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Perinatal prebiotic supplementation has later consequences on adult metabolism and immunity in pigs used as a human model.

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Perinatal nutrition, a key factor controlling gut bacterial colonization, may have lasting consequences on health. We investigated whether early short-chain fructooligosaccharide (scFOS) supplementation, known to well-balance microbiota, impacted adult metabolic and immunologic responses to a high-fat (HF) diet.

Sows received a supplementation with scFOS or not for the last 4 weeks of gestation and the lactation. The scFOS supplementation was maintained in piglets weaned from scFOS sows till postnatal day (PND) 56. Twenty four piglets were then fed a standard diet until PND190, then a HF diet for 12 weeks.

Early scFOS supplementation increased faecal short-chain fatty acid production after 3 weeks of HF diet but this effect was not observed later. Ongoing metagenomics analysis will give more insights on microbiota composition changes. Insulin response to a glucose challenge (IVGTT) tended to increase in scFOS group, but no other metabolic parameter was modified (lipid metabolism, basal glycaemia and insulinemia, insulin pancreatic content). Preliminary results showed a modulation of the pro-inflammatory cytokine secretion (IFN $\gamma$ , TNF $\alpha$ , IL-8) by *ex vivo* stimulated ileal explants and MLN cells, revealing a modification of local immunity orientation with perinatal scFOS supplementation.

Our results underline the key role of early microbiota modulation on adult responses to a nutritional challenge.