## (19) World Intellectual Property **Organization**

International Bureau





(43) International Publication Date 7 October 2004 (07.10.2004)

PCT

# (10) International Publication Number WO 2004/084819 A3

(51) International Patent Classification<sup>7</sup>:

A61K 9/16

(21) International Application Number:

PCT/US2004/008399

(22) International Filing Date: 19 March 2004 (19.03.2004)

(25) Filing Language: English

English (26) Publication Language:

(30) Priority Data:

US 60/455,590 19 March 2003 (19.03.2003)

(71) Applicant (for all designated States except US): UNIVER-SITY OF KENTUCKY RESEARCH FOUNDATION [US/US]; 442 Bowman Hall, Lexington, KY 40506-0058 (US).

- (72) Inventors; and
- (75) Inventors/Applicants (for US only): DELUCA, Patrick [US/US]; 3292 Nantucket Drive, Lexington, KY 40502 (US). JIANG, Ge [CN/US]; 3204-11 Stonethrow Lane, Durham, NC 27713 (US). WOO, Byung [KR/US]; 1329 Lunt Court, Schaumburg, IL 60193 (US).
- (74) Agents: REA, Teresa, Stanek et al.; Burns, Doane, Swecker & Mathis, LLP, P.O. Box 1404, Alexandria, VA 22313-1404 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### **Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG. ES. FI. GB. GD. GE. GH. GM. HR. HU. ID. IL. IN. IS. JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

### **Published:**

- with international search report
- (88) Date of publication of the international search report: 29 December 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: POLY(ACRYLOYL-HYDROXYETHYL STARCH)-PLGA COMPOSITE MICROSPHERES

(57) Abstract: The present invention relates to a composite microsphere system comprising poly(D,L-lactide-co-glycolide) (PLGA), poly(acryloyl hydroxyethyl starch) (AcHES), and a pharmaceutically effective amount of a biologically active compound. The active compound may be, for example, an insulin, an interferon, a luteinizing hormone-releasing hormone (LHRH) analog, a somatostatin and/or derivatives thereof, a calicitonin, a parathyroid hormone (PTH), a bone morphogenic protein (BMP), an erythropoietin (EPO), an epidermal growth factor (EGF) or a growth hormone. This invention also relates to methods of using the composite microspheres, and methods of preparing same.



# INTERNATIONAL SEARCH REPORT

International app<sup>1</sup> PCT/US04/08399<sup>4</sup>

		]	101/000-/00555	
A. CLASSIFICATION OF SUBJECT MATTER				
IPC(7) : A61K 9/16				
USCL : 424/490				
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)				
		by classification sym	0015)	
U.S.: 424/490				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Documentation seatened state that the seatened state the seatened state the seatened state that the seatened state that the seatened state that the seatened state the seatened state that the seatened state that the seatened state the seatened state the seatened state that the seatened state the seatened				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
Electionic data base constitute dataing at any and a second datains a				
C. DOCUMENTS CONSIDERED TO BE RELEVANT			1	
Category *	Citation of document, with indication, where appropriate, of the relevant passages			Relevant to claim No.
A	US 5,160,745 A (DELUCA et al.) 03 November 1992 (03.11.1992), see entire document.			1-15
^	05 5,100,745 A (BEBOOM of Mar) of November 1992 (Comment of			
A	US 5,922,340 A (BERDE et al.) 13 July 1999 (13.07.1999), see entire document.		ocument.	1-15
^	03 5,722,540 A (BERDE 60 MI) 10 0MJ 1999 (12-00-13-00)			
1				
			1	
				,
				,
	1			
			C 11	
Further documents are listed in the continuation of Box C. See patent family annex.				
* Special categories of cited documents: "T" later document published after the integrated date and not in conflict with the application."				emational filing date or priority
date and not in contrict with the app			ention	
	defining the general state of the art which is not considered to be lar relevance			
	"X" document of particular relevance; in			claimed invention cannot be cred to involve an inventive step
"E" earlier ap	plication or patent published on or after the international filing date	when the do	cument is taken alone	not to myour and any
"L" document	which may throw doubts on priority claim(s) or which is cited to			-1-id investion gonnot be
establish the publication date of another citation or other special reason (as specified)		"Y" document of	o involve an inventive ste	claimed invention cannot be n when the document is
		combined w	ith one or more other suc	h documents, such combination
"O" document referring to an oral disclosure, use, exhibition or other means being obvious to a person			is to a person skilled in th	ne art
"P" document	aublished prior to the international filing date but later than the	"&" document m	ember of the same patent	family
"P" document published prior to the international filing date but later than the "&" document member of the same patent family priority date claimed				
Date of the actual completion of the international search  Date of mailing of the international search report				
25 August 2004 (25.08.2004)				
Name and mailing address of the ISA/US  Authorized officer  Authorized officer				
1	il Stop PCT, Attn: ISA/US	Say Drugg		
	nmissioner for Patents	BLESSING FUBARA		
P.O	. Box 1450	Telephone No. (571) 272-1600		
1,7				
Facsimile No. (703) 305-3230				