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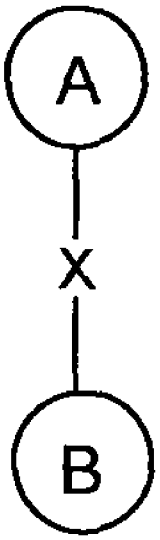
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

[Continued on next page]

(54) Title: ANTIMICROBIAL AGENTS

(57) Abstract: The invention provides methods of treating a bacterial infection in a mammal comprising administering to the mammal a compound of formula I: [formula should be inserted here] wherein A, B, and X have any of the meanings defined in the specification; or a pharmaceutically acceptable salt thereof, as well as novel compounds of formula I and salts thereof and pharmaceutical compositions comprising a compound of formula I or a pharmaceutically acceptable salt thereof.



(I)

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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, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K31/131 A61K31/14 A61K31/155 A61K31/417 A61P31/04
ADD.

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)
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, BIOSIS, CHEM ABS Data, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011/156626 A1 (UNIV RUTGERS [US]; UNIV NEW JERSEY MED [US]; LAVOIE EDMOND J [US]; PAR) 15 December 2011 (2011-12-15) claims 160-174	1-28

X	US 2006/183943 A1 (HU BAIHUA [US]) 17 August 2006 (2006-08-17) page 9; example 3 claims 9-20	24,25,27

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[X] Further documents are listed in the continuation of Box C.

[X] 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 application or patent 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	Date of mailing of the international search report
15 April 2013	19/07/2013

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

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/021300

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.:

5, 12-16(completely); 1, 2, 4, 8-11, 17-28(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.

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TOBY JACKSON ET AL: "Non-Steroidal Aromatase Inhibitors Based on a Biphenyl Scaffold: Synthesis, in vitro SAR, and Molecular Modelling", CHEMMEDCHEM, vol. 3, no. 4, 14 April 2008 (2008-04-14), pages 603-618, XP055059262, ISSN: 1860-7179, DOI: 10.1002/cmdc.200700266 page 605; table 2 page 611 -----	24,25
X	LEROUX F ET AL: "N-(4-Biphenylmethyl)imidazoles as Potential Therapeutics for the Treatment of Prostate Cancer: Metabolic Robustness Due to Fluorine Substitution?", HELVETICA CHIMICA ACTA, VERLAG HELVETICA CHIMICA ACTA, BASEL, CH, vol. 86, 1 January 2003 (2003-01-01), pages 2671-2686, XP002996593, ISSN: 0018-019X, DOI: 10.1002/HLCA.200390217 page 2671 - page 2673 examples 2a, 2b, 3a, 3b, 1e -----	24,25
X	US 4 309 539 A (BOLLER ARTHUR ET AL) 5 January 1982 (1982-01-05) column 11 -----	24
X	US 5 177 067 A (GUERRY PHILIPPE [CH] ET AL) 5 January 1993 (1993-01-05) 1-dimethylamino-1-methylethyl-biphenyl; column 20 -----	24
X	DE 43 27 748 A1 (MERCK PATENT GMBH [DE]) 23 February 1995 (1995-02-23) compounds RN166740-42-7 -----	24
X	WACHALL B G ET AL: "IMIDAZOLE SUBSTITUTED BIPHENYLS: A NEW CLASS OF HIGHLY POTENT AND IN VIVO ACTIVE INHIBITORS OF P450 17 AS POTENTIAL THERAPEUTICS FOR TREATMENT OF PROSTATE CANCER", BIOORGANIC & MEDICINAL CHEMISTRY, PERGAMON, GB, vol. 7, no. 9, 1 January 1999 (1999-01-01) , pages 1913-1924, XP002936367, ISSN: 0968-0896, DOI: 10.1016/S0968-0896(99)00160-1 page 1916 - page 1917; tables 1-2 page 1923, column 1 -----	24,25

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/021300

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BILD T ET AL: "DISCOVERY OF INHIBITORS OF MCF-7 TUMOR CELL ADHESION TO ENDOTHELIAL CELLS AND INVESTIGATION ON THEIR MODE OF ACTION", ARCHIV DER PHARMAZIE, WILEY VERLAG, WEINHEIM, vol. 337, no. 12, 1 January 2004 (2004-01-01), pages 687-694, XP008057236, ISSN: 0365-6233, DOI: 10.1002/ARDP.200400622 page 688 - page 689; compound BW39 -----	24,25
X,P	KAUL, MALVIKA ET AL: "A Bactericidal Guanidinomethyl Biaryl That Alters the Dynamics of Bacterial FtsZ Polymerization", JOURNAL OF MEDICINAL CHEMISTRY , 55(22), 10160-10176 CODEN: JMCMAR; ISSN: 0022-2623, vol. 55, 2012, XP002695345, the whole document -----	1-28

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2013/021300

Patent document cited in search report		Publication date	Patent family member(s)			Publication date
WO 2011156626	A1	15-12-2011	CA	2810162	A1	15-12-2011
			US	2013116278	A1	09-05-2013
			WO	2011156626	A1	15-12-2011
US 2006183943	A1	17-08-2006	US	2006183943	A1	17-08-2006
			WO	2006088705	A1	24-08-2006
US 4309539	A	05-01-1982	NONE			
US 5177067	A	05-01-1993	AT	116964	T	15-01-1995
			AU	649684	B2	02-06-1994
			CA	2044533	A1	30-12-1991
			DE	59104205	D1	23-02-1995
			DK	0464465	T3	22-05-1995
			EP	0464465	A1	08-01-1992
			IE	912283	A1	01-01-1992
			JP	H0768190	B2	26-07-1995
			JP	H04230348	A	19-08-1992
			NZ	238672	A	23-12-1993
			US	5177067	A	05-01-1993
DE 4327748	A1	23-02-1995	NONE			

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 5, 12-16(completely); 1, 2, 4, 8-11, 17-28(partially)

   A compound of formula I wherein A and B are both phenyl, pharmaceutical compositions containing it and medical use thereof.

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2. claims: 6(completely); 1, 2, 4, 8-10, 17-28(partially)

   A compound of formula I wherein A is phenyl and B is pyridyl, pharmaceutical compositions containing it and medical use thereof.

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3. claims: 1, 2, 4, 8-10, 18-28(all partially)

   A compound of formula I wherein A is phenyl and B is benzothiazole, pharmaceutical compositions containing it and medical use thereof.

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4. claims: 7(completely); 1, 2, 4, 8-10, 18-28(partially)

   A compound of formula I wherein A is phenyl and B is thiazolyl, pharmaceutical compositions containing it and medical use thereof.

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5. claims: 5(completely); 1, 3, 4, 8-10, 18-28(partially)

   A compound of formula I wherein A is thiazolyl and B is phenyl, pharmaceutical compositions containing it and medical use thereof.

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6. claims: 6(completely); 1, 3, 4, 8-10, 18-28(partially)

   A compound of formula I wherein A is thiazolyl and B is pyridyl, pharmaceutical compositions containing it and medical use thereof.

   ---

7. claims: 1, 3, 4, 8-10, 18-28(all partially)

   A compound of formula I wherein A is thiazolyl and B is benzothiazole, pharmaceutical compositions containing it and medical use thereof.

   ---

8. claims: 7(completely); 1, 3, 4, 8-10, 18-28(partially)

   A compound of formula I wherein A is thiazolyl and B is

thiazolyl, pharmaceutical compositions containing it and medical use thereof.