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Case 1. Subretinal fine needle aspirate from a dog.

CYTOLOGIC DESCRIPTION: This is a good quality, moderately cellular, fine needle aspirate. The aspirate is composed of moderate numbers of viable and degenerating neutrophils **(2pt.)** and fewer macrophages **(1pt.)** on a moderate granular proteinaceous background **(1pt.)**. Neutrophils are vacuolated, often with swollen, hypersegmented nuclei. **(1pt.)** Macrophages have abundant vacuolated cytoplasm which contains small amounts of cellular debris. **(1pt.)** Scattered among the inflammatory cells, predominantly extracellular (but rarely contained within the cytoplasm of macrophages (image C), there are numerous endosporulating alga **(2pt.)**. Clusters of replicating 6-8um endospores **(1pt.)** with a 1um hyaline wall **(1pt.)** and basophilic cytoplasm predominate which exhibit binary cellular division (image D) **(1pt.)** and rare tripartite division (center, image B) **(1pt.)**. Scattered among these are larger 10-12 sporangia **(1pt.)** which also have a hyaline cell wall, less basophilic granular cytoplasm which contains numerous 2-3um pink globules (sporangiospores) **(1pt.)**. The proteinaceous background contains numerous rod-shaped melanin granules **(1pt.)** and rare cholesterol crystals (image A).

CYTOLOGIC DIAGNOSIS: Pyogranulomatous inflammation **(1pt.)** with numerous endosporulating algae **(1pt.)**

CAUSE: Prototheca sp. **(3pt.)**

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Tissue from a cat.

MICROSCOPIC DESCRIPTION: Spleen: Effacing 80% of the splenic white pulp **(1pt)** and extending into the surrounding red pulp are multiple coalescing nodules of lytic necrosis **(2pt)** , up to 1.5 mm in diameter, that are composed of abundant eosinophilic cellular and karyorrhectic necrotic debris **(1pt)** and variable amounts of eosinophilic finely beaded fibrillar material (fibrin) **(1pt)** admixed with few lymphocytes, macrophages, and erythrocytes **(1pt)**. The remaining white pulp is moderately hypocellular **(1pt)** and contains lymphocytes with pyknotic to karyorrhectic nuclei **(1pt)** admixed with cellular debris, and often contains a central aggregate of dense eosinophilic protein. There is hemorrhage, edema, and moderate numbers of neutrophils within the remaining red pulp. **(1pt)**. Multifocally, vessels are occasionally lined by plump, reactive endothelial cells, and occasionally contains non-occlusive fibrin thrombi **(1pt)** and necrotic cellular debris within their lumens. Multifocally, the capsule is lined by a disordered single layer of hypertrophic mesothelial cells. **(1pt)**

MORPHOLOGIC DIAGNOSIS: Spleen: Splenitis, necrotizing **(1pt)**, multifocal to coalescing, moderate to severe, with mild lymphoid depletion **(1pt)** and thrombosis **(1pt)**.

CAUSE: *Francisella tularensis* **(3pt)**

Name two other affected organs: Ileum, mesenteric lymph nodes **(2pt)**

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

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Case 3. Tissue from a cynomolgus macaque.

(This is not a good descriptive slide – just note the changes and move on. Not enough changes to really even assign points.)

MICROSCOPIC DESCRIPTION: Kidney: Diffusely proximal epithelial cells are swollen by one to multiple discrete variably clear vacuoles (lipid) which impinges on luminal diameter. The lumina contain flocculent to granular eosinophilic protein. Glomeruli occasionally contain refluxed protein and mildly hypertrophic parietal epithelium. Lipid vacuoles decrease in size and number down the nephron, with no vacuolation in the medullary tubules and collecting ducts. Occasional medullary tubules contain variable combinations and concentrations of low numbers of sloughed epithelial cells, neutrophil, and erythrocytes. Rare oxalate crystals are seen within tubules.

MORPHOLOGIC DIAGNOSIS: Kidney, tubular epithelium: Lipidosis, diffuse, severe, with mild tubular proteinosis.

NAME THE CONDITION: Fatal fasting syndrome

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Case 4. Tissue from a rabbit.

MICROSCOPIC DESCRIPTION: Cerebrum, level of hippocampus and thalamus: Randomly scattered throughout the gray and white matter **(1pt.)** are, occasionally perivascular, variably sized aggregates of moderate numbers of epithelioid macrophages **(1pt.)** centered on cellular debris, and rarely, mineral. Often these foci are infiltrated by low to moderate numbers of heterophils **(1pt.)** which extend into the surrounding neuropil, and contain few lymphocytes **(1pt.)**. Scattered throughout the section, there are low numbers of microsporidian pseudocysts **(1pt.)** measuring up to 40um **(1pt.)**, with a thin wall (parasitophorous vacuole) **(1pt.)** and numerous intracellular 2-3 um elliptical spores. **(1pt.)** There is mild gliosis **(1pt.)** of the adjacent neuropil with activated microglia. Adjacent vessels are often lined by a single layer of histiocytes, lymphocytes, plasma cells and neutrophils. **(1pt.)** In areas of inflammation, vessel lumina rarely contain fibrin thrombi and their walls are expanded by heterophils and cellular debris (vasculitis). **(1pt.)** The leptomeninges **(1pt.)**, especially in perivascular locations, as well as Virchow-Robin's spaces, are expanded by low to moderate numbers of predominant histiocytes, with fewer lymphocytes and plasma cells. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: Cerebrum: Encephalitis **(1pt.)**, granulomatous **(1pt.)**, multifocal and perivascular, moderate, with lymphoplasmacytic meningitis and numerous microsporidia. **(1pt.)**

CAUSE: *Encephalitozoon cuniculi* **(3pt.)**

NAME ANOTHER AFFECTED ORGAN: Kidney, eye (lens in dwarf rabbits) **(1pt.)**

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