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Aetiology

Infectious bronchitis is caused by a Group 3 coronavirus. Groups 1 and 2 contain mammalian coronaviruses, while Group 3 contains avian coronaviruses. The surface of the virus is covered by club shaped projections or spikes and it is these which give the coronaviruses their name because under the electron microscope these create a corona around the virus.

There are many strains of infectious bronchitis virus. In fact, this virus is renowned for its ability to produce new strains and this is a key part of its ability to produce a varied and changing disease picture in the field. These 'strains' are often referred to as variants.

Infectious bronchitis replicates (multiplies) in the cytoplasm of cells in the respiratory and reproductive tracts. Nephropathogenic strains also replicate in kidney cells. It is this replication which disrupts the cells and ultimately causes the clinical signs. In this context, it is worth remembering relate to the organ (s) damaged in the infective process and not the virus type. Thus, with infectious bronchitis different strains have different tissue predilections resulting in differing clinical signs.

Some 3-4 hours after infection and viral multiplication, virus is shed from the cells and this peaks within 12 hours. These viruses also infect birds in the flock and so it can be seen why this disease spreads rapidly between birds. Outside the bird the virus is capable of surviving in the environment for up to two weeks in spring and up to eight weeks in winter. So, fomites (objects which transfer infection between houses or farms) can remain contaminated with viable viruses for some time.

Strain classification

Strain classification is done on the basis of features of the S-protein in the coronal spikes and numerous strains are known. Genetic assessment of strains indicates that the evolution of infectious bronchitis viruses involves recombination in mixed strain infections. In this process when the two viruses are replicating in the same cell, then some genetic material switches between them. If the resulting recombinant strain has some feature that favours its survival or multiplication then it can become the dominant strain on a farm or in an area.

This means that different strains can be seen in different areas and the chickens at risk might require different vaccines. Historically, it is probable that all infectious bronchitis virus strains are recombinants and have arisen by this process.

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