

Mitochondrial dysfunction is associated with insulin resistance. Although chicoric acid (CA) is known to have beneficial effects on insulin sensitivity, the involvement of mitochondrial function has not been elucidated yet. Here, we investigated the effect of CA on insulin resistance and mitochondrial dysfunction. In palmitate-induced insulin-resistant C2C12 myotubes, CA improved impaired glucose uptake and insulin signaling pathways, along with enhanced mitochondrial membrane potential and oxygen consumption. CA treatment in diet-induced obese mice ameliorated glucose tolerance and increased insulin sensitivity. CA treatment also recovered the dysregulated expression of glucose metabolism-related genes in the high-fat-fed mice. CA significantly increased the mitochondrial DNA content, citrate synthase, and ATP content, as well as the expression of genes related to mitochondrial biogenesis and oxidative phosphorylation in the liver and skeletal muscle in high-fat-fed obese mice. These findings suggested that CA attenuates insulin resistance and promotes insulin sensitivity by enhancing mitochondrial function.

Chicoric acid ameliorates in diet-induced insulin resistance partly through its modulation of mitochondrial function.