

RECORDATION FORM COVER SHEET
PATENT APPLICATIONS & PATENTS ONLY

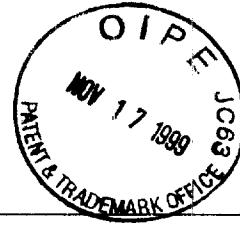


101205179

TO THE ASSISTANT COMMISSIONER OF PATENTS AND TRADEMARKS:
SIR: PLEASE RECORD THE ATTACHED ORIGINAL DOCUMENTS OR COPY THEREOF.

1. NAME OF CONVEYING PARTY(IES) (ASSIGNORS(S)):

- 1. Allan C. Spradling
- 2. Ting Xie
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.



ADDITIONAL NAME(S) OF CONVEYING PARTY(IES) ATTACHED? YES NO

2. PARTY(IES) (ASSIGNEE(S)) RECEIVING INTEREST:

NAME: Howard Hughes Medical Institute

ADDRESS: 4000 Jones Bridge Road, Chevy Chase, Maryland 20815

ADDITIONAL NAME(S) & ADDRESS(ES) ATTACHED? YES NO

3. NATURE OF CONVEYANCE (DOCUMENT):

(Submit herewith only one document for recordation—multiple copies of same Assignment signed by different inventors is one document)

- ASSIGNMENT OF WHOLE PART INTEREST
- ORIGINAL FACSIMILE/PHOTOCOPY
- CHANGE OF NAME ACCURATE TRANSLATION
- SECURITY MERGER OTHER:

EXEC. DATE: September 24, 1999

EXECUTION DATE(S) ON THE DECLARATION IF FILED HEREWITH: (**NOTE:** IF DATES ON DECLARATION AND ASSIGNMENT DIFFER SEE ATTY!)

4.5 APPL. NO.(S) OR PAT NO.(S). OTHERS ON ADDITIONAL SHEET(S) attached? YES NO

A. PAT. APP. NO.(S) series code/serial no	M#	1 st INVENTOR if not in item 1	B. PATENT NO(S)	M#	1 st INVENTOR if not in item 1
09/358.937	254812				

5. Name & Address of Party to Whom Correspondence Concerning Document Should be Mailed:

Pillsbury Madison & Sutro LLP
Intellectual Property Group
1100 NEW YORK AVENUE, N.W.
NINTH FLOOR, EAST TOWER
WASHINGTON, D.C. 20005-3918

6. NUMBER INVOLVED:
APPLNS 1 + PATS _____ = TOTAL 1

7. AMOUNT OF FEE ENCLOSED: (Code 581)
ABOVE TOTAL x \$40 = \$40

5.5 ATTY DKT:

PMS 254812	
MATTER NO.	CLIENT REF.

8. IF ABOVE FEE IS MISSING OR INADEQUATE CHARGE INSUFFICIENCY TO DEPOSIT ACCOUNT NUMBER: 03-3975

UNDER ORDER NO	20263	254812
dup. sheet not required	CLIENT NO.	MATTER NO.

9. STATEMENT AND SIGNATURE.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Gary R. Tanigawa
Signature

10. Total number of pages including this cover sheet, attachments and document (do not file dup. Cover sheet)	3
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Attorney: Gary R. Tanigawa
Reg. No. 43180
Atty/Sec: GRT/maf TEL: (202) 861-3546

Date: November 17, 1999
FAX: (202) 822-0944

FILE WITH PTO RETURN RECEIPT (PAT-103A)

RECORDATION FORM COVER SHEET
PATENT APPLICATIONS & PATENTS ONLY

TO THE ASSISTANT COMMISSIONER OF PATENTS AND TRADEMARKS:
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1. NAME OF CONVEYING PARTY(IES) (ASSIGNORS(S)):

- 1. Howard Hughes Medical Institute
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

ADDITIONAL NAME(S) OF CONVEYING PARTY(IES) ATTACHED? YES NO

2. PARTY(IES) (ASSIGNEE(S)) RECEIVING INTEREST:

NAME: Carnegie Institution of Washington

ADDRESS: 1530 P Street, N.W., Washington, D.C. 20005

ADDITIONAL NAME(S) & ADDRESS(ES) ATTACHED? YES NO

3. NATURE OF CONVEYANCE (DOCUMENT):

(Submit herewith only one document for recordation—multiple copies of same Assignment signed by different inventors is one document)

- ASSIGNMENT OF
- WHOLE
- PART INTEREST
- ORIGINAL
- FACSIMILE/PHOTOCOPY
- CHANGE OF NAME
- ACCURATE TRANSLATION
- SECURITY
- MERGER
- OTHER:

EXEC. DATE: October 8, 1999

EXECUTION DATE(S) ON THE DECLARATION IF FILED HEREWITH: (**NOTE:** IF DATES ON DECLARATION AND ASSIGNMENT DIFFER SEE ATTY!)

4.5 APPL. NO.(S) OR PAT NO.(S). OTHERS ON ADDITIONAL SHEET(S) attached? YES NO

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dup. sheet not required	CLIENT NO.	MATTER NO.

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Gary Tanigawa
Signature

Attorney: Gary R. Tanigawa

Reg. No. 43180

Atty/Sec: GRT/maf

TEL: (202) 861-3546

Date: November 17, 1999

FAX: (202) 822-0944

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FILE WITH PTO RETURN RECEIPT (PAT-103A)

11/19/1999 MSHIFERA 00000047 09358937

08 FC:581

40.00 DP

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1. Howard Hughes Medical Institute

- | | |
|----|----|
| 3. | 2. |
| 5. | 4. |
| 7. | 6. |
| | 8. |

ADDITIONAL NAME(S) OF CONVEYING PARTY(IES) ATTACHED? YES NO

2. PARTY(IES) (ASSIGNEE(S)) RECEIVING INTEREST:

NAME: Allan C. Spradling

ADDRESS: Dept. of Embryology, 115 W. University Parkway, Baltimore, MD 21210

ADDITIONAL NAME(S) & ADDRESS(ES) ATTACHED? YES NO

3. NATURE OF CONVEYANCE (DOCUMENT):

(Submit herewith only one document for recordation—multiple copies of same Assignment signed by different inventors is one document)

- | | | |
|---|--|--|
| <input type="checkbox"/> ASSIGNMENT OF | <input type="checkbox"/> WHOLE | <input type="checkbox"/> PART INTEREST |
| <input type="checkbox"/> ORIGINAL | <input type="checkbox"/> FACSIMILE/PHOTOCOPY | |
| <input type="checkbox"/> CHANGE OF NAME | <input type="checkbox"/> ACCURATE TRANSLATION | |
| <input type="checkbox"/> SECURITY | <input checked="" type="checkbox"/> Appointment of Investigator As Agent | |

EXEC. DATE: September 21, 1999



EXECUTION DATE(S) ON THE DECLARATION IF FILED HEREWITH: (**NOTE:** IF DATES ON DECLARATION AND ASSIGNMENT DIFFER SEE ATTY!)

4.5 APPL. NO.(S) OR PAT NO.(S). OTHERS ON ADDITIONAL SHEET(S) attached? YES NO

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UNDER ORDER NO 20263 254812

MATTER NO.

CLIENT REF.

dup. sheet not required

CLIENT NO.

MATTER NO.

9. STATEMENT AND SIGNATURE.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Gary Tanigawa

Signature

10 Total number of pages including this cover sheet, attachments and document (do not file dup. Cover sheet)

2

Attorney: Gary P. Tanigawa

Reg. No. 43180

Date: November 17, 1999

Atty/Sec: GRT/maf

TEL: (202) 861-3546

FAX: (202) 822-0944

FILE WITH PTO RETURN RECEIPT (PAT-103A)

11/19/1999 MSHIFERA 00000047 09358937

07 FC:581

40.00 DP

ASSIGNMENT

Assignment made ^{Sept 24} ~~x~~ _____, 1999, by Dr. Allan C. Spradling and Dr. Ting Xie (jointly referred to herein as "Inventors") to the Howard Hughes Medical Institute, a Delaware corporation (the "Institute").

Recitals

WHEREAS, Inventors are employees of the Institute and, as a condition of their employment, have signed the Agreement appended to the Institute's Policy on Intellectual Property (the "Intellectual Property Agreement");

WHEREAS, pursuant to the Intellectual Property Agreement, the Inventors have agreed (a) to assign to the Institute all rights they may acquire in any invention, discovery, improvements, or other intellectual property, whether or not patentable or copyrightable, developed directly or indirectly as a result of a program of research financed by Institute funds or by funds under the control of the Institute and (b) to execute any agreements that may be desired by the Institute in connection with such assignment;

WHEREAS, the Inventors have invented "Method for Maintenance and Propagation of Germline Stem Cells Using Members of the TGF-B Family of Growth Factors" as disclosed in U.S. Appln. No. 09/358,937 and International Appln. No. PCT/US99/16633, both filed on July 23, 1999, said invention being hereafter referred to as "The Invention";

WHEREAS, said Inventors seek to make a formal assignment of their interest in The Invention to the Institute, and the Institute desires the execution of a formal assignment of all of the Inventors' right, title, and interest in The Invention.

NOW, THEREFORE, in consideration of the promises contained in and the acts performed and to be performed pursuant to the Intellectual Property Agreement and of other good and valuable consideration, the receipt of which is hereby acknowledged by the Inventors, the Inventors agree as follows:

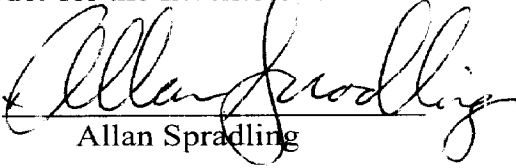
1. **Assignment**. Inventors hereby assign to the Institute their entire right, title, and interest in The Invention; any patent applications, including but not limited to, said United States and International patent applications and all corresponding foreign patent applications which are directed to The Invention and any and all patents issued therefrom; all United States or foreign continuation, division, reissue, and substitute applications based on any of the foregoing, and any and all patents issued therefrom, together with the right of priority under the International Convention for the Protection of Industrial Property, Inter-American Convention Relating to Patents, Designs and Industrial Models, and any other international agreements to which the United States of America adheres; and all claims which are directed to The Invention and which may be contained in continuation in-part applications or in patents which issue therefrom.

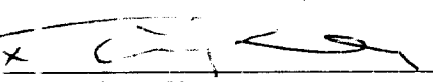
2. **Cooperation**. Inventors agree to execute upon request such further assignments, documents, and other instruments as may be necessary or desirable to assign Inventors' entire right, title and interests in The Invention to the Institute and to assist the Institute (or others at the direction of the Institute) in applying for, obtaining, and enforcing

patents, copyrights, or other rights in the United States and in any foreign country with respect to The Invention.

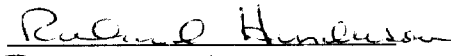
3. **Parties.** The terms and provisions of this Assignment shall inure to the benefit of the Institute and its successors and assigns and shall be binding on Inventors and their heirs, personal representatives and assigns.

4. **Warranty.** Inventors warrant and represent that they have not entered into any assignment, contract, or understanding in conflict herewith, and that there is no other person or entity whose consent is required in order for the Inventors to make the assignment contained herein.

Inventor: 
Allan Spradling

Inventor: 
Ting Xie

There personally appeared before me the above-named inventors and acknowledged that they executed the foregoing instrument as their free act and deed this 24 day of September, 1999.

Notary Public: 
(printed name) Richard Henderson

My Commission expires 6/19/2001

(Seal)

ASSIGNMENT

WHEREAS, Howard Hughes Medical Institute ("Institute") is the owner of the entire right, title and interest in and to an invention entitled "Method for Maintenance and Propagation of Germline Stem Cells Using Members of the TGF-B Family of Growth Factors" as disclosed in U.S. Appln. No. 09/358,937 and International Appln. No. PCT/US99/16633, both filed on July 23, 1999, and to any and all U.S. and foreign patent applications and patents based thereon; and

WHEREAS, the Carnegie Institution of Washington ("Carnegie"), a non-profit corporation duly organized and existing under the laws of the District of Columbia and having its principal office and place of business at 1530 P Street, N.W., Washington, D.C. 20005, is desirous of obtaining all of the Institute's rights in and to said invention and patent applications and patents based thereon;

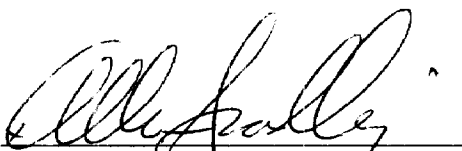
NOW, THEREFORE, in consideration of Ten Dollars (\$10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Institute does hereby sell, assign and transfer unto Carnegie, its successors, assigns and legal representatives, the full and exclusive right, title and interest, in the United States and all foreign countries, to each invention as described in the aforesaid provisional application, and to the said application and to all subsequent U.S. and foreign applications based thereon including any and all continuations, divisions, reissues and substitutes of such subsequent applications, together with the right of priority under the International Convention for the Protection of Industrial Property, Inter-American Convention Relating to Patents, Designs and Industrial Models, and any other international agreements to which the United States of America adheres.

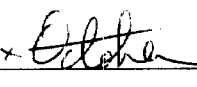
And Institute hereby agrees to execute any papers requested by Carnegie, its successors, assigns and legal representatives, deemed essential to Carnegie's full protection and title in and to each invention hereby transferred.

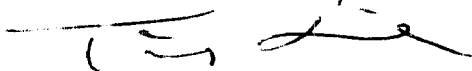
Institute furthermore agrees upon request of said Carnegie, and without further remuneration, to execute any and all papers desired by said Carnegie for the filing and granting of the aforesaid subsequent U.S. and of foreign applications and the perfecting of title thereto in said Carnegie.

Executed by the undersigned authorized agent for Institute on the date here indicated.

HOWARD HUGHES MEDICAL INSTITUTE

By 
Dr. Allan Spradling
Authorized Agent

Date:  28, 1999



APPOINTMENT OF INVESTIGATOR AS AGENT

Appointment by the Howard Hughes Medical Institute ("Institute") of Dr. Allan C. Spradling, as investigator employed by the Institute, as its agent for the purpose of assigning certain rights to the Carnegie Institution of Washington ("Carnegie").

WHEREAS, the Institute and Carnegie collaborate in the active conduct of medical research pursuant to a Collaboration Agreement between them dated as of July 5, 1988, and revised as of July 12, 1995 (the "Collaboration Agreement");

WHEREAS, pursuant to the Collaboration Agreement, the Institute has agreed to assign to Carnegie the Institute's rights with respect to inventions, discoveries, improvements, and other intellectual property, whether patentable or copyrightable (each a "Subject Property"), conceived or reduced to practice in the course of the research program conducted under the Collaboration Agreement by employees of the Institute;

WHEREAS, research conducted pursuant to the Collaboration Agreement by Dr. Spradling and by Dr. Ting Xie, while employed by the Institute at Carnegie, has resulted in the invention of certain Subject Property entitled "Method for Maintenance and Propagation of Germline Stem Cells Using Members of the TGF-β Family of Growth Factors" as described in U.S. Appln. No. 09/358,937 and International Appln. No. PCT/US99/16633, both filed on July 23, 1999; and

WHEREAS, the Institute wishes Dr. Spradling to act as its agent for the purpose of assigning to Carnegie all of the rights the Institute has in the Subject Property by reason of the research program conducted at Carnegie;

NOW, THEREFORE, the Institute hereby appoints Dr. Allan C. Spradling as its agent for the purpose of assigning the rights the Institute has in the Subject Property to Carnegie by reason of the research program conducted at Carnegie in accordance with and subject to the conditions of the Collaboration Agreement.

Executed: x Spradling 21, 1999

HOWARD HUGHES MEDICAL INSTITUTE

By x [Signature]
W. Maxwell Cowan, M.D., Ph.D.
Vice President and Chief Scientific Officer

ATTESTED:

x [Signature]
Joan S. Leonard, Esq.
Vice President and General Counsel and Secretary