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C07D 471/10 (2006.01) **A61K 31/496** (2006.01)
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(71) Applicant (for all designated States except US): **PFIZER INC.** [US/US]; 235 East 42nd Street, New York, NY 10017 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): NAIR, Sajiv Krishnan [US/US]; Pfizer Global Research and Development, 10777 Science Center Drive, San Diego, CA 92121 (US). **PLANKEN, Simon Paul** [GB/US]; Pfizer Global Research and Development, 10777 Science Center Drive, San Diego, CA 92121 (US). **PLEWE, Michael Bruno** [DE/US]; 5036 Pearlman Way, San Diego, CA 92130 (US). **VERNIER, William Francois** [US/US]; Pfizer Global Research and Development, 10777 Science Center Drive, San Diego, CA 92121 (US). **YANG, Yi** [US/US]; Pfizer Global Research and Development, 10777 Science Center Drive, San Diego, CA 92121 (US). **ZHU, Huichun** [US/US]; Pfizer Global Research and Development, 10777 Science Center Drive, San Diego, CA 92121 (US).

(74) Agent: KLEIMAN, Gabriel L.; 235 East 42nd Street, New York, NY 10017 (US).

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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- of inventorship (Rule 4.17(iv))

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))

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

1 September 2011

(54) Title: BENZIMIDAZOLE DERIVATIVES

(57) Abstract: The present invention relates to a compound of formula (I) or a pharmaceutically acceptable salt thereof, wherein R^{1A}, R^{1B}, R^{1C}, R², R³, R⁴, R⁵, R_A, R_B, R_C and X are as defined herein. These novel benzimidazole derivatives are useful in therapy, in particular for treating diseases or conditions mediated by SMO, including the treatment of abnormal cell growth, such as cancer, in mammals. This invention also relates to a method of using such compounds in the treatment of abnormal cell growth in mammals, especially humans, and to pharmaceutical compositions containing such compounds.



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/053634

A. CLASSIFICATION OF SUBJECT MATTER

INV. C07D401/04 C07D401/14 C07D403/04 C07D413/14 C07D471/04
C07D471/10 C07D487/04 C07D487/08 C07D513/04 A61K31/444
A61P35/00 A61K31/506 A61K31/496

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

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, CHEM ABS Data, WPI 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.
X	WO 2006/050506 A1 (CURIS INC [US]; GUICHERIT OIVIN M [US]; BOYD EDWARD ANDREW [GB]; BRUNT) 11 May 2006 (2006-05-11) page 1, line 8 - page 3, line 29; claims 1,20; examples 17,34-38; table 1 -----	1-20
X	WO 2008/064830 A1 (UCB PHARMA SA [BE]; DAVENPORT RICHARD JOHN [GB]; RATCLIFFE ANDREW JAME) 5 June 2008 (2008-06-05) page 1, line 28 - line 31; claim 1; compounds 23,24 -----	1
X,P	WO 2010/027746 A2 (IRM LLC [US]; CHENG DAI [US]; HAN DONG [US]; ZHANG GUOBAO [US]; WAN YO) 11 March 2010 (2010-03-11) paragraph [0004]; claim 1; table 1; compound 111 -----	1

☐ 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

15 October 2010

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12/07/2011

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

Seelmann, Ingo

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2010/053634

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006050506 A1	11-05-2006	AU 2005301962 A1 CA 2587489 A1 EP 1807074 A1 JP 2008519044 A NZ 555419 A US 2009012082 A1	11-05-2006 11-05-2006 18-07-2007 05-06-2008 31-07-2009 08-01-2009
WO 2008064830 A1	05-06-2008	NONE	
WO 2010027746 A2	11-03-2010	AU 2009288399 A1 CA 2733533 A1 EP 2328871 A2 US 2011152282 A1	11-03-2010 11-03-2010 08-06-2011 23-06-2011

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-4, 9, 10, 12, 14, 17-20(all partially)

subject-matter relating to compounds with RA=N, RB=CH, RC=CH
and R4 and R5 forming together a ring

2. claims: 1-4, 9, 10, 12, 14, 17-20(all partially)

subject-matter relating to compounds with RA=N, RB=CH, RC=CH
and R4 and R5 not forming together a ring

3. claims: 16(completely); 1-6, 9-15, 17-20(partially)

subject-matter relating to compounds with RA=CH, RB=N, RC=CH
and R4 and R5 forming together a ring

4. claims: 1-6, 9-15, 17-20(all partially)

subject-matter relating to compounds with RA=CH, RB=N, RC=CH
and R4 and R5 not forming together a ring

5. claims: 1-4, 7, 9-15, 17-20(all partially)

subject-matter relating to compounds with RA=CH, RB=CH, RC=N

6. claims: 8(completely); 1-7, 9-15, 17-20(partially)

subject-matter relating to compounds with two or three of
RA, RB and RC=N

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/053634

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.:

1-4, 9, 10, 12, 14, 17-20(all partially)

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.