

# VMC 605: Systematic Animal Virology

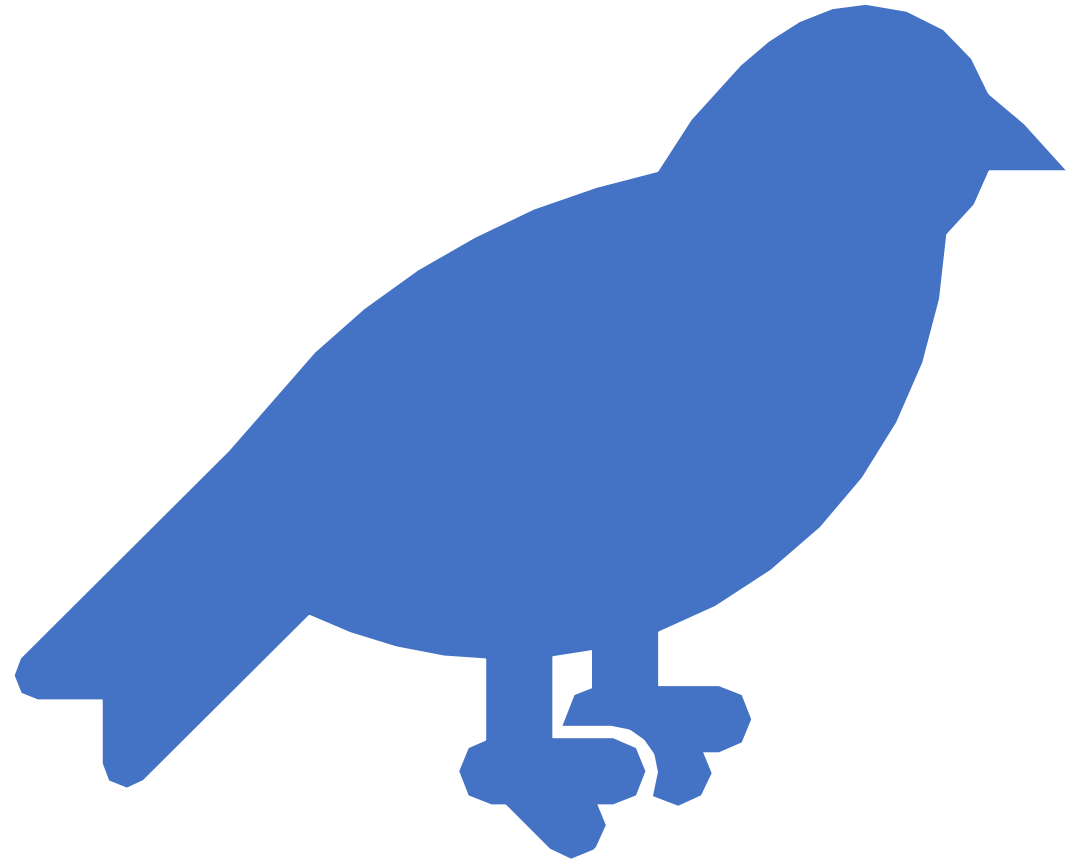
## Topic: *Avian leucosis*

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# Avian leucosis





# General characteristics:

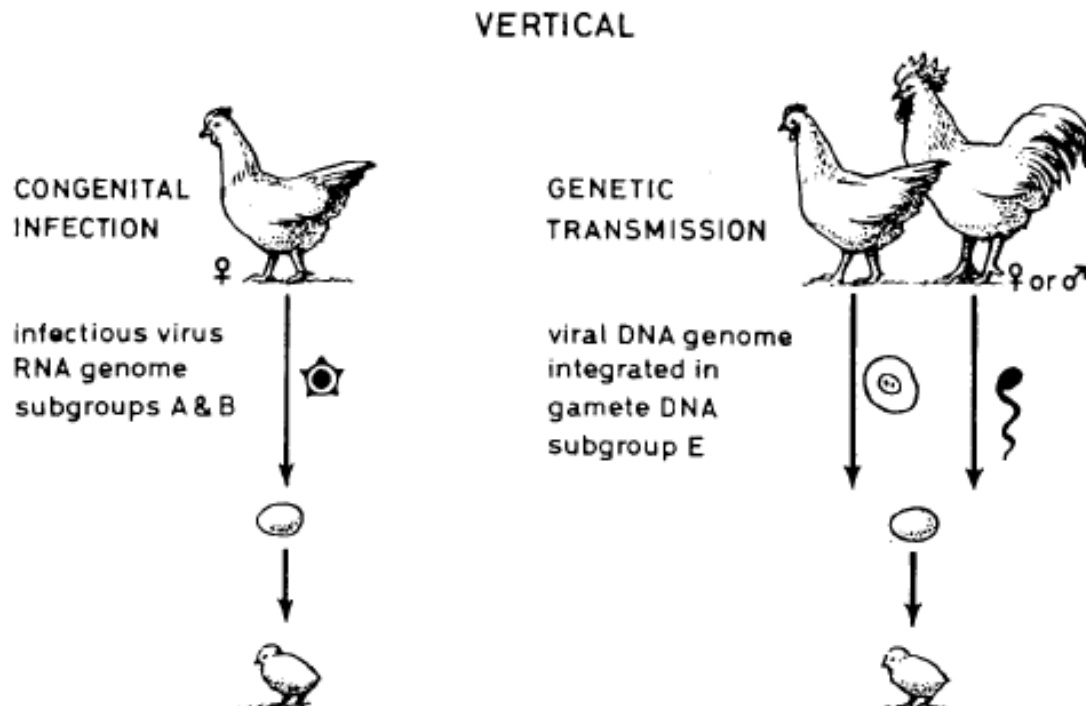
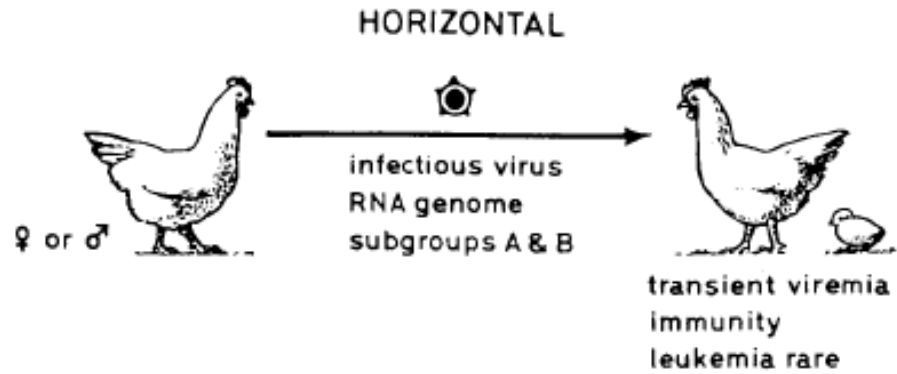
**The avian leucosis-sarcoma complex is**

- **caused by a closely related group of retroviruses**
- **appears in different forms of slowly developing proliferative diseases.**



# Aetiology

- ***Retroviridae, Alpharetrovirus. Avian leucosis, avian sarcoma, Rous sarcoma, avian myeloblastosis → most important is the avian leucosis-sarcoma: A-J serogroups.***
- **Extremely sensitive virus: role of environment, fomites can be excluded.**



# Transmission

RNA viruses that replicate via a DNA proviral stage linearly present in the host genome, by virtue of the presence in the viral genome of a *pol* gene that encodes the enzyme reverse transcriptase necessary for the transcription of RNA to DNA





# PATHOGENESIS OF ALSV-INDUCED DISEASES

- Avian leukosis/sarcoma viruses induce leukoses
- affecting the erythroid, lymphoid, and myeloid series of hematopoietic cells, solid tumors,
- solid tumors affecting cells of the mesenchyme, kidney, ovary, testis, liver, pancreas, & nervous system



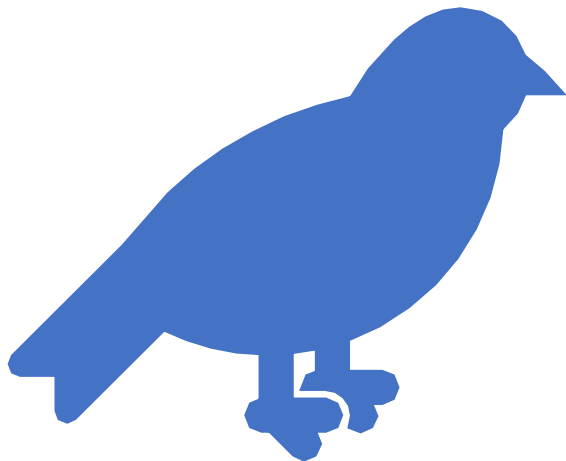
# Avian leukosis complex

- leukemia (leukosis) and sarcomas





# Retrovirus-Induced Disease in Poultry



- Three species of avian retrovirus cause disease in poultry:
- Avian leukosis/sarcoma virus (ALV)
- Reticuloendotheliosis virus (REV),
- Lymphoproliferative disease virus (LPDV) of turkeys.



- The incubation period for lymphoid leukosis is 4-6 months and as a consequence the disease is usually seen in broiler flocks.

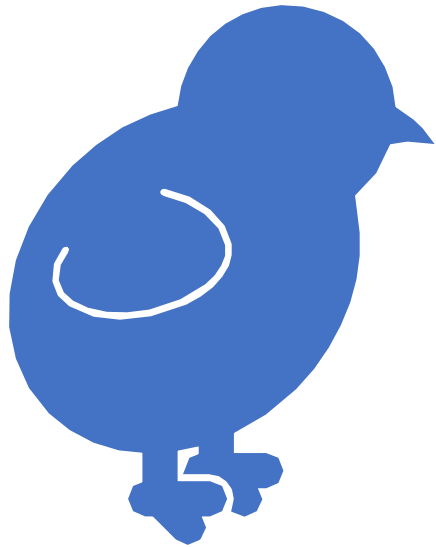


# Clinical signs:

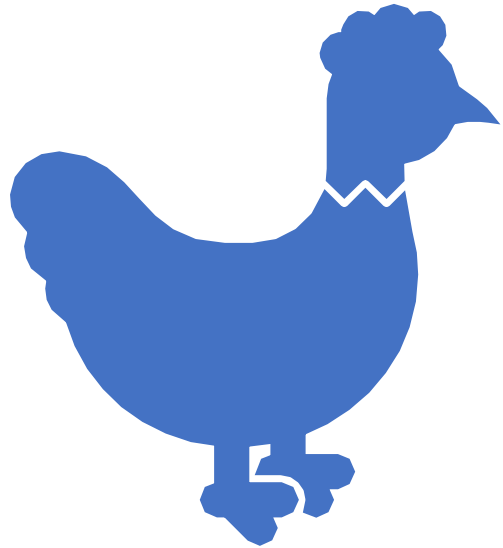
- Only in animals infected in embryonic life or in the first 2 month.

Bursa → B cell lymphocytes → oncogenic transformation → metastases all over the body.

# Clinical signs



- Chickens infected *in ovo* frequently
- Develop lymphoid leukosis(B-cell leukemia) arising from infected cells in the bursa of Fabricius.
- ALV replicates in chick embryo fibroblasts but does not transform them.
- Immunosuppression



- Decreases in the immunologic function and productivity
- Chickens with a tolerant viremic infection are more likely to develop neoplasms because of more virus loads.
- Decreases in productivity performed as decline in weight gain, egg production, fertility, and hatchability

- Wasting disease and anemia
- Subgroup J ALV mainly attacks myeloid cells, causes a malignant growth

Affected birds  
show non-  
specific clinical  
signs including:

### Reduced feed intake

- Weakness
- Diarrhoea
- Dehydration
- Weight loss
- Depression
- Reduced egg production.

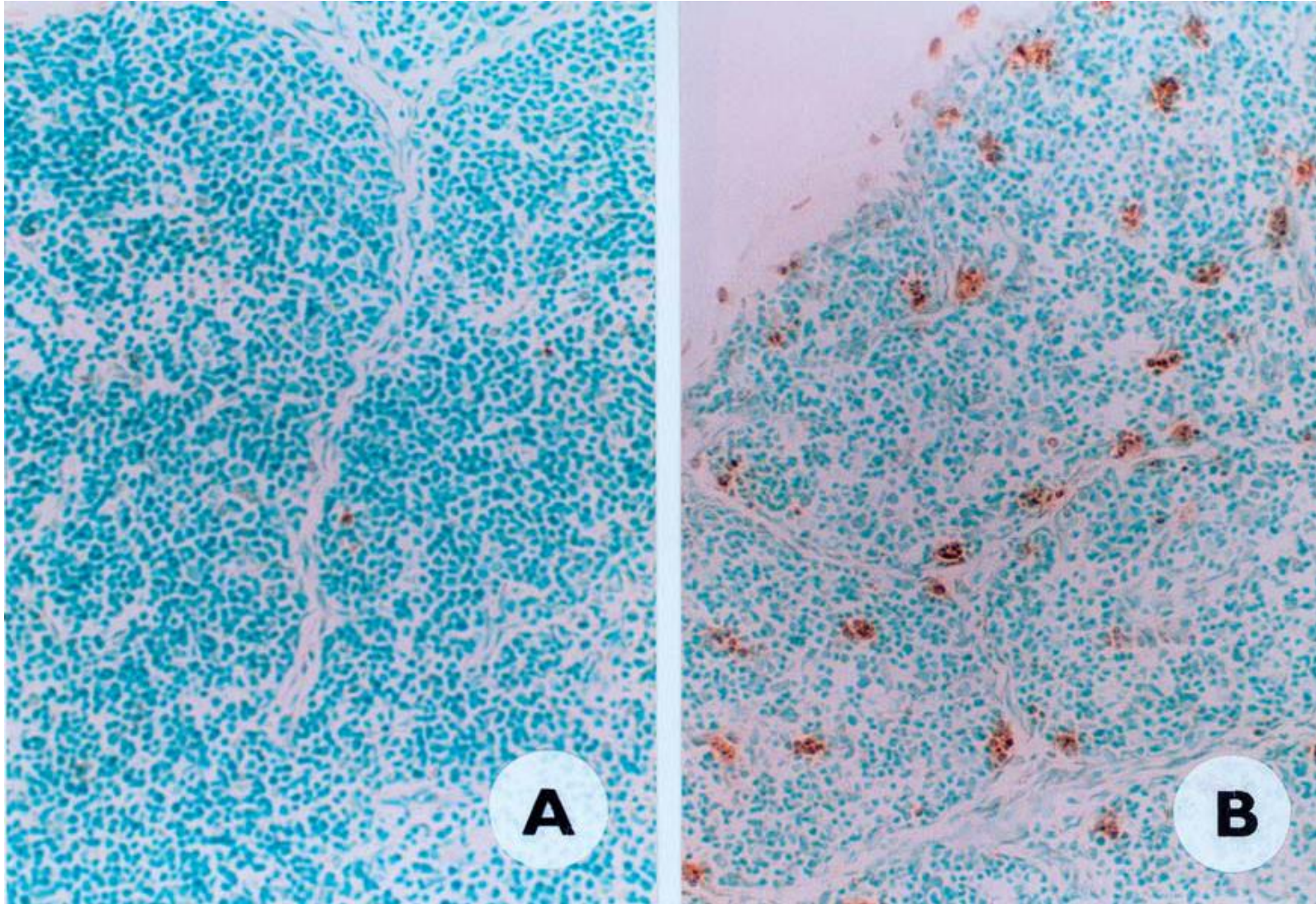


## *The internal organs of chicken affected by lymphoid leukosis*

- Palpation often reveals an enlarged bursa of Fabricius
- enlarged liver (Hepatomegaly).







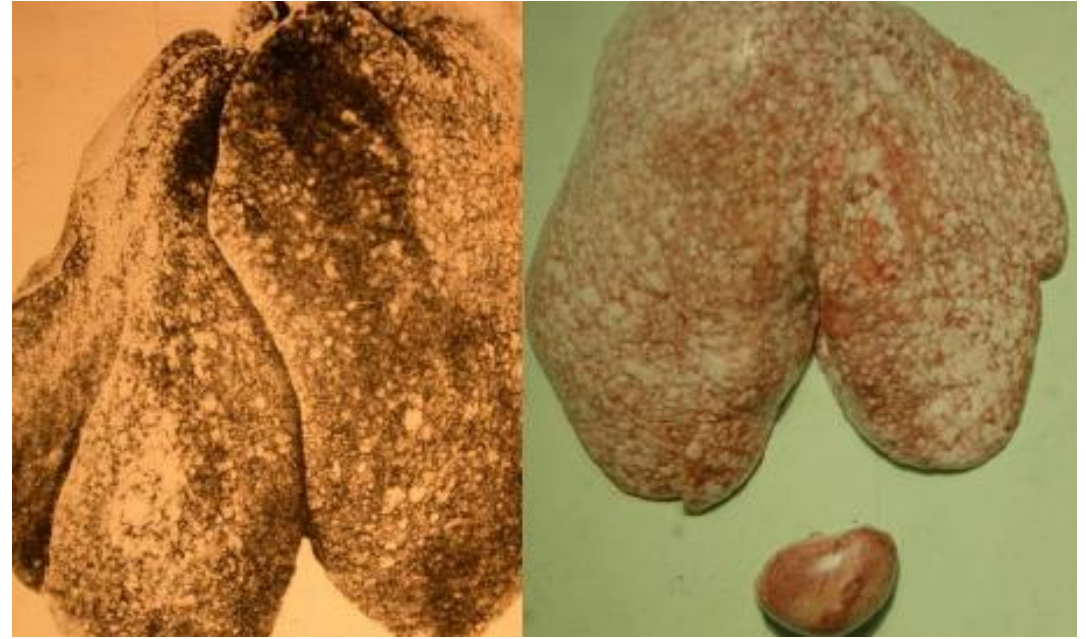
Atrophy of  
thymus



# “Big liver” disease







Retrovirus infection: Tumour in liver



# ALV infection



# ALV infection

*“A subclinical disease syndrome characterised by depressed egg production in the absence of tumour formation is economically more important than mortality from lymphoid leukaemia.”*



# Epidemiology

- **Widespread!**
- **Vertical:**
  - **Immunotolerance**
  - **Lifelong carrier animals**
  - **Germinative infection**
- **Horizontal infection (less important)**

# Laboratory Diagnosis

## Antigen / antibody detection

- ELISA
- Screening of blood donors
- Western Blotting
- COFAL test

## PCR

- Viral RNA or DNA provirus
- Blood or tissue specimens
- Quantitative PCR (viral load).





***Any questions ???***

**THANKS**