



- (51) **International Patent Classification:**  
*A61K 47/38* (2006.01) *A61L 27/52* (2006.01)
- (21) **International Application Number:**  
PCT/FI2011/050941
- (22) **International Filing Date:**  
26 October 2011 (26.10.2011)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
20106121 27 October 2010 (27.10.2010) FI
- (71) **Applicant (for all designated States except US):** UPM-KYMMENE CORPORATION [FI/FI]; Eteläesplanadi 2, FI-00130 Helsinki (FI).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** YLIPERTTULA, Marjo [FI/FI]; Kattilavuorenkuja 2, FI-02330 Espoo (FI). LAURÉN, Patrick [FI/FI]; Valopoiju 2 A 21, FI-02320 Espoo (FI). BHATTACHARYA, Madhushree [IN/FI]; Erkki Melartinin tie 1 F 68, FI-00720 Helsinki (FI). LOU, Yanru [CN/FI]; Tilanhoitajankaari 14 A 21, FI-00790 Helsinki (FI). LAUKKANEN, Antti [FI/FI]; Mannerheimintie 35 A 5, FI-00250 Helsinki (FI).
- (74) **Agent:** BORENIUS & CO OY AB; Itämerenkatu 5, FI-00180 Helsinki (FI).

(81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) **Date of publication of the international search report:**  
14 June 2012



WO 2012/056111 A3

(54) **Title:** DRUG DELIVERY COMPOSITIONS

(57) **Abstract:** The present invention relates material that is useful in drug delivery compositions. The material comprises cellulose nanofibers and/or derivatives thereof, wherein the cellulose nanofibers are in a form of a hydrogel or membrane. The invention also provides methods for producing these materials and compositions and uses thereof.

**INTERNATIONAL SEARCH REPORT**

International application No PCT/FI2011/050941
---------------------------------------------------

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. A61K47/38 A61L27/52  
 ADD.

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)  
 C12N A61L C08J C08L 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, BIOSIS

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CZAJA W ET AL: "Microbial cellulose-the natural power to heal wounds", BIOMATERIALS, vol. 27, no. 2, January 2006 (2006-01), pages 145-151, XP025096958, ISSN: 0142-9612, DOI: 10.1016/J.BIOMATERIALS.2005.07.035 [retrieved on 2006-01-01]	1-12
X	US 2007/053960 A1 (BROWN R M JR [US] ET AL) 8 March 2007 (2007-03-08) claims 5-8	1-12

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	"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
"E" earlier document but published on or after the international filing date	"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
"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)	"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.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  24 April 2012	Date of mailing of the international search report  04/05/2012
--------------------------------------------------------------------------------	----------------------------------------------------------------------

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  Teyssier, Bertrand
----------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------

## INTERNATIONAL SEARCH REPORT

International application No

PCT/FI2011/050941

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MÜLLER A ET AL: "Bacterial nanocellulose wound dressing as drug delivery system", AMERICAN CHEMICAL SOCIETY. ABSTRACTS OF PAPER; 239TH NATIONAL MEETING OF THE AMERICAN CHEMICAL SOCIETY, US; SAN FRANCISCO, CA, US, vol. 239, CELL-22, 21 March 2010 (2010-03-21), XP008151040, ISSN: 0065-7727 the whole document -----	1-12
X	WIEGAND C ET AL: "HaCaT keratinocytes in co-culture with Staphylococcus aureus can be protected from bacterial damage by polihexanide", WOUND REPAIR & REGENERATION, vol. 17, no. 5, September 2009 (2009-09), pages 730-738, XP55016133, ISSN: 1067-1927, DOI: 10.1111/j.1524-475X.2009.00536.x the whole document -----	1-12
X,P	ELZINGA G ET AL: "Clinical evaluation of a PHMB-impregnated biocellulose dressing on paediatric lacerations", JOURNAL OF WOUND CARE, vol. 20, no. 6, June 2011 (2011-06), pages 280-284, XP55025495, ISSN: 0969-0700 the whole document -----	1-12
X	VALO H ET AL: "Immobilization of protein-coated drug nanoparticles in nanofibrillar cellulose matrices-Enhanced stability and release", JOURNAL OF CONTROLLED RELEASE, vol. 156, no. 3, December 2011 (2011-12), pages 390-397, XP55025318, ISSN: 0168-3659, DOI: 10.1016/j.jconrel.2011.07.016 [retrieved on 2011-07-23] online publication 23 July 2011 the whole document -----	1-12
X,P	TROVATTI E ET AL: "Biocellulose Membranes as Supports for Dermal Release of Lidocaine", BIOMACROMOLECULES, vol. 12, no. 11, 14 November 2011 (2011-11-14), pages 4162-4168, XP55025497, ISSN: 1525-7797, DOI: 10.1021/bm201303r [retrieved on 2011-10-16] online publication 16 October 2011 the whole document -----	1-12

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/FI2011/050941

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007053960	A1	NONE	08-03-2007
-----			