

## **The Influence of Inflammation, Glucose/Insulin Regulation and Stress on the Lipidome**

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Many life style associated diseases, such as diabetes type II, may be caused by aberrant lipid metabolism. Although some of these diseases have a genetic origin, the phenotype is mostly caused by disturbance of the metabolic homeostasis. It is generally accepted that processes like inflammation, (metabolic) stress and glucose/insulin deregulation initiate the switch from a healthy state into the diseased state. Knowing to what extent these processes regulate the plasma lipidome would be a considerable step towards quantifying individual health, and would enable to work towards personalization of therapy.

Therefore, five groups of male apoE3Leiden mice (n=15 per group) were exposed to a metabolic (high fat diet), inflammatory (interleukin-1), intraperitoneal glucose, or hormonal challenge (insulin). A control group was not challenged. Plasma was collected before and 1, 2 and 4 days after start of the challenge. The plasma lipidome was quantified by the application of different LC-MS platforms.

In order to making biological sense of these data, statistical ranking, filtering and selection was applied. Biological networks were constructed to integrate information on lipid pathways & lipid interactions with the data. Finally, statistical significant changes in the lipidome as a result of the different challenges were visualized on these biological networks. In this way specific markers were identified for processes of inflammation, glucose/insulin regulation and (metabolic) stress. Ultimately, these results may help to quantify the degree of inflammation, the insulin response and the metabolic flexibility and help to quantify the effect of pharmaceuticals and food products on these health related processes.