Effect of anti-Nogo-A antibody treatment in hand dexterity recovery following unilateral hemisection: Electrophysiological study in non-human primates.

J. Savidan¹, T. Wannier¹, J. Bloch², M-L. Beaud, E.M. Rouiller¹ and A. Belhaj-Saif¹

(1) Dept Medicine, University of Fribourg
(2) Dept Neurosurgery, University Hospital Lausanne

Anti-Nogo-A antibody treatment has shown in both rat and non-human primate to improve recovery of hand dexterity following spinal hemisection. Such behavioral improvement was correlated to new sprouting of corticospinal (CS) axons caudal and rostral to the lesion. Nevertheless, the functional role of such new CS sprouting in the recovery process needed to be assessed. Separately the BDNF has shown to improve axons growth and to be implicating in inhibition of the neurite outgrowth inhibition, so potentially to improve the recovery after a spinal cord injury. In recent work we assessed the effect of combined treatment of anti-Nogo-A antibody and BDNF after a spinal cord lesion in adult macaque monkeys using transcranial electrical stimulation (TES). The obtained results were correlated to behavioral recovery of the hand dexterity. The behavioral and TES data was analyzed in 4 adult monkeys that were submitted to unilateral cervical spinal lesion (C7/C8). Two monkeys were treated intrathecally with anti-Nogo-A antibody and BDNF, whereas a control antibody was infused in the other monkeys.

The TES results showed that there were no significant differences between treated and untreated monkeys. These results were correlated with the recovery of the hand dexterity that didn’t show any beneficial effects of this combined treatment compared to the control group.

Therefore, following these results our ongoing study will investigate the functional role of these new projections only in anti-Nogo-A antibody treated monkeys, using sophisticated methods: stimulus triggered averaging of EMG activity from chronically recorded forelimb muscles in monkeys before and after lesion. In this project, we will focus principally on the primary motor cortex (M1).