

Streszczenie w języku angielskim

Adipose tissue plays a central role in the pathogenesis of insulin resistance and type 2 diabetes associated with obesity. However, the molecular changes that promote these diseases are not completely understood. Several studies demonstrated, that ceramide (Cer) and diacylglycerols (DAG) accumulation in muscle is associated with insulin resistance. It is not yet known what role biologically active lipids play in adipose tissue. We sought to explain whether high-fat diet (HFD) leads to bioactive lipids accumulation in adipose tissue and how metformin affects the lipids content in adipose tissue as well the plasma adipocytokines concentration. The experiments were conducted on male Wistar rats divided into three groups: 1. Control fed standard diet, 2. fed HFD, 3. fed HFD and treated with metformin. Ceramide and diacylglycerols were analyzed by liquid chromatography tandem mass spectrometry. Phosphorylation of hormone sensitive lipase (HSL) was analyzed by Western Blot. An oral glucose tolerance test and insulin tolerance test was also performed. Plasma adiponectin and TNF- α concentration were measured by enzyme-linked immunosorbent assay. HFD induced IRes and elevated diacylglycerols and ceramide content in subcutaneous and visceral adipose tissue what was accompanied with the increased phosphorylation of HSL. Metformin improved insulin sensitivity, decreased ceramide and diacylglycerol levels and attenuated the phosphorylation of HSL in both fat depots. Furthermore, we observed a strong correlation between adiponectin (negative) and TNF- α (positive) and bioactive lipids in both fat tissues. These results indicate that bioactive lipids accumulation in adipose tissue influences the induction of IRes and, at least in part, answer the question of what is the insulin-sensitizing effect of metformin at the level of adipose tissue.