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Effects of transplantation of human cord blood mononuclear cells expressing the recombinant VEGF and FGF2 genes into spinal cord traumatic injury sites in rats

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Abstract

A model of dosed TVIII spinal cord contusion trauma in rats was used to study the effects of immediate single-dose transplantation of human cord blood mononuclear cells transformed with the recombinant genes for neurotrophic factors - vascular endothelia growth factor (VEGF) and fibroblast growth factor 2 (FGF2) - into the injury zone. A further group of animals, in the same conditions, received the same cells transfected with plasmid pEGFP-N2. EGFP-labeled cells were detected in the white matter for 21 days after transplantation at distances of at least 10 mm in the rostral and caudal directions from the administration point. By 30 days after transplantation with cells transfected with plasmid pBud-VEGF-FGF2, the area of intact gray matter 3 mm from the trauma epicenter increased by more than 60%. By this time, the outer areas of the white matter in animals of this group, 1.5 cm from the trauma epicenter, showed an average 30% increase in the number of perivascular cells expressing platelet-derived growth factor β receptors (PDGFβR). Addition of therapeutic genes VEGF an FGF2 to the trauma injury zone and their expression in carrier cells stimulated vascularization and post-traumatic regeneration of the spinal cord. © 2013 Springer Science+Business Media New York.

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Keywords

cord blood cells, FGF2, regeneration, spinal cord, VEGF