Lipidomics in Studies of Life Style Associated Diseases
Part 2: Biological Interpretation

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Life style associated diseases like obesity, diabetes and cardiovascular disease are rapidly becoming the worldwide number 1 health problem. In developing strategies for preventing or treating life style associated pathologies, it is critical to identify the key metabolic changes involved in the development of these diseases. These metabolic changes should be responsive to nutritional and pharmaceutical intervention to allow their evaluation. Lipids play an important role in metabolic stress, inflammation and oxidation - processes that often form the basis of these life style associated diseases. TNO developed several lipidomics platforms that can be applied in nutritional and pharmacological studies (presented in Part 1 of this poster, see I. Bobeldijk et al.)

These different lipidomics platforms were successfully applied to livers from a mouse study involving 3 different diet interventions: a control diet, a high fat diet of plant origin and a high fat diet of animal origin. Both high fat diets were found to cause metabolic syndrome with insulin resistance. Interestingly, the high fat diet of plant origin resulted in a significant higher degree of whole body insulin resistance than the high fat diet of animal origin, which was also reflected in the hepatic lipidome of these animals.

This poster (Part 2) will provide an overview of the most striking differences found in the hepatic lipidome of mice on the two different high fat diets. We show that livers of mice on plant based high fat diet contained higher contents of pro-inflammatory eicosanoid precursors and of total diacylglycerol. Furthermore, livers of mice on animal based high fat diet contained lower contents of ceramide species. We will identify feasible mechanisms that might be the key in the development of a different insulin resistance phenotype and what in the diet might have caused this difference.