

PATENT ASSIGNMENT

Electronic Version v1.1

Stylesheet Version v1.1

SUBMISSION TYPE:	NEW ASSIGNMENT												
NATURE OF CONVEYANCE:	ASSIGNMENT												
CONVEYING PARTY DATA													
<table border="1"> <thead> <tr> <th>Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Marion Dorsch</td> <td>09/24/2009</td> </tr> <tr> <td>John E. Monahan</td> <td>09/24/2009</td> </tr> <tr> <td>Michael Patrick Morrissey</td> <td>09/24/2009</td> </tr> <tr> <td>Shifeng Pan</td> <td>09/23/2009</td> </tr> <tr> <td>Juliet Williams</td> <td>09/28/2009</td> </tr> </tbody> </table>		Name	Execution Date	Marion Dorsch	09/24/2009	John E. Monahan	09/24/2009	Michael Patrick Morrissey	09/24/2009	Shifeng Pan	09/23/2009	Juliet Williams	09/28/2009
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John E. Monahan	09/24/2009												
Michael Patrick Morrissey	09/24/2009												
Shifeng Pan	09/23/2009												
Juliet Williams	09/28/2009												
RECEIVING PARTY DATA													
Name:	NOVARTIS AG												
Street Address:	Lichtstrasse 35												
City:	Basel												
State/Country:	SWITZERLAND												
Postal Code:	4056												
PROPERTY NUMBERS Total: 1													
<table border="1"> <thead> <tr> <th>Property Type</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Application Number:</td> <td>13119072</td> </tr> </tbody> </table>		Property Type	Number	Application Number:	13119072								
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CORRESPONDENCE DATA													
Fax Number:	9737818064												
<i>Correspondence will be sent via US Mail when the fax attempt is unsuccessful.</i>													
Phone:	8627788462												
Email:	pip_inbox.phchbs@novartis.com												
Correspondent Name:	Linda Adams												
Address Line 1:	Novartis Pharmaceuticals Corporation												
Address Line 2:	One Health Plaza												
Address Line 4:	East Hanover, NEW JERSEY 07936												
ATTORNEY DOCKET NUMBER:	PAT052398-US-PCT												
NAME OF SUBMITTER:	Linda Adams												

CH \$40.00 13119072

Signature:	/Linda Adams/
Date:	07/31/2013
<p>Total Attachments: 15 source=52398_US_PCT#page1.tif source=52398_US_PCT#page2.tif source=52398_US_PCT#page3.tif source=52398_US_PCT#page4.tif source=52398_US_PCT#page5.tif source=52398_US_PCT#page6.tif source=52398_US_PCT#page7.tif source=52398_US_PCT#page8.tif source=52398_US_PCT#page9.tif source=52398_US_PCT#page10.tif source=52398_US_PCT#page11.tif source=52398_US_PCT#page12.tif source=52398_US_PCT#page13.tif source=52398_US_PCT#page14.tif source=52398_US_PCT#page15.tif</p>	

(joint)

Patent Case PAT052398

107
17

ASSIGNMENT

For good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, we

Marion DORSCH	citizen of Germany	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
John E. MONAHAN	citizen of United States of America	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
Michael Patrick MORRISSEY	citizen of United States of America	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
Shifeng PAN	citizen of United States of America	Novartis Institute for Functional Genomics, Inc. 10675 John Jay Hopkins Drive San Diego, CA 92121 US
Juliet WILLIAMS	citizen of United Kingdom	Flat 5-55 Queens Gardens FLAT #5-55 CLEVELAND SQ London W2 3AF C.D.D. UK

do hereby sell, assign and transfer to Novartis AG, a company organized under the laws of the Swiss Confederation, of Lichtstrasse 35, 4056 Basel, Switzerland, (hereinafter referred to as the "ASSIGNEE") and its successors, assigns and legal representatives, all of my right, title and interest for all countries of the world in and to (1) all of my inventions and discoveries described in the patent application(s) titled

SMOOTHENED ANTAGONISM FOR THE TREATMENT OF HEDGEHOG PATHWAY-RELATED DISORDERS

and filed in the United States Patent and Trademark Office on _____, 20__ and accorded Application Number _____* and/or filed in the ROI/_____ on 28 September, 2009 and accorded International Patent Application Number PCT/EP2009/062537*, (2) the patent application(s) identified in (1), (3) all national stages of any international patent application identified in (1), (4) all other patent applications in all countries and regions claiming the priority of the provisional or non-provisional patent application filed in the United States Patent and Trademark Office on October 1, 2008 and accorded Application Number 61/101851, and all other patent applications in all countries and regions claiming the priority of the provisional or non-provisional patent application filed in the United States Patent and Trademark Office on October 1, 2008 and accorded Application Number 61/101858, (5) for all patent applications, all rights of priority based upon the United States patent application identified in (4) in all

countries and regions under the Paris Convention for the Protection of Industrial Property, 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 identified in (4) is a provisional patent application, under 35 USC 119(e) (including the right to file patent applications on said inventions and discoveries in the names of **ASSIGNEE** or their designees or in our names, at their election and in accordance with applicable law in all countries and regions), (6) all continuations and divisions of any United States patent application or international patent application designating the United States identified in (1), any national stages of any international application identified in (1) and any patent applications within the scope of (4) (including further continuations and divisions such as, but not limited to, continuations of continuations and continuations of divisions), ((2)-(4) and (6) hereinafter referred to, collectively as "patent applications"), (7) all patents that are granted on any of said patent applications, (8) all registrations and confirmations of, and importation certificates based upon, one or more of said patents and applications for such registrations, confirmations and importation certificates and (9) all reissues, renewals and extensions of said patents, 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** and their successors, assigns and legal representatives to the full ends of the terms for which said patents, registrations, confirmations, importation certificates, reexamination certificates, supplementary protection certificates, reissues, renewals and extensions may be granted, as fully and entirely as the same would have been held and enjoyed by us if this sale, assignment and transfer had not been made.

*We hereby authorize **ASSIGNEE** and their representatives to insert in this Assignment the filing date(s) and Application Number(s) of said patent application(s) when notified thereof.

And we hereby covenant and agree that we will, at any time, (i) upon the request, but at the expense, of **ASSIGNEE** or their successors, assigns or legal representatives execute and deliver all documents that may be necessary or desirable to perfect the title to the foregoing inventions and discoveries, patent applications, patents, registrations, confirmations, importation certificates, reissues, renewals, extensions, reexamination certificates, supplementary protection certificates and applications within the scope of (8) and (9) in **ASSIGNEE** or their successors, assigns or legal representatives, 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** or their successors, assigns or legal representatives execute all additional patent applications within the scope of (3), (4) and (6) and all applications within the scope of (8) or (9) 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** or their successors, assigns or legal representatives.

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

Executed this 24 day of September, 2003

Marion Dorsch L.S.
Marion Dorsch

ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)

On this 24th day of September, 2009 personally appeared before me

Marion Dorseth to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Jessica N. Yoo
Notary Public

Jessica N. Yoo
Notary Public
Commonwealth of Massachusetts
My Commission Expires
May 19, 2011

Executed this 24 day of SEPT, 2009

John E. Monahan L.S.
John E. Monahan

ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)

On this 24th day of September, 2009 personally appeared before me

John Monahan to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Jessica N. Yoo
Notary Public

Jessica N. Yoo
Notary Public
Commonwealth of Massachusetts
My Commission Expires
May 19, 2011

Executed this 24th day of September, 2009

Michael Patrick Morrissey
Michael Patrick Morrissey

ACKNOWLEDGEMENT

State of Massachusetts)
) s.s.:
County of Middlesex)

On this 24th day of September, 2009 personally appeared before me

Michael Morrissey to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Jessica N. Yoo
Notary Public
Commonwealth of Massachusetts
My Commission Expires
May 19, 2011

Executed this _____ day of _____, 20__

Shifeng Pan L.S.

ACKNOWLEDGEMENT

State of _____)
) s.s.:
County of _____)

On this _____ day of _____, 20__, personally appeared before me

_____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public

(joint)

Patent Case PAT052398

ASSIGNMENT

For good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, we

Marion DORSCH	citizen of Germany	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
John E. MCNAHAN	citizen of United States of America	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
Michael Martin PATRICK MORRISSEY	citizen of United States of America	Novartis Institutes for BioMedical Research, Inc. 250 Massachusetts Avenue Cambridge, MA 02139 US
Shifeng PAN	citizen of United States of America	Novartis Institute for Functional Genomics, Inc. 10675 John Jay Hopkins Drive San Diego, CA 92121 US
Juliet WILLIAMS	citizen of United Kingdom	Flat 5-55 Queens Gardens FLAT 6 SW 33, CLEVELAND SQ London W2 3AQ 6DD UK

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PATENT

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countries and regions under the Paris Convention for the Protection of Industrial Property, 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 identified in (4) is a provisional patent application, under 35 USC 119(e) (including the right to file patent applications on said inventions and discoveries in the names of **ASSIGNEE** or their designees or in our names, at their election and in accordance with applicable law in all countries and regions), (6) all continuations and divisions of any United States patent application or international patent application designating the United States identified in (1), any national stages of any international application identified in (1) and any patent applications within the scope of (4) (including further continuations and divisions such as, but not limited to, continuations of continuations and continuations of divisions), ((2)-(4) and (6) hereinafter referred to collectively as "patent applications"), (7) all patents that are granted on any of said patent applications, (8) all registrations and confirmations of, and importation certificates based upon, one or more of said patents and applications for such registrations, confirmations and importation certificates and (9) all reissues, renewals and extensions of said patents, 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** and their successors, assigns and legal representatives to the full ends of the terms for which said patents, registrations, confirmations, importation certificates, reexamination certificates, supplementary protection certificates, reissues, renewals and extensions may be granted, as fully and entirely as the same would have been held and enjoyed by us if this sale, assignment and transfer had not been made.

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

Executed this _____ day of _____, 20__.

Marion Dorsch L.S.

Executed this _____ day of _____, 20__.

Michael Martin Morrissey L.S.

ACKNOWLEDGEMENT

State of _____)

) s.s.:

County of _____)

On this _____ day of _____, 20__, personally appeared before me

_____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public

Executed this _____ day of _____, 20__.

Shifeng Pan L.S.

ACKNOWLEDGEMENT

State of _____)

) s.s.:

County of _____)

On this _____ day of _____, 20__, personally appeared before me

_____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public

PATENT

Executed this 25th day of September, 2007.

Juliet Williams L.S.
Juliet Williams

ACKNOWLEDGEMENT

State of _____)
() s.s.:
County of _____)

On this _____ day of _____, 20_____, personally appeared before me

_____ to me known and known by me to be the same person described in and who executed the foregoing Assignment and acknowledged that (s)he executed the same of his (her) own free will for the purpose set forth.

(Seal)

Notary Public

62388

ACCEPTANCE OF ASSIGNMENT

AB
UAE

Reference to the Assignment to NOVARTIS AG of an invention entitled "SMOOTHENED
AGONISM FOR THE TREATMENT OF HEDGEHOG PATHWAY-RELATED DISORDERS" signed by
Dorsch, John E. Monahan, Michael Patrick Morrissey, Shifeng Pan, and Juliet Williams; this will
that NOVARTIS AG accepts such Assignment.

NOVARTIS AG

Elena S. Bruqnera

E. Rutschmann

Elena S. Bruqnera

Ella Rutschmann

Authorized Signatory

Authorized Signatory

October 12, 2009

me :

inction :

ate :

Attestation

I, the undersigned Civil Law Notary in Basel, Switzerland, Dr. Matthias Staehelin, certify herewith that the signature attached heretofore is the genuine signature of **Ms. Juliet Williams**, born on the 31st (thirty-first) day of March 1972 (nineteen hundred seventy-two), British citizen, residing in London, United Kingdom.

Further I certify herewith that the above signatures are the genuine signatures of **Ms. Elena Sona Brugnera**, Indian citizen, residing in Regensdorf/ZH, Switzerland, and of **Ms. Ella Rutschmann**, citizen of Lotzwil/BE, Switzerland, residing in Basel, Switzerland, both acting for **Novartis AG**, in Basel, Switzerland, both as proxy holders, both with joint signature.

The authenticity of the signatures was established by means of comparison.

BASEL, Switzerland, this 15th (fifteenth) day of October 2009 (two thousand and nine)

M. Staehelin, Notar

Dr. M. Staehelin
Notar

Leg. Prot. Nr. 2761 2009

ATTESTATION

I, the undersigned Civil Law Notary in Basel, Switzerland, Dr. Matthias Staehelin, certify herewith that the signatures attached heretofore are the genuine signatures of **Ms. June Violet Mentel**, citizen of Grenchen/SO, Switzerland, residing in Arlesheim/BL, Switzerland, and of and **Ms. Ella Rutschmann**, citizen of Lotzwil/BE, Switzerland, residing in Basel/BS, Switzerland, both acting for **Novartis AG**, in Basel, Switzerland, both as proxy holders, both with joint signature.

The authenticity of the signatures was established by means of comparison.

BASEL, Switzerland, this 11th (eleventh) day of February 2011 (two thousand and eleven).

M. Staehelin, Notar

Dr. M. Staehelin
Notar

Leg.Prot.Nr. 567/2011



Legalization

We hereby certify that the signature of Mr *Dr. M. Staehelin* notary public in Basle (Switzerland), who is personally known to us, is genuine.

Basle, 11 Feb. 2011
No. 2043

State Chancery of the
Canton of Basle - City

Holena Schaffner
Holena Schaffner

FOR CERTIFIED COPY

I, the undersigned Civil Law Notary in Basel, Switzerland, Dr. Matthias Staehelin, hereby certify that the document attached heretofore is a true and authentic photocopy of the original.

BASEL, Switzerland, this 11th (eleventh) day of February 2011 (two thousand and eleven)

M. Staehelin, Notar

Dr. M. Staehelin
Notar

Leg. Prot. Nr. 563 /2011