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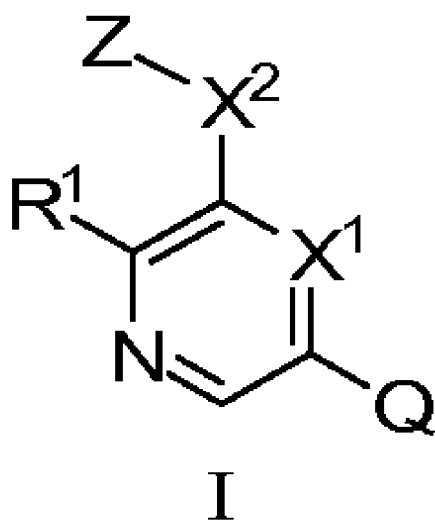
DEAK, Holly L. [US/US]; 124 Park Street, Apt. 3, Brookline, MA 02446 (US). **LIU, Longbin** [US/US]; 753 Rushing Creek Place, Thousand Oaks, CA 91360 (US). **ANDREWS, Kristin** [US/US]; 3154 Foxtail Court, Thousand Oaks, CA 91362 (US). **NISHIMURA, Nobuko** [JP/US]; 24050 Arminta Street, West Hills, CA 91304 (US). **NORMAN, Mark H.** [US/US]; 130 Venus Street, Thousand Oaks, CA 91360 (US). **PANTER, Kathleen** [US/US]; 80 Porter Road, Apt. 44, Cambridge, MA 02140 (US). **SCHENKEL, Laurie** [US/US]; 4 Longfellow Place, Apt. 3106, Boston, MA 02114 (US). **SIEGMUND, Aaron C.** [US/US]; 311 Mariposa Drive, Ventura, CA 93011 (US). **TAMAYO, Nuria A.** [US/US]; 4394 Camino De La Rosa, Newbury Park, CA 91320 (US). **YANG, Kevin** [US/US]; 8871 Camino Real Avenue, San Gabriel, CA 91775 (US).

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[Continued on next page]

(54) Title: INHIBITORS OF PI3 KINASE



(57) Abstract: The present invention relates to compounds of Formula (I), or a pharmaceutically acceptable salt thereof; methods of treating diseases or conditions, such as cancer, using the compounds; and pharmaceutical compositions containing the compounds, wherein Q, X¹, X², R¹ and Z are as defined herein.



KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

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

Published:

- *with international search report (Art. 21(3))*
— *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))*

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INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

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A61K31/4709 A61P35/00

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 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, BEILSTEIN Data, 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.
X	WO 2007/117607 A (NOVARTIS VACCINES & DIAGNOSTIC [US]; RAMURTHY SAVITHRI [US]; LIN XIADO) 18 October 2007 (2007-10-18) abstract; example 55; compounds 236,404,929,933	1-36
X	WO 03/093297 A (EXELIXIS INC [US]; BUHR CHRIS A [US]; BAIK TAE-GON) 13 November 2003 (2003-11-13) abstract; claims 2,3,42,43,49,51; examples 3,17; compounds 503, 516	1-36
A	WO 2008/012326 A (NOVARTIS AG [CH]; NOVARTIS PHARMA GMBH [AT]; STAUFFER FREDERIC [FR]; F) 31 January 2008 (2008-01-31) abstract; example 1a	1-17,36
	-/-	

☒ 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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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/073283 A (ASTRAZENECA AB [SE]; CHAPDELAINE MARC [US]; OHNMACHT CYRUS [US]; BECKE) 28 June 2007 (2007-06-28) claims 11,13,20,21; examples 11,12,157,173,180,191 -----	1-17,36

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/045713

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.:

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: 1-8 (each complete); 9-17, 36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein Q = cinnoline or phthalazine-type ring (when X=C) or an aza-derivative thereof (when at least one of X is N)

2. claims: 9-17, 36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein X1 = C and Q = isoquinoline (2nd substructure for Q in claim 9)

3. claims: 18-26 (each complete); 36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein Q = 4-substituted quinoline

4. claims: 27-36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein Q = aza derivative of quinoline/isoquinoline (1st to 3rd substructure for Q in claim 27)

5. claims: 27-36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein Q = 5th and 6th substructure for Q in claim 27

6. claims: 27-36 (each partial)

compounds (and subject-matter referring to these compounds) of formula I, wherein Q = 7th and 8th substructure for Q in claim 27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/045713

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