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Objectives: These studies investigated the ability of a hydroxychalcone from cinnamon to function as an insulin mimetic in 3T3-L1 adipocytes.

Methods: Comparative experiments were performed with the cinnamon methylhydroxychalcone polymer and insulin with regard to glucose uptake, glycogen synthesis, phosphatidylinositol-3-kinase dependency, glycogen synthase activation and glycogen synthase kinase-3 β activity. The phosphorylation state of the insulin receptor was also investigated.

Results: MHCP treatment stimulated glucose uptake and glycogen synthesis to a similar level as insulin. Glycogen synthesis was inhibited by both wortmannin and LY294002, inhibitors directed against the PI-3-kinase. In addition, MHCP treatment activated glycogen synthase and inhibited glycogen synthase kinase-3 β activities, known effects of insulin treatment. Analysis of the insulin receptor demonstrated that the receptor was phosphorylated upon exposure to the MHCP. This supports that the insulin cascade was triggered by MHCP. Along with comparing MHCP to insulin, experiments were done with MHCP and insulin combined. The responses observed using the dual treatment were greater than additive, indicating synergism between the two compounds.

Conclusion: Together, these results demonstrate that the MHCP is an effective mimetic on insulin. MHCP may be useful in the treatment of insulin resistance and in the study of the pathways leading to glucose utilization in cells.

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