WSC 2021-2022
Conference 23, Case 1.

Tissue from a red-chested mustached tamarin.

MICROSCOPIC DESCRIPTION: Ileum **(1pt)**: Focally embedded in the smooth muscle of the intestinal wall **(1pt)**, there is a single adult acanthocephalid **(1pt)** which is 1.2 mm in diameter, has a thin, ridged, outer cuticle and a thick hypodermis (up to 150 um) **(1pt)** composed of an outer felted layer and cross fibers containing lacunae, outer circular and inner longitudinal muscle layers, **(1pt)** and a pseudocoelom containing lemnisci with compressor muscles which contains cross sections of uterus and eggs. **(1pt)** The anterior segment of the acanthacephalid is surrounded by a thin layer of cellular debris and innumerable bacilli **(1pt)** bounded by necrotic muscularis and submucosa infiltrated by numerous degenerate neutrophils **(1pt)** and eosinophils and lymphocytes, few siderophages and multinucleated giant cell macrophages **(1pt)**, and small amounts of hemorrhage and fibrin. The adjacent muscularis contains few remnant fragmented and atrophic smooth muscle cells separated by fibroblasts and abundant mature collagen. **(1pt)** The underlying serosa is also diffusely expanded by loosely arranged edematous mature collagen interspersed by fibroblasts **(1pt)**and a smaller population of primarily lymphocytes and macrophages. The lamina propria of the overlying mucosa is mildly expanded by increased numbers of lymphocytes, plasma cells, macrophages, neutrophils and eosinophils which multifocally infiltrate the muscularis mucosa and superficial submucosa. **(1pt)** Crypts are multifocally dilated and contain cellular debris. Overlying the mucosa and lining the attachment site, there is a thick layer of bacteria **(1pt)** throughout which are interspersed numerous oval acanthocephalid eggs **(1pt)** with spindled ends, a thick brown shell, small amounts of eosinophilic cytoplasm, and a large brown nucleus.

MORPHOLOGIC DIAGNOSIS: Ileum: Enteritis, and pyogranulomatous **(1pt)**, focal, chronic, with marked submucosal, muscular, and serosal **(1pt)** and adult acanthocephalan **(1pt)** with eggs. **(1pt)**

CAUSE: *Prosthenorchis elegans* **(2pt)**

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O/C: **(1pt)**

WSC 2021-2022
Conference 25, Case 2.
Tissue from a dog.

MICROSCOPIC DESCRIPTION: Liver: Multifocally, portal areas are expanded by abundant fibrous connective tissue **(1pt.)** containing variable combinations and concentrations of spindled to epithelioid macrophages **(1pt.)**, neutrophils **(1pt.)** , lymphocytes, plasma cells and rare eosinophils **(1pt.)** and multinucleated giant cell macrophages admixed with plump fibroblasts. Macrophages often contain a brown granular pigment (degenerated heme pigments). This inflammation is often centered on single or rarely clusters of trematode eggs **(1pt.)** which are irregularly oval, up to 110 um in diameter , and are non-operculated, with a 2um thick brown shell and contain a miracidium **(1pt.)** Often, eggs are mineralized **(1pt.).** There is mild diffuse biliary hyperplasia (ductular reaction). Portal fibrous connective tissue often extends into the surrounding hepatic parenchyma. There are small nodular aggregates of macrophages and individual sinusoidal Kupffer cells within the hepatic parenchyma which contain a granular dark brown to black pigment similar to that within portal areas **(1pt.)**. Within a hepatic vein, there is a 150 cm diameter cross section of an adult trematode **(1pt.)** which has a ridged cuticle, a spongy body cavity with numerous somatic cells, a gynecophoric canal and multiple cross sections of a gastrointestinal tract containing heme pigment and cross sections of testes and with developing sperm. **(1pt.)** Within the hepatic parenchyma, hepatocytes are mildly swollen by accumulation of cytoplasmic glycogen.

Small intestine: Multifocally within the lamina propria and submucosa, there are numerous trematode eggs **(1pt.)** within clear spaces (artifact). The eggs are surrounded by epithelioid macrophages and occasionally multinucleated giant cell macrophages, admixed with moderate numbers of plasma cells and fewer lymphocytes. Eggs are irregularly oval, up to 110 um in diameter, and are non-operculated, with a 2um thick brown shell and contain a miracidium. The lamina propria surrounding eggs is midly expanded by a low numbers of neutrophils lymphocytes, and eosinophils as compared to the remainder of the lamina propria, and there is diffuse mild proprial edema with dilation of lymphocytes within villi and the remainder of the lamina propria. **(1pt.)** Eggs within the submucosa are surrounded by several layers of spindled macrophages. **(1pt.)** Eggs are also present in perivascular areas between the circular and longitudinal smooth muscle layers.

MORPHOLOGIC DIAGNOSIS: 1. Liver: Hepatitis, portal, granulomatous **(1pt.)**, chronic, diffuse, marked with numerous trematode eggs **(1pt.)** nodular hemosiderosis and an intravascular adult schistosome. **(1pt.)**

2. Small intestine: Enteritis, granulomatous **(1pt.)** , multifocal, moderate with numerous mucosal and submucosal trematode eggs. **(1pt.)**

CAUSE: *Heterobilharzia americana* **(2pt.)**

WSC 2021-2022
Conference 25, Case 3
Tissue from an opossum.

MICROSCOPIC DESCRIPTION: Lung: Diffusely, bronchioles are expanded and filled with variable combinations and concentrations of the following: foamy macrophages **(1pt.)**, neutrophils **(1pt.)** , fewer lymphocytes and plasma cells, mucus **(1pt.),** fibrin, edema fluid, and cellular debris, as well as numerous cross sections of both males and female adult **(1pt.)** metastrongyle **(1pt.)** nematodes, larvae, and embryonated eggs **(1pt.)**. The adult nematodes are 300-400um in diameter **(1pt.)** and have a 5-10 um thick outer cuticle with small ridges **(1pt.)**, a pseudocoelom lined by coelomyarian-polymyarian musculature and prominent lateral cords, a large intestine lined by few uninucleate cells, an ovary, and a paired uterus contain numerous morulated and larvated eggs **(1pt.)**. Larvae are 10-12 um in diameter with numerous somatic cell nuclei. Nematodes are also present within adjacent alveoli.Multifocally, bronchiolar epithelium is hyperplastic **(1pt.)**, characterized by piling of epithelium (up to 5 layers), and is often sloughed, necrotic, or absent, and is often infiltrated by low to moderate numbers of lymphocytes, plasma cells and eosinophils, with lesser numbers of histiocytes and macrophages, which are also present within the submucosa **(1pt.)**. There is marked smooth muscle hyperplasia **(1pt.)** resulting in tortuosity, as well as hyperplasia of bronchiolar-associated lymphoid tissue **(1pt.)**. There is marked hyperplasia of submucosal glands surrounding bronchioles. Alveolar spaces are multifocally filled with variable combinations and concentrations of foamy macrophages, multinucleated foreign body macrophages **(1pt.)**, neutrophils, lymphocytes, admixed with cellular debris and moderate numbers of metastrongyle larvae. Multifocally, alveolar septa are expanded by macrophages, fewer neutrophils lymphocytes and plasma cells, edema, and mild fibrosis **(1pt.)**. There is mild edema within the pleura and interlobular septa. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: Lung: Bronchopneumonia **(1pt.),** granulomatous **(1pt.)** and lymphoplasmacytic, diffuse, severe with marked smooth muscle hyperplasia, BALT hyperplasia, and metastrongyle adults, larvae, and eggs. **(1pt.)**

O/C**: (1pt.)**

WSC 2021-2022 Conference 25
Case 4. Tissue from a raccoon.

MICROSCOPIC DESCRIPTION: Lung: Scattered throughout the section are foci of granulomatous **(1pt.)** inflammation centered on numerous adiasporess**(1pt.)** which range up to 250um **(1pt.)** with a thick hyaline bilayered cell wall **(1pt.)** consisting of a 6-8um trilaminar outer wall **(1pt.)** and an 80um amphophilic inner wall. Inside the cell wall, the cytoplasm is deeply basophilic **(1pt.)** and granular (adiaspores) **(1pt.)**. Adiaspores are surrounded by varying combinations and concentrations of epithelioid macrophages **(1pt.)**, eosinophils **(1pt.)**, lymphocytes and plasma cells, and rare multinucleated giant cell macrophages **(1pt.)**, admixed with small amounts of cellular debris. Granulomas are contained by lamellae of compressed alveolar walls. Rarely, adiaspores are ruptured and infiltrated by macrophages. **(1pt.)** Diffusely, alveolar walls **(1pt.)** are compressed (atelectasis) and are diffusely expanded by variable combinations and concentrations of histiocytes **(1pt.)** and fewer neutrophils admixed with hemorrhage, edema, and fibrin, and small amounts of mature collagen and cellular debris. **(1pt.)** There are rare aggregates of macrophages containing anthracolsilicotic pigments adjacent to airways.

MORPHOLOGIC DIAGNOSIS: 1. Lung: Pneumonia, granulomatous **(1pt.)**, chronic diffuse, severe, with numerous yeasts. **(1pt.)**
2. Lung: Pneumonia, interstitial, histiocytic, diffuse, moderate. **(1pt.)**

CAUSE: *Emmonsia* sp. **(2pt.)**

O/C: **(1pt.)**

(Note: This raccoon was co-infected with canine distemper, but the inclusions are so rare, I gave no points to finding them – but there is an interstitial pneumonia.)