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(71) Applicant *(for all designated States except US)*: **PSYCHIATRIC GENOMICS, INC.** [US/US]; 19 Firstfield Road, Gaithersburg, MD 20878 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **ALTAR, C., Anthony** [US/US]; 11100 Kenilworth Avenue, Garrett Park, MD 20896 (US). **BROCKMAN, Jeffrey, A.** [US/US]; 2207 Lamp Post Lane, Frederick, MD 21701 (US). **EVANS, David** [US/US]; 13405 Moran Drive, N. Potomac, MD 20878 (US). **HOOK, Derek** [US/US]; 403 Main Street, Gaithersburg, MD 20878 (US). **KLIMCZAK, Leszek** [CA/US]; 628 Windbrooke Drive, Gaithersburg, MD 20879 (US). **LAENG, Pascal** [FR/US]; 1841 Columbia Road, Washington, DC 20009 (US). **PALFREYMAN, Michael** [US/US]; 2125 Quay Village Court, T-1, Annapolis, MD 21403 (US). **RAJAN, Prithi** [US/US]; 106 Lynch Street, Rockville, MD 20850 (US).

(74) Agents: **WOODLEY, Samuel, S.** et al.; Darby & Darby P.C., 805 Third Avenue, New York, NY 10022-7513 (US).

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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.

(54) Title: MULTI-PARAMETER HIGH THROUGHPUT SCREENING ASSAYS (MPHTS)

(57) Abstract: The present invention relates to screening methods and assays that are referred to herein as multi-parameter hight throughput screening (MPHTS) assays. These MPHTS assays are useful for identifying candidate pharmaceutical compounds. In particular, the screening methods of this invention may be used to identify compounds that have potential therapeutic benefits for the treatment of neuropsychiatric and neurodegenerative disorders, including schizophrenia, bipolar affective disorder (BAD), autism and Alzheimer's disease to name a few.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/19457

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 33/48; C12Q 1/68; A01N 43/04
US CL : 702/19, 127; 435/6; 514/44

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. : 702/19, 127; 435/6; 514/44

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)
WEST, MEDLINE, CAPLUS, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SHOEMAKER et al. Application of High Throughput, Molecular-Targeted Screening to Anticancer Drug Discovery. Current Topics in Med. Chem. 2002, Vol. 2, No. 3, pages 229-246, see entire article for background on High Throughput and drug design.	1-19
A	HAUGABOOK et al. High Throughput Screens for the Identification of Compounds that Alter the Accumulation of the Alzheimer's Amyloid B Peptide (AB). Journal of Neuroscience Methods. 2001, Vol. 108, pages 171-179, see entire article for background on high throughput in neuroscience.	1-19
A	SAUNDERS. Gene Identification in Alzheimer's Disease. Pharmacogenomics. 2001, Vol. 2, No. 3, pages 239-249, see entire article for background on pharmacogenomics in neuroscience.	1-19
A	HAKAK et al. Genome-Wide Expression Analysis Reveals Dysregulation of Myelination-Related Genes in Chronic Schizophrenia. PNAS. 2001, Vol. 98, No. 8, pages 4746-4751, see entire article.	1-19

☒ 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

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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. (703)305-3230

Authorized officer
Marjorie Moran
Telephone No. 703-308-0196

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INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Database Genbank on NCBI, US National of Medicine, (Bethesda, Maryland, USA), No. M22357, LAI et al. 'Two Forms of 1B236/Myelin-Associated Glycoprotein, a Cell Adhesion Molecule for Postnatal Neural Development, are Produced by Alternative Splicing'. PNAS. 1987, Vol. 84, No. 12, pages 43378-341.	7, 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/19457

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.:
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:
Please See Continuation Sheet

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.: 1-19 and SEQ ID NO:1

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Groups 1-168, claims 1-19, drawn to a method of selecting one or more efficacy genes that are indicative of an effective therapy for treating a disease or a disorder of interest. In this instance, Group I=Claims 1-19 and SEQ ID NO:1; Group II=Claims 1-19 and SEQ ID NO:2, Group III=Claims 1-19 and SEQ ID NO:3 etc...

Groups 170-205, claims 29-31, drawn to a method for identifying a compound to treat a disease or disorder of interest. In this instance, Group 170=Claims 29-31 and SEQ ID NO:26, Group 171=Claims 29-31 and SEQ ID NO:51, Group 172=Claims 29-31 and SEQ ID NO:53 etc...(SEQ IDs are listed as 26, 51, 53-55, 132, 162, 170-197 in claim 29).

Group 169, claims 20-28, drawn to a method for identifying a compound to treat a disease or disorder of interest.

The inventions listed as Groups 1-205 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: Group 1 has as a special technical feature a nucleic acid which is chemically distinct from the nucleic acid of Group 2 etc....
Furthermore, Group 170 has as a special technical feature a nucleic acid which is chemically distinct from the nucleic acid of Group 171 etc...
In addition, Groups 1-168, 169, and 170-205 are drawn to methods that propose different outcomes/results, such as selecting efficacy genes, identifying a compound to treat disease by determining expression of a gene, and identifying a compound to treat a disease by determining expression of a particular gene.
Finally, the prior art teaches a method for identifying a compound to treat a disease by contacting a cell and comparing the expression to a non-contacted cell (as in the invention of Group II). See US 6,171,856 B1 (09 January 2001) (see especially column 4, lines 7-16).