

# **Regulation of metabolic enzymes in neuropathic dorsal root ganglia: Proteomic analysis**

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## **ABSTRACT**

Widely cellular energy metabolism would be affected by nerve injury and here, we mentioned different kinds of cellular changes might be orchestrated to fight against neuronal degeneration. Because of the great importance to identify metabolic enzymes are now known to be the fundamental parts of neuron-specific functions and elucidate how they are regulated after nerve injury. Key enzymes in energy metabolism are as follows. Upregulation of  $\alpha$ -enolase and pyruvate kinase M1 and M2 and the downregulation of lactate dehydrogenase B which reflect the presence of hypoxic or similarly stressful conditions in the injured Dorsal root ganglion (DRG). A cholesterologenic enzyme, and ATP synthase  $\beta$ -subunit, an enzyme in the ATP biosynthesis and acetyl-CoA acetyltransferase 2, in fatty acid metabolism, mitochondrial proteins including hydroxymethylglutaryl-CoA synthase I and monoglyceride lipase, and Advillin/pervin, a DRG neuron-specific gene, were significantly downregulated. Exclusively, in L4 DRG carbonic anhydrase, muscle-type creatine kinase, muscle-type  $\beta$ -enolase, and muscle-type tropomyosin-2 $\beta$ , plus transferrin and hemopexin were upregulated. Carbonic anhydrase, muscle-type creatine kinase, myosin, and troponin-T/-I as myogenic proteins uphold functional and structural stability of cells under stress. Overall, to respond to stress or injury, metabolic pathways that are normally inactive under steady state conditions are activated while some of the regular pathways may be halted or bypassed. In addition, a substantial amount of energy is needed to make changes in protein expression and to build up cellular defense mechanisms. For these reasons, it is conceivable that we observed the regulation of many cellular enzymes, especially those in the energy metabolism.

**Key words:** Dorsal root ganglion, Metabolic enzyme, Neuropathy, Proteomics