

Case 1. Tissue from a piglet.

MICROSCOPIC DESCRIPTION: Liver: There is massive hepatocellular necrosis and loss **(1pt)** which effaces normal hepatic plate architecture. There is diffuse stromal collapse **(1pt)**. Remaining hepatocytes are markedly swollen **(1pt)** and have abundant cytoplasm with innumerable variably sized discrete lipid vacuoles **(1pt)**. Nuclei in these hepatocytes are centrally located and often have clumped chromatin (degeneration.) Sinusoids are markedly dilated, congested and contains numerous foamy vacuolated macrophages **(1pt)** and eosinophils **(1pt)** (often in clusters) fewer lymphocytes and neutrophils, admixed with shrunken, necrotic hepatocytes. Portal triads are expanded **(1pt)** by large numbers of lymphocytes and macrophages as well as fewer plasma cells, neutrophils, and eosinophils. (Note: the apparent fibrosis of portal areas is likely just artifactual due to surrounding stromal collapse.) Multifocally, epithelium lining biliary ductules is multifocally degenerate and/or necrotic **(1pt)**. There are multifocal areas of extramedullary hematopoiesis scattered throughout the section.

Lymph node: There is diffuse loss of lymphocytes **(1pt)** in all areas of the node. Approximately 40% of the cortex is replaced by large aggregates of epithelioid macrophages **(1pt)** admixed with fewer lymphocytes, eosinophils and rare neutrophils, admixed with moderate numbers of cellular debris. Occasionally, macrophages contain a single 4-6µm light basophilic botryoid inclusion **(2pt)**. Vessels throughout the nodes are diffusely congested.

MORPHOLOGIC DIAGNOSIS:

1. Liver: Hepatitis, necrotizing and granulomatous, massive, severe. **(2pt)**
2. Lymph node: Lymphadenitis, granulomatous, diffuse, moderate, with intrahistiocytic intracytoplasmic viral inclusions. **(2pt)**

CAUSE: Porcine circovirus type 2 **(3pt)**

O/C - (1pt)

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Case 2. Tissue from a cat.

MICROSCOPIC DESCRIPTION: Spinal cord, transverse section: Diffusely and circumferentially **(1pt.)**, the leptomeninges are moderately expanded **(1pt.)** by large numbers of neutrophils **(2pt.)** and macrophages **(2pt.)** admixed with lesser numbers of lymphocytes, edema, strands or mats of polymerized fibrin **(2pt.)**, and cellular debris **(1pt.)**. Multifocally, this infiltrate is centered around meningeal vessels, whose wall are expanded by infiltrating neutrophils and fewer macrophages, which are admixed with cellular debris and dense mats of fibrin (vasculitis) **(2pt.)**. The infiltrate also surrounds and occasionally infiltrates spinal nerves **(2pt.)**. Rarely, within spinal nerves and in the most peripheral areas of the spinal cord, myelin sheaths are dilated and axons are mildly dilated.

MORPHOLOGIC DIAGNOSIS: Spinal cord, meninges: Vasculitis and meningitis, pyogranulomatous, diffuse, severe. **(3pt.)**

CAUSE: Mutated feline coronavirus **(3pt.)**

O/C: (1pt.)

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Case 3. Tissue from a chicken

MICROSCOPIC DESCRIPTION: Feathered skin with mucous membrane (eyelid): Multifocally, the stratified squamous epithelium is thickened up to ten times normal, with marked hypertrophy and hyperplasia **(1pt)** of epithelial cells within the stratum spinosum. Affected epithelial cells are markedly swollen with abundant granular to vacuolated eosinophilic cytoplasm **(1pt)** (ballooning degeneration) **(1pt)** and often contain one to several 2-6µm round brightly eosinophilic intracytoplasmic viral inclusions **(1pt)** (Bollinger bodies) **(1pt)**. Nuclei are irregularly round with finely stippled chromatin and a single prominent basophilic nucleolus. At the periphery of the hyperplastic areas, to include the stratum granulosum and corneum, keratinocytes are shrunken and hypereosinophilic with pyknotic nuclei (necrosis) **(1pt)**, and are admixed with large numbers of viable and degenerate heterophils **(1pt)**, edema, and cellular debris (which occasionally form pustules) **(1pt)**. Overlying the epidermis, there is a thick serocellular crust **(1pt)** composed of abundant eosinophilic keratin debris, numerous degenerate neutrophils, feather detritus, edema, hemorrhage, and cellular debris. Underlying the ulcerated epidermis, the edematous superficial dermis contains numerous heterophils, histiocytes, and lymphocytes **(1pt)**. Dermal vessels occasionally contain fibrinocellular thrombi **(1pt)**, and the deep dermis, central to the section, contains numerous histiocytes **(1pt)**. The submucosal fibrous connective tissue is infiltrated by moderate numbers of lymphocytes and heterophils which infiltrate the overlying moderately hyperplastic **(1pt)** mucosal epithelium. There are multifocal heterophilic pustules within the hyperplastic mucosal epithelium, as well as multifocal areas of ballooning degeneration of virally infected cells with Bollinger bodies. **(1pt)**

MORPHOLOGIC DIAGNOSIS: Eyelid, feathered and mucosal epithelium: Dermatitis and conjunctivitis, necrotizing and proliferative, subacute, multifocal, moderate, with ballooning degeneration, hemorrhage, and eosinophilic intracytoplasmic inclusion bodies. **(3pt)**

CAUSE: Avian poxivirus **(2pt)**

O/C - (1pt)

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Case 4. Tissue from a pig.

MICROSCOPIC DESCRIPTION:

Lung: Approximately 90% of alveoli **(1 pt.)** are expanded by variable combinations and concentrations of viable and degenerate neutrophils **(1 pt.)**, foamy alveolar macrophages **(1 pt.)**, edema **(1 pt.)** admixed with cellular debris. Alveolar septa are hypercellular **(1 pt.)** and expanded by moderate numbers of neutrophils, macrophages, small amounts of edema fluid, and hyperplastic type II pneumocytes **(1 pt.)**. Airways **(1 pt.)** and to a lesser extent, vessels **(1 pt.)** are surrounded by dense cuffs of lymphocytes **(1 pt.)** which occasionally transmigrate the mildly hyperplastic **(1 pt.)** epithelium. There is marked hyperplasia of bronchiolar-associated lymphoid tissue **(2 pt.)**, and airways contain a similar exudate to that seen in alveoli **(1 pt.)** (likely refluxed).

MORPHOLOGIC DIAGNOSIS: Lung: Pneumonia, bronchointerstitial, neutrophilic and lymphocytic, chronic, diffuse, severe, with marked BAL hyperplasia. **(3pt.)**

CAUSE: *Mycoplasma hyopneumoniae* **(3 pt.)**

O/C: (1 pt.)