

## Fluoro-Gold tracing after chronic constriction injury of rat sciatic nerve

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**Abstract:** In the present study we have used Fluoro-Gold (FG) to retrogradely label primary sensory neurons in dorsal root ganglia (DRG) and motoneurons in ventral horn following chronic constriction injury of sciatic nerve (CCI). The neuropathic animals with fully developed tactile allodynia revealed a significant decrease of FG-labeled neurons in DRG L4-L5, three weeks after nerve-ligation. No such changes were detected in the DRG of sham-operated rats. The FG labeling in the motoneurons throughout L4-L6 spinal cord segments remained unchanged in both sham-operated and neuropathic groups. These data suggest that remodeling processes induced by CCI affect first of all the sensory pathways throughout the corresponding DRG.

**Key words:** fluorogold, neuropathic pain, dorsal root ganglia, spinal cord.

**Abbreviations:** CCI, chronic constriction injury; DRG, dorsal root ganglia; FG, Fluoro-Gold; PWT, paw withdrawal thresholds.

### Introduction

Tracer substances that are taken up by axonal transport provide us a useful tool to study neurons by their projections and connectivity rather than by their anatomical residency (KUYPERS et al., 1980). Nowadays a wide range of different markers is available for anterograde and/or retrograde transport within neurons (MOLANDER & GRANT, 1985; KOBBERT et al., 2000).

Since ongoing afferent impulses from dorsal root ganglia (DRG) regulate pain behaviors, changes in the primary sensory neurons followed by alterations in the central afferent projection and peripheral input are believed to play a major role in the development of abnormal pain syndromes (GRACEY et al., 1992). Therefore, we have employed the chronic constriction injury (CCI) model producing behaviors that mimic some of the clinical symptoms of peripheral neuropathies (BENNETT & XIE, 1988), including hyperalgesia, allodynia and spontaneous pain. Animals with neuropathic pain moreover show postural changes of the foot as a result of a complex mixture of motor and sensory abnormality. However, it is not clear whether the abnormal foot posture is a result of motor impairment or a form of guarding

behavior reflecting the level of pain. Importantly, convergent evidence has accumulated to indicate that these pathological manifestations of neuropathic pain may be mediated by different neuronal pathways.

In the present study, we examined the retrograde axonal transport of Fluoro-Gold (FG) to the primary sensory neurons and to the motoneurons in the intact and chronically constricted rat sciatic nerve. Here we analyzed possible alterations of FG labeling in regard to the damage of the somatic sensory and motor axons, caused by peripheral nerve injury.

### Material and methods

Experiments were done in accordance with the regulations of the Animal Care and Use Committee at the Institute of Neurobiology, Slovak Academy of Sciences (Košice, Slovakia) and following the guidelines of the Ethical Standards and the regulations of International association for study of Pain (IASP). All animals were housed in groups of 2 or 3 in clear plastic cages, exposed to light 12 h per day. Food and water were available *ad libitum*.

#### *Neuropathic lesion*

Male adult Wistar rats ( $n = 5$ ; 250g body weight) were anesthetized under halothane anesthesia (2%). The com-

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