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Exercise and insulin sensitivity: a review.

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Abstract

Physical activity has a beneficial effect on insulin sensitivity in normal as well as insulin resistant populations. A distinction should be made between the acute effects of exercise and genuine training effects. Up to two hours after exercise, glucose uptake is in part elevated due to insulin independent mechanisms, probably involving a contraction-induced increase in the amount of GLUT4 associated with the plasma membrane and T-tubules. However, a single bout of exercise can increase insulin sensitivity for at least 16 h post exercise in healthy as well as NIDDM subjects. Recent studies have accordingly shown that acute exercise also enhances insulin stimulated GLUT4 translocation. Increases in muscle GLUT4 protein content contribute to this effect, and in addition it has been hypothesized that the depletion of muscle glycogen stores with exercise plays a role herein. Physical training potentiates the effect of exercise on insulin sensitivity through multiple adaptations in glucose transport and metabolism. In addition, training may elicit favourable changes in lipid metabolism and can bring about improvements in the regulation of hepatic glucose output, which is especially relevant to NIDDM. It is concluded that physical training can be considered to play an important, if not essential role in the treatment and prevention of insulin insensitivity.

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