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α-mangostin improves glucose uptake and inhibits adipocytes differentiation in 3T3-L1 cells via PPAR γ, GLUT4, and leptin expressions

(Article)

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Abstract

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Obesity has been often associated with the occurrence of cardiovascular diseases, type 2 diabetes, and cancer. The development of obesity is also accompanied by significant differentiation of preadipocytes into adipocytes. In this study, we investigated the activity of α-mangostin, a major xanthone component isolated from the stem bark of G. malaccensis, on glucose uptake and adipocyte differentiation of 3T3-L1 cells focusing on PPARγ, GLUT4, and leptin expressions. α-Mangostin was found to inhibit cytoplasmic lipid accumulation and adipogenic differentiation. Cells treated with 50 μM of α-mangostin reduced intracellular fat accumulation dose-dependently up to 44.4% relative to MDI-treated cells. Analyses of 2-deoxy-D-[^{3}H] glucose uptake activity showed that α-mangostin significantly improved the glucose uptake ($P < 0.05$) with highest activity found at 25 μM. In addition, α-mangostin increased the amount of free fatty acids (FFA) released. The highest glycerol release level was observed at 50 μM of α-mangostin. qRT-PCR analysis showed reduced lipid accumulation via inhibition of PPARγ gene expression. Induction of glucose uptake and free fatty acid release by α-mangostin were accompanied by increasing mRNA expression of GLUT4 and leptin. These evidences propose that α-mangostin might be possible candidate for the effective management of obesity in future.

Indexed keywords

EMTREE drug terms: alpha mangostin; fatty acid; glucose; glucose transporter 4; leptin; peroxisome proliferator activated receptor gamma; plant medicinal product; unclassified drug

EMTREE medical terms: adipocyte; adipogenesis; animal cell; Article; bark; cell differentiation; cell viability; controlled study; drug isolation; Garcinia; Garcinia malaccensis; gene expression; glucose transport; lipid storage; mouse; MTT assay; nonhuman; priority journal; reverse transcription polymerase chain reaction

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