Summary

In the framework of my PhD thesis I performed a first comparison of liver and fat tissue derived LDs from mice kept at room temperature or in the cold (4°C). The preliminary data shows increased abundance of PAT proteins and neutral lipid lipases, which suggest increased LD formation as well as high turnover. This fits to the physiological requirement of elevated heat production via fatty acid burning and uncoupling of the ATP synthesis to produce heat. LDs derived from BAT were heavily “contaminated” with mitochondrial proteins, while LDs derived from liver contained many ER proteins. It will require future work to establish the putative intimate association between these organelles.

LD proteome profiling led to the identification of c2orf43 as a novel LD associated protein. C2orf43 seems to shuttle between membranes (most likely the ER) and nascent LDs. The protein harbours a hydrolase active site motif (GxSxG); however, we were unable to reveal any lipase activity.

In the main part of this work I could clearly establish the apolipoprotein-like properties of TIP47. The analysis of TIP47 mutants showed that the amino-terminal half mediates LD association and we could identify a short sequence mediating membrane association of TIP47. Despite this progress it still remains to be shown why TIP47 specifically binds to LDs and not to other intracellular organelles/membranes.