

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 December 2010 (09.12.2010)

PCT

(10) International Publication Number
WO 2010/141718 A8

- (51) International Patent Classification:
A61F 2/28 (2006.01)
- (21) International Application Number:
PCT/US2010/037256
- (22) International Filing Date:
3 June 2010 (03.06.2010)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
12/455,778 5 June 2009 (05.06.2009) US
- (63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 12/455,778 (CIP)
Filed on 5 June 2009 (05.06.2009)
- (71) Applicant (for all designated States except US): THE UNIVERSITY OF CONNECTICUT [US/US]; 263 Farmington Avenue, Farmington, CT 06030 (US).
- (72) Inventor; and
- (71) Applicant : LAURENCIN, Cato, T. [US/US]; 50 Far Hills Road, Avon, CT 06001 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): YU, Xiaojun [CN/US]; 8940 Woodstock Way, Fishers, IN 46037 (US). VALMIKINATHAN, Chandra, M. [IN/US]; 159 Linden Avenue, Elmwood Park, NJ 07407 (US). WANG, Junping [CN/US]; 340 Belgrove Drive, Kearny, NJ 07032 (US).
- (74) Agents: BROOK, David, E. et al.; Hamilton, Brook, Smith & Reynolds, P.C., 530 Virginia Rd, P.O. Box 9133, Concord, MA 01742-9133 (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,

[Continued on next page]

(54) Title: SYNERGETIC FUNCTIONALIZED SPIRAL-IN-TUBULAR BONE SCAFFOLDS

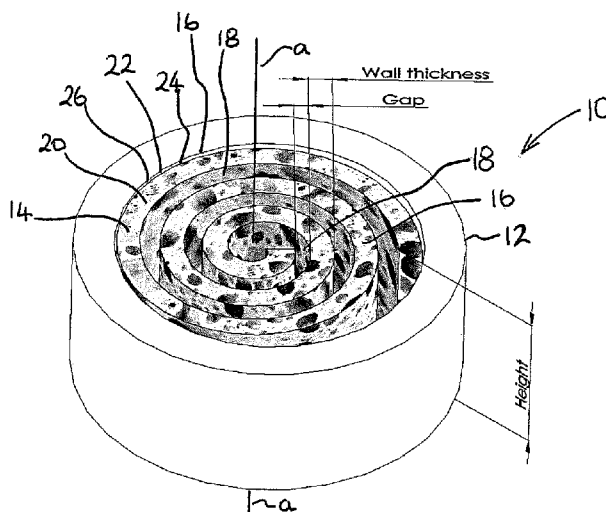


FIGURE 1A

(57) Abstract: An integrated scaffold for bone tissue engineering has a tubular outer shell and a spiral scaffold made of a porous sheet. The spiral scaffold is formed such that the porous sheet defines a series of spiral coils with gaps of controlled width between the coils to provide an open geometry for enhanced cell growth. The spiral scaffold resides within the bore of the shell and is integrated with the shell to fix the geometry of the spiral scaffold. Nanofibers may be deposited on the porous sheet to enhance cell penetration into the spiral scaffold. The spiral scaffold may have alternating layers of polymer and ceramic on the porous sheet that have been built up using a layer-by-layer method. The spiral scaffold may be seeded with cells by growing a cell sheet and placing the cell sheet on the porous sheet before it is rolled.



WO 2010/141718 A8



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).

(48) Date of publication of this corrected version:

28 July 2011

(15) Information about Correction:

see Notice of 28 July 2011

Published:

— with international search report (Art. 21(3))