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(54) Novel human calcium sensitive potassium channel subunits

(57) The present invention is directed to novel human DNA sequences encoding calcium sensitive potassium channel subunits β3a, β3b, β3c and β3d, the proteins encoded by the DNA sequences, vectors comprising the DNA sequences, host cells containing the vectors, and methods of identifying inhibitors and agonists of calcium sensitive potassium channels containing human β3a, β3b, β3c, or β3d subunits and inhibitors and agonists of β3 gene transcription.

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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 5961

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DATABASE EMBL Calcium-activated potassium channel subunit 13 July 1999 (1999-07-13), XP002294852 retrieved from EBI accession no. AI823768 * abstract *	1-17	C07K14/47 C07K16/18 G01N33/53 G01N33/567 C12N5/10 C12N15/12 C12N15/63 C12N15/64 C07K14/705
P,X	WO 99/43696 A (AXYS PHARM INC) 2 September 1999 (1999-09-02) Potassium channel (no mention calcium sensitive but inherent feature) AC number AAY34131 * page 5 *	1-17	
P,X	RIAZI M A ET AL: "Identification of a putative regulatory subunit of a calcium-activated potassium channel in the dup(3q) syndrome region and a related sequence on 22q11.2." GENOMICS. 15 NOV 1999, vol. 62, no. 1, 15 November 1999 (1999-11-15), pages 90-94, XP002294851 ISSN: 0888-7543 SEQ ID No.4 99.6% 277 aa SEQ ID No.3 99.6% 827 nt * abstract * * figure 1 *	1-17	
T	UEBELE V N ET AL: "Cloning and functional expression of two families of beta-subunits of the large conductance calcium-activated K+ channel." THE JOURNAL OF BIOLOGICAL CHEMISTRY. UNITED STATES 28 JUL 2000, vol. 275, no. 30, 28 July 2000 (2000-07-28), pages 23211-23218, XP002236231 ISSN: 0021-9258 * the whole document *	1-17	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
C07K

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	15 September 2004	Surdej, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 04 07 5961

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-17 (all partially)

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 04 07 5961

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-17 (all partially)

DNA encoding a human calcium sensitive potassium channel beta3a (corresponding to SEQ ID No.3 and 4) and the corresponding protein. The corresponding products or methods containing or using said DNA and protein: Expression vector, recombinant host cell, antibody, DNA or RNA oligonucleotide probe and a method for identifying substances that bind to calcium sensitive potassium channels containing human calcium sensitive potassium channel beta3a.

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2. claims: 1-17 (all partially)

DNA encoding a human calcium sensitive potassium channel beta3b (corresponding to SEQ ID No.5 and 6) and the corresponding protein. The corresponding products or methods containing or using said DNA and protein: Expression vector, recombinant host cell, antibody, DNA or RNA oligonucleotide probe and a method for identifying substances that bind to calcium sensitive potassium channels containing human calcium sensitive potassium channel beta3b.

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3. claims: 1-17 (all partially)

DNA encoding a human calcium sensitive potassium channel beta3c (corresponding to SEQ ID No.7 and 8) and the corresponding protein. The corresponding products or methods containing or using said DNA and protein: Expression vector, recombinant host cell, antibody, DNA or RNA oligonucleotide probe and a method for identifying substances that bind to calcium sensitive potassium channels containing human calcium sensitive potassium channel beta3c.

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4. claims: 1-17 (all partially)

DNA encoding a human calcium sensitive potassium channel beta3d (corresponding to SEQ ID No.9 and 10) and the corresponding protein. The corresponding products or methods containing or using said DNA and protein: Expression vector, recombinant host cell, antibody, DNA or RNA oligonucleotide probe and a method for identifying substances that bind to calcium sensitive potassium channels containing human calcium sensitive potassium channel beta3d.

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5. claims: 1, 3, 6-7, 14 (all partially), claims 18-42 (all completely)

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 04 07 5961

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

DNA encoding a human calcium sensitive potassium channel (corresponding to SEQ ID No. 20). The corresponding products or methods containing or using said DNA: Expression vector, recombinant host cell, DNA or RNA oligonucleotide probe, methods of identifying DNA sequences in the beta3 gene that promote, enhance, or repress gene transcription.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 07 5961

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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15-09-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9943696 A	02-09-1999	AU 747846 B2	23-05-2002
		AU 2780999 A	15-09-1999
		CA 2321194 A1	02-09-1999
		EP 1056765 A1	06-12-2000
		WO 9943696 A1	02-09-1999
		US 2003036648 A1	20-02-2003
		US 6399761 B1	04-06-2002

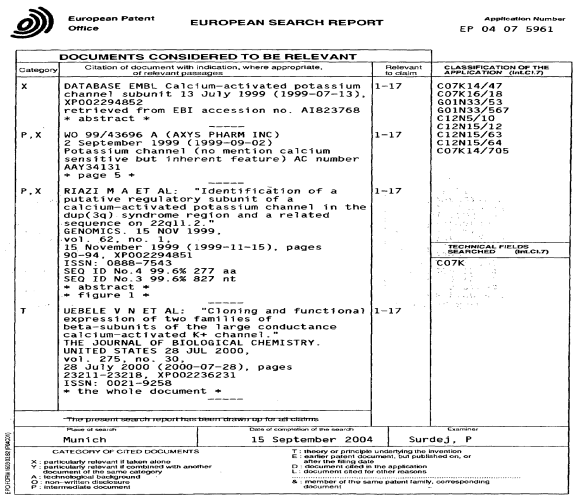
EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	新型人钙敏感钾通道亚基		
公开(公告)号	EP1475388A3	公开(公告)日	2005-02-09
申请号	EP2004075961	申请日	2000-07-18
申请(专利权)人(译)	MERCK & CO.，INC.		
当前申请(专利权)人(译)	MERCK & CO.，INC.		
[标]发明人	UEBELE VICTOR SWANSON RICHARD LIU YUAN LAGRUTTA ARMANDO		
发明人	UEBELE, VICTOR SWANSON, RICHARD LIU, YUAN LAGRUTTA, ARMANDO		
IPC分类号	C07K14/705 C12N15/12 C07K14/47 C07K16/18 G01N33/53 G01N33/567 C12N5/10 C12N15/63 C12N15/64		
CPC分类号	C07K14/705		
优先权	60/144764 1999-07-20 US		
其他公开文献	EP1475388A2		
外部链接	Espacenet		

摘要(译)

本发明涉及编码钙敏感性钾通道亚基β3a，β3b，β3c和β3d的新型人DNA序列，由DNA序列编码的蛋白质，包含DNA序列的载体，含有载体的宿主细胞，以及鉴定抑制剂和含有人β3a，β3b，β3c或β3d亚基的钙敏感性钾通道的激动剂和β3基因转录的抑制剂和激动剂。



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L: document cited for other reasons

&: member of the same patent family, corresponding document

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