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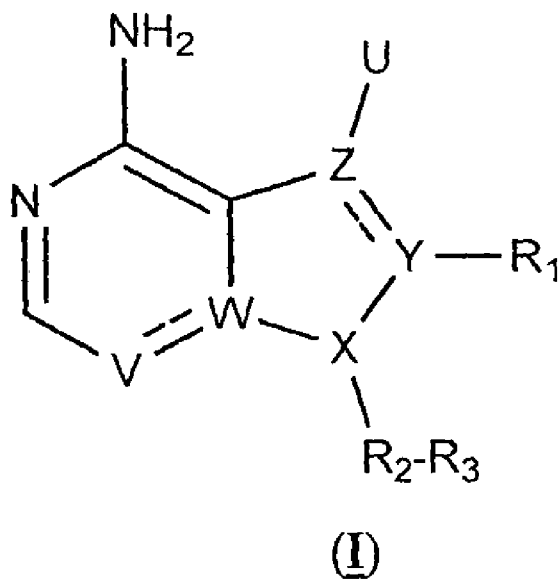
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
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KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
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TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,

[Continued on next page]

(54) Title: HETEROCYCLIC COMPOUNDS



(57) Abstract: The present invention relates to heterocyclic compounds of the general formula (I) their pharmaceutically acceptable salts, pharmaceutically acceptable solvates, enantiomers, diastereomers, and polymorphs. The invention also relates to processes for the preparation of the compounds of invention, pharmaceutical compositions containing the compounds and their use as selective Bruton's Tyrosine Kinase (BTK) inhibitors.(I)



LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
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GW, KM, ML, MR, NE, SN, TD, TG).

— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted
a patent (Rule 4.17(ii))

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER					
INV.	C07D487/04	A61K31/4985	A61K31/5025	A61K31/519	A61K31/52
	A61K31/522	A61P35/00	A61P37/00	A61P29/00	A61P19/02
	A61P11/06				

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

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)

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 95/03304 A1 (MERRELL DOW PHARMA [US]) 2 February 1995 (1995-02-02) pages 4-6; claims -----	1-13
Y	WO 00/17203 A1 (BASF AG [DE]; HIRST GAVIN C [US]; CALDERWOOD DAVID [US]; WISHART NEIL) 30 March 2000 (2000-03-30) pages 17,32,33; claims; example 208 -----	1-13
Y	WO 01/19829 A2 (BASF AG [DE]; HIRST GAVIN C [US]; CALDERWOOD DAVID [US]; WISHART NEIL) 22 March 2001 (2001-03-22) pages 34,49; claims -----	1-13
Y	WO 01/72751 A1 (BASF AG [DE]; HIRST GAVIN C [US]; CALDERWOOD DAVID [US]; MUNSCHAUER RA) 4 October 2001 (2001-10-04) claims; example 208 -----	1-13
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search	Date of mailing of the international search report
25 August 2015	02/09/2015

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Frelon, Didier
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IN2015/000063

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02/080926 A1 (ABBOTT GMBH & CO KG [DE]; HIRST GAVIN C [US]; RAFFERTY PAUL [US]; RITT) 17 October 2002 (2002-10-17) pages 16,23,40,54; claims -----	1-13
Y	WO 2005/037836 A2 (OSI PHARM INC [US]; BECK PATRICIA ANNE [US]; CESARIO CARA [US]; COX MA) 28 April 2005 (2005-04-28) pages 59,87,88; claims -----	1-13
Y	WO 2008/121742 A2 (PHARMACYCLICS INC [US]; HONIGBERG LEE [US]; VERNER ERIK [US]; BUGGY JO) 9 October 2008 (2008-10-09) pages 27-29; claims -----	1-13
Y	WO 2010/009342 A2 (PHARMACYCLICS INC [US]; HONIGBERG LEE [US]; VERNER ERIK [US]; BUGGY JO) 21 January 2010 (2010-01-21) pages 45-47; claims -----	1-13
Y	WO 2011/046964 A2 (PHARMACYCLICS INC [US]; CHEN WEI [US]; LOURY DAVID J [US]; MODY TARAK) 21 April 2011 (2011-04-21) pages 24,27; claims -----	1-13
A	YOUNG, RODNEY C. ET AL: "Purine derivatives as competitive inhibitors of human erythrocyte membrane phosphatidylinositol 4-kinase", JOURNAL OF MEDICINAL CHEMISTRY, vol. 33, no. 8, 1990, pages 2073-2080, XP002741886, DOI: 10.1021/JM00170A005 table III; compounds 53-57 -----	1-13

INTERNATIONAL SEARCH REPORT

International application No.
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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 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13

Compounds of formula (I)

1.1. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.3.0] bicyclic hydrocarbon system substituted by a rest -NH-R3

1.2. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.2.0] aza-bicyclic system

1.3. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.3.0] aza-bicyclic system substituted by a "X-5-cyclopentapyrrol-2-yl" group

1.4. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.3.0] aza-bicyclic system substituted by a "X-5-cyclopentapyrrol-1-yl" group

1.5. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.3.0] aza-bicyclic system substituted by a "X-4-cyclopentapyrrol-1-yl" group

1.6. claims: 1-13(partially)

Compounds of formula (I) wherein R2 is a [3.3.0] aza-bicyclic system substituted by a "X-4-cyclopentapyrrol-2-yl" group

1.7. claims: 1-13(partially)

Compound of formula(I) wherein R2 is a [4.3.0] aza-bicyclic system

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IN2015/000063

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