

# The effects of strawberry bioactive compounds on lipid metabolism and adipogenesis

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Obesity is one of the major problems of the 21<sup>st</sup> century worldwide. It is characterized by an expansion of white adipose tissue (WAT) mass resulting from increased adipocytes number and/or size. Excessive accumulation of mature adipocytes is associated with high lipid levels and with a general impairment of catabolic pathways. In this work, we evaluated the effect of a strawberry extract on lipid metabolism and adipogenesis on HepG2 cells and 3T3-L1 adipocytes. The results demonstrated that in HepG2 strawberry extract stimulated the LKB1/AMPK pathway leading to the inactivation of acetyl coenzyme A carboxylase (ACC) and inhibition of 3-hydroxy-3-methylglutaryl-CoA reductase (HMGCR), the major regulators of fatty acids and cholesterol synthesis, respectively; it also stimulated LDL receptor, sirtuin 1 (Sirt1) and the peroxisome proliferator activated receptor gamma coactivator 1-alpha (PGC-1 $\alpha$ ). In addition, strawberry extract reduced 3T3-L1 pre-adipocytes differentiation, lipid accumulation and down-regulated the mRNA expression of the adipogenic transcription factors CCAAT/enhancer-binding protein (C/REB- $\alpha$ ) and peroxisome proliferation-activated receptor (PPAR- $\gamma$ ). Consistently, it inhibited the expression of fatty acid binding protein (FABP4), ACC and sterol regulatory element-binding protein (SREBP1), by activating AMPK pathway. Strawberry extract also inhibited oxidative stress and inflammation biomarkers, increased antioxidant enzymes activities and mitochondrial functionality. Our results suggest the potential anti-obesity effect of the bioactive components of strawberry.



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