

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference F20W0703PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/CN2020/103178	International filing date (<i>day/month/year</i>) 21 July 2020	(Earliest) Priority Date (<i>day/month/year</i>) 15 August 2019
Applicant MERCK SHARP & DOHME CORP. et al		

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 7 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 43.6bis(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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PCT/CN2020/103178**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

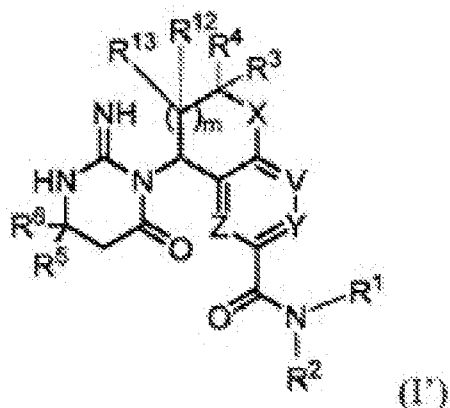
This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: **33-40,43-44**
because they relate to subject matter not required to be searched by this Authority, namely:

[1] Claims 33-40, 43-44 direct to methods for treating a plasmodium infection or malaria. Therefore, claims 33-40, 43-44 direct to methods for treatment for the human or animal body. They do not meet the criteria set out in PCT Rules 39.1 (iv). The search has been carried out and based on the use of compounds of claims 1-32 for the manufacturing of medicaments for the treatment of plasmodium infection or malaria, or inhibiting plasmepsin X or IX.
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. IV **Text of the abstract (Continuation of item 5 of the first sheet)**

Methods of treating malaria comprising administration of compounds of Formula (I) :



or a pharmaceutically acceptable salt thereof, to a subject in need thereof, wherein the variables are as defined herein. It also provides uses of the compounds of Formula (I) , as defined herein, for inhibiting plasmepsin X, plasmepsin IX or plasmepsin X and IX activity, for treating a Plasmodium infection, and for treating malaria. Also provided are methods of treatment further comprising administration of one or more additional anti-malarial compounds.

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A. CLASSIFICATION OF SUBJECT MATTER

C07D 239/22(2006.01)i; C07D 405/04(2006.01)i; C07D 405/14(2006.01)i; A61K 31/513(2006.01)i; A61P 33/06(2006.01)i

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)

C07D; 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)

DWPL,SIPOABS, WOTXT, EPTXT, USTXT, CNTXT, CATXT, GBTXT, JPTXT, KRABS, CNABS, CNKI,STNExt,ISI Web of Science: MERCK SHARP&DOHME, plasmodium, malaria, plasmepsin, infect+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2017142825 A2 (MERCK SHARP & DOHME. et al.) 24 August 2017 (2017-08-24) the abstract, claims 1-21	1-44
A	WO 2008103351 A2 (SCHERING CORP. et al.) 28 August 2008 (2008-08-28) the abstract	1-44
A	WO 2017089453 A1 (UCB BIOPHARMA SPRL) 01 June 2017 (2017-06-01) the abstract	1-44
A	WO 2011044181 A1 (SCHERING CORP. et al.) 14 April 2011 (2011-04-14) the abstract	1-44
A	WO 2017144517 A1 (UCB BIOPHARMA SPRL) 31 August 2017 (2017-08-31) the abstract	1-44

☐ 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

08 October 2020

Date of mailing of the international search report

28 October 2020

Name and mailing address of the ISA/CN

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
WO	2017142825	A2	24 August 2017	WO	2017142825	A3	21 September 2017
				US	2020230140	A1	23 July 2020
				EP	3416647	A4	23 October 2019
				EP	3416647	A2	26 December 2018
WO	2008103351	A2	28 August 2008	IL	200561	A	31 March 2015
				TW	201139415	A	16 November 2011
				HK	1130792	A1	10 February 2017
				NZ	579301	A	25 May 2012
				US	2012276118	A1	01 November 2012
				US	7763609	B2	27 July 2010
				IL	200561	D0	17 May 2010
				EC	SP099597	A	29 September 2009
				AU	2008219071	B2	28 March 2013
				EP	2097387	B1	04 May 2016
				PT	2097387	T	20 July 2016
				JP	2013014628	A	24 January 2013
				PE	20100731	A1	12 November 2010
				BR	PI0807547	A2	17 June 2014
				KR	20090114468	A	03 November 2009
				KR	101612961	B1	19 April 2016
				ME	02528	B	20 February 2017
				US	2010292203	A1	18 November 2010
				US	2012231018	A1	13 September 2012
				SG	179407	A1	27 April 2012
				ES	2582367	T3	12 September 2016
				RU	2009135277	A	27 March 2011
				US	2008200445	A1	21 August 2008
				US	2012231017	A1	13 September 2012
				TW	I355937	B	11 January 2012
				US	8829036	B2	09 September 2014
				AU	2008219071	A1	28 August 2008
				LT	2097387	T	10 October 2016
				US	8691831	B2	08 April 2014
				RS	54979	B1	30 November 2016
				CO	6220968	A2	19 November 2010
				SI	EP2097387	T1	30 September 2016
				AU	2008219071	A2	25 November 2010
				MY	149183	A	31 July 2013
				PL	2097387	T3	30 November 2016
				AR	106237	A2	27 December 2017
				AR	065421	A1	03 June 2009
				ZA	200905837	B	25 January 2012
				HR	P20160876	T1	23 September 2016
				CA	2678958	A1	28 August 2008
				US	8691833	B2	08 April 2014
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				CN	101715442	B	26 March 2014
				CY	1117946	T1	17 May 2017
				HU	E029867	T2	28 April 2017
				TW	200840580	A	16 October 2008

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				RU	2496774 C2	27 October 2013
				PE	20081884 A1	27 December 2008
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				BR	112018010473 A8	26 February 2019
				JP	2019501138 A	17 January 2019
				EA	201891222 A1	31 October 2018
				CA	3005809 A1	01 June 2017
				CN	108290860 A	17 July 2018
				EP	3380464 B1	27 May 2020
				BR	112018010473 A2	21 November 2018
				EP	3380464 A1	03 October 2018
WO	2011044181	A1	14 April 2011	NZ	598694 A	28 March 2014
				JP	2017002052 A	05 January 2017
				PE	20141935 A1	17 December 2014
				KR	20140036048 A	24 March 2014
				US	8940748 B2	27 January 2015
				AU	2010303591 B2	27 February 2014
				TW	201129562 A	01 September 2011
				IL	230926 A	28 September 2017
				CA	2774579 C	15 December 2015
				ZA	201608799 B	30 May 2018
				CL	2012000872 A1	31 August 2012
				ZA	201202517 B	30 October 2019
				IL	218712 A	30 July 2015
				CA	2774579 A1	14 April 2011
				CN	104744403 A	01 July 2015
				NI	201200044 A	17 August 2012
				ES	2773908 T3	15 July 2020
				TW	1477502 B	21 March 2015
				US	9029362 B2	12 May 2015
				US	2015307465 A1	29 October 2015
				SI	EP2485736 T1	31 March 2016
				MX	2012004148 A	08 May 2012
				PL	2485736 T3	30 June 2016
				KR	20160095199 A	10 August 2016
				HK	1167608 A1	27 May 2016
				PT	2485736 E	04 March 2016
				EP	3034080 B1	25 December 2019
				IL	230926 D0	31 March 2014
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				AU	2010303591 A1	12 April 2012
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				DO	P2012000067 A	15 September 2017

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International application No.

PCT/CN2020/103178

Patent document cited in search report			Publication date (day/month/year)		Patent family member(s)		Publication date (day/month/year)	
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					EC	SP12011857	A	31 August 2012
					CN	102639135	B	25 March 2015
					HN	2012000612	A	02 February 2015
					JP	6023749	B2	09 November 2016
					TW	201124412	A	16 July 2011
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					JP	2013507368	A	04 March 2013
					CN	102639135	A	15 August 2012
					UA	108363	C2	27 April 2015
					EA	034537	B1	18 February 2020
					EP	3419975	A1	02 January 2019
WO	2017144517	A1	31 August 2017		CA	3015271	A1	31 August 2017
					BR	112018016196	A2	18 December 2018
					US	10464932	B2	05 November 2019
					EA	201891870	A1	29 March 2019
					GB	201603104	D0	06 April 2016
					JP	2019509337	A	04 April 2019
					CN	109153674	A	04 January 2019
					US	2019040053	A1	07 February 2019