

3rd International Congress on

Bacteriology and Infectious Diseases

August 04-06, 2015 Valencia, Spain

Immune suppression by *Escherichia coli* O157:H7 in calves after an oral infection: A study of fecal shedding and gene expression

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Enterohemorrhagic Escherichia coli (EHEC) like *E. coli* O157:H7 are frequently detected in slaughter houses as cattle are the main natural reservoir of EHEC showing no symptoms upon infection. However, for humans the consequences can be severe leading to hemorrhagic colitis and hemolytic uremic syndrome. An EHEC infection can persist in herds for longer periods. The immune response against EHEC cannot clear the infection rapidly as infected animals can secrete the bacteria during several months. We observed that a first infection elicits a primary immune response which was unable to protect from an experimental re-infection. Furthermore, the duration of shedding of the first infection was shorter (<14 days) compared to the duration after a re-infection (>28 days). We hypothesized that these results may reflect a suppression of certain pathways of the immune system making cattle more prone to persistent colonization after re-infection. The RNA-Seq technology was used to quantify changes in the recto-anal junction (RAJ) and ileal Peyer's patches (I+PP) transcriptome of nine Holstein-Friesian calves in response to a primary and secondary infection with EHEC O157:H7. A total of 21,046 genes were detected at least once in one of the nine RAJ or I+PP samples. We observed a downregulation of immunostimulatory genes and a stimulation of immuno-suppressing genes. Summarized, the gene-expression in the I+PP is far more influenced by EHEC infection compared to the RAJ and a first EHEC infection modulates the immune response most likely promoting the colonization during a second infection.

Biography

Kieckens Evelien has worked in a Tissue Engineering Lab during her Internship's Master thesis on the Development of a Bioactive Meniscus using Polymeric Scaffold and Hydrogels. She obtained the Degree of Master in Biomedical science in 2011 at Ghent University. In 2012, she started her PhD at the Faculty of Veterinary Medicine at Ghent University, where she has been working on the clearance of EHEC infections in ruminants. Until now she is first author of one publication in Applied and Environmental Microbiology and first author and co-author of several manuscripts in preparation.

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