

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
5 February 2004 (05.02.2004)

PCT

(10) International Publication Number  
**WO 2004/011603 A3**

- (51) International Patent Classification<sup>7</sup>: **C12Q 1/00**
- (21) International Application Number:  
PCT/US2003/023174
- (22) International Filing Date: 25 July 2003 (25.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/399,330 26 July 2002 (26.07.2002) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**  
— with international search report  
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report:  
8 July 2004
- 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.*



WO 2004/011603 A3

(54) Title: FUNCTIONAL CARDIOMYOCYTES FROM HUMAN EMBRYONIC STEM CELLS

(57) Abstract: Human embryonic stem cells form embryoid bodies in culture which contain differentiated human cells. Some of the human cells in embryoid bodies differentiate into cardiomyocytes. Here the biological and electrical characteristics of those cardiomyocytes are described with reference to the use of cardiomyocytes derived from human embryonic stem cells in drug screening protocols for mechanisms of cardiac toxicity.

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/23174

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : C12Q 1/00  
US CL : 435/4

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. : 435/4

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)  
Please See Continuation Sheet

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	KOLOSSOV et al. Functional characteristics of ES cell-derived cardiac precursor cells identified by tissue-specific expression of the green fluorescent protein. J Cell Biol. December 1998, Vol. 143 No. 7, pages 2045-2056, see entire document.	1-3 ----- 4-15
X --- Y	MALTSEV et al. Establishment of beta-adrenergic modulation of L-type Ca <sup>2+</sup> current in the early stages of cardiomyocyte development. Circ Res. February 1999, Vol. 84 No. 2, pages 136-145, see entire document.	1-3 ----- 4-15
X --- Y	MALTSEV et al. Cardiomyocytes differentiated in vitro from embryonic stem cells developmentally express cardiac-specific genes and ionic currents. Circ Res. August 1994, Vol. 75 No. 2, pages 233-244, see entire document.	1-3,7-9 ----- 4,10-15
Y	US 2002/0092035 A1 (HESCHELER) 11 July 2002 (11.07.2002), see entire document, especially the section beginning at paragraph [0156].	1-15
Y	US 5,928,943 A (FRANZ et al.) 27 July 1999 (27.07.1999), see entire document, especially column 2, paragraph 2	1-15

Further documents are listed in the continuation of Box C.

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	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"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
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

04 February 2004 (04.02.2004)

Date of mailing of the international search report

19 MAY 2004

Name and mailing address of the ISA/US

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Alexandria, Virginia 22313-1450

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**INTERNATIONAL SEARCH REPORT**

PCT/US03/23174

**Continuation of B. FIELDS SEARCHED Item 3:**

APS (EAST); STN (MEDLINE, BIOSIS, CAPLUS, EMBASE, CANCERLIT)

KEY WORDS: CARDIOMYOCYTE; PATCH CLAMP; ES CELL OR EMBRYONIC STEM