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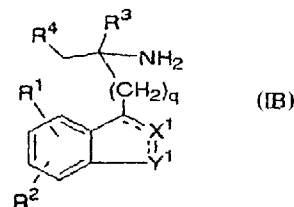
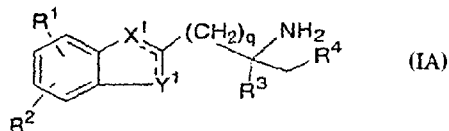
## Published:

— with international search report

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

30 October 2008

(54) Title: HYDRINDANE ANALOGS HAVING SPHINGOSINE 1-PHOSPHATE RECEPTOR AGONIST ACTIVITY



(57) Abstract: Hydrindane analogs of formula (IA) and (IB) that have agonist activity at one or more of the SIP receptors are provided. The ' compounds are sphingosine analogs, which, after phosphorylation, can behave as agonists at SIP receptors.

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/085401

## A. CLASSIFICATION OF SUBJECT MATTER

INV. C07C215/38 C07C233/18 C07D209/16 C07D271/06 C07D333/20  
C07D413/04 C07F9/117 A61K31/4245 A61K31/404 A61P19/00  
A61P37/00

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)

C07D C07F C07C 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 practical, search terms used)

EPO-Internal, WPI Data, CHEM ABS Data, BEILSTEIN Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                                                                                                                                                                                  | Relevant to claim No. |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | <p>CLEMENS J J ET AL: "Synthesis of benzimidazole based analogues of sphingosine-1-phosphate: discovery of potent, subtype-selective SIP4 receptor agonists"<br/>BIOORGANIC &amp; MEDICINAL CHEMISTRY LETTERS, OXFORD, GB,<br/>vol. 14, no. 19,<br/>4 October 2004 (2004-10-04), pages 4903-4906, XP004548785<br/>ISSN: 0960-894X<br/>abstract<br/>page 4903; figure 1<br/>Scheme 1, compounds 7A, 7B, 9A, 9B; page 4904<br/>Scheme 3, compound 18, page 4905</p> <p style="text-align: center;">-----<br/>-/--</p> | 1-15,17,<br>18,20-32  |

☒ 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 document 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

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12/08/2008

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/085401

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                      | Relevant to claim No.         |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| X         | <p>WO 2004/096757 A (NOVARTIS AG [CH];<br/> NOVARTIS PHARMA GMBH [AT]; ALBERT RAINER<br/> [CH]; EHRHA) 11 November 2004 (2004-11-11)<br/> page 1, line 1 - page 2, line 7<br/> claims 1-10</p> <p style="text-align: center;">-----</p> | <p>1-15,17;<br/> 18,20-32</p> |

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

Continuation of Box II.1

Although claims 20-29 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

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Continuation of Box II.1

Claims Nos.: -

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/085401

## 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:  
see FURTHER INFORMATION sheet PCT/ISA/210
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 fee, 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.:

see annex

### 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.

## 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(part)-15(part), 17(part)-18(part), 20(part)-32(part)

Compounds of formula (IA) where X1 and Y1 are O and their use.

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2. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part)

Compounds of formula (IA) where X1 is O and Y1 is CRa or CRaRb and their use.

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3. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part)

Compounds of formula (IA) where X1 is O and Y1 is N or NRc and their use

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4. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 is O and Y1 is S and their use

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5. claims: 1(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 and Y1 are CRa or CRaRb and their use.

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6. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 is CRa or CRaRb and Y1 is N or NRc and their use

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7. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 is CRa or CRaRb and Y1 is S and their use.

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8. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 is N or NRc and Y1 is N or NRc and their use

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9. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 is N or NRc and Y1 is S and their use

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

10. claims: 1(part)-15(part), 17(part)-18(part), 20(part)-32(part):

Compounds of formula (IA) where X1 and Y1 are S and their use.

11. claims: 1(part)-32(part):

Compounds of formula (IB) and their use

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/085401

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
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| <hr/>                                     |                     |                            |                     |