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(71) Applicant (*for all designated States except US*): **BAYER AKTIENGESELLSCHAFT** [DE/DE]; 51368 Leverkusen (DE).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **RAMAKRISHNAN, Shyam** [IN/US]; 76 Euston Road Apt. #10, Brighton, MA 02135 (US).

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(74) Common Representative: **BAYER AKTIENGESELLSCHAFT**; 51368 Leverkusen (DE).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: REGULATION OF HUMAN PHOSPHODIESTERASE-LIKE ENZYME

(57) Abstract: Reagents which regulate human phosphodiesterase-like enzyme (PDE-like enzyme) activity and reagents which bind to human PDE-like enzyme gene products can be used to regulate degradation of cGMP. Such regulation is particularly useful for treating urinary incontinence, benign prostate hyperplasia, erectile dysfunction, diabetes, cancer, and cardiovascular disorders.



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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N9/16 C12N15/52 C12N15/63 C12N5/10 C12Q1/68
G01N33/50 G01N33/573 A61K48/00 C12N15/62 C12N15/11
A61K39/00 A61K38/00

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)

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, PAJ, SEQUENCE SEARCH, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FAWCETT ET AL: "Molecular cloning and characterization of a distinct human phosphodiesterase gene family: PDE11A" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 97, no. 7, 28 March 2000 (2000-03-28), pages 3702-3707, XP002139278 ISSN: 0027-8424 entire document, in particular the cited passages abstract page 3704, right-hand column, last paragraph -page 3706, left-hand column, paragraph 1; figures 1-4; table 2 --- -/--	1-71

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

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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

Brenz Verca, S

INTERNATIONAL SEARCH REPORT

National Application No

PCT/EP 01/07289

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	STRAUSBERG ET AL: "ov40a11.x1 Soares_testis_NHT Homo sapiens cDNA clone IMAGE:1639772 3' similar to TR:q28156 Q28156 CGMP-SPECIFIC PHOSPHODIESTERASE" EMBL NUCLEOTIDE SEQUENCE; ACCESSION NR. AI025081, 'Online! - 19 June 1998 (1998-06-19) XP002130583 the whole document ---	1-71
P,X	DATABASE EMBL 'Online! Homo sapiens BAC clone RP11-696G20, 6 July 2000 (2000-07-06) NGUYEN C. ET AL: "Homo sapiens " retrieved from EBI Database accession no. AC073892 XP002196954 Annotations in FT fields referring to AI025081 the whole document ---	1-71
P,X	HETMAN JOANNA M ET AL: "Cloning and characterization of two splice variants of human phosphodiesterase 11A" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE. WASHINGTON, US, vol. 97, no. 23, 7 November 2000 (2000-11-07), pages 12891-12895, XP002158338 ISSN: 0027-8424 the whole document ---	1-71
P,X	YUASA KEIZO ET AL: "Isolation and characterization of two novel phosphodiesterase PDE11A variants showing unique structure and tissue-specific expression" JOURNAL OF BIOLOGICAL CHEMISTRY, AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS, BALTIMORE, MD, US, vol. 275, no. 40, 6 October 2000 (2000-10-06), pages 31469-31479, XP002158339 ISSN: 0021-9258 whole document, in particular cited passages and GenBank entries AB036704 and AB038041 page 31474, left-hand column, last paragraph -page 31476, right-hand column, paragraph 2; figures 1B,2A,4,5,6; tables I,II --- -/--	1-71

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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.
P,A	YUASA KEIZO ET AL: "Genomic organization of the human phosphodiesterase PDE11A gene. Evolutionary relatedness with other PDEs containing GAF domains." EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 268, no. 1, January 2001 (2001-01), pages 168-178, XP002196952 ISSN: 0014-2956 whole document, in particular the cited passages page 174, left-hand column, last paragraph -right-hand column, paragraph 1; figures 1,2,4	1-4, 18-22
P,X	EP 1 085 089 A (PFIZER LTD ;PFIZER (US)) 21 March 2001 (2001-03-21) whole document, in particular sequences Nr.1 and 2, as well as cited passages paragraphs '0024!', '0063!', '0339!'-'0357!; claims 1-23	1-71
E	DATABASE WPI Section Ch, Week 200144 Derwent Publications Ltd., London, GB; Class B04, AN 2001-418074 XP002196955 -& WO 01 46436 A (TANABE SEIYAKU CO), 28 June 2001 (2001-06-28) Sequences 1-39 abstract	1-4, 6-13, 36-48
E	DATABASE WPI Section Ch, Week 200164 Derwent Publications Ltd., London, GB; Class B04, AN 2001-570769 XP002196956 -& WO 01 66716 A (KYOWA HAKKO KOGYO KK), 13 September 2001 (2001-09-13) Sequences 15 and 16 abstract	1-13, 36-48
E	WO 01 71042 A (PE CORP NY) 27 September 2001 (2001-09-27) See sequence IDs Nr. 17847 and 42399 the whole document	1-3,6-9
A	EP 0 967 284 A (PFIZER LTD ;PFIZER (US)) 29 December 1999 (1999-12-29) the whole document	1-71

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national Application No
PCT/EP 01/07289

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	YUASA KEIZO ET AL: "Identification of rat cyclic nucleotide phosphodiesterase 11A (PDE11A). Comparison of rat and human PDE11A splicing variants." EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 268, no. 16, August 2001 (2001-08), pages 4440-4448, XP002196953 ISSN: 0014-2956 -----	

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 14-17, 60-65, 68-71 (all partial)

Present claims 14-17 and 68-71 relate to a "reagent" defined by reference to a desirable characteristic or property, namely its ability to modulate the activity of a PDE-like enzyme polypeptide and its medical use.

The claims cover all reagents having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and disclosure within the meaning of Article 5 PCT for only a very limited number of such reagents. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the reagent by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the inhibitor compounds IBMX and dipyridamole mentioned in the description.

For analogous reasons, the search of claims 60-65 was restricted to explicitly mentioned "reagents" capable of specifically binding the product of a polynucleotide comprising the sequence of SEQ IDs NO. 1 or 4, namely antibodies, ribozymes and antisense oligonucleotides.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

national Application No

PCT/EP 01/07289

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1085089	A	21-03-2001	EP 1085089 A2	21-03-2001
			JP 2001136987 A	22-05-2001
WO 0146436	A	28-06-2001	JP 2001178467 A	03-07-2001
			JP 2001340084 A	11-12-2001
			AU 2400401 A	03-07-2001
			WO 0146436 A1	28-06-2001
WO 0166716	A	13-09-2001	AU 3610101 A	17-09-2001
			WO 0166716 A1	13-09-2001
WO 0171042	A	27-09-2001	AU 4594501 A	03-10-2001
			WO 0171042 A2	27-09-2001
EP 0967284	A	29-12-1999	EP 0967284 A1	29-12-1999
			JP 2000023682 A	25-01-2000