Local Chronic Nerve Injury Induces a Neuronal Phenotypic Switch of the Dorsal Root Ganglia

Khoa Pham1, Tom Chao1, Winnie Palispis1, Oswald Steward2, Ranjan Gupta1,2,3
1Orthopaedic Surgery, University of California, Irvine, Irvine, CA; 2Anatomy and Neurobiology, University of California, Irvine, Irvine, CA; 3Biomedical Engineering, University of California, Irvine, Irvine, CA
ranjang@uci.edu

Introduction: Until recently, chronic nerve compression (CNC) injuries have been relatively understudied. Recent studies have shown that CNC injury induces Schwann cell proliferation and apoptosis with no morphologic evidence of axonal injury (1,2). Moreover, axons within the zone of injury undergo a sprouting response that is readily apparent by two weeks following injury. Early work has shown that this response may also be manifested within the corresponding dorsal root ganglia (DRG) and may actually initiate a phenotypic switch during the early months as a rise in the population of small diameter IB4 positive neurons has been detected (3). As we hypothesized that DRG neurons may adopt an altered phenotype centrally secondary to local protein up-regulation at the site of injury, we sought to explore the relative contribution of DRG neuronal subtypes following CNC injury and the molecular triggers by which a phenotypic switch is achieved.

Materials and Methods: Surgical Technique

CNC injury model in adult male Sprague-Dawley rats (Simonsen Laboratories, Inc) were created. Briefly, using a gluteal-splitting approach, the right sciatic nerve was exposed and atraumatically fitted with a 1 cm sample of inert tubular (Baxter Healthcare) with internal diameter of 1.3mm. The left sciatic nerve was mobilized and returned to its muscular bed to serve as a comparative control.

Surgical Technique

Animals were then sutured and returned to their cages until time of harvest.

Results:

1. Orthopaedic Surgery, University of California, Irvine, Irvine, CA; 2Anatomy and Neurobiology, University of California, Irvine, Irvine, CA; 3Biomedical Engineering, University of California, Irvine, Irvine, CA
ranjang@uci.edu

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