O28

Use of a Vector HVT+IBD vaccine in broiler breeders

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The use of an HVT+IBD vector vaccine in broiler breeder pullets was investigated. Three flocks of approximately 1,200 Broiler breeder pullets each were vaccinated at one day of age or at 19 d of incubation with HVT+SB1 or a vector HVT + Infectious bursal disease (IBD) + SB1 vaccine. Serum samples were collected periodically and the antibody titters for IBD assessed using the ELISA kits IDEXX IBD classic and Symbiotics IBD Plus (PROFLOCK Plus). At 20 weeks of age, all pullets primed with the vector HVT+IBD were vaccinated with an Inactivated IBD+Reo vaccine intramuscularly in the breast. The HVT+SB1-vaccinated pullets remained unvaccinated to serve as negative controls. At 30, 40 and 50 birds of age, chicks from the IBDV-vaccinated and control breeder groups were challenged with several pathogenic IBDV field isolates. At 65 weeks of age, groups of breeder breeders were challenged subcutaneously with a very virulent Marek's disease virus isolate together with a group of 2 week-old SPF birds that served as challenge controls. The results obtained indicate that there was a sustained level of antibodies against IBDV throughout the life of the breeders that received the vector HVT+IBD as embryos or at one day of age. There were differences in the results obtained with the two ELISA kits used. The protection after MDV challenge in the vector-vaccinated 65 week-old breeders was 100%. The protection of the progenies against IBDV challenge was comparable or superior to progenies from industry breeder flock receiving live-modified IBDV vaccines as IBDV primers.

O29

Differential genetic variation of chickens and MD vaccine protective efficacy

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Vaccine protective efficacy is determined by multiple factors including host genetics, the type of vaccine, vaccine dosage, the virulence and dose of challenging viruses, and the interval between vaccination and viral challenge. Studies on human immune responses to vaccinations suggest host genetic variability has a strong effect and involves both genes within and outside of the major histocompatibility complex (MHC). Using chickens from two highly inbred and specific pathogen free lines (63 and 72) sharing a common MHC (B*2) haplotype in challenge trials, striking differences in protective efficacy were observed when vaccinated with HVT or CVI988/Rispens at either 500PFU/bird or at a commercial dosage. Genome-Wide SNP scan identified 14,925 SNPs mainly residing on chromosomes 1-15, 17-28 and Z, out of 57,636 SNPs, that differ between the two lines. DNA methylation level, an epigenetic factor, was also found to differ between the two lines at promoter regions of genes with hypomethylation, intermediate methylation, or hypermethylation levels. Differential gene expression post vaccination between the two lines will also be discussed. A better understanding of the roles of host genetics in immunological challenge will serve as the touchstone for rational design and development of novel safe and effective vaccines.