

# Peripheral Nerve Injury

*Lasers Surg Med.* 2002;31(3):216-22.

## **Quantitation of calcitonin gene-related peptide mRNA and neuronal cell death in facial motor nuclei following axotomy and 633 nm low power laser treatment.**

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### **Background and Objectives:**

A persistent increase in calcitonin gene-related peptide (CGRP) immunoreactivity in motoneurons may serve as an indicator for regeneration after peripheral nerve injury [Borke et al., *J Neurocytol* 1993;22:141-153].

### **Study Design/Materials and Methods:**

We examined the effects of low power laser treatment (633 nm) on axotomy-induced changes in alpha-CGRP mRNA and long-term neuronal survival in facial motoneurons.

A quantitative reverse transcriptase-polymerase chain reaction (RT-PCR) assay for alpha-CGRP mRNA was used to detect changes in the response to axotomy and laser irradiation. Cell counts of neurons in injured and non-injured facial motor nuclei of laser-treated and non-treated rats were done to estimate neuronal survival.

### **Results:**

A 10-fold increase ( $P < 0.0001$ ) in mRNA for alpha-CGRP at 11 days post-transection and an almost threefold increase ( $P < 0.0001$ ) in neuronal survival at 6-9 months post-transection were found in 633 nm light treated rats.

### **Discussion:**

These findings demonstrate that 633 nm laser light upregulates CGRP mRNA and support the theory that laser irradiation increases the rate of regeneration, target reinnervation, and neuronal survival of the axotomized neuron.

PMID: 12224097 [PubMed - indexed for MEDLINE]