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Oral Presentation

Treatment of Traumatic Brain Injury in Adult Rats with Injection of Human Epileptic Neural Stem Cells and Nano-Scaffold

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Abstract

Traumatic brain injury (TBI) is described by a disruption in the normal function of the brain due to an injury following a trauma, which can potentially cause severe physical, cognitive, and emotional impairment. The use of human stem cells and self-assembling peptide scaffolds suggest huge potential for application in the treatment of TBI. In the present study, we surveyed the beneficial effects of human adipose-derived stem cells (hADSCs), human epileptic neural stem cells (hENSCs), and PuraMatrix hydrogel (PM) in an acute brain injury model of mild TBI using 3 months rats. hADSCs and hENSCs were transplanted with or without scaffolds into rats brain and the electroencephalography were compared. Modified neurologic severity score (mNSS) tests were performed to measure behavioral outcomes. PM scaffold increased the retention of hENSCs in the lesion site and limited its distribution at the transplanted region. Significantly more hENSCs were detected in the brain when transplanted with PM scaffold. The results showed PM scaffold also efficiently improved cell survival in vivo, resulting in better neural functional recovery. We hypothesized that PM scaffold would improve early engraftment and support the survival of grafted cells and functional recovery post-transplantation.

Keywords: PuraMatrix hydrogel, Human stem cells, Traumatic brain injury

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