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Oral Presentation

A Self-Assembled Nanopeptide Scaffold Combined with Mesenchymal Stem Cells Improved Functional Recovery after Traumatic Brain Injury in Rats

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Abstract

Traumatic Brain Injury (TBI) is a major cause of death and disability worldwide. TBI can cause cognitive and memory function impairments which Current medical setting is not able to cure. In this study, we hypothesized that mesenchymal stem cells derived from Adipose tissue transplanted with RADA1- GGS IKVAV (GSIKVAV) can rescue cognitive function. An acute model of TBI was carried out in male Wistar rats (n=36). Subjects were divided into 7 groups: Sham (receiving no treatment), PBS, GSIKVAV, Mesenchymal Stem Cells (MSCs), GSIKVAV+ MSCs. MSCs were stained with BrdU. To evaluate the MSCs characterization flow cytometery was performed. IHC was done to s tudy the differentiation and viability. Behavioral tests including Open Field (OF), Elevated Plus Maze (EPM) and modified Neurological Severity Score (mNSS) were done to evaluate the sensory- motor function and anxiety. At day 30, animals were sacrificed. In order to detect inflammation toll like receptor3, 4, tumor necrosis factor α and glial fibrillary acidic protein were assessed using western blot. CD markers (CD 105, 34) were reported to be positive for most of MSCs. The mNSS score significantly decreased among MSCs and MSCs + GSIKVAV groups. We observed a significant increase in the number of enteries to the open arm in the EPM test. The total distance was also increased in the OF test. These data suggest that using MSCs with GSIKVAV can be a potential therapy for TBI patients according its neuroprotective and immunomodulatory effects.

Keywords: Tissue Engineering, Neuroinflammation, Functional Recovery

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