

Metabolische Konsequenzen nahezu Kohlenhydrat-freier Ernährung

Effects of low-carbohydrate/high fat diets in rats

Low-carbohydrate / high fat (LC-HF), "Atkin´s style" diets are characterized by a high fat and protein contents, whereas carbohydrates are drastically reduced. These diets have become popular in recent years and are thought to be an efficient alternative to low-fat diets for induction of weight loss in overweight subjects. Notably, these diets claim to be efficient in terms of weight loss without caloric restriction only by inducing ketosis and increasing resting energy expenditure.

Less known is that ketogenic LC-HF diets are also used therapeutically to alleviate epileptic seizures in children. However, despite frequent use as a therapeutic for children with epilepsy and in general population as a tool for weight loss, potential side effects of these diets remain unclear or at least controversial. Moreover, the mechanisms by which LC-HF diets potentially lead to weight loss and how hormonal systems might be involved in this process are currently not well understood.

We have established a rat model in which we pair-feed rats iso-energetic amounts of different LC-HF diets. The LC-HF diets studied vary in their relative abundance of dietary fat and protein. In addition, we investigate if and how differences in the dietary fat and protein sources of LC-HF diets affect the phenotypes observed.

Our primary aim is to understand how nutrients, in the absence of dietary carbohydrates, affect growth, body composition and different hormonal systems. To study the effects of LC-HF diets in detail and at manifold levels, the project has been sub-divided into several key research areas:

- Effects of LC-HF diets on longitudinal growth and body composition
- Effects of LC-HF diets on the GH / IGF system
- Effects of LC-HF diets on bone turnover and osteoblastogenesis
- Effects of LC-HF diets on glucose metabolism and insulin secretion
- Effects of LC-HF diets on physical activity and exercise capacity
- Effects of LC-HF diets on liver metabolism
- Effects of LC-HF diets on digestibility of macro and micro nutrients