The effect of 5 days of aspartate and asparagine supplementation on glucose transport activity in rat muscle.

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BACKGROUND: The consumption of protein supplements containing amino acids is increasing around the world. Aspartate (Asp) and asparagine (Asn) are amino acids metabolized by skeletal muscle. This metabolism involves biochemical pathways that are involved in increasing Krebs cycle activity via anaplerotic reactions, resulting in higher glutamine concentrations. A connection between amino acid supplementation, glycogen concentration, and glucose uptake has been previously demonstrated.

OBJECTIVE AND METHODS: The purpose of this study was to evaluate the effect of Asp and Asn supplementation on glucose uptake in rats using three different glycogen concentrations.

RESULTS: The results indicate that Asp and Asn supplementation in rats with high glycogen concentrations (fed state) further increased the glycogen concentration in the muscle, and decreased in vitro 2-deoxyglucose (a glucose analog) uptake by the muscle at maximal insulin concentrations. When animals had a medium glycogen concentration (consumed lard for 3 days), glucose uptake was higher in the supplemented group at sub-maximal insulin concentrations.

CONCLUSIONS: We conclude that supplementation of Asp and Asn reduced glucose transport in rat muscle only at higher levels of glycogen. The ingestion of lard for 3 days changed the responsiveness and sensitivity to insulin, and that group had higher levels of insulin sensitivity with Asp and Asn supplementation.

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