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Oral Presentation

Using Stromal Cell-Derived Factor-I as Bio Active Motif in A Novel Self-Assembly Peptide Nanofiber Scaffold: an Approach to Improve Cell Therapy in Brain Injury

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Abstract

Traumatic brain injury (TBI) is one of the main causes of mortality and morbidity worldwide. Despite extensive investigations over the past few decades, no effective therapies exist to improve the brain function in patients with TBI. Neural tissue engineering is an attractive therapeutic approach to restore the brain structure and function of damaged tissue. Bioactive motif of Stromal cell-derived factor-1 (SDF-1) induces neurogenesis by increasing the migration and proliferation of endogenous neural progenitor cells (NPCs) in the lesion sites. We designed the novel scaffold with SDF1 and RADA16. The Aim of this study is to determine in vitro effects of SDF scaffold on neural stem cells behavior including migration, attachment, and differentiation. Neural stem cells were isolated from the hippocampus and subventricular zone of the lateral ventricle of 17-days rat fetus. In this study, Apoptosis, cytotoxicity, proliferation, neurite outgrowth, and differentiation were assessed. Migration, attachment and differentiation of stem cells significantly increased in the SDF scaffold. Our results showed no significant difference between apoptosis, survival and proliferation of cells in SDF and RADA16-IKVAV scaffolds. Although SDF scaffold increased Migration, and attachment of stem cells in vitro, in vivo studies should be conducted to determine the features of SDF scaffold in the brain tissue.

Keywords: Neural Tissue Engineering, Stromal Derived Factor, Neural Stem Cells

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