Innovax® ND-IBD

ALWAYS PRODUCING MORE

IMPROVING PROTECTION, INCREASING PRODUCTIVITY

Innovax®-ND-IBD: unique 3-in-1 long-term protection against IBD, ND and MD

Convenience Program

www.msd-animal-health.com

MSD Animal Health

INTRODUCING INNOVAX®-ND-IBD

FOR THE FIRST TIME, THE POULTRY INDUSTRY CAN ENJOY SAFE, EFFECTIVE, LONG-TERM PROTECTION AGAINST THREE OF THE MOST IMPORTANT INFECTIOUS AND COMMERCIALLY DISRUPTIVE FLOCK DISEASES IN A SINGLE VACCINE.

UNIQUE 3-IN-1 PROTECTION

More dependable and complete performance, whether measured by growth rate, feed efficiency or egg production: all performance parameters can enjoy maximum potential without interference from ND, IBD or Marek's disease, in just one in ovo or subcutaneous vaccination.

MORE EFFICIENT DISEASE CONTROL

Hatchery vaccination ensures better process control; 3-in-1 protection means that producers do not have to choose between reduced ND vaccination reaction or improved IBD protection without timing.

SUPERIOR, LONG-TERM DISEASE PREVENTION

Innovax®-ND-IBD has demonstrated protection against standard virulent ND and IBD as well as genotype VII ND and vvIBD challenges and classical, variant (Var E) and vvIBDV (CS89) challenges.

PRODUCING IMPROVED RETURNS ON INVESTMENT

Reduced field vaccination labour, reduced medication cost and improved processing plant efficiency and reduced downgrading/condemnation rates, which leads to a better processing yield.

HEALTHIER, MORE PRODUCTIVE BIRDS

Innovax®-ND-IBD eliminates live ND vaccination reaction, inactivated ND performance loss and protects against IBD without worry about MDA interference.

PRODUCING MORE OPPORTUNITIES

Innovax®-ND-IBD is part of a complete bird health program to reduce overall antibiotic use through better disease control without reaction.

ALWAYS REDUCING THE THREAT FROM INFECTIOUS DISEASES

POULTRY IS ONE OF THE FASTEST GROWING FOOD PRODUCTION SECTORS WORLDWIDE. TO TAKE FULL ADVANTAGE OF THIS OPPORTUNITY AND DELIVER THE HIGH PERFORMANCE REQUIRED, THE THREAT FROM INFECTIOUS DISEASES MUST BE CONTROLLED.

Innovax®-ND-IBD has been developed to make disease control more effective and easier. It is the first ever dual-construct HVT vaccine to offer long-term protection against three of the most important infectious diseases that threaten today's commercial poultry operations – Newcastle Disease, Infectious Bursal Disease and Marek's Disease.

NEWCASTLE DISEASE

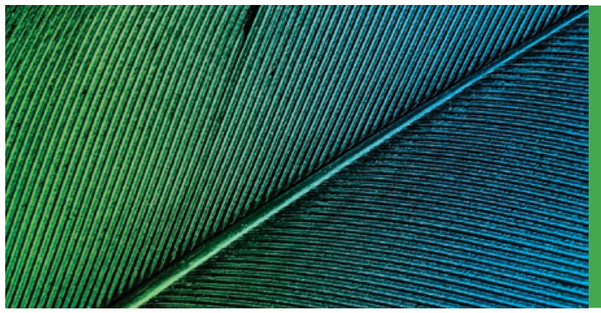
Newcastle Disease (ND) is a ubiquitous threat to the poultry industry hurting livability, broiler performance and causing plant rejects. The presence of ND can also restrict international trade, as well as production losses in egg-producing birds, causing further economic harm. Vaccination against ND is effective, but traditional live vaccines induce vaccination reactions and inactivated vaccines used in broilers may hurt performance. ND control remains a challenge to the poultry industry.

INFECTIOUS BURSAL DISEASE

Infectious Bursal Disease (IBD) is a widespread immunosuppressive viral disease that has been linked to mortality, susceptibility to other disease challenges, plant rejects and to reduced pullet uniformity. Field application of IBD vaccines requires labour and effort to achieve uniformity of vaccination, and it must be timed to achieve maximum efficacy in the face of maternally derived antibody using formulas such as Deventer Formula. The challenges to best define the correct time and manage optimal application make IBD one of the biggest threats to productivity for the poultry industry.

MAREK'S DISEASE

Marek's Disease virus is present in most poultry facilities. The virus, located in poultry dust and dander, is impossible to eliminate from the complex poultry house environment, even with careful cleanout and disinfection procedures. This herpes virus attacks the nerves, which can produce lameness, but it can also cause tumours or enlarged feather follicles in affected birds. It results in broiler rejects at processing and can cause mortality and egg production losses in egg-laying birds. Hatchery vaccination either in ovo or in day-old chicks has proven to be an extremely effective prevention strategy for many years.

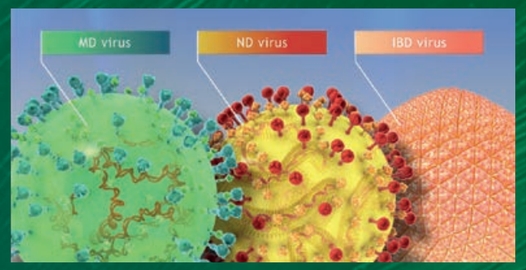


NO NEED TO CHOOSE

HVT is a safe and effective foundation for biotechnology vaccines, but HVT-based vaccines interfere with one another.

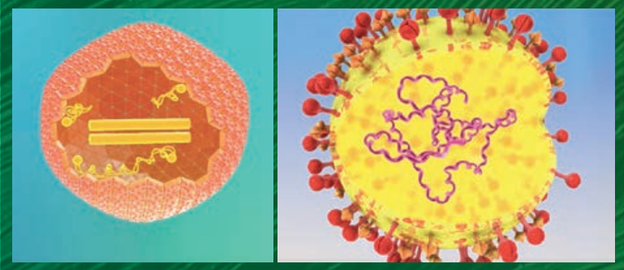
Now there is no need to choose: Innovax®-ND-IBD is a dual-construct HVT vaccine protecting against ND, IBD and Marek's disease in a single, non-reactive vaccine.

INNOVATING TO PRODUCE MORE



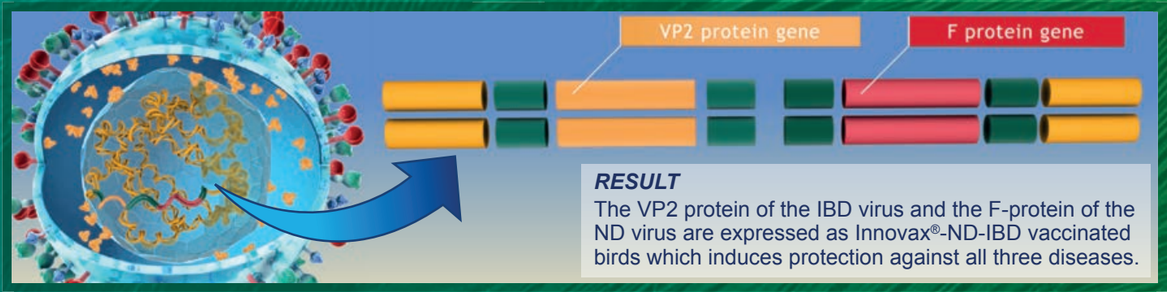
IMMUNE RESPONSE

Innovax®-ND-IBD prompts an immune response against the proteins of the MD, ND, IBD viruses.



HOW IT'S MADE

We have accomplished this by using the VP2-protein gene of the IBD virus and the F-protein gene from the ND virus and combining both genes with optimised regulatory sequences into a dual-construct cassette, which is inserted into the HVT genome.



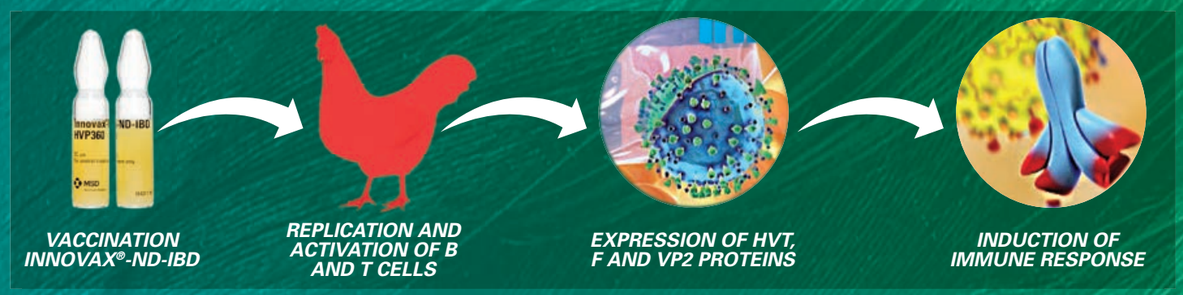
RESULT

The VP2 protein of the IBD virus and the F-protein of the ND virus are expressed as Innovax®-ND-IBD vaccinated birds which induces protection against all three diseases.

HOW IT WORKS

Innovax®-ND-IBD is inoculated into day-old chicks with care to ensure the viability of this cell-associated vaccine. It is extra important to ensure that every chick or every hatching egg is properly vaccinated because HVT-based vaccines cannot spread bird-to-bird in the field.

Once birds are vaccinated, the virus infects T and B lymphocytes, expressing and presenting the proteins for HVT, F and VP2. The immune system develops immunity (antibodies and cell mediated) to the HVT virus, but also to the IBD-VP2 and ND-F proteins expressed by the inserted genes. The antibodies against the F protein prevent ND challenge virus from fusing or attaching to cells, providing protection against ND. The antibodies against the VP2 protein prevent IBD challenge virus from infecting cells, providing protection against IBD.



Introduction of protective immunity against MD, ND and IBD

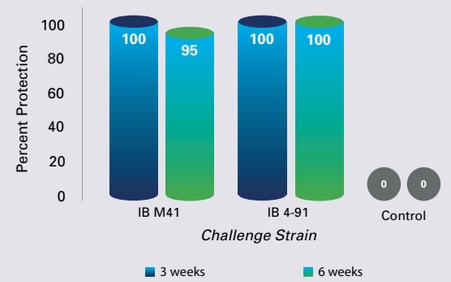
PROVING COMPATIBILITY

INNOVAX®-ND-IBD COMPATIBILITY WITH LIVE INFECTIOUS BRONCHITIS (IB) VACCINES

IB CHALLENGE STUDY

SPF birds were vaccinated with a minimum dose of Innovax®-ND-IBD by subcutaneous route and with a concurrent dose of Nobilis® IB Ma5 and Nobilis® IB 4/91 via oculonasal route. Birds were challenged with virulent IB M41 and virulent IB 4-91 at 3 and 6 weeks post-vaccination.

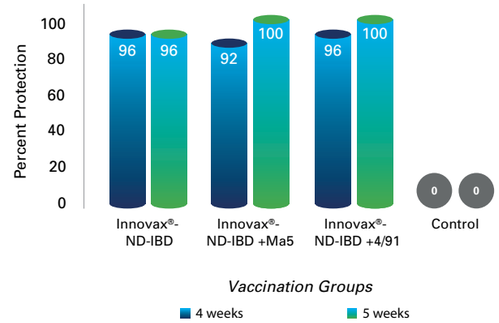
NO IMPACT ON IBV PROTECTION[1]



ND CHALLENGE STUDY

SPF birds were vaccinated with a minimum dose of Innovax®-ND-IBD by subcutaneous route and with a concurrent dose of either Nobilis® IB Ma5 or Nobilis® IB 4/91 via oculonasal route. Birds were challenged with virulent Herts 33/56 NDV at 4 and 5 weeks of age.

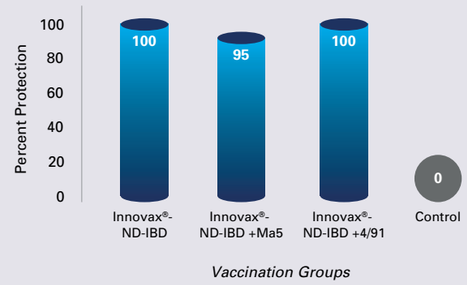
NO IMPACT ON NDV PROTECTION[1]



IBD CHALLENGE STUDY

SPF birds were vaccinated with a minimum dose of Innovax®-ND-IBD by subcutaneous route and with a concurrent dose of either Nobilis® IB Ma5 or Nobilis® IB 4/91 via oculonasal route. Birds were challenged with vvIBDV CS89 at 2 weeks of age.

NO IMPACT ON IBD PROTECTION[1]



CONCLUSION

Innovax®-ND-IBD demonstrated compatibility with Nobilis® IB Ma5 and Nobilis® IB 4/91.

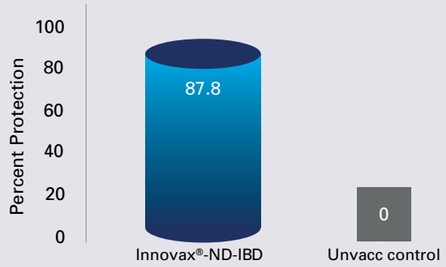
- ✓ Protection against virulent Herts 33/56 NDV challenge at 4 and 5 weeks of age
- ✓ Protection against virulent M41 and 4-91 IBV challenge at 3 and 6 weeks of age
- ✓ Protection against very virulent CS89 IBDV challenge at 2 weeks of age

THE PROTECTION YOU NEED

ONSET AND DURATION OF IMMUNITY: MAREK'S DISEASE

SPF birds were inoculated with the minimum dose of Innovax®-ND-IBD via subcutaneous route. They were challenged at 9 days post vaccination using very virulent Marek's disease virus (vvMDV) RB1B according to monograph 0589 of the EU Pharmacopoeia. Protection is considered long-term for Marek's disease because the vaccine is a persistent herpesvirus.

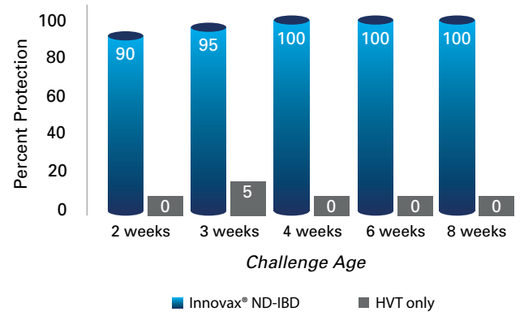
MAREK'S PROTECTION[1]



ONSET AND DURATION OF IMMUNITY: INFECTIOUS BURSAL DISEASE

SPF birds were inoculated with a minimum dose of Innovax®-ND-IBD via subcutaneous route and challenged at 2, 3, 4, 6 and 8 weeks of age with very virulent IBD virus (vvIBDv) CS 89 according to monograph 0587 of the EU Pharmacopoeia. Controls were vaccinated with regular HVT vaccine.

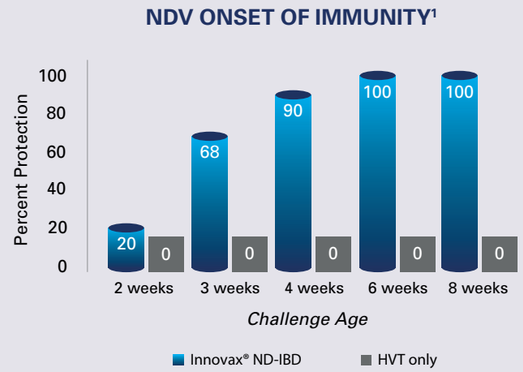
IBD ONSET OF IMMUNITY[1]



ONSET AND DURATION OF IMMUNITY: NEWCASTLE DISEASE

SPF birds were inoculated with the minimum dose of Innovax®-ND-IBD via subcutaneous route. They were challenged at 2, 3, 4, 6 or 8 weeks of age with virulent Herts 33/56 NDV according to monograph 0450 of the EU Pharmacopoeia.

NDV ONSET OF IMMUNITY[1]



CONCLUSION

Innovax®-ND-IBD demonstrated:

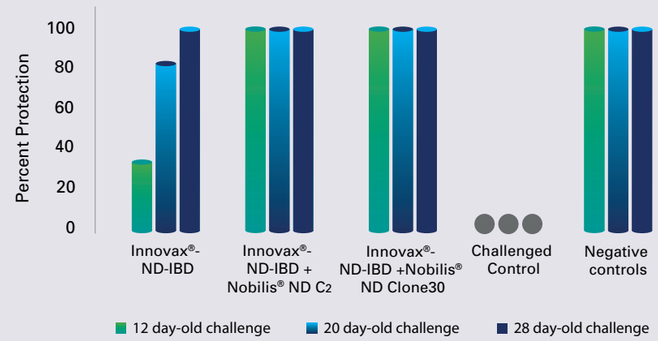
- ✓ Proven protection against vvMDV at 9 days of age
- ✓ Consistent protection against NDV Herts strain challenge
- ✓ Protection against vvIBDV CS89 strain
- ✓ Duration of immunity against all three disease challenges is considered long-term for broilers

EXPANDING PROTECTION

INNOVAX®-ND-IBD COMPATIBILITY WITH LIVE NEWCASTLE DISEASE VACCINES AGAINST VELOGENIC NDV GENOTYPE VII

SPF birds were vaccinated with a minimum dose of Innovax®-ND-IBD by subcutaneous route and with a concurrent dose of either Nobilis® ND C2 or Nobilis® ND Clone 30 via oculonasal route. Birds were challenged with virulent Egyptian isolate of genotype VII ND virus at $10^{5.0}ELD_{50}$ per bird at one of three time points: 12 days, 20 days or 28 days. Innovax®-ND-IBD gave significant protection at 20 days post vaccination, which was extended to full protection when Nobilis® ND C2 or Nobilis® ND Clone 30 was added to the vaccination program.

EXPANDING NEWCASTLE DISEASE PROTECTION[1]



CONCLUSION

- ✓ Innovax®-ND-IBD protects against NDV genotype VII strain challenge
- ✓ The addition of Nobilis® ND C2 and Nobilis® ND Clone 30 enhance protection when birds are challenged with NDV genotype VII strains in endemic areas.

innovax® ND-IBD

ALWAYS PRODUCING MORE

WHY USE INNOVAX®-ND-IBD

- Superior, long-term disease protection and prevention
- Healthier, more productive birds
- Higher, more consistent profits
- Improved process control and consistency
- Lower labour costs
- Fewer disruptions to production
- Reduced antibiotic usage and medication costs
- Access to new markets

For more information contact your local MSD Animal Health representative about how you can start using Innovax®-ND-IBD to protect chickens against ND, IBD and MD, or go to **www.innovax-vaccines.com**

REFERENCES:
1. Data on file

GL/INI/0717/0011

www.innovax-vaccines.com

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