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Case 1. Tissue from a cynomolgus monkey.

MICROSCOPIC DESCRIPTION: Prostate: Approximately 33% of the section **(1pt)** is effaced by multifocal to coalescing areas of lytic necrosis **(2pt)**. Within these area, prostatic glands are replaced by large numbers of degenerate neutrophils **(2pt)** with fewer macrophages, admixed with abundant cellular debris **(1pt)**, small amounts of hemorrhage, fibrin **(1pt)**, and edema. The inflammatory cells extend into the surrounding tissue, expanding the prostatic stroma **(1pt)**, prostatic capsule, and often filling adjacent mildly ectatic glands **(1pt)**, where they are variably admixed with abundant protein **(1pt)** and mucin. Smooth muscle cells within the prostatic stroma adjacent to areas of suppuration are occasionally fragmented, hypereosinophilic, Within affected glands, lining epithelium is variably swollen and granular (degenerate) **(1pt)**, shrunken, hypereosinophilic with pyknotic or karyorrhectic nuclei (necrotic) **(1pt)**, and rarely attenuated. The prostatic stroma is multifocally expanded by inflammatory cells as previously described, as well as congestion and edema, and rare aggregates of low numbers of lymphocytes.**(1pt)**. Lesser amounts of protein and rare cells are present within the lumen of tubules at a distance from the areas of necrosis; occasionally tubules contain brightly eosinophilic protein concretions. **(1pt)**.

(Note: There are multiple sections and some sections contain prostatic urethra, which is filled with a suppurative exudates. As the slide I described did not have urethra, I have chosen to leave it off the key. If it was on your slide, it should appear both in the description and in the morphologic diagnosis.)

MORPHOLOGIC DIAGNOSIS: Prostate gland: Prostatitis, necrosuppurative, multifocal to coalescing, severe. **(4pt)**

CAUSE: *Burkholderia pseudomallei* (*Klebsiella pneumoniae, E coli, F. tularensis OK, B mallei* ok)

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

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Case 2. Tissue from a short-tailed opossum.

MICRSCOPIC DESCRIPTION: Heart: Expanding and effacing the aortic valve **(1pt)**, and occluding the aortic lumen **(1pt)** is a large fibrin thrombus **(1pt)** which contains large enmeshed colonies of 1-2um cocci **(1pt)**, admixed with low to moderate numbers of largely degenerate neutrophils **(1pt)** entrapped erythrocytes, and abundant cellular debris **(1pt)**. The thrombus is multifocally attached to the discontinuous arterial wall **(1pt)**. In these areas, the wall is transmurally effaced by large numbers of viable and degenerate neutrophils, abundant cellular debris, moderate numbers of plump fibroblasts, rare hypertrophic smooth muscle cells in visible disarray, hemorrhage, fibrin, and edema (arteritis) **(2pt)**. The adjacent adventitial tissue **(1pt)** and epicardium is also infiltrated by large numbers of neutrophils, admixed with cellular debris, hemorrhage, fibrin, and hemorrhage, and is further expanded by granulation tissue **(1pt)** and congested vessels lined by reactive endothelium. Similar inflammatory changes are present within the proximal extent of the interventricular septum **(1pt)** and dissect along the subendocardial myocardium **(1pt)**, and at the base of the left atrium. In these areas, myocardiocytes adjacent to areas of inflammation exhibit hypereosinophilia, hyalinization, variation in diameter (degeneration) **(1pt)** rare nuclear pyknosis and fragmentation (necrosis) and are separated by small amounts of edema. Myocardial vessel multifocally contain increased numbers of neutrophils within their lumina and are lined by reactive endothelium.

MORPHOLOGIC DIAGNOSIS: Heart: Valvulitis, fibrinosuppurative, focally extensive, severe, with aortic arteritis and thrombosis, multifocal mild suppurative myocarditis, and numerous cocci.

CAUSE: *Staphylococcus aureus, Streptococcus viridians (or sp.) OK* **(3pt)**

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

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Case 3. Tissue from a dog.

Kidney: There are changes at all levels of the nephron. Glomeruli are diffusely mildly enlarged and segmented **(1pt)**, and capillary loops are globally expanded **(1pt)** up to 5 times normal by homogenous eosinophilic material. Glomeruli are also hypercellular **(1pt)**, with hypertrophy of podocyte nuclei, rare synechiae **(1pt)**, thickened Bowman's capsule, and hypertrophy of parietal epithelium **(1pt)**. Diffusely proximal convoluted tubular epithelium is swollen and vacuolated **(1pt)** and contains numerous cytoplasmic eosinophilic protein granules **(1pt)** as well as low amounts of brown lipofuscin granules. Other tubules are dilated **(1pt)**, lined by attenuated epithelium and contain low to moderate amounts of lightly to darkly eosinophilic proteinaceous fluid **(1pt)**. Multifocally, the renal interstitium is multifocally expanded by large numbers of plasma cells **(1pt)**, fewer lymphocytes, and low numbers of macrophages **(1pt)**. Macrophages are expanded by numerous intracytoplasmic 2-4um round amastigotes **(1pt)** with a central dark nucleus and a single rod-shaped kinetoplast **(1pt)**.

MICROSCOPIC DESCRIPTION: Kidney: Glomerulonephritis, membranoproliferative, diffuse, moderate with tubular proteinosis, marked plasmacytic and histiocytic interstitial nephritis, and intrahistiocytic amastigotes **(3pt)**

CAUSE: *Leishmania donovani, infantum, or any other species.* **(3pt)**

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

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Tissue from a ring-tailed lemur.

MICROSOPIC DESCRIPTION: There are random **(1pt)**, multifocal **(1pt)** areas of necrosis **(2pt)** scattered throughout the section. These areas contain hepatocytes which have lost differential staining, have ghost nuclei, but retain plate architecture (coagulative necrosis) **(2pt)**. Centrally, areas of necrosis are infiltrated by large numbers of neutrophils **(1pt)**, admixed with abundant cellular debris **(1pt)**, small amounts of fibrin, hemorrhage, and edema. These areas of necrosis occasionally extended into adjacent vessels (note: this is not to be interpreted as a vasculitis in the morphologic diagnosis, as vascular changes are seen only in areas of necrosis.) At the edges of the necrotic areas, hepatocytes are shrunken, with darkly eosinophilic with basophilic granules in their cytoplasm, , and nuclei contain clumped, peripheralized chromatin (degeneration) **(2pt)**. Diffusely, hepatic plate architecture is distorted **(2pt)**; away from areas of necrosis, hepatocytes are occasionally rounded up, with darkly eosinophilic cytoplasm and pyknotic to karyolytic nuclei (piecemeal necrosis) **(2pt)**.

MORPHOLOGIC DIAGNOSIS: Liver: Hepatitis, necrotizing, multifocal and random, moderate, with piecemeal necrosis. **(3pt)**

CAUSE: *Listeria monocytogenes* (*F. tularensis* OK) **(2pt)**

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