



Improvements in neuroelectrophysiological and rear limb functions in rats with spinal cord injury after Schwann cell transplantation in combination with a C5a receptor antagonist

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ABSTRACT. We measured the effect of Schwann cell transplantation and complement factor 5a (C5a) receptor antagonist on nerve function recovery in rats with spinal cord injury. Experimental spinal cord injury was induced in eighty Wistar rats and these were randomly divided into four treatment groups: culture medium and saline injection (control group), Schwann cell injection (cell transplantation group), C5a receptor antagonist injection (C5a receptor antagonist group), and both Schwann cell and C5a receptor antagonist injections (combination group). Rear limb functional recovery was assessed 1, 2, 4, 6, and 8 weeks after the spinal cord injury with the

tilt table test and the Basso, Beattie, Bresnahan scale. Sex-determining region Y (SRY) gene expression was measured at week 4 and horseradish peroxidase (HRP) labeling was used at week 8 to further assess the recovery of neuroelectrophysiological functions. The rear limb functional assessment showed that the combination group had better outcomes than the cell transplantation and C5a receptor antagonist groups. All treatment groups had better outcomes than control. Only the cell transplantation and combination groups showed SRY expression. The number of HRP-positive nerve fibers in the different groups ranked as follows: combination group > cell transplantation and C5a receptor antagonist > control. The refractory period and amplitude of the induced potential in the combination group were significantly greater than in the other three groups. These results suggest that the combination of Schwann cell transplantation and the C5a receptor antagonist enhances the regeneration of injured synapses and improves limb function and electrophysiology.

Key words: Schwann cell; C5a receptor antagonist; Spinal cord injury; Cell transplantation