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C07D 401/12 (2006.01) A61P 37/00 (2006.01)
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C07D 311/22 (2006.01) A61K 31/353 (2006.01)
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MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
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claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

17 March 2016

(54) Title: TETRAHYDROQUINOLINE SULFONAMIDE AND RELATED COMPOUNDS FOR USE AS AGONISTS OF RORY AND THE TREATMENT OF DISEASE

(57) Abstract: The invention provides tetrahydroquinoline sulfonamide compounds, tetrahydronaphthalene sulfonyl compounds, and related compounds, pharmaceutical compositions, methods of promoting RORY activity, methods of increasing the amount of IL-17 in a subject, and methods of treating cancer and other medical disorders using such compounds.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2015/029240

A. CLASSIFICATION OF SUBJECT MATTER

C07D 265/36 (2006.01) *C07D 215/58 (2006.01)* *C07D 401/12 (2006.01)* *C07D 413/12 (2006.01)* *C07D 417/12 (2006.01)*
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A61K 31/5415 (2006.01)

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)

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)

STN: databases Registry and CAplus (structure search based on formulae I and II)

Applicant and inventor names searched in PatentScope and in IP Australia internal databases

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|--|-----------------------|
| Documents are listed in the continuation of Box C | | |

 Further documents are listed in the continuation of Box C See patent family annex

| | | | |
|----------|---|-----|--|
| * "A" | Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance | "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 |
| "E" | earlier application or patent but published on or after the international filing date | "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 |
| "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) | "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 |
| "O" | document referring to an oral disclosure, use, exhibition or other means | "&" | document member of the same patent family |
| "P" | document published prior to the international filing date but later than the priority date claimed | | |

Date of the actual completion of the international search
29 January 2016Date of mailing of the international search report
29 January 2016

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| INTERNATIONAL SEARCH REPORT | | International application No. |
|---|--|--|
| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | PCT/US2015/029240 |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | WO 2004/056820 A1 (WARNER-LAMBERT COMPANY LLC) 08 July 2004 See example 1 (page 40), page 32, page 9 and page 35 onwards | 1, 2, 4, 10, 12, 13, 23, 29 to 32, 75 to 78 and 80 |
| X | CAS RN 632292-33-2, STN Entry Date 30 December 2003 2-[[1,2,3,4-tetrahydro-1-[(4-methylphenyl)sulfonyl]-6-quinolinyl]methyl]-1H-isoindole-1,3(2H)-dione | 1, 2, 4, 10, 12 to 14, 23, 26, 27, 31 and 32 |
| A | WO 2012/064744 A2 (LYCERA CORPORATION) 18 May 2012 Whole document, especially examples and claims | |
| P,X | Zhu, W., <i>et al</i> , "Potent 11 β -Hydroxylase Inhibitors with Inverse Metabolic Stability in Human Plasma and Hepatic S9 Fractions to Promote Wound Healing", <i>Journal of Medicinal Chemistry</i> , 2014, 57 (18), 7811-7 (DOI: 10.1021/jm501004t) See whole document, especially scheme 1 (page 7812) | 1 to 34, 51 to 73, 75, 82 to 85 |
| E | WO 2015/131035 A1 (LYCERA CORPORATION) 03 September 2015 See whole document, especially example 1 (and others), paragraph 0091, claim 86 | 1 to 48 and 75 to 91 |

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:
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including
2. Claims Nos.: **49, 50, 74**
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:
See Supplemental Box
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:

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 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.

Supplemental Box**Continuation of Box II**

The claims do not comply with Rule 6.2(a) because they rely on references to the description and/or drawings.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2015/029240

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document/s Cited in Search Report | | Patent Family Member/s | |
|---|-------------------------|-------------------------------|-------------------------|
| Publication Number | Publication Date | Publication Number | Publication Date |
| WO 2004/056820 A1 | 08 July 2004 | WO 2004056820 A1 | 08 Jul 2004 |
| | | AU 2003303231 A1 | 14 Jul 2004 |
| | | BR 0317572 A | 22 Nov 2005 |
| | | CA 2510851 A1 | 08 Jul 2004 |
| | | EP 1581529 A1 | 05 Oct 2005 |
| | | JP 2006512357 A | 13 Apr 2006 |
| | | MX PA05006742 A | 08 Sep 2005 |
| | | US 2004138199 A1 | 15 Jul 2004 |
| WO 2012/064744 A2 | 18 May 2012 | WO 2012064744 A2 | 18 May 2012 |
| | | AU 2011326071 A1 | 23 May 2013 |
| | | CA 2816753 A1 | 18 May 2012 |
| | | EP 2638014 A2 | 18 Sep 2013 |
| | | JP 2013541597 A | 14 Nov 2013 |
| | | US 2014088094 A1 | 27 Mar 2014 |
| WO 2015/131035 A1 | 03 September 2015 | WO 2015131035 A1 | 03 Sep 2015 |

End of Annex