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(54) Title: CARDIAC ARRHYTHMIA TREATMENT METHODS

(57) Abstract: Disclosed are methods of preventing or treating cardiac arrhythmia. In one embodiment, the methods include administering to an amount of at least one polynucleotide that modulates an electrical property of the heart. The methods have a wide variety of important uses including treating cardiac arrhythmia.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/27623

A. CLASSIFICATION OF SUBJECT MATTER														
IPC(7) : A61K 48/00; C12N 15/63; CO7H 21/02; A61N 1/05 US CL : 514/44; 435/320.1; 536/23.1; 606/41														
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) U.S. : 514/44; 435/320.1; 536/23.1; 606/41														
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) EAST, MEDLINE, BIOSIS, CAPLUS, EMBASE, COMMERCIAL SEQUENCE DATABASES														
C. DOCUMENTS CONSIDERED TO BE RELEVANT														
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	US 6,086,582 A (ALTMAN et al) 11 July 2000, see particular abstract and figure 1a.	53-55												
X	US 5,944,710 A (DEV et al) 31 August 1999, figures 1, 6 and 7, column 13, lines 1-14 and claims 15-18.	52-55												
X, P	US 6,214,620 B1 (JOHNS et al) 10 April 2001, see entire document.	1-15, 22-26, 36-39, 45-47, 49-51												
X	Johns et al. Adenovirus-mediated expression of a voltage-gated potassium channel in vitro (Rat Cardiac Myocytes) and in vivo (Rat Liver). A novel strategy for modifying excitability. J Clin. Invest. August 1995, Vol. 96, pages 1152-1158, see entire document.	1-15, 22-26, 36-39, 45-47, 49-51												
X	Hoppe et al. Adenovirus-mediated inducible gene expression in vivo by a hybrid ecdysone receptor. Molecular Therapy. February 2000, Vol. 1, pages 159-164, see entire document.	1-11, 22-26, 36, 45-47, 50, 51												
X	Hoppe et al. Molecular dissection of cardiac repolarization by in vivo Kv4.3 gene transfer. Journal of Clinical Investigation. April 2000, Vol. 105, pages 1077-1084, see entire document.	1-15, 22-26, 36, 45-47, 49-51												
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
<table border="0"> <tr> <td>* Special categories of cited documents:</td> <td>"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</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent published on or after the international filing date</td> <td>"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</td> </tr> <tr> <td>"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)</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			* Special categories of cited documents:	"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	"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent published on or after the international filing date	"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	"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)	"&" document member of the same patent family	"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	
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"P" document published prior to the international filing date but later than the priority date claimed														
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Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer Q. Janice Li <i>Janice Ford</i> Telephone No. 703-308-0196												

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/27623

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim 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. Claim Nos.: 16 and 56-59
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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 fee, this Authority did not invite payment of any additional fee.
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.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.