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► To cite this version:

Cindy Le Bourgot, Sophie Blat, Stéphanie Ferret-Bernard, Emmanuelle Apper, Frédérique Respondek, et al.. Perinatal prebiotic supplementation has later consequences on adult metabolism and immunity in pig as human model. 9. World congress developmental origins of health and disease (DOHAD), Nov 2015, Le Cap, South Africa. hal-01594699

HAL Id: hal-01594699

<https://hal.science/hal-01594699>

Submitted on 5 Jun 2020

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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 γ , TNF α , 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.