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Oral Presentation

Three-Dimensional Transplantation of Adult Neural Stem Cells in an Acute Brain Injury Model

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Abstract

Brain injury is the leading cause of death and disability in the most active population. There is no definite clinical treatment for repair of damaged brain tissue. Application of nanoscaffolds supporting stem cells can be helpful. The present study examined the effects of autologous adult neural stem/progenitor cells (NS/PCs) seeded in PuraMatrix in acute brain injury. The right brain subventricular zone of adult wistar rats was stereotactically harvested. Then, NS/PCs were cultured using neurosphere assay. At day 45, brain injury was performed in left side of brain and PBS, PuraMatrix, NS/PCs or PuraMatrix+NS/PCs was injected into the created cavity. The neurological status was evaluated for 4 weeks. Then, morphological and immunohistochemical studies were done. The neurologic status improved after treatment of brain injury with PuraMatrix, NS/PCs or PuraMatrix+NS/PCs. The lesion volume was decreased in PuraMatrix+NS/PCs. By 3D transplantation of NS/PCs, not only the rate of inflammation was reduced but also the survival rate in the site of injury was increased. In addition, the transplanted cells expressed the differentiation markers after 4 weeks. Transplantation of adult NS/PCs in PuraMatrix may be a feasible method for reduction of tissue damage following brain injury.

Keywords: Brain Injury, Neural Stem Cells, Autologous Transplantation, Nanoscaffold, Neural Tissue Engineering.

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