Meetings International SciTechnol

Ker Dai Fei Elmer et al., Biomater Med Appl 2018, Volume: 2
DOI: 10.4172/2577-0268-C1-002

Annual Conference on

3D PRINTING & BIO-PRINTING IN HEALTHCARE

August 20-21, 2018 | Singapore City, Singapore

Bioprinting of growth factors to repair bone-tendon-muscle units

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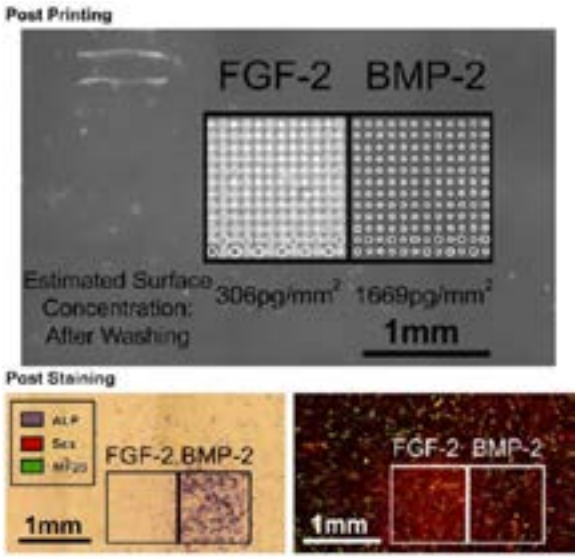
The present study investigated the effect of bioprinting musculoskeletal growth factors on musculoskeletal differentiation. Candidate growth factors were identified both from the literature and by growth factor screening assays. In these studies, Fibroblast Growth Factor-2 (FGF-2) was found to increase expression of the tendon marker Scleraxis (SCX) in a variety of cells including musculoskeletal progenitor cell lines and muscle-derived stem cells. Gene expression studies indicated that FGF-2 increased scx expression in a manner similar to chick embryonic tendon development. Biopatterning of multiple musculoskeletal growth factors onto different materials including fibrin-coated glass, sub-micron aligned fibrous scaffolds mimicking extracellular matrix, acellular dermal matrix, and polyurethane-based elastomers resulted in spatial control of cell differentiation. In summary, bioprinting holds promise to engineer complex tissues such as bone-tendon-muscle units but numerous challenges still persist.



Biography

Ker Dai Fei Elmer has completed his PhD in Biological Sciences from Carnegie Mellon University and Postdoctoral training from Department of Orthopaedic Surgery at Stanford University. He is an Assistant Professor at The Chinese University of Hong Kong with appointments in the School of Biomedical Sciences and the Institute for Tissue Engineering and Regenerative Medicine.

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