

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 August 2009 (20.08.2009)

PCT

(10) International Publication Number
WO 2009/102748 A3

(51) International Patent Classification:
C12Q 1/68 (2006.01)

(21) International Application Number:
PCT/US2009/033733

(22) International Filing Date:
11 February 2009 (11.02.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/029,209 15 February 2008 (15.02.2008) US

(71) Applicant (for all designated States except US): **UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN** [IE/IE]; Belfield, Dublin 4 (IE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MURPHY, Keith J.** [IE/IE]; 16 St. Patrick's Cottages, Rathfarnham, Dublin, 14 (IE). **RING, Robert H.** [US/US]; 8 Sunset Road, Yardley, Pennsylvania 19067 (US). **MULVANY, Sean** [IE/IE]; Carrick Crossakiel, Kells, Co. Meath (IE). **VON SCHACK, David** [US/US]; 10 Cheviot Road, Arlington, Massachusetts 02474 (US). **REGAN, Ciaran M.** [IE/IE]; 14 Madison Road, Kilmainham, Dublin, 8 (IE).

(74) Agent: **SONNENFELD, Kenneth H.**; King & Spalding LLP, 1185 Avenue of the Americas, New York, New York 10036 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, 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, ST, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, 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 (Art. 21(3))
- with sequence listing part of description (Rule 5.2(a))

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

(54) Title: ALTERNATIVELY TRANSCRIBED GENES ASSOCIATED WITH SCHIZOPHRENIA

(57) Abstract: Methods of identifying gene targets associated with schizophrenia or the symptoms thereof, as well as to specific nucleic acid molecules that have been discovered to be associated with schizophrenia are provided. Accordingly, the invention also relates to methods of modulating schizophrenia or the symptoms thereof, methods of diagnosing schizophrenia or the symptoms thereof, methods for predicting the susceptibility to schizophrenia or the symptoms thereof, and methods of identifying compounds that modulate schizophrenia or the symptoms thereof via manipulations of the nucleic acid molecules and their products.



WO 2009/102748 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 09/33733

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - C12Q 1/68 (2009.01)

USPC - 435/6

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)

USPC - 435/6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 435/4 (text search, see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PubWEST(PGPB,USPT,EPAB,JPAB); Google/Scholar; PubMed (text search, see terms below)

Search Terms: Model, schizophrenia, marker, biomarker, isolation, deprivation, transcriptional, expression, upregulation, PKR, PRKR, EIF2AK2, EIF2AK1, IRF7 or IRF7A or interferon regulatory factor 7, DnaJ, DNajc9, JDD1, Ifit2, interferon induced protein with tetr

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2003/0175741 A1 (COCHRAN et al.) 18 September 2003 (18.09.2003); paras [0004], [0009], [0011], [0037], [0051], [0062]-[0067], [0106], [0144].	1,2,5,8-17,19 ----- 3,4,6,7,28
Y	Husum et al. Early maternal deprivation alters hippocampal levels of neuropeptide Y and calcitonin-gene related peptide in adult rats. Neuropharmacology, 2002, vol 42, pp 798-806; Abstract, (page 800, para 2).	3,4
Y	US 2007/0202515 A1 (HADLOCK et al.) 30 August 2007 (30.08.2007); para [0297], [0302].	7
Y	NCBI Submission AB002591. October 2007. [retrieved on 6 Sep 2009] Retrieved from the internet: <URL:http://www.ncbi.nlm.nih.gov/nucleotide/158936937>.	6,18
Y	Takamura et al. JDD1, a novel member of the DnaJ family, is expressed in the germinal zone of the rat brain. Biochem Biophys Res Comm, 2001, vol 285, pp 387-392; (page 387, para 1).	6,18
Y	Kato et al. Comprehensive gene expression analysis in bipolar disorder. Canadian Journal of Psychiatry, 2007, vol 52, pp 763-771; (page 764, abbreviations), (page 764, para 5), (page 765, para 3), (page 766, para 1), (page 767, paras 7,9), (page 768, para 2).	6,18

☐ Further documents are listed in the continuation of Box C.

* 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 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

"&"

document member of the same patent family

Date of the actual completion of the international search

11 September 2009 (11.09.2009)

Date of mailing of the international search report

24 SEP 2009

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:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 09/33733

CONTINUED FROM BOX III - UNITY OF INVENTION IS LACKING

Group II+: Claims 20-27 are drawn to a method of preventing the onset of schizophrenia or its symptoms in an individual, a method of treating schizophrenia or its symptoms in an individual, or a method of treating cognitive deficits, I, where the first named invention will be searched and includes claims 20-27, wherein claim 24 is limited to SEQ ID NO: 1. Applicant may have additional sequences searched for an additional search fee per sequence.

The groups listed above do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The technical feature of Group I+ is the detection of a schizophrenia-associated gene.

The technical feature of Group II+ is the detection of a schizophrenia-associated gene.

The technical feature that links the listed Groups is a schizophrenia-associated gene.

However, this does not represent an improvement over the prior art of Cochran et al. (US 2003/0715741 A1) who teach a schizophrenia-associated gene (para [0001]).

In addition, Groups I+ and II+ each contain multiple inventions drawn to one of SEQ ID NOS: 1-16. The inventions are drawn to a distinct sequence having different structure and function.

Accordingly, unity of invention is lacking under PCT Rule 13.2 because the groups do not share a same or corresponding special technical feature providing a contribution over the prior art.