

# Neoplastic Diseases

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Neoplastic diseases of poultry are divided into two groups according to their etiological agents.

- The first group includes neoplasms of known etiology,
- The other group includes neoplasms of unknown etiology.

Neoplastic diseases or disease complexes can be grouped into 5 groups according to their etiological differences

1. Marek's Disease
2. Leukosis/ Sarcoma Group
3. Reticuloendotheliosis group
4. Lymphoproliferative Disease (LPD)
5. Neoplasms of unknown etiology

# 1. Marek's Disease

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- It is a lymphoproliferative disease that affects the nervous system and visceral organs
- The agent of the disease is the *Herpesvirus*

## 2. Leukosis/sarcoma Group

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- A group of **neoplastic diseases caused by RNA retroviruses**
- **Lymphoid leukosis** is the most common and well-known form
- In lymphoid leukosis, the **bursa of Fabricius is the primary target organ**, with secondary involvement of **visceral organs** such as the liver and spleen
- This group also includes **other neoplastic diseases**, mainly of **hematopoietic origin**, as well as some non-hematopoietic tumors

### **These include:**

- Erythroblastosis
- Myeloblastosis
- Myelocytomatosis
- Nephroblastoma
- Osteopetrosis

### 3. Reticuloendotheliosis group

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- Some members of this group, which are antigenically related to RNA-containing retroviruses, cause neoplastic diseases in ducks
- Others are the cause of lymphoid neoplasms in turkeys

## 4. Lymphoproliferative Disease (LPD)

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- This group pathogens are retroviruses associated with a number of neoplastic diseases
- These viruses are grouped into different envelope subgroups

## 5. Neoplasms of unknown etiology

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- Neoplasms in this group, which includes a wide range of benign and malignant neoplasms, are derived from muscle, epithelium, nervous tissue, serous membranes and pigmented cells

# Leukosis/sarcoma Group Virus Infections

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- **Lymphoid leukosis** is known to be of significant economic importance
- Other diseases occur sporadically, with some exceptions

# Etiology

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- Avian type C oncoviruses of the *Retroviridae* family are divided into 6 subgroups (A, B, C, D, E and J) according to the differences in their envelope glycoproteins
- Type E viruses are endogenous leukosis viruses and have negligible oncogenicity for chickens. Those excluded from this group are exogenous viruses of external origin
- A and B are the most common exogenous viruses in the field
- C and D viruses have been reported rarely
- Type J has recently been isolated from meat type chickens (broilers)

# Epidemiology

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- Chickens are natural hosts for all viruses in the ALV group
- The diseases they cause are seen in all poultry
- The virus can be transmitted by both **vertical** and **horizontal** routes.
- Horizontal transmission occurs through direct contact with infected chickens via virus-containing feces, as well as saliva and skin debris.
- Indirect transmission may also occur through contaminated fomites, including equipment, litter, feed, and personnel.
- In vertical transmission originating from the mother, ALSV infects the egg albumin from the oviduct and then the embryo.
- The virus does not reproduce in sex cells.
- Cocks have no role in transmission.
- Since the infected cocks have virus they can be porters

# Clinical Signs

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- Depending on the affected system, ALV occurs in three main leukosis forms:
  - Lymphoid leukosis,
  - Erythroid leukosis,
  - Myeloid leukosis
- In addition, ALV may be associated with other neoplastic conditions including:
  - Osteopetrosis,
  - hemangioma,
  - nephroblastoma.

# Clinical Signs

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- Leukosis causes nonspecific clinical signs, such as:
  - anorexia, weight loss, weakness, diarrhea, dehydration, abnormal feathering, pallor of the comb and wattles, paralysis, and death.
- Erythroid leukosis and myeloblastosis:
  - Hemorrhages in feather follicles and eyes
  - Blindness may occur
- Myelocytomatosis:
  - Formation of skeletal myelocytomas
  - Swelling of the head, chest, and legs
- Osteopetrosis:
  - Primarily affects long bones
  - Causes uniform or irregular thickening of the diaphysis or metaphysis
  - Affected areas are warmer than normal
  - Chickens show a characteristic appearance resembling “boots on the legs”

# Necropsy Findings

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- **Lymphoid Leukosis:** Neoplastic lesions are observed in the liver, spleen, bursa of Fabricius, kidneys, lungs, reproductive organs, heart, bone marrow, and mesenteric organs.
- **Erythroid Leukosis:** Marked enlargement of the spleen is observed, while the liver and kidneys show moderate enlargement. Affected organs appear dark red in color, have a soft and friable consistency, and are easily ruptured. Petechial hemorrhages are observed in visceral organs, muscles, and subcutaneous tissues. Affected chickens are severely anemic, and the blood is often watery with delayed coagulation.
- **Myeloid Leukosis:** Occurs in two forms: myeloblastic myeloid leukosis and myelocytic myeloid leukosis.
  - **Myeloblastosis:** The liver is enlarged and firm. Diffuse gray neoplastic infiltrates with a mottled and granular appearance are present. The spleen and kidneys are moderately enlarged. The bone marrow is firm and replaced by dense yellowish-gray cellular infiltrates. Severe leukemia and anemia are commonly observed.
  - **Myelocytomatosis:** Neoplastic lesions are observed in the bone marrow, periosteum, and adjacent cartilage. Multiple tissues and organs may be affected.

# Diagnosis

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1. Clinical and Necropsy Findings
2. Laboratory Examinations
  - a) Virus Isolation
  - b) RIF Test (Resistance Inducing Factor Test)
  - c) Cofal Test (Complement Fixation Test for Avian Leucosis Viruses)
  - d) NP Test (Non producer Test)
  - e) Other tests: Apart from the tests mentioned above, tests such as fluorescent antibody technique, Enzyme tests, PCR, hematopoietic transformation test are applied.
  - f) Serological tests: Plasma, serum and egg yolk can be used as samples for antibody screening. Neutralization test, indirect immunoperoxidase absorbance test and ELISA techniques are important serological tests.

# Protection and Control

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- There is no known treatment or vaccine.
- Control can be performed by flock management to reduce infection in the environment, good quality care and feeding, high standards of hygiene and the use of animals from genetically resistant.
- Because the infection is transmitted by eggs, retrospective virus isolation can be done

# RETICULOENDOTHELIOSIS

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Reticuloendotheliosis is a neoplastic disease of chickens that is caused by retroviruses other than leukosis/sarcoma group viruses and includes various pathological syndromes.

## Etiology

- *Reticuloendotheliosis virus (REV)* is one of the **avian type C onco viruses** of the *retroviridae* family.
- It is separated from the leukosis/sarcoma group.
- The most isolated strain is T in the REV group.
- The T strain is acutely oncogenic and cause reticuloendotheliosis.
- The virus can be cultured on embryonated chicken eggs and tissue cultures

# Epidemiology

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- Poultry such as turkey, duck, goose, pheasant and quail are susceptible to the disease
- Infection has been reported in many countries of the world
- The disease is transmitted vertically as well as horizontally
- Contaminated vaccines also cause disease.
- Contamination is more common especially in smallpox and marek's disease vaccines

# Symptoms

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- Clinical signs are not pathognomonic
- Acute or chronic neoplastic lesions commonly affect the liver and spleen
- Similar lesions may also involve the heart, kidneys, and pancreas
- In experimental infections, macroscopic lesions resembling Marek's disease may appear in peripheral nerves approximately 3 weeks post-inoculation
- Paralysis may occur in some birds
- The disease is associated with immunosuppression

# Diagnosis

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- Clinical signs, necropsy, and histopathological findings are not sufficient for definitive diagnosis
- Virus isolation and identification are required
- Virus isolation can be performed using:
  - Embryonated eggs
  - Cell cultures
  - Susceptible animals
- Serological tests can be used to detect infection at the flock level, including:
  - ELISA
  - Agar gel precipitation test (AGPT)
  - Plaque reduction test
  - Pseudoneutralization test
  - Fluorescent antibody test

# Neoplasms of Unknown Etiology

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- This group includes neoplastic diseases with unclear or variable etiology
- These diseases are primarily important in poultry due to economic losses and immunosuppression
- No adverse effects on human health have been reported
- Not considered zoonotic