Enhancing Differentiation of Human Mesenchymal Stem Cells for Myogenesis through the 3D
Co-culture with Rodent C2C12 Myoblasts on Dual-patterned Hydrogel Scaffold

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In the field of tissue engineering, there have been many attempts to induce differentiation of specific cell types from human mesenchymal stem cells (hMSC), and the advent of co-culture has definitely enhanced the overall differentiation process. In this study, we have combined the idea of co-culture materialized in 3D to provide an environment that is analogous to the in vivo system for cells. A fibrous scaffold is produced by patterning the polycaprolactone (PCL) electrospun nanofiber with poly(ethyleneglycol) (PEG) hydrogel in two ways vertically. Here, the nanofibrous scaffold accommodates 3D culture environment, and PEG functions as a support. In each side, hMSC and rodent C2C12 myoblasts are seeded separately to generate cellular interactions in between and enhanced differentiation of hMSC towards myoblasts with an aid of paracrine factors from C2C12. This dual-patterned hydrogel scaffold is predicted to be a practical platform in tissue engineering.