuticals and he served as a director of Alpharma, Inc., Guilford Pharmaceuticals Inc., Lynx Therapeutics, Inc., Naurex Inc., Silence Therapeutics plc, and non-executive Chairman of Oxagen Ltd. He was a Venture Partner with Red Abbey Venture Partners, private equity providers, from 2005-2010 Dr. U'Prichard was Chairman of the Pennsylvania Biotechnology Association in 2004-2005, and from 1992 to 1997, he was a member of the board of directors of the Biotechnology Industry Organization (BIO). He received a B.Sc. in Pharmacology from University of Glasgow in 1970 and a Ph.D. in Pharmacology from University of Kansas in 1975.

16

Table of Contents

Continuing Class 3 Directors (Terms to Expire in 2016)

Paul McBarron. Mr. McBarron joined Cyclacel in January 2002 and has over 24 years of experience with pharmaceutical and biotechnology companies. He has served as a financial executive at Sterling Drug, Sanofi-Winthrop and SmithKline Beecham and, from 1996 to 2001, as a senior member of the finance team at Shire Pharmaceuticals plc, where he held the positions of Director of Corporate Finance and Group Financial Controller. He joined Shire when it was an emerging public company. He qualified as a chartered accountant with Ernst & Young and serves on the Life Sciences Industry Advisory Board for the Scottish Government.

Nicholas Bacopoulos, Ph.D. Dr. Bacopoulos joined the Board of Directors of Cyclacel in September 2008. He is currently the Chief Executive Officer of Mersana Therapeutics, a private biotechnology company. His previous leadership roles include Chief Executive Officer and President of Aton Pharma, Inc., where he led the development of Zolinza®, approved for the treatment of cutaneous T-cell lymphoma. Aton was subsequently acquired by Merck & Co., Inc. He was previously President and Head of Research and Development at OSI Pharmaceuticals, Inc. where he was involved with the global development of Tarceva®, approved for the treatment of non-small cell lung cancer and pancreatic cancer. Dr. Bacopoulos also worked for 17 years at Pfizer, where he held senior positions within Pfizer Central Research and Corporate Strategic Planning. He led the company's Cancer and Neuroscience Research groups, which developed several marketed drugs, including Geodon® and Zoloft®. Dr. Bacopoulos also serves on the board of directors of Mersana Therapeutics, Inc. He received his B.A. degree from Cornell College and his Ph.D. from the University of Iowa. He obtained postdoctoral training at Yale University School of Medicine.

Christopher S. Henney, Ph.D. D.Sc. Dr. Henney had served as one of Xcyte's directors since March 2005, and continued on as Vice Chairman of the Company. Previously, Dr. Henney co-founded three major publicly held U.S. biotechnology companies, Immunex, ICOS and Dendreon, and held a seat on the board of directors and executive positions at each company. From 1995 to January 2003, Dr. Henney was Chairman and Chief Executive Officer of Dendreon Corporation. Dr. Henney currently serves as the Chairman of Oncothyreon, Inc. and Anthera Pharmaceuticals, Inc., both biotechnology companies. He is also a director of Prothena Corporation plc. He previously served as a director of AVI Biopharma Inc. (now Sarepta Therapeutics) from March 2009 until June 2010 and a director of Mymetics Inc. from March 2011 until November 2011. Dr. Henney received a Ph.D. in experimental pathology from the University of Birmingham and a D.Sc. from the same university for contributions to the field of immunology.

17

Table of Contents

Director Independence

Our Board of Directors has reviewed the materiality of any relationship that each of our directors has with the Company, either directly or indirectly. Based upon this review, our Board of Directors has determined that each of the following directors is an "independent director" as such term is defined by rules of The NASDAQ Stock Market, Inc., or NASDAQ:

- · Nicholas Bacopoulos, Ph.D.
- Sir John Banham
- Christopher Henney, Ph.D., D.Sc.
- David U'Prichard, Ph.D.
- · Gregory T. Hradsky
- · Lloyd Sems

The Board of Directors has established three standing committees, (1) the Compensation and Organization Development Committee, (2) the Audit Committee, and (3) the Nominating and Corporate Governance Committee. The Board of Directors has also determined that each member of these committees meets the independence requirements applicable to each such committee as prescribed by NASDAQ and the SEC.

Committees of the Board of Directors

Audit Committee. Our Audit Committee met four times during fiscal 2012. The Audit Committee during such period had four members, Daniel K. Spiegelman (Chairman), Sir John Banham, Dr. Christopher Henney and Gregory T. Hradsky; upon Mr. Spiegelman's resignation, Sir John Banham became Chairman of the Audit Committee. All members of the Audit Committee satisfy the current independence standards promulgated by the NASDAQ and SEC, as such standards apply specifically to members of audit committees. The Board of Directors has determined that Sir John Banham is an "audit committee financial expert," as the SEC has defined that term in Item 407 of Regulation S-K.

Our Audit Committee oversees and monitors the processes management has in place to maintain the reliability and integrity of our accounting policies and financial reporting processes, to ensure the adequacy of internal accounting, financial reporting and disclosure controls, and to comply with legal and regulatory requirements that may impact our financial reporting and disclosure obligations. The Audit Committee is also responsible for reviewing the qualifications, independence and performance of, and selecting or replacing, if necessary, our independent registered public accounting firm and approving all audit and non-audit services and fees related thereto. In addition, the Audit Committee is responsible for reviewing, in consultation with our management and independent registered public accounting firm, the scope and results of (1) reviews of our quarterly financial statements, (2) audits of our annual financial statements, and (3) audits of our system of internal control over financial reporting and management's assessment of the effectiveness thereof. The Audit Committee may also perform other duties and responsibilities as the Audit Committee or the Board of Directors deems appropriate or necessary, including reviewing, evaluating and approving related-party or similar transactions or relationships. Please also see the report of the Audit Committee set forth elsewhere in this proxy statement.

18

Table of Contents

Compensation and Organization Development Committee. Our Compensation and Organization Development Committee met once during fiscal 2012. The Compensation and Organization Development Committee is composed entirely of directors who are not our current or former employees, all of whom qualify as independent under the definition promulgated by the NASDAQ and SEC. The Compensation and Organization Development Committee currently has three members: Dr. Nicholas Bacopoulos (Chairman), Dr. Christopher Henney and Dr. David U'Prichard. Generally, our Compensation and Organization Development Committee reviews, approves and makes recommendations regarding our compensation policies, practices and procedures to ensure that legal and fiduciary responsibilities of the Board of Directors are carried out and that such policies, practices and procedures contribute to our

success. The Compensation and Organization Development Committee also develops and implements policies, principles and procedures for the selection and performance review of the Company's executive officers (including our Chief Executive Officer), other officers, directors, employees, consultants, and advisors; interprets and administers our Amended and Restated 2006 Equity Incentive Plan.

Nominating and Corporate Governance Committee. Our Nominating and Corporate Governance Committee during fiscal 2012. The Nominating and Corporate Governance Committee during such period had four members, Sir John Banham (Chairman), Lloyd Sems, Daniel K. Spiegelman (who resigned on June 6, 2012) and Dr. David U'Prichard, all of whom qualify as independent under the definition promulgated by the NASDAQ and SEC. The committee currently consists of Dr. Christopher Henney (Chairman), Sr. John Banham, Lloyd Sems and David U'Prichard. The functions of the Nominating and Corporate Governance Committee include making recommendations to the full Board of Directors as to particular nominees for election or appointment to the Board of Directors; making recommendations to the full Board of Directors as to the membership, structure and operations of the committees of the Board of Directors; reviewing and assessing the adequacy of our corporate governance guidelines, principles and practices and recommending changes to the full Board of Directors for approval; monitoring compliance with our Corporate Code of Conduct and Ethics; and reviewing and maintaining oversight of matters relating to the independence, operation and effectiveness of the Board of Directors and committee members.

Executive Officers

The following table sets forth certain information regarding our executive officers during fiscal 2012 who are not also members of our Board of Directors. All such executive officers are or were at-will employees.

| Name | Age | Position |
|---------------------|-----|---|
| Dr. Judy Chiao | 53 | Vice President, Clinical Development and Regulatory Affairs |
| | | |
| Robert Sosnowski(1) | 54 | Vice President, Sales & Marketing |
| • • | | |
| | | |
| | | |

(1) Mr. Sosnowski resigned on June 30, 2012.

19

Table of Contents

Judy Chiao, M.D. Dr. Chiao joined Cyclacel in December 2004. From December 2001 to September 2004, she was at Aton Pharma, Inc., a wholly owned subsidiary of Merck & Co. Inc., most recently as Vice President, Oncology Clinical Research and Development. Prior to Aton's acquisition by Merck, she was responsible for leading the clinical development of Zolinza®, a histone deacetylase inhibitor, for hematologic and solid tumor indications. From July 2000 to December 2001, Dr. Chiao was a Senior Medical Reviewer, Division of Oncology Drug Products, Center for Drug Evaluation and Research, U.S. Food and Drug Administration, where she was the agency's primary reviewer for a range of oncology drugs and regulatory subjects. She also presented the FDA's views in several New Drug Application reviews at Oncology Drug Advisory Committees. Dr. Chiao earned her Bachelor of Science in Chemistry (summa cum laude) at Columbia University and received her medical degree from Harvard Medical School. Her internship and residency in internal medicine was carried out at Columbia-Presbyterian Medical Center, New York and she held a Research Fellowship in Molecular Pharmacology at Sloan Kettering Institute for Cancer Research and a Clinical Fellowship in Hematology/Oncology at Memorial Sloan Kettering Cancer Center both in New York. She has also been a member of a number of FDA-related working groups and has also been a Core Member of the Pharsight-FDA Cooperative Research and Development Agreement (CRADA) on clinical trial simulation and population pharmacokinetic analysis software for drug development.

20

Table of Contents

EXECUTIVE AND DIRECTOR COMPENSATION

Summary Compensation Table

The following table shows the compensation paid or accrued during the last two fiscal years ended December 31, 2011 and 2012 to (1) our President and Chief Executive Officer, (2) our Executive Vice President, Finance, Chief Financial Officer and Chief Operating Officer, and (3) our next most highly compensated executive officer, other than our President and Chief Executive Officer and our Executive Vice President, Finance, Chief Financial Officer and Chief Operating Officer, who earned more than \$100,000 during the year ended December 31, 2012.

| Name and Principal Position | Year | Salary (\$) | Bonus (\$) | Stock Awards (\$)(1) | Option Awards (\$)(2) | All Other Compensation (\$)(3) | Total (\$) |
|---|------|----------------|---------------|----------------------------|-----------------------------|---|---------------|
| Spiro Rombotis | 2012 | 505,000 | 126,250(4) | | | 28,562 | 659,812 |
| President and Chief Executive Officer | 2011 | 490,383 | 100,000 | 62,250 | _ | 33,131 | 685,764 |
| Paul McBarron(5) | 2012 | 321,128 | 80,282(6) | _ | _ | 21,125 | 422,535 |
| Executive Vice President, Finance, Chief | | | | | | | |
| Operating Officer, Chief Financial Officer, and | | | | | | | |
| Secretary | 2011 | 298,175 | 38,633 | 62,250 | | 16,209 | 415,267 |
| Judy Chiao, MD | 2012 | 331,600 | 66,320(7) | _ | _ | 19,607 | 417,527 |
| Vice President, Clinical Development and | | | | | | | |
| Regulatory Affairs | 2011 | 321,947 | 42,000 | 49,800 | | 20,766 | 434,513 |
| | | | | | | | |

⁽¹⁾ This column represents the dollar amount recognized for financial statement reporting purposes for the fair value of stock awards. The fair value, a non-cash expense, was estimated using the Black-Scholes option-pricing method in accordance with ASC Topic 718. See Note 11 to our Financial Statements reported in our Form 10-K for our fiscal year ended December 31, 2011 and Note 12 to our Financial Statements reported in our Form 10-K for our fiscal year ended December 31, 2012 for details as to the assumptions used to determine the fair value of the stock awards and

stock options. See also our discussion of stock-based compensation under "Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Policies and Estimates."

(2) These amounts represent the aggregate grant date fair value for option awards for fiscal years 2011 and 2012, respectively, computed in accordance with FASB ASC Topic 718. The grant date fair value of performance awards is determined based on the probable outcome of such performance conditions as of the grant date. A discussion of the assumptions used in determining grant date fair value may be found in Note 11 to our Financial Statements, included in our Annual Report on Form 10-K for the year ended December 31, 2011 and Note 12 to our Financial Statements, included in our Annual Report on Form 10-K for the year ended December 31, 2012.

21

Table of Contents

- (3) Consists of the following for all executive officers: Payments for private medical and health insurance, life insurance and permanent health insurance; and matching contributions made under the Company's UK Group Personal Pension Plan and the U.S. 401(k) Plan.
- (4) Fifty percent of this bonus was paid in cash, or \$63,125, and 50% was paid in 10,791 shares of common stock at the closing price of \$5.85 on the date of grant. As only 50% of the annual target was reached, the bonus reflects 25% of 50% of Mr. Rombotis' 2012 base salary. In addition, Mr. Rombotis was granted 20,000 RSUs, which will vest upon the fulfillment of certain clinical and financial condition and terminate if they have not vested by December 31, 2014. They will be issued at the market price when approved.
- (5) Mr. McBarron's compensation was translated from British pound sterling to the U.S. dollar using the exchange rate of \$1.5453 as of December 31, 2011 and \$1.61533 as of December 31, 2012.
- (6) Fifty percent of this bonus was paid in cash, or \$40,141, and 50% was paid in 6,712 shares of common stock at the closing price of \$5.85 on the date of grant. As only 50% of the annual target was reached, the bonus reflects 25% of 50% of Mr. McBarron's 2012 base salary. In addition, Mr. McBarron was granted 20,000 RSUs, which will vest upon the fulfillment of certain clinical and financial condition and terminate if they have not vested by December 31, 2014. They will be issued at the market price when approved.
- (7) Fifty percent of this bonus was paid in cash, or \$33,160, and 50% was paid in 5,668 shares of common stock at the closing price of \$5.85 as of the date of grant. As only 50% of the annual target was reached, the bonus reflects 20% of 40% of Dr. Chiao's 2012 base salary. In addition, Dr. Chiao was granted 20,000 RSUs, which will vest upon the fulfillment of certain clinical and financial condition and terminate if they have not vested by December 31, 2014. They will be issued at the market price when approved.

Narrative Disclosure to Summary Compensation Table

The Compensation and Organization Development Committee of our Board of Directors makes decisions regarding the compensation of our President and Chief Executive Officer. The Compensation and Organization Development Committee is composed entirely of independent directors and meets in executive session to discuss and formulate its recommendation for the Chief Executive Officer's base salary and bonus. The Compensation and Organization Development Committee does not rely solely on any predetermined formula or a limited set of criteria in evaluating the Chief Executive Officer's performance for the year. The evaluation is based on the Chief Executive Officer's success in achieving his performance goals, which include financial, strategic and leadership objectives. The Chief Executive Officer also provides the Compensation and Organization Development Committee with a self-review of his performance as part of the Company's review process.

22

Table of Contents

The Compensation and Organization Development Committee also approves the annual compensation (including base salary, bonus, and stock-based compensation) for our other named executive officers based on:

- the executive's scope of responsibilities;
- · an informed market assessment of competitive practices for similar roles within peer group companies;
- evaluations of performance for the year, as assessed by the Chief Executive Officer, supported by the Company's performance review process and the executive's self-assessment; and
- · recommendations by our Chief Executive Officer for each named executive officer with respect to base salary, cash bonus, and stock-based compensation.

The Compensation and Organization Development Committee is authorized to engage and retain independent third party compensation and legal advisors to obtain advice and assistance on all matters related to executive compensation and benefit plans, and the Committee does intend to engage periodically an external consultant to provide independent verification of market position and ensure the appropriateness of executive compensation. The last time that the Compensation and Organization Development Committee engaged an external consultant was in 2008, when a representative of Radford Surveys and Consulting, a business unit of AON, was selected and engaged to be the independent compensation consultant to the Committee to assess our 2007 and 2008 executive compensation program. Using this extensive analysis, the Compensation and Organization Development Committee acted on the recommendations made to determine executive compensation and implement our compensation program structures for subsequent years. Although no external compensation consultant was engaged during 2011 or 2012, the Compensation and Organization Development Committee did consult independent external compensation survey data as part of the decision making process relating to such periods.

During 2011, our Board of Directors, at the recommendation of the Compensation and Organization Development Committee, granted restricted stock units under the 2006 Plan to our executive officers, which restricted stock units cliff-vest on December 6, 2014. During 2012, 12,281 restricted stock

units were granted to employees which cliff-vest on January 28, 2015.

During 2011, the Company granted 28,500 stock options to employees and directors of the Company with a weighted value exercise price of \$10.64 per share, as well as 34,000 restricted stock units. During 2012, the Company granted 33,571 stock options to directors of the Company with a weighted value exercise price \$3.29 per share.

We currently have employment agreements with two of our named executive officers, Spiro Rombotis, our President and Chief Executive Officer, and Paul McBarron, our Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary.

On March 20, 2008, we entered into a three-year employment agreement with Mr. Spiro Rombotis, effective January 1, 2008, which agreement was renewed on substantially the same terms, effective January 1, 2011, for an additional three years. This agreement provides for an initial annual base salary of \$490,383, which salary may be increased in the future. Mr. Rombotis' annual base salary was \$490,383 and \$505,000 for 2011 and 2012, respectively. Mr. Rombotis is also eligible for a yearly incentive cash bonus, based on a percentage of his then current base salary, if he meets certain corporate and individual performance criteria set by the Compensation and Organization Development Committee at the beginning of each year of employment, subject to the approval of our Board of Directors. The agreement had been amended effective December 31, 2008, to make certain payments to be made under the agreement compliant with Section 409A of the Internal Revenue Code of 1986, as amended, and similar regulations.

23

Table of Contents

On March 31, 2008, we entered into a three-year employment agreement with Mr. Paul McBarron effective January 1, 2008, which agreement was renewed on substantially the same terms, effective January 1, 2011, for an additional three years. This agreement provides for an initial annual base salary of £192,955, which salary may be increased in the future. Mr. McBarron's base salary was £192,955 and £198,800 for 2011 and 2012, respectively. Mr. McBarron is also eligible for a yearly incentive cash bonus, based on a percentage of his then current base salary, if he meets certain corporate and individual performance criteria set by the Compensation and Organization Development Committee at the beginning of each year of employment, subject to the approval of our Board of Directors.

Outstanding Equity Awards at Fiscal Year-End

The following table shows grants of stock options and grants of unvested stock or unvested stock units outstanding on the last day of the fiscal year ended December 31, 2012, including non-performance based awards, to each of the executive officers named in the Summary Compensation Table. The Company does not have any unearned equity incentive awards.

| | | Option Av | wards | s | | Stock Awa | ards |
|----------------|--|--|-------|-------------------------------------|------------------------------|--|---|
| Name | Number of Securities Underlying Unexercised Options Exercisable | Number of Securities Underlying Unexercised Options Unexercisable | | Option Exercise Price (\$) | Option Expiration Date | Number of Shares or Units of Stock That Have Not Vested | Market Value of Shares or Units of Stock That Have Not Vested |
| Spiro Rombotis | 13,976 | 0(2) | \$ | 44.80 | 6/13/2016 | | _ |
| | 22,857 | 0(3) | \$ | 48.65 | 12/20/2016 | _ | _ |
| | 28,571 | 0(4) | \$ | 38.71 | 12/06/2017 | _ | _ |
| | 5,360 | 5,354(5) | \$ | 11.13 | 12/10/2020 | _ | _ |
| | | | | | | 10,714(6) | 64,927 |
| Paul McBarron | 9,097 | 0(7) | \$ | 44.80 | 6/13/2016 | _ | _ |
| | 14,286 | 0(8) | \$ | 48.65 | 12/20/2016 | _ | _ |
| | 14,286 | 0(9) | \$ | 38.71 | 12/06/2017 | _ | _ |
| | 21,429 | 0(10) | \$ | 3.08 | 11/18/2018 | _ | _ |
| | 5,360 | 5,354(11) | \$ | 11.13 | 12/10/2020 | _ | _ |
| | | | | | | 10,714(12) | 64,927 |
| Judy Chiao | 6,995 | 0(13) | \$ | 44.80 | 6/13/2016 | _ | _ |
| | 11,429 | 0(14) | \$ | 48.65 | 12/20/2016 | _ | _ |
| | 14,286 | 0(15) | \$ | 38.71 | 12/06/2017 | _ | _ |
| | 10,714 | 0(16) | \$ | 3.08 | 11/18/2018 | _ | _ |
| | 4,464 | 4,465(17) | \$ | 11.13 | 12/10/2020 | _ | _ |
| | | | | | | 8,571(18) | 51,940 |
| | | | | | | | |

24

Table of Contents

- (1) The market value of the shares is determined by multiplying the number of shares by \$6.06, the closing price of our common stock on the NASDAQ Global Market on December 31, 2012, the last day of our fiscal year.
- (2) These options were granted on June 14, 2006, two-thirds (2/3) of which vested immediately, and the balance of which vested ratably on a monthly basis over the following 12 months.
- (3) These options were granted on December 21, 2006, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 21, 2007, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.

- (4) These options were granted on December 6, 2007, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 6, 2008, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.
- (5) These options were granted on December 10, 2010, and vest over a four-year period, such options vesting ratably on a monthly basis over 48 months.
- (6) These shares of common stock represent restricted stock units, which were granted on December 6, 2011, and are subject to forfeiture; the restrictions will lapse on the third anniversary of the date of grant.
- (7) These options were granted on June 13, 2006, two-thirds (2/3) of which vested immediately, and the balance of which vested ratably on a monthly basis over the following 12 months.
- (8) These options were granted on December 21, 2006, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 21, 2007, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.
- (9) These options were granted on December 6, 2007, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 6, 2008, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.
- (10) These options were granted on November 18, 2008, and vest over a three-year period, with one-third (1/3) of the options granted vesting on November 18, 2009, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 24 months.

25

Table of Contents

- (11) These options were granted on December 10, 2010, and vest over a four-year period, such options vesting ratably on a monthly basis over 48 months.
- (12) These shares of common stock represent restricted stock units, which were granted on December 6, 2011, and are subject to forfeiture; the restrictions will lapse on the third anniversary of the date of grant.
- (13) These options were granted on June 13, 2006, two-thirds (2/3) of which vested immediately, and the balance of which vested ratably on a monthly basis over the following 12 months.
- (14) These options were granted on December 21, 2006, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 21, 2007, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.
- These options were granted on December 6, 2007, and are exercisable over a four-year period with one-fourth (1/4) of the options granted vesting on December 6, 2008, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 36 months.
- (16) These options were granted on November 18, 2008, and vest over a three-year period, with one-third (1/3) of the options granted vesting on November 18, 2009, the first anniversary of the grant date, and the balance of the options granted vesting ratably on a monthly basis over the following 24 months.
- (17) These options were granted on December 10, 2010, and vest over a four-year period, such options vesting ratably on a monthly basis over 48 months.
- (18) These shares of common stock represent restricted stock units, which were granted on December 6, 2011, and are subject to forfeiture; the restrictions will lapse on the third anniversary of the date of grant.

Nonqualified Deferred Compensation

We do not have any non-qualified deferred compensation plans.

Potential Payments Upon Termination or Change-in-Control

We have entered into agreements that require us to make payments and/or provide benefits to certain of our executive officers in the event of a termination of employment or change-in-control. Our Amended and Restated 2006 Equity Incentive Plan already provides for payments to named executive officers in connection with a termination or a change-in-control of the Company.

The following summarizes the potential payments to each named executive officer for which we have entered into such an agreement, assuming that one of the events identified below occurs. The discussion assumes that the event occurred on December 31, 2012, the last business day of our fiscal year, at which time the closing price of our common stock as listed on the NASDAQ Global Market was \$6.06 per share.

On March 20, 2008, we entered into a three-year employment agreement with Mr. Spiro Rombotis, effective January 1, 2008, which agreement was renewed on substantially the same terms, effective January 1, 2011, for an additional three years. Mr. Rombotis' current base salary is \$515,100, which may be increased in the future in accordance with the terms of the agreement. Mr. Rombotis is also eligible for a yearly incentive cash bonus, based on a percentage of his then current base salary, if he meets certain corporate and individual performance criteria set by the Compensation and Organization Development Committee at the beginning of each year of employment, subject to the approval of our Board of Directors. The agreement also provides for reimbursement of reasonable and necessary expenses incurred by Mr. Rombotis in connection with the performance of his services. In addition, Mr. Rombotis is entitled to certain employment benefits.

The agreement also provides for certain severance arrangements for Mr. Rombotis. In the event that Mr. Rombotis' employment is terminated "without cause," other than termination for a "change of control" (each as defined in the Agreement), we will be required to pay Mr. Rombotis (i) all accrued but unpaid compensation up to the time of such termination; (ii) for a period of twelve months following such termination, severance payments in the form of continuation of his base salary as in effect immediately prior to such termination (the "Severance Payments"), including coverage of his medical care and life insurance pursuant to COBRA, on the same terms as applicable to other executive employees, unless Mr. Rombotis obtains substitute coverage; and (iii) a period of six months in which to exercise all vested options held by Mr. Rombotis. In the event that Mr. Rombotis' employment is terminated within six months following a "change in control" event, Mr. Rombotis will be entitled to (i) all accrued but unpaid compensation up to the time of such termination; (ii) Severance Payments for a period of 24 months; (iii) out-of-pocket expenses reasonably incurred by Mr. Rombotis in connection with his and his family's relocation to London; and (iv) 18 months' accelerated vesting of any options held by him. In the event of termination due to his death or disability, we will pay Mr. Rombotis (or his estate, as the case may be) (i) all accrued but unpaid compensation up to the time of such termination; (ii) Severance Payments for a period of twelve months; and (iii) he will be entitled to a period of twelve months in which all of his vested options can be exercised.

In addition, Mr. Rombotis also agreed to certain confidentiality and assignment of inventions obligations and will be subject to certain non-competition obligations for a period of one year following termination of his employment.

Mr. Rombotis' employment agreement was amended effective December 31, 2008, to make certain payments to be made under the agreement compliant with Section 409A of the Internal Revenue Code of 1986, as amended, and then amended again effective January 1, 2011 to extend its term for an additional three years.

27

Table of Contents

Paul McBarron, Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary

On March 31, 2008, we entered into a three-year employment agreement with Mr. Paul McBarron effective January 1, 2008, which agreement was renewed on substantially similar terms, effective January 1, 2011, for an additional three years. Mr. McBarron's current base salary is £202,776, which may be increased in the future in accordance with the terms of his agreement. Mr. McBarron is also eligible for a yearly incentive cash bonus, based on a percentage of his then current base salary, if he meets certain corporate and individual performance criteria set by the Compensation and Organization Development Committee at the beginning of each year of employment, subject to the approval of our Board of Directors. The agreement also provides for reimbursement of reasonable and necessary expenses incurred by Mr. McBarron in connection with the performance of his services. In addition, Mr. McBarron is entitled to certain employment benefits.

The agreement also provides for certain severance arrangements for Mr. McBarron. In the event that Mr. McBarron's employment is terminated "without cause," other than termination for a "change of control" (each as defined in the Agreement), we will be required to pay Mr. McBarron (i) all accrued but unpaid compensation up to the time of such termination; (ii) Severance Payments for a period of twelve months following such termination; and (iii) a period of six months in which to exercise all vested options held by Mr. McBarron. In the event that Mr. McBarron's employment is terminated within six months following a "change in control" event, Mr. McBarron will be entitled (i) all accrued but unpaid compensation up to the time of such termination; (ii) Severance Payments for a period of 12 months; and (iii) 18 months' accelerated vesting of any options held by him and, in the event of termination due to his death or disability, we will pay Mr. McBarron (or his estate, as the case may be) (i) all accrued but unpaid compensation up to the time of such termination; (ii) Severance Payments for a period of twelve months; and (iii) he will be entitled to a period of twelve months in which all of his vested options can be exercised.

In addition, Mr. McBarron also agreed to certain confidentiality and assignment of inventions obligations and will be subject to certain non-competition obligations for a period of one year following termination of his employment.

Dr. Judy Chiao, Vice President, Clinical Development and Regulatory Affairs

On December 10, 2010, we entered into a Change in Control Agreement, or the CIC Agreement, with Dr. Chiao.

In the event of a Change in Control (as defined below) of the Company, and Dr. Chiao's employment with the continuing or surviving company, or the Controlling Company, is terminated (including if Dr. Chiao voluntarily terminates her employment for Good Reason, as defined below) at any time within six months following the effective date of a Change in Control, unless such termination is For Cause, death, disability or Dr. Chiao voluntarily leaves without Good Reason (as each such term is defined below), Dr. Chiao will be entitled to receive the following benefits from the Controlling Company in lieu of any further salary and bonus payments to Dr. Chiao for certain periods subsequent to the date of termination in consideration for Dr. Chiao's execution and delivery of a general release in favor of the Controlling Company: (i) payment by the Controlling Company of a lump sum severance payment equal to Dr. Chiao's annual salary for a period of twelve months from the date of termination; (ii) payment by the Controlling Company of all unpaid, accrued vacation through the date of termination; (iii) all options to purchase shares of the Company's Common Stock held by Dr. Chiao shall be vested and exercisable for twelve months following the effective date of the Change in Control; and (iv) the Controlling Company shall arrange coverage for Dr. Chiao and her dependents, as the case may be, under medical care and life insurance benefit plans substantially similar to those which Dr. Chiao and her dependents were entitled immediately prior to the effective date of the Change in Control for a period of up to twelve months after the effective date of the Change in Control, subject to certain exceptions as set forth in more detail in the CIC Agreement.

Table of Contents

Under the terms of the CIC Agreement, a "Change in Control" shall be deemed to have taken place in the event of: (i) any consolidation or merger of the Company is consummated in which Company is not the continuing or surviving corporation or pursuant to any transaction in which shares of the Company's capital stock are converted into cash, securities or other property, or any sale, lease, exchange or other transfer in one transaction or a series of transactions contemplated or arranged by any party as a single plan of all or substantially all of the assets of the Company, or the approval of a plan of complete liquidation or dissolution of the Company adopted by the stockholders of the Company; (ii) any person (as such term is used in Sections 13(d) and 14(d)(2) of the Exchange Act, shall, after the date of the CIC Agreement, become the beneficial owner (as defined in Rules 13d-3 and 13d-5 under the Exchange Act), directly or indirectly, of securities of the Company representing 35% or more of the voting power of all then outstanding securities of the Company having the right under ordinary circumstances to vote in an election of the board of directors; or (iii) individuals who, at the date of the CIC Agreement, constitute the entire Board and any new directors whose election by the Board, or whose nomination for election by the Company's stockholders, shall have been approved by a vote of at least a majority of the directors then in office who either were directors as of such date or whose election or nomination for election shall have been so approved shall cease for any reason to constitute a majority of the members of the Board.

Dr. Chiao's employment shall have been terminated "For Cause" if the Controlling Company shall have terminated Dr. Chiao as a result of:
(A) improper conduct, consisting of any willful act or omission with the intent of obtaining, to the material detriment of the Controlling Company, any benefit to which Dr. Chiao would not otherwise be entitled; (B) gross negligence, consisting of wanton and reckless acts or omissions in the performance of Dr. Chiao's duties to the material detriment of the Controlling Company; (C) addiction to drugs or chronic alcoholism; or (D) any conviction of, or plea of nolo contendere to, a crime (other than a traffic violation) under the laws of the United States or any political subdivision thereof, subject to certain requirements, as set forth in more detail in the CIC Agreement.

Dr. Chiao shall be deemed to have terminated her employment for "Good Reason" if the Controlling Company (A) materially reduces Dr. Chiao's duties, responsibilities or authority commensurate with his or her position immediately prior to the effective date of the Change in Control; (B) reduces Dr. Chiao's base salary in effect immediately prior to the effective date of the Change of Control; (C) requires Dr. Chiao to relocate to another office more than 50 miles of her office location immediately prior to the effective date of the Change of Control, subject to certain exceptions, as more fully set forth in detail in the CIC Agreement; or (D) fails to offer Dr. Chiao all material benefits offered to all other employees of the Controlling Company, and the Controlling Company fails to correct or cure the acts giving rise to the termination of Dr. Chiao's employment for "Good Reason," after receipt of Dr. Chiao's notice of such acts.

29

Table of Contents

Potential payments to each named executive officer under our Amended and Restated 2006 Equity Incentive Plan in connection with a termination or a change-in-control of the Company

The following summarizes the potential payments to each named executive officer under our Amended and Restated 2006 Equity Incentive Plan, or the 2006 Plan, in connection with a termination or a change-in-control of the Company.

Termination

Termination For Cause - If an award recipient's service relationship with the Company terminates for "cause" (as defined the 2006 Plan), then any unexercised award shall terminate immediately upon his or her termination of service.

Termination Without Cause - If an award recipient's service relationship with the Company terminates for any reason other than for "cause" (excluding death or disability), then the recipient generally may exercise the award, to the extent vested, within 30 days of such termination to the extent that the award is vested on the date of termination (but in no event later than the expiration of the term of the award as set forth in the award agreement). If the recipient dies within three months following such a termination, the award generally may be exercised, to the extent vested, within 180 days' of the recipient's death.

Death - If an award recipient's service relationship with the Company terminates due to his or her death, the award recipient's personal representative, estate, or the person who acquires the right to exercise the award by bequest or inheritance, as the case may be, generally may exercise the award, to the extent the award was vested on the date of termination, within one year from the date of the recipient's death.

Disability - If an award recipient's service relationship with the Company terminates due to his or her disability, the recipient, the recipient's personal representative, estate, or the person who acquires the right to exercise the award by bequest or inheritance, as the case may be, generally may exercise the award, to the extent the award was vested on the date of termination, within one year from the date of the recipient's termination, or if the recipient dies during such one-year period, within the later of one year from the date of the recipient's termination and 180 days from the recipient's death. In no event may an award be exercised later than the expiration of the term of the award as set forth in the award agreement.

Change in Control

Pursuant to the terms of the 2006 Plan, in the event of a change in control (as defined in the 2006 Plan), all outstanding options, SARs and other awards granted under the 2006 Plan will be either:

 \cdot assumed by the successor corporation or a parent or subsidiary of the successor corporation; or

30

Table of Contents

· substituted with an equivalent award by the successor corporation or a parent or subsidiary of the successor corporation.

However, in the event that the successor corporation refuses to assume or substitute an award:

- awards consisting of options, SARs and rights to purchase restricted stock will become fully vested and immediately exercisable, including awards that would not otherwise have become vested or exercisable; and
- · all other awards will become fully earned and eligible to receive a payout.

For the purposes of the 2006 Plan, a participant's award will be considered assumed if, following the change in control, the assumed award confers, for each share of the Company's Common Stock subject to the award immediately prior to the change in control, the right to receive the consideration (whether stock, cash, or other securities or property) received in the change in control for each share of Common Stock held on the effective date of the transaction; provided, however, that if the consideration received in the change of control is not solely common stock of the successor corporation or its parent, the committee administering the plan may, with the consent of the successor corporation, provide for the consideration per share to be received upon the exercise of the award, to be solely common stock of the successor corporation or its parent equal in fair market value to the per share consideration received by holders of the Company's Common Stock in the change of control.

Under the 2006 Plan, a change of control is the occurrence of one of the following events:

- a person, partnership, joint venture, corporation or other entity, or two or more of any of the foregoing acting as a group (or any "person" within the meaning of Sections 13(d)(3) and 14(d) of the Exchange Act), other than the Company, a Subsidiary, or an employee benefit plan (or related trust) of the Company or a Subsidiary, become(s) the "beneficial owner" (as defined in Rule 13d-3 under the Exchange Act) of 30% or more of the then-outstanding voting stock of the Company;
- during any period of two consecutive years, individuals who at the beginning of such period constitute the Board of Directors (together with any new director whose election by the Board of Directors or whose nomination for election by the Company's stockholders, was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of such period or whose election or nomination for election was previously so approved) cease for any reason to constitute a majority of the directors then in office;
- all or substantially all of the business of the Company is disposed of pursuant to a merger, consolidation or other transaction in which the Company is not the surviving corporation or the Company combines with another Company and is the surviving corporation (unless the stockholders of the Company immediately following such merger, consolidation, combination, or other transaction beneficially own, directly or indirectly, more than 50% of the aggregate voting stock or other ownership interests of (x) the entity or entities, if any, that succeed to the business of the Company or (y) the combined company);

31

Table of Contents

- the Company is a party to a merger, consolidation, sale of assets or other reorganization, or a proxy contest, as a consequence of which the Board of Directors in office immediately prior to such transaction or event constitutes less than a majority of the Board of Directors thereafter; or
- the stockholders of the Company approve a sale of all or substantially all of the assets of the Company or a liquidation or dissolution of the Company.

Director Compensation

The following table shows the total compensation paid or accrued during the fiscal year ended December 31, 2012 to each of our non-employee directors:

| | Fees Earned | | |
|-------------------------------------|----------------------------|-----------------------------|---------------|
| Name | or Paid in Cash (\$) | Option Awards (\$)(1) | Total (\$) |
| David U'Prichard, Ph.D. | 85,000 | 23,500(2) | 108,500 |
| Sir John Banham | 50,964 | 11,749(3) | 62,443 |
| Nicholas Bacopoulos, Ph.D. | 45,000 | 11,749(4) | 56,749 |
| Christopher S. Henney, Ph.D., D.Sc. | 65,000 | 23,500(5) | 88,500 |
| Gregory T. Hradsky | 45,000 | 11,749(6) | 56,749 |
| Lloyd Sems | 45,000 | 11,749(7) | 56,749 |
| Daniel K. Spiegelman * | 23,833 | _ | 23,833 |

- (1) These amounts represent the grant date fair value of stock awards granted to each director in 2012 computed in accordance with FASB ASC Topic 718. The grant date fair value of performance awards is determined based on the probable outcome of such performance conditions as of the grant date. A discussion of the assumptions used in determining grant date fair value may be found in Note 12 to our financial statements included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
- (2) Fair value of the options granted on May 23, 2012 was \$3.29 per share. 50,001 options remain outstanding as of December 31, 2012.
- (3) Fair value of the options granted on May 23, 2012 was \$3.29 per share. 24,998 options remain outstanding as of December 31, 2012.
- (4) Fair value of the options granted on May 23, 2012 was \$3.29 per share. 17,855 options remain outstanding as of December 31, 2012.
- * Mr. Spiegelman resigned on June 6, 2012.

Table of Contents

- (5) Fair value of the options granted on May 23, 2012 was \$3.29 per share. 53,001 options remain outstanding as of December 31, 2012.
- (6) Fair value of the options granted on May 23, 2012 was \$3.29 per share. 3,571 options remain outstanding as of December 31, 2012.
- (7) Fair value of the options granted on May 23, 2012 was \$3.29 per share, 3,571 options remain outstanding as of December 31, 2012.

Director Compensation Program

Under the terms of our Director Compensation Program, the non-employee members of our Board of Directors are paid a fixed annual fee, payable on a quarterly basis, in arrears, on the first day of each quarter, as follows:

| Chairman of the Board | \$ 85,000 |
|------------------------------------|--------------|
| Vice Chairman of the Board | \$ 65,000 |
| Chairman - Audit Committee | \$ 55,000 |
| Other Non-Management Board Members | \$ 45,000 |

In addition, the non-employee members of our Board of Directors are entitled to receive stock options on an annual basis on the date of the Company's annual meeting as follows:

| Chairman and Vice Chairman | 7,142 |
|---------------------------------|-------|
| Chairman of the Audit Committee | 5,000 |
| Other Board Members | 3,571 |

The non-employee directors are also reimbursed for customary business expenses in connection with attending Board of Directors and committee meetings.

33

Table of Contents

Equity Compensation Plan Information

The following table provides certain aggregate information with respect to all of our equity compensation plans in effect as of December 31, 2012:

| Plan Category | (a) No. of securities to be issued upon exercise of outstanding options, warrants and rights | (b) Weighted-average exercise price of outstanding options, warrants and rights | (c) Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) |
|---|---|--|--|
| Total equity compensation plans approved by security holders(1) | 503,347 | \$ 26.68 | 839,327 |
| Equity compensation plans not approved by security holders | | _ | _ |

(1) Consists of our Amended and Restated 2006 Equity Incentive Plan, or the 2006 Plan. The 2006 Plan provides for the grant of incentive stock options, nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units and performance units. The number of shares available for issuance, as of April 1, 2013, under the 2006 Plan is 782,416.

34

Table of Contents

REPORT OF AUDIT COMMITTEE

The Audit Committee of the Board of Directors, which consists entirely of directors who meet the independence and experience requirements of NASDAQ Global Market, has furnished the following report:

The Audit Committee assists the Board of Directors in overseeing and monitoring the integrity of our financial reporting process, compliance with legal and regulatory requirements and the quality of internal and external audit processes. The Audit Committee's role and responsibilities are set forth in our charter adopted by the Board of Directors. The Audit Committee reviews and reassesses our charter annually and recommends any changes to the Board of Directors for approval.

In fiscal 2012, the Audit Committee met with management to consider the adequacy of the Company's internal controls and the objectivity of its financial reporting. The Audit Committee discussed these matters with the Company's independent registered public accounting firm and with appropriate Company financial personnel.

The Audit Committee is responsible for overseeing our overall financial reporting process, and for the appointment, retention, and oversight of the work of Ernst & Young LLP (US), or E&Y US.

The Audit Committee reviewed and discussed the audited financial statements for the fiscal year ended December 31, 2012 with management and E&Y US, our independent registered public accounting firm.

The Audit Committee discussed with E&Y US the matters required to be discussed by Statement on Auditing Standards No. 61, as amended, as adopted by the Public Company Accounting Oversight Board in Rule 3200T, relating to the conduct of the audit.

The Audit Committee received written disclosures and the letter from E&Y US regarding its independence as required by applicable requirements of the Public Company Accounting Oversight Board regarding E&Y US's communications with the Audit Committee and the Audit Committee further discussed with E&Y US their independence. The Audit Committee also considered the status of pending litigation, taxation matters and other areas of oversight relating to the financial reporting and audit process that the Audit Committee determined appropriate.

Based on the Audit Committee's review of the audited consolidated financial statements and discussions with management and E&Y US, the Audit Committee recommended to the Board of Directors that the audited financial statements be included in our Annual Report on Form 10-K for the fiscal year ended December 31, 2012 for filing with the SEC.

Members of the Audit Committee

Sir John Banham (Chairman) Dr. Christopher Henney Gregory T. Hradsky

35

Table of Contents

SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Section 16(a) of the Securities Exchange Act of 1934, as amended, requires our officers and directors, and persons who own more than 10% of a registered class of our equity securities to file reports of ownership and changes in ownership with the SEC. These persons are required by regulation to furnish us with copies of all Section 16(a) reports that they file. Based on our review of the copies of these reports received by us, or written representations from the reporting persons that no other reports were required, we believe that, during fiscal year 2012, all reports to be filed pursuant to Section 16(a) of the Exchange Act were filed on a timely basis.

36

Table of Contents

CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

Our Audit Committee reviews and approves in advance all related-party transactions. There have been no transactions during our last two fiscal years with our directors and officers and beneficial owners of more than 5% of our voting securities and their affiliates.

37

Table of Contents

PROPOSALS TO BE VOTED UPON BY STOCKHOLDERS

PROPOSAL 1: ELECTION OF CLASS 1 DIRECTOR

Background

Under our Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws, as amended, the number of directors is fixed from time to time by the Board of Directors. We have a staggered Board of Directors comprised of three classes, and each director serves until the annual meeting in which his term expires. Sir Jon Banham is a Class 1 director, the term of which class expires at the 2016 annual meeting, and, if elected, would serve until our 2016 annual meeting.

The Board of Directors has voted to nominate Sir John Banham for re-election at the 2013 annual meeting to serve as a Class 1 director until the 2016 annual meeting of stockholders and until his successor has been elected and qualified.

Unless authority to vote for the nominee named above is withheld, the shares represented by the enclosed proxy will be voted FOR the re-election as director of Sir John Banham. In the event that any nominee shall become unable or unwilling to serve, the shares represented by the enclosed proxy will be voted for the election of such other person as the Board of Directors may recommend in his place. The Board of Directors has no reason to believe that any nominee will be unable or unwilling to serve.

Unless authority to vote for either of the nominees named above is withheld, the shares of Common Stock represented by the enclosed proxy will be voted FOR the re-election as director of Sir John Banham.

Required Vote

A plurality of the votes cast at the annual meeting by the holders of our Common Stock is required to elect the nominee as a director.

Recommendation

THE BOARD OF DIRECTORS RECOMMENDS THE RE-ELECTION BY HOLDERS OF COMMON STOCK OF SIR JOHN BANHAM AS CLASS 1 DIRECTOR, AND PROXIES SOLICITED BY THE BOARD OF DIRECTORS WILL BE VOTED IN FAVOR THEREOF UNLESS A STOCKHOLDER HAS INDICATED OTHERWISE ON THE PROXY CARD.

38

Table of Contents

PROPOSAL 2: RATIFICATION OF APPOINTMENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM BY HOLDERS OF COMMON STOCK

The Audit Committee has appointed Ernst & Young (US) LLP, or E&Y US, independent registered public accounting firm, to audit our consolidated financial statements for the fiscal year ending December 31, 2013. The Board of Directors proposes that the stockholders ratify this appointment. We expect that representatives of E&Y US will be present at the annual meeting via conference call, will be able to make a statement if they so desire, and will be available to respond to appropriate questions.

The following table presents fees for professional audit services rendered by E&Y for the audit of Cyclacel's annual financial statements for the years ended December 31, 2011 and 2012, and fees billed for other services rendered by E&Y.

| | 2011 | 2012 |
|---------------------|---------------|---------------|
| Audit fees: (1) | \$ 542,315 | \$ 514,474 |
| Audit related fees: | _ | _ |
| Tax fees:(2) | 45,208 | 41,711 |
| All other fees: | _ | _ |
| Total | \$ 587,523 | \$ 556,185 |

- (1) Audit fees represent fees of E&Y for the audit of the Company's annual consolidated financial statements; reviews of the Company's interim financial statements included in quarterly reports on Form 10-Q; the services that an independent auditor would customarily provide in connection with subsidiary audits, other regulatory filings, and similar engagements for each fiscal year shown, such as attest services, consents, and assistance with review of documents filed with the SEC.
- (2) Tax fees represent tax compliance and return preparation and tax planning and advice.

Policy on Audit Committee Pre-Approval of Audit and Permissible Non-audit Services of Independent Auditors. Consistent with SEC policies regarding auditor independence, the Audit Committee has responsibility for appointing, setting compensation, and overseeing the work of the independent auditor. In recognition of this responsibility, the Audit Committee has established a policy to pre-approve all audit and permissible non-audit services provided by the independent auditor.

Prior to engagement of the independent auditor for the next year's audit, management will submit an aggregate of services expected to be rendered during that year for each of four categories of services to the Audit Committee for approval.

1. **Audit** services include audit work performed in the preparation of financial statements, as well as work that generally only the independent auditor can reasonably be expected to provide, including comfort letters, statutory audits, and attest services and consultation regarding financial accounting and/or reporting standards.

39

Table of Contents

- 2. **Audit-Related** services are for assurance and related services that are traditionally performed by the independent auditor, including due diligence related to mergers and acquisitions, employee benefit plan audits, and special procedures required to meet certain regulatory requirements.
- 3. *Tax* services include all services performed by the independent auditor's tax personnel except those services specifically related to the audit of the financial statements, and includes fees in the areas of tax compliance, tax planning, and tax advice.
- 4. *Other Fees* are those associated with services not captured in the other categories. The Company generally does not request such services from the independent auditor.

Prior to engagement, the Audit Committee pre-approves these services by category of service. The fees are budgeted and the Audit Committee requires the independent auditor and management to report actual fees versus the budget periodically throughout the year by category of service. During the year, circumstances may arise when it may become necessary to engage the independent auditor for additional services not contemplated in the original pre-approval. In those instances, the Audit Committee requires specific pre-approval before engaging the independent auditor.

The Audit Committee may delegate pre-approval authority to one or more of its members. The member to whom such authority is delegated must report, for informational purposes only, any pre-approval decisions to the Audit Committee at its next scheduled meeting.

In the event the stockholders do not ratify the appointment of Ernst & Young LLP as our independent registered public accounting firm, the Audit Committee will reconsider its appointment.

Required Vote

The affirmative vote of a majority of the votes cast by holders of our Common Stock is required to ratify the appointment of the independent registered public accounting firm.

Recommendation

THE BOARD OF DIRECTORS RECOMMENDS A VOTE TO RATIFY THE APPOINTMENT OF ERNST & YOUNG, LLP OUR INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM, AND PROXIES SOLICITED BY THE BOARD OF DIRECTORS WILL BE VOTED IN FAVOR OF SUCH RATIFICATION UNLESS A STOCKHOLDER INDICATES OTHERWISE ON THE PROXY CARD.

40

Table of Contents

PROPOSAL 3: ADVISORY VOTE ON APPROVAL OF EXECUTIVE COMPENSATION AS DISCLOSED IN THIS PROXY STATEMENT

General

The Dodd-Frank Wall Street Reform and Consumer Protection of 2010 (or "the Dodd-Frank Act"), now applicable to our Company, enables our stockholders to vote to approve on an advisory and non-binding basis, the compensation of our named executive officers as described in the Executive Officer and Director Compensation section of this proxy statement, the compensation tables and related material contained in this proxy statement. This "say-on-pay" proposal gives our stockholders the opportunity to express their views on our overall compensation decisions and policies. The Dodd-Frank Act also requires an advisory vote on executive compensation at least once every three years.

Stockholders are urged to read the Executive and Director Compensation section of this proxy statement, which discusses how our compensation policies and procedures implement our compensation philosophy. The Compensation Committee and the Board of Directors believe that these policies and procedures are effective in implementing our compensation philosophy and in achieving its goals.

As more fully described in the Executive and Director Compensation section of this proxy statement, existing employment contracts provide for the bulk of the compensation of our executives. A significant portion, however, is discretionary and determined by the Compensation Committee on an annual basis. Historically (but subject to change in the future), much of the additional or bonus compensation and equity awards have been based on specific numeric and weighted criteria for these officers. On an annual basis, the Committee reviews and approves the objectives for each officer's goals and the following year analyzed to what extent the objectives have been achieved. The Committee then determines the resulting additional compensation and equity grants. In so doing, the Committee considers the interest of the stockholders, current market practices, the clinical goals of the Company, the need to motivate its officers and other criteria. The Committee has also considered the extensive experience of our executives in the biotech industry as well as their related and relevant activities prior to their entry into the biotech industry. These considerations inform the Committee's assessment of the type of compensation program and incentives that are appropriate and necessary to attract, motivate and retain the named executives who are crucial to the Company's long-term success.

During the most recent year and giving due consideration to the Company's continuing cash requirements, some of the bonus compensation to executives was paid in stock. Additionally, restricted stock units with specific performance conditions were also granted. It is expected that these grants will further encourage sustained performance and be aligned with long-term shareholder interests.

Because your vote is advisory, it will not be binding on our Compensation Committee or our Board of Directors, nor will it directly affect or otherwise limit any compensation or award arrangements that have already been granted to any of the named executive officers. However, the Compensation Committee and the Board will review the voting results and take them into consideration when making future decisions regarding executive compensation.

41

Table of Contents

In accordance with the rules recently adopted by the SEC, the following resolution, commonly known as a "say-on-pay" vote, is being submitted for a stockholder vote at the 2013 annual meeting:

"RESOLVED, that the compensation paid to the named executive officers of Cyclacel Pharmaceuticals, Inc., as disclosed pursuant to the compensation disclosure rules of the Securities and Exchange Commission, including the Executive Officer and Director Compensation section of the proxy statement for the 2013 annual meeting, the compensation tables and the related material disclosed in the proxy statement, is hereby APPROVED."

Required Vote

The affirmative vote of the votes cast by holders of our Common Stock is required to approve, on an advisory basis, this resolution.

Recommendation

THE BOARD OF DIRECTORS RECOMMENDS A VOTE TO APPROVE THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS, AND PROXIES SOLICITED BY THE BOARD WILL BE VOTED IN FAVOR OF SUCH APPROVAL UNLESS A STOCKHOLDER INDICATES OTHERWISE ON THE PROXY.

Table of Contents

PROPOSAL 4: ADVISORY VOTE ON APPROVAL OF THE FREQUENCY OF HOLDING AN ADVISORY VOTE ON THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS

General

We are seeking your input with regard to the frequency of holding future stockholder advisory votes on the compensation of our named executive officers. In particular, we are asking whether the advisory vote on the compensation of our named executive officers (Proposal 3) should occur every year, every two years or every three years. The Dodd-Frank Act requires the Company to hold the advisory vote on the frequency of the say-on-pay vote at least once every six years.

Because your vote is advisory, it will not be binding on our Compensation Committee or our Board of Directors. However, the Compensation Committee and the Board will review the voting results and take them into consideration when making future decisions regarding how frequently it should present the advisory vote on the compensation of our named executive officers to our stockholders.

The Board of Directors believes a biennial frequency (i.e., every two years) is the optimal frequency for the say-on-pay vote. A say-on-pay vote every two years strikes the right balance between having the vote too frequently with an annual vote and being less responsive to stockholders with a vote every third year. A vote every two years provides stockholders and advisory firms the opportunity to evaluate the Company's compensation program on a more thorough, longer-term basis than an annual vote.

The Board believes an annual say-on-pay vote would not allow for changes to the Company's compensation program to be in place long enough to evaluate whether the changes were effective. For example, if the say-on-pay vote in May 2013 led to changes to the compensation program being made in January 2014, at the beginning of the next fiscal year, those changes would be in place only a few months before the next annual say-on-pay vote would take place in May 2014. For a related example, even if changes were made to the compensation program shortly after a say-on-pay vote in May 2013, those changes would be in place only for the last half of fiscal 2013 and the first few months of fiscal 2014 before the next annual say-on-pay vote would take place in May 2014.

Conversely, waiting for a say-on-pay vote once every three years may allow an unpopular pay practice to continue too long without timely feedback. A say-on-pay vote every two years is also sensitive to stockholders who have interests in many companies and may not be able to devote sufficient time to an annual review of pay practices for all of their holdings.

Required Vote

The proxy card provides stockholders with the opportunity to choose among four options (holding the vote every one, two or three years, or abstaining) and, therefore, stockholders will not be voting to approve or disapprove the Board's recommendation. The affirmative vote of a majority of the shares voted for this proposal — every year, every two years or every three years —will be the frequency approved, on an advisory basis, by our stockholders. However, because the vote on the frequency of holding future advisory votes on the compensation of our named executive officers is not binding, if none of the frequency options receives a majority vote, the option receiving the greatest number of votes will be considered the frequency preferred by our stockholders.

43

Table of Contents

Recommendation

THE BOARD OF DIRECTORS RECOMMENDS A VOTE TO APPROVE, ON AN ADVISORY BASIS, THE FREQUENCY OF HOLDING A VOTE ON THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS EVERY TWO YEARS, AND PROXIES SOLICITED BY THE BOARD WILL BE VOTED IN FAVOR OF SUCH FREQUENCY UNLESS A STOCKHOLDER INDICATES OTHERWISE ON THE PROXY CARD.

44

Table of Contents

PROPOSAL TO BE VOTED UPON BY HOLDERS OF PREFERRED STOCK

PROPOSAL 1: ELECTION OF CLASS 1 DIRECTOR

General

Pursuant to the terms of the Company's Certificate of the Powers, Designations, Preferences and Rights of the 6% Convertible Exchangeable Preferred Stock (the "Certificate"), holders of the Preferred Stock are entitled to receive, when, as and if declared by the Board of Directors, out of the funds of the Company legally available therefor, cash dividends payable in equal quarterly installments on February 1, May 1, August 1 and November 1. The Certificate further provides that, if the Company is in arrears in an aggregate amount equal to at least six quarterly dividends (whether or not consecutive), the number of members of the Company's Board of Directors will be increased by two, effective as of the time of election of such directors, and the holders of Preferred Stock, voting separately as a class, will have the right to vote and elect such two additional directors. This right accrued to the holders of our Preferred Stock as of August 2, 2010. The Company is still in arrears in an aggregate amount in excess of six quarterly dividends on the Preferred Stock.

Mr. Gregory T. Hradsky has been serving as a Class 1 director since the Company's 2011 annual meeting. We have not received any other nominations for director by the holders of the Preferred Stock. If elected, Mr. Hradsky would continue to serve as a Class 1 director until the earlier of (a) the

2016 annual meeting and his successor is duly elected and qualified, and (b) such time as all accrued and unpaid dividends on the Preferred Stock have been declared and paid or set apart for payment.

Unless authority to vote for the nominee named above is withheld, the shares of Preferred Stock represented by the enclosed proxy will be voted FOR the re-election as Class 1 director of Gregory T. Hradsky.

Required Vote

A plurality of the votes cast by the holders of our Preferred Stock at the annual meeting is required to elect the nominee as a director.

Recommendation

THE BOARD OF DIRECTORS DOES NOT MAKE A RECOMMENDATION IN FAVOR OF OR AGAINST THE ELECTION OF GREGORY T. HRADSKY AS A CLASS 1 DIRECTOR.

45

Table of Contents

CODE OF CONDUCT AND ETHICS

We have adopted a code of conduct and ethics that applies to all of our employees, including our chief executive officer and chief financial and accounting officers. The text of the code of conduct and ethics is posted on our website at www.cyclacel.com, is filed as an exhibit to our Annual Report on Form 10-K, and will be made available to stockholders without charge, upon request, in writing to the Corporate Secretary at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922, Attention: Paul McBarron, Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary. Disclosure regarding any amendments to, or waivers from, provisions of the code of conduct and ethics that apply to our directors, principal executive and financial officers will be included in a Current Report on Form 8-K within four business days following the date of the amendment or waiver, unless website posting of such amendments or waivers is then permitted by the rules of NASDAQ.

OTHER MATTERS

The Board of Directors knows of no other business which will be presented to the annual meeting, and the Company's Amended and Restated Bylaws, as amended, provide that only such business shall be conducted at the annual meeting of stockholders as shall have been brought before the meeting pursuant to the Company's notice of meeting. If any other business is properly brought before the annual meeting, proxies in the enclosed form will be voted in accordance with the judgment of the persons voting the proxies.

STOCKHOLDER PROPOSALS AND NOMINATIONS FOR DIRECTOR

To be considered for inclusion in the proxy statement relating to our 2014 Annual Meeting of Stockholders, we must receive stockholder proposals (other than for director nominations) by no later than December 5, 2013. To be considered for presentation at the 2014 Annual Meeting of Stockholders, although not included in the proxy statement, proposals (including director nominations that are not requested to be included in our proxy statement) must be received no earlier than January 18, 2014 and no later than February 19, 2014. Proposals that are not received in a timely manner will not be presented or voted on at the 2014 Annual Meeting of Stockholders. If a proposal is received on time, the proxies that management solicits for the meeting may still exercise discretionary voting authority on the proposal under circumstances consistent with the proxy rules of the SEC. All stockholder proposals should be marked for the attention of Secretary, Cyclacel Pharmaceuticals, Inc., 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922.

Berkeley Heights, New Jersey April 3, 2013

Our Annual Report on Form 10-K for the fiscal year ended December 31, 2012, as amended (other than exhibits thereto), filed with the SEC, which provides additional information about us, is available on the Internet at www.cyclacel.com and is available in paper form to beneficial owners of our stock without charge upon written request to 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey 07922, Attention: Paul McBarron, Executive Vice President—Finance, Chief Financial Officer, Chief Operating Officer and Secretary.

CYCLACEL PHARMACEUTICALS INC. 200 CONNELL DRIVE **SUITE 1500** BERKELEY HEIGHTS, NJ 07922

VOTE BY INTERNET - www.proxyvote.com
Use the Internet to transmit your voting instructions and for electronic delivery of information up until 11:59 P.M. Eastern Time the day before the cut-off date or meeting date. Have your pray card in hand when you access the web site and follow the instructions to obtain your records and to create an electronic voting instruction form.

ELECTRONIC DELIVERY OF FUTURE PROXY MATERIALS

If you would like to reduce the costs incurred by our company in mailing proxy materials, you can consent to receiving all future proxy statements, proxy cards and annual reports electronically via e-mail or the Internet. To sign up for electronic delivery, please follow the instructions above to vote using the Internet and, when prompted, indicate that you agree to receive or access proxy materials electronically in future years.

VOTE BY PHONE - 1-800-690-6903

Use any touch-tone telephone to transmit your voting instructions up until 11:59 PM. Eastern Time the day before the cut-off date or meeting date. Have your proxy card in hand when you call and then follow the instructions.

VOTE BY MAIL

Mark, sign and date your proxy card and return it in the postage-paid envelope we have provided or return it to Vote Processing, o'o Broadridge, 51 Mercedes Way, Edgewood, NY 11717.

| CLACEL PHARMACEUTICALS INC. | For 1 | Withhold | | To withhold authority to vote for any individual | | | | |
|---|-------------|-------------|-------------|---|---------|---------|---------|---------|
| The Board of Directors recommends you vote FOR the following: | All | All | Except | nominee(s), mark "For All Except" and write the number(s) of the nominee(s) on the line below. | | | - | \neg |
| Election of Director | 0 | 0 | 0 | | | | | |
| Nominee | | | | | | | | |
| O1) Sir John Banham | | | | | | | | |
| The Board of Directors recommends you vote FOR propo | osals 2 an | d 3: | | | | For A | Against | Abstair |
| Ratify the appointment of Ernst & Young LLP as the Opening St. 2013 | Company's | s indepen | dent regis | stered public accounting firm for the fiscal year ending | | 0 | 0 | 0 |
| Approve the compensation of named executive officers | as disclose | ed in the F | Proxy State | ement | | 0 | 0 | 0 |
| The Board of Directors recommends you vote 2 years on | n the follo | weing ne | onosal: | | 3 Vears | 2 Years | 1 Veor | Abstai |
| The board of birectors recommends you vote 2 years or | r die rolle | ming pro | aprosin. | | 3 10013 | 21000 | | Austin |
| The frequency of future stockholder advisory votes rega | arding com | pensation | awarded | to named executive officers | 0 | 0 | 0 | 0 |
| NOTE: The Company will transact any other business that or postponement thereof. Please sign exactly as your name(s) appear(s) hereon. Whattorney, executor, administrator, or other fiduciary, please gr | | | presente | d before the annual meeting or at any adjournment | | | | |

Important Notice Regarding the Availability of Proxy Materials for the Annual Meeting:

The Notice and Proxy Statement and Form 10-K are available at www.proxyvote.com.

M54520-P35893

CYCLACEL PHARMACEUTICALS, INC.
This proxy is solicited by the Board of Directors
Annual Meeting of Stockholders
May 22, 2013

The stockholder(s) hereby appoint(s) each of Spiro Rombotis and Paul McBarron, severally and not jointly, as proxies, each with the power to appoint his substitute, and hereby authorize(s) each of them to represent and to vote, as designated on the reverse side of this ballot, all of the shares of Common Stock of Cyclacel Pharmaceuticals, Inc. that the stockholder(s) is/are entitled to vote at the Annual Meeting of Stockholders to be held at 10:00 A.M. Eastern Time on May 22, 2013, at the company's headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey, 07922, and any adjournment or postponement thereof.

THIS PROXY, WHEN PROPERLY EXECUTED, WILL BE VOTED AS DIRECTED BY THE STOCKHOLDER(5). IF NO SUCH DIRECTIONS ARE MADE, THIS PROXY WILL BE VOTED FOR THE ELECTION OF THE NOMINEE LISTED ON THE REVERSE SIDE FOR THE BOARD OF DIRECTORS AND FOR PROPOSALS 2 AND 3 AND EVERY 2 YEARS FOR PROPOSAL 4. PLEASE MARK, SIGN, DATE AND RETURN THIS PROXY CARD PROMPTLY USING THE ENCLOSED REPLY ENVELOPE.

Continued and to be signed on reverse side

CYCLACEL PHARMACEUTICALS INC. 200 CONNELL DRIVE **SUITE 1500** BERKELEY HEIGHTS, NJ 07922

VOTE BY INTERNET - www.proxyvote.com
Use the Internet to transmit your voting instructions and for electronic delivery of information up until 11:59 P.M. Eastern Time the day before the cut-off date or meeting date. Have your pray card in hand when you access the web site and follow the instructions to obtain your records and to create an electronic voting instruction form.

ELECTRONIC DELIVERY OF FUTURE PROXY MATERIALS

If you would like to reduce the costs incurred by our company in mailing proxy materials, you can consent to receiving all future proxy statements, proxy cards and annual reports electronically via e-mail or the Internet. To sign up for electronic delivery, please follow the instructions above to vote using the Internet and, when prompted, indicate that you agree to receive or access proxy materials electronically in future years.

VOTE BY PHONE - 1-800-690-6903

Use any touch-tone telephone to transmit your voting instructions up until 11:59 PM. Eastern Time the day before the cut-off date or meeting date. Have your proxy card in hand when you call and then follow the instructions.

VOTE BY MAIL

Mark, sign and date your proxy card and return it in the postage-paid envelope we have provided or return it to Vote Processing, c/o Broadridge, 51 Mercedes Way, Edgewood, NY 11717.

| TE, MARK BLOCKS BELOW IN BLUE OR B | LACK INK AS FOLLOWS: | | | M54521-P35893 | KEEP THIS PORTION FOR YOUR F |
|---|---|-----------------------|-------------------------|--|--|
| | THIS PROXY CA | ARD IS V | ALID OF | ILY WHEN SIGNED AND DATED. | DETACH AND RETURN THIS PORTI |
| LACEL PHARMACEUTICALS INC. | | | | | |
| | | | | | |
| he Board of Directors does not h | have a recommendatio | n for vo | ting on | the following: | |
| Election of Director | | | | | |
| Nominee | For | Against | Abstain | | |
| Gregory T. Hradsky | 0 | 0 | 0 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| OTF TO A STATE OF THE STATE OF | | | | and in the single-second and best in the third | and the state of t |
| natters properly come before the me | seting, the persons name | ecuted, v | proxy wil | ted in the manner directed herein by the I vote in his discretion. | undersigned stockholder(s). If any off |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Please sign exactly as your name(s) a | ppear(s) hereon. When : | signing a | s attorne | y, executor, administrator, or other fidu | iciary, please give full title as such . Jo |
| Please sign exactly as your name(s) a wners should each sign personally | ippear(s) hereon. When s All holders must sign. If a | signing a corporat | s attorne tion or pa | y, executor, administrator, or other fidu rtnership, please sign in full corporate or | iciary, please give full title as such. Jo partnership name by authorized office |
| Please sign exactly as your name(s) a wwners should each sign personally . | ippear(s) hereon. When s All holders must sign. If a | signing a corporal | s attorne tion or pa | y, executor, administrator, or other fidu rtnership, please sign in full corporate or | iciary, please give full title as such. Joi partnership name by authorized of fice |

| Important Notice Regarding the Availability of Proxy Materials for the Annual Med The Notice and Proxy Statement and Form 10-K are available at www.proxyvote.com | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |

M54522-F35893

CYCLACEL PHARMACEUTICALS, INC. THIS PROXY IS SOLICITED ON BEHALF OF THE BOARD OF DIRECTORS ANNUAL MEETING OF STOCKHOLDERS May 22, 2013

The stockholder(s) hereby appoint(s) each of Spiro Rombotis and Paul McBarron, severally and not jointly, as proxies, each with the power to appoint his substitute, and hereby authorize(s) each of them to represent and to vote, as designated on the reverse side of this ballot, all of the shares of Common Stock of Cyclacel Pharmaceuticals, Inc. that the stockholder(s) is/are entitled to vote at the Annual Meeting of Stockholders to be held at 10:00 A.M. Eastern Time on May 22, 2013, at the company's headquarters at 200 Connell Drive, Suite 1500, Berkeley Heights, New Jersey, 07922, and any adjournment or postponement thereof.

THIS PROXY, WHEN PROPERLY EXECUTED, WILL BE VOTED AS DIRECTED BY THE STOCKHOLDER(S). PLEASE MARK, SIGN, DATE AND RETURN THIS PROXY CARD PROMPTLY USING THE ENCLOSED REPLY ENVELOPE.

Continued and to be signed on reverse side