

Case 1. Tissue from an ox.

**MICROSCOPIC DESCRIPTION:** Liver: Diffusely, there is necrosis (**1 pt**) of hepatocytes within all areas of the lobule (**1 pt**) (massive necrosis) (**2 pt**). There is also centrilobular hemorrhage (**1 pt**) as well as hypertrophic Kupffer cells and moderate amounts of cellular debris throughout the entirety of the lobule (**1 pt**). Remaining hepatocytes, primarily in the immediate portal areas (**1 pt**) are individualized and swollen (**1 pt**) with granular eosinophilic cytoplasm (**1 pt**), one to multiple clear cytoplasmic vacuoles (**1 pt**) (degeneration) (**1 pt**). Within portal areas, there are small to moderate numbers of lymphocytes and plasma cells as well as mild hyperplasia of bile ductules (ductular reaction) (**2 pt**) and hypertrophy of biliary epithelium.

**MORPHOLOGIC DIAGNOSIS:** Liver: Necrosis, massive, diffuse, with hemorrhage (**3 pt**).

**CAUSE:** Sawfly larvae (other acceptable possibilities – *Microcystin* toxicity, *Amanita*, cocklebur, cycad, or iron toxicosis (**3 pt**))

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

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Case 2. Tissue from a miniature horse.

**MICROSCOPIC DESCRIPTION:** Liver: Multifocally and randomly **(1 pt)** scattered throughout the liver, there are foci of lytic **(1 pt)** and coagulative **(1 pt)** of hepatocytes. Within these areas, hepatocytes are lost and replaced with abundant eosinophilic cellular debris **(1 pt)**, hemorrhage, and fibrin. Surrounding these areas, hepatocytes are hypereosinophilic, and shrunken **(1 pt)** (degenerate) **(1 pt)**, often with pyknotic or karyorrhectic nuclei (necrosis) **(1 pt)**. These remaining hepatocytes are individualized and separated by large numbers of viable and degenerate neutrophils **(1 pt)** and cellular debris, **(1 pt)** as well as hypertrophied spindle cells (interpretation of either stellate cells or myofibroblasts OK) **(1 pt)**, fibrin, hemorrhage, and edema. At the edges of the necrotic areas, occasional hepatocytes contain small numbers of faint elongate 1-3um **(1 pt)** filamentous bacilli **(1 pt)** within their cytoplasm **(1 pt)**. Remaining sinusoids are multifocally congested. There is edema within portal areas as well as in the capsule.

**MORPHOLOGIC DIAGNOSIS:** Liver: Hepatitis, necrotizing, multifocal to coalescing, severe, with intracytoplasmic filamentous bacilli. **(3 pt)**

**CAUSE:** *Clostridium piliforme* **(4 pt)**

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

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Case 3. Tissue from a mouse.

**MICROSCOPIC DESCRIPTION:** Liver: There are random **(1 pt)** multifocal **(1 pt)** variably-sized areas of lytic **(1 pt)** necrosis **(1 pt)** scattered throughout the liver, in which hepatocytes are individualized and swollen **(1 pt)**, with eosinophilic hyalinized cytoplasm and pyknotic to karyorrhectic nuclei **(1 pt)**. Areas of necrosis contain variable combinations and concentrations of viable and degenerate neutrophils **(1 pt)** admixed with fewer lymphocytes, rare histiocytes, and moderate amounts of cellular debris **(1 pt)**. In older areas, fibrocytes within sinusoids are hypertrophic. There are rare scattered multinucleated hepatocytes **(2 pt)** which are occasionally necrotic **(1 pt)** as well. Scattered throughout the section, most commonly in portal areas, are aggregates of immature leukocytes (EMH) **(2 pt)**.

**MORPHOLOGIC DIAGNOSIS:** Liver: Hepatitis, necrotizing, multifocal, moderate, with viral syncytia **(3 pt)**

**CAUSE:** Mouse polytropic coronavirus (Mouse hepatitis virus) **(3 pt)**

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

WSC 2012-2013, Conference 15

Case 4. Tissue from a sugar glider.

**MICROSCOPIC DESCRIPTION:** Liver: Multifocally, there are variably-sized areas of necrosis **(1 pt)** scattered randomly **(1 pt)** throughout the liver. Areas of necrosis contain central areas of lytic necrosis **(1 pt)**, composed of brightly eosinophilic and basophilic cellular debris admixed with viable and degenerate neutrophils and fibrin **(1 pt)**. Peripherally, hepatocytes are brightly eosinophilic and lack differential staining (coagulative necrosis) **(1 pt)**. At the edges of the areas of necrosis, there are numerous 1x3 um **(1 pt)** bacilli **(1 pt)** both extracellularly and within macrophages **(1 pt)**. Kupffer cells are hypertrophic and occasionally contain hemosiderin granules **(1 pt)**. Hepatocytes at edges of necrosis contain numerous discrete cytoplasmic vacuoles **(1 pt)**. Occasionally, veins bordering edges of necrosis have focally extensive areas of mural necrosis in which smooth muscle cells are karyorrhectic, the wall contains large amounts of brightly eosinophilic protein, and there are moderate numbers of infiltrating, occasionally necrotic neutrophils (vasculitis) **(2 pt)**. The lumen of these vessels contain large fibrin thrombi **(1 pt)** with entrapped degenerate leukocytes. Multifocally along the capsule, there are aggregates of polymerized fibrin.

**MORPHOLOGIC DIAGNOSIS:** Liver: Hepatitis, necrotizing, multifocal to severe with vasculitis, thrombosis, and numerous intra- and extracellular bacilli. **(4 pt)**

**CAUSE:** *Listeria monocytogenes* **(2 pt)**

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