

Case 1 – Tissue from a pig.

MICROSCOPIC DESCRIPTION: Lung: Diffusely, alveolar septa **(1pt)** are expanded by variable combinations and concentrations of hypertrophied pulmonary intravascular macrophages, circulating neutrophils, congested capillaries, edema, and small amounts of fibrin. Randomly throughout the lung, there are patchy areas of alveolar consolidation in which alveoli **(1pt)** are filled and expanded by variable combinations and combinations of neutrophils, foamy alveolar macrophages, edema, fibrin, and small amounts of cellular debris. Occasional macrophages are multinucleated **(1pt)**, and rare Langhans type macrophages are present - macrophages often contain ingested debris and neutrophils. Scattered throughout the alveoli and rarely airways, are small colonies of 2-3um coccobacilli. **(1pt)** The wall of a large vessel **(1pt)** is effaced by innumerable viable and degenerate neutrophils, cellular debris, and fewer macrophages which surround numerous 2-4 diameter, dichotomously branching, septate basophilic hyphae **(1pt)**. Throughout the section, airway lumina often contain moderate numbers of neutrophils and fewer macrophages refluxed **(1pt)** from surrounding alveoli, and BALT is diffusely and markedly diminished. **(1pt)** Multifocally, within the minimal remaining BALT, macrophages contain basophilic botryoid intracytoplasmic inclusions. **(1pt)** Interlobular septa **(1pt)** are diffusely and moderately expanded by edema, fibrin and moderate numbers of neutrophils and fewer macrophages, and the lumina of interlobular lymphatics **(1pt)** is expanded by numerous viable and degenerate neutrophils, fewer macrophages, and cellular debris.

MORPHOLOGIC DIAGNOSIS:

1. Lung: Pneumonia, interstitial, **(1pt)** necrotizing, diffuse, moderate, with diffuse severe BALT depletion, rare intrahistiocytic botryoid inclusions, and rare multinucleated macrophages. **(1pt)**
2. Lung: Bronchopneumonia **(1pt)**, suppurative and histocytic, multifoal to coalescing, moderate with rare intra- and extracellular bacilli. **(1pt)**
3. Lung: Arteritis, necrotizing, focally extensive, severe, with intraluminal fungal hyphae. **(1pt)**

CAUSE: Porcine circovirus-2 **(1pt)**, *Pasteurella multocida*, *Strep suis* (*Hemophilus hyorhinis* or *Actinobacillus suis* or pleuropneumonia acceptable as well) **(1pt)** and *Aspergillus* sp. **(1pt)**

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

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Case 2 – Tissue from an ox.

MICROSCOPIC DESCRIPTION: Lung: Diffusely alveoli are filled and expanded **(1pt)** by variable combinations and concentrations of neutrophils **(1pt)**, macrophages **(1pt)**, abundant edema **(1pt)**, polymerized fibrin **(1pt)**, and small amounts of cellular debris. Alveolar septa are mildly expanded **(1pt)** by congested capillaries, circulated neutrophils, and patchy Type II pneumocyte hyperplasia **(1pt)**, and multifocal, there is septal necrosis **(1pt)** characterized by a loss of the outline of alveolar septa and replacement by degenerate neutrophils and cellular debris. Airways are filled with moderate numbers of viable and degenerate neutrophils, **(1pt)** fewer macrophages, and cellular debris and there is multifocal necrosis of airway epithelium **(1pt)**, ranging from segmental, to in smaller airways, diffuse., and inflammatory cells often infiltrate underlying smooth muscle. Scattered through the sections there are increased numbers of lymphocytes, plasma cells surrounding or adjacent to airways and vessels., and which extend out into the peribronchial or perivascular tissues. **(1pt)** Interlobular fibrous connective tissue is expanded by mild edema **(1pt)** and infiltrated by low numbers of macrophages, lymphocytes, and rare neutrophils. Rare multinucleate macrophages are present within alveoli. **(1pt)**

MORPHOLOGIC DIAGNOSIS: Lung: Pneumonia, bronchointerstitial **(1pt)**, necrotizing **(1pt)** and fibrinosuppurative **(1pt)**, diffuse, moderate with rare alveolar and bronchiolar viral syncytia with intracytoplasmic viral inclusions. **(1pt)**

Cause: Bovine paramyxoviruses (BRSV or PI-3 OK) **(2pt)**

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

Case 3 – Tissue from a pig.

MICROSCOPIC DESCRIPTION: Lung: There are multifocal to coalescing well-demarcated areas of lytic necrosis **(1pt)** scattered randomly throughout the section affecting airways **(1pt)** and adjacent alveoli. Foci of lytic necrosis are centered on large colonies of 2-3um bacilli **(1pt)**, which are surrounded by large numbers of degenerate neutrophils **(1pt)** and abundant cellular debris which effaces underlying pulmonary architecture. Surrounding alveoli contain large numbers of degenerate and rarely viable neutrophils whose nuclei are often elongate and streaming (oat cells). Larger areas of necrosis are often characterized by maintenance of pulmonary architecture but loss of differential staining and nuclear fading (coagulative necrosis) **(1pt)**. Between areas of necrosis, affected alveoli are expanded by variable combinations and concentration of edema fluid, polymerized fibrin, hemorrhage, macrophages, fewer neutrophils, cellular debris, and occasional bacterial colonies. **(1pt)** Airways often contain large confluent areas of epithelial necrosis and sloughing, and their lumina are filled with abundant neutrophils, bacterial colonies and cellular debris. Interlobular septa are expanded by moderate edema, polymerized fibrin, dilated lymphatics, and few macrophages. Vessels of all sizes often contain fibrinocellular thrombi. **(1pt)**

Liver: Scattered throughout the sinusoids are foci of lytic necrosis **(1pt)** characterized by small aggregates of degenerate neutrophils **(1pt)** and cellular debris admixed with hemorrhage and polymerized fibrin. In other areas, bacterial colonies **(1pt)** similar to those in the lung are present within sinusoids. Scattered randomly throughout the section are large areas of hepatocytes (which occasionally encompass entire lobules) in which hepatocytes have lost differential staining. These areas contain bacterial colonies similar to those seen in the lung, but also large filamentous bacilli (post-mortem overgrowth – similar bacilli are present within vessels as well). Rare multinucleated cells are present within sinusoids.

Lymph node: There is marked lymphoid depletion **(1pt)** with infiltration of pre-existent follicles with moderate number of macrophages. Sinuses are markedly expanded by edema, hemorrhage **(1pt)** and polymerized fibrin, and often contain bacterial colonies as previously described. Macrophages occasionally contain bacilli within their cytoplasm. Occasional multinucleated cells **(1pt)** are present within sinuses.

MICROSCOPIC DIAGNOSIS: 1. Lung: Bronchopneumonia, necrotizing **(1pt)**, multifocal to coalescing, severe, with numerous bacterial colonies. **(1pt)**

2. Liver: Hepatitis, necrotizing, multifocal, mild to moderate, with occasional bacterial colonies. **(1pt)**

3. Lymph node: Lymphoid depletion, diffuse, severe, with histiocytic inflammation, hemorrhage, edema, and occasional bacterial colonies. **(1pt)**

CAUSE: (Any extremely hot gram-negative – Salmonella is a great one.) **(2pt)**

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

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Case 4 – Tissue from a pig.

MICROSCOPIC DESCRIPTION: Spleen: There is marked lymphoid depletion within splenic PALS **(1pt)**, with moderate numbers of tingible body macrophages **(1pt)** and rare mitotic figures **(1pt)**. Multifocally within splenic red pulp, arterioles **(1pt)** contain fibrin thrombi **(1pt)**, and occasionally, walls are infiltrated by low to moderate numbers of neutrophils **(1pt)** and fewer macrophages **(1pt)**, which are admixed with cellular debris and extruded protein **(1pt)** (fibrinoid necrosis) **(1pt)**. The surrounding red pulp is hypocellular, often expanded by polymerized fibrin **(1pt)** and hemorrhage **(1pt)**, and occasionally contains extensive areas in which cells have lost differential staining (infarct) **(2pt)**. There are rare multinucleated macrophages **(1pt)** scattered throughout the section. There is multifocal moderate mesothelial hyperplasia.

MORPHOLOGIC DIAGNOSIS: 1. Spleen, red pulp: Arteritis **(1pt)**, necrotizing **(1pt)**, multifocal to coalescing with multifocal infarcts **(1pt)**.

2. Spleen, white pulp: Lymphoid depletion, diffuse, severe. **(1pt.)**

CAUSE: Porcine pestivirus or asfarvirus **(2pt.)**

O/C: (1pt.)