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 Gal5 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 (F½F, R½R, F½R and R½F) 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.