Insulin Signaling in Skeletal Muscle Strips from Intrauterine Growth Restricted Lambs

Intrauterine growth restriction (IUGR) is commonly associated with infants who weigh less than 2,500 g. Evidence demonstrates that IUGR increases the probability of insulin resistance and Type-2 diabetes in adulthood. This fetal programming effect indicates that individuals with IUGR may decrease their skeletal muscle responsiveness to insulin, which involves intracellular protein signaling. The aim of this study was to determine AKT concentrations in insulin challenged skeletal muscle strips from IUGR lambs. AKT is a kinase in the insulin-signaling pathway, and is activated by phosphorylation of thr308 and ser473 in order to regulate cell survival and apoptosis. Pregnant ewes were exposed to heat stress during mid gestation (40-90 days) to create placental insufficiency. Their lambs were IUGR (n=6) and compared to a thermoneutral control group (n=6). At 30 days of age, strips of semitendinosus muscle were collected and challenged with insulin. Muscle strips (24.3mg) were dissected, and incubated for additional 20 minutes in the following treatment conditions: 0 or >10 μU/ml insulin. Total AKT was measured by western blot analysis. Mixed effects models were used to analyze total AKT between groups and treatments, which are included as fixed terms, as well as lamb as random effect. Least square means were 0.356 ± 0.05 and 0.233 ± 0.05 for IUGR and control groups, and 0.249 ± 0.05 and 0.344 ± 0.05 for Insulin and No-Insulin treatments. However, no significant difference (P>0.05) was found between groups and treatments. In conclusion, AKT was not different between groups which allow us to test AKT phosphorylation.