



Oral presentation



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Poster



**Importance of heat-stable enterotoxin b in the induction of early immune responses in piglets after infection with enterotoxigenic *Escherichia coli***

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### Introduction

Enterotoxigenic *Escherichia coli* (ETEC) strains that produce heat-stable (STa, STb) and/or heat-labile (LT) enterotoxins are an important cause of post-weaning diarrhea in piglets [1]. However, the relative importance of the different enterotoxins in the pathogenesis of ETEC infection has been poorly defined. In the present study we assessed the contributions of different ETEC enterotoxins to the induction of small intestinal secretion and early innate immune responses in weaned piglets.

### Materials and Methods

Several isogenic mutant strains of the ETEC reference strain GIS26 (O149:F4ac<sup>+</sup>, LT<sup>+</sup> STa<sup>+</sup> STb<sup>+</sup>) were constructed that lack the expression of LT in combination with one or both types of ST enterotoxins (STa and/or STb). The small intestinal segment perfusion (SISP) technique [2] and microarray analysis were used to study porcine early immune responses induced by these mutant strains 4h after infection in comparison to the wild type strain and a PBS control. Simultaneously, net fluid absorption of pig small intestinal mucosa was measured 4h after infection, allowing us to correlate enterotoxin secretion with gene regulation.

### Results and Discussion

This is the first study to investigate both the functional role of ETEC enterotoxins and their

possible influence on ETEC induced innate immune responses. In summary, our data suggest that physiological response to the wild type ETEC strain used in this study is accompanied by a marked change in mucosal expression of innate immune genes. Microarray analysis showed on the one hand a non-toxin related response comprising genes such as Pancreatitis associated protein (PAP), matrix metalloproteinase 1 (MMP1) and IL-8. PAP and MMP1 were also found in reaction to other bacteria [3, 4], suggesting them to be part of a general antibacterial response. On the other hand, our results suggest a dominant role for STb in small intestinal secretion early after post-weaning infection, as well as in the induced innate immune response through differential regulation of inflammatory cytokines like IL-1 and IL-17. Results from this study can be useful to select either targets for intervention or parameters to measure severity of disease.

### References

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