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A61B 5/00 (2006.01) *A61P 9/10* (2006.01)
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(71) Applicant: **VITAK B.V.** [NL/NL]; Brains Unlimited Building, Oxfordlaan 55, 6229 EV Maastricht (NL).

(72) Inventor: **VERMEER, Cornelis**; c/o Vitak B.V., Brains Unlimited Building, Oxfordlaan 55, 6229 EV Maastricht (NL).

(74) Agent: **HUYGENS, Arthur V.**; P.O. Box 86, 3400 AB IJsselstein (NL).

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22 September 2016

(54) Title: VITAMIN K AND CAPILLARY FUNCTION

(57) Abstract: A new indication of vitamin K is disclosed which results in the provision of methods of treatment, both therapeutic and non-therapeutic, as well as functional foods and pharmaceutical and nutraceutical products comprising vitamin K for improving microvascular integrity and capillary structure and function, thus preventing, mitigating, counteracting or curing diseases associated with impaired capillary morphology including the glycocalyx or capillary dysfunction. Preferably, vitamin K is a menaquinone, most preferably selected from the long-chain menaquinones MK-7 through MK-10.



WO 2016/131993 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/053696

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.:
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 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:

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. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
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.:

1-10

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

International application No
PCT/EP2016/053696

A. CLASSIFICATION OF SUBJECT MATTER INV. A61K31/122 A61B5/02 A61B5/00 A61B5/024 A23L33/15 ADD. A61P9/14 A61P9/10								
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) A23L A61K A61B 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) EPO-Internal, BIOSIS, FSTA, WPI Data								
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td> WO 2012/161572 A1 (FRIESLAND BRANDS BV [NL]; VAN DEN HEUVEL ELISABETH GERTRUDA HENDRIKA M) 29 November 2012 (2012-11-29) page 2, line 5 - page 3, line 9 page 4, lines 1-16 page 6, lines 24-25 page 7, lines 24-30 page 10, line 18 - page 11, line 6 page 12, lines 14-19 page 14, lines 14-19 ----- -/-- </td> <td>1-10</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	WO 2012/161572 A1 (FRIESLAND BRANDS BV [NL]; VAN DEN HEUVEL ELISABETH GERTRUDA HENDRIKA M) 29 November 2012 (2012-11-29) page 2, line 5 - page 3, line 9 page 4, lines 1-16 page 6, lines 24-25 page 7, lines 24-30 page 10, line 18 - page 11, line 6 page 12, lines 14-19 page 14, lines 14-19 ----- -/--	1-10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.						
X	WO 2012/161572 A1 (FRIESLAND BRANDS BV [NL]; VAN DEN HEUVEL ELISABETH GERTRUDA HENDRIKA M) 29 November 2012 (2012-11-29) page 2, line 5 - page 3, line 9 page 4, lines 1-16 page 6, lines 24-25 page 7, lines 24-30 page 10, line 18 - page 11, line 6 page 12, lines 14-19 page 14, lines 14-19 ----- -/--	1-10						
☒ 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 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						
11 August 2016		18/08/2016						
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Couzy, François						

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/053696

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2013/122465 A1 (FRIESLAND BRANDS BV [NL]) 22 August 2013 (2013-08-22) page 3, lines 10-16, 17-27 page 4, line 8 - page 5, line 16 page 7, lines 7-26 page 8, line 15 page 8, line 29 - page 9, line 9 page 12, lines 3-26 -----	1-10
X	US 2010/130618 A1 (VAIDYA ASHOK B [IN] ET AL) 27 May 2010 (2010-05-27) paragraphs [0001], [0006], [0007], [0025], [0048] - [0049], [0081], [0091] - [0093] examples 1,2 -----	1-10
X	US 2013/178522 A1 (JAMISON JAMES M [US] ET AL) 11 July 2013 (2013-07-11) paragraphs [0002] - [0004], [0007], [0041] - [0042], [0054], [0064], [0164], [0169], [0180], [0198], [0201] -----	1-9 10
Y	US 2005/074447 A1 (PAPAS ANDREAS M [US] ET AL) 7 April 2005 (2005-04-07) paragraphs [0012], [0013], [0014], [0018], [0020] -----	10
X	US 2010/247693 A1 (MARINI JAN L [US]) 30 September 2010 (2010-09-30) paragraphs [0001], [0009], [0014], [0017] - [0018], [0031] - [0032], [0060] -----	1-3, 6, 7, 9, 10
A	EP 2 671 574 A1 (VITAK BV [NL]) 11 December 2013 (2013-12-11) paragraphs [0001], [0002], [0038] - [0039], [0044] - [0045], [0048] - [0052] -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/053696

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WO 2012161572 A1	29-11-2012	CN 103687495 A EP 2709460 A1 RU 2013156676 A WO 2012161572 A1	26-03-2014 26-03-2014 27-06-2015 29-11-2012
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-10

Composition comprising vitamin K for use in a method of treatment that improves the capillary exchange of nutrients, oxygen, carbon dioxide, and waste, in the body, and method itself

2. claim: 11

Diagnostic method of the pathological consequences of vitamin K deficiency by plethysmographic acceleration pulse wave technique
