

TISSUE ENGINEERING AND BIOBANKING &

TISSUE SCIENCE AND REGENERATIVE MEDICINE

April 23-24, 2018 Las Vegas, USA

Therapeutic efficacy of neuroectodermal stem cells in regeneration of compressed spinal cord injury in rat model

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In spinal cord injury, radical treatment is still a persistent hope for patients and clinicians. The aim of this study was to evaluate therapeutic efficacy of neuroectodermal stem cells (NESC) in compressed spinal cord injury in rat model. For extraction of the NESC, future brains were extracted from E10 mice embryos and cultured. 140 male white Wistar rats were divided randomly into three main groups; 20 rats were kept as control and 20 rats acted as sham, while 100 rats were subjected to compressed spinal cord injury (CSCI). Seven days after CSCI, rats were subdivided into two groups; an untreated and treated with NESC injected at site of the injury. Evaluation of the locomotor function and histopathology was assessed. Rats were sacrificed four weeks after transplantations of NESC and sections of the spinal cord at the epicentral site of the lesion, cranial and caudal to it were examined. Sections of CSCI revealed areas of hemorrhages, necrosis and cavitation limited by reactive astrogliosis, with up regulation of GFAP expression. Nerve fibers became swollen or lost. Degeneration of the axoplasm and demyelination were revealed. The frequency and duration of movements in rats with CSCI decreased by 15.61% and 13.13% respectively as compared to the control group, but significantly increased in rats treated with NESC by 4.285 and 3.94 times as compared to CSCI. Evidence of remyelination and mitigation of histopathological features and reactive astrogliosis in CSCI sections were more pronounced in cranial than in caudal region. NESC transplantation ameliorated the pathological changes, promoted remyelination and improved the functional locomotor activity.

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