

Influence of nerve growth factor upon the injured peripheral nerve in the absence of its distal part

Wiesław Marcol¹, Katarzyna Kotulska², Magdalena Larysz-Brysz¹,
Marita Pietrucha-Dutczak¹, Edyta Olakowska¹,
Izabela Malinowska¹ and Joanna Lewin-Kowalik¹

¹ Department of Physiology, Medical University of Silesia, Katowice, Poland

² Department of Neurology, Medical University of Silesia, Katowice, Poland

Key words: NGF; Motoneurons; No distal stump; Peripheral nerve; Regeneration; Adult rats

SUMMARY

Transected peripheral nerve can be protected with different supplementations. One of them is implantation of dead-ended connective tissue chambers filled with fibrin and growth-promoting substances. The aim of this study was to find whether nerve growth factor (NGF) applied by means of such method exerts neuroprotective effect upon transected sciatic nerves. Study was performed on the adult male Wistar C rats. Connective tissue chambers grew around the silicone tubes implanted under their skin. Chambers were then filled with fibrin (control group) or fibrin with NGF solution (NGF group). Right sciatic nerve was cut, its distal stump was removed and its proximal stump was introduced into the chamber. Following 4 weeks DiI was applied to the free end of implant. The labeled motoneurons in the slices obtained from L₃-L₄ spinal cord segments and the number of myelinated nerve fibers present in the middle part of the chambers were counted. Acetylcholinesterase-positive fiber endings inside the chambers were also visualized. Our data showed that the number of motor neurons and their diameters as well as the number of myelinated fibers were higher in the NGF group when compared to the control group, but these differences were not significant. In both groups parallelly arranged acetylcholinesterase-positive nerve fibers were present. The obtained results show that NGF has no influence on regeneration of the motor component of the rat sciatic nerves in adult animals.