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## ELECTROACUPUNCTURE MAINTAINS THE SURVIVAL AND SYNAPTIC CONNECTION OF NEURAL STEM CELL-DERIVED NEURONS IN A GRAFTED NEURAL NETWORK SCAFFOLD VIA ENHANCING NEUROTROPHIN-3 SECRETION, AND IMPROVES NEURAL TRANSDUCTION IN THE TRANSECTED RAT SPINAL CORD

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The unfavorable microenvironment of the injured spinal cord results in the low cell survival rate and astrocytic differentiation of the grafted neural stem cells (NSCs). Our previous study found that electroacupuncture (EA) on the governor vessel acupoints enhanced neurotrophin-3 (NT-3) level in the injury/graft site of spinal cord and promoted the survival and migration of NSCs grafted immediately. However, the transplanted NSCs appeared low efficiency in differentiating into neurons. The NSC derived neurons are especially needed for reconstructing circuit of the damaged spinal cord. Therefore, in the present study, first *in vitro*, we attempted to co-culture with NT-3 gene modified NSCs and TrkC (receptor of NT-3) gene modified NSCs in a gelatin sponge scaffold (GS) for 14 days, to establish a neural network scaffold (NN) with synaptic transmission and then, the NN was transplanted into a 2 mm wide transection gap in the T9-10 spinal cord of adult rats, to investigate whether EA application could promote the survival and function of transplanted NN by enhancing the secretion of endogenous NT-3 in the injured spinal cord. The results showed that EA treatment can increase NT-3 levels of the injured spinal cord, maintain the survival, differentiation and synaptic connections of

the NSC derived neurons in the grafted NN, and encourage axonal regeneration in the injury/graft site of spinal cord, as well as improve neural transduction of spinal cord and paralysis hindlimb function. Our data suggest that the combinational strategy of EA and grafted NN can partially improve the structure and function of transected spinal cord.

### Biography

Ying Ding is an Associate Professor, Master's Supervisor in the Department of Histology and Embryology from Zhongshan School of Medicine at Sun Yat-sen University. She is a Member of Guangdong Provincial Anatomical Society Council; Guangdong Provincial Rehabilitation Medicine Association and Guangdong Provincial Experimental Medicine Professional Committee of Chinese and Western Medicine Association. Her research mainly focuses on the mechanism of electroacupuncture combined with transplanted stem cell repairing spinal cord injury. So far, she has obtained some grants from National Natural Science Foundation and the Natural Science Foundation of Guangdong Province. She has totally published 23 SCI-E papers.

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