VAXXITEK®
HVT+IBD+ILT

Protection against infectious laryngotracheitis powered by VAXXITEK®

The POWER to PROTECT uniquely and conveniently

VAXXITEK® HVT+IBD+ILT provides:

- A solid immune foundation
- 3in1 Protection against infectious laryngotracheitis, Marek's, and infectious bursal diseases in one shot
- Proven safety for your flock
- XXI The latest innovation from the manufacturer of VAXXITEK® HVT+IBD

PREVENTION WORKS
Shaping the future of poultry health

Boehringer Ingelheim

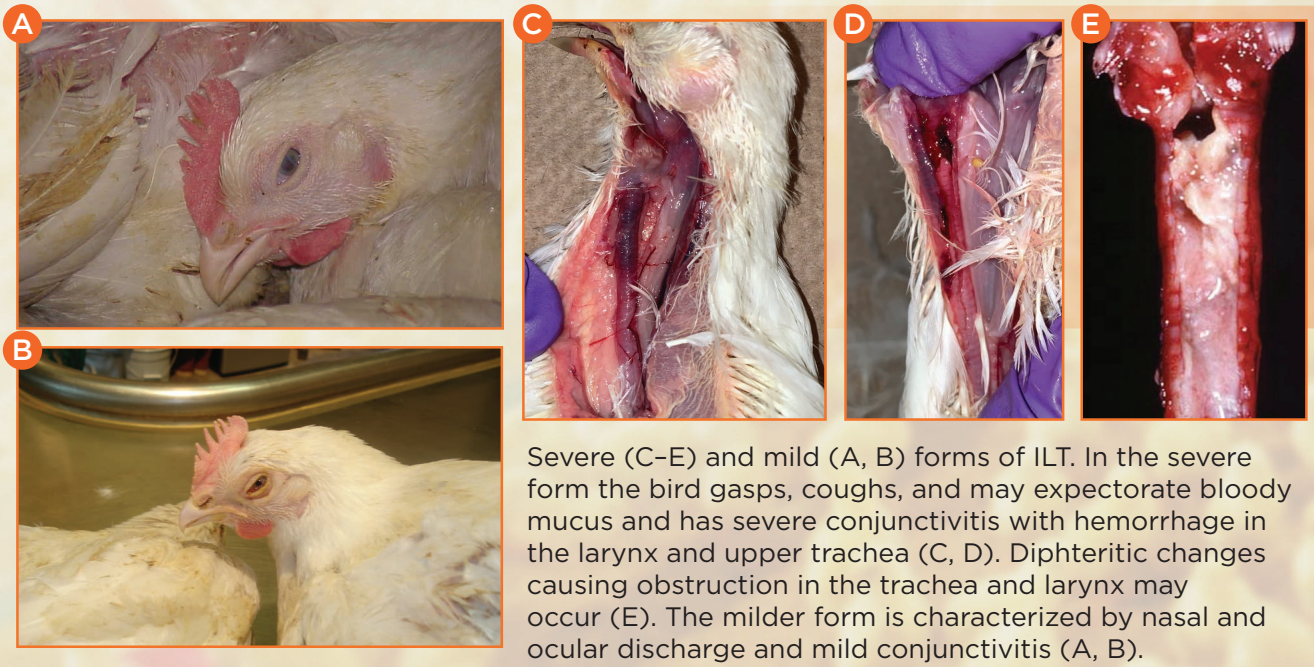
INFECTIOUS LARYNGOTRACHEITIS (ILT) A GLOBAL CHALLENGE

An acute viral respiratory disease caused by Gallid herpesvirus type I (GaHV-1)[1]

- Occurs primarily in chickens, but can also affect pheasants and peafowl[1]
- Located within the trachea and trigeminal ganglion in active and latent forms, respectively[2]
- Virus persists in infected birds for life[1]
- Reactivated viruses from the latent state may be shed and cause an outbreak in susceptible birds[3]

Causes severe respiratory clinical signs and lesions in the trachea[1]

- Transmission occurs within flocks via airborne particles or fomites[1]
- Clinical signs include nasal discharge, moist rales, coughing, and gasping[1,2]
- Infected flocks often experience severe respiratory disease with expectoration of blood[1,2]



Severe (C–E) and mild (A, B) forms of ILT. In the severe form the bird gasps, coughs, and may expectorate bloody mucus and has severe conjunctivitis with hemorrhage in the larynx and upper trachea (C, D). Diphteritic changes causing obstruction in the trachea and larynx may occur (E). The milder form is characterized by nasal and ocular discharge and mild conjunctivitis (A, B).

References: 1. Bagust TJ, Jones RC, Guy JS. Avian infectious laryngotracheitis. *Rev Sci Tech.* 2000;19:483–492. **2.** Davison D. Infectious laryngotracheitis. In: Brugère-Picoux J, et al, eds. *Manual of Poultry Diseases*. Paris, France: French Association for the Advancement of Science; 2013:chap 22. **3.** Williams RA, Al-Afaleq AI, Jordan FTW, et al. Pathogenicity of latent infectious laryngotracheitis virus in chickens. *Avian Pathol.* 1992;21:287–294.

VAXXITEK® HVT+IBD+ILT

Can lead to major economic losses worldwide[1]

- As there is no effective treatment for ILT, infection in a flock can be devastating[2]
- In peracute form, ILT can result in a mortality rate that **exceeds 50%**, and mild or chronic ILT is characterized by unthriftiness[2]
- The ILT virus can establish latency after 7 days of acute infection with reactivation and shedding at times of stress[2]
- ILT can cause significant economic damage as a result of mortality and decreased bird growth[3,4]

Estimated mortality in broilers due to ILT[5]

In the broiler segment, mortality resulting from ILT infection has been shown to double every day once clinical signs appear[5]

References: 1. Bagust TJ, Jones RC, Guy JS. Avian infectious laryngotracheitis. *Rev Sci Tech*. 2000;19:483–492. **2.** Gowthaman V, Kumar S, Koul M, et al. Infectious laryngotracheitis: etiology, epidemiology, pathobiology, and advances in diagnosis and control—a comprehensive review. *Vet Q*. 2020;40:140–161. **3.** Garcia M, Spatz S, Guy JS. Infectious laryngotracheitis. In: Swain D, ed. *Diseases of Poultry*. 13th ed. Ames, IA: Wiley-Blackwell; 2013:chap 5. **4.** Data on file. Boehringer Ingelheim Animal Health. **5.** Davison D. Infectious laryngotracheitis. In: Brugère-Picoux J, et al, eds. *Manual of Poultry Diseases*. Paris, France: French Association for the Advancement of Science; 2013:chap 22.

THE SOLUTION:
VAXXITEK® HVT+IBD+ILT

Developed by the trusted leader in infectious bursal disease (IBD) vector vaccine technology

HISTORY OF LEADERSHIP: Boehringer Ingelheim was the first to introduce herpesvirus of turkey (HVT) vector vaccines using **one virus to control multiple diseases,** providing game-changing solutions for the poultry industry.

TRUSTED PROTECTION: Launched in 2006, **VAXXITEK® HVT+IBD was the first HVT+IBD vector vaccine** on the market, making it the historic leader in IBD vaccination. Today, it has **protected more than 100 billion birds** and is **available in more than 75 countries** around the world.[1]

STRONG SCIENTIFIC BACKING: More than **100 publications** report the benefits of using VAXXITEK® HVT+IBD.

An all-in-one solution to protect flocks in the hatchery against 3 diseases

Building on the **trusted vaccination platform used to develop VAXXITEK® HVT+IBD,** our research and manufacturing experts successfully designed a **3-in-1 vaccine** that provides a strong immune foundation and optimizes protection against **Marek's disease (MD), infectious bursal disease (IBD)—and infectious laryngotracheitis (ILT).**

IBD

All the benefits of VAXXITEK® HVT+IBD now with the power of ILT protection

3in1

Strong immune foundation and optimized protection against MD, IBD, and ILT, for a simplified vaccination protocol in 1 shot[1]

Demonstrated safety proven by clinical studies[1]

ILT

Immunogenic glycoprotein D ILT insert for optimal ILT protection

1

Unique vector vaccine with a single promoter for 2 disease inserts, leading to consistent antigen expression and immunity[1]

XXI

Powered by the manufacturer of VAXXITEK® HVT+IBD

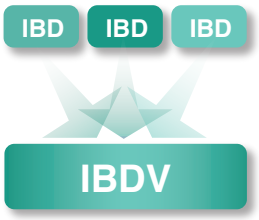
Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

VAXXITEK® HVT+IBD+ILT

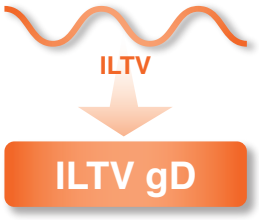
Engineered using the same backbone as VAXXITEK® HVT+IBD

VAXXITEK® HVT+IBD

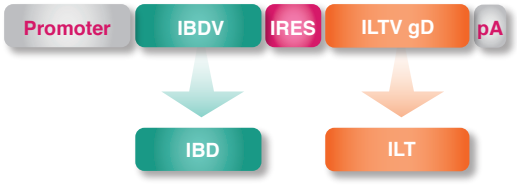
1 It all starts with the bioengineering platform of the trusted HVT+IBD market leader.



2 The selected IBDV VP2 gene from the Faragher 52/70 classic strain provides efficient, broad protection against IBD classic, very virulent, and variant viruses.



3 Of the major glycoproteins expressed by the ILT virus, glycoprotein D (gD) has been shown to give clinical protection against virulent, infectious laryngotracheitis virus (ILTV).[1,2] As a result, a genetic sequence coding for gD was inserted.



4 The insertion site of the ILTV gD gene is the same as the IBDV VP2 gene. Furthermore, use of only one promoter allows proper gene expression of both viral genes, resulting in optimal protection.

VAXXITEK® HVT+IBD+ILT

5 The result is an exciting addition to the VAXXITEK® family of vaccines—the power to protect.

References: 1. Kanabagatte Basavarajappa M, Kumar S, Khattar SK, et al. A recombinant newcastle disease virus (NDV) expressing infectious laryngotracheitis virus (ILTV) surface glycoprotein D protects against highly virulent ILTV and NDV challenges in chickens. *Vaccine*. 2014;32:3555–3563. **2.** Yu Q, Spatz S, Li Y, et al. Newcastle disease virus vectored infectious laryngotracheitis vaccines protect commercial broiler chickens in the presence of maternally derived antibodies. *Vaccine*. 2017;35:789–795.

EFFICIENT PROTECTION
AGAINST A VARIETY OF IBDV STRAINS

VAXXITEK® HVT+IBD+ILT provides IBD protection

STC CLASSIC IBDV CHALLENGE[1]:

- VAXXITEK® HVT+IBD+ILT construct (vHVT317 IBD+ILT) was administered subcutaneously or *in ovo* to specific-pathogen-free (SPF) chickens that were then challenged at 29 days of age
- **96.7% protection** was demonstrated at 29 days of age for both administration routes

Level of protection against STC classic IBDV after subcutaneous and *in ovo* administration

Vaccine	Administration	Level of protection (or infectivity) at 29 days of age
VAXXITEK® HVT+IBD+ILT	Subcutaneous and *in ovo*	96.7%
Sham-vaccinated/ Challenge control	Subcutaneous	(100%)
	In ovo	(93.3%)

Immunity is demonstrated against classic IBDV[1]

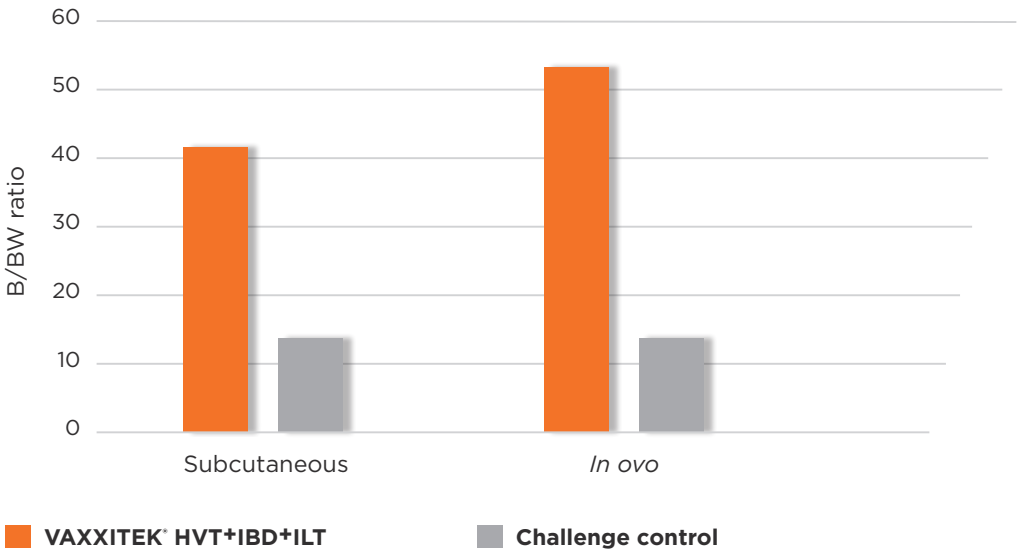
Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

VAXXITEK® HVT+IBD+ILT

IBDV VAR-E CHALLENGE[1]:

- VAXXITEK® HVT+IBD+ILT construct (vHVT317 IBD+ILT) was administered subcutaneously or *in ovo* to SPF chickens that were then challenged at 29 days of age
- Vaccinated chickens showed significant differences in bursa-to-body weight (B/BW) ratio compared with challenge control
- Protection was shown against IBDV VAR-E after both subcutaneous and *in ovo* administration from 29 days of age

IBDV VAR-E challenge



VAXXITEK® HVT+IBD+ILT protects efficiently against both classic and variant E IBDV and acts as the cornerstone of your hatchery vaccination program.

Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

PRECISION-ENGINEERED
PROTECTION AGAINST INFECTIOUS LARYNGOTRACHEITIS

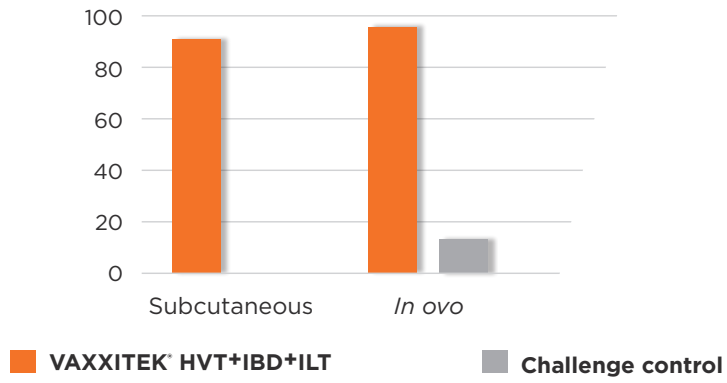
Designed to provide reliable protection[1]

SPF chickens were vaccinated with VAXXITEK® HVT+IBD+ILT construct (vHVT317 IBD+ILT) subcutaneously at 1 day of age and then challenged with infectious laryngotracheitis virus (ILTV) at 29 days of age. SPF chickens vaccinated *in ovo* were challenged with ILTV at 25 days of age.

- Chickens vaccinated subcutaneously at 1 day of age showed **93.3% clinical protection from ILTV at 29 days of age**
- Chickens vaccinated *in ovo* showed **96.7% clinical protection from ILTV at 25 days of age**
- The percent incidence and infectivity of sham-vaccinated birds when challenged with ILT was 86.7% *in ovo* and 100% in subcutaneous

Administration of VAXXITEK® HVT+IBD+ILT provides immunity against ILT from 25 days of age (*in ovo*) or from 29 days of age (subcutaneous).

Percent protection at 25 days of age (*in ovo*) and 29 days of age (subcutaneous)[1]



Subcutaneous or *in ovo* administration of VAXXITEK® HVT+IBD+ILT provides reliable ILT protection.

Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

PROVEN PROTECTION
AGAINST MAREK'S DISEASE

VAXXITEK® HVT+IBD+ILT

Demonstrated onset of immunity to MD

MD immunity has been demonstrated from **5 days of age** after *in ovo* and subcutaneous administration.

Level of MD protection through *in ovo* and subcutaneous administration[1]

Vaccination	Challenge	% Protection *in ovo*	% Protection subcutaneous
VAXXITEK® HVT+IBD+ILT	vMDV* GA22	88.6%	91.4%
Non-vaccinated challenge control		14.7%	11.4%

*Virulent Marek's disease virus.

Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

DEMONSTRATED SAFETY
FOR YOUR FLOCK

Safety in target species[1]

- The absence of residual pathogenicity of vHVT317 IBD+ILT MSV was demonstrated after *in ovo* vaccination of embryonated eggs and subcutaneous vaccination of day-old SPF chicks[1]
- VAXXITEK® HVT+IBD+ILT was shown not to spread to non-vaccinated contact birds[1]

Proven prevention of reversion to virulence[1]

- The VAXXITEK® HVT+IBD+ILT Virus Vector (vHVT317) did not show any signs of virulence after 5 successive *in vivo* passages[1]

Put the power of protection in your hands with precision-engineered VAXXITEK® HVT+IBD+ILT

Reference: 1. Data on file. Boehringer Ingelheim Animal Health.

VAXXITEK®
HVT+IBD+ILT

Contact your Boehringer Ingelheim representative to learn more.

PROTECTION POWERED BY VAXXITEK®

Reduced labor time and enable **increased profitability**

Improved animal welfare through fewer vaccine applications[1]

Simplified vaccination program from field to hatchery

3-in-1 vaccine: Marek's disease, infectious bursal disease, and infectious laryngotracheitis protection

The strong immune foundation provided by the **VAXXITEK® HVT+IBD** backbone enables productivity, **reduces antibiotic use,** and **supports return on investment**[2–8]

VAXXITEK® HVT+IBD+ILT

Moving vaccination from field to hatchery **reduces chick handling stress**

Safe and **easy to use**

Same VAXXITEK® technology platform ensures proper gene expression

Enlarge your portfolio of vaccines using the **VAXXITEK® backbone**

To learn more about VAXXITEK® HVT+IBD+ILT, contact your Boehringer Ingelheim representative.

References: 1. Data on file. Boehringer Ingelheim Animal Health. **2.** Morton DB. Vaccines and animal welfare. *Rev Sci Tech.* 2007;26:157–163. **3.** Lemiere S, Rojo F, Fernandez R, et al. Benefits of the herpesvirus of turkey vector vaccine of infectious bursal disease in control of immuno-depression in broilers and decrease of use of antibiotic medication. In: Proceedings from the XVIII Congress of the World Veterinary Poultry Association Congress; August 19–23, 2013; Nantes, France. Abstract. **4.** Hoelzer K, Bielke L, Blake DP, et al. Vaccines as alternatives to antibiotics for food producing animals. Part 2: new approaches and potential solutions. *Vet Res.* 2018;49:70. **5.** Atienza JC, Nagera AJ, Martinez PO, et al. Evaluation of a herpesvirus of turkey vector vaccine inducing protection against infectious bursal and Marek's diseases (VAXXITEK® HVT + IBD) under Philippines field conditions. In: Proceedings from the XXIII World's Poultry Congress; 29 June 29–July 4, 2008; Queensland, Australia. **6.** Rautenschlein S, Lemiere S, Simon B, Prandini F. A comparison of the effects of the humoral and cell-mediated immunity between an HVT-IBD vector vaccine and an IBDV-immune complex vaccine after in ovo vaccination of commercial broilers. In: Proceedings from the XVII Congress of the World Veterinary Poultry Association Congress; August 14–18, 2011; Cancun, Mexico: 830–843. **7.** Tang SF, He SJ, Li WM, Lemiere S. Field experience of vaccination in day-old broiler chickens with a herpesvirus turkey-infectious bursal disease (HVT-IBD) vector vaccine in different systems of chicken production across China. Poster presentation. In: Proceedings from the XVII Congress of the World Veterinary Poultry Association Congress; August 14–18, 2011; Cancun, Mexico: 920–926. **8.** Zhou X, Wang D, Xiong J, Zhang P, Li Y, She R. Protection of chickens, with or without maternal antibodies, against IBDV infection by a recombinant IBDV-VP2 protein. *Vaccine.* 2010;28:3990–3996.

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