



Title: Transplantation of olfactory ensheathing cells promotes the therapeutic effect of neural stem cells on spinal cord injury by inhibiting necroptosis

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Abstract:

Transplantation of neural stem cells (NSCs) is one of the most promising treatments for spinal cord injury (SCI).

However, the limited survival of transplanted NSCs reduces their therapeutic effects. The aim of the present study was to examine whether a co-transplantation of olfactory ensheathing cells (OECs) may enhance the survival of NSCs and improve the beneficial effects of NSCs in rats with SCI, as well as to investigate potential mechanisms underlying such efficacies. Co-transplantation of OECs and NSCs was used to treat rats with SCI.

Sympathetic nerve function was determined by measuring sympathetic skin responses. The results showed that OEC/NSC co-transplantation improved motor function and autonomic nerve function in rats with SCI. Co-transplantation of OECs promoted NSC-induced neuroprotection and inhibited programmed necrosis of NSCs, which was mediated by receptor-interacting protein kinase 3 (RIP3) and mixed lineage kinase domain-like protein (MLKL). Furthermore, OECs increased the proliferation and differentiation of NSCs in vitro, and improved the survival rate of NSCs in vivo. Taken together, we conclude that transplantation of OECs inhibited programmed necrosis of co-transplanted NSCs to promote therapeutic effects on SCI. Therefore, co-transplantation of OECs and NSCs may represent a promising strategy for treating patients with SCI.