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Peri-partum scFOS supplementation improves intestinal mucosal immune response of the offspring

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Diet supplementation with short-chain fructo-oligosaccharides (scFOS) promotes the growth of *Bifidobacterium* and *Lactobacillus* and elicits a mucosal immune response including antibody and cytokine production. Objectives were to determine impact of scFOS maternal supplementation on intestinal mucosal immune responses of the offspring.

Sows received during the last month of their gestation and lactation a diet supplemented with scFOS (SUPP) or not (CTRL). One piglet per litter was sacrificed at 21 days old (n=10-13/group). Mononuclear cells were isolated from ileal Peyer's Patches (PP) and cultured *in vitro*. Secretory activity (sIgA) and cytokine pattern (IFN γ and IL-10) of PP cells were studied following respectively, 7 day (basal condition) and 3 day (concanavalin A stimulation) cultures. In addition, titration of IgA was done on ileal mucosa, ileal lavage (20 cm ileal segment rinsed with PBS) and ileal digesta as well as on maternal colostrum (d 1) and milk (d 6 and d 21).

Maternal supplementation with scFOS increased colostrum IgA concentration (P<0.05) (sign of cellular recruitment and/or higher production in mammary glands of SUPP sows at the end of gestation). Thereafter, there was a rapid decrease of the immune quality between colostrum and mature milks in both groups, leading to a slightly lower amount of IgA in SUPP sow's milk at d 6 (P=0.08). In SUPP group, mononuclear cells from PP showed a dramatic increase in production of IFN γ and no change in that of IL-10. Secretion of IgA by PP tended to be upregulated (P<0.10). In contrast, IgA content in ileal lavage, but not in ileal mucosa, was dramatically decreased (P<0.05). No difference in IgA content of ileal digesta was observed.

In conclusion we demonstrated that diet supplementation with scFOS during the last month of gestation and lactation reinforces sow colostrum immune quality and stimulates secretory activity of PP cells in the offspring.