

TRANSPLANTATION OF DENTAL PULP STEM CELLS PROMOTES HEALING OF DAMAGED BLADDER TISSUE IN A RAT MODEL OF CHEMICALLY INDUCED CYSTITIS

Hypothesis / aims of study

Mesenchymal stem cells (MSCs) are used as cell therapy options for various diseases, one type being dental pulp stem cells (DPSCs). We examined the healing effects of DPSC transplantation on damaged bladder tissue in a chemically induced cystitis rat model.

Study design, materials and methods

Cystitis was induced by hydrochloride injection into the bladder of female F344/NSlc rats. The following day, DPSCs suspended in phosphate-buffered saline (PBS) were transplanted into the bladder and maintained for 1 h (DPSC transplant group). PBS alone was injected as the control (PBS injection group).

Results

Two days following transplantation, considerable submucosal edema, vascular structure destruction, hemorrhage, and inflammatory cell invasion was observed in the DPSC transplant and PBS injection groups, but there was no difference in recovery between the groups. Six days following transplantation, vascular structure regeneration was observed in both groups; however, unlike the DPSC transplant group, the PBS injection group also showed traces of submucosal edema and hemorrhage. These results correlated with the myeloperoxidase (MPO) and tissue concentrations of the inflammatory cytokines interleukin (IL)-1 β , IL-6, and tumor necrosis factor (TNF)- α . Furthermore, the intercontraction interval was prolonged, and the frequency of nociceptive behaviors was reduced in the DPSC transplant group compared with the PBS injection group. DPSCs were found on the bladder epithelium until day 3 after transplantation. In the DPSC conditioned media (CM), trophic factors were detected for the fibroblast growth factor (FGF)-2, vascular endothelial growth factor (VEGF), C–C family, and C–X–C family chemokines.

Interpretation of results

The results of DPSC transplantation into the model suggested that transplanted cells may promote healing of damaged bladder tissue by exerting various trophic effects while localizing on the bladder epithelium and that MSC transplantation may be a potential novel therapy for interstitial cystitis/painful bladder syndrome.

Concluding message

Transplantation of Dental Pulp Stem Cells Promotes Healing of Damaged Bladder Tissue in a Rat Model of Chemically Induced Cystitis

Disclosures

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