

Maternal glucose metabolism and the gut and placental microbiota

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Overweight and obesity are common in the obstetric population around the world. Overweight and obesity are associated with insulin resistance resulting in higher levels of circulating insulin and predisposing to the development of hyperglycaemia. In pregnancy, placental hormones induce maternal insulin resistance in order to ensure adequate glucose supply to the developing fetus. In women with high prepregnancy insulin resistance levels, the pregnancy-induced rise in insulin resistance can result in frank hyperglycaemia and the development of gestational diabetes mellitus.

The gut microbiota has been identified as an important regulator of metabolism and inflammation of the host. In pregnancy, the composition of the gut microbiota changes and has been linked to the development of insulin resistance and to weight gain. Hence our studies into the connections between the maternal gut microbiota and glucose metabolism. Our research has identified links between the abundance of specific genera of bacteria and the levels of insulin, leptin and GIP in early pregnancy. It is unclear what regulates the abundances of these bacterial genera in pregnancy. Preliminary results indicate that the abundance of the insulin-linked *Collinsella* genus is regulated by dietary fibre intake.

We are also interested in links between pregnancy complications and the placental microbiota. The presence of a placental microbiota and the origin of the bacteria in the placenta are still controversial. Results from our studies indicate that bacteria can be detected in the placenta of healthy term pregnancies as well as pregnancies affected by complications including gestational diabetes mellitus, preeclampsia and preterm birth. When comparing the microbiotal composition of the placenta, the gut and the oral cavity of the same mothers, it appears that the composition of the placental microbiota is distinct from that of the gut and the oral cavity. The bacteria are localized to both the villi and the membranes of the placenta and preliminary results indicate that the localisation patterns are not different between placentas from healthy pregnancies or those affected by complications.