



(51) International Patent Classification:

A61L 27/14 (2006.01) A61F 2/82 (2006.01)
A61L 27/40 (2006.01) A61F 2/04 (2006.01)
A61L 27/38 (2006.01)

(21) International Application Number:

PCT/US2010/001609

(22) International Filing Date:

1 June 2010 (01.06.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/217,345 29 May 2009 (29.05.2009) US

(71) Applicant (for all designated States except US): **INCUBE LABS, LLC** [US/US]; 2051 Ringwood Avenue, San Jose, CA 95131 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **IMRAN, Mir** [IN/US]; 26641 Laurel Lane, Los Altos Hills, CA 94022 (US). **PATEL, Sanjay** [GB/US]; 1142 Stanislaus Lane, Palo Alto, CA 94303 (US). **HARRIS, Joel** [US/US]; 1027 Solana Drive, Mountain View, CA 94040 (US).

(74) Agent: **EKSTROM, Richard, C.**; Ekstrom Law Group, 650 Castro Street, Suite 120-248, Mountain View, CA 94041 (US).

(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, RO, RS, RU, 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, 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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

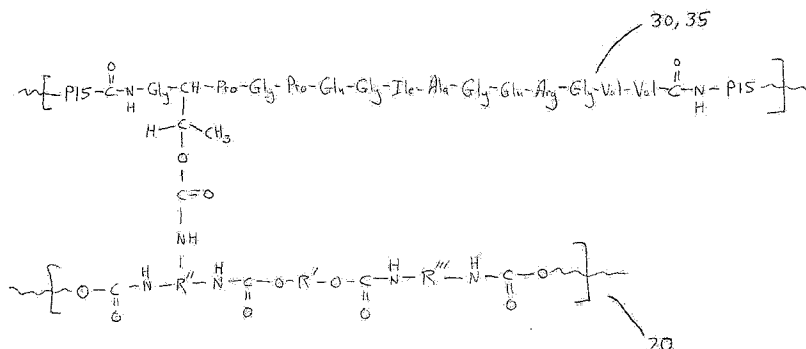
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

21 April 2011

(54) Title: BIODEGRADABLE MEDICAL IMPLANTS, POLYMER COMPOSITIONS AND METHODS OF USE

Fig. 3



(57) Abstract: Embodiments of the invention provide compositions comprising bio degradable polymers, medical implants fabricated from these compositions and methods of using such implants. Many embodiments provide medical implants comprising a first polymer backbone having a first rate of biodegradation and a second polymer backbone having a second rate of biodegradation faster than the first rate. In some embodiments, the second backbone is configured to be replaced by a natural tissue layer. The first backbone provides a scaffold for the implant while the second backbone degrades. This scaffold can enhance mechanical properties of the implant including various aspects of mechanical strength such as tensile, bending, hoop and yield strength; and elasticity. The scaffold also serves to maintain a minimum level of structural support of the implant during the period of degradation of the second backbone or for the entire life of the implant so that the implant does not mechanically fail.

A. CLASSIFICATION OF SUBJECT MATTER*A61L 27/14(2006.01)i, A61L 27/40(2006.01)i, A61L 27/38(2006.01)i, A61F 2/82(2006.01)i, A61F 2/04(2006.01)i*

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)

A61L 27/14; D04H 13/00; A61F 2/02; A61F 2/06; A61F 2/04; B29C 47/06; A61K 9/70

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: implant*, medical

devic*, scaffold*, stent*, rate, first*, second*, poly*, polyurethan*, polyglycol*, polylact*, PLGA, PGLA, PLA, PGA, faster*

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005-0042253 A1 (DAVID FARRAR et al.) 24 February 2005 See claims 1-2, 9, 12, 15, paragraphs [0014], [0020].	1, 5, 6, 10, 18-21 , 35-38
Y		2-4, 7-9, 22-34
Y	US 2007-0299510 A1 (-) 27 December 2007 See claims 1, 7, figure 3.	2-4, 22-34
Y	US 2005-0021131 A1 (VENKATRAMAN SUBRAMANIAN et al.) 27 January 2005 See claims 37, 57, paragraphs [0059], [0063], [0082].	7-9
A	US 2008-0015686 A1 (DAVID C. GALE et al.) 17 January 2008 See claim 70.	1-38
A	US 2003-0072790 A1 (CHIN-CHIN TSAI et al.) 17 April 2003 See claims 1-2.	1-38
A	US 6368356 B1 (ZHONG; SHENG PING et al.) 09 April 2002 See abstract, claim 1, figure 1.	1-38



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 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

24 FEBRUARY 2011 (24.02.2011)

Date of mailing of the international search report

25 FEBRUARY 2011 (25.02.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KOH, TAE WOOG

Telephone No. 82-42-481-8655



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2010/001609**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.: 39-71
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 39-71 pertain to methods for treatment of the human body by surgery or therapy as well as diagnostic methods, and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.
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:

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 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

Information on patent family members

International application No.

PCT/US2010/001609

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005-0042253 A1	24.02.2005	AU 2004-266150 A1	03.03.2005
		AU 2004-266150 B2	09.09.2010
		AU 2004-266150 B2	09.09.2010
		AU 2010-200401 A1	25.02.2010
		EP 1656166 A1	17.05.2006
		JP 2007-503226 A	22.02.2007
		JP 2007-503226 T	22.02.2007
		US 2007-0129810 A1	07.06.2007
		WO 2005-018700 A1	03.03.2005
		WO 2005-018700 A1	03.03.2005
US 2007-0299510 A1	27.12.2007	EP 2020956 A2	11.02.2009
		US 2007-299510 A1	27.12.2007
		US 2008-097620 A1	24.04.2008
		US 2008-097620 A1	24.04.2008
		WO 2007-140320 A2	06.12.2007
		WO 2007-140320 A2	06.12.2007
		WO 2007-140320 A3	20.11.2008
		WO 2007-140320 A3	20.11.2008
US 2005-0021131 A1	27.01.2005	US 2008-0208321 A1	28.08.2008
US 2008-0015686 A1	17.01.2008	US 7794495 B2	14.09.2010
		WO 2008-011048 A2	24.01.2008
		WO 2008-011048 A2	24.01.2008
		WO 2008-011048 A3	26.03.2009
		WO 2008-011048 A3	24.01.2008
US 2003-0072790 A1	17.04.2003	None	
US 6368356 B1	09.04.2002	CA 2262523 C	20.09.2005
		EP 0912211 A1	06.05.1999
		EP 0912211 A1	25.09.2002
		EP 0912211 A4	16.08.2000
		EP 0912211 B1	08.10.2003
		US 06060534A A	09.05.2000
		US 2001-0002411 A1	31.05.2001
		US 6184266 B1	06.02.2001
		US 6387978 B2	14.05.2002
		WO 98-02204 A1	22.01.1998