

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

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WU, FENG & ZHANG

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing

(day/month/year)

28 October 2020

Applicant's or agent's file reference

F20W0703PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/CN2020/103178

International filing date (day/month/year)

21 July 2020

Priority date (day/month/year)

15 August 2019

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

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

Applicant

MERCK SHARP & DOHME CORP. et al

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/

**National Intellectual Property
Administration, PRC
China 6, Xitucheng Rd., Jimen Bridge,
Haidian District, Beijing 100088**

Date of completion of this opinion

19 October 2020

Authorized officer

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2020/103178

Box No. I

Basis of the opinion

1. With regard to the **language**, this opinion has been established 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)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established 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 13ter.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 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ 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.
5. Additional comments:

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 33-40,43-44

because:

☒ the said international application, or the said claims Nos. 33-40,43-44 relate to the following subject matter which does not require an international search (*specify*):

[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 opinion has been made 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.

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. _____ are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☐ no international search report has been established for said claims Nos. _____

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing in the form of an Annex C/ST.25 text file, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ furnish a sequence listing on paper or in the form of an image file complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13*ter*.1(a) or (b).

☐ See Supplemental Box for further details.

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Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-44	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-44	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-44	YES
	Claims	None	NO

2. Citations and explanations :

[1] Reference is made to the following document:

[2] D1:W02017142825A2

[3] 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 citations and explanations have been made and based on the use of compounds of any one of claims 1-32 for the manufacturing of medicaments for the treatment of plasmodium infection or malaria, or inhibiting plasmepsin X or IX.

[4] I. Novelty:

[5] D1 (see the abstract, claims 1-21) discloses compounds for treating plasmodium infection or malaria, inhibiting plasmepsin V activity. The method further comprises administration of additional anti-malarial treatments to the subject. D1 further discloses structural formula (I) and specific compounds.

[6] D1 does not disclose the compounds in claims 1-32. Therefore, the subject matter of claims 1-44 involves novelty in the sense of PCT Article 33(2).

[7] II. Inventive step:

[8] D1 is considered to be the closest prior art to claim 1. Claim 1 differs from D1 in the dicyclic ring. The problem to be actually solved by the present invention therefore is regarded as providing different compounds with activity of treating a plasmodium infection or malaria. Although D1 discloses structural formula (I), there is no hint in D1 or the prior art to form dicyclic ring. Thus claim 1 involves an inventive step, and meets the criteria set out in PCT Article 33(3).

[9] Based on the same reason, claims 2-44 also involve inventive steps, and meet the criteria set out in PCT Article 33(3).

[10] III. Industrial applicability:

[11] Claims 1-44 can find industrial applicability in the field of medicine and thus meet the criteria set out in PCT Article 33(4).

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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

- [1] Claims 12-13, 15-19, 22-26 are multiple dependent claims. They refer to the preceding multiple dependent claim or claims. But multiple dependent claims can not form a basis for other multiple dependent claims. Therefore claims 12-13,15-19,22-26 do not meet the requirements of PCT Rules 6.4(a).