

Lipid Analysis of Different Lipid Droplet Subpopulations in Regenerating Liver

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Lipid droplets (LD) are dynamic and complex organelles composed by a triglyceride and cholesteryl ester core and a surrounding monolayer of phospholipid, free cholesterol and proteins. While LD lipidome studies are still very scarce, the proteome of the LD is a subject under intense study nowadays in different tissues and conditions. LD from adipose tissue have traditionally been the most studied ones. However, it is nowadays known that practically all the cells are able to generate LD in response to different physiological or pathological stimuli. Liver regeneration after a partial hepatectomy implies a cellular condition characterized by a necessary increased lipid accumulation in the cytosolic (LD) of the hepatocyte.

In this work, we used homogenates of rat quiescent liver and the regenerating tissue 24 h after a partial hepatectomy to isolate LD by density gradient centrifugation. The fractions of different densities containing LD were identified by the presence of the marker protein adipophilin.

We studied the characteristic lipid rise in liver regeneration in the LD isolated along the gradient. The lipid composition of the LD of different densities was also analyzed and the distribution and proportions of the main hydrophobic and amphipatic lipids were profiled for quiescent and regenerating tissue.

We found compositionally different subpopulations that probably respond to different functionalities in the hepatic tissue.