



## BACTERIAL DISEASES

BBD-037

### THE IMPACT OF VACCINATION AGAINST *LAWSONIA INTRACELLULARIS* ON SHEDDING OF *SALMONELLA ENTERICA* SEROVAR TYPHIMURIUM AND THE GUT MICROBIOME

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#### Introduction

*Lawsonia intracellularis* (*Li*) is among the most common intestinal pathogens of swine, and has been found as a risk factor for increased *Salmonella enterica* shedding in pigs. *Salmonella enterica* serovar Typhimurium (*ST*) continues to be a major cause of foodborne illness worldwide and pork can serve as a source of infection. The objective of this study was to investigate if oral live vaccination against *L. intracellularis* could lead to decreased *S. Typhimurium* shedding in a co-infection model.

#### Materials & Methods

To test this hypothesis, pigs were challenged with either *ST* or *ST* and *Li*, with and without *Li* vaccination ( $n = 9/\text{group}$ ). A non-challenged group served as negative control. Fecal samples were collected on the day of challenge with *ST* and weekly thereafter until 49 days post infection. *ST* was quantified in feces using a most probable number enrichment method and the microbiome was investigated using the V1-V3 region of the 16S rRNA gene.

#### Results

*Li* vaccination decreased the shedding of *ST* in co-infected animals by 2.12 log<sub>10</sub> organisms/gram of feces at 7 d.p.i. ( $p < 0.05$ ). Analysis of the microbiome showed that vaccination led to a significant ( $p < 0.05$ ) increase in the abundance of *Clostridium* species, including *Clostridium butyricum* in co-infected animals.

#### Discussion & Conclusion

This study demonstrated that oral live vaccination against *L. intracellularis* can significantly reduce the shedding of *S. Typhimurium* in co-infected animals. The increase of *C. butyricum* mediated by vaccination could have contributed to decreased shedding of *S. Typhimurium*. This is because *C. butyricum* is known to produce large amounts of butyrate, which can inhibit *S. Typhimurium* invasion of the intestine. These results indicate that vaccination against *L. intracellularis* in co-infected herds may provide a new tool to increase food safety and animal health by decreasing *S. enterica* shedding and transmission without the need for antibiotics.