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WO 2004/007532 A3

(54) Title: BETA-SHEET FORMING PEPTIDES AND MATERIAL MADE THEREOF

(57) Abstract: There is described a material comprising ribbons, fibrils or fibres characterised in that each of the ribbons, fibrils or fibres have an antiparallel arrangement of peptides in a β-sheet tape-like substructure.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/03016

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07K7/06 C12N9/36 D01F4/00 C08H1/00 A61K38/08
A61K6/00 A61K7/48 A61C5/04 A61F2/10

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)
IPC 7 C07K C12N A61K

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 practical, search terms used)
EPO-Internal, WPI Data, CHEM ABS Data, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AGGELI A ET AL.: "Responsive gels formed by the spontaneous self-assembly of peptides into polymeric beta-sheet tapes" NATURE, vol. 386, 20 March 1997 (1997-03-20), pages 259-262, XP001172962 the entire document, particularly abstract, page 261 and Figures 1c,4 page 2 --- -/--	1-99

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 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	Date of mailing of the international search report
25 February 2004	12/03/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Schmidt, Harald

INTERNATIONAL SEARCH REPORT

Internati plication No
PCT/GB 03/03016

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	NYRKOVA I A ET AL: "SELF-ASSEMBLY AND STRUCTURE TRANSFORMATIONS IN LIVING POLYMERS FORMING FIBRILS" EUROPEAN PHYSICAL JOURNAL B. CONDENSED MATTER, EDP SCIENCES;SPRINGER VERLAG, LES ULIS,, FR, vol. 17, no. 3, 2000, pages 499-513, XP001118808 ISSN: 1434-6028 the whole document ---	1-99
X	NYRKOVA I A ET AL: "FIBRIL STABILITY IN SOLUTIONS OF TWISTED BETA-SHEET PEPTIDES: A NEW KIND OF MICELLIZATION IN CHIRAL SYSTEMS" EUROPEAN PHYSICAL JOURNAL B. CONDENSED MATTER, EDP SCIENCES;SPRINGER VERLAG, LES ULIS,, FR, vol. 17, no. 3, 2000, pages 481-497, XP001118807 ISSN: 1434-6028 the entire document, particularly pages 481,489 and 494; Figures 2-5, ---	1-99
A	FUKUSHIMA Y: "SELF-INDUCED HELIX-SHEET CONFORMATIONAL TRANSITIONS OF AN AMPHIPHILIC PEPTIDE" POLYMER JOURNAL, SOCIETY OF POLYMER SCIENCE. TOKYO, JP, vol. 27, no. 8, 1995, pages 819-830, XP000579630 ISSN: 0032-3896 the whole document ---	
A	US 6 034 211 A (KELLY JEFFERY W) 7 March 2000 (2000-03-07) the entire document, particularly column 11, Scheme II and the claims ---	
P,X	WO 03 006494 A (AGELLI AMALIA ;BODEN NEVILLE (GB); KNOWLES PETER (GB); HUNTER MALC) 23 January 2003 (2003-01-23) the whole document ---	1-99
T	FISHWICK CWG ET AL.: "Structures of Helical beta-Tapes and Twisted Ribbons: The Role of Side-Chain Interactions on Twist and Bend Behaviour" NANO LETTERS, vol. 3, no. 11, 30 September 2003 (2003-09-30), pages 1475-1479, XP002271432 the whole document ---	

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INTERNATIONAL SEARCH REPORT

Internati ication No
PCT/GB 03/03016

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	AGGELI A ET AL.: "pH as a Trigger of Peptide beta-Sheet Self-Assembly and Reversible Switching between Nematic and Isotropic Phases" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY , vol. 125, 16 July 2003 (2003-07-16), pages 9619-9628, XP002271433 the whole document	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 03/03016

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 61 to 68 encompass a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [X] Claims Nos.: 1,3-7,9-12,14-21,23-29,31-67,69-99 (all partially)
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:

see FURTHER INFORMATION sheet PCT/ISA/210

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:

see additional sheet

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [X] 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-70,72-79,88-99 (all completely)

material comprising ribbons, fibrils or fibres characterized in that each of the ribbons, fibrils and fibres have an antiparallel arrangement of peptides in a beta-sheet tape-like substructure and methods and use in tissue engineering, medical and cosmetical treatments

2. Claims: 71,80-87 (all completely)

use of the material in the manufacture of e.g. continous filament yarns,staple, floc, cord, fabric or use of the material in the manufacture of a material with applications selected from adhesives and sealants

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1,3-7,9-12,14-21,23-29,31-67,69-99 (all partially)

Present claims 1,3-7,9-12,14-21,23-29,31-36,28-67 and 69-98 relate to a material defined by reference to a desirable characteristic or property, namely that each of the ribbons, fibrils or fibres have an antiparallel arrangement of peptides in a beta-sheet tape-like substructure. The claims cover all materials having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such materials. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the material by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible.

The scope of claim 37, in as far as the expression "variant" is concerned, is so unclear (Article 6 PCT) that a meaningful International Search is impossible with regard to this expression.

The peptide network of claim 99 lacks any technical feature, which renders a meaningful search impossible (Article 6 PCT).

Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the material wherein the beta-sheet forming peptides are selected from the group P11-1, P11-2, P11-3, P11-4, P11-5, P11-6 and P10-7 (see claim 2 and Table 1).

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internation olication No
PCT/GB 03/03016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6034211 A	07-03-2000	AU 3295497 A	05-01-1998
		WO 9746547 A1	11-12-1997
WO 03006494 A	23-01-2003	WO 03006494 A1	23-01-2003