Cornea: Anatomy, Pathology, and Mechanisms of Toxicity
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Corneal Anatomy

Tear Film

Corneal Anatomy
Epithelium

Corneal Anatomy
Endothelium

Primate
Corneal stromal innervation

Subepithelial/basal epithelial nerve plexus

Corneal Evaluation with a Slit Lamp

Corneal Epithelial Irritation/Toxicity

Superficial Stromal Diseases

- Indolent ulcer/Recurrent erosion syndrome
- Sequestrum
- Band keratopathy

Canine Indolent Ulcer or Recurrent Erosion Syndrome

- Poor epithelial attachment with superficial stromal acellular zone
- Basement membrane is lost but laminin is over expressed on the surface
- Very commonly seen in enucleated globes as a secondary phenomenon
  - Possibly bullous edema
Indolent Ulcer/Recurrent Erosion

Lamanin Immunohistochemistry
Epithelial Nonattachment in a Lab Rat

Feline Corneal Sequestrum
- Associated with superficial ulcer
- The superficial stroma becomes acellular
- Descication might play a role in sequestrum formation
- Emibes pigment of unkown chemical make-up
Superficial Chronic Keratitis

- Dry eye or tear film break-up problems
- Innervation problems
- Persistent irritation
Collagenolytic Keratitis

- Usually associated with suppurative keratitis
- Collagenolytic enzymes from neutrophils, bacteria or native cells
  - MMP-2 & MMP-9 in the epithelium or stroma
  - Regulated by metalloproteinases (TIMPs)
  - Dependant on zinc
  - Neutrophil protease
  - Rapid lysis of the entire stroma

Canine Pannus / Chronic Superficial Keratitis

- Lichenoid infiltrate
- Single Cell Necrosis
- Increased Mitotid Activity

Early Collagenolytic Keratitis

2 hours after injury

Dog Fight

"Melting" Corneal Ulcer
Diseases Affecting the Endothelium

Deep irritative effect

Canine “Blue Eye’
The extent of edema can be estimated by measuring changes in the corneal thickness by pachometry.

Mechanical Damage to Endothelium

Mechanical Damage to Endothelium
Endothelial Dystrophy

Spontaneous Rupture of Descemet's Membrane

Haab's Stria

Equine

Corneal Cholesterol Deposition
Cholesterol with Inflammation or Neoplasia