

Exercise effects on insulin sensitivity

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After a single bout of exercise, the ability of insulin to stimulate glucose uptake is markedly improved locally in the previously active muscles. This makes exercise a potent stimulus counter-acting insulin resistance characterising type 2 Diabetes. It is believed that at least part of the mechanism relates to an improved ability of insulin to stimulate translocation of glucose transporters (GLUT4) to the muscle membrane after exercise. Reviewing existing studies clearly indicates that improved insulin action can occur independently of interactions with proximal insulin signalling. In contrast, more recent observations indicate that interactions exist at the distal signalling level of TBC1D1 and TBC1D4. Although the functional interpretation is lacking these novel observations may present a breakthrough in understanding the beneficial interplay between exercise and insulin action.

Repeated bouts of exercise (exercise training) increase insulin sensitivity of muscle. Most findings including our own, do not support generally improved insulin signalling after endurance training; rather it appears that the effect of training is at least partly a result of increased cellular protein content of individual insulin signalling components and molecules involved in glucose transport and metabolism such as HKII and GLUT4.