Molecular analysis of crossbreeding experiment to improve immune genetic response against salmonella in poultry (Abstract)

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ABSTRACT

Gallinacins are functional analogues of the mammalian beta-defensins and play an important role in the innate immunity against microbial infections in chickens. *Salmonella Typhimurium* is a gram-negative bacterium that adversely affects both human and animal health. A crossbreeding experiment in chickens was conducted between an Egyptian breed (Fayoumi; F) and an exotic breed (Rhode Island Red; R) to improve the immune genetic response against salmonella in F1 chicks of ½F½R and their reciprocal cross of ½R½F. This study aimed to assess the association between four Gallinacins polymorphic genes (*Gal2, Gal3*, *Gal4* and *Gal5*) and cecal salmonella bacterial count or antibodies titer (IgA, IgG and IgM). The cecal bacterial count and the antibodies titer were determined in both F1 chicks after pathogenic with *S. Typhimurium*. The polymorphic genes of *Gal2, Gal3*, *Gal4* and *Gal*5 were assessed by the restriction fragment length polymorphism technique (PCR-RFLP) using HpyCH4IV, AvaI, AluI and HinfI restriction enzymes, respectively. The *Gal2* gene was homozygous for the four genetic groups (FXF, RXR, FXR and RXF), so it was excluded from the association study. Among the four genes studied, the *GAL3* gene was found to be significantly ($p<0.05$) associated with the salmonella cecal bacterial count and the antibodies produced. This gene encourages us to use it in any marker-assisted selection in order to improve and enhance the genetic immune response against salmonella infection in chickens.

Keywords: Gallinacin genes, salmonella, immune response, crossbreeding, PCR-RFLP, poultry.