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126 – Leukosis/sarcoma group I

Introduction

The leukosis/sarcoma group of diseases is a group of transmissible benign and malignant tumours of chickens caused by retroviruses. The most common disease in this group is lymphoid leukosis although in recent times myeloid leukosis has become more prevalent. Other tumours include:

Epithelial tumours – Nephroblastoma, nephroma, hepatocarcinoma, pancreatic adenocarcinoma, thecoma, granulosa cell carcinoma, seminoma and squamous cell carcinoma.

Connective tissue tumours – Fibroma, fibrosarcoma, myxoma, myxosarcoma, histolytic sarcoma, chondroma, osteoma and osteosarcoma.

Endothelial tumours – Haemangioma, angiosarcoma, endothelioma and mesothelioma.

Other related tumours – Osteopetrosis, meningioma and glioma.

These diseases are of economic significance because of the mortality caused (usually 1-2%, occasionally up to 20%) and depressed performance including egg production losses and loss of egg quality.

History

The earliest report was of lymphosarcomatosis in the 1860. Aleukaemic lymphadenosis was reported in 1905 and by 1908 the science of viral oncology had been created. Soon a book, 'The Leucosis of Fowls and Leucaemia Problems', had been published. In the 1920-30s various strains of avian leukosis virus were isolated. A lot of this early work was for scientific and human medical reasons but, with the expansion of the poultry industry, the 'avian leukosis complex' began to emerge. Marek's disease was confirmed as a separate entity.

The cause

The viruses that cause the conditions in the leukosis/sarcoma group are RNA viruses of the Retroviridae family. These RNA viruses have a reverse transcriptase, which is required for the formation of a DNA provirus. This is integrated into the host's genome during virus replication.

Viral infection

Virions are taken into cells in vacuoles and within 120 minutes of the virus first attaching to the cell's outer membrane viral RNS is in the cell's nucleus. Then viral DNA is synthesised and integrated and ultimately results in tumour formation.

Avian leukosis viruses, which are transmitted as infectious viral particles, are known as exogenous viruses. In nature the chicken genome contains several groups of avian retrovirus-like particles that are transmitted genetically. These are known as endogenous viruses.

Avian leukosis/sarcoma viruses that are found in chickens can be divided into six subgroups designated A, B, C, D, E and J. Subgroups F, G, H and I are endogenous avian leucosis viruses that are found in pheasants, partridges and quail.

Many strains of avian leukosis/sarcoma viruses exist and many induce a predominant tumour type although some are capable of producing a variety of tumours. Viral factors, including the origin and dose, and host factors, including rate of inoculation, age, genotype and sex, influence which tumour type is formed.