

Case 1. Tissue from an ox.

MICROSCOPIC DESCRIPTION: Lung: Approximately 80% of the section are replaced by a large area of coagulative necrosis which is demarcated by prominent bands of lytic necrosis and, in other areas, granulation tissue and fibrosis. Within the areas of coagulative necrosis (**2 pt**), alveoli, airways, lymphatics, and interlobular fibrous connective tissue are markedly expanded by polymerized fibrin (**1 pt**), edema, rare hemorrhage (**1 pt**), and low to moderate numbers of alveolar macrophages with fewer neutrophils, lymphocytes, and cellular debris. Septa have lost differential staining (**1 pt**) and are multifocally ruptured. Throughout this area, there are numerous large colonies of 2-3um rods, (**1 pt**) and, clusters of pauciseptate, 6-10um diameter non-dichotomous branching (**2 pt for description**) fungal hyphae (**1 pt**) seen in negative relief which is occasionally seen within within vascular walls. . Areas of coagulative necrosis are bordered by thick bands of lytic necrosis (**1 pt**), in which alveoli are expanded by large numbers of degenerate neutrophils (**1 pt**) and fewer alveolar macrophages admixed with abundant cellular debris and fibrin. There is extensive septal necrosis (**1 pt**). At other borders of necrotic tissue, alveolar septa are markedly expanded by plump fibroblasts (**1 pt**) and mature collagen (**1 pt**) as well as moderate numbers of macrophages, neutrophils, and lymphocytes, and alveoli are expanded by similar inflammatory cells as well as dense linings of polymerized fibrin and edema. At the edges of the section, alveoli and lymphatics are mildly to moderately expanded by edema (**1 pt**) fluid and contain increased numbers of foamy alveolar macrophages, and capillaries are markedly congested.

MORPHOLOGIC DIAGNOSIS: Lung: Pleuroneumonia, necrotizing and fibrinosuppurative, chronic, focally extensive, severe, with vasculitis, fungal hyphae, and numerous colonies of bacilli. (**4 pt**)

CAUSE: Any zygomycete fungus (Rhizopus, Mucor OK), (**2 pt**) *Truperella pyogenes* - (**1 pt**) (Note: while the combination of lytic and coagulative necrosis suggests *Mannheimia* or *Mycoplasma* neither of these bacteria would be present in large colonies as seen in this slide).

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

Case 2. Tissue from a cat.

MICROSCOPIC DESCRIPTION: Thymus: Thymic architecture is largely replaced by an infiltrative, unencapsulated, poorly demarcated, moderately cellular, and multifocally cystic neoplasm **(1 pt)**. Neoplastic cells are arranged in sheets **(1 pt)** of polygonal cells on a moderate fibrous stroma. Neoplastic cells have indistinct cell borders with a moderate amount of eosinophilic granular to fibrillar cytoplasm **(1 pt)**. Nuclei are irregularly round to oval with finely clumped chromatin and 1-2 basophilic nuclei **(1 pt)**. Mitotic figures are rare **(1 pt)**. There are a large number of plump macrophages with abundant phagocytosed cellular debris scattered throughout the section **(1 pt)**. There is multifocal fibrosis and scattered aggregates of hemosiderin-laden macrophages throughout the section.

Ear, pinna: On both sides of the pinna, the epidermis is markedly hyperplastic **(1 pt)**, forming deep rete ridges **(1 pt)** into the underlying dermis. There is marked paraerotic, hyperkeratosis **(1 pt)** of the stratum corneum, and thicker rete ridges contain a core of dyskeratotic keratinocytes. There is multifocal dyskeratosis **(1 pt)** throughout the hyperplastic epidermis, and keratinocytes within the stratum spinosum multifocally and often exhibit intracytoplasmic swelling and are rarely necrotic **(1 pt)**. Rare necrotic keratinocytes are seen within the deeper levels of the epidermis. There is multifocal mild pigmentary incontinence. (In some slides, there is multifocal full-thickness ulceration of the epidermis). There is moderate superficial edema within dermal pegs, and there superficial dermis contains low to moderate numbers of lymphocytes and plasma cells in close association and occasionally infiltrating the basal epidermis (interface dermatitis). Multifocally, sebaceous glands are bordered similar inflammatory cells and are moderately to severely atrophic. byThere are small aggregates of degenerate neutrophils admixed with cellular debris and colonies of 1-2um cocci throughout the overlying hyperkeratotic scale **(1 pt)**.

MORPHOLOGIC DIAGNOSIS: 1. Thymus: Thymoma. **(3 pt)**

2. Haired skin: Epidermal hyperplasia and hyperkeratosis, diffuse, moderate to severe, with multifocal keratinocyte necrosis and mild lymphoplasmacytic interface dermatitis. **(2 pt)**

NAME THE CONDITION: Thymoma-associated exfoliative dermatitis **(2 pt)**

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

Case 3. Tissue from a horse.

MICROSCOPIC DESCRIPTION: Placenta: At one edge of the section, there is an extensive area of coagulative necrosis (infarct) **(1 pt)**. Within this area, the chorion, including chorionic villi, diffusely lacks differential staining, and the chorion is expanded by moderate numbers of degenerate neutrophils admixed with cellular debris **(1 pt)**. Throughout the entire section, the chorion is markedly expanded by edema **(1 pt)** and around a large arteriole within the infarcted area, abundant polymerized fibrin. Throughout the chorion, small vessels often contain or are occluded by fibrin thrombi **(1 pt)**, and occasional vessel walls are thickened or effaced by variable combinations and concentrations of brightly eosinophilic protein, infiltrating degenerate neutrophils, and cellular debris (fibrinoid vascular change) **(1 pt)**. Within the adjacent viable placenta, villi are separated by abundant sloughed cellular debris as well as numerous 3-5um diameter fungal hyphae **(1 pt)**, which are pauciseptate, have parallel walls, and branch dichotomously at acute angles **(1 pt for description)**. Rarely, there are low to moderate numbers of degenerate neutrophils and cellular debris scattered in aggregates among chorionic villi **(1 pt)**. There is a diffuse band of moderate numbers of viable and degenerate neutrophils **(1 pt)**, with fewer macrophages, and lymphocytes admixed with cellular debris within the superficial chorion subjacent to the villi, and diffusely in lower numbers throughout the remainder. The allantoic epithelium is moderately hyperplastic **(1 pt)**, piled up to 6 cell layers thick in some spots. Individual cells have large large central discrete vacuoles containing aggregates of brightly eosinophilic protein. Epithelial cells are multifocally necrotic and admixed with cellular debris.

Haired skin, eyelid: There is diffuse moderate orthokeratotic hyperkeratosis **(1 pt)** with irregularly spaced areas of hyperkeratotic scale ranging up to 200um in thickness; hyperkeratosis occasionally extends into follicular ostia **(1 pt)**. The superficial dermis is mildly edematous and contains low numbers of evenly distributed lymphocytes and histiocytes. Within the scale, there are low to moderate numbers of 3-5um fungal hyphae which are pauciseptate, have parallel walls and branch dichotomously at acute angles **(1 pt)**, admixed with low amounts of cellular debris. Underlying epithelium is mildly hyperplastic with scattered keratinocytes within the stratum spinosum occasionally exhibiting intracytoplasmic swelling, pyknosis, and there is rare pigmentary incontinence.

MORPHOLOGIC DIAGNOSIS: 1. Placenta: Placentitis, necrotizing and suppurative, diffuse, moderate, with focal infarction, vasculitis, fibrinoid change, and moderate numbers of fungal hyphae. **(2 pt)**

2. Haired skin, eyelid: Dermatitis, lymphoplasmacytic, diffuse, mild, with marked epithelial hyperkeratosis and intracorneal fungal hyphae. **(2 pt)**

CAUSE: *Aspergillus sp.* or similar fungus **(2 pt)**

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

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Case 4. Tissue from a dog.

MICROSCOPIC DESCRIPTION: Lung: Diffusely, alveoli are markedly expanded (**1 pt**) by aggregates of large numbers of single- and rarely multinucleated macrophages (**2 pt**) ranging up to 30um with abundant pink cytoplasm, admixed with lesser numbers of neutrophils (**1 pt**), rare lymphocytes, and plasma cells, and moderate amounts of cellular debris and edema (**1 pt**). Macrophages often contain large numbers of 2-3 um (**1 pt**) round yeasts (**2 pt**) with a 1um clear halo within their cytoplasm, and less commonly, extracellularly. Alveolar septa are expanded (**1 pt**) by infiltrating macrophages, fewer neutrophils and lymphocytes, and moderate congestion. There is multifocal type II pneumocytes hyperplasia (**1 pt**). Airways are filled with a similar cellular exudate (**1 pt**). In one section, alveoli are widely expanded and often ruptured (**1 pt**) by the sheer volume of yeast-packed macrophages, and there are often variably-sized areas of coagulative necrosis (**1 pt**). In one section, there is marked diffuse fibrosis (**1 pt**) of remaining alveolar septa with plum fibroblasts. (**1 pt**).

MORPHOLOGIC DIAGNOSIS: Lung: Pneumonia, interstitial, granulomatous, diffuse, severe with numerous intracytoplasmic yeasts. (**2 pt**)

CAUSE: *Histoplasma capsulatum* (**2 pt**)

O/C: (1pt)