6. Aims and hypotheses

The main study of this thesis (study 2) aimed to provide proof-of-concept in mice showing that ad libitum low protein/high carbohydrate (LPHC) diet provided in a periodized fashion, i.e. combining the on/off cycling from intermittent diet with the ad libitum energy intake from LPHC, would induce health benefits in mice similar to chronic LPHC diets. In addition, we provided mice in this study with access to voluntary exercise wheels in their cages, allowing us to study the effect of combining periodized LPHC diet with exercise training.

To control for diet efficacy, we performed a second study in parallel providing regular chow vs. 5% protein LPHC diet or 40% protein HPLC diet chronically for 3 months (study 1). Apart from an extensive phenotypic characterization, study 1 also aimed to investigate whether the previously reported increased and decreased whole-body insulin sensitivity on low and high protein diet, respectively, were associated with changes in insulin action in the isolated skeletal muscle.

The following hypotheses were proposed:

- Both whole body and skeletal muscle insulin sensitivity would be increased and decreased by low and high dietary protein ingestion, respectively, due to stimulation of skeletal muscle AMPK, presumably by adiponectin.
- Periodized LPHC would mimic chronic LPHC diet and synergize with exercise to stimulate FGF21 release and improve metabolic health.