Histopathology and Electron Microscopy of the Bursa of Fabricius in Chickens following IBD Vaccination and IBDV Challenge

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Two experiments were conducted to determine comparative severity of gross, histopathologic, and ultrastructural lesions among six Dekalb lines and five Dekalb cross-matings of chickens following Infectious Bursal Disease Virus (IBDV) challenge. In these experiments, 3,680 Dekalb chickens and 410 Specific-Pathogen-Free (SPF) chickens at one-day of age were divided into 18 groups and randomly placed in battery units under standard environmental conditions. Water and feed were provided ad-libitum throughout the experimental periods. In experiment one, 1,680 Dekalb chickens and 200 SPF chickens, at 4 weeks of age, were vaccinated by the oral route with a commercial intermediate live IBD vaccine. Samples of Bursa of Fabricius from chickens at 4, 8, and 11 weeks of age, were collected and fixed in 10% buffered formalin for histopathologic study, or in a mixture of 2.5% glutaraldehyde and 1% paraformaldehyde in 0.05 M sodium cacodylate-HCl buffer pH 7.2 for TEM study. Tissue specimens were subsequently post fixed in osmium and dehydrated through graded alcohol then embedded in epoxy resin. Ultrathin sections were doubly stained in uranyl acetate and lead and observed using either Hitachi H-7000 or H-7100 TEM (3). Seven weeks after vaccination, histopathologic study revealed bursae atrophy and there were reduced bursa/body weight ratios, which may imply a concurrent potential decrease in immune competence of chickens following IBD vaccination (4,5,7,9).

Transmission electron microscopy demonstrated IBD virions in cytoplasm of lymphocytes in bursa tissues from vaccinated Dekalb chickens and SPF chickens (2,6,10,12). In experiment two, 2,000 Dekalb chickens and 210 SPF chickens were challenged with IBD standard challenge virus at 4 weeks of age by the eye drop route. The mortality after challenge was 4% in Dekalb chickens and 29% in SPF chickens. The histopathologic and ultrastructural lesions were studied at 3, 7, and 24 days after challenge. Extensive bursae lesions were observed in Dekalb and SPF chickens at 3, 7, and 24 days after IBD virus challenge. The lesions were follicular lymphoid necrosis, depletion, and acute inflammation with edema, hemorrhage, and heterophil infiltration through the observation period of 24 days (1,2). The
severity of bursae lesions were greater and more persistent in SPF chickens than in Dekalb chickens. Bursa samples from infected chickens were macerated and centrifuged, and the supernatants were directly applied to membrane supported grids for negative staining with 1% neutralized PTA (3). Ultrathin sections of bursal tissues from infected chickens revealed virions in the cytoplasm of lymphocytes and macrophages (1,10,11). In conclusion, these findings suggest that Dekalb chickens had greater immune resistance to IBDV challenge than SPF chickens, which is possibly due to genetic factors.

References


