

Myogenesis in Adipose-derived Stem Cells by Co-culture with C₂C₁₂ Myoblasts on Aligned Electrospun Scaffold

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To regenerate injured skeletal muscle tissue, stem cells have been studied as sources of replacing damaged tissue. In recent years, it has been demonstrated that adipose-derived stem cells (ASCs) have potential to be differentiated into myogenic lineage when they are co-cultured with myoblasts by paracrine effect. In addition to the cell source, topographically aligned scaffold is also an important cue to mimic the native structure of skeletal muscle tissue which is highly aligned. In this study, we co-cultured ASCs and C2C12 myoblast cells on aligned nanofiber scaffold. This scaffold is fabricated by electrospinning poly(caprolactone) (PCL), which is biocompatible material, onto rapidly rotating drum. Then, it is patterned with poly(ethylene glycol) (PEG) hydrogel for easy handling and distinguishing cell seeding area. ASCs and C2C12 myoblasts are blended and seeded onto the scaffold, and then they were treated in differentiation media for C2C12 myoblasts. No media supplementation was used for inducing myogenic differentiation. This co-culture system integrated with topographical cues is expected to be potentially applied for skeletal muscle tissue engineering.