SPINAL CORD INJURY AND NEURAL PRECURSORS. HOMING, FATE AND RECOVERY OF FUNCTION

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Replacement of dead or damaged cells is the primary goal of regenerative medicine. One extremely interesting finding of the past few years was the discovery and isolation of neural stem cells from various regions of the brain, indicating that cell replenishment is possible within the brain (1-3)
The aim of this study was to asses the effects of the transplantation of neural stem cells (NSCs) in a mouse model of spinal cord injury (SCI).
We used a contusive model for SCI and performed the contusion with an Infinitive Horizon device. Since this apparatus can control the time and strength of the impact, it allows us to generate reproducible damage to the spinal cord. We administered green fluorescent NSCs either by intravenous (IV) injection or by transplantation in the spinal cord parenchyma.
NSCs significantly improved the recovery rate of hindlimb function and greatly attenuated secondary degeneration compared with the controls. IV administration of NSCs gave superior recovery compared to intraspinal injection. About 2% of total IV-administered NSCs homed to the SCI site, where they survived almost undifferentiated; thus, the positive effect of NSC treatment is not necessarily ascribed to damaged tissue substitution. The homing of NSCs triggered within 48 hours a tremendous increase of neurotrophic factor and chemokyne expression at the injury site. One week after transplantation these cells maintained the capacity to produce neurospheres when recovered from the lesion site and grown in vitro.
We suggest that the environmental modification of the site of lesion and the augmented expression of neurotrophic factors and chemokynes by live NSCs may be the basis of the enhanced recovery of function.

Bibliography

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