WSC 2015-2016, Conference 14
Case 1. Tissue from a guinea pig

MICROSCOPIC DESCRIPTION Heart: Multifocally and randomly affecting all regions of the heart, but most prominently in the interventricular septum and left ventricular free wall **(1 pt.)**, there are variably-sized and often coalescing areas of cardiac fibrosis **(1 pt.)** which surround and replace **(1 pt.)** myocytes and contains large amounts of crystalline mineral. Within these areas, cardiomyocytes are brightly eosinophilic, hyalinized and fragmented (degeneration) **(1 pt.)**, contain pyknotic to rhectic nuclei (necrotic) **(1 pt.)**, and often are markedly thinned with a diameter equal to the width of its nucleus (atrophy) **(1 pt.)**. Necrotic fibers contain variable amounts of granular to crystalline mineral **(1 pt.)**, which often forms large aggregates which are often fractured by processing. Surrounding necrotic myocytes, there are low to moderate numbers of macrophages **(1 pt.)** and multinucleated foreign-body type **(1 pt.)** macrophages, admixed with fewer heterophils and lymphocytes, and small amounts of cellular debris on a background of dense collagen **(1 pt.)** and plump fibroblasts. The myocytes adjacent to necrotic and mineralized areas are mildly swollen and pale with variably sized clear vacuoles within their cytoplasm (degeneration) **(1 pt.)**. Within the overlying aorta, there are multifocal areas in which smooth muscle and intervening ground substance is replaced by crystalline mineral **(1 pt.)** The tunica intima is segmentally outlined by crystalline mineral. **(1 pt.)**

MORPHOLOGIC DIAGNOSIS*:* 1. Heart, cardiac myocytes: Degeneration, necrosis, and loss, multifocal to coalescing with marked mineralization, myocardial fibrosis and granulomatous myocarditis. **(2pt.)**
2. Aorta: Mineralization, intimal and mural, multifocal, moderate. **(2 pt.)**

CAUSE: Hypervitaminosis D. **(2 pt.)**

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

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Case 2. Tissue from a rabbit.

MICROSCOPIC DESCRIPTION: Cecum: The cecal mucosa is moderately hyperplastic, with numerous mitotic figures at all levels of the mucosa **(1pt)**. There is a diffuse decrease in the number of goblet cells **(1pt)**. There is multifocal cobblestoning of the luminal epithelium, as degenerate enterocytes with abundant intracytoplasmic vacuolation balloon and exfoliate into the lumen and necrosis and loss **(1pt)** of individual and small areas of mucosal epithelium. In areas of denuded epithelium, the mucosa is infiltrated by low numbers of heterophils **(1pt)** admixed with cellular debris. Necrosis of enterocytes and hyperplasia of adjacent enterocytes often forms small pseudocystic areas within the mucosa which are often filled with necrotic cellular debris. In areas of epithelial degeneration and necrosis, enterocytes are lined by a a prominent layer of 2um robust, deeply basophilic bacilli **(2pt)**. The underlying lamina propria and submucosa is diffusely edematous **(1pt)** and the lamina propria is infiltrated by moderate numbers of heterophils. Cecal crypts often contain prominent mats of long filamentous bacilli.

Colon: There are multifocal areas of mucosal necrosis within colonic glands which contain variable amounts of sloughed enterocytes, degenerating heterophils, and cellular debris (crypt abscesses.) **(1pt)** There is individual cell necrosis of the luminal epithelium, and infiltration of the lamina propria by low numbers of heterophils. Degenerating enterocytes are often lined by a thick layer of 2um robust bacilli. There is moderate crypt hyperplasia with mitotic figures extending more than halfway up the colonic glands, and a marked decrease in goblet cells in the proximal half of the gland.

Jejunum: There are similar changes within the jejunum as described for the colon. In addition, vili are markedly blunted and often fused **(1pt)** . Multifocally mucosal epithelial cells are expanded by intracellular, extracytoplasmic macrogamonts, microgamonts, and schizonts. Macrogamonts **(1pt)** are approximately 30 um in diameter with a single, central nucleus and a peripheral ring of 2 um diameter eosinophilic granules; microgamonts **(1pt)** are round to oval, approximately 15-20 um in diameter with multiple nuclei; schizonts **(1pt)** are 20-40 um in diameter with numerous basophilic, crescentic merozoites that are 4 x 10 um.

MORPHOLOGIC DIAGNOSIS: 1. Cecum, colon: Typhlocolitis, superficial and necrotizing, multifocal, moderate, with marked crypt hyperplasia and numerous attaching bacilli. **(3 pt)**
2. Jejunum: Villar blunting and fusion, with intraepithelial apicomplexan schizonts, macrogamonts and microgamonts. **(1pt)**

CAUSE: *Attaching and effacing E.coli* **(2pt),** *Eimeria sp.* **(1pt)**

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

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Case 3. Tissue from a rhesus macaque.

MIROSCOPIC DESCRIPTION: Cerebrum at the level of the hippocampus: Within the subcortical white matter tracts **(1pt)**, there are coalescing areas of malacia **(1pt)** in which there is extensive axonal loss **(1pt)** and numerous astrocytic processes forming a mesh-like framework **(1pt)**. Remaining axonal sheaths are often dilated **(1pt)**, but only a few spheroids are present **(1pt)**. Within these areas, there are large numbers of astrocytes with abundant brightly eosinophilic cytoplasm (gemistocytes) **(1pt)** mild proliferation of oligodendroglial cells **(1pt)**, and infiltration of low to moderate numbers of foamy histiocytes (Gitter cells) **(1pt)** . Multifocally, occasional oligodendroglia have enlarged nuclei which contain an amphophilic glassy viral inclusion **(2pt)**. Vessels and oligodendroglia in the adjacent white matter are surrounded by clear halos (edema) and often low numbers of Gitter cells, and vessels in the adjacent gray and white matter are multifocally cuffed by low to moderate numbers of lymphocytes and plasma cells. **(1pt)**.

MORPHOLOGIC DIAGNOSIS: Cerebrum, subcortical white matter: Leukoencephalomalacia, multifocal to coalescing, with numerous gemistocytic astrocytes, perivascular lymphocytic cuffing, and intracellular amphophilic viral inclusions. **(3pt)**

CAUSE: *Simian polyomavirus (SV-40) virus* **(3pt)**

Name the condition: Progressive leukoencephalomyelitis **(1pt)**

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

WSC 2015-2016, Conference 14
CASE 4. Tissue from a rat.

(Not really a good descriptive slide – not a lot of points, and we really don't even know the cause, or what the pigment is. You may just want to look at the answer and drive on…)

MICROSCOPIC DESCRIPTION: Kidney: Diffusely, glomeruli are enlarged **(2pt.)**. Capillary basement membranes **(2pt.)** are outlined by a dark red, granular pigment **(2pt.)** which is clumped within the glomerular mesangium **(2pt.)** and capillary lumina **(2pt.)** as well. Tubular epithelium often contains bright red granules within their cytoplasm **(2pt.)**, and low number of tubules, often in clusters, are ectactic **(1pt.)**, lined by attenuated tubular epithelium, and contain light pink protein casts **(1pt.)**. Larger renal vessels are often dilated, and multifocally cuffed by moderate numbers of lymphocytes and plasma cells. **(1pt.)**

MORPHOLOGIC DIAGNOSIS: Kidney, glomerular and tubular basement membranes, glomerular mesangium and proximal tubular epithelium: Pigment deposition, diffuse, severe. **(4pt.)**

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