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PATENT ASSIGNMENT COVER SHEET

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
HA-SOON CHOI	04/15/2015
JAMES PAUL LAJINESS	04/15/2015
BAO NGOC NGUYEN	04/15/2015
HANK MICHAEL JAMES PETRASSI	04/16/2015
ZHICHENG WANG	04/15/2015
SRINIVASA REDDY NATALA	03/17/2015

RECEIVING PARTY DATA

Name:	NOVARTIS INSTITUTE FOR FUNCTIONAL GENOMICS, INC. DBA THE GENOMICS INSTITUTE OF THE NOVARTIS RESEARCH FOUNDATION (GNF)	
Street Address:	10675 JOHNS JAY HOPKINS DR.	
City:	SAN DIEGO	
State/Country:	CALIFORNIA	
Postal Code:	92121	

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16203122

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

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Email:	amoten@gnf.org	
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Address Line 1:	10675 JOHNS JAY HOPKINS DR.	
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ATTORNEY DOCKET NUMBER: PAT055940-US-DIV02	
NAME OF SUBMITTER:	ALICIA R. MOTEN
SIGNATURE:	/Alicia R. Moten/
DATE SIGNED:	06/26/2019

Total Attachments: 13

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ASSIGNMENT

This Assignment Agreement is entered into by and between

Ha-Soon CHOI	Citizen of South Korea	Novartis Institute for Functional Genomics, Inc. dba Genomics Institute of the Novartis Research Foundation (GNF) 10675 John Jay Hopkins Drive San Diego, California 92121 US
James Paul LAJINESS	Citizen of United States of America	dba Genomics Institute of the Novartis Research Foundation (GNF) 10675 John Jay Hopkins Drive San Diego, California 92121 US
Bao Ngoc NGUYEN	Citizen of United States of America	Novartis Institute for Functional Genomics, Inc. dba Genomics Institute of the Novartis Research Foundation (GNF) 10675 John Jay Hopkins Drive San Diego, California 92121 US
Hank Michael James PETRASSI	citizen of United States of America	Novartis Institute for Functional Genomics, Inc. dba Genomics Institute of the Novartis Research Foundation (GNF) 10675 John Jay Hopkins Drive San Diego, California 92121 US
Zhicheng WANG	Citizen of China	Novartis Institute for Functional Genomics, Inc. dba Genomics Institute of the Novartis Research Foundation (GNF) 10675 John Jay Hopkins Drive San Diego, California 92121 US

(hereinafter "Inventor(s)"), and the **NOVARTIS INSTITUTE FOR FUNCTIONAL GENOMICS, INC.**, dba the GENOMICS INSTITUTE OF THE NOVARTIS RESEARCH FOUNDATION (GNF), 10675 John Jay Hopkins Drive, San Diego, California 92121, USA, a company organized under the laws of the State of Delaware.

For good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, I/We the Inventor(s) do hereby confirm and agree that, by operation of law and/or contract, and/or by the fulfillment of any and all legal requirements regarding the transfer of employee inventions in my/our country of employment, GNF is the true and lawful owner of all right, title and interest in all inventions, discoveries, patents/utility models, applications, and rights described in paragraphs (1) through (8) below.

If, however, under the laws of any country, I/We the Inventor(s) nevertheless have any ownership right, title or interest in any of the items described herein (which I/We do not believe to be the case and make no claim in or to), for good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, I/We the Inventor(s) do hereby sell, assign and

PATENT REEL: 049591 FRAME: 0003

transfer to GNF and its successors, assigns and legal representatives (hereinafter referred to collectively as the "ASSIGNEE"), all of our right, title and interest for all countries of the world in and to

(1) all of our inventions and discoveries described in the provisional or non-provisional patent, utility model, or other application(s) entitled

COMPOUNDS AND COMPOSITIONS FOR INDUCING CHONDROGENESIS [PAT055940]

and filed in the <u>to be determined</u> Office on <u>to be determined</u> and accorded Application Number <u>to be determined</u> and/or filed as a PCT International Application on <u>to be determined</u> and accorded International Patent Application Number PCT/<u>to be determined</u>; and/or filed in the United States Patent and Trademark Office on <u>May 13, 2014</u> and accorded Application Number <u>61/992815</u>;

(2) the application(s) identified in paragraph (1), and all applications claiming priority from such application(s), directly or indirectly, including all national stages of any international patent application(s);

(3) the right to file patent, utility model, or other applications on any invention or discovery disclosed in any of the applications identified in paragraphs (1) and (2), including the right to file such applications on said inventions and discoveries in the names of ASSIGNEE or their designees or in our/my name, at ASSIGNEE's election and in accordance with applicable law in all countries and regions; and the right to file all patent, utility model, or other applications in all countries and regions claiming the priority of any of the provisional or non-provisional application(s) identified in paragraphs (1) or (2);

(4) all rights to claim priority from any of the applications referred to in paragraphs (1), (2), and (3) or from any application from which any of the applications referred to in paragraphs (1), (2) and (3) claim priority in all countries and regions under the Paris Convention for the Protection of Industrial Property, the WTO GATT TRIPS Agreement, the Inter-American Convention relating to Inventions, Patents, Designs, and Industrial Models and all other international agreements to which the United States now is or hereafter becomes a signatory and, if the United States patent application is a provisional patent application, under 35 USC 119(e);

(5) all continuations, continuations-in-part, and divisionals of any United States patent application(s) or international patent application(s) designating the United States, any national stages of any international application(s), and any other patent application(s) described in paragraphs (1) through (4) hereof, including further continuations, continuations-in-part, and divisionals such as, but not limited to, continuations of continuations and continuations of divisionals;

(6) all patents, utility models, or other grants that issue from any of the applications referred to herein and all rights and remedies associated therewith including the right to sue for

PATENT REEL: 049591 FRAME: 0004 and recover past damages and to recover under 35 U.S.C. § 154 (d) or any other law permitting remedies for infringement prior to issuance of the patent;

(7) all registrations and confirmations of, and importation certificates based upon, one or more of said patents, utility models, or other grants, and applications for such registrations, confirmations and importation certificates and;

(8) all reissues, renewals and extensions of said patents, utility models, registrations, confirmations and importation certificates, reexamination certificates issued for said patents and supplementary protection certificates based upon said patents and applications for such reissues, renewals, extensions, reexamination certificates and supplementary protection certificates, the same to be held and enjoyed by said ASSIGNEE to the full ends of the terms for which said patents, utility models, registrations, confirmations, importation certificates, reexamination certificates, reissues, renewals and extensions may be granted, as fully and entirely as the same would have been held and enjoyed by me/us if this sale, assignment and transfer had not been made.

I/We the Inventor(s) hereby authorize ASSIGNEE and their representatives to insert in paragraph (1) of this Assignment the filing date(s) and Application Number(s) of said patent, utility model, or other application(s) when notified thereof.

I/We the Inventor(s) hereby covenant and agree that I/We will, at any time, (i) upon the request, but at the expense, of ASSIGNEE, execute and deliver all documents that may be necessary or desirable to perfect the title to the foregoing inventions and discoveries, applications, patents, utility models, registrations, confirmations, importation certificates, reissues, renewals, extensions, reexamination certificates, supplementary protection certificates, and applications within the scope of (7) and (8), in ASSIGNEE, including the execution and procurement of all further documents evidencing this sale, assignment and transfer as may be necessary or desirable for recording the same in the patent office or other intellectual property office, agency or the like of any country or region, (ii) upon the request, but at the expense, of ASSIGNEE execute all additional applications within the scope of paragraphs (1) through (6) and all applications within the scope of (7) or (8), and (iii) make all rightful oaths and declarations and do all lawful acts requisite for procuring the same or for aiding therein, without further compensation, but at the expense of ASSIGNEE .

Should any provision of this Assignment be deemed invalid or unenforceable by reason of any law, statute, regulation or judgment, existing now or in the future in any jurisdiction, such provision shall be modified in such jurisdiction so as to nearly approximate the intent of the Parties. If this cannot be done, such invalid or unenforceable provision shall be divisible and be deleted in any such jurisdiction, and all other provisions shall remain in full force and effect. The modification or deletion of any provision in one jurisdiction shall have no effect on this Assignment in any other jurisdiction.

This Assignment shall be governed by the laws of Delaware.

This Assignment is effective as from the earliest priority date as stated above.

Executed this 15 day of April , 20/5 BY_Nason choi Ha-Soon CHOI

Chlangerismuk Name: Chikking Army Smith Name: SUSAU SESMOVICH Address: 10675 John Lay Hopkins Dr. Address: 10675 JOHN JAY MORKINS DRIVE San Diego CA 92121 SAW DIEGO CA 92121

Patent Family Number PAT055940

Executed this 15 day of $4\rho r$, 2015BY Com James Paul LAHNESS

Chhan any Smith Name: Childreng Amy Smith, Name: SUSAN SESANICH Address: 10675 John Jay Hoppins Dr. Address: 10675 VOITN VAI San Diego, CA 92121 SAN DIEGO, CA

10675 JOHN NAY HOPKINSDRIVE SAN DIEGO, CA 95/01

Executed this 15 day of APRIL , 2015 BY Bao Ngoc NGUYEN

Witnessed by:

Chihang Ceny Smith Name: Chihang Arny Smith Name: SUSAN SESNOVICH Address: 10675 John Jay Hopkins Dr. Address: 101075 JOHN JAY HOPKINS DRIVE San Diego, CA 90121 SAN DIE40, CA 90-12-1

6

Executed this $\underline{/b}$ day of $\underline{/pril}$, $20\underline{/b}$

BY

Hank Michael James PETRASSI

hank ling Smith e: OCH Lang Amy Smith ess: 10675 John Jay Hoppinson San Diepo, CA. 98121 Name: Address:

<u>uun J</u> = s/Sm Name:

In <u>Lemmed</u> 5/5AD SESNOVICH 101075 JOIMSVAY MORKINS DKIVE SAN DIEGO (M DO 12-1 Address:

Patent Family Number PAT055940

Executed this <u>If</u> day of <u>April</u>, 20<u>15</u>

Jacht -BY Zhicheng WANG

China Conversion of Amy Smith Name: SJSAN SESLOVICAT Address: 10615 John Jay Hopkins Dr. Address: 10675 JOHN JAY HOARING DRIVE San Diogo, CA 92121 SAN DIELO, CA 92121

NOVARTIS INSTITUTE FOR FUNCTIONAL GENOMICS, INC., dba the Genomics Institute of the Novartis Research Foundation

Executed this 17 day of April , 20_15

BY Julie McCarty Julio McCarthy

General Counsel and Vice President Legal

Chhang Cung Smith Name: Childrag Amy Smith Name: SUSAN SESNOULCH Address: 10675 John Jay Hoppins Dr. Address: 10675 JOHN JNY HOPPINS DRILE San Diago, CA. 92121 SAN DIEGO, CA. 92121

ASSIGNMENT

This Assignment Agreement is entered into by and between

Srinivasa Reddy NATALA	Citizen of United States of America	10910 Ivy Hill Drive, #4 San Diego, California 92131 US
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(hereinafter "Inventor(s)"), and the **NOVARTIS INSTITUTE FOR FUNCTIONAL GENOMICS, INC.**, dba the GENOMICS INSTITUTE OF THE NOVARTIS RESEARCH FOUNDATION (GNF), 10675 John Jay Hopkins Drive, San Diego, California 92121, USA, a company organized under the laws of the State of Delaware.

For good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, I/We the Inventor(s) do hereby confirm and agree that, by operation of law and/or contract, and/or by the fulfillment of any and all legal requirements regarding the transfer of employee inventions in my/our country of employment, GNF is the true and lawful owner of all right, title and interest in all inventions, discoveries, patents/utility models, applications, and rights described in paragraphs (1) through (8) below.

If, however, under the laws of any country, I/We the Inventor(s) nevertheless have any ownership right, title or interest in any of the items described herein (which I/We do not believe to be the case and make no claim in or to), for good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, I/We the Inventor(s) do hereby sell, assign and transfer to GNF and its successors, assigns and legal representatives (hereinafter referred to collectively as the "ASSIGNEE"), all of our right, title and interest for all countries of the world in and to

(1) all of our inventions and discoveries described in the provisional or non-provisional patent, utility model, or other application(s) entitled

COMPOUNDS AND COMPOSITIONS FOR INDUCING CHONDROGENESIS [PAT055940]

and filed in the <u>to be determined</u> Office on <u>to be determined</u> and accorded Application Number <u>to be determined</u> and/or filed as a PCT International Application on <u>to be determined</u> and accorded International Patent Application Number PCT/<u>to be determined</u>; and/or filed in the United States Patent and Trademark Office on <u>May 13, 2014</u> and accorded Application Number <u>61/992815</u>;

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I

(3) the right to file patent, utility model, or other applications on any invention or discovery disclosed in any of the applications identified in paragraphs (1) and (2), including the right to file such applications on said inventions and discoveries in the names of ASSIGNEE or their designees or in our/my name, at ASSIGNEE's election and in accordance with applicable law in all countries and regions; and the right to file all patent, utility model, or other applications in all countries and regions claiming the priority of any of the provisional or non-provisional application(s) identified in paragraphs (1) or (2);

(4) all rights to claim priority from any of the applications referred to in paragraphs (1), (2), and (3) or from any application from which any of the applications referred to in paragraphs (1), (2) and (3) claim priority in all countries and regions under the Paris Convention for the Protection of Industrial Property, the WTO GATT TRIPS Agreement, the Inter-American Convention relating to Inventions, Patents, Designs, and Industrial Models and all other international agreements to which the United States now is or hereafter becomes a signatory and, if the United States patent application is a provisional patent application, under 35 USC 119(e);

(5) all continuations, continuations-in-part, and divisionals of any United States patent application(s) or international patent application(s) designating the United States, any national stages of any international application(s), and any other patent application(s) described in paragraphs (1) through (4) hereof, including further continuations, continuations-in-part, and divisionals such as, but not limited to, continuations of continuations and continuations of divisionals;

(6) all patents, utility models, or other grants that issue from any of the applications referred to herein and all rights and remedies associated therewith including the right to sue for and recover past damages and to recover under 35 U.S.C. § 154 (d) or any other law permitting remedies for infringement prior to issuance of the patent;

(7) all registrations and confirmations of, and importation certificates based upon, one or more of said patents, utility models, or other grants, and applications for such registrations, confirmations and importation certificates and;

(8) all reissues, renewals and extensions of said patents, utility models, registrations, confirmations and importation certificates, reexamination certificates issued for said patents and supplementary protection certificates based upon said patents and applications for such reissues, renewals, extensions, reexamination certificates and supplementary protection certificates, the same to be held and enjoyed by said ASSIGNEE to the full ends of the terms for which said patents, utility models, registrations, confirmations, importation certificates, reexamination certificates, reissues, renewals and extensions may be granted, as fully and entirely as the same would have been held and enjoyed by me/us if this sale, assignment and transfer had not been made.

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2

I/We the Inventor(s) hereby covenant and agree that I/We will, at any time, (i) upon the request, but at the expense, of ASSIGNEE, execute and deliver all documents that may be necessary or desirable to perfect the title to the foregoing inventions and discoveries. applications, patents, utility models, registrations, confirmations, importation certificates, reissues, renewals, extensions, reexamination certificates, supplementary protection certificates, and applications within the scope of (7) and (8), in ASSIGNEE, including the execution and procurement of all further documents evidencing this sale, assignment and transfer as may be necessary or desirable for recording the same in the patent office or other intellectual property office, agency or the like of any country or region, (ii) upon the request, but at the expense, of ASSIGNEE execute all additional applications within the scope of paragraphs (1) through (6) and all applications within the scope of (7) or (8), and (iii) make all rightful oaths and declarations and do all lawful acts requisite for procuring the same or for aiding therein, without further compensation, but at the expense of ASSIGNEE.

Should any provision of this Assignment be deemed invalid or unenforceable by reason of any law, statute, regulation or judgment, existing now or in the future in any jurisdiction, such provision shall be modified in such jurisdiction so as to nearly approximate the intent of the Parties. If this cannot be done, such invalid or unenforceable provision shall be divisible and be deleted in any such jurisdiction, and all other provisions shall remain in full force and effect. The modification or deletion of any provision in one jurisdiction shall have no effect on this Assignment in any other jurisdiction.

This Assignment shall be governed by the laws of Delaware.

This Assignment is effective as from the earliest priority date as stated above.

Executed this day of March , 2015

(______ Srinivasa Reddy NATALA ΒŶ

Charlen Strick Name: Chipping Amy Smith Address: 10075 John Jay Hopking Dr. San Digo, CA 92121 SAN DIEGO, CA 92121 SAN DIEGO, CA 92121

NOVARTIS INSTITUTE FOR FUNCTIONAL GENOMICS, INC., dba the Genomics Institute of the Novartis Research Foundation

Executed this 17 day of April , 2015

BY Julie McCarthy

General Counsel and Vice President Legal

Witnessed by:

Chihang confinith Name: Childing Army Smith Address: 106 75 John Jay Hopkins Dr. San Diego, ch 92121 Name: SUSAN SESADVICH Address: 10675 JOHN JAY MORKINS DRILE SAN DIEGO CA 92121

RECORDED: 06/26/2019