

Analysis of the prevalence of maternal anti-*C. jejuni* N-glycan antibodies in Swiss breeder populations

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Key words

Campylobacter jejuni, chicken, vaccination, immunoblotting, ELISA

Aim of the study

The aim of this study was to analyze the prevalence of anti-*C. jejuni* N-glycan antibodies in Swiss breeder populations.

Background

Campylobacter jejuni is a food borne human pathogen that causes gastrointestinal disease as well as some severe long-term consequential illnesses such as Guillain-Barré syndrome (GBS) that is caused by antibodies generated against the ganglioside-mimicking lipooligosaccharides on the surface of *C. jejuni*. The main route of infection in developed countries is through consumption of contaminated poultry meat. One approach to decrease infection risk for humans is the reduction of *C. jejuni* colonization in broiler chickens. Our approach targets the *C. jejuni* N-linked glycosylation system encoded by the *pgl* (protein glycosylation) operon. The resulting N-glycan was shown to be important for adherence and invasion of epithelial cells and colonization of chicks and mice.

Previously, during BVet-Project 1.10.05, we had detected antibodies that reacted with the *C. jejuni* N-glycan in immunoblots. The antibody titer decreased over time and was detectable till around 25 days post hatch, which led us to the conclusion that these antibodies are of maternal origin. High maternal antibody titers were correlated with the delay of colonization of *C. jejuni* after hatching which suggests a protective function. Increasing the level of maternal antibodies by vaccinating the breeding population followed by a booster vaccination of broilers might be a possible vaccination strategy.

Material and methods

In this study, we analyzed the presence of *C. jejuni* specific antibodies in 102 breeder chicken sera from 10 different stables and two providers. Sera were analyzed using two established methods, ELISA (enzyme linked immunosorbent assay) and immunoblotting, both based on the glycoengineered single chain F antibody fragment 3D5, in a glycosylated and unglycosylated form. Additionally, sera were tested for their reaction against *C. jejuni* wildtype and *pglB_{mut}* (containing an inactivated oligosaccharyltransferase, *PglB* which is necessary for protein glycosylation) whole cell extracts.

Results and significance

In all tested herds, we detected at least two chickens that showed anti-*C. jejuni* N-glycan antibodies and were therefore considered to still be or at least have been colonized by *C. jejuni* at some point. In total, we found a prevalence of around 70% *C. jejuni* N-glycan antibodies in the tested chicken sera. The methods used delivered comparable results.

In the future, the anti-*C. jejuni* glycan-ELISA assay may be developed into a diagnostic tool to measure the exposure of chicken herds to *Campylobacter*. The correlation of anti-glycan antibody titer and *Campylobacter* colonization will need to be shown and analysed in more detail in order to allow the diagnostic test to become a simple tool to measure *Campylobacter* prevalence in chicken herds.

Publications, posters and presentations

None.

Project 1.12.04

Project duration 4 months