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(88) Date of publication of the international search report:
4 July 1996 (04.07.96)

(54) Title: NSK2 A MUSCLE RECEPTOR TYROSINE KINASE

(57) Abstract

A novel family of muscle receptor tyrosine kinases is disclosed. The nucleic acid molecules encoding them (Fig. 1), and the uses of these, are features of the disclosed invention.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/13490

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :Please See Extra Sheet.
US CL :Please See Extra Sheet.
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, 240.2, 252.3, 320.1; 514/2; 530/300, 350, 388.22, 388.26, 806; 536/23.2

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)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Proc. Natl. Acad. Sci. USA, Vol. 90, issued April 1993, Jennings et al., "Muscle-specific trk related receptor with a kringle domain defines a distinct class of receptor tyrosine kinases", pages 2895-2899.	1-12
X, P	Mammalian genomics, Vol. 6, No. 9, issued September 1995, Reith, "Isolation and chromosomal location of Nsk1, a novel murine putative receptor tyrosine kinase", page 689.	1-6
X, P	Oncogene, Vol. 11, No. 2, issued 26 April 1995, Ganju et al., "Cloning and developmental expression of Nsk2, a novel receptor tyrosine kinase implicated in skeletal myogenesis", pages 281-290.	1-6

[X] 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 document 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 19 MARCH 1996	Date of mailing of the international search report 01 APR 1996
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer KENNETH A. SORENSEN Telephone No. (703) 308-0196

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/13490

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Proc. Natl. Acad. Sci., Vol. 86, issued March 1989, Wilks, "Two putative protein-tyrosine kinases identified by application of the polymerase chain reaction", pages 1603-1607.	1-6

INTERNATIONAL SEARCH REPORT

International application No.
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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. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

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 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 Extra 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.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/13490

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IPC (6):

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B. FIELDS SEARCHED
Electronic data bases consulted (Name of data base and where practicable terms used):

APS, MEDLINE, EMBASE, SCISEARCH

search terms: (receptor tyrosine kinase or RTK or PTK or protein tryosine kinase) and ((msn-2 or nsk1 or nsk2 or homolog) and (myotube? or muscle-associat?)

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING
This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single 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)1-10, are drawn to an isolated nucleic acid, expression vector, transformed cell, isolated tyrosine kinase polypeptide,and an immunogenic composition.
Group II, claim(s) 11-12, are drawn to an antibody.
The inventions listed as Groups I and II do not relate to a single 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 I, consists of claims drawn to a nucleic acid, an expression vector, transformed cell, and polypeptides encoding a receptor tyrosine kinase. The shared special technical feature is the nucleic acid or amino acid sequence encoding the claimed tyrosine kinase.
Group II consists of claims drawn to an antibodies that specifically bind the claimed tryosine kinase, and as such do not share the special technical feature of a sequence found in the receptor tyrosine kinase of claimed for Group I.
Accordingly, the claims are not so linked by a special technical feature within the meaning of PCT Rule 13.2, so as to form a single general inventive concept.