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# **Offspring from rat mothers fed a high-fat/high-sucrose diet during gestation and lactation accumulate free fatty acids in the liver when exposed to high fat diet as adults.**

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**Introduction:** Maternal diet during gestation and lactation has been implicated as a factor that modifies the risk of developing metabolic diseases later in life. Hepatic lipid accumulation is strongly linked to development of metabolic diseases. Free fatty acids induce ER stress, mitochondrial stress and are the substrate for formation of other lipotoxic species, such as ceramide, diacylglycerol and acyl-CoA. We have therefore investigated if the maternal intake of a high fat diet combined with sucrose-rich beverage alters the offsprings ability to metabolically cope with a high-fat challenge in adult life. In this poster, we report data on hepatic lipid content.

**Methods:** Rat dams were fed a 60 E% fat diet and given 15% sucrose (HFHS) in the drinking water or chow and pure water (C) six weeks before mating as well as during gestation and lactation. After birth, male pups was cross-fostered by the dams, so that half of the pups born by HFHS mothers was lactated by C dams and vice versa, generating four groups; CC, CH, HC and HH (first letter maternal diet during pregnancy and the second diet during lactation). At weaning all pups were transferred to chow-diet and kept on this diet until the age of 20 weeks. At 20 weeks of age, all rats, with the exception of one control group, were transferred to a high fat diet (45E% fat). After 6 weeks on this diet, all rats were sacrificed and hepatic lipid content and composition was analyzed using GC-FID.

**Results:** The high fat intervention caused strongly increased levels of hepatic free fatty acids (FFA) in rats both born and lactated by HFHS-dams. Principal component analysis of the FFA fatty acid composition showed that there were in particular dietary PUFA that accumulated, indicating that it is the ability to metabolize these fatty acids that are hampered in these animals..

**Conclusion:** Maternal high fat/high sucrose intake during gestation and lactation makes the offspring less able to metabolize dietary PUFA, which cause accumulation of these as FFA. This might make them more prone to develop metabolic diseases when exposed to energy dense diets.