Attenuation of Adipocyte Hypertrophy in a Palmitic Acid-Induced 3T3 Cell Model Through Lupeol Treatment

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Obesity is the enlargement of adipose tissue caused by consuming more calories than used by the body. Excessive fat accumulation in the adipose tissue forms adipocyte hypertrophy, which promotes metabolic dysfunction. Lupeol is a pharmacologically active pentacyclic triterpenoid present in medicinal plants, vegetables, and fruits. The current project investigated the role of lupeol in an adipocyte hypertrophy model by measuring the critical adipogenic regulators in vitro. 3T3-L1 MBX mouse embryonic cells were differentiated to adipocytes and treated with 500 μM palmitic acid to convert the adipocyte to hypertrophied cells. Adipocytes and hypertrophied adipocytes were treated with or without 60 μM lupeol. Differentiated adipocytes showed increased expression of FABP4 and oil-red staining. 3T3 adipocytes treated with palmitic acid showed significantly increased droplet size, which confirms the cells' adipocyte hypertrophy. Western-blot analysis results showed that lupeol treatment reduced the expression of fatty acid-binding protein 4 (FABP-4), peroxisome proliferator-activated receptor-gamma (PPAR gamma), and adiponectin. Oil-red staining analysis showed less staining in the adipocytes with lupeol. The results suggest that lupeol treatment decreased adipogenic markers, contributing to reduced hypertrophy.

Awards Won:
First Award of $5,000