



# Diagnostic Exercise

From The Davis-Thompson Foundation\*

Case #: 86 Month: November Year: 2017

*Answer Sheet*

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**Follow-up questions:** Morphologic diagnoses; Differential diagnoses; Immunohistochemical findings given the probable etiology.

**Morphologic diagnoses:**

Bursa of Fabricius, liver, kidney, and other viscera (testicle, spleen, proventriculus): Lymphoma  
Kidney: Degeneration, tubular, multifocal, moderate, with luminal urates & mineral  
Ureters: Urate urolithiasis, bilateral, moderate, with biliverdinuria (gross diagnosis)

**Differential diagnoses:** Etiologies to consider include viral-induced lymphoproliferative neoplasia and spontaneous neoplasia of unknown etiology. Viruses to consider include Herpesviridae (Marek’s disease, Gallid herpesvirus 2) and Retroviridae (e.g. avian leukosis virus and reticuloendotheliosis).

<b>Marek’s disease</b>	<b>Avian leukosis</b>
Herpesvirus	Retrovirus
Affects T lymphocytes	Affects various hematopoietic cells (e.g. lymphoid leukosis is a B-cell lymphoma; ALV-J infects myeloid cells)
Younger birds (4 weeks), possible in older birds too	> 16 weeks old
Paralysis (neurolymphomatosis)	No paralysis
Liver, spleen, kidney, nerves, iris (gray eye or ocular lymphomatosis), skin (feather follicles)	Liver, spleen, kidney, bursa of Fabricius
Lymphoblast size variable	Lymphoblast size uniform
Possible intranuclear inclusion bodies	Never any intranuclear inclusion bodies
Table modified from JPC Systemic Pathology Nervous System May 2014 N-V08	

**Immunohistochemical findings given the probable etiology:** In this case, given the patient’s age (40 weeks), the uniform histological appearance of the round cells, the lack of nervous tissue

involvement, the intrafollicular involvement of the bursa of Fabricius, and no herpesvirus detected on PCR of the spleen, this is probably a retroviral lymphoid leukosis; with neoplastic cells therefore expected to be a B-cell immunophenotype.

**Typical gross findings:** Chicken older than 14 to 16 weeks with multifocal visceral lymphoma that involves the bursa of Fabricius and that generally spares the nervous system.

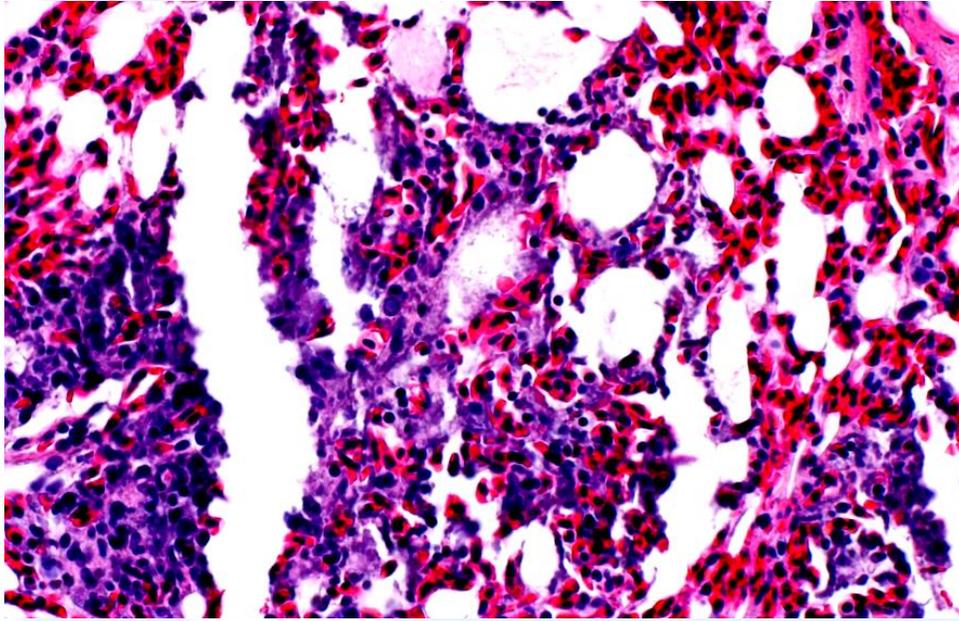
**Typical microscopic findings:** Uniform large lymphoblastic tumor cells that infiltrate intrafollicular bursal follicles or viscera following metastasis.

**Discussion:** Avian leukosis virus (ALV) in chickens is a member of the leukosis/sarcoma group of avian retroviruses and is classified into six ALV subgroups: A, B, C, D, E, J<sup>1</sup>. Exogenous ALVs (Subgroups A, B, C, D, J) can induce a variety of neoplasms, of which lymphoid leucosis (LL), a B-cell lymphoma of chickens, is the most common and usually attributed to subgroup A<sup>1</sup>. Other types of proliferative conditions include myeloblastosis, myelocytomatosis, hemangioma, erythroblastosis, osteopetrosis, and nephroblastoma<sup>1</sup>. Lymphoid leukosis originates in the follicles of the bursa of Fabricius and metastasizes to the viscera. The presence of enlarged lymphoid nodules in the bursa is considered nearly pathognomonic for LL<sup>1</sup>; however, Marek's disease can cause interfollicular diffuse bursal enlargement<sup>2</sup>, and reticuloendotheliosis virus can induce bursal lymphoma<sup>3</sup>. Because of the lengthy retroviral incubation period, neoplasms are infrequent in patients less than 14-16 weeks, which is helpful when trying to differentiate it from Marek's disease. Although much rarer, certain forms of reticuloendotheliosis virus infection (e.g. chronic B-cell lymphoma) can mimic the gross and microscopic lesions of lymphoid leukosis and require viral assays for definitive diagnosis.<sup>3</sup> Yet, in this case, given the ubiquitous nature of ALV, lymphoid leukosis is favored. The biliverdinuria in this case is attributed to hepatic lymphoma and the organ's subsequent dysfunction.

#### **References and Recommended literature:**

- 1) Fadly, AM. Isolation and identification of avian leukosis viruses: A review. Avian Pathology 2000 29(6): 529-535
- 2) JPC Systemic Pathology Integument System. January 2014. I-V13. [https://www.askjpc.org/vspo/show\\_page.php?id=422](https://www.askjpc.org/vspo/show_page.php?id=422)
- 3) Dunn, John. Reticuloendotheliosis in Poultry. Merck Manual Veterinary Manual. 2016. <http://www.merckvetmanual.com/poultry/neoplasms/reticuloendotheliosis-in-poultry>

Interesting histological finding (Figure 8): Focally, in one section of lung, amongst mild histiocytic and heterophilic inflammation, occupying air capillaries and obscuring the pulmonary parenchyma, there are spherical to wavy to branching strands of globular basophilic material. The material does not stain with special fungal stains and is determined to be mineral. Given this patient's urate urolithiasis and renal pathology, a "uremic pneumopathy"-like pathogenesis is speculated.



**Figure 8 - Lung. H&E. 40x objective.**

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