Perinatal programming, epigenetics and long term consequences for lipid metabolism

Introduction – It is nowadays widely accepted that the early environment programs the development of chronic diseases later in life. This is commonly referred to as the Developmental Origins of Health and Disease (DOHAD) paradigm. Epigenetic modifications are often involved in this long term transmission of information. I will here discuss several mouse models of maternal undernutrition or placental dysfunction which lead to long term changes in lipid metabolism.

Methods – Pregnant C57BL6 mice are fed a protein restricted diet or caloric restricted diet during pregnancy. Alternatively, they are treated with LPS and an sFlt1 adenovirus to simulate preeclampsia. DNA methylation is studied by targeted pyrosequencing (Qiagen).

Results and conclusion – In several models, I have shown that an early adverse environment changes DNA methylation of genes involved in lipid metabolism, namely in regulation of cholesterol homeostasis. Candidates are LXR but also SREBPF. Epigenetic changes might be involved in the often-observed variation in lipid metabolism.