## **ESPGHAN 2013 - Abstract Submission**

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SUPPLEMENTATION OF THE MATERNAL DIET WITH ALPHA-LINOLENIC ACID MODIFIES PIGLET GUT IMMUNE SYSTEM EDUCATION TOWARDS LPS

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Objectives and Study: N-3 polyunsaturated fatty acids (PUFA) have many beneficial health effects, especially in neonates. We recently demonstrated that supplementation of the maternal diet with alpha-linolenic acid (C18:3 n-3) increases intestinal permeability at the end of the suckling period in piglets<sup>1</sup>. Education of the gut immune system towards the colonizing microbiota, and particularly towards lipopolysaccharides (LPS) is intense during this period. We hypothesized that the increased intestinal permeability observed with maternal n-3 PUFA would lead to increased transepithelial passage of LPS and modification of the gut immune system education towards this bacterial component. **Methods:** Two groups of sows were fed either a flaxseed-based (n-3 group) or a sunflower oil-based diet (n-6 group) during gestation and lactation. Piglets suckled their dam until post-natal day (PND) 28 when they were weaned on a regular weaning diet. From PND 14 to 28, a sub-group of piglets in each litter received an anti-gram negative bacteria antibiotic per os daily. At PND28 and 52, FITC-labeled LPS passage across the jejunum was evaluated ex vivo in Ussing chambers. Cultures of jejunal explants were used to evaluate cytokine secretion in response to LPS. Mononuclear cells were also isolated from mesenteric lymph nodes (MLN) and cultivated with LPS or concanavalin A. Results: At PND28, passage of FITC-LPS across the jejunum was increased in n-3 piglets (P<0.05), as well as in piglets receiving the antibiotic (P<0.05). Pro-inflammatory cytokines (IL-8, TNF- $\alpha$ ) secretion by jejunal explants was not altered by the maternal diet nor antibiotic administration. However, TNF-α secretion by MLN cells in response to LPS tended to be decreased in n-3 piglets (P=0.06) without modification of IL-10 or IFN-y secretion. Antibiotic treatment tended to reduce this TNF- $\alpha$  secretion (P=0.08). Maternal diet effects were specific to LPS since no difference between groups was noticed in response to concanavalin A. Later in life (PND52), transepithelial passage of LPS was similar in both groups. TNF- $\alpha$  secretion by jejunal explants was reduced while IL-10 secretion by MLN cells was increased in response to LPS in n-3 piglets (P=0.01 and 0.04, respectively), irrespective of the antibiotic treatment during the suckling period. Conclusion: Supplementing the maternal diet with alpha linolenic acid during gestation and lactation orientated the gut immune system response to LPS towards an anti-inflammatory profile which lasted beyond the suckling period. This longlasting anti-inflammatory response seems independent of microbiota composition during the suckling period. References: 1 de Quelen et al. J Physiol. 2011, 589:4341-52

## Disclosure of Interest: None Declared