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Effects of bovine whey and soy protein supplemented diets on biochemical signalling pathways involved in muscle development in pigs

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Muscle is a dynamic reservoir of bound and unbound proteins (amino acids) that are constantly broken down and regenerated to meet metabolic demands. Insulin-like growth factor 1 (IGF-1) is a small peptide growth factor that controls muscle growth through the insulin signalling pathway. Insulin axis involves the phosphorylation of Insulin Receptor Substrate-1 (IRS-1) in response to insulin in vivo which in turn activates the phosphatidylinositol-3-kinase (PI-3K) pathway. PI-3K pathway stimulates muscle protein synthesis and the uptake of glucose with the most prevalent glucose transporter isoform expressed being GLUT4. Creatine kinase (CK) system efficiently regulates energy transfer and is believed to be involved in the metabolic regulation of energy fluxes and oxidative phosphorylation. Forty eight pigs were fed with 100%, 140% and 180% of the RDI for protein (whey and soy) supplemented diets for 20 weeks and blood samples obtained at weeks 1, 5, 10, 15 and 20. Muscle biopsies were taken at the end. Plasma insulin levels are measured by RIA and Quantitative PCR and Western blotting used for IRS-1, IGF-1, CK and GLUT4 genes. These analyses will indicate the effects of both whey and soy protein sources and levels on muscle development through the insulin and IGF axes.