3,3'-Diindolylmethane Enhances Glucose Uptake Through Activation of Insulin Signaling in 3T3-L1 Adipocytes.

Choi KM[1], Yoo HS[1].

⊖ Author information

1   College of Pharmacy, Chungbuk National University, Cheongju, Republic of Korea.

Abstract

OBJECTIVE: Indole-3-carbinol (I3C), a naturally occurring compound found in cruciferous vegetables, and its metabolite 3,3'-diindolylmethane (DIM) reduce body mass and serum glucose levels in high-fat-diet-induced obese mice. This study aimed to determine whether I3C or DIM could increase glucose uptake via enhanced insulin sensitivity in 3T3-L1 adipocytes, as well as the mechanism involved.

METHODS: 3T3-L1 preadipocytes were differentiated by using a mixture of adipogenic inducers, including a suboptimal concentration of insulin.

RESULTS: DIM, but not I3C, increased adipocyte differentiation through upregulation of peroxisome proliferator-activated receptor γ and CCAAT/enhancer-binding protein α. DIM also enhanced glucose uptake by increasing expression of glucose transporter 4 in adipocytes. This was associated with DIM-enhanced phosphorylation of the signaling intermediates Akt, insulin receptor substrate-1, and insulin receptor early in differentiation.

CONCLUSIONS: Our findings suggest that DIM may improve insulin sensitivity through the activation of the insulin signaling pathway, leading to enhanced glucose uptake.