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- (71) **Applicant** (for all designated States except US):
BEZWADA BIOMEDICAL, LLC [US/US]; 15 Ileen
Court, Suite 1, Hillsborough, New Jersey 08844 (US).
- (72) **Inventor; and**
- (75) **Inventor/Applicant** (for US only): **BEZWADA, Rao S.**
[US/US]; 1 Nevius Road, Whitehouse Station, New Jersey
08889 (US).
- (74) **Agent:** **JACKSON, Arthur E.; MOSER TABOADA,**
1030 Broad Street Suite 203, Shrewsbury, New Jersey
07702 (US).
- (81) **Designated States** (unless otherwise indicated, for every
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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,
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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,
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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 February 2013

(54) **Title:** AMINO ACID DERIVATIVES AND ABSORBABLE POLYMERS THEREFROM

(57) **Abstract:** The present invention relates to the discovery of new class of hydrolysable amino acid derivatives and absorbable polyester amides, polyamides, polyepoxides, polyureas and polyurethanes prepared therefrom. The resultant absorbable polymers are useful for drug delivery, tissue engineering, tissue adhesives, adhesion prevention, bone wax formulations, medical device coatings, stents, stent coatings, highly porous foams, reticulated foams, wound care, cardiovascular applications, orthopedic devices, surface modifying agents and other implantable medical devices. In addition, these absorbable polymers should have a controlled degradation profile.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/024641**A. CLASSIFICATION OF SUBJECT MATTER***C07C 265/12(2006.01)i, C07C 291/10(2006.01)i, B01J 20/26(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)

C07C 265/12; C08G 18/78; A61K 31/216; A61K 9/00; A61K 9/10; C08G 18/77; C08L 89/00

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: isocyanate, absorbable, polyurethane, ester, glycol*, lactic, diox*, caprolactic, amino acid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7772352 B2 (BEZWADA, RAO S.) 10 August 2010 See the whole document.	1,5-9
A	US 2009-0098180 A1 (BEZWADA, RAO S.) 16 April 2009 See the whole document.	1,5-9
A	US 2008-0057127 A1 (BEZWADA, RAO S.) 06 March 2008 See the whole document.	1,5-9
A	US 5064653 A (SESSIONS, ROBERT W. et al.) 12 November 1991 See the whole document.	1,5-9

☐ 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

30 NOVEMBER 2012 (30.11.2012)

Date of mailing of the international search report

30 NOVEMBER 2012 (30.11.2012)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHO Han Sol

Telephone No. 82-42-481-5580



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/024641**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 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.:
1, 5 - 9

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/US2012/024641

Continuation of Box No. III

Group I: Claim 1 and its dependent claims are directed to absorbable isocyanates of Formula (B), (D) or (F).

Group II: Claim 2 and its dependent claims are directed to isocyanates from nitrophenylalanine of the Formula (H), (J), (HH) and (LL).

Group III: Claim 3 and its dependent claims are directed to isocyanates from nitrophenylalanine of the Formula ZZ.

Group IV: Claim 4 and its dependent claims are directed to isocyanates derived from L-lysine of the formula Y' or YY".

Group V: Claim 10 and its dependent claims are directed to an amines from nitrophenylalanine of the Formula (Z), (GG), (G) and (I).

Since the above-mentioned groups of claims do not share any of the technical features identified, a special technical relationship between the inventions does not exist.

Accordingly the claims do not relate to one invention or to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/024641

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7772352 B2	10.08.2010	AT 491408 T	15.01.2011
		DE 602006018971 D1	27.01.2011
		EP 1931334 A2	18.06.2008
		EP 1937182 A2	02.07.2008
		EP 1937182 A4	15.07.2009
		EP 1937182 B1	15.12.2010
		EP 2298235 A1	23.03.2011
		US 2006-0172983 A1	03.08.2006
		US 2006-0173065 A1	03.08.2006
		US 2006-0188547 A1	24.08.2006
		US 2010-0152272 A1	17.06.2010
		US 2010-0260702 A1	14.10.2010
		US 2011-0130448 A1	02.06.2011
		US 7691364 B2	06.04.2010
		US 7858077 B2	28.12.2010
		US 8143325 B2	27.03.2012
		WO 2007-030464 A2	15.03.2007
		WO 2007-030464 A3	20.09.2007
		WO 2007-030538 A2	15.03.2007
		WO 2007-030538 A3	30.04.2007
US 2009-0098180 A1	16.04.2009	EP 1948713 A2	30.07.2008
		EP 1948713 A4	30.03.2011
		US 8093420 B2	10.01.2012
		WO 2007-047244 A2	26.04.2007
		WO 2007-047244 A3	13.09.2007
US 2008-0057127 A1	06.03.2008	None	
US 5064653 A	12.11.1991	CN 1037523 A	29.11.1989
		EP 0335669 A2	04.10.1989
		EP 0335669 B1	30.06.1993
		EP 0424164 A2	24.04.1991
		EP 0424164 B1	06.09.1995
		JP 02-043231 A	13.02.1990
		JP 03-207614 A	10.09.1991
		JP 07-113067 B2	06.12.1995
		JP 2532161 B2	11.09.1996
		KR 10-0131075 B1	17.04.1998
		US 5065752 A	19.11.1991
		US 5254301 A	19.10.1993
		US 5916928 A	29.06.1999