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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: FULL-LENGTH SERINE PROTEIN KINASE IN BRAIN AND PANCREAS

(57) Abstract: The present invention relates to all facets of novel Polynucleotides, the polypeptides they encode, antibodies and specific binding partners thereto, and their applications to research, diagnosis, drug discovery, therapy, clinical medicine, forensic science, pathology, , and medicine, etc. The polynucleotides are expressed in brain and pancreas and are therefore useful in variety of ways, including, but not limited to, as molecular markers, as drug targets, and for detecting, diagnosing, staging, monitoring, prognosticating, preventing or treating, determining predisposition to, etc., diseases and conditions, especially relating to brain and pancreas .

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International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 9/12, 15/00; C12Q 1/48; C07H 21/04; G01N 33/00
US CL : 435/194, 15, 320.1; 536/23.2; 436/94

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. : 435/194, 15, 320.1; 536/23.2; 436/94

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, DGENE, AGRICOLA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/59287-A2 (LEXICON GENETICS INC.), 01 August 2002, the entire document, especially SEQ ID NO:1.	1-5, 7-8, 13-14
X	WO 02/18557-A2 (INCYTE GENOMICS INC.), 07 March 2002, the entire document, especially human PKIN-18 cDNA SEQ ID NO:18 and SEQ ID NO:42.	4, 7, 8

☐ 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

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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.: 1-5,7-8,13-14

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.

Group I, claim(s) 1-5, 7-8, 13-14, drawn in part to a polynucleotide encoding the polypeptide of SEQ ID NO: 2, the polynucleotide of SEQ ID NO: 1, and a method of use of said polynucleotide in a method to detect a nucleic acid coding for human KSE336.

Group II, claim(s) 1-5, 7-8, 13-14, drawn in part to a polynucleotide encoding the polypeptide of SEQ ID NO: 4, the polynucleotide of SEQ ID NO: 3, and a method of use of said polynucleotide in a method to detect a nucleic acid coding for human KSE336.

Group III, claim(s) 9-12 and 22, drawn in part to the polypeptide of SEQ ID NO: 2 and a method of use of said polypeptide in a method for identifying an agent that modulates expression of the polypeptide of SEQ ID NO: 2.

Group IV, claim(s) 9-12 and 22, drawn in part to the polypeptide of SEQ ID NO: 4 and a method of use of said polypeptide in a method for identifying an agent that modulates expression of the polypeptide of SEQ ID NO: 4.

Group V, claim(s) 15-16, drawn in part to a method of treating a pancreas or brain tissue disease by administering a therapeutic agent effect in the regulation of a polynucleotide which encodes the polypeptide of SEQ ID NO: 2.

Group VI, claim(s) 15-16, drawn in part to a method of treating a pancreas or brain tissue disease by administering a therapeutic agent effect in the regulation of a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

Group VII, claim(s) 17-20, drawn in part to a method of diagnosing a pancreas or brain tissue disease associated with abnormal KSE336 expression by assessing the expression of a polynucleotide encoding the polypeptide of SEQ ID NO: 2.

Group VIII, claim(s) 17-20, drawn in part to a method of diagnosing a pancreas or brain tissue disease associated with abnormal KSE336 expression by assessing the expression of a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

Group IX, claim(s) 21, drawn in part to a method for identifying an agent that modulates the expression of a polynucleotide encoding the polypeptide of SEQ ID NO: 2.

Group X, claim(s) 21, drawn in part to a method for identifying an agent that modulates the expression of a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

Group XI, claim(s) 23-25, drawn in part to a method for detecting polymorphisms in KSE336 by comparison with the polynucleotide of SEQ ID NO: 1.

Group XII, claim(s) 23-25, drawn in part to a method for detecting polymorphisms in KSE336 by comparison with the polynucleotide of SEQ ID NO: 3.

Group XIII, claim(s) 26-28, drawn in part to a method for identifying a genetic basis for a pancreas or brain tissue disease by determining the association of disease with a polynucleotide encoding the polypeptide of SEQ ID NO: 2.

Group XIV, claim(s) 26-28, drawn in part to a method for identifying a genetic basis for a pancreas or brain tissue disease by determining the association of disease with a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

Group XV, claim(s) 29-30, drawn in part to a non-human transgenic mammal comprising a functional disruption of a homolog of a polynucleotide encoding the polypeptide of SEQ ID NO: 2.

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Group XVI, claim(s) 29-30, drawn in part to a non-human transgenic mammal comprising a functional disruption of a homolog of a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

Group XVII, claim(s) 31, drawn in part to a method of advertising KSE336 for sale by displaying the polynucleotide sequence set forth in SEQ ID NO: 1.

Group XVIII, claim(s) 31, drawn in part to a method of advertising KSE336 for sale by displaying the polynucleotide sequence set forth in SEQ ID NO: 3.

Group XIX, claim(s) 32, drawn in part to an antibody which is specific for the polypeptide of SEQ ID NO: 2.

Group XX, claim(s) 32, drawn in part to an antibody which is specific for the polypeptide of SEQ ID NO: 4.

Group XXI, claim(s) 33, drawn in part to a method for selecting a polynucleotide sequence coding for KSE336 from a database by displaying in a computer readable medium the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2.

Group XXII, claim(s) 33, drawn in part to a method for selecting a polynucleotide sequence coding for KSE336 from a database by displaying in a computer readable medium the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 4.

The inventions listed as Groups I-XXII 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:

According to PCT Rule 13.2 and to the guidelines in Section (f)(i)(B)(1) of Annex B of the PCT Administrative Instructions, all alternatives of a Markush Group must have a common property or activity. Although the polynucleotides of Groups I-II, polypeptides of Groups III-IV, the non-human transgenic mammals of Groups XV-XVI, and the antibodies of Groups XIX-XX share a common property within Groups I-II, III-IV, XV-XVI, and XIX-XX, in that they are either nucleic acids, proteins, or non-human transgenic mammals, the compounds are not regarded as being of similar nature because all the alternatives do not share a common structure or function. It is noted that each of the polynucleotides/polypeptides of Groups I-II and III-IV appear to encode/be different KSE336 kinases as indicated in Figure 2A of the specification.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The polynucleotides of Groups I-II, polypeptides of Groups III-IV, the non-human transgenic mammals of Groups XV-XVI, and the antibodies of Groups XIX-XX share no special technical feature as the nucleic acid of Groups I-II, particularly the nucleic acid of claim 5, is not required for the polypeptides of Groups III-IV or the transgenic mammals of Groups XV-XVI, and therefore does not correspond to the polypeptides of Groups III-IV. As such, the polynucleotides of Groups I-II encode proteins which may not elicit the antibodies of Groups XIX-XX. It is noted that claim 5 is directed in part to a polynucleotide of any size and function which is complementary to any section of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or the polypeptide of SEQ ID NO: 4.

The polynucleotides of Groups I-II do not have unity of invention with the methods of Groups VII-XIV according to 37 CFR 1.475(b)(c) since Groups I-II already contain one method of use/manufacture and the methods of Groups VII-XIV are additional methods of use.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The proteins of Groups III-IV and the methods of Groups V-XIV, XVII-XVIII, XXI-XXII do share the same or corresponding special technical feature. The special technical feature of Groups III-IV is a protein comprising the amino acid sequences of SEQ ID NO: 2 or 4. The special technical feature of Groups V-VI is being a method of treating a disease with an agent effective in regulating a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Each of the special technical features of Groups VII-XIV is being a different method of use of the polynucleotide of Groups I-II. The special technical feature of Groups XVII-XVIII is being a method of advertising KSE336 by displaying the sequence of SEQ ID NO: 1 or SEQ ID NO: 3. The special technical feature of Groups XXI-XXII is being a method for selecting a sequence from a database which contains the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Therefore each of the groups have a different special technical feature not shared by the remaining groups.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The non-human transgenic animals of Groups XV-XVI and the methods of Groups V-XIV, XVII-XVIII, XXI-XXII do share the same or corresponding special technical feature. The special technical feature of Groups XV-XVI is a non-human transgenic mammal comprising a polynucleotide encoding the polypeptides of SEQ ID NO: 2 or 4. The special technical feature of Groups V-VI is being a method of treating a disease with an agent effective in regulating a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Each of the special technical features of Groups VII-XIV is being a different method of use of the polynucleotide of Groups I-II. The special technical feature of Groups XVII-XVIII is being a method of advertising KSE336 by displaying the sequence of SEQ ID NO: 1 or SEQ ID NO: 3. The special technical feature of Groups XXI-XXII is being a method

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for selecting a sequence from a database which contains the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Therefore each of the groups have a different special technical feature not shared by the remaining groups.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The antibodies of Groups XIX-XX and the methods of Groups V-XIV, XVII-XVIII, XXI-XXII do share the same or corresponding special technical feature. The special technical feature of Groups XIX-XX is a protein which can bind specifically to the polypeptides of SEQ ID NO: 2 or 4. The special technical feature of Groups V-VI is being a method of treating a disease with an agent effective in regulating a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Each of the special technical features of Groups VII-XIV is being a different method of use of the polynucleotide of Groups I-II. The special technical feature of Groups XVII-XVIII is being a method of advertising KSE336 by displaying the sequence of SEQ ID NO: 1 or SEQ ID NO: 3. The special technical feature of Groups XXI-XXII is being a method for selecting a sequence from a database which contains the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Therefore each of the groups have a different special technical feature not shared by the remaining groups.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The polynucleotide of Groups I-II and the methods of Groups V-VI, XVII-XVIII, XXI-XXII do share the same or corresponding special technical feature. The special technical feature of Groups I-II is a nucleic acid encoding the polypeptides of SEQ ID NO: 2 or 4, the special technical feature of Groups V-VI is being a method of treating a disease with an agent effective in regulating a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4, the special technical feature of Groups XVII-XVIII is being a method of advertising KSE336 by displaying the sequence of SEQ ID NO: 1 or SEQ ID NO: 3, and the special technical feature of Groups XXI-XXII is being a method for selecting a sequence from a database which contains the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Therefore each of the groups have a different special technical feature not shared by the remaining groups.

According to PCT Rule 13.2, unity of invention exists only when there is a share same or corresponding technical feature among the claimed inventions. The methods of Groups V-XIV, XVII-XVIII, and XXI-XXII do share the same or corresponding special technical feature. The special technical feature of Groups V-VI is being a method of treatment a disease with an agent which regulates a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. The special technical feature of Groups VII-VIII is being a method for diagnosing a disease by assessing the expression of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. The special technical feature of Groups IX-X is being a method for identifying an agent which modulates the expression of a polynucleotide encoding the polypeptides of SEQ ID NO: 2 or 4. The special technical feature of Groups XI-XII is being a method for detecting polymorphisms by comparison with the polynucleotide of SEQ ID NO: 1 or 3. The special technical feature of Groups XIII-XIV is being a method for identifying a genetic basis for a disease by determining association with a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. The special technical feature of Groups XVII-XVIII is being a method of advertising KSE336 by displaying the sequence of SEQ ID NO: 1 or SEQ ID NO: 3. The special technical feature of Groups XXI-XXII is being a method for selecting a sequence from a database which contains the sequence of a polynucleotide encoding the polypeptide of SEQ ID NO: 2 or 4. Therefore each of the groups have a different special technical feature not shared by the remaining groups.