Neural stem cell therapy

**Neural stem cells** are emerging as a **regenerative therapy** for **spinal cord injury** (SCI), since they differentiate into functional **neurons** and secrete beneficial **paracrine factors** into the damaged microenvironment.

A growing number of pre-clinical studies have suggested that transplantation of neural stem cells (NSCs) could offer a promising new therapeutic approach for neurodegeneration. While much of the initial excitement about this strategy focused on the use of NSCs to replace degenerating neurons, more recent studies have implicated NSC-mediated changes in **neurotrophins** as a major mechanism of therapeutic efficacy ³.

Several groups have developed novel techniques to isolate and expand aNSCs from normal adult brains, and showed successful applications of aNSCs to neurological diseases. With new technologies for aNSCs and their clinical strengths, previous hurdles in stem cell therapies for neurological diseases could be overcome, to realize clinically efficacious regenerative stem cell therapeutics ².

Lee et al., from **South Korea**, successfully isolated and cultured adult human **multipotent neural stem cells** (ahMNCs) from the **temporal lobes** of epileptic **patients**. In a study, they investigated the therapeutic efficacy and treatment mechanism of ahMNCs for SCI using **rodent** models. When 1 x 10⁶ ahMNCs were transplanted into injured **spinal cords** at 7 days after **contusion**, the injection group showed significantly better functional recovery than the control group (media injection after contusion), which was determined by the Basso, Beattie and Bresnahan (BBB) score. Although transplanted ahMNCs disappeared continuously, remained cells expressed differentiated neural cell markers (**Tuj1**) or astrocyte marker (**GFAP**) in the injured spinal cords. Moreover, the number of **CD31**-positive microvessels significantly increased in the injection group than that of the control group. The paracrine pro-angiogenic activities of ahMNCs were confirmed by in vitro tube formation assay and in vivo Matrigel plug assay. Together, these results indicate that ahMNCs have significant therapeutic efficacy in SCI via replacement of damaged neural cells and pro-angiogenic effects on the microenvironment of SCI ³.

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