



Title: Evaluation of neuroprotective properties of adipose-derived stem cells for peripheral nerves damage

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Abstract:

Background: Tissue engineering is currently the most promising approach in the field of regenerative medicine, concerning peripheral nervous system injuries. The aim of presented research was evaluation of effectiveness of ASCs (adipose-derived stem cells) for peripheral nerves mechanical injuries repair.

Methods: Phenotypic and functional properties of ASCs from 5 localizations of rats adipose tissue were compared. Potential of neurogenic differentiation and impact of NGF, VEGF and bFGF on this differentiation direction was evaluated. Effect of ASCs and their secretome on growth rate and ability to repair mechanical defect in N2a cell line repair was studied.

Results: High regenerative potential was proven in *in vitro* model. No differences in phenotypic and functional features were detected. Among the examined growth factors, NGF stimulated ASCs to differentiate into neurogenic lineage. However, adding NGF to N2a cell culture did not increase their growth rate. Improvement of time of mechanical injury in N2a cell line repair was significant after adding ASCs to the cell culture.

Conclusions: Presented in this research results confirm that ASCs have high potential to repair injuries in peripheral nervous system and using them together with material-engineered scaffold gives promising results in treatment of big defects of peripheral nerves.