

ABSTRACT

Type 2 diabetes is often associated with insulin resistance, a condition where body cells become less sensitive to the effects of insulin, a hormone produced by the pancreas that plays an important role in regulating blood glucose level. Insulin resistance results in decreased translocation of glucose transporters. GLUT4 and GLUT12 are the main glucose transporters responsive to insulin. Decreased expression of GLUT4 and GLUT12 in the membrane lead to impaired glucose transport, increasing blood glucose levels. Naringenin is one of the natural flavonoids found in several types of citrus and tomatoes, known to enhance insulin sensitivity in GLUT1 and GLUT3 glucose transporters through in vivo models of streptozotocin-induced diabetic mice. This study aimed to determine the role of naringenin in enhancing glucose uptake and GLUT12 expression in C2C12 muscle cells.

This research uses an experimental design using differentiated C2C12, myoblast, cells as a muscle cell model. We generated a resistant insulin cells model by treating 200 nM palmitic acid. Then we analyze the viability of cells treated with Naringenin by MTT assay for 4 hours and 24 hours. To measure the uptake of glucose, cells were pre-conditioned with 200 nM palmitic acid, 200 nM insulin, and naringenin (0.008 μ M; 0.125 μ M; and 0.5 μ M) dissolved in the KRPH buffer according to their groups, followed by 1-hour incubation. The test continued with the addition of 25 mM glucose and incubation for 30 minutes to measure absorbance using anthrone and the expression of GLUT12 by Real-Time Quantitative Reverse Transcription PCR (qRT-PCR) method.

As a result, the group induced with 200 nM palmitic acid experienced a decrease in glucose uptake and GLUT12 gene expression, while the group with the addition of naringenin showed an increase in glucose uptake and GLUT12 gene expression to normal levels. This indicates that naringenin has the potential to improve insulin resistance conditions. However, further research is needed to determine the long-term effects of naringenin on GLUT12 expression, glucose uptake in cells, and other metabolic parameters in type 2 DM conditions.

Keywords: Insulin resistance, GLUT12, Naringenin