Diagnostic Exercise
From The Davis-Thompson Foundation*

Case #: 94 Month: April Year: 2018

Answer Sheet

Title: Canine, bone marrow, myelodysplastic syndrome.

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Morphologic Diagnosis: Bone marrow: Marrow hypercellularity with marked megakaryocytic proliferation and dysplasia; moderate, left-shifted, granulocytic hyperplasia; moderate erythroid hypoplasia; and moderate myelofibrosis (consistent with myelodysplastic syndrome).

Histologic Description: The bone marrow is markedly hypercellular with approximately 40% of the cell population being mature, dysplastic megakaryocytes, including numerous micro or dwarf megakaryocytes. These cells contain moderate to large amount of pale eosinophilic cytoplasm, a lobulated nucleus with finely stippled chromatin, and indistinct nucleoli. There is a
moderately increased number of granulocytic precursors, with a decrease in mature granulocytes. There is also a moderately decreased number of erythroid precursor cells. Small amounts of fibrous tissue are scattered amongst the cells (myelofibrosis).

**Immunohistochemistry:** Factor VIII (Von Willebrand Factor/vWF). The marrow is hypercellular with a marked increase in the number of megakaryocytes (Factor VIII immunoreactive) with abnormal morphology (dysplastic), including numerous micro or dwarf megakaryocytes, left-shifted granulocytic hyperplasia, and a hypoplastic erythroid population. These findings in combination with a severe, non-regenerative, macrocytic anemia, chronic neutropenia, and normal platelet count but markedly increased MPV (mean platelet volume) are indicative of MDS.
**Trichrome stain:** demonstrating scattered regions of fibrosis within the marrow space.

**Discussion:** Findings in the bone marrow along with the clinical history and clinical pathology findings are consistent with the diagnosis of a primary Myelodysplastic Syndrome (MDS). MDS is a neoplastic disease of ill-defined pathogenesis in animals. Primary MDS is characterized by peripheral cytopenia(s) in one or more cell lineages along with dysplastic changes in the marrow and blood, as well as evidence of ineffective hematopoiesis that typically occurs in conjunction with a hypercellular bone marrow. This bone marrow was hypercellular and had a markedly increased number of dysplastic megakaryocytes, including numerous micro or dwarf megakaryocytes, left shifted granulocytic hyperplasia, and a hypoplastic erythroid population. These findings in combination with a severe, non-regenerative, macrocytic anemia, chronic neutropenia, and normal platelet count but markedly increased MPV (mean platelet volume) are indicative of MDS. There are numerous types of primary MDS in people, but MDS is poorly characterized in animals. The marrow morphologic findings and the clinical history of macrocytic, non-regenerative anemia are comparable to a form of MDS in humans known as myelodysplastic syndrome with isolated del(5q). This condition is associated with loss of a tumor suppressor gene in the deleted region. However, whether this is similar in dogs is unknown.
References:


*The Diagnostic Exercises are an initiative of the **Latin Comparative Pathology Group (LCPG)**, the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website (http://www.cldavis.org/diagnostic_exercises.html).

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