

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 01-3361-WO-1	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/EP2020/062802	International filing date (<i>day/month/year</i>) 8 May 2020 (08-05-2020)	(Earliest) Priority Date (<i>day/month/year</i>) 9 May 2019 (09-05-2019)
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 6 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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A. CLASSIFICATION OF SUBJECT MATTER

INV. C07K16/18 A61P27/02 C07K16/28
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 A61P

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, 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	NAOYA YAMASHITA ET AL: "Anti-Semaphorin 3A neutralization monoclonal antibody prevents sepsis development in lipopolysaccharide-treated mice", INTERNATIONAL IMMUNOLOGY, vol. 27, no. 9, 7 April 2015 (2015-04-07), pages 459-466, XP055280232, ISSN: 0953-8178, DOI: 10.1093/intimm/dxv014	1-12,20, 23-27
Y	page 460, left-hand column, paragraph 4 - right-hand column, paragraph 1 page 463, left-hand column, paragraph 2 page 463, right-hand column, paragraph 1 figure 4 ----- -/--	13-19, 21,22

☒ 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

13 July 2020

Date of mailing of the international search report

17/07/2020

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	EP 2 955 195 A1 (UNIV YOKOHAMA CITY [JP]; CHIOME BIOSCIENCE INC [JP]) 16 December 2015 (2015-12-16)	1-12,20, 23-27
Y	abstract page 16; example 2 page 21; table 6 page 22; example 7	13-19, 21,22
X	----- EP 3 385 281 A1 (SAMSUNG LIFE PUBLIC WELFARE FOUNDATION [KR]; PANGEN BIOTECH INC [KR]) 10 October 2018 (2018-10-10)	1-12,20, 23-27
Y	page 8 - page 9; example 1 page 9, paragraph 0123 - page 10 page 13; example 4	13-19, 21,22
X	----- WO 2014/127479 A1 (RSEM LTD PARTNERSHIP [CA]) 28 August 2014 (2014-08-28)	8-12,20
Y	abstract paragraph [0003] example 7 paragraph [0126] paragraph [0065]	13-19, 21,22
X	----- SHIRVAN ANAT ET AL: "Anti-semaphorin 3A antibodies rescue retinal ganglion cells from cell death following optic nerve axotomy", JOURNAL OF BIOLOGICAL CHEMISTRY,, vol. 277, no. 51, 20 December 2002 (2002-12-20), pages 49799-49807, XP002483825, ISSN: 0021-9258, DOI: 10.1074/JBC.M204793200 [retrieved on 2002-10-09]	1-12,20, 23-27
Y	page 49800, right-hand column, paragraph 4 - page 49801, left-hand column, paragraph 1 abstract page 49806, left-hand column, paragraph 3	13-19, 21,22
X	----- HAYNES SHEK HEI YUAN ET AL: "A mechanism for semaphorin-induced apoptosis: DNA damage of endothelial and myogenic cells in primary cultures from skeletal muscle", ONCOTARGET, vol. 9, no. 32, 27 April 2018 (2018-04-27) , XP055633014, United States ISSN: 1949-2553, DOI: 10.18632/oncotarget.25200 figure 3 page 22626, right-hand column, paragraph 4 ----- -/--	8,9

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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	PAOLO GIACOBINI ET AL: "Brain Endothelial Cells Control Fertility through Ovarian-Steroid-Dependent Release of Semaphorin 3A", PLOS BIOLOGY, vol. 12, no. 3, 11 March 2014 (2014-03-11) , page e1001808, XP055633040, DOI: 10.1371/journal.pbio.1001808 page 15, left-hand column, paragraph 4 -----	8,9
A	WO 2013/005603 A1 (PUBLIC UNIV CORP YOKOHAMA CITY [JP]; TANAKA JUNMI [JP] ET AL.) 10 January 2013 (2013-01-10) abstract -----	1-27

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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
EP 2955195	A1	16-12-2015	DK 2955195 T3 06-05-2019
			EP 2955195 A1 16-12-2015
			ES 2728854 T3 29-10-2019
			JP 6372040 B2 15-08-2018
			JP WO2014123186 A1 02-02-2017
			US 2015368327 A1 24-12-2015
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			JP 2019500889 A 17-01-2019
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			KR 20170051213 A 11-05-2017
			US 2018346567 A1 06-12-2018
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			CA 2901946 A1 28-08-2014
			EP 2958580 A1 30-12-2015
			HK 1218071 A1 03-02-2017
			JP 6437462 B2 12-12-2018
			JP 2016516003 A 02-06-2016
			US 2016002641 A1 07-01-2016
			US 2018030455 A1 01-02-2018
			US 2020208159 A1 02-07-2020
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