

The Effects of a Single Bout of Endurance Exercise on Glucose Transporter-4 (GLUT-4) Content

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ABSTRACT

Glucose Transporter protein-4 (GLUT-4) is considered the predominant glucose transporter in skeletal muscle. Exercise has been shown to increase glucose uptake and GLUT-4 protein content in skeletal muscle following muscle contraction. **PURPOSE:** To determine the acute effects of a single bout of moderate intensity endurance exercise on skeletal muscle GLUT-4 content. **METHODS:** 10 healthy male volunteers (age: 24.4 ± 1.3 years; BMI 23.16 ± 0.60 kg/m²) participated in a single bout of endurance exercise on a cycle ergometer at 65% maximal aerobic capacity (VO_{2max}) for 1.5 - 2.0 hours (650kcal). Muscle biopsies were obtained from the vastus lateralis immediately before and after the exercise. Muscle glycogen content was measured using a Periodic acid-Schiff stain (PAS). GLUT-4 content was determined via immunohistochemistry techniques and quantified using ImageJ software. **RESULTS:** Blood glucose tended to decrease following aerobic exercise (Pre: 87.6 ± 1.78 mg/dl; Post: 84.5 ± 1.85 mg/dl; $p=0.05$). Glycogen content significantly decreased following exercise (Pre: 0.008 ± 0.0002 AU; Post: 0.007 ± 0.0002 AU; $p=0.04$). Total GLUT-4 content significantly increased after a single bout of exercise (Pre: 9.05 ± 1.09 AU; Post 13.32 ± 1.17 AU; $p=0.01$). **CONCLUSION:** A single bout of moderate intensity, long duration, aerobic exercise increase GLUT-4 protein content in healthy males.