

Effects of Endurance Training on mRNA levels of the KIF1B Motor Protein in Sensory areas of the Spinal Cord of Rats with Diabetic Neuropathy

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Abstract

Objective: Diabetic neuropathy leads to axonal transport abnormalities. However its mechanism and the beneficial effects of exercise on these abnormalities are not well documented. The present study aims to investigate KIF1B mRNA in spinal cord sensory neuron tissue of Wistar male rats with diabetic neuropathy following endurance training.

Methods: We randomly assigned 12 male Wistar rats into three groups: diabetic trained, diabetic untrained and healthy control. Intraperitoneal injection of a STZ (streptozotocin) solution (45 mg/kg) was used to induce diabetes. At two weeks after STZ injections, the mechanical allodynia and thermal hyperalgesia tests demonstrated the presence of diabetic neuropathy. A moderate endurance training protocol was performed for a six-week period. At 24 hours after the final training session, the rats were sacrificed and the L4-L6 sensory neurons of the spinal cord tissue were removed. KIF1B mRNA expression was performed using real time-PCR.

Results: Diabetic neuropathy led to increased KIF1B gene expression in the diabetic untrained group compared with the intact control group ($p=0.03$). Compared with the diabetic untrained group, training significantly decreased KIF1B gene expression ($P<0.05$) and blood glucose levels ($P=0.0001$) in the diabetic trained group.

Conclusion: KIF1B mRNA up-regulation in sensory neurons of STZ-diabetic rats is a factor which can be involved in abnormal axonal transport. Endurance training as a non-pharmacotherapy strategy can modulate and return KIF1B to approximate normal levels.

Keywords: Diabetic neuropathy, Endurance training, Sensory neurons, KIF1B mRNA

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