Peripheral Nerve injury induced expression of mRNA for serine protease inhibitor 3 in the rat facial and hypoglossal nuclei but not in the spinal cord

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SUMMARY

The current work has documented the expression of the mRNAs for serine protease inhibitor 3 (SPI-3) in the facial and hypoglossal nuclei following peripheral nerve transection by using the in situ hybridization method. The signals appeared 6 hour after nerve injury; they became stronger on day 1 of injury and persisted for 21 days. SPI-3 may be involved during early events of modulating the activities of serine proteases following nerve injury. Such activities may include synaptic stripping and re-organization and facilitation of glial cell reaction to nerve injury. In the later stages of nerve injury SPI-3 may enhance neuronal survival, growth of neurites and re-establishment of synaptic contacts in the facial and hypoglossal nuclei. Hypoglossal but not facial nerve transection caused the expression of mRNAs for SPI-3 in the pineal gland. The signals appeared 6 hours after nerve injury and persisted for 21 days. The significance of this observation is not known but it indicates that the pineal gland senses injury to some peripheral nerves including the hypoglossal nerve. The study has also showed that axotomy of the sciatic nerve did not give rise to the up-regulation of the mRNAs for SPI-3 in the spinal cord. There was no hybridization signals in the lumbar segments; an indication that SPI-3 may not form part of molecules that are released during sciatic nerve transaction by the neural and non-neural cells of the spinal cord. At the moment there are no antibodies for SPI-3 and therefore future studies are needed to verify the findings. It will be interesting also to study on the role of pineal gland during peripheral nerve injuries.

INTRODUCTION

The understanding of pathways for neuronal regeneration is an important element in neuroscience and in the management of neuronal pathology such as neurodegenerative diseases and injury. Many research centers are using different tools to study on the molecules that are up-regulated following neuronal pathology.