Lipid droplets are both highly oxidized and Plin2-covered in hepatocytes of insulin resistant-mice

Abstract

Chronic high-fat diet feeding is associated with obesity and accumulation of fat in the liver, leading to the development of insulin resistance and non-alcoholic fatty liver disease. This condition is characterized by the presence of a high number of intrahepatic lipid droplets (LD), with changes in the perilipin pattern that covers them. This work aimed to describe the distribution of perilipin 2 (Plin2), an LD-associated protein involved in neutral lipid storage, and perilipin 5 (Plin5), that is favoring the lipid oxidation in lipid droplets and, to evaluate lipoperoxidation through live-cell visualization using the lipophilic fluorescent probe C11-BODIPY581/591 in fresh hepatocytes isolated from high-fat diet (HFD)-fed mice. Male C57BL/6J adult mice were divided in control and HFD groups and fed with a control diet (Control; 10% fat, 20% protein, and 70% carbohydrates) or a HFD (60% fat, 20% protein, and 20% carbohydrates) for 8 weeks. The animals fed the HFD show a significant increase of Plin2 in lipid droplets of hepatocytes. LD from HFD-fed mice have a stronger lipoperoxidation score than control hepatocytes. These data provide evidence that obesity status is accompanied by a higher degree of lipid peroxidation in hepatocytes, both in the cytoplasm and in the fats stored inside the lipid droplet.

Publications

