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Regulation and molecular mechanism of *TLR5* on resistance to *E. coli* F18 in weaned piglets

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Toll-like receptor 5 (*TLR5*) plays an important role in the immune system. In this study, we performed transcriptome sequencing of the duodenum in *E. coli* F18-resistant and sensitive Sutai weaned piglets and analyzed the differential expression of *TLR5*. The cellular localization of *TLR5* was investigated; the small intestinal epithelial cell line (IPEC-J2) with *TLR5* gene overexpression and interference was established. Following stimulation of IPEC-J2 cells by *E. coli*, we evaluated the effect of *TLR5* expression on E. coli invasion. The results showed that *TLR5* expression level in the duodenum and jejunum was significantly higher in sensitive than in resistant piglets. IPEC-J2 cell lines with *TLR5* interference and overexpression were established and the expression of genes associated with the *TLR5* signaling pathway were significantly higher in *TLR5*-overexpressed cells than in control cells. Bacterial adhesion was higher in *TLR5*-overexpressed cells than in blank cells and lower in *TLR5* interference than in blank cells. The core promoter region of *TLR5* included two CpG islands and 15 acting elements. The methylation of the mC-6 site in the second CpG island of the promoter region had a regulatory effect on *TLR5* expression. Therefore, low expression of *TLR5* inhibited the immune response to some extent and decreased cell damage, which was conducive to the resistance to *E. coli* infection. The methylation of the mC-6 CG site in the second CpG island of the *TLR5* promoter inhibited the binding of the transcription factor Sp1, which decreased *TLR5* expression and affected *E. coli* resistance.

Biography

Chaohui Dai is a Doctoral student of Yangzhou University and her research interest is in animal genetics, breeding and reproduction. Presently, she is mainly engaged in pig disease-resistant breeding and reproduction.

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