

Oleuropein Ameliorates Palmitate-Induced Insulin Resistance by Increasing GLUT4 Translocation through Activation of AMP-Activated Protein Kinase in Rat Soleus Muscles

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Abstract : Oleuropein, the main constituent of leaves and fruits of the olive tree, has been demonstrated to exert beneficial effects on parameters relevant to the normal homeostatic mechanisms of glucose regulation in rat skeletal muscle. However, the antidiabetic effect of oleuropein, to our knowledge, has not been examined. Therefore, in this study, we examined whether oleuropein ameliorated palmitate-induced insulin resistance in skeletal muscle. To examine this question, insulin resistance was rapidly induced by incubating (12h) soleus muscle with a high concentration of palmitate(2mM). Subsequently, we attempted to restore insulin sensitivity by incubating (12h) muscles with oleuropein (1.5mM), while maintaining high concentrations of palmitate. Palmitate treatment for 12 h reduced insulin-stimulated glucose transport, GLUT4 translocation and AS160 phosphorylation. Oleuropein treatment (12 h) fully restored insulin-stimulated glucose transport, GLUT4 translocation and AS160 phosphorylation. Inhibition of PI3K phosphorylation with wortmannin (1 μ M) did not affect the oleuropein-induced improvements in insulin-stimulated glucose transport, GLUT4 translocation, and AS160 phosphorylation. These results suggested that the improvements in these parameters cannot account for activating PI3K pathway. Taken altogether, it appears that oleuropein, through activation of another pathway like activated protein kinase (AMPK), may provide a possible strategy by which they ameliorate palmitate-induced insulin resistance in skeletal muscles.

Keywords : AS160, diabetes, GLUT4, oleuropein

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