

## Synergistic Effect of Curcumin and Insulin on GLUT4 Translocation in C2C12 Cell

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**Abstract :** Introduction: Curcumin, the yellow pigment in turmeric, has been shown as an anti-diabetic agent for centuries but only in recent few years, its mechanism of action has been under investigation. Some studies showed that curcumin might exert its anti-diabetic effect via increasing glucose transporter isotype-4 (GLUT4) gene and glycoprotein contents in cells. To investigate this possibility, we investigate the effects of extract and commercial curcumin with and without insulin on GLUT4 translocation from intracellular compartments of nuclear or endoplasmic reticulum membranes (N/ER) into the cytoplasmic membrane (CM). Methods and Material: C2C12 myoblastic cell line were seeded in DMEM plus 20 % FBS and differentiated to myotubes using 2 % horse serum. After myotubes formation, 40  $\mu$ molar Extract and Commercial curcumin, with or without insulin as intervention, and as control 1 % DMSO were added for 3 h. Cells were washed and homogenized followed by ultracentrifuge fractionation, protein separation by SDS-PAGE and GLUT4 detection using semi-quantitative Western blotting. Data analysis was done by two independent samples t-test for comparison of mean  $\pm$  SD of GLUT4 percent in categories. GLUT4 contents were higher in CM groups curcumin and curcumin with insulin in comparison to 1 % DMSO-treated myotubes control group. Results: As our results have shown extract and commercial curcumin induces GLUT4 translocation from intra-cell into cell surface. The results have also shown synergic effect of curcumin on translocation of GLUT4 from intra-cell into cell surface in the presence of 100 nm insulin. Discussion: We conclude that curcumin may be a choice of type-2 diabetes mellitus treatment because its extract and commercial enhances GLUT4 contents in CM where it facilitates glucose entrance into the cell. However, it is necessary to trace the signaling pathways which are activated by curcumin.

**Keywords :** Curcumin, insulin, Diabetes type-2, GLUT4

**Conference Title :** ICBB 2016 : International Conference on Biochemistry and Biotechnology

**Conference Location :** Kuala Lumpur, Malaysia

**Conference Dates :** February 11-12, 2016