Effect of Dietary Glycemic Index on Substrate Transporter Gene Expression in Human Skeletal Muscle Following Exercise

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**Background:** In skeletal muscle, uptakes of glucose and fatty acid from circulation are facilitated by transmembrane substrate transporters GLUT4 and FAT/CD36, respectively. **Aim:** To determine the effect of dietary glycemic index (GI) on GLUT4 and FAT/CD36 gene expressions in human skeletal muscle following a single bout of exercise. **Methods:** Eight male subjects completed a 60-min cycling exercise at 75% VO2 max, and immediately received an isocaloric meal containing either high GI (HGI) or low GI (LGI) diets, with the same carbohydrate: fat: protein proportion, in a crossover design. Muscle samples from deep vastus lateralis were taken by needle biopsy immediately after exercise and 3 h after exercise. **Results:** Following exercise, the HGI diet produced a significantly greater glucose and insulin responses compared to the LGI diet, indicated by greater area under curves. Both diets resulted in rapid reductions in plasma fatty acid and glycerol below fasting level. GLUT4 mRNA was downregulated by both HGI and LGI diets to a comparable extent, while GLUT4 protein levels were not changed during this short period. FAT/CD36 mRNA and protein levels were substantially decreased with the HGI diet below baseline, but not with the LGI diet. **Conclusion:** The present study found a significant dietary GI effect on postexercise FAT/CD36 gene expression in human skeletal muscle. This result implicates that the differences in dietary GI are sufficient to alter fat metabolism.

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