Immunomodulatory effects of E.coli Nissle 1917 and β-glucans in early life

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Background: Infectious diseases are problematic for the pig sector worldwide, with the weaning period being the most critical period in a pig's life. A promising strategy to reduce the incidence of infectious diseases is immunomodulation by feed in early life. Therefore, the immunomodulatory effects of two feed additives, yeast-derived β-glucans and *E.coli* Nissle 1917 (EcN), were studied *in vitro* and *in vivo*. **Materials and methods:** *In vitro* cultured dendritic cells (DCs) were used to assess the immunomodulatory effects of both feed additives. Read-out parameters included upregulation of maturation markers and production of cytokines after co-cultivation with the feed additives. For the *in vivo* assessment, both feed additives were administered to neonatal piglets and immune parameters (e.g. DC maturation and *ex-vivo* re-stimulation responses) were assessed in blood- and tissue samples collected at pre- and post-weaning time points. **Results:** Yeast-derived β-glucans and EcN induced differential DC responses *in vitro,* with respect to upregulation of DC maturation markers (e.g. CD80/86) and production of cytokines (e.g. TNFa and IL-10). In line with these *in vitro* results, EcN promoted DC maturation during the pre-weaning phase of the *in vivo* study. Furthermore, *ex-vivo* re-stimulated immune cells from EcN treated animals produced higher amounts of the anti-inflammatory cytokine IL-10. **Conclusion:** These results indicate that yeast derived β-glucans and EcN demonstrated to possess immunomodulatory properties, but the type and magnitude differed. Especially EcN has the potential to enhance the porcine immune system during the pre-weaning phase, but any long lasting effects of the remain to be elucidated.