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(E)-5-hydroxy-7-methoxy-3-(2'-hydroxybenzyl)-4-chromanone increases glucose uptake by stimulating GLUT4 translocation to the plasma membrane in 3T3-L1 adipocytes

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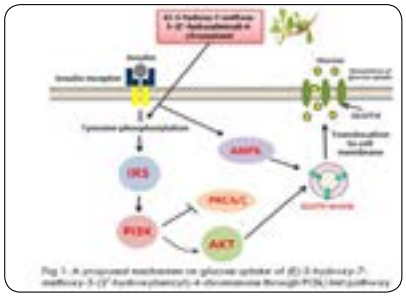
Five compounds were isolated from *Portulaca oleracea* L. by bioassay-guided fractionation and HPLC isolation. Among them, (E)-5hydroxy-7methoxy-3-(2'-hydroxybenzyl)-4-chromanone showed the highest effect on glucose uptake. This study investigated how (E)-5-hydroxy-7-methoxy-3-(2'-hydroxybenzyl)-4-chromanone increased glucose uptake in 3T3-L1 adipocytes. (E)-5-hydroxy-7- methoxy-3-(2'-hydroxybenzyl)-4-chromanone significantly increased glucose uptake by stimulating GLUT4 translocation to the plasma membrane in 3T3-L1 adipocytes. The increase in plasma membrane GLUT4 expression was caused by IRS-1 phosphorylation, PI3K activation and Akt phosphorylation, and finally stimulated glucose uptake into the cells. But the phosphorylation of PKCλ/ζ was not activated by (E)-5-hydroxy-7-methoxy-3-(2'-hydroxybenzyl)-4-chromanone in the insulin signaling pathway, the phosphorylation of AMPK had been activated, which also stimulated GLUT4 translocation. The glucose uptake increased by (E)-5-hydroxy-7-methoxy-3-(2'-hydroxybenzyl)-4-chromanone was significantly inhibited by the PI3K inhibitor and the AMPK inhibitor in 3T3-L1 adipocytes. These findings suggest that (E)-5-hydroxy-7-methoxy-3-(2'-hydroxybenzyl)-4-chromanone may increase the glucose uptake by stimulating GLUT4 translocation to the plasma membrane via activating the PI3K/Akt and AMPK pathway in 3T3-L1 adipocytes.



Recent Publications

1. Ruderman N B, Carling D, Prentki M and Cacicedo J M (2013) AMPK, insulin resistance, and the metabolic syndrome. J Clin Invest 123:2764-2771.
2. Huang Y C, Chang W L, Huang S F, Lin C Y, Lin H C and Chang T C (2010) Pachimic acid stimulates glucose uptake through enhanced GLUT4 expression and translocation. Eur J Pharmacol 648:39-49.
3. Nagano T, Hayashibara K, Wakaki M, Yamashita Y and Ashida H (2015) Black tea polyphenols promotes GLUT4 translocation through both PI3K and AMPK-dependent pathways in skeletal muscle cells. Food Sci Tech Res 21:489-494.
4. Yan J, Sun L R, Zhou Z Y, Chen Y C, Zhang W M, Dai H F and Tan J W (2012) Homoisoflavonoids from the medicinal plant *Portulaca oleracea*. Phytochemistry 80:37-41.
5. Sultana A and Rahman K (2013) *Portulaca oleracea* Linn. A global panacea with ethno-medicinal and pharmacological potential. Int J Pharm Pharm Sci 5:33-39.

Biography

Ji Sook Han is currently working as a Professor at Pusan National University, Republic of Korea. She is engaged in research on isolating a bioactive compound from natural plant and investigating its effect for the prevention and treatment of type 2 diabetes. The active compound containing in natural plant may be a good anti-diabetic source by improving insulin resistance or insulin secretary defect. She evaluates the effect and the mechanism of a bioactive compound isolated from natural plant through *in vitro* and *in vivo* study.

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