

Case 1. Tissue from a cat.

MICRSCOPIC DESCRIPTION: Small intestine: The intestinal wall (with the exception of the mucosa) **(1pt)** is circumferentially and asymmetrically **(1pt)** thickened by abundant fibrosis, throughout which are scattered poorly demarcated areas of granulomatous and necrotizing inflammation. The majority of the mural thickening is the result of numerous plump fibroblasts **(1pt)** and proliferating blood vessels **(1pt)** with hypertrophic endothelium, which surround and separate pre-existing collagen fibers and smooth muscle within these areas. Scattered throughout are inflammatory foci centered on cores of abundant necrotic debris **(1pt)** which occasionally contain negative images of 6-8um diameter hyphae **(1pt)** with non-parallel walls, few if any septations **(1pt)**, and non-dichotomous irregular branching **(2pt)**. Necrotic foci are in turn surrounded by numerous, often degenerate epithelioid macrophages **(1pt)**, eosinophils **(1pt)**, and neutrophils, admixed with rare multinucleated giant cell macrophages and cellular debris. Scattered throughout the section are several large caliber arteries and veins, whose walls are necrotic as well as infiltrated by large masses of hyphae. **(1 pt.)**

The inflammatory change extend into and efface the adjacent mesentery. **(1pt)** Mucosal changes are minimal with small amounts of edema at the villar tips.

MORPHOLOGIC DIAGNOSIS: 1. Small intestine: Enteritis, granulomatous and eosinophilic, circumferential, multifocal to coalescing, chronic, with moderate numbers of hyphae. **(2pt)**

2. Mesentery: Peritonitis, granulomatous and eosinophilic, circumferential, multifocal to coalescing, chronic, with moderate numbers of hyphae. **(1pt)**

CAUSE: *Pythium insidiosum*, *Lagenidium sp.* and various species of zygomycetes fungi **(3pt)**

O/C: (1pt)

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Case 2. Tissue from a dog.

MICROSCOPIC DESCRIPTION: Small intestine. The serosa and mesentery **(1 pt.)** is markedly expanded and multifocally effaced by multifocal to coalescing foci of granulomatous **(1 pt.)** inflammation ranging up to 500 um in diameter and are centered on areas of necrotic fat **(1 pt.)**. The foci are composed of a central area of homogenous to granular, amphophilic to eosinophilic nuclear and cellular debris **(1 pt.)** which is surrounded by large numbers of lipophages **(1 pt.)** (polymorphic foamy macrophages with numerous clear intracytoplasmic vacuoles) **(1 pt.)** admixed with lesser numbers of neutrophils, lymphocytes, rare plasma cells, and abundant cellular and nuclear debris **(1 pt.)**. Separating these areas of granulomatous inflammation is a mixture of mature fibrous connective tissue and granulation tissue. **(1 pt.)** Similar, but far less severe changes are present around lymphatics within the muscularis and submucosa **(1 pt.)**, and the fibrous connective tissue of these layers is moderately edematous. Blood vessels are often congested and contain increased numbers of circulating and marginated neutrophils. The lamina propria, is edematous all the way out to villar tips **(1 pt.)**; clear space and dilated lymphatics separate crypts. Villi are diffusely blunted **(1 pt.)**, and at the tip, there is occasional hemorrhage and small numbers of neutrophils and macrophages admixed with small amounts of cellular debris. Crypts occasionally are mildly dilated and contain low numbers of necrotic enterocytes, foamy macrophages, and eosinophilic cellular debris **(1 pt.)** (crypt abscesses). **(1 pt.)**

MORPHOLOGIC DIAGNOSIS: Small intestine and mesentery, lymphatics : Lymphangitis, lipogranulomatous, diffuse, severe, with edema, lymphangiectasia and crypt abscesses. **(3 pt.)**

NAME THE CONDITION: Intestinal lymphangiectasia **(2 pt.)**

NAME AN AFFECTED BREED: Soft-coated wheaten terrier, Yorkshire terrier, Norwegian Lundehund **(1pt)**

O/C: (1 pt.)

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Case 3. Tissue from a cat.

MICROSCOPIC DESCRIPTION: Bone marrow **(1 pt.):** Within the bone marrow, there is a moderately cellular, poorly demarcated, unencapsulated, infiltrative neoplasm **(1 pt.)** composed of neoplastic plasma cells **(1 pt.)** arranged in sheets **(1 pt.)** on pre-existent stroma **(1 pt.)**. Neoplastic cells are round, with distinct cell borders, and a moderate amount of dark purple cytoplasm **(1 pt.)**, often with a prominent light pink perinuclear hoff **(1 pt.)**. Nuclei are eccentric, round and have coarsely clumped chromatin with indistinct nucleoli **(1 pt.)**. Mitotic figures are rare **(1 pt.)**. The remaining bone marrow is normocellular **(1 pt.)** at low magnification with adequate fat reserves **(1 pt.)**, and cells of all lineages are present in normal numbers **(1 pt.)**.

MORPHOLOGIC DIAGNOSIS: Bone marrow: Plasma cell myeloma (myeloma and multiple myeloma also acceptable terms) **(4pt)**

Name three expected clinicopathologic findings: Hyperproteinemia, proteinuria, hyperglobulinemia, hypercalcemia, monoclonal gammopathy, Bence-Jones proteinuria , hypocholesterolemia **(3 pts.)**

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

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Case 4. Tissue from a dog.

MICROSCOPIC DESCRIPTION: Gingiva with erupted deciduous tooth and developing permanent tooth (**2 pt.**): There is multifocal and segmental degeneration and necrosis of the ameloblasts (**1 pt.**) of the inner enamel epithelium (**1 pt.**) and the stratum intermedium (**1 pt.**) which line the enamel of the developing tooth. Within affected areas, degenerate (**1 pt.**) ameloblasts exhibit a distinct loss of polarity, are markedly swollen and pale (intracellular edema) (**1 pt.**), and many are shrunken and brightly eosinophilic with pyknotic or karyorrhectic nuclei (necrosis) (**1 pt.**). Swollen ameloblasts often contain one to several 2-4um round, red intracytoplasmic (**1 pt.**) viral inclusions (**1 pt.**), and rare multinucleated viral syncytial cells (**2 pt.**) are present within this populations. In areas of necrosis, small vesicles of necrotic cell debris and dark pink proteinaceous fluid are contained within the layer of ameloblasts and also between the ameloblasts and adjacent enamel. (**1 pt.**) The overlying enamel has an irregular, convoluted edge (**1 pt.**) in apposition with degenerate/necrotic ameloblasts. There is rare degeneration and necrosis of odontoblasts.

MORPHOLOGIC DIAGNOSIS: Developing tooth, stratum intermedium and inner enamel epithelium: Degeneration and necrosis, multifocal, moderate to severe with intracytoplasmic viral inclusions and multinucleated viral syncytia. (**4 pt.**)

CAUSE: Canine morbillivirus (**3 pt.**)

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