



(43) International Publication Date
27 December 2013 (27.12.2013)

(51) International Patent Classification:

A61L 27/56 (2006.01) C12N 5/07 (2010.01)
A61L 27/38 (2006.01) A61F 2/08 (2006.01)

(21) International Application Number:

PCT/US2013/046519

(22) International Filing Date:

19 June 2013 (19.06.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/661,768 19 June 2012 (19.06.2012) US
13/801,780 13 March 2013 (13.03.2013) US

(71) Applicant: **ORGANOVO, INC.** [US/US]; 6275 Nancy Ridge Drive, Suite 110, San Diego, CA 92121 (US).

(72) Inventors: **SHEPHERD, Benjamin, R.**; 11248 Golden Birch Way, San Diego, CA 92131 (US). **PRESNELL, Sharon, C.**; 14023 Newporter Way, San Diego, CA 92128 (US). **EVINGER, Albert, J.**; 620 Empress Road, Pomona, CA 91768 (US).

(74) Agent: **HOSTETLER, Michael, J.**; Wilson Sonsini Goodrich & Rosati, 650 Page Mill Road, Palo Alto, CA 94304 (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, BN, 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, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

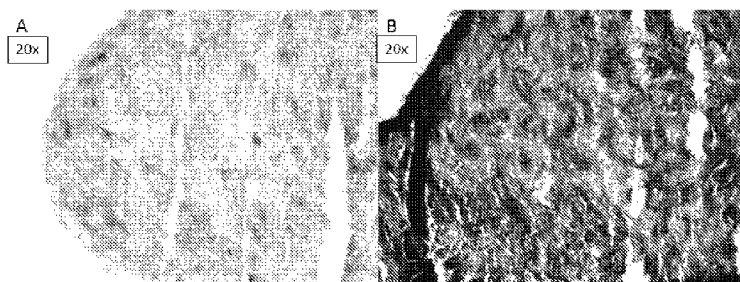
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

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

(54) Title: ENGINEERED THREE-DIMENSIONAL CONNECTIVE TISSUE CONSTRUCTS AND METHODS OF MAKING THE SAME

Fig. 4



(57) Abstract: Disclosed are engineered, living, three-dimensional connective tissue constructs comprising connective tissue cells. In some embodiments, the connective tissue cells are derived from multi-potent cells such as mesenchymal stem/stromal cells. In some embodiments, the cells are cohered to one another. In some embodiments, the multi-potent cells have been exposed to one or more differentiation signals to provide a living, three-dimensional connective tissue construct. In some embodiments, the constructs are substantially free of pre-formed scaffold at the time of use. Also disclosed are implants for engraftment, arrays of connective tissue constructs for *in vitro* experimentation, as well as methods of making the same.

