

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
17 February 2005 (17.02.2005)

PCT

(10) International Publication Number  
**WO 2005/014656 A1**

(51) International Patent Classification<sup>7</sup>: **C08B 37/00**,  
A61K 31/726

(21) International Application Number:  
PCT/EP2004/051391

(22) International Filing Date: 7 July 2004 (07.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
MI2003A001618 6 August 2003 (06.08.2003) IT

(71) Applicant (for all designated States except US): **INALCO S.P.A.** [IT/IT]; Via Calabiana 18, I-20139 Milano (IT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MANONI, Marco** [IT/IT]; Via Filippo Carcano 10, I-20149 Milano (IT). **SALSINI, Liana** [IT/IT]; Via Gramsci 238, I-55040 Ripa (IT). **CHINI, Jacopo** [IT/IT]; Via Antonio Stoppani, 26, I-50131 Firenze (IT). **CIPOLLETTI, Giovanni** [IT/IT]; Via Tagliamento 21, I-20139 Milano (IT).

(74) Agent: **GERVASI, Gemma**; Notarbartolo & Gervasi S.p.A., Corso di Porta Vittoria 9, I-20122 Milan (IT).

(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, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, 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).

**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

**Published:**

— with international search report

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: POLYSACCHARIDES DERIVATIVES WITH HIGH ANTITHROMBOTIC ACTIVITY IN PLASMA

(57) Abstract: The present invention relates to a process for the preparation of sulphated glycosaminoglycans derived from N-acetylheparosan which comprises: a) N- deacetylation and N-sulphation of the N-acetylheparosan polysaccharide prepared from natural or recombinant bacterial strain, preferably K5 E. coli, b) enzymatic epimerization with the glucuronyl C5-epimerase enzyme, c) partial O-sulphation followed by a partial O-desulphation, d) partial 6-O-sulphation, e) N-sulphation and an intermediate step of controlled depolymerization characterised by the fact that both O-sulphations (O-sulphation and 6O-sulphation) are partial. Furthermore the invention relates to the products obtained according to the process which show a ratio between the anti-Xa activity and anti-IIa activity equal to or higher than 1 and to compositions comprising said products in combination with suitable and pharmaceutically acceptable excipients and/or diluent.



WO 2005/014656 A1