Deoxynivalenol alters the interactions of *Salmonella* Typhimurium with porcine intestinal epithelial cells and macrophages

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Introduction: In European countries with temperate climates, the *Fusarium* toxin deoxynivalenol (DON) is one of the most frequent contaminants of maize and small grain cereals [1]. The toxic effects of DON have been well documented and among farm animals, pigs seem to be particularly sensitive to the dietary intake of DON. Substantial economic losses have been attributed to DON contamination of pig feed [2].
In European countries, pigs infected with *Salmonella* Typhimurium have become the main source of salmonellosis in humans. Since *Fusarium* toxins such as DON have been shown to affect among others the immune system of pigs [3], exposure to DON might affect the interactions of *Salmonella* Typhimurium with the porcine host.
The objective of this study is to examine the effect of low level concentrations of DON on the intestinal and the systemic phase of a *Salmonella* infection in pigs, using *in vitro* cell models with porcine intestinal epithelial cells (IPEC-J2 cells) and porcine alveolar macrophages (PAM).

Materials and Methods: Invasion and intracellular survival assays with *Salmonella* Typhimurium were performed at non-cytotoxic but practically relevant concentrations of DON in IPEC-J2 cells and PAM. IPEC-J2 cells grown on Transwell® inserts were incubated with various concentrations of DON to measure the effect of the mycotoxin on the epithelial barrier function and the passage of *Salmonella* Typhimurium through the IPEC-J2 cell epithelium. The effect of DON on both the direct IL-8 secretion by IPEC-J2 cells as well as on the IL-8 secretion induced by *Salmonella* Typhimurium was tested using a commercial ELISA kit (Swine IL-8 ELISA kit, Invitrogen, Camarillo, CA). The morphological changes in PAM were visualized using diverse staining techniques.

Results: Levels of DON plausibly encountered in the gastrointestinal tract of pigs after consumption of contaminated feed lead to a dose dependent increase of invasion in and translocation of *Salmonella* Typhimurium through the IPEC-J2 cell monolayer. The results of the effect of DON on IL-8 secretion will be presented at the congress.
Pre-exposure of PAM to 0.025 µg/mL of DON significantly promotes the uptake of *Salmonella* Typhimurium through F-actin reorganization. On average, approximately 1.5 times more intracellular *Salmonella* bacteria were present in DON treated macrophages.

Discussion and Conclusion: These findings suggest that low concentrations of DON severely affect the interactions of *Salmonella* Typhimurium with porcine host cells. The relevance for the *in vivo* situation needs further study.

References:
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