Won-Gun Koh, J Tissue Sci Eng 2017, 8:2 (Suppl)
DOI: 10.4172/2157-7552-C1-033

Hydrogel micro pattern-incorporated nanofibers for biomedical application

Won-Gun Koh
Yonsei University, Seoul South Korea

In this study, we describe a simple method for fabricating multiscale scaffolds that are capable of controlling the spatial positioning of mammalian cells and proteins or peptides. Photopatterning of poly (ethylene glycol) (PEG) hydrogel on the electrospun nanofibers produced micropatterned nanofiber matrices made of hydrogel microwells filled with a nanofibrous region, which is capable of generating cell and protein micropatterns due to the different interactions that cells and proteins have with PEG hydrogels and nanofibers. Different proteins could be immobilized onto resultant micropatterned nanofiber scaffold, carrying out cell patterning, metabolite detection, and growth factor delivery. As potential applications of resultant scaffold, the control of stem cell differentiation via controlled release of multiple growth factors. We fabricated fibrous scaffolds incorporating PEG hydrogel micro patterns for potential applications to spatio-temporal release of multiple growth factors for optimized osteogenesis of hMSCs. The resulting scaffolds were capable of loading different growth factors separately into the hydrogel micro patterns and the fibers in a single scaffold platform. Sequential delivery of bFGF and BMP-2 for osteogenesis of hMSC was achieved by a quick release of bFGF from the fibers and a slow and sustained release of BMP-2 from PEG hydrogel. The enhanced effect of the sequential release of bFGF and BMP-2 on the osteogenesis of hMSCs was clearly validated by *in vitro* studies such as ALP activity/staining and mineralization studies.

Biography

Won-Gun Koh received his BS and MS degrees from the Department of Chemical Engineering at Yonsei University, Korea. He received Ph.D in 2004 from Department of Chemical Engineering at Penn State University under the guidance of Professor Michael V Pishko. After Ph.D, he was appointed as Post-doc scholar at Stanford University, where he made relationship with Professor Curtis W Frank. At Stanford University, he worked in the Artificial Cornea Project with collaboration of Stanford University School of Medicine. He became the Assistant Professor in the Department of Chemical and Biomolecular Engineering at Yonsei University in 2005. Currently, he is Professor in the same department and Director of Yonsei Center for Research Facilities. His research interests include polymer-based tissue engineering and biosensor.

wongun@yonsei.ac.kr

Notes: