

SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

SCHEDULE 13G  
(Rule 13d-102)

INFORMATION TO BE INCLUDED IN STATEMENTS FILED PURSUANT TO  
RULES 13d-1(b)(c), AND (d) AND AMENDMENTS THERETO FILED PURSUANT TO RULE  
13d-2(b)  
(Amendment No 1)1

MacroPore Biosurgery, Inc.

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(Name of Issuer)

Common Stock, \$.001 par value

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(Title of Class of Securities)

U55396 10 2

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(CUSIP Number)

February 15, 2005

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(Date of Event Which Requires Filing of this Statement)

Check appropriate box to designate the rule pursuant to which this Schedule is filed:

Rule 13d-1(b)

Rule 13d-1(c)

Rule 13d-1(d)

1The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

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CUSIP NO. U55396 10 2

Page 2 of 7 Pages

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1 NAME OF REPORTING PERSON  
S.S. or I.R.S. IDENTIFICATION NO. OF ABOVE  
PERSON (ENTITIES ONLY)

Neil Gagnon

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2 CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP\*  
(a)   
(b)

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3 SEC USE ONLY

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4 CITIZENSHIP OR PLACE OF ORGANIZATION

United States of America

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5 SOLE VOTING POWER

422,779

NUMBER OF  
SHARES  
BENEFICIALLY  
OWNED BY  
EACH  
REPORTING  
PERSON  
WITH

6 SHARED VOTING POWER

197,285

7 SOLE DISPOSITIVE POWER

375,775

8 SHARED DISPOSITIVE POWER

1,196,426

9 AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH  
REPORTING PERSON

1,572,201

10 CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES  
CERTAIN SHARES\* [ ]

11 PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9

11.3%

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12 TYPE OF REPORTING PERSON\*

IN  
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\*SEE INSTRUCTION BEFORE FILLING OUT!

Item 1(a) Name of Issuer:

MacroPore Biosurgery, Inc.

Item 1(b) Address of Issuer's Principal Executive Offices:

6740 Top Gun Street  
San Diego, CA 92121

Item 2(a) Name of Person Filing:

Neil Gagnon

Item 2(b) Address of Principal Business Office or, if none, Residence:

1370 Avenue of the Americas  
Suite 2002  
New York, NY 10019

Item 2(c) Citizenship:

United States of America

Item 2(d) Title of Class of Securities:

Common Shares, par value \$.001 per share

Item 2(e) CUSIP Number:

U55396 10 2

Item 3 Type of Reporting Person:

Not Applicable

Item 4 Ownership.

Item 4(a) Amount Beneficially Owned:

As of February 15, 2005, Neil Gagnon beneficially owned 1,572,201 shares of Common Stock of MacroPore Biosurgery, Inc., which amount includes (i) 111,015 shares beneficially owned by Mr. Gagnon over which he has sole voting and sole dispositive power; (ii) 43,829 shares beneficially owned by Mr. Gagnon over which he has sole voting and shared dispositive power; (iii) 70,850 shares beneficially owned by Lois Gagnon, Mr. Gagnon's wife, over which he has shared

voting and shared dispositive power; (iv) 2,195 shares held by Mr. Gagnon and Mrs. Gagnon as Joint Tenants with Rights of Survivorship, over which he has shared voting and shared dispositive power; (v) 85,590 shares held by the Lois E. and Neil E. Gagnon Foundation (the "Foundation") (of which Mr. Gagnon is a trustee) over which Mr. Gagnon has shared voting and shared dispositive power; (vi) 38,650 shares held by the Gagnon Family Limited Partnership (the "Partnership") (of which Mr. Gagnon is a partner) over which Mr. Gagnon has shared voting and shared dispositive power; (vii) 63,260 shares held by the Gagnon Grandchildren Trust (the "Trust") over which Mr. Gagnon has shared dispositive but no voting power; (viii) 261,345 shares held by a hedge fund (of which Mr. Gagnon is the principal) over which Mr. Gagnon has sole voting and sole dispositive power; (ix) 3,415 shares held by the Gagnon Securities LLC P/S Plan (the "Plan") (of which Mr. Gagnon is a trustee) over which Mr. Gagnon has sole voting and sole dispositive power; (ix) 3,175 shares held by the Plan over which Mr. Gagnon has sole voting and shared dispositive power; and (x) 888,877 shares held for certain customers of Gagnon Securities LLC (of which Mr. Gagnon is the Managing Member and the principal owner) over which shares Mr. Gagnon has shared dispositive but no voting power.

Item 4(b) Percent of Class:

11.3% beneficially owned by Mr. Gagnon. Calculation of percentage of beneficial ownership is based on 13,927,184 shares of Issuer's Common Stock outstanding as of October 25, 2004 as reported by the Issuer in its Quarterly Report on Form 10-Q for the period ended September 30, 2004.

Item 4(c) Number of shares as to which such person has:

- (i) sole power to vote or to direct the vote: 422,779
- (ii) shared power to vote or to direct the vote: 197,285
- (iii) sole power to dispose or to direct the disposition of: 375,775
- (iv) shared power to dispose or to direct the disposition of: 1,196,426

Items 5-9. Not applicable.

Filing of this statement by the Reporting Person shall not be deemed an admission that he beneficially owns the securities reported herein as held in customer accounts at Gagnon Securities LLC, by the Foundation, the Partnership, the Trust or the Plan. Mr. Gagnon expressly disclaims beneficial ownership of all securities held in such customer accounts or by the Foundation, the Partnership, the Trust or the Plan. No single client's interest as reported in the customer accounts at Gagnon Securities LLC exceeds 5% of the outstanding Common Stock.

Item 10 Certification.

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

March 2, 2005

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Date

/s/ Neil Gagnon

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Neil Gagnon