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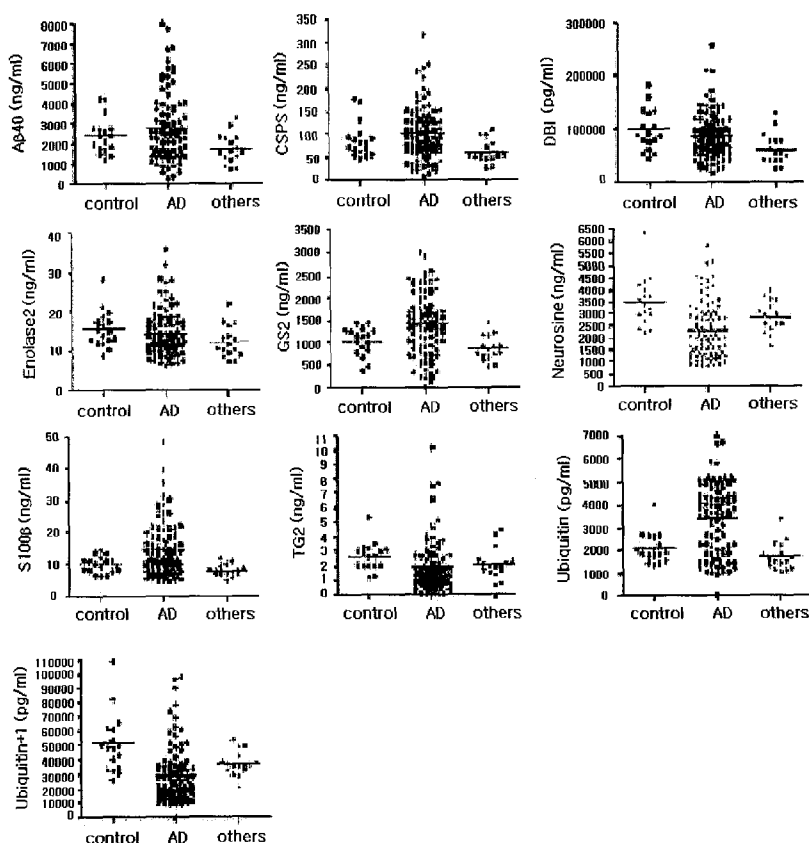
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[Continued on next page]

(54) Title: MARKERS AND KIT FOR DIAGNOSIS OF ALZHEIMER'S DISEASE

FIG. 2



(57) Abstract: Disclosed are a protein marker for a diagnosis of Alzheimer's disease, a composition for detecting a diagnostic marker for Alzheimer's disease, comprising an agent for measuring the level of the protein marker, a kit for detecting a diagnostic marker for Alzheimer's disease, comprising an antibody specific to the protein marker, and a method of diagnosing Alzheimer's disease. Since the diagnostic protein marker exists in blood, there is no pain or side effect in collecting a sample, and sample collection is easy and useful.

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Published:

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/004181**A. CLASSIFICATION OF SUBJECT MATTER****G01N 33/53(2006.01)i**

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)

IPC8 as above

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and application for Utility models since 1975

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

eKIPASS (KIPO internal), NCBI PubMed (Alzheimer, blood, biomarker, diagnos*, amyloid beta, CSPA, GS2, S100, ubiquitin, DBI, neurosine, enolase, transglutaminase and similar terms)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 1020040015168 A (SYN. X PHARMA, INC.) 18 February 2004. See the whole document, especially abstract, claims.	1-9
X	US 5,958,684 (F. W. VAN LEEUWEN, et al.) 28 September 1999. See the whole document, especially abstract, claims 5, 7.	1-9
X	V. K. SINGH. 'Studies of neuroimmune markers in Alzheimer's disease.' In Mol. Neurobiol., Vol.9(1-3):73-81 (Aug.-Dec., 1994). See the whole document, especially abstract.	1-9

☒ 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 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 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

20 JANUARY 2009 (20.01.2009)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2008/004181

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	A. HYE, et al. 'Proteom-based plasma biomarkers for Alzheimer's disease.' In Brain, Vol.129:3042-3050 (2006). See the whole document, especially abstract, pages 3042-3043, left column, 1st paragraph.	1-2 ----- 3-9
X ----- Y	B. B. MILLER, AND J. W. MANDELL. 'Multiplex method for measuring biomarkers of Alzheimer disease in cerebrospinal fluid.' In Clin. Chem. Vol.51(2):289-230 (2005). See the whole document, especially page 289 right column.	1-2 ----- 3-9
X ----- Y	K. BLENNOW, et al. 'Ubiquitin in cerebrospinal fluid in Alzheimer's disease and vascular dementia.' In Int. Psychogeriatr. Vol.6(1):13-22; discussion 59-60 (1994 Spring). See the whole document, especially abstract.	1-2, 8-9 ----- 3-7
X ----- Y	R. SULTANA, et al. 'Proteomic analysis of the Alzheimer's disease hippocampal proteome.' In J. Alzheimers Dis. Vol.11(2):153-164 (May 2007). See the whole document, especially abstract.	1-2 ----- 3-9
X ----- Y	R. E. MRAK AND W. S. GRIFFINBC. 'The role of activated astrocytes and the neurotrophic cytokine S100 beta in the pathogenesis of Alzheimer's disease.' In Neurobiol. Aging. Vol.22(6):915-922 (Nov.-Dec. 2001). See the whole document, especially abstract.	1-2 ----- 3-9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2008/004181**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

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

1. ☒ Claims Nos.: 10, 11
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 10 and 11 pertain to diagnostic methods and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and rule 39.1(iv) of the Regulations under the PCT, to search.
2. ☐ Claims 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. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/004181

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2004-0015168 A	18.02.2004	AT 268909 T	15.06.2004
		BR 0209262 A	01.02.2005
		CA 2445367 A1	07.11.2002
		CN 1543571 A	03.11.2004
		DE 60200615 D1	15.07.2004
		DE 60200615 T2	16.06.2005
		EP 1381866 A2	21.01.2004
		EP 1381866 B1	09.06.2004
		EP 1467212 A1	13.10.2004
		EP 1381866 A2	21.01.2004
		EP 1381866 B1	09.06.2004
		EP 1467212 A1	13.10.2004
		ES 2222445 T3	01.02.2005
		GB 0228176 D0	08.01.2003
		GB 2380546 A	09.04.2003
		GB 2380546 B	19.11.2003
		IL 158595 D0	12.05.2004
		JP 2004-527754	09.09.2004
		JP 2004-527754 T	09.09.2004
		US 7070945	04.07.2006
		US 7101680	05.09.2006
		US 2002-0160425 A1	31.10.2002
		US 2002-160425 A1	31.10.2002
		US 2003-0064416 A1	03.04.2003
		US 7101680 B2	05.09.2006
		WO 0208-8706A2	07.11.2002
		WO 0208-8706A3	24.04.2003
		ZA 200308497 A	02.09.2004
US 5958684	28.09.1999	AU 7142796 A	28.04.1997
		US 5958684 A	28.09.1999
		WO 97-12992 A2	10.04.1997
		WO 97-12992 A3	23.10.1997