



## ***In-ovo* IBDV Vaccination of Maternal Antibody-Positive Broiler Chicks with Univax-BD®**

### **PART II: *In-ovo* IBDV Vaccination Demonstrates Significant Protection Against Virulent Challenge With Variant and Classic IBDV Strains**

**H**yperimmunization of broiler breeders against infectious bursal disease virus (IBDV) is a common practice among U.S. broiler integrators. Intensive breeder vaccination programs are designed to maximize the maternal antibody titers of the progeny, protecting broiler flocks from the immunosuppressive effects of early subclinical IBDV infection. Integrators have questioned the effectiveness of day-of-age or *in-ovo* IBDV vaccination in high-titered progeny, and many have abandoned the practice based on the supposition that maternal antibodies would neutralize vaccine virus before it could be of benefit.

However, a study presented by Dr. John McCarty at the 2003 American Veterinary

Medical Association-American Association of Avian Pathologists annual convention demonstrated the protective effects of *in-ovo* IBDV vaccination with Univax-BD® in broilers with high maternal antibody titers.

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#### **Study Design**

For the study, 145 eggs with maternal antibodies to IBDV were obtained from a commercial broiler integrator. The average ELISA titer of the eggs was 11,000. Next, 100 of the eggs were divided into two groups: 50 were injected at 18 days of incubation with a full dose of an intermediate classic strain IBDV vaccine (Univax-BD, Schering-Plough Corporation) and 50 remained unvaccinated to serve as controls for the challenge study. The remaining eggs were unvaccinated and provided a maternal antibody-positive, unchallenged control.

At hatch, the group of 50 vaccinated and 50 unvaccinated chicks were subdivided into two groups of 25 chicks. One of these two groups was to be challenged with USDA Standard Strain IBDV and the other with the USDA Delaware E Strain IBDV.

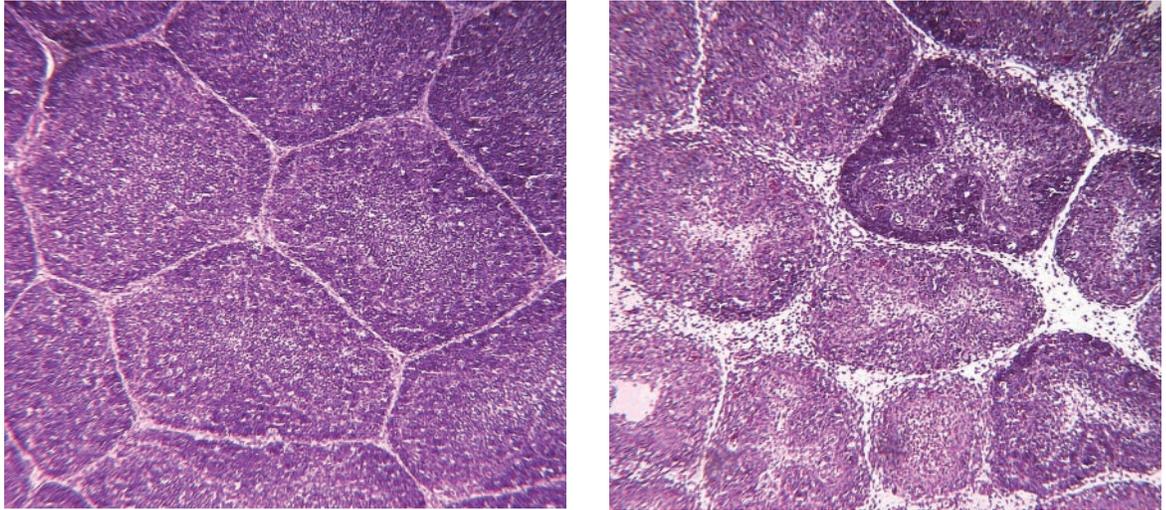
Birds from each group were grown in isolation units through 20 days of age. In addition to these four test groups, one group of 42 unvaccinated, maternal antibody-positive birds remained in a separate isolation unit to serve as unchallenged controls.

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## **Key Points**

- ***In-ovo* vaccination of maternal antibody-positive chicks with Univax-BD® appeared to delay the age at which challenge virus could be detected in the bursa by 6 to 7 days.**
- **A delay of bursal infection for 6 to 7 days should significantly improve the immunocompetency of the flock.**

**Figure 1: Bursa histopathology.**



Bursas from antibody-positive broiler chickens given either Univax-BD *in ovo* (left) or no vaccine (right) and then challenged with IBDV after hatching.

All groups, except the unchallenged controls, were challenged at day 2, 4, 6, 8, 12, 14, 16 and 18 post-hatch with their assigned challenge viruses. Three bursas were harvested from each challenged group 5 days after each sequential challenge. Two bursas were also harvested from the unchallenged control birds daily. Bursas were submitted for histological examination and for IDEXX reverse transcriptase/polymerase chain reaction-restriction fragment length polymorphism (RT/PCR-RFLP) assay. See Figure 1 for examples of typical bursal histopathology.

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## Results

In the non-vaccinated, maternal antibody-positive chicks beginning at 9 days of age, Delaware E strain IBDV was detected by RT/PCR-RFLP. The average histopathology score for the Delaware E challenged group was 2.9. The standard strain IBDV was detected at 12 days of age, with an average histopathology score of 1.3.

The Delaware E strain IBDV was not detected via IDEXX RT/PCR-RFLP in the vaccinated, maternal antibody-positive birds until 15

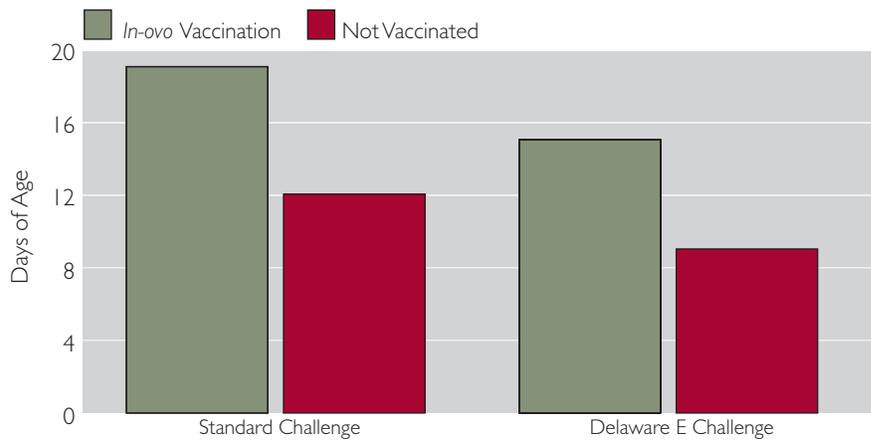
days of age. The average histopathology score for this group was 1.7. The standard strain IBDV was not detected until 19 days of age, with an average histopathology score of 1.5.

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## Conclusion and Discussion

Prior studies demonstrated that Univax-BD administered *in-ovo* to chicks with high maternal antibody was capable of reaching and producing histological changes in the bursa (see SPAH-PBU technical bulletin #401 “*In-ovo* IBDV Vaccination of Maternal Antibody-Positive Broiler Chicks With Univax-BD®: Part I”). This study demonstrates that the changes correspond to a transient protection of the bursa in maternally immune broilers.

Sequential challenges of both vaccinated and non-vaccinated chicks with anti-IBDV maternal antibody demonstrated that the Delaware E variant strain could be detected in the bursas of both groups at a younger age than the standard IBDV strain. However, the Delaware E strain was detected in *in-ovo* vaccinated chicks at 15 days of age, 6 days later than in non-vaccinated chicks



**Figure 2: Onset of IBDV infection in vaccinated vs. non-vaccinated broilers.**

(Figure2). The standard IBDV strain was detected in the *in-ovo* vaccinated chicks at 19 days of age, 7 days later than in non-vaccinated chicks.

*In-ovo* vaccination of maternal antibody-positive chicks with Univax-BD appeared to delay the age at which virus could be detected in the bursa by approximately 1 week.

Previous research has demonstrated that the severity of immunosuppression associated with subclinical IBDV increases with earlier challenge. In the face of constant field challenge, a delay of bursal infection for approximately 1 week should significantly improve the immunocompetence of the flock.

