International Poultry Production

Poultryhealth BYTES

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Broiler Health 2018

Number: 209

Avian influenza XXVII

Live vectored vaccines

Alternative virus vectored constructs or bacterial vectors can provide the same immunological benefits that a live vaccine does, but without the risk of reassortment associated with live, replication competent avian influenza vaccines. This type of influenza vaccine provides a broader protection across antigenically divergent avian influenza viruses within the same subtype.

These vaccines utilise recombinant DNA techniques to incorporate genetic material from the avian influenza virus genome, typically the HA gene, into the viral backbone for in vivo generation of gene expression.

The most frequently reported system has been the recombinant fowl poxvirus (rFPV) with H5, H7 or H9 (rFPV-H5, rFPV-H7 or rFPV-H9). This type of vaccine (rFPV-H5) has been used extensively in Central America against endemic H5N2 LPAI viruses.

Experimentally, other vectors have been used including infectious laryngotracheitis (ILT), Newcastle disease (NDV), Herpes Virus of Turkeys (HVT) and Duck Viral Enteritis (DVE). Bacterial vectors have included Salmonella Spp and Lactobacillus lactis.

rNDV and rILT, as well as some of recombinant adenovirus vectors, can be applied by mass administration techniques because they multiply in the mucous membranes. However, others need to be injected in order to produce an adequate or effective immunity.

One disadvantage of rNDV is that most poultry have been immunised against Newcastle disease and this will limit the immunogenicity of rNDV vectored vaccines. Similarly, any pre-existing immunity, most likely cell mediated immunity, will interfere with the primary immune response of rFPV-H5 vaccine.

Therefore, rFPV-H5 vaccines are best administered at day old in the hatchery.

A rDVE-H5 vaccine has been developed and it gives good protection to ducks.

DNA vaccines

Plasmid based experimental DNA vaccines using the HA gene have induced a protective immune response in chickens against a variety of H5 and H7 HPAI viruses. In general, the prospects for this type of vaccine looks more promising for mammals rather than birds.