

عنوان مقاله:

Effect of mesenchymal stem cells and polyvinyl alcohol-coated selenium nanoparticles on rats with Alzheimer-like phenotypes

محل انتشار:

مجله علوم پایه پزشکی ایران، دوره 27، شماره 10 (سال: 1403)

تعداد صفحات اصل مقاله: 8

نویسندگان:

Siamak Shahidi - Neurophysiology Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Sara Soleimani Asl - Department of Anatomy, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran

Bahareh Gholamigeravand - Department of Anatomy, School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran

Simimn Afshar - Neurophysiology Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Nasrin Hashemi-Firouzi - Neurophysiology Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Alireza Samzadeh-Kermani - Department of Chemistry, Faculty of Science, University of Zabol, Zabol, Iran

Mahsa Majidi - School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran

Kimia Amiri - School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran

خلاصه مقاله:

Objective(s): Mesenchymal stem cell (MSC) transplantation represents a promising approach for treating Alzheimer's disease (AD). These stem cells, however, have a short lifespan following transplantation into recipient animals. Selenium nanoparticles, due to their size, aid in drug delivery for brain disorders. This study investigated the therapeutic effect of MSCs and polyvinyl alcohol (PVA)-coated selenium nanoparticles (SeNPs) in a rat model of AD. Materials and Methods: An Alzheimer-like phenotype was induced through intracerebroventricular (ICV) administration of streptozotocin (STZ). Rats were assigned to five groups: control, Alz (STZ; 3 mg/kg, 10 µl, ICV), Alz+stem cell (ICV transplantation), Alz+SeNP (0.4 mg/kg, orally), and Alz+stem cell+SeNPs. The ICV administration of STZ mimicked some aspects of AD in the Alz groups. SeNPs were administered for 30 days following STZ administration. The novel object recognition (NOR) and passive avoidance learning (PAL) tests were used to evaluate cognition and memory. Oxidative stress biomarkers and brain-derived neurotrophic factor (BDNF) were assessed by biochemical analysis, ELISA kits, and Congo red staining, respectively. Results: The combined therapy of PVA-coated SeNPs and MSC transplantation was more effective in enhancing memory reacquisition compared to either SeNPs or MSCs alone. The use of stem cells in conjunction with PVA-coated SeNPs significantly boosted anti-oxidant capacity. Conclusion: The results suggest that the joint treatment with PVA-coated SeNPs and MSCs offers considerable neuroprotection against AD in animal models.

کلمات کلیدی:

Alzheimer disease, Memory, Polyvinyl alcohol, Selenium, Stem cells, Streptozocin

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/2055633>

