MERCK ANIMAL HEALTH

# TECHNICAL SERVICES BULLETIN

**INNOVAX®-ILT:**

# One Vaccination for Long Duration of Immunity

Recombinant HVT-ILT (rHVT-ILT) vaccines are not generic. Each rHVT-ILT vaccine uses unique promoter and terminator segments to insert specific ILT genes that code for important immunogenic glycoproteins.

INNOVAX-ILT features the insertion of genes that code for two immunogenic glycoproteins (gI and gD) that are keys to an effective immune response against ILT virus challenge.

A competitor product is constructed with a gene that codes for immunogenic glycoprotein B.

The duration of immunity against infectious laryngotracheitis (ILT) is critical for commercial layer and broiler breeder flocks because these flocks remain susceptible from as young as three weeks of age until spent hens are sent to the processing plant.

The duration of the immunity (DOI) produced by rHVT-ILT vaccines was tested independently. The 60-week DOI test results for INNOVAX-ILT were presented in a poster at AAAP 2010 by Melson et. al. The 60-week DOI test results for the competitor product were presented in a poster at AAAP 2012 by Rosenberger et. al.

## Key Points

- Duration of immunity post-vaccination with INNOVAX-ILT and a competitor HVT-ILT were studied for 60 weeks using intra-tracheal challenge with virulent USDA ILT challenge virus.
- The competitor HVT-ILT administered subcutaneously at one day of age demonstrated excellent protection (>90%) at 30 weeks of age, but the protection waned at 40 and 60 weeks of age.
- Supplementation of the competitor HVT-ILT vaccine with FP-ILT at eight weeks of age extended the protection to >90% at 40 and 60 weeks of age.
- INNOVAX-ILT administered at one day of age demonstrated excellent protection (>90%) at all 10-week increments from 10 weeks of age through 60 weeks of age. No supplemental ILT vaccination was needed to ensure long duration of immunity.

## MATERIALS AND METHODS:

### Competitor Vaccine DOI Study

Commercial leghorn chickens (Hyline Variety 36) were vaccinated at one day of age with the competitor rHVT-ILT vaccine plus CVI988 or with HVT+ CVI988 alone. At eight weeks of age, half of the rHVT-ILT birds were revaccinated with a recombinant fowlpox-ILT vaccine plus AE, while the rest of the rHVT-ILT vaccinates and the Marek's vaccinated controls were given regular fowlpox plus AE.

At 30, 40 and 60 weeks of age, 30 birds from each of the three vaccinated groups were challenged intratracheally with virulent USDA-NVSL ILT challenge virus at 103.5EID50 per bird and observed for clinical signs for 10 days post-challenge per 9CFR 113.328 procedure. Tracheal swabs were also collected for virus re-isolation at 5 and 10 days post-inoculation. Birds with positive virus isolations and/or ILT-specific mortality were considered susceptible. Results are summarized in Table 1 and Figure 1.

### Table 1

Virulent ILT Challenge of Competitor rHVT-ILT vaccinates to 60 Weeks of Age Percent protection determined by virus re-isolation at 5 and 10 days post-challenge and ILT specific mortality

| Treatment Group | Age Vaccinated | Percent Protection | | |
|---|---|---|---|---|
| | | 30wk $10^{3.5}EID_{50}$ | 40wk $10^{3.5}EID_{50}$ | 60wk $10^{3.5}EID_{50}$ |
| **rHVT-ILT** | Day 1 | 97 | 83 | 70 |
| **rHVT-ILT + FP-LT** | Day 1 / 8 weeks | 93 | 97 | 93 |
| **Controls** | N/A | 10 | 10 | 10 |

## CONCLUSION:

Vaccination with the competitor rHVT-ILT vaccine plus the FP-ILT at 8 weeks of age provided excellent protection through 60 weeks of age (> 90%) when challenged with the virulent USDA ILT challenge virus.

The rHVT-ILT vaccine alone provided >90% protection at 30 weeks, but protection waned at 40 and 60 weeks of age.

## MATERIALS AND METHODS:

### INNOVAX®-ILT DOI Study

SPF leghorn chickens were either sham-vaccinated with Marek's Disease vaccine diluent (controls) or vaccinated subcutaneously with INNOVAX-ILT. In addition to the age-matched sham-vaccinated controls, a group of four- to five-week control birds were challenged to ensure that the challenge virus was virulent, as the older birds would become more refractory to ILT with age.

At 10-week intervals, groups of 30 vaccinates, 10 sham-vaccinated same-age birds and 10 four- to five-week-old challenge dose control birds were challenged intratracheally (IT) with virulent USDA-NVSL ILT challenge virus and observed for clinical signs for 10 days post-challenge per 9CFR 113.328 procedure. Results are summarized in Table 2 and Figure 1.

### Table 2

Virulent ILT Challenge of Innovax-ILT vaccinates to 60 Weeks of Age Percent protection based upon ILT-specific mortality and clinical signs

| Treatment Group | ILT VIRUS CHALLENGE | | | | | |
|---|---|---|---|---|---|---|
| | 10 weeks $10^{3.7}EID_{50}$ | | 20 weeks $10^{3.7}EID_{50}$ | | 30 weeks $10^{2.8}EID_{50}$ | |
| | Number positive / total | Percent protection | Number positive / total | Percent protection | Number positive / total | Percent protection |
| INNOVAX ILT Vaccines | 3/30 | 90 | 0/30 | 100 | 0/27* | 100 |
| Sham Controls | 4/10 | 60 | 10/10 | 0 | 6/10* | 40 |
| Four Week Control | 10/10 | 0 | 10/10 | 0 | 9/10 | 10 |
| | 40 weeks $10^{2.8}EID_{50}$ | | 50 weeks $10^{4.0}EID_{50}$ | | 60 weeks $10^{4.0}EID_{50}$ | |
| | Number positive / total | Percent protection | Number positive / total | Percent protection | Number positive / total | Percent protection |
| INNOVAX ILT Vaccines | 1/30 | 97 | 2/30 | 93 | 1/17** | **94** |
| Sham Controls | 2/10 | 80 | 3/10 | 70 | 7/9** | **22** |
| Four- or Five-Week Controls | 10/10 | 0 | 10/10 | 0 | 10/10 | **0** |

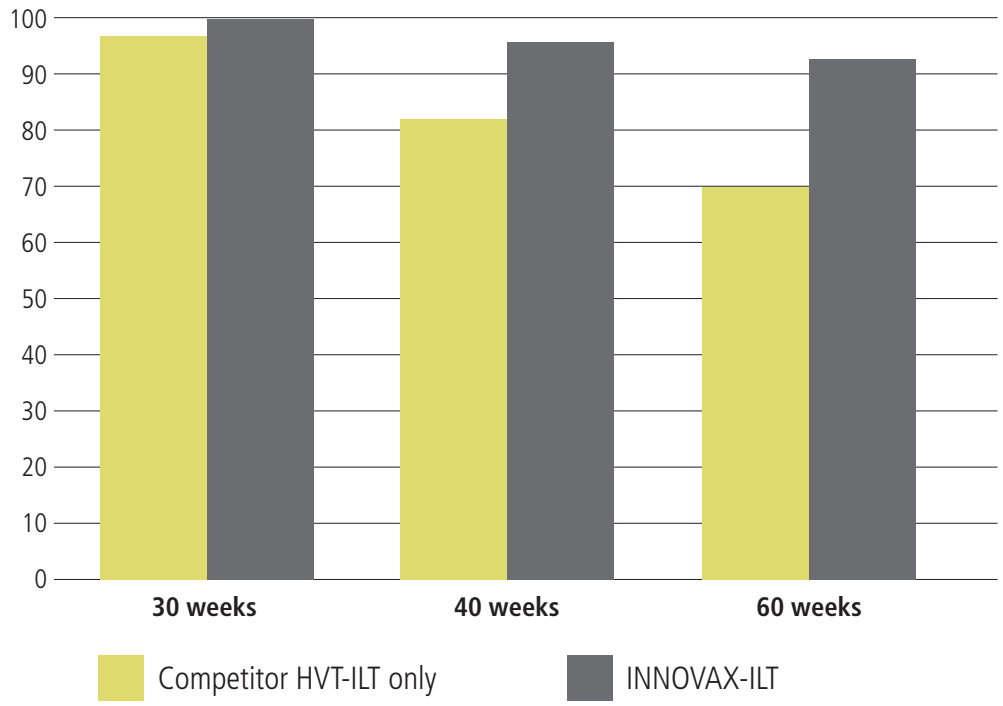
* Chickens that died from causes unrelated to challenge were not included in the final results.
**By the final challenge age, only 17 vaccinates and 9 control birds remained.

## CONCLUSION:

INNOVAX®-ILT provided excellent protection against the virulent USDA ILT challenge (>90%) at all ages tested through 60 weeks of age.

There was no evidence that protection waned using INNOVAX-ILT alone, as it did with the competitor HVT-ILT product alone.

**Comparison of Competitor rHVT-ILT vs. Innovax-ILT: Duration of Immunity to 60 weeks**




**Merck Animal Health**
**Summit, New Jersey 07901**
**merck-animal-health-usa.com/species/poultry**

**Technical Service: 1-800-211-3573**
**Customer Service: 1-800-356-7470**



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