**Effect of intranasal Nerve Growth Factor administration in spinal cord injury**

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**Abstract:**

Nerve growth factor is known to play a critical protective role on a number of brain neurons in mammals, including humans. However, its role in the spinal cord is not still unclear. Indeed, NGF does not cross the blood-brain barrier if injected subcutaneously or intravenously, and another delivery method is therefore required. Hence the aim of this study was first to investigate whether purified NGF reaches spinal cord neurons and has any effect on the motor skills of rats with induced spinal cord injury and second to determine its effect on NGF concentrations and NGF-receptors in injured spinal cord neurons in adult rats when administered via the nasal cavity. Adult Sprague-Dawley rats with intact and injured spinal cord received daily intranasal nerve growth factor administration in both nostrils for 1 day or for 3 consecutive weeks. We found an increased content of nerve growth factor and enhanced expression of nerve growth factor receptor in the spinal cord 24 hours after a single intranasal administration of nerve growth factor in healthy rats, while daily treatment for 3 weeks in a model of spinal cord injury improved the deficits in locomotor behaviour and increased spinal content of both nerve growth factor and nerve growth factor receptors. These outcomes suggest that the intranasal nerve growth factor bypasses blood-brain barrier and affects spinal cord neurons in spinal cord injury. They also suggest exploiting the possible therapeutic role of intranasally delivered nerve growth factor for the neuroprotection of damaged spinal nerve cells.