(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 April 2008 (17.04.2008)

PCT

(10) International Publication Number
WO 2008/045952 A3

(51) International Patent Classification:
C12N 5/00 (2006.01) *G01N 33/00* (2006.01)
C12N 5/06 (2006.01) *A01K 67/00* (2006.01)
C12N 5/18 (2006.01) *A01K 67/027* (2006.01)

(21) International Application Number:
PCT/US2007/080975

(22) International Filing Date: 10 October 2007 (10.10.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/850,471 10 October 2006 (10.10.2006) US
60/881,527 19 January 2007 (19.01.2007) US

(71) Applicant *(for all designated States except US)*: **THE REGENTS OF THE UNIVERSITY OF MICHIGAN** [US/US]; 3003 South State Street, Ann Arbor, MI 48109-1280 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **SWAROOP, Anand** [US/US]; 3805 Walden Wood Drive, Ann Arbor, 48105 (US). **AKIMOTO, Masayuki** [JP/JP]; 56 Higashioguracho, Kitashirakawa, Sakyoku, Kyoto, 606-8265 (JP). **MEARS, Alan** [GB/CA]; 51 Great Oak Pvt, Ottawa, Ontario, K1G 6P7 (CA). **CHENG, Hong** [CN/US]; 2882 Braeburn Circle, Ann Arbor, MI 48108 (US). **OH, Edwin, C.t.** [SG/US]; 953 Wall St., Apt. 1, Ann Arbor, MI 48105 (US).

(74) Agents: **SISK, Tyler J.** et al.; Casimir Jones, S.C., 440 Science Drive, Suite 203, Madison, WI 53711 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
30 April 2009

(54) Title: PHOTORECEPTOR PRECURSOR CELLS

(57) Abstract: The present invention relates to photoreceptor cells. In particular, the present invention provides photoreceptor cells comprising heterologous nucleic acid sequences and transgenic animals comprising the same. The present invention also provides photoreceptor precursor cells (e.g., rod photoreceptor precursor cells), and methods of identifying, characterizing, isolating and utilizing the same. Compositions and methods of the present invention find use in, among other things, research, clinical, diagnostic, drug discovery, and therapeutic applications.

WO 2008/045952 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/80975

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **C12N 5/00**(2006.01),**5/06**(2006.01),**5/18**(2006.01);**G01N 33/00**(2006.01);**A01K 67/00**(2006.01),**67/027**(2006.01)

USPC: 435/325,354;800/3,8,18
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. : 435/325,354; 800/3, 8,18

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-USPTO internal database, PubMed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	Lamba et al. Efficient generation of retinal progenitor cells from human embryonic stem cells. PNAS.Aug. 22, 2006. Vol. 103(34):12769-12774	1-6, 14-17, 43-45 ---------- 7-9, 18-41
X --- Y	US 6,117,675 (Van der Kooy et al) 12 September 2000 (12.09.2000) col.5, 8	1-6, 10-17, 42 ---------- 7-9, 18-41
Y	Khanna et al. Retinoic Acid Regulates the Expression of Photoreceptor Transcription Factor NRL. JOURNAL OF BIOLOGICAL CHEMISTRY. SEPTEMBER 15, 2006. VOL. 281(37):27327-27334	46-49, 52, 53

☒ 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

"E" earlier application or patent 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

"&" document member of the same patent family

Date of the actual completion of the international search
27 July 2008 (27.07.2008)

Date of mailing of the international search report
07 OCT 2008

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (571) 273-3201

Authorized officer
Taeyoon Kim

Telephone No. 571-272-0700

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/80975

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Swain et al. Multiple Phosphorylated Isoforms of NRL Are Expressed in Rod Photoreceptors. THE JOURNAL OF BIOLOGICAL CHEMISTRY. Vol. 276, No. 39, September 28, 2001. pp. 36824–36830	46, 47, 50, 51-53