

Case 1 – Tissue from a horse.

MICROSCOPIC DESCRIPTION: Spinal cord, cauda equina **(1pt)**: Diffusely, the epineurium **(1pt)** of numerous bundles and individual spinal nerve roots **(1pt)** is markedly expanded by dense bands of variably mature fibrous connective tissue (some being mature dense collagen **(1pt)**, and other areas containing thin bands of collagen with plump fibroblasts**(1pt)**) which often blends with the epineurium of adjacent nerve roots. At the periphery, this fibrosis extends into and multifocally effaces perineural adipose tissue **(1pt)**. Infiltrating these dense bands of fibrosis, primarily at the periphery of nerve roots, there are large numbers of lymphocytes **(1pt)** and macrophages **(1pt)**, fewer plasma cells **(1pt)**, rare hemosiderin-laden macrophages and multinucleated foreign body and Langhans type macrophages **(1pt)**, rare clusters of neutrophils **(1pt)**, and scattered hemorrhage, all admixed with cellular debris. Inflammatory cells variably infiltrate nerves **(1pt)**, effacing architecture in some, and less infiltrated nerves demonstrate evidence of degeneration: swollen and empty myelin sheaths, with swollen, hypereosinophilic axons (spheroids) **(1pt)**. Vessels within and adjacent to inflamed nerves have expanded walls which contain hyperchromatic nuclei admixed with cellular debris (vasculitis) **(1pt)**.

MORPHOLOGIC DIAGNOSIS: Spinal cord, cauda equina: Polyradiculoneuritis **(1pt)**, granulomatous **(1pt)**, chronic, diffuse, severe, with marked epineurial and perineurial fibrosis, **(1pt)** and widespread axonal degeneration, Morgan, equine.

Name the condition: Cauda equina syndrome (polyneuritis equi) **(2pt)**

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

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Case 2 – Tissue from hedgehog.

(Note: There are multiple recuts. The one I got was brainstem – the one online appears to be diencephalon at the level of the hippocampus. If you got brainstem, it's a far better demonstration, due to the amount of white matter involvement.)

MICROSCOPIC DESCRIPTION: Brainstem. There is bilaterally symmetrical **(1pt)** vacuolation of the brainstem white matter **(1pt)**, localized most obviously to the areas of the medullary reticular formation (just off midline) and nuclei associated with cranial nerves (lateral) **(1pt)**. The vacuoles are discrete, clear, extracellular, occasionally coalescing and range up to 45um **(1pt)** in diameter. Many of the vacuoles have an associated compressed hyperchromatic nucleus (Schwann cell) at the periphery suggesting that these may be greatly distended myelin sheaths. **(1pt)** Some vacuoles contain lamellar eosinophilic to amphophilic material (myelin debris) **(1pt)** within them, and rarely, they contain vacuolated macrophages (Gitter cells) **(1pt)**. Within areas of vacuolation, there are increased numbers of microglial cells **(1pt)** and astrocyte nuclei are hypertrophic **(1pt)**. Within these areas, occasional neurons are swollen with pale pink vacuolated cytoplasm and dissolution of chromatin. **(1pt)**

MORPHOLOGIC DIAGNOSIS: Brainstem: Myelin degeneration **(1pt)**, bilaterally symmetrical, with neuropil vacuolation **(1pt)**, neuronal degeneration, and gliosis. **(1pt)**

NAME THE CONDITION: Wobbly hedgehog syndrome **(2pt)**

O/C: (1pt)

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Case 3 – Tissue from a dog.

MICROSCOPIC DESCRIPTION: Cerebrum, frontal cortex: There are multiple areas of marked pallor and hypercellularity of the submeningeal superficial grey matter. **(1pt)** Within this layer, there is marked neuroparenchymal loss **(1pt)**, with replacement by moderate to large numbers of Gitter cells **(1pt)**. Remaining nerve fibers are widely separated by clear space and edema, **(1pt)** and vessel endothelium is hypertrophic. Virchow-Robins spaces are expanded **(1pt)** by moderate numbers of lymphocytes, macrophages, neutrophils, and plasma cells, and a similar population is present within the overlying meninges. **(1pt)** Within this layer, there is moderate increase in numbers of glial cells **(1pt)**, modest hypertrophy of astrocytes, and low to moderate numbers of lymphocytes and plasma cells. Scattered throughout this layer are low number of round apicomplexan **(1pt)** cysts which range up to 30um in diameter**(1pt)**, which have a hyaline 3um cyst wall and numerous oval bradyzoites contained within. **(1pt)** The underlying white matter is moderately spongiotic **(1pt)** with vacuoles ranging up to 30um. Within this area, vessels are cuffed by variable several layers of macrophages (Gitter cells) with occasional neutrophils, lymphocytes, and plasma cells. **(1pt)** Oligiodendrocytes are prominent with hypertrophic nuclei. Macrophages and neutrophils often extend into the adjacent neuroparenchyma. **(1pt)** There are occasionally swollen myelin sheaths with dilated eosinophilic axons (spheroids). There is mild sclerosis of the choroid plexus. **(1pt)**

MORPHOLOGIC DIAGNOSIS: Cerebrum: Meningoencephalitis, **(1pt)** necrotizing **(1pt)**, multifocal, severe, with rare intracellular apicomplexan cysts. **(1pt)**

CAUSE: *Neospora caninum* (*Toxoplasma gondii* ok) **(2pt)**

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

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Case 4 – Tissue from a dog.

MICROSCOPIC DESCRIPTION: Cerebrum: Within the superficial cortex **(1pt.)**, primarily within the inner half **(1pt.)**, there are multifocal areas of neuropil pallor and hypercellularity. **(1pt.)** Blood vessels are surrounded and outlined by 1-4 layers of macrophages **(1pt.)**, lymphocytes **(1pt.)**, and plasma cells **(1pt.)** admixed with small amounts of cellular debris (larger caliber vessels generally have larger cuffs) **(1pt.)**. Similar inflammatory cells are present within the meninges as well. **(1pt.)** Inflammatory cells extend in small numbers into the surrounding spongiotic **(1pt.)** neuropil. **(1pt.)** The neuropil is vacuolated, and cells and blood vessels within this area are surrounded by clear space (edema.) Within these areas, astrocytes are increased in number and size **(1pt.)** with markedly hypertrophic nuclei. **(1pt.)** Within extravascular aggregates of inflammatory cells, there is a decrease in the number of neurons as compared to the immediately adjacent neuropil (but there aren't any obvious necrotic neurons, neurons surrounded by glial cells, or cellular debris.

MORPHOLOGIC DIAGNOSIS: Cerebrum: Meningoencephalitis **(1pt.)**, lymphohistiocytic **(2pt.)**, multifocal to coalescing, severe, with focal neuronal loss, astrocyte hypertrophy and edema. **(1pt.)**

NAME THE CONDITION: Either granulomatous meningoencephalitis (GME) or necrotizing meningoencephalitis (NME) is acceptable. **(2pt.)**

O/C: (1pt.)