

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 01-3274-WO-1	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/EP2018/065107	International filing date (<i>day/month/year</i>) 8 June 2018 (08-06-2018)	(Earliest) Priority Date (<i>day/month/year</i>) 9 June 2017 (09-06-2017)
Applicant BOEHRINGER INGELHEIM INTERNATIONAL GMBH		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 9 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6**bis**(a)).

c. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. _____
☐ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☐ as selected by this Authority, because this figure better characterizes the invention
b. ☒ none of the figures is to be published with the abstract

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:
 - a. ☒ forming part of the international application as filed:
 - ☒ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13~~ter~~.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13~~ter~~.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13~~ter~~.1(b) and Administrative Instructions, Section 713).
2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

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A. CLASSIFICATION OF SUBJECT MATTER

INV. C07K16/28 A61K39/395
ADD. A61K39/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, BIOSIS, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/103667 A1 (6452728 CANADA INC [CA]; SARAGOVI HORACIO URI [CA]) 1 September 2011 (2011-09-01) page 30, line 3 - line 5 page 30, line 12 - line 18 page 33, line 14 - line 19 page 32 - page 33; example 3 page 34; example 5 sequence 4 page 30, line 24 - line 27 ----- -/-	1-32



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

7 August 2018

Date of mailing of the international search report

21/08/2018

Name and mailing address of the ISA/

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2017/085035 A1 (GLAXOSMITHKLINE IP DEV LTD [GB]; GLAXOSMITHKLINE R&D COMPANY LTD [CN]) 26 May 2017 (2017-05-26) abstract page 51; table 3 page 57, paragraph 3 table; page 59 page 64, paragraph 3 page 66, paragraph 2 -----	1-27,32
X	WO 2006/133164 A2 (WYETH CORP [US]; CHO SEONGEUN [US]; GILL DAVINDER SINGH [US]; TAN XIAN) 14 December 2006 (2006-12-14) page 2, line 28 - line 29 page 4, line 19 - line 23 page 35; table 2 page 37, line 16 - line 23 figures 5A,5B sequence 1 page 47, line 26 - page 48, line 2 page 48, line 7 - line 14 -----	1-27
X	WO 2017/019907 A1 (OTONOMY INC [US]; SARAGOVI HORACIO URI [CA]) 2 February 2017 (2017-02-02) page 2, paragraph 0008 - page 3 sequence 118 page 47, paragraph 00171 -----	1-27,32
X	WO 2010/086828 A2 (RINAT NEUROSCIENCE CORP [US]; LIN CHIA-YANG [US]; CHAPARRO RIGGERS JAV) 5 August 2010 (2010-08-05) page 115; tables 6-7 page 123; example 7 -----	1-27,32
X	US 2010/150914 A1 (WANG YAN [US] ET AL) 17 June 2010 (2010-06-17) cited in the application page 9; example 1 page 6, paragraph 0070 - paragraph 0071 -----	1-27,32
X	WO 2012/156505 A1 (UNIV BASEL [CH]; HOFBAUER KARL [CH]; PETER JEAN-CHRISTOPHE [FR]) 22 November 2012 (2012-11-22) page 12, line 4 page 13, line 4 - line 5 -----	1-27,32
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DANIEL TODD ET AL: "A Monoclonal Antibody TrkB Receptor Agonist as a Potential Therapeutic for Huntington's Disease", PLOS ONE, vol. 9, no. 2, 4 February 2014 (2014-02-04), page e87923, XP055339993, DOI: 10.1371/journal.pone.0087923 page 5; table 1 page 5, left-hand column, paragraph 2 - right-hand column, paragraph 1 -----	28-31
X	WO 2008/078179 A1 (RINAT NEUROSCIENCE CORP [US]; LIN CHIA-YANG [US]; LONG HUA [US]; TSAO) 3 July 2008 (2008-07-03) page 38; example 6 page 39; example 7 -----	28-31
X	CAZORLA M ET AL: "Pharmacological characterization of six trkB antibodies reveals a novel class of functional agents for the study of the BDNF receptor", BRITISH JOURNAL OF PHARMACOLOGY, WILEY-BLACKWELL, UK, vol. 162, no. 4, 1 February 2011 (2011-02-01), pages 947-960, XP002679847, ISSN: 0007-1188, DOI: 10.1111/J.1476-5381.2010.01094.X [retrieved on 2011-01-21] page 953; table 2 page 959, left-hand column, paragraph 2 -----	28-31
X	WO 2009/092049 A1 (IRM LLC; LUEHRSEN KENNETH R [US]) 23 July 2009 (2009-07-23) page 43; example 1 page 51, paragraph 0189 - paragraph 0190 -----	28-31
A	YUJING BAI ET AL: "An Agonistic TrkB mAb Causes Sustained TrkB Activation, Delays RGC Death, and Protects the Retinal Structure in Optic Nerve Axotomy and in Glaucoma", INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE, vol. 51, no. 9, 1 September 2010 (2010-09-01), pages 4722-4731, XP055330962, US ISSN: 1552-5783, DOI: 10.1167/iovs.09-5032 the whole document -----	1-31

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Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011103667	A1	01-09-2011	NONE
WO 2017085035	A1	26-05-2017	AU 2016356877 A1 10-05-2018 CA 3005491 A1 26-05-2017 CN 108350079 A 31-07-2018 TW 201730206 A 01-09-2017 WO 2017085035 A1 26-05-2017
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International application No

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			GB 2491106 A	28-11-2012
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			CA 2672750 A1	03-07-2008
			CN 101605556 A	16-12-2009
			EP 2114436 A1	11-11-2009
			JP 2010513461 A	30-04-2010
			KR 20090091181 A	26-08-2009
			RU 2009123491 A	27-12-2010
			US 2010086997 A1	08-04-2010
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			EA 201001139 A1	29-04-2011
			EP 2235062 A1	06-10-2010
			JP 5420568 B2	19-02-2014
			JP 2011510021 A	31-03-2011
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			PE 13262009 A1	18-09-2009
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			US 2011097326 A1	28-04-2011
			WO 2009092049 A1	23-07-2009

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-32

anti-TrkB antibodies

1.1. claims: 1-27, 32

anti-TrkB antibodies comprising HDR1-3 with SEQ ID No 51-53 (definition of CDRs according to Chemical Computing Group (CCG)), 55-57 (definition of CDRs according to Kabat) or 58-60 (definition of CDRs according to Chothia) respectively and LCDR1-3 with SEQ ID No 48-50, respectively and antibodies competing for binding to TrkB with antibodies comprising in their heavy and light chain variable regions the CDRs of claim 1.

1.2. claims: 28-31

anti-TrkB antibodies that bind to at least one amino acid residue within amino acid regions 92-112, 130-143 and /or 205-219 of the extracellular domain of human TrkB with SEQ ID No 54.
