The 6th International Epilepsy Symposium
Shefa Neuroscience Research Center, Tehran, Iran, 24-26 August, 2018
The Neuroscience Journal of Shefaye Khatam
Volume 6, No. 3, Suppl 2

Oral Presentation

Human Neural Stem/Progenitor Cells Derived from Epileptic Human Brain in a Self-Assembling Peptide Nanoscaffold Improve Traumatic Brain Injury in Rats

Ali Jahanbazi Jahan-Abad[1, 2], Sajad Sahab Negah[1, 3], Hassan Hosseini Ravandi[1], Sepideh Ghasemi[1], Maryam Borhani-Haghighi[1], Walter Stummer[4], Ali Gorji[1,3,4,5,6*], Maryam Khaleghi Ghadiri[4]

[1]Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran
[2]Department of Clinical Biochemistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3]Department of Neuroscience, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
[4]Department of Neurosurgery, Westfälische Wilhelms-Universität Münster, Münster, Germany
[5]Department of Neurology, Westfälische Wilhelms-Universität Münster, Münster, Germany
[6]Epilepsy Research Center, Westfälische Wilhelms-Universität Münster, Robert-Koch-Strasse 45, 48149 Münster, Germany

Published: *24 August, 2018*

Abstract

Traumatic brain injury (TBI) is a disruption in the brain functions as a result of an external force. To date, the main problem is that no direct effective therapies exist for brain injury treatment. It is thought that stem Cell therapy may provide a promising treatment for TBI. The use of human-derived stem/progenitor cells seeded in three- dimensional (3D) micro-environments have shown as a promising novel method for cell replacement therapy in TBI. The project aims here were to investigate the effects of human neural stem/progenitor cells (hNS/PCs) derived from the resected mesial temporal lobe brain tissues and human adipose-derived stromal/stem cells (hADSCs) cultured in PuraMatrix hydrogel (PM) on brain function in animal models of TBI. By comparing the results of doubling time characteristics of hNS/PCs and hADSCs, revealed that hNS/PCs doubling time was significantly longer than hADSC. Transplantation of hNS/PCs and hADSCs seeded in PM after TBI does seem to improved functional recovery, decreased lesion volume, inhibited neuroinflammation, and reduced the reactive gliosis at the injury site in rats. The data suggest the hNS/PCs derived from epileptic human brain seeded in PM scaffold can be used for the potential cell therapy for neurological disorders, such as TBI.

Keywords: Tissue Engineering, Human Neural Stem Cells, Traumatic Brain Injury, Epilepsy.

Corresponding Author: Ali Gorji
E-mail: *gorjial@uni–muenster.de*

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