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C07D 487/04 (2006.01) A61P 35/00 (2006.01)
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60/954,698 8 August 2007 (08.08.2007) US


(72) Inventors;
and


(54) Title: (7H-PYRROLO[2, 3-D] PYRIMIDIN-4-YL) -PIPERAZINES AS KINASE INHIBITORS FOR THE TREATMENT OF CANCER AND INFLAMMATION

(57) Abstract: Inhibitors of LIM kinase 2 are disclosed, along with pharmaceutical compositions comprising them and methods of their use. X is O or NR_A; Y is O, NR_R or C(R_R^2); A is cycloalkyl, aryl or heterocycle; R_A is hydrogen, cyano, nitro, R_A^1, SO2R_A^1, SO2NR_A^1 or SO2N(R_A^1)^2;
INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/072584

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D487/04 A61K31/519 A61P35/00

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification scheme 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 Oda base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document with indication</th>
<th>where appropriate, of the relevant passages</th>
<th>Relevant to claim</th>
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Further documents are listed in the continuation of Box C

See patent family annex

Date of the actual completion of the international search
7 November 2008

Date of mailing of the international search report
18/03/2009

Name and mailing address of the ISA/
European Patent Office P B 5818 Paterlaan 2
NL - 2280 HV Rijswijk
Tel (+31-70) 340-2040, Fax (+31-70) 340-3016

Authorized officer
Lange, Tim

Form PCT/ISA/210 (second sheet) (April 2006)
**INTERNATIONAL SEARCH REPORT**

**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:

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 additional sheet(s)**

**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.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-30, 33-35, 37 (all in part)

1-acyl derivative substituted (7H-pyrrolo[2,3-d]pyrimidin-4-yl)-piperazines with the variable "Y" of claim 1 formula representing the value "O", pharmaceutical compositions with these compounds and their medicinal use.

2. claims: 1-30, 33-35, 37 (all in part)

1-acyl derivative substituted (7H-pyrrolo[2,3-d]pyrimidin-4-yl)-piperazines with the variable "Y" of claim 1 formula representing the value "N", pharmaceutical compositions with these compounds and their medicinal use.

3. claims: 1-30, 33-35, 37 (all in part)

1-acyl derivative substituted (7H-pyrrolo[2,3-d]pyrimidin-4-yl)-piperazines with the variable "Y" of claim 1 formula representing the value "C", pharmaceutical compositions with these compounds and their medicinal use.

4. claims: claims 31-32, 33 (in part), 36, 38-39

(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-tetrahydroimidazo[1,5-a]pyrazines being substituted at their 2-position, pharmaceutical compositions with these compounds and their medicinal use.
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