

## HUMAN MILK OLIGOSACCHARIDES AND PERINATAL MICROBIAL TRANSFER (TRAMIC)

The human microbiome, the community of all microbes living in and on the human body, has important health implications. Derangement of the microbiome (dysbiosis) is associated with disorders such as obesity, diabetes and inflammatory intestinal diseases. Transfer of microbes from mother to child is a pivotal process to establish a healthy gut microbiome in early life. Details on how and when we acquire our early microbiome, and which factors may influence this process are unknown. During pregnancy, microbial communities undergo changes at different sites maternal body that might be involved in the microbial transfer. What drives these microbial changes, and whether they affect maternal-to-child transfer is unknown. After birth, Human Milk Oligosaccharides (HMOs), act as prebiotics, shaping the microbiome in the breastfed infant's gut. We have previously shown that HMOs are already present in maternal blood during pregnancy and in cord blood. Thus, we here hypothesize that **prenatal HMOs can influence the maternal microbial communities already before birth, potentially impacting mother-to-child transfer**. To test this hypothesis, in **Aim1**, we will investigate **associations of HMOs with quality and quantity of microbial communities** in different maternal body sites before birth, and fetal/neonatal sites at birth or shortly thereafter. **Aim2** will investigate whether **HMOs can impact the function of fetal/neonatal microbiome** using metabolomics and metatranscriptomic analyses and *in vitro* assays.

Results of this study will shed light on *in utero* and perinatal mother-to-child transfer of microbes, and on the role of prenatal HMOs in this process. If we find certain prenatal HMOs associated with beneficial microbiome signatures and functions in pregnant women or newborns, future studies investigating HMOs as safe prebiotics and their microbial targets for prophylactic and therapeutic strategies in pregnancy are warranted.