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Innovative electro hydrodynamic jet process for obtaining 3D fibrous architecture as a tissue regenerative material: Fabrication and cellular activities

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In this study, we propose a new scaffold fabrication method, “direct electro-hydrodynamic jet process,” using the initial jet of an electro spinning process and ethanol media as a target. The fabricated three dimensional (3D) fibrous structure was configured with multi-layered micro sized struts consisting of randomly entangled micro/nano fibrous architecture, similar to that of native extracellular matrixes. The fabrication of the structure was highly dependent on various processing parameters, such as the surface tension of the target media, and the flow rate and weight fraction of the polymer solution. As a tissue regenerative material, the 3D fibrous scaffold was cultured with preosteoblasts to observe the initial cellular activities in comparison with a solid-freeform fabricated 3D scaffold sharing a similar structural geometry. The cell-culture results showed that the newly developed scaffold provided outstanding microcellular environmental conditions to the seeded cells (about 3.5-fold better initial cell attachment and 2.1-fold better cell proliferation).

Biography

Minseong Kim did his MS and is presently pursuing his PhD from 2012 to present in Bio-Mechatronic Engineering, from SKKU, South Korea. He did his BS in 2008-2012 in Biochemical Engineering from Chosun University, South Korea.

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