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(71) Applicant (for all designated States except US): **SCHERING CORPORATION** [US/US]; 2000 Galloping Hill Road, Kenilworth, New Jersey 07033-0530 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GUZI, Timothy, J.** [US/US]; 48 Red Road, Chatham, New Jersey 07928 (US). **PARUCH, Kamil** [CZ/US]; 20 Third Avenue, Garwood, NJ 07027 (US). **DWYER, Michael, P.** [US/US]; 235 Katherine Street, Scotch Plains, NJ 07076 (US). **ZHAO, Lianyun** [CN/US]; 3 Radcliff Street, Burlington, MA 01803 (US). **CURRAN, Patrick, J.** [US/US]; 300 Governor's Drive, Apt. 23, Winthrop, MA 02152 (US). **BELANGER, David, B.** [US/US]; 27 Chalk Street, #2, Cambridge, MA 02139 (US). **HAMANN, Blake** [US/US]; 15 Alden Road, Watertown, MA 02472 (US). **REDDY, Panduranga, A.** [US/US]; 32 Bubbling Brook Road, Walpole, MA 02081 (US). **SIDDIQUI, Arshad, M.** [CA/US]; 10 Ohio Street, Newton, MA 02464 (US).

(74) Agent: **KALYANARAMAN, Palaiyur, S.**; Schering-Plough Corporation, 2000 Galloping Hill Road, Patent Dept. K-6-1 1990, Kenilworth, New Jersey 07033-0530 (US).

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(54) Title: IMIDAZOPYRAZINES AS CYCLIN DEPENDENT KINASE INHIBITORS

(57) Abstract: In its many embodiments, the present invention provides a novel class of imidazo[1,2-a]pyrazine compounds as inhibitors of cyclin dependent kinases, methods of preparing such compounds, pharmaceutical compositions containing one or more such compounds, methods of preparing pharmaceutical formulations comprising one or more such compounds, and methods of treatment, prevention, inhibition, or amelioration of one or more diseases associated with the CDKs using such compounds or pharmaceutical compositions.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

INV. C07D487/04 A61K31/498 A61P35/00

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

B. FIELDS SEARCHED

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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, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 2006/106023 A1 (GUZI TIMOTHY J [US] ET AL) 18 May 2006 (2006-05-18) claim 1 page 1, paragraph 2 Examples	1-38
X	US 2004/063715 A1 (PARUCH KAMIL [US] ET AL) 1 April 2004 (2004-04-01) claim 1 page 1, paragraph 8 Examples page 4 - page 10; table 1	1-38
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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bissmire, Stewart

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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	BONNET P A ET AL: "Synthesis and antibronchospastic activity of 8-alkoxy- and 8-(alkylamino)imidazo(1,2-a)pyrazines" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, US, vol. 35, no. 18, 1992, pages 3353-3358, XP002971280 ISSN: 0022-2623 page 3354; table 1; compounds 6, 19 -----	1
Y	WO 2004/026310 A1 (SCHERING CORP [US]) 1 April 2004 (2004-04-01) claim 1 -----	1-38
Y	WO 2004/026877 A (SCHERING CORP [US]) 1 April 2004 (2004-04-01) claim 1 -----	1-38
Y	US 2004/072835 A1 (PARUCH KAMIL [US] ET AL) 15 April 2004 (2004-04-15) claim 1 -----	1-38

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2006/043592

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006106023 A1	18-05-2006	NONE	
US 2004063715 A1	01-04-2004	US 2005130980 A1	16-06-2005
WO 2004026310 A1	01-04-2004	AU 2003275031 A1	08-04-2004
		CA 2499874 A1	01-04-2004
		CN 1694706 A	09-11-2005
		EP 1542693 A1	22-06-2005
		JP 2006503838 T	02-02-2006
		KR 20060010709 A	02-02-2006
		MX PA05003119 A	22-06-2005
		ZA 200502380 A	27-09-2005
WO 2004026877 A	01-04-2004	AU 2003272476 A1	08-04-2004
		CA 2499756 A1	01-04-2004
		CN 1694886 A	09-11-2005
		EP 1543008 A1	22-06-2005
		JP 2006507253 T	02-03-2006
		KR 20050057520 A	16-06-2005
		MX PA05003120 A	22-06-2005
		ZA 200502375 A	27-09-2005
US 2004072835 A1	15-04-2004	NONE	