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Isolation of infectious bronchitis virus from a flock of racing pigeons

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The chicken is the only confirmed natural host to infectious bronchitis virus (IBV) (Hofstad 1984). We report the isolation of IBV from a flock of racing pigeons and assess its significance.

During the winter of 1985, a racing pigeon fancier in north eastern Victoria observed an acute illness in his loft of 150 racing pigeons. Affected birds had ruffled feathers, dyspnoea and excessive mucus at the commissures of the beak. Eleven birds died during the first 24 h and 11 more over the next 2 days. Seven birds were submitted for necropsy. The flock was treated with antibiotics. Affected birds recovered over the next 2 to 3 weeks.

At post-mortem examination, all birds were in average body condition. They had recently eaten but the linings of the oesophagus and crop were ulcerated. Mucoid pharyngitis and tracheitis were noted. The lower intestines contained fluid. Histological examination of oesophageal tissues confirmed that the birds were infested with trichomonads.

Four clarified suspensions from pooled samples of 5 tracheal mucosae and from 7 cloacal swabs were each inoculated into the allantoic cavity of sets of 5 nine-day-old fertile chicken eggs. Allantoic fluids, from the third passage, were collected 72 h after inoculation of each set of eggs, clarified and pelleted in an ultra centrifuge. Coronaviruses were seen when the pellets were examined by electron microscopy. Ten days after inoculation, all eggs were opened and the embryos examined. Embryos in each set were curled and stunted, changes which are characteristic of IBV.

An aliquot of a tracheal isolate was passaged 3 times in eggs at 48 h intervals. Fluorescence, shown to be specific for IBV, was seen in the aliantoic cells of each passage (Endo and Faragher, unpublished). After concentration and treatment with phospholipase C type 1, allantoic fluid from the third passage haemagglutinated chicken red blood cells. The haemagglutination was inhibited by specific IBV antiserum, indicating IBV of sub-type B (Faragher 1987). The IBV was then sub-typed by plaque reduction serum neutralisation tests using serums specific for each of the 9 Australian IBV sub-types (Wadey and Faragher 1981), and shown to belong to sub-type B.

Twenty-six days after the onset of disease in the pigeons, samples of serum were obtained from 10 birds in the affected flock and also from 12 birds in an unaffected flock kept in a separate loft 400m away. IBV haemagglutination inhibition (HI) antibody was detected at levels from 2 to 2^5. The titres in serum from the unaffected and the affected pigeon flocks were similar.

The pathogenicity of a cloacal IBV isolate was examined. Four 4-week-old CSIRO SPF chickens and four 8-week-old meat pigeons that were housed in the same cage were each inoculated by intranasal, intraocular and oral routes with allantoic fluid containing 10^3 EID_{50} of IBV. Meat pigeons were chosen rather than racing pigeons to reduce the likelihood of previous exposure to IBV. A similar number of birds of both species was inoculated with phosphate buffered saline (PBS) and housed in a separate room. Four days after inoculation, all the chickens inoculated with IBV had marked respiratory rales. All pigeons and those chickens inoculated with PBS remained healthy for 18 d when all the birds were bled and killed.

Levels of IBV HI antibodies in the chickens increased from 2^0 before inoculation to 2^3 to 2^4 18 d after inoculation. This response is common following vaccination of chickens, whereas wild IBV stimulate higher antibody levels. No IBV HI antibody was detected in the pigeons.

The IBV may have caused disease in the racing pigeons because their resistance was lowered by intercurrent disease. Pigeons raced over long distances have been seen to shelter in open-sided caged-layer poultry sheds when they are attacked by raptors (J Dark, personal communication). Such direct contact may have been the route of transmission to the pigeons of an IBV shown to be of the same serotype as widely used Australian IBV vaccine strains. A stray pigeon which the pigeon fancier had seen join his flock a week before the onset of disease may have been implicated in the transmission of the IBV. Laboratory contamination as a source of the isolate was considered to be a remote possibility because no other IBV was isolated during the 5 days immediately preceding or following this case.

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