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http://creatiwittyblog.com/2012/08/creativity-of-nature-most-unique-animal-eyes-photography/
Ocular Cytology
Ocular Cytology

• Sampling
• Stains
• Microscopic evaluation
Ocular Cytology
Look at the exudate, too!
Ocular Cytology

- Stains
  - Romanowsky stains
  - Wright’s, Giemsa
  - Quick stains, e.g., Diff-Quik
  - Gram stain
  - Fungal stains (PAS, silver)
  - Acid-fast stains
OPHTHO STAIN
General purpose stain is around the corner.

Cytology Only!
If you recap the fixative, it won't evaporate so fast! (It's mostly alcohol.)
Ocular Cytology

- Normal
- Inflammation
- Hemorrhage
- Cyst
- Hyperplasia
- Neoplasia
Ocular Cytology

Adequacy of sample
Goblet cells
Sample size and number of slides

• If sample size is small first slide is best!
Inflammation

- Cellular pattern
- Septic vs. nonseptic
  - morphology of neutrophils
  - significance of bacteria
- Etiologic agent
- Inclusions and extracellular material
- Dysplastic epithelium
Inflammation

• Cellular pattern
  ◇ Neutrophilic
  ◇ Pyogranulomatous
  ◇ Granulomatous/Histiocytic
  ◇ Eosinophilic
  ◇ Lymphoplasmacytic
  ◇ Mixed
Neutrophilic Inflammation

• Septic vs. nonseptic
  ♦ Morphology of neutrophils
  ♦ Significance of bacteria
• Etiologic agent
  ♦ Intracellular inclusions
  ♦ Extracellular material
• Dysplastic epithelium
Neutrophil Morphology

Nondegenerate vs Degenerate
Healthy nondegenerate neutrophils: well-segmented
Significance of bacteria

- Sampling technique
- Bacterial morphology
- Intracellular or extracellular
- Differentiate from stain precipitate
Fractured nuclei

Stain precipitate
Bacterial cocci
Neutrophilic Inflammation

• Etiologic agent
  ♦ Intracellular inclusions
  ♦ Extracellular material
Intracellular Inclusions

• In epithelial cells
  ‧ Mycoplasma
  ‧ Chlamydophila
  ‧ Distemper
  ‧ Melanin
  ‧ Drug inclusions
  ‧ Neutrophils
Mycoplasma felis
Chlamydophila spp
Distemper viral inclusions
Drug/ointment inclusions
Emperipolesis: cells within cells
Intracellular Inclusions

• In neutrophils
  ♦ Bacteria
  ♦ Pyknotic nuclear material
Long thin bacteria
anaerobic bacteria
Pyknotic/apoptotic neutrophils: aging change
Etiologic Agent

• Extracellular material
  ◆ Bacterial/mycotic organisms
  ◆ Granules
  ◆ Cellular debris
Granules from eosinophils and mast cells
Strands of chromatin from fractured nuclei
Inflammation

- Cellular pattern
- Septic vs. nonseptic
  - morphology of neutrophils
  - significance of bacteria
- Etiologic agent
- Inclusions and extracellular material
- Dysplastic epithelium
Dysplastic epithelium
Dysplastic epithelium

Neutrophils in squamous cells
Chronic Inflammation

- Pyogranulomatous
- Histiocytic/granulomatous
Conjunctival lymphoid follicle: *Histoplasma* spp
Leishmania spp
Pyogranulomatous inflammation
Blastomyces spp.
Organisms with little inflammation
Cryptococcus spp
Finding organisms in thick material with mucus
Pay attention to thick wads of material
Candida spp

pseudohyphae
Prototheca
Nematode
Inflammation

• Eosinophilic
Melanin in squamous cell
Eosinophils in thick areas
Melanin in thick area
Inflammation

- Lymphocytic/Plasmacytic
Follicular hyperplasia - conjunctiva (reactive lymphoid hyperplasia)
Atypical pannus: plasma cell infiltrate
Non-Inflammatory/Non-Neoplastic

- Hemorrhage
- Cyst
Hemorrhage: erythrophagia
Eyelid cyst
Foamy macrophages in cyst fluid (concentrated sample)
Retina

Sometimes obtained when aspirating vitreous

Especially if retina is detached
Ocular cytology

• Neoplasia
  ♦ Epithelial
  ♦ Mesenchymal (Connective Tissue)
  ♦ Round cell
Epithelial Neoplasia

• Squamous cell carcinoma
• Adenomas/adenocarcinomas
Squamous cell carcinoma - cornea
Squamous cell carcinoma with neutrophilic inflammation - cornea
Lacrimal gland adenoma
Lacrimal gland adenocarcinoma
Canine lobular orbital adenoma
Canine lobular orbital adenoma
Iridociliary adenoma
Iridociliary adenoma
Iridociliary adenoma
Mesenchymal Neoplasia

- Benign tumors
- Sarcomas
Peripheral nerve sheath tumor - orbit
Peripheral nerve sheath tumor - orbit
Osteosarcoma - orbit

osteoid
osteoblast
Round Cell Tumors

• Histiocytoma
• Lymphoma
• Mast cell tumor
• Others
Histiocytoma
Lymphoma - conjunctival
Anterior uveitis: lymphoma
Eyelid mass: round cell tumor (Diff-Quik stain)
Eyelid mass: round cell tumor

Diff-Quik stain

Wright’s stain
Eyelid mass: round cell tumor (Wright’s stain)
Iris freckle - cat
Mass on iris: mesenchymal cells
Mass on iris: melanoma

melanin
Orbital mass: features of epithelial and mesenchymal cells
Orbital meningioma
Orbital meningioma with metaplastic bone formation