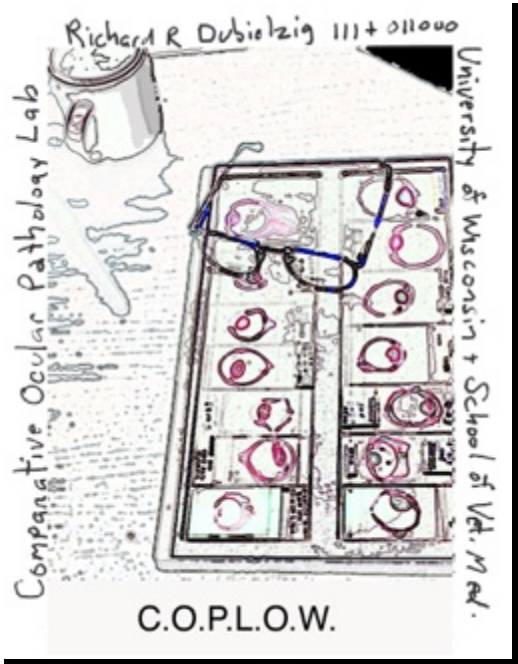
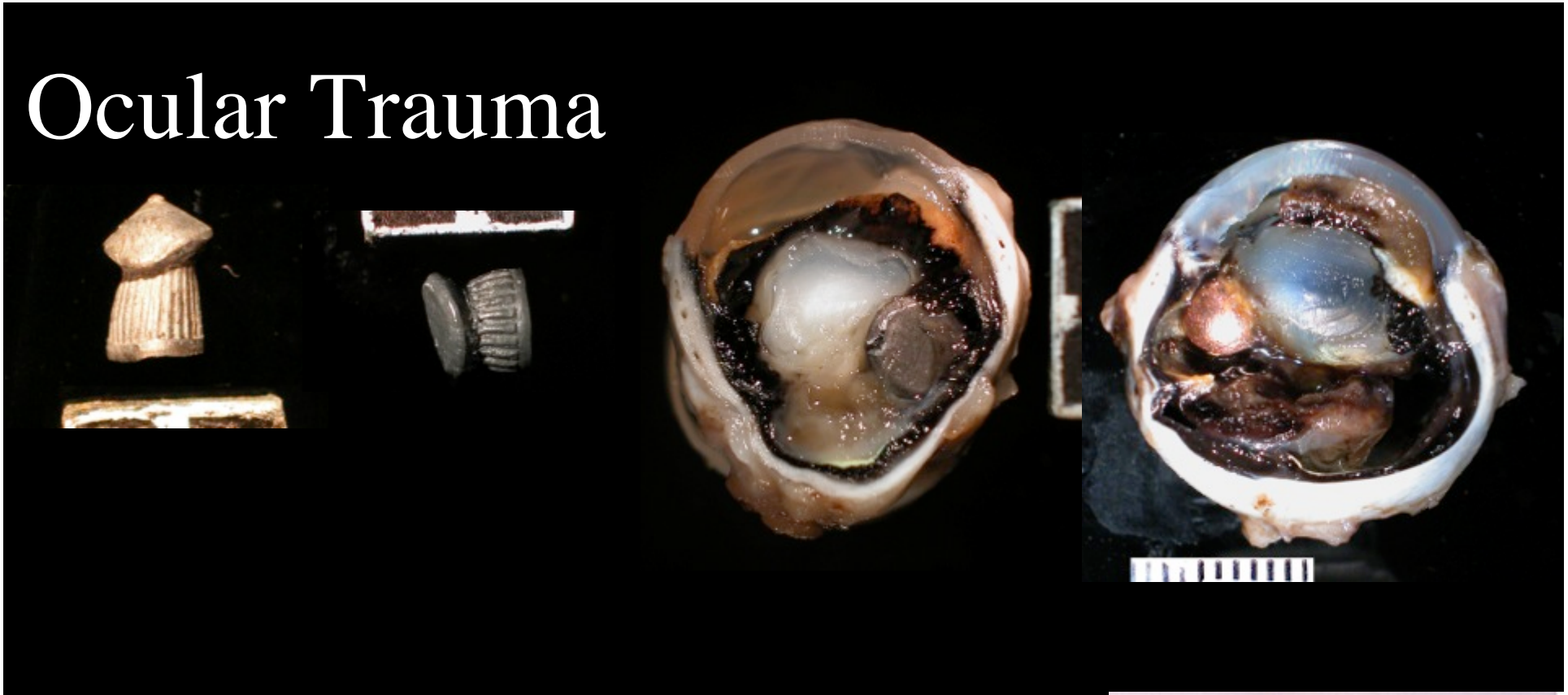
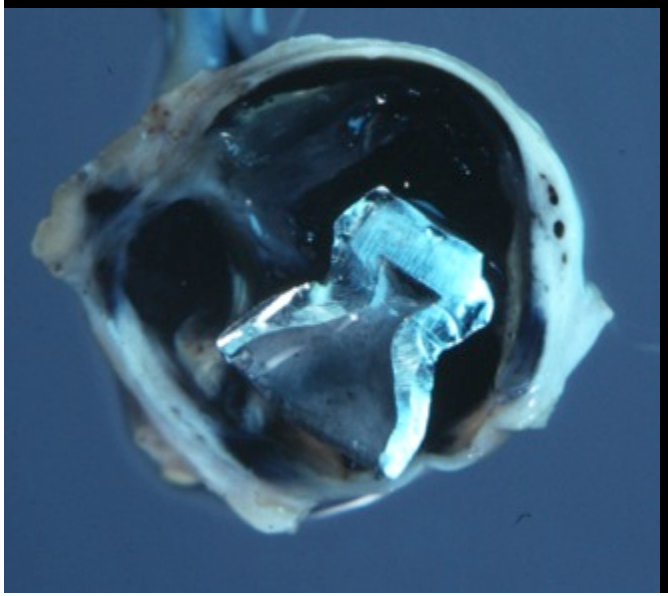


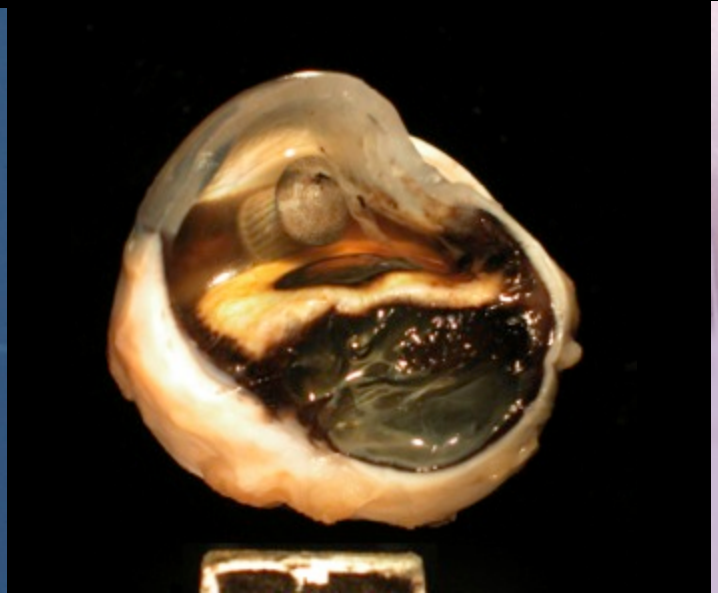
The Pathology of Trauma to the Eye, Spontaneous and Iatorgenic

Richard R Dubielzig

Ocular Trauma

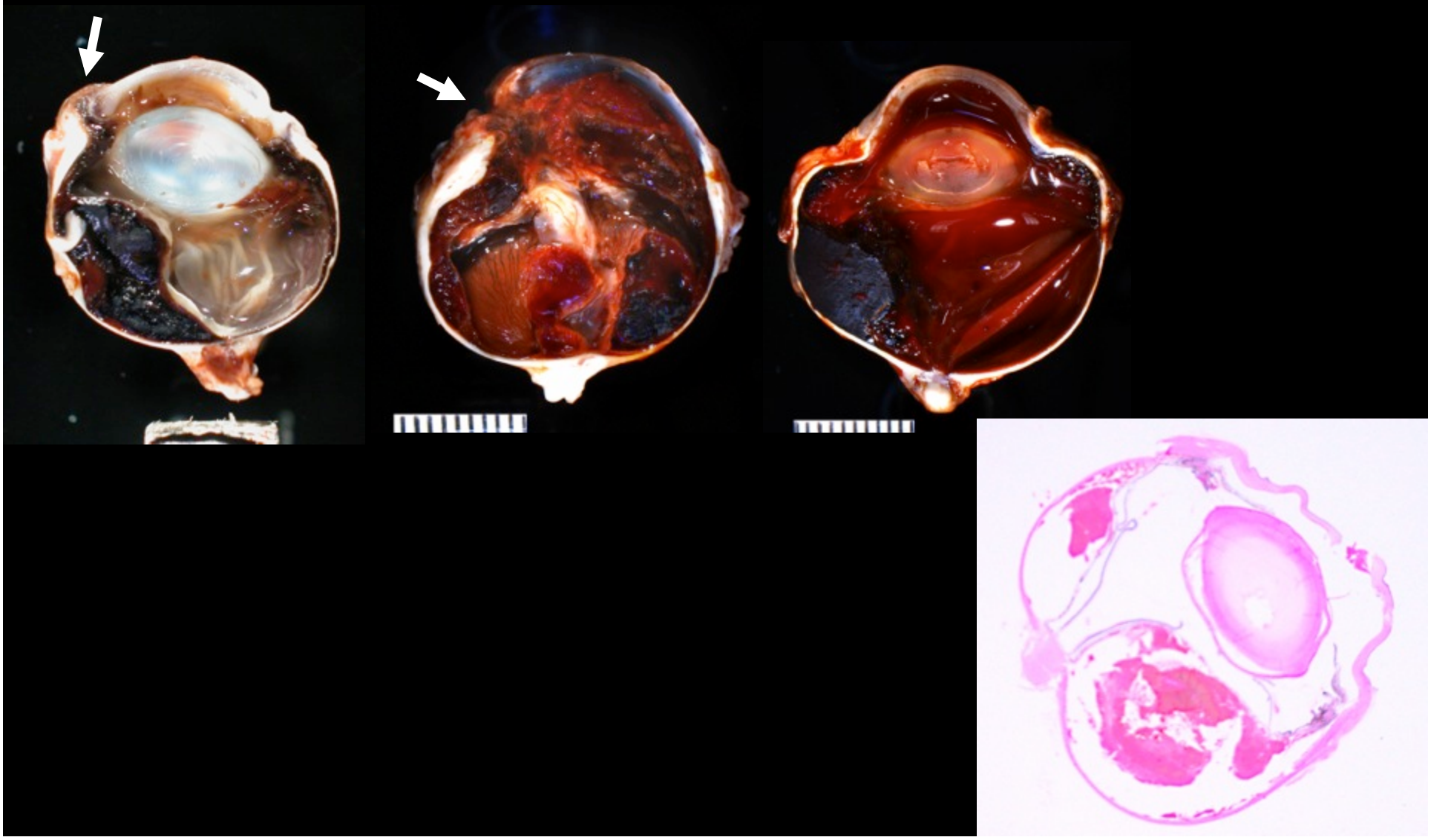




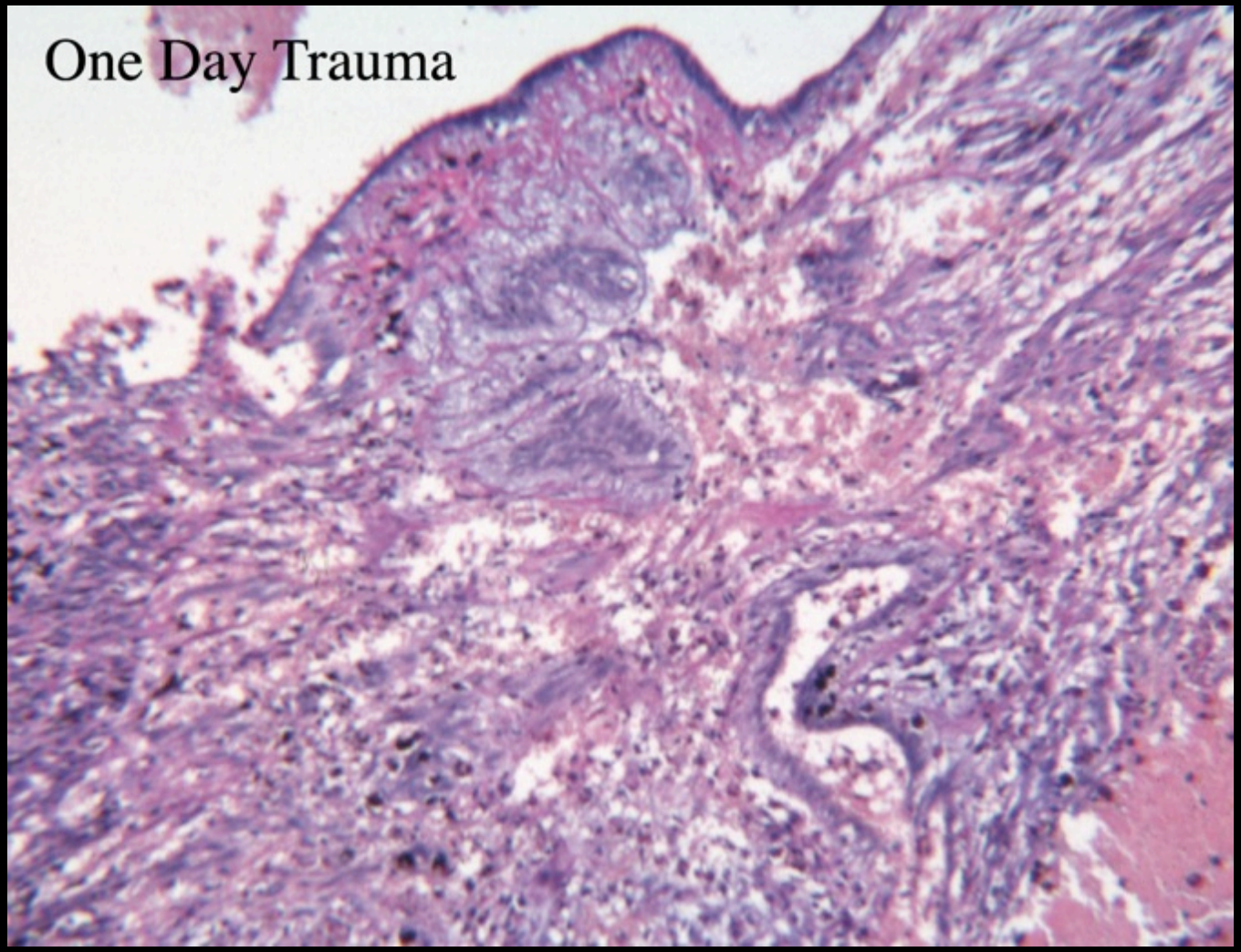


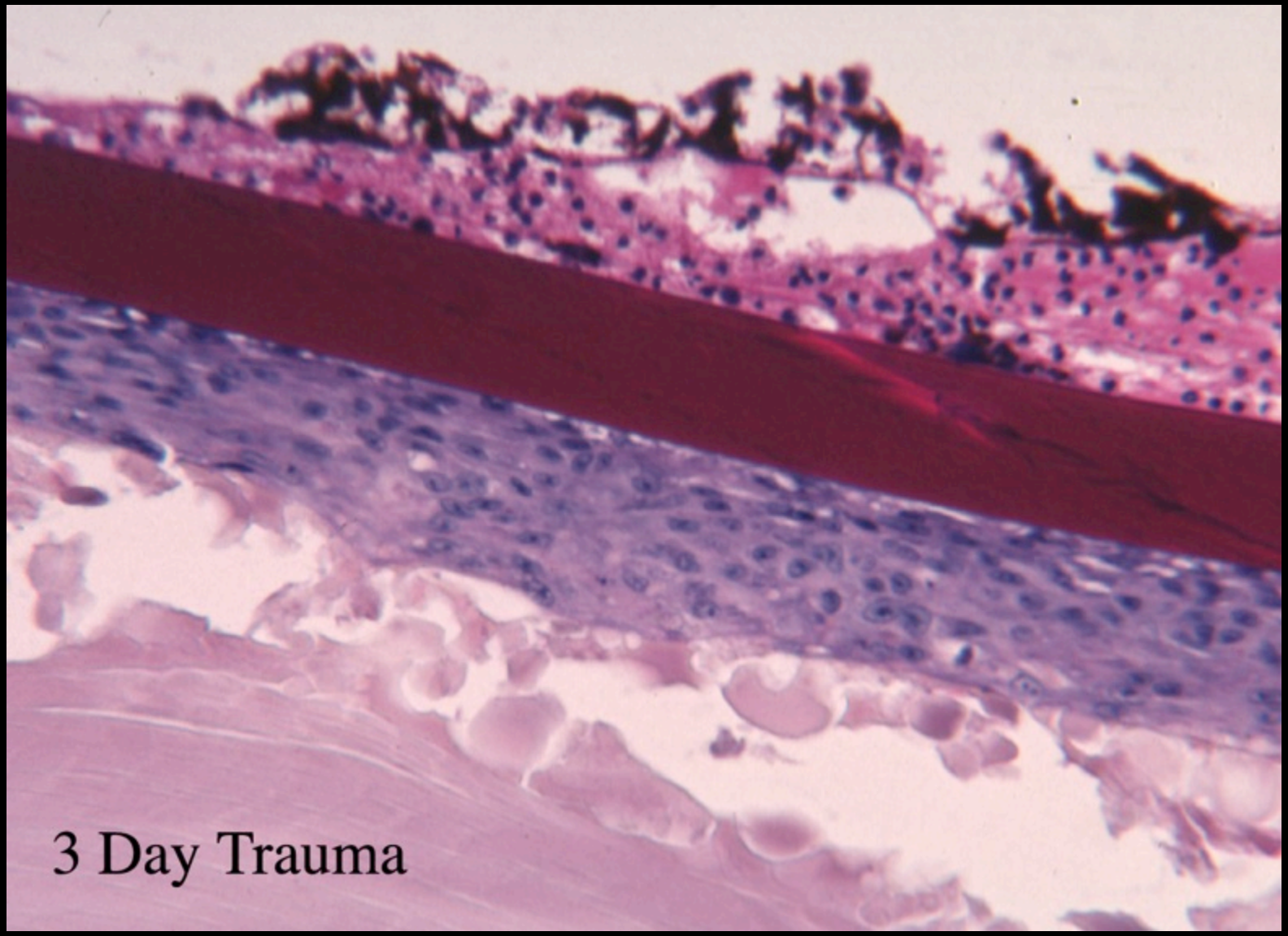
Expulsive Choroidal Hemorrhage

Sudden Loss of Intraocular Pressure

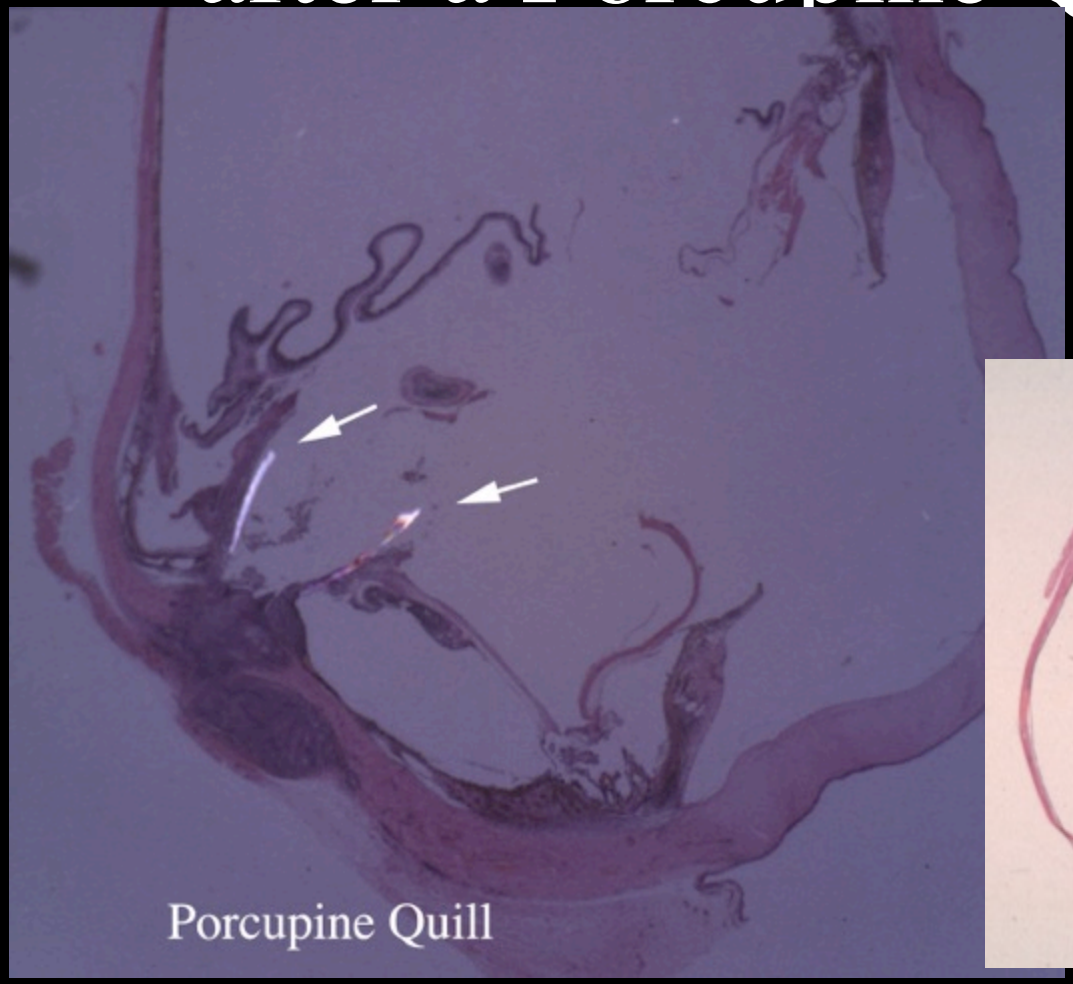


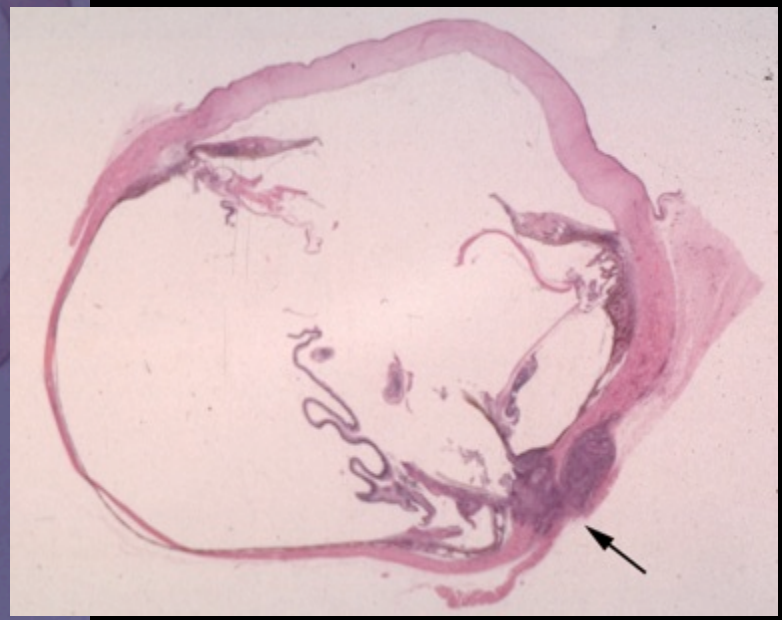
Early Cellular Events after Trauma

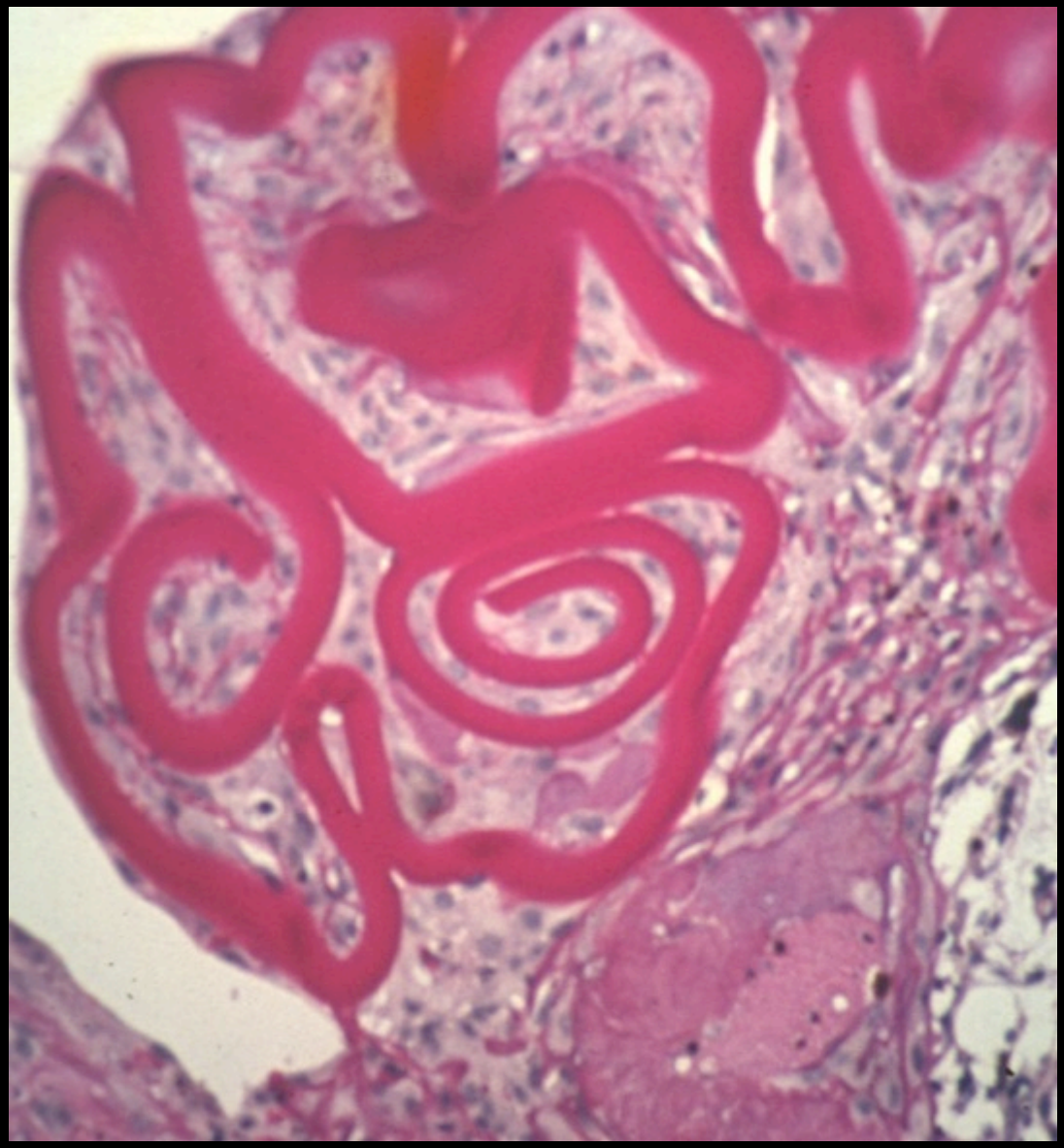



3 Day Trauma

Lens Epithelial Cell Proliferation after a Porcupine Quill Injury

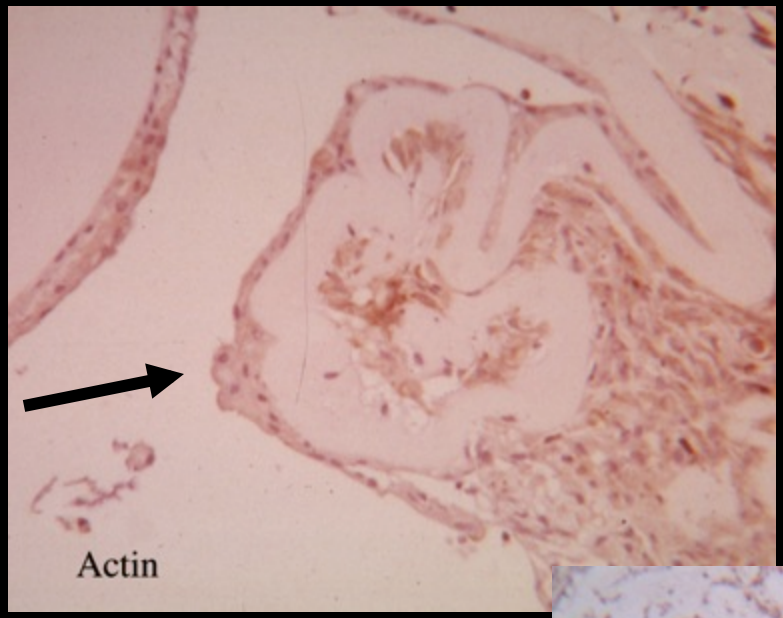


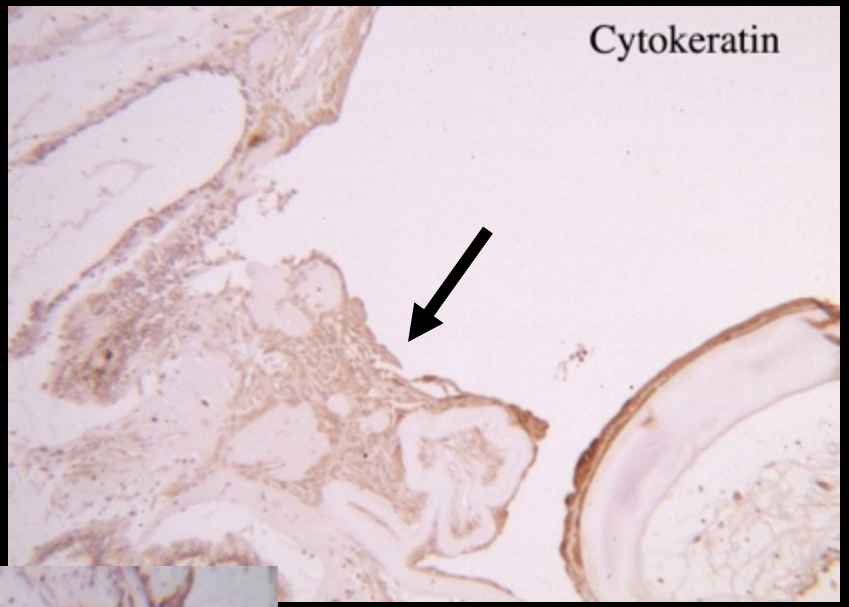


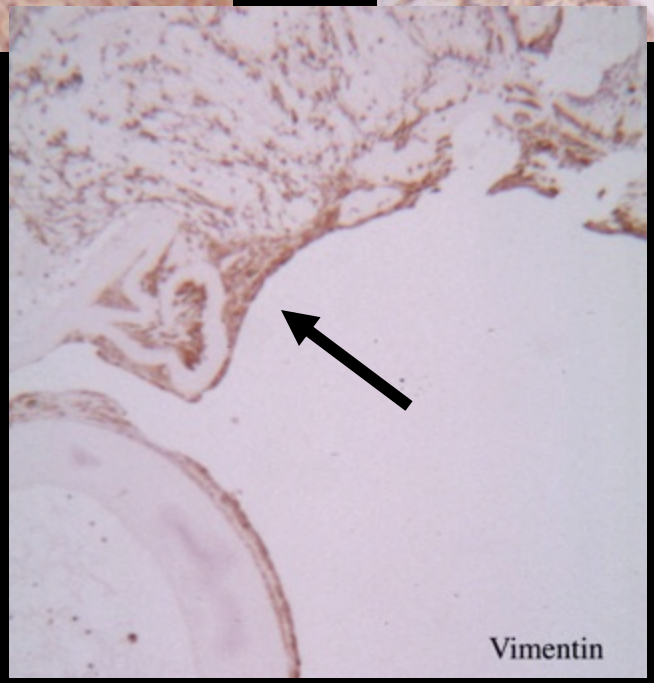


Porcupine quill injury

Lens epithelial cell proliferation and migration

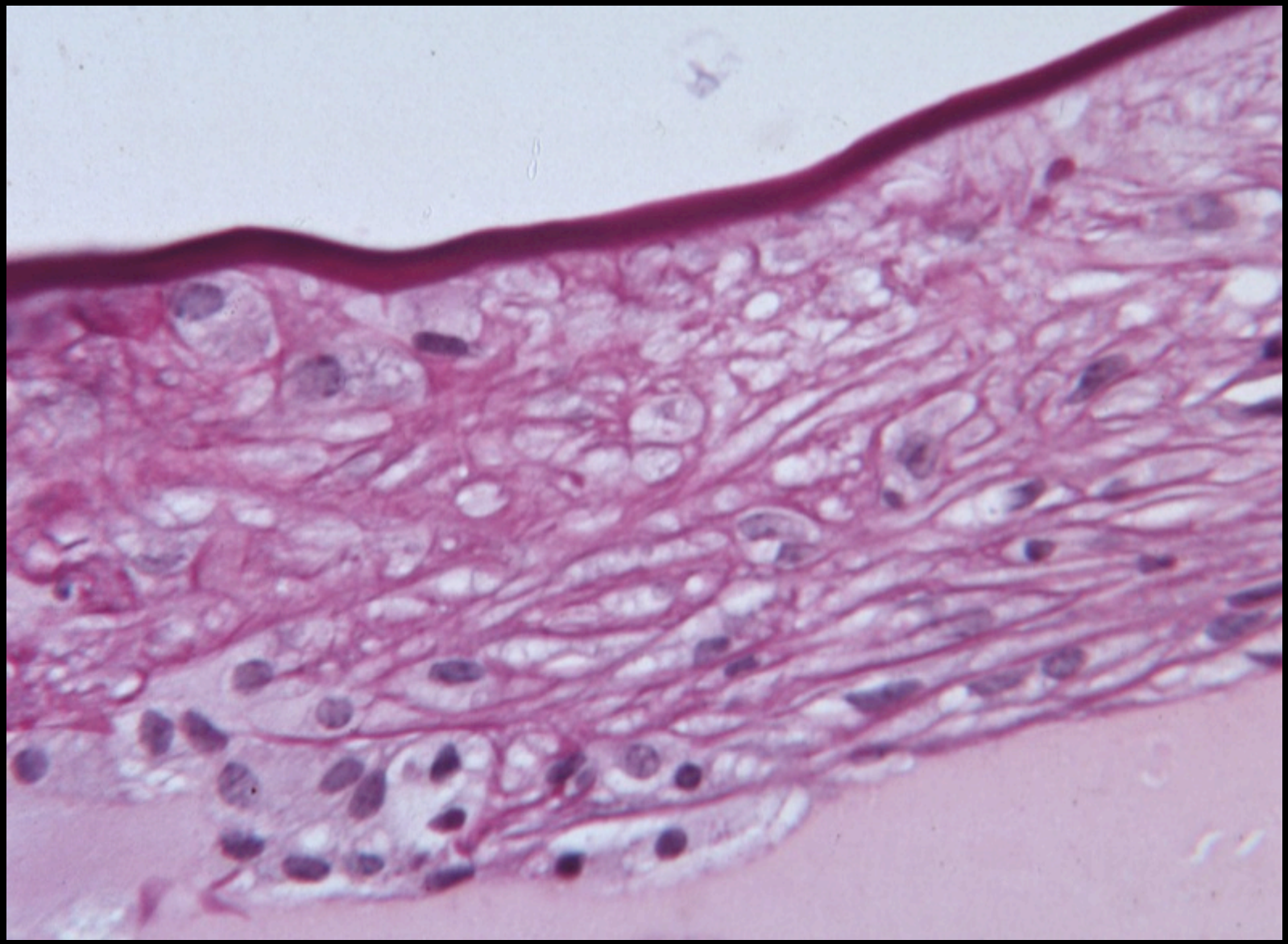




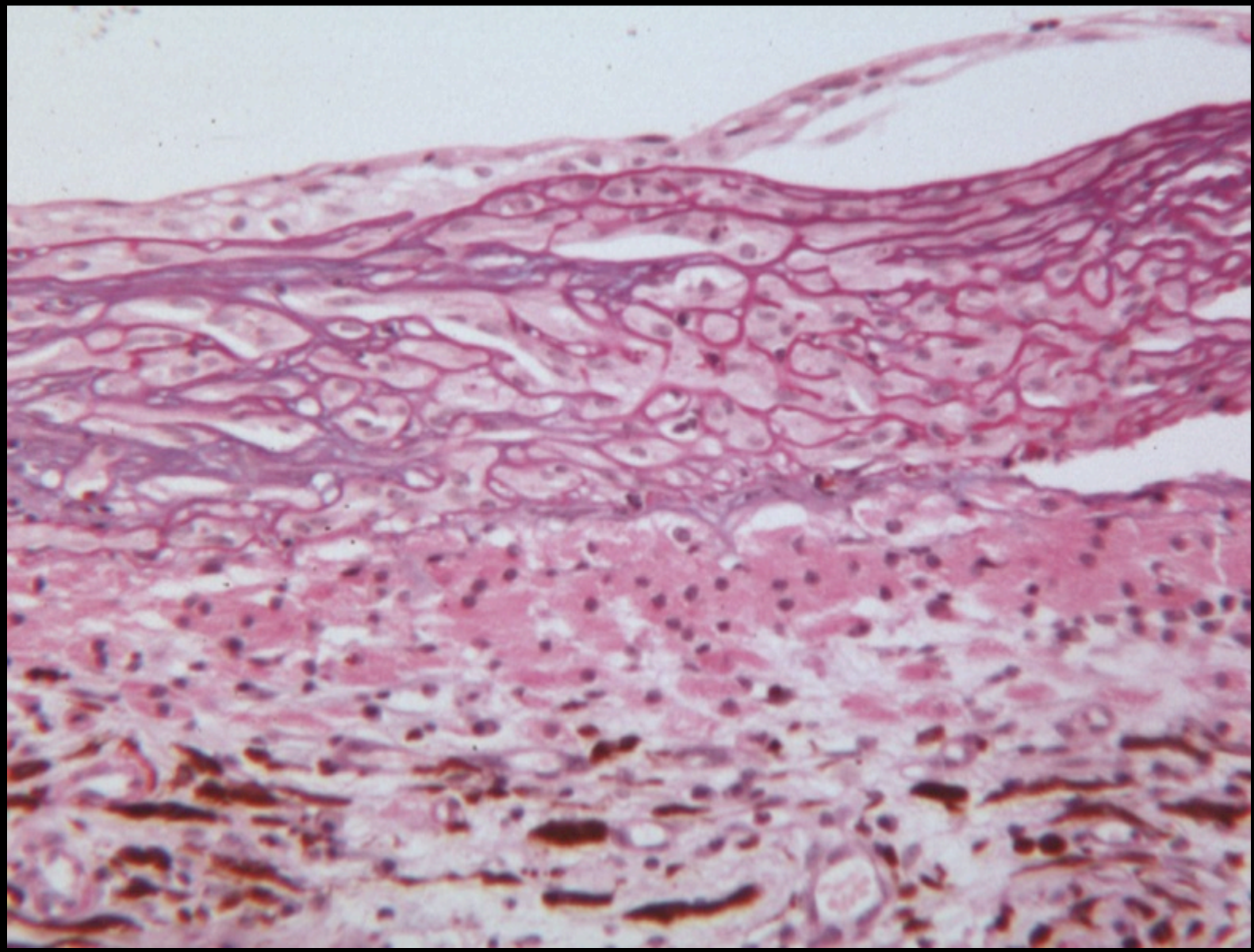


Porcupine quill injury

Lens epithelial cell proliferation and migration



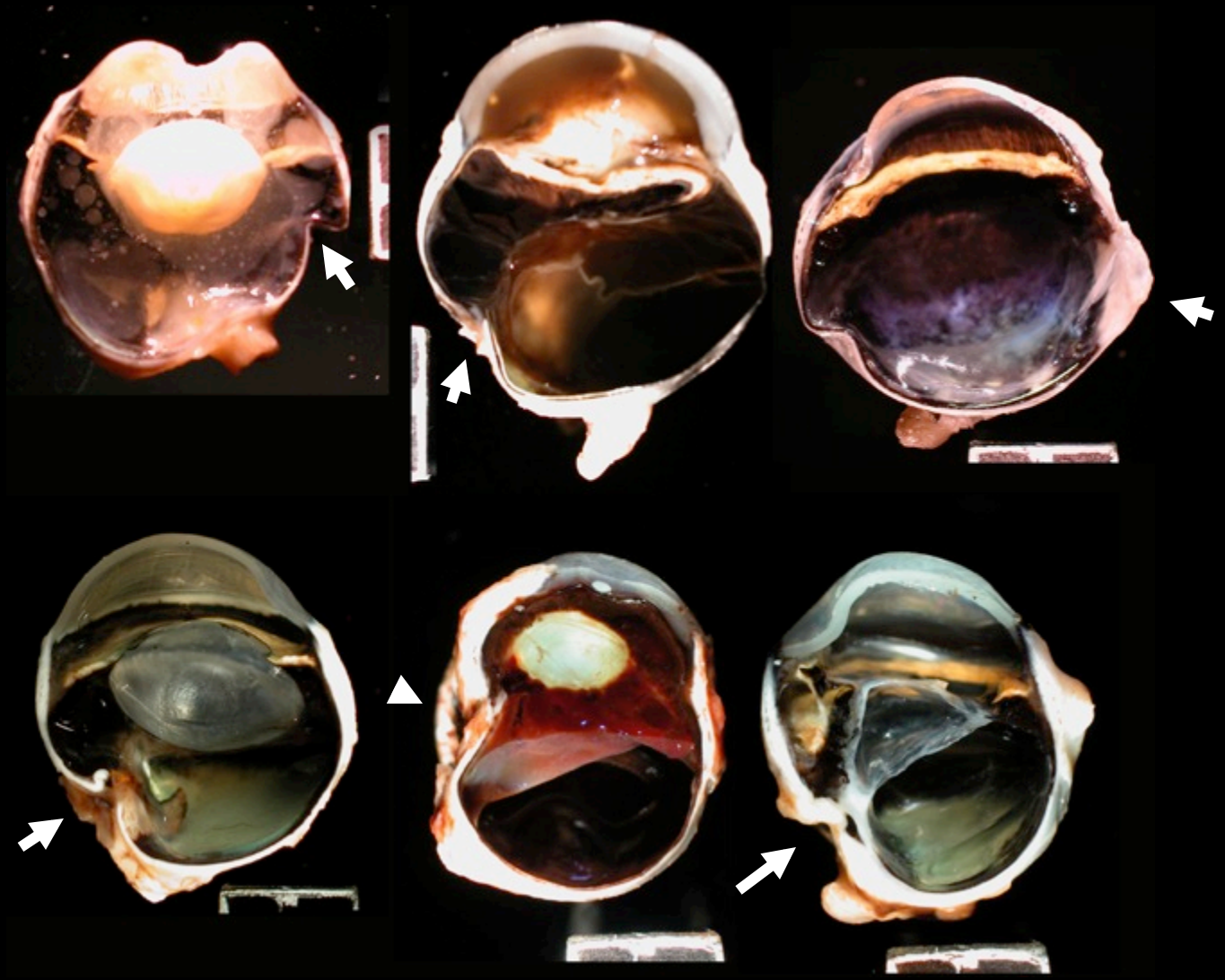
Lens Epithelial Cell Proliferation & Migration



Lens Epithelial Cell Proliferation & Migration on Tapetum

Scleral Rupture

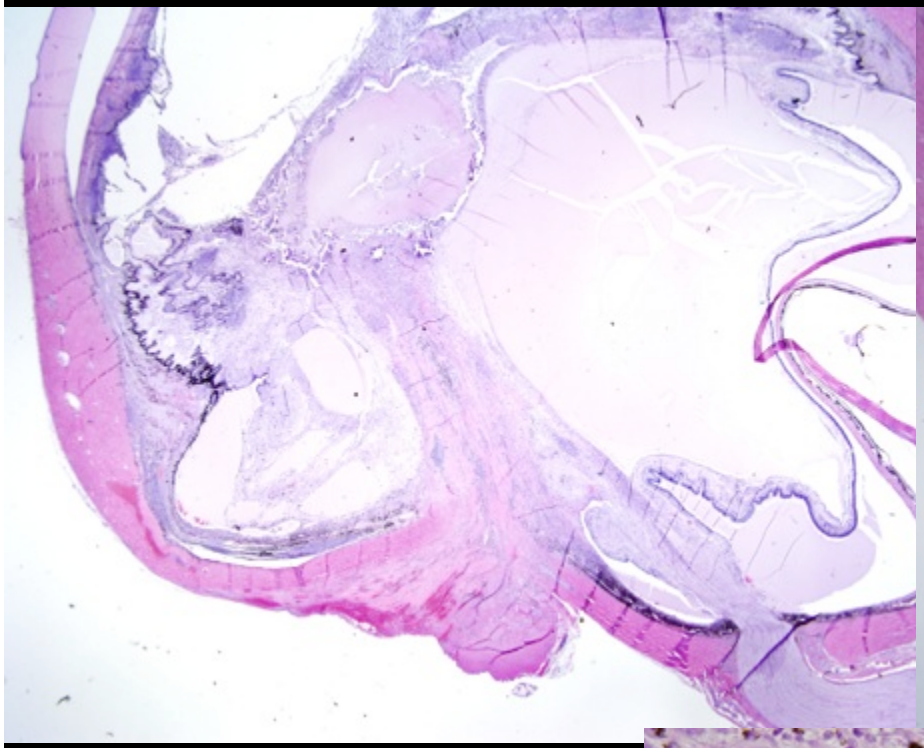
Blunt Trauma

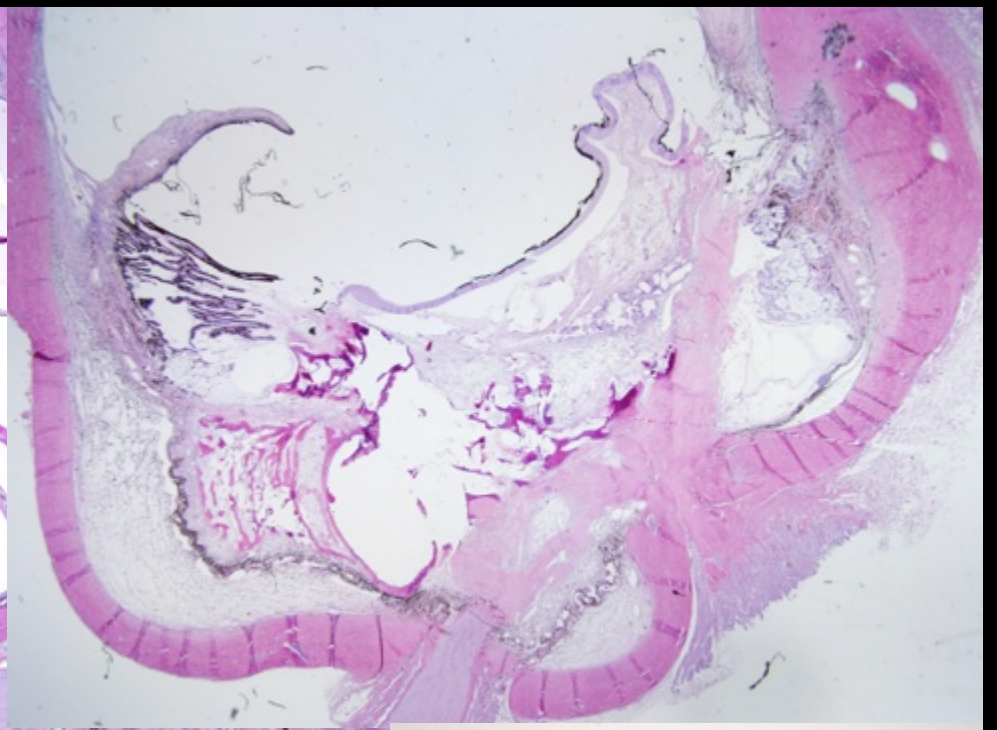


Scleral Rupture
Blunt Trauma

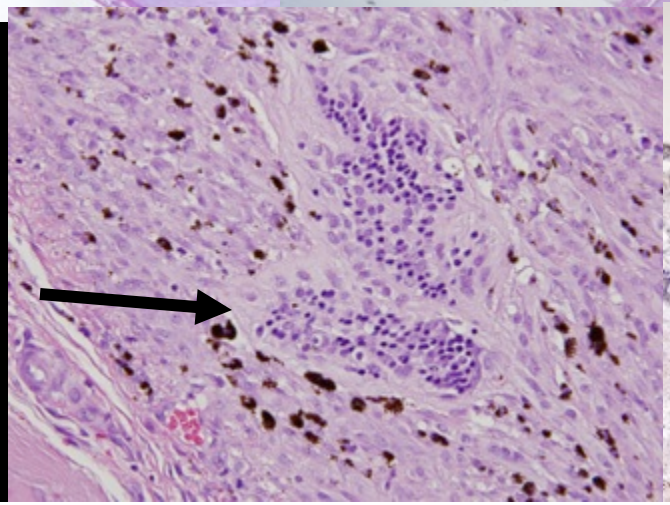
- In a series of 52 dogs
  - 6 Boston Terrier, 5 Yorkies, 4 Shih Tzu, 2 Labs
  - 11 less than 3 years old, 13 more that 10 years old
- In a series of 80 Cats
  - 56 DSH, 11 DLH
  - 15 less than 3 years old, 29 more than 10 years old

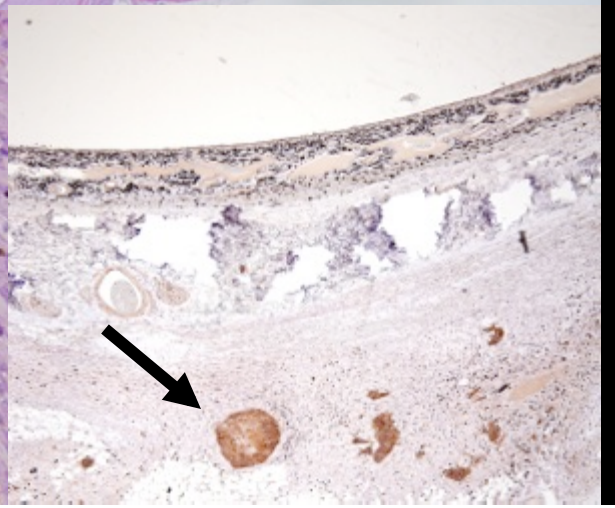
Scleral Rupture

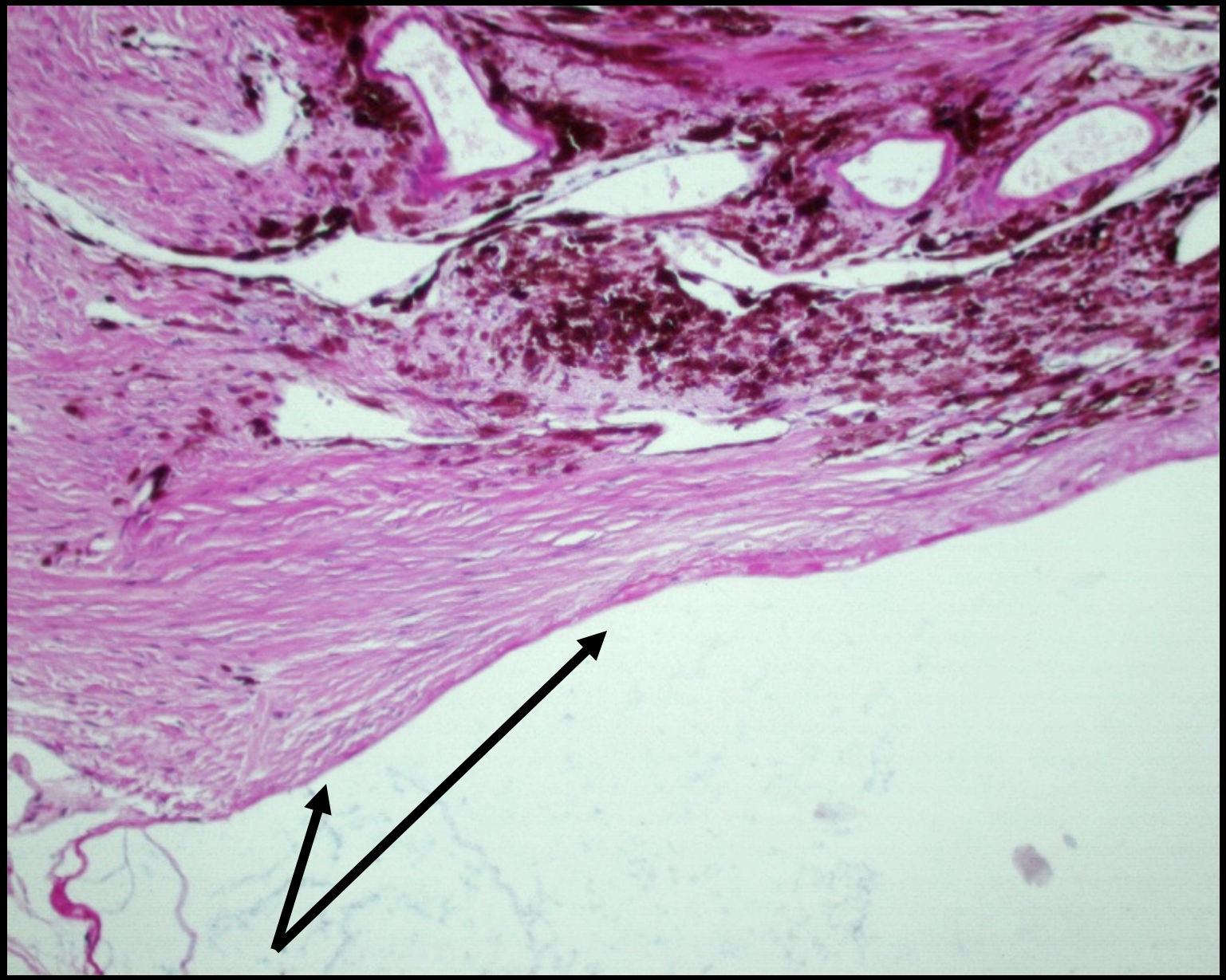




Episcleral Retinal Extrusion







Fibrosis Internal to the Choroid

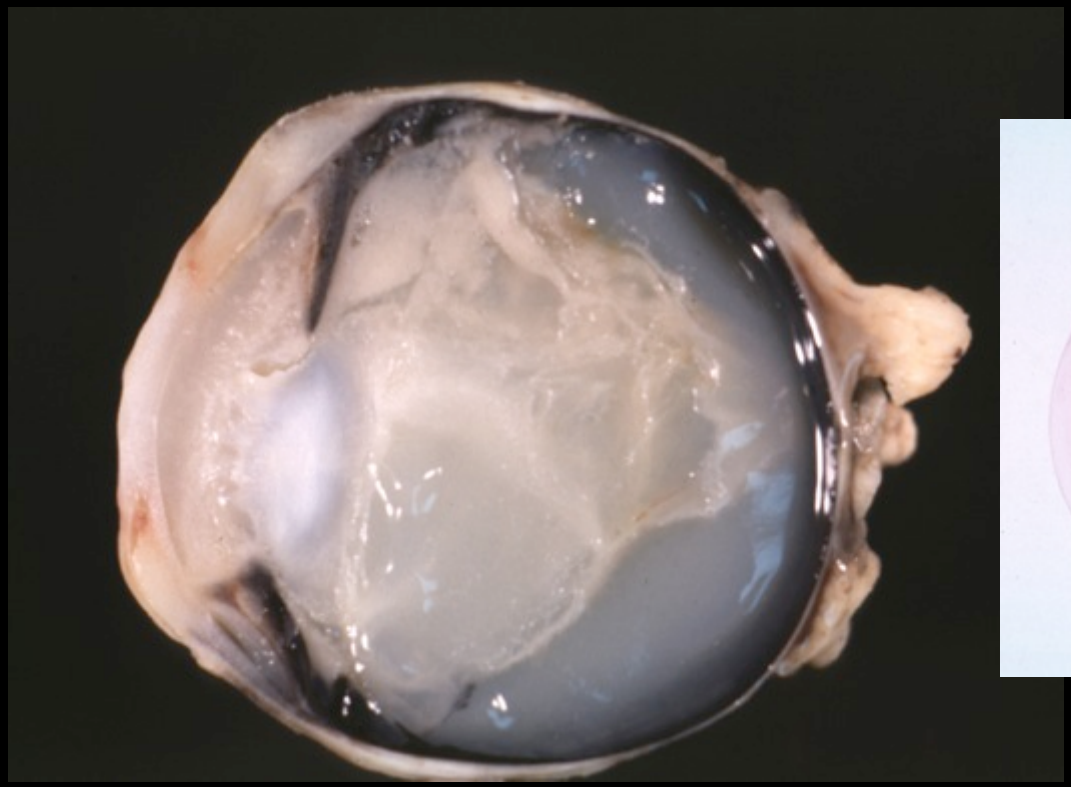
Endophthalmitis or Panophthalmitis Breeds in 1420 Canine Cases

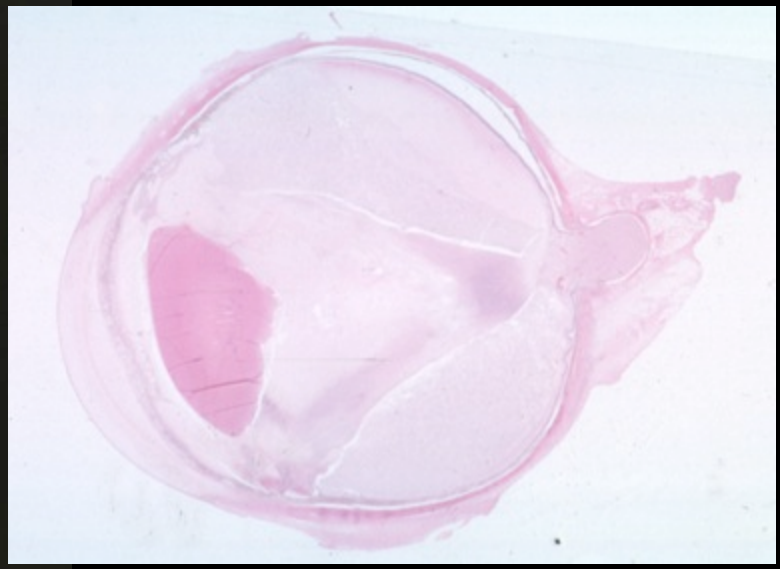
- Shih Tzu……..153
- Pugs……55
- Labs……..82
- Lhasa Apso……...31
- Dachshund.....46
- Boston Terrier……55
- Golden Retriever…46
- German Shepherd...31
- Yorkies……44

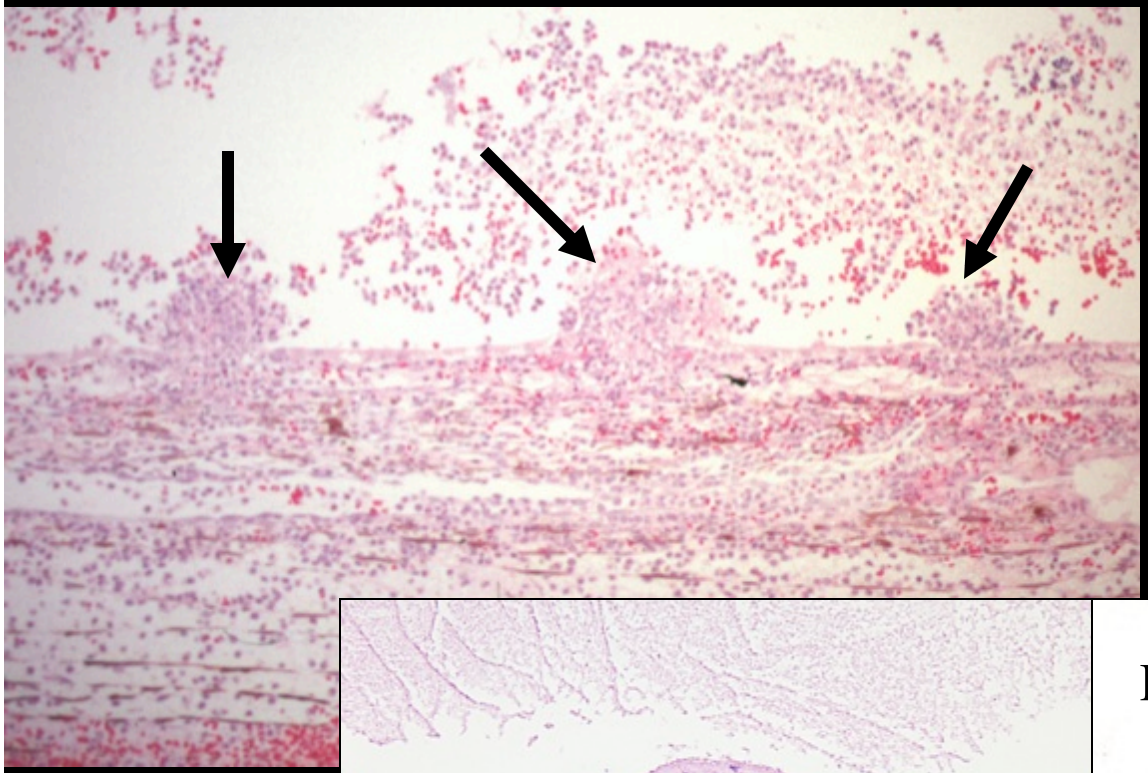
AKC Most Popular Breeds in USA

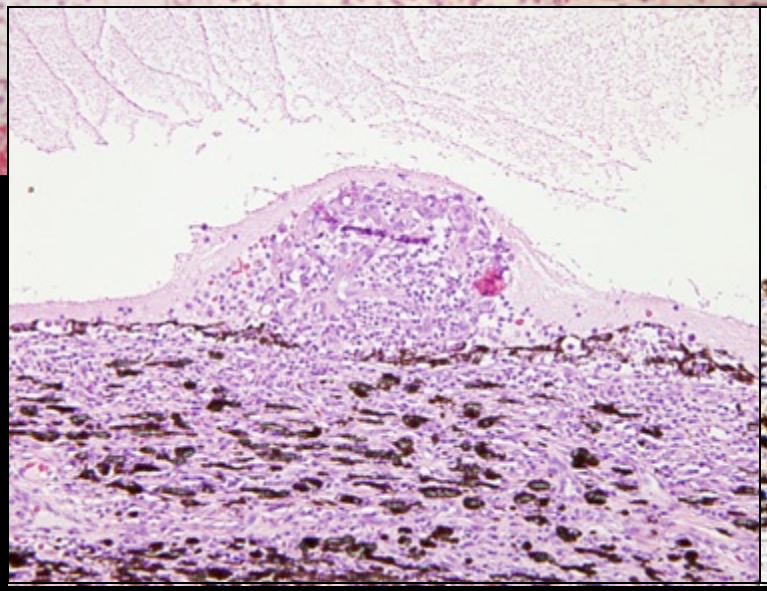
1. Labrador retrievers 154,616
2. Golden retrievers 56,124
3. German shepherds 46,963
4. Beagles 44,610
5. Dachshunds 42,571
6. Yorkshire terriers 37,277
7. Boxers 34,340
8. Poodles 33,917
9. Chihuahuas 28,466
10. Shih Tzus 28,294

Endophthalmitis





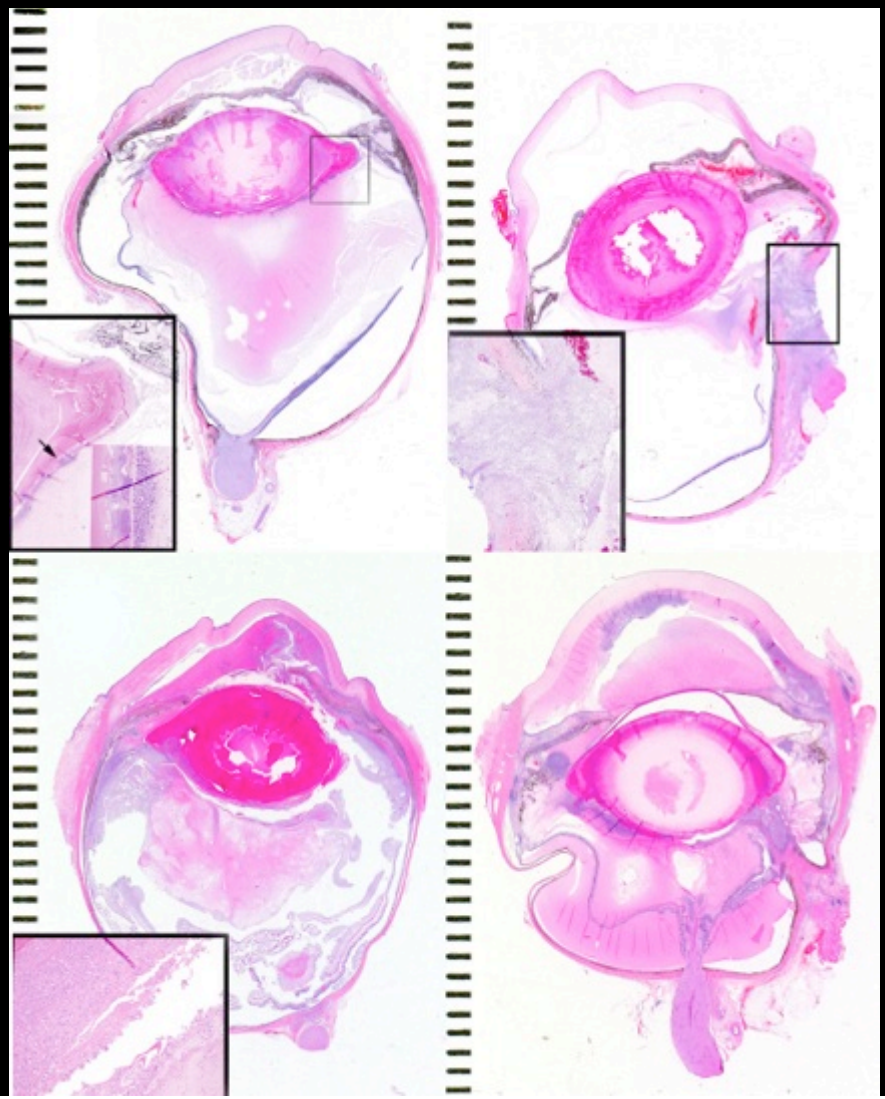




"Volcanoes" in the subretinal space, extending from the choriocapillaris

Endophthalmitis Following a Dental Accident

7 cats and 14 dogs

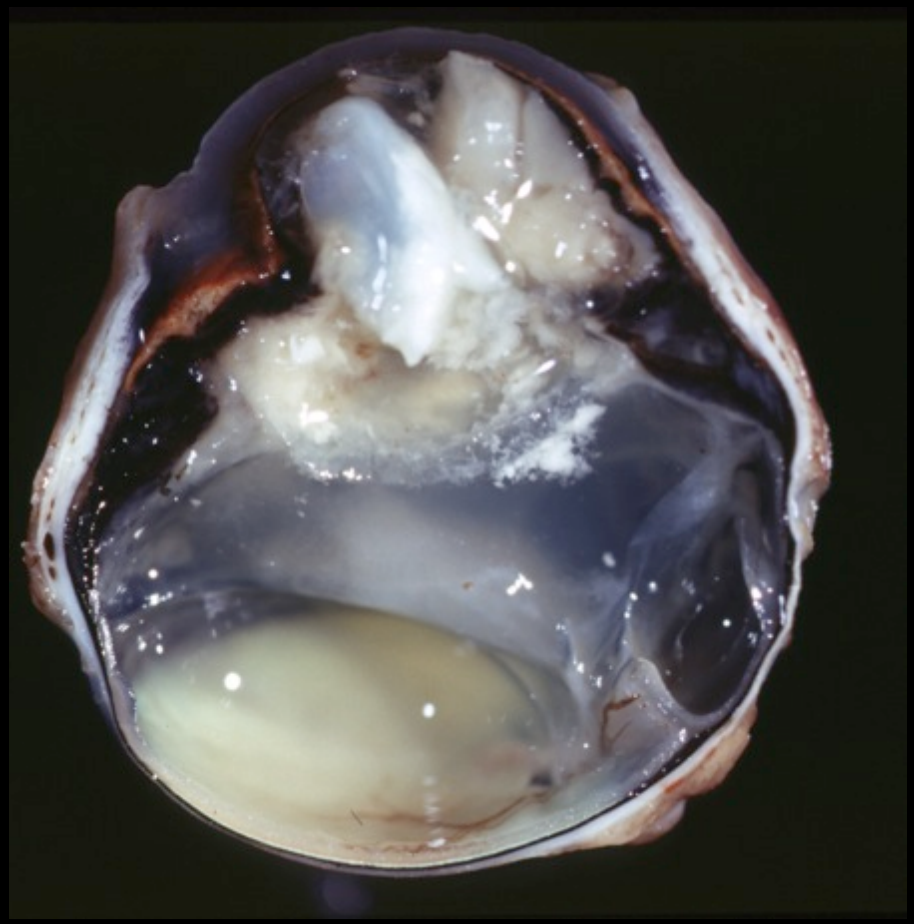


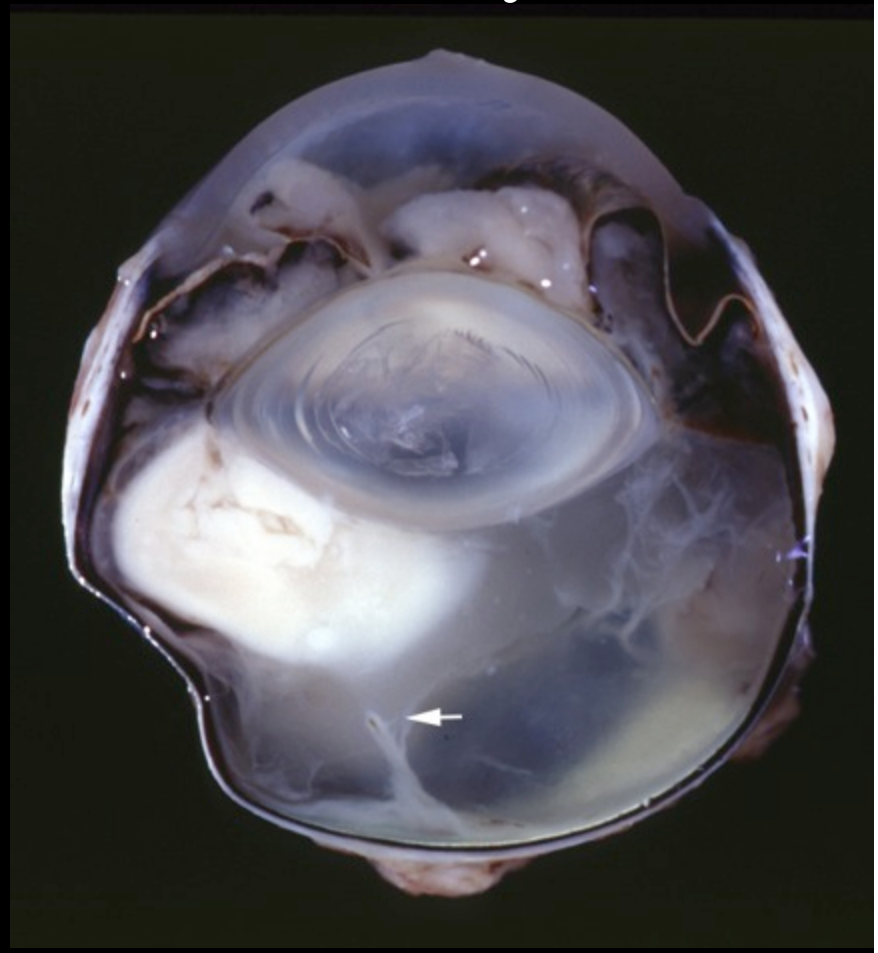
Endophthalmitis with Foreign Body

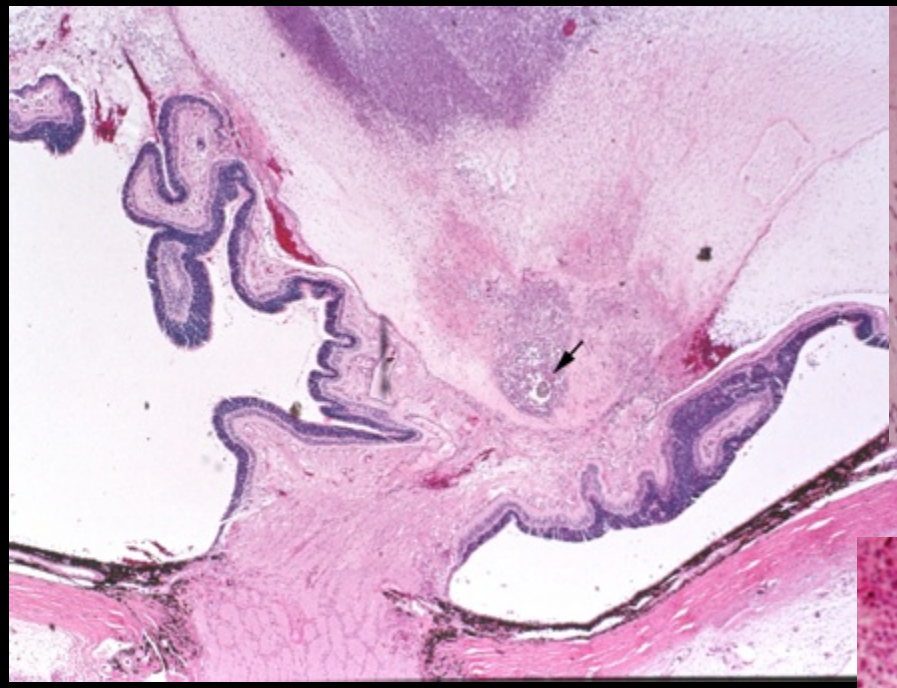
68 cases in dogs

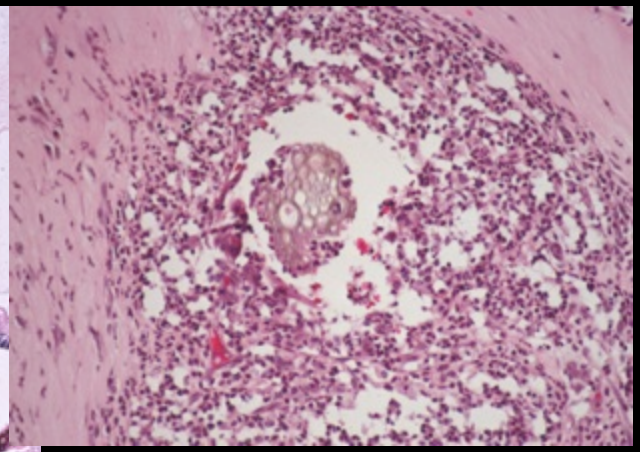
Large Breed dogs are over-represented

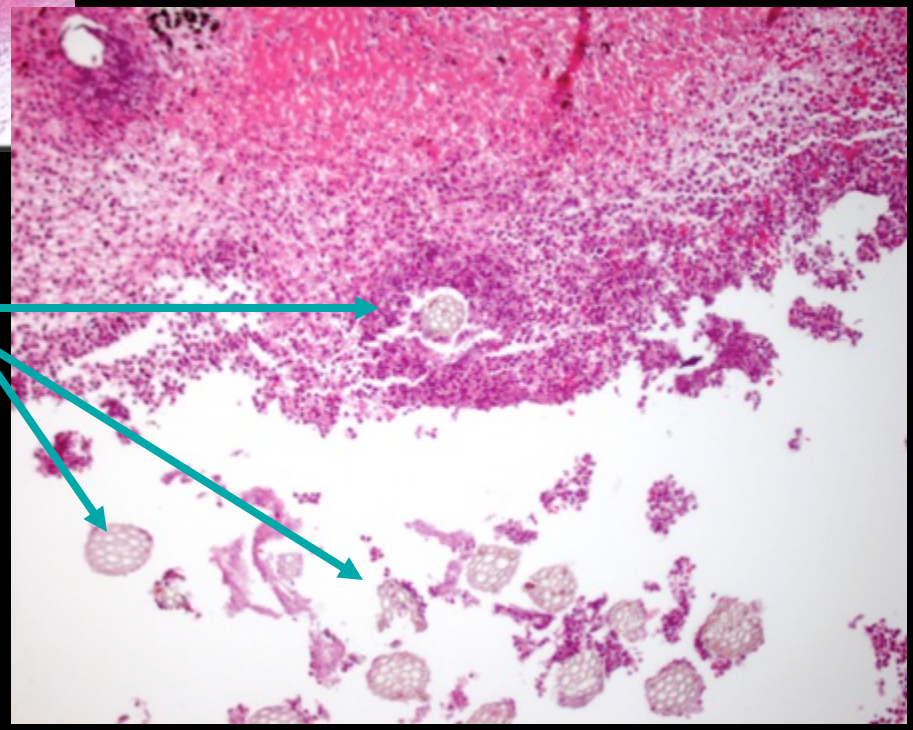
Plant foreign body the most common by far



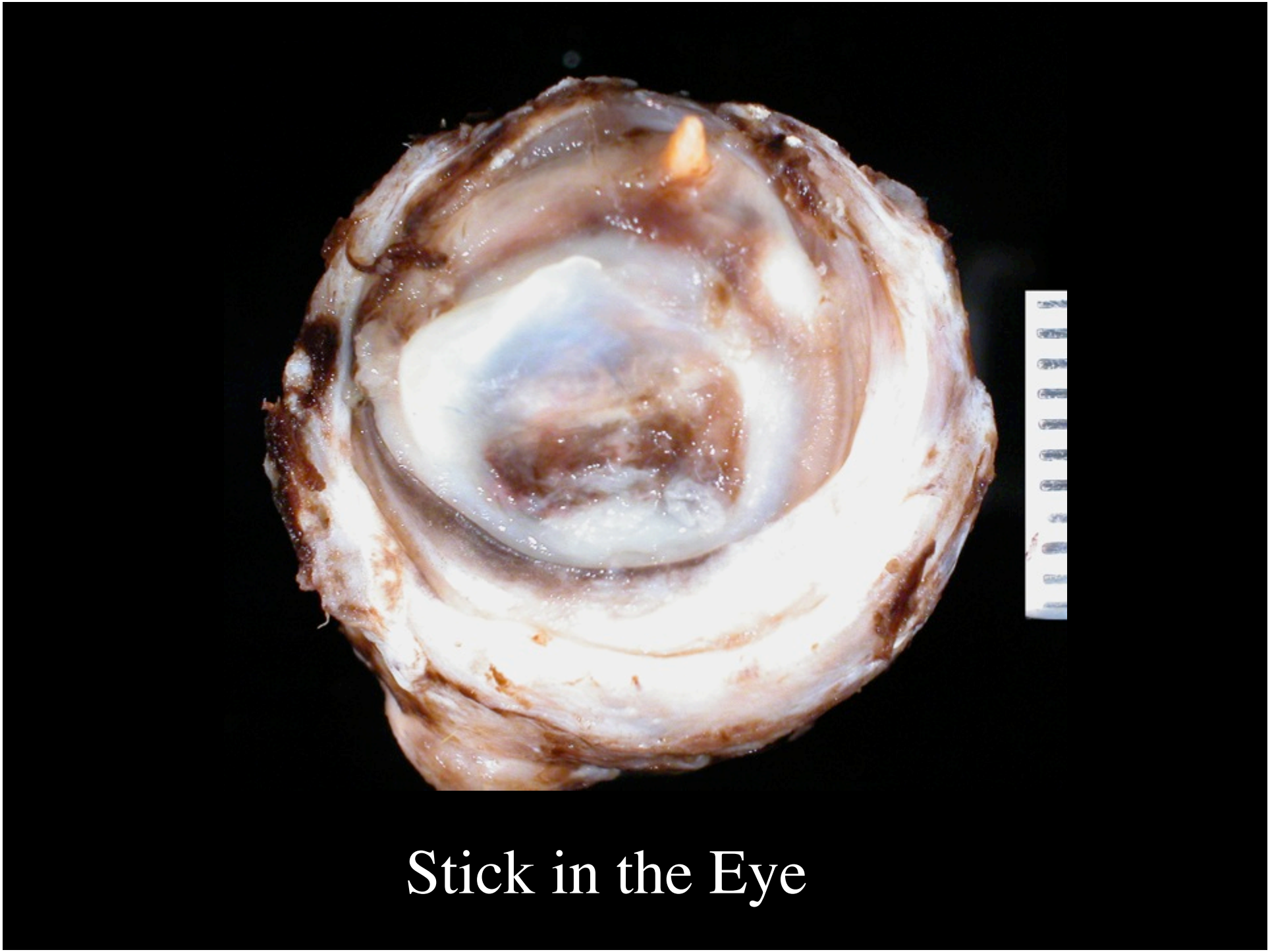








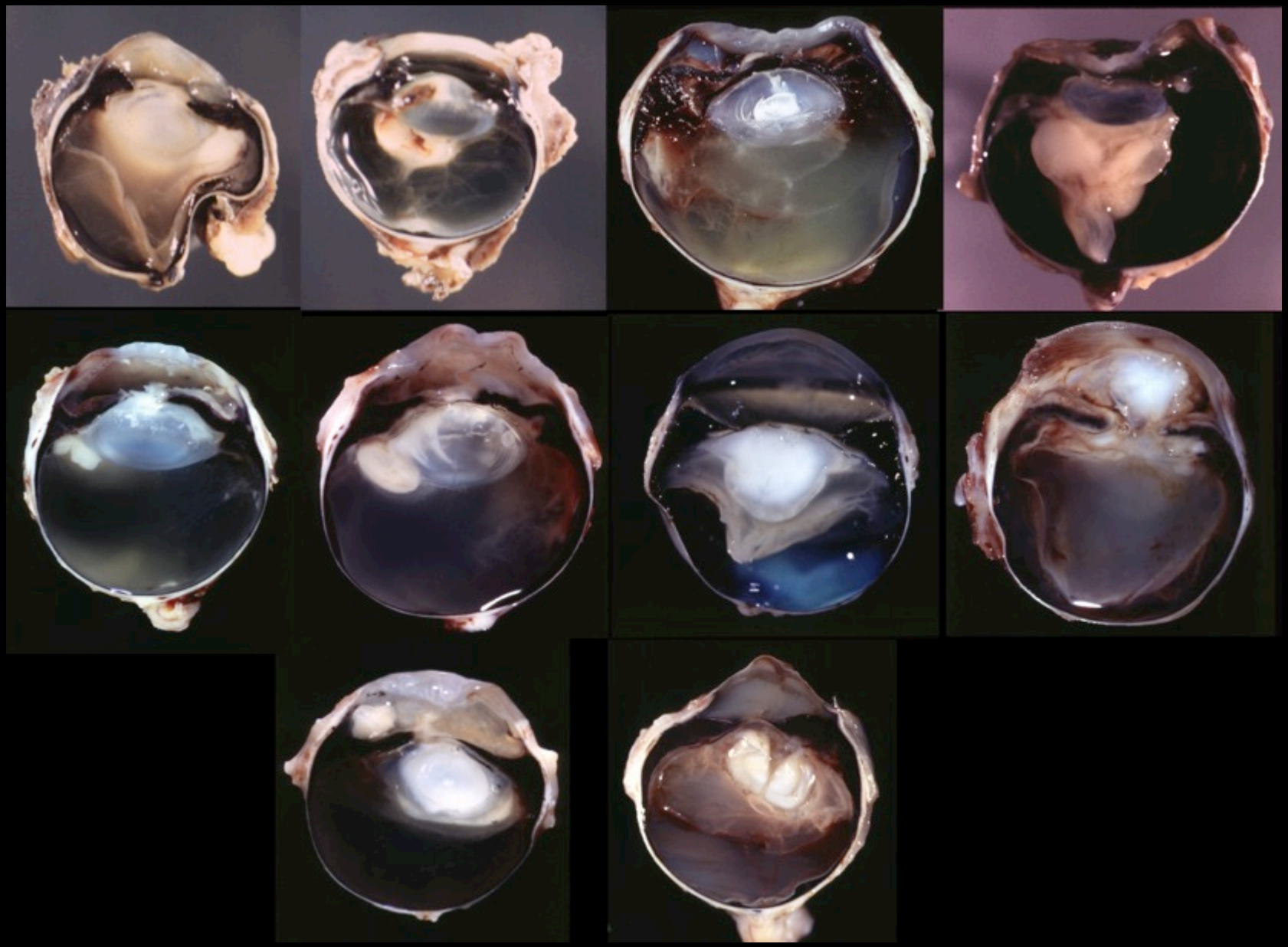
Plant Foreign Bodies



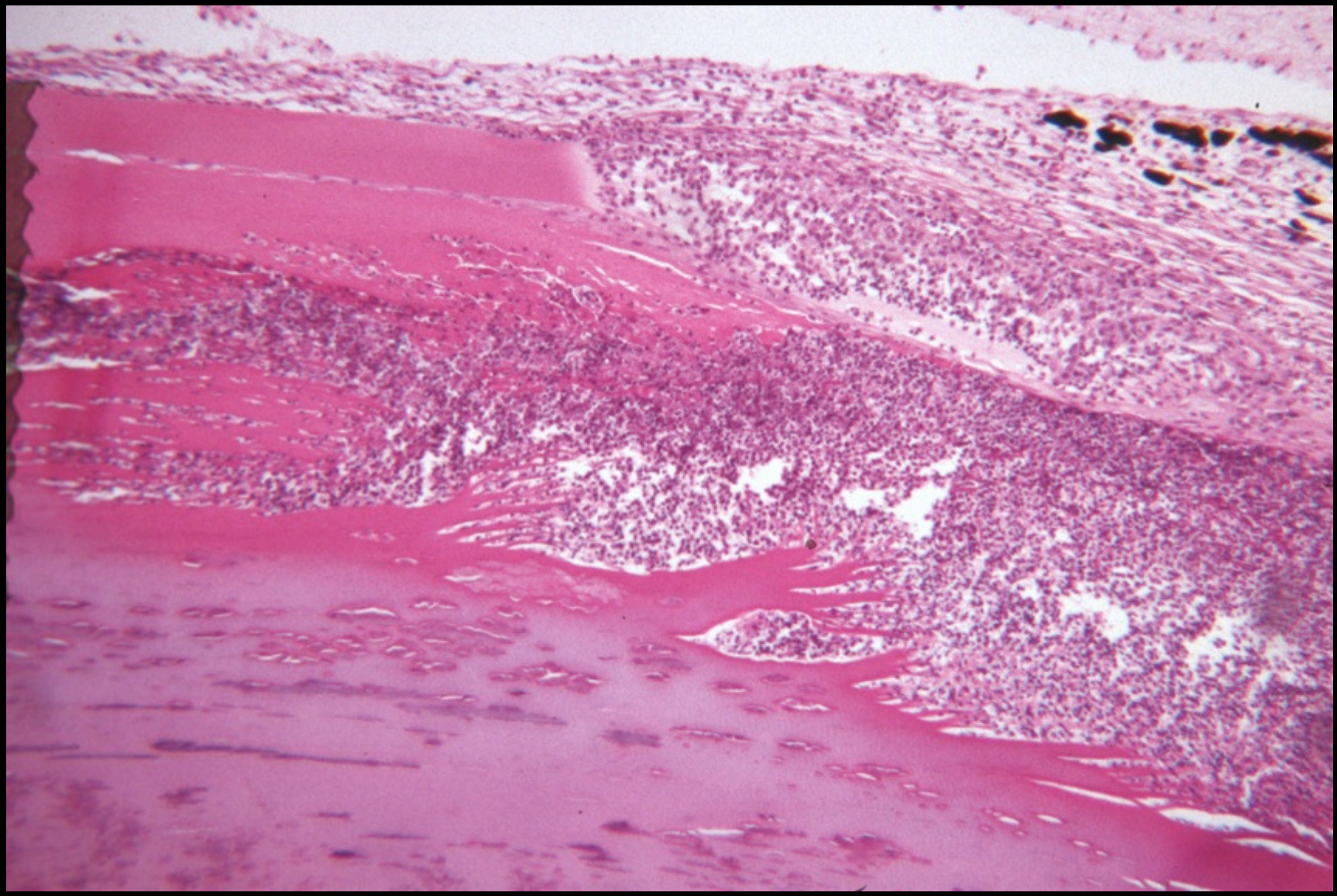
Stick in the Eye

Septic Implantation Syndrome 139 in dogs & 36 in cats

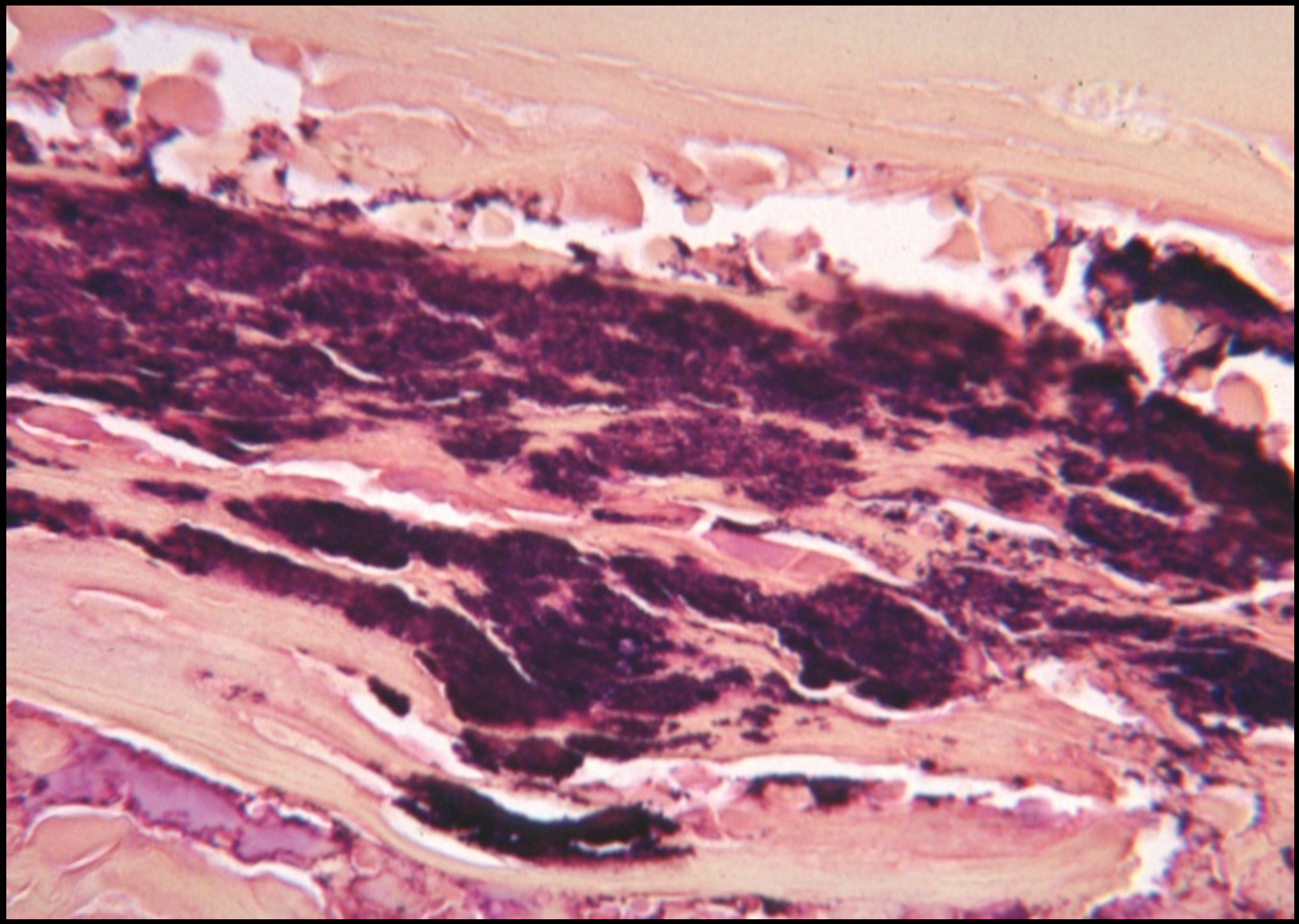
- Syndrome features
  - Suppurative endophthalmitis
  - Fibrous posterior synechia
  - Lens capsule rupture with a suppurative infiltrate into the lens
  - Bacterial colonies in the lens protein away from the neutrophils, less often, fungi
- No particular breed
- 56/139 dogs less than 6 years-old
- 18 of 36 cats less than 6 years-old
- 37 dogs more than 10 years-old and 9 cats more than 10



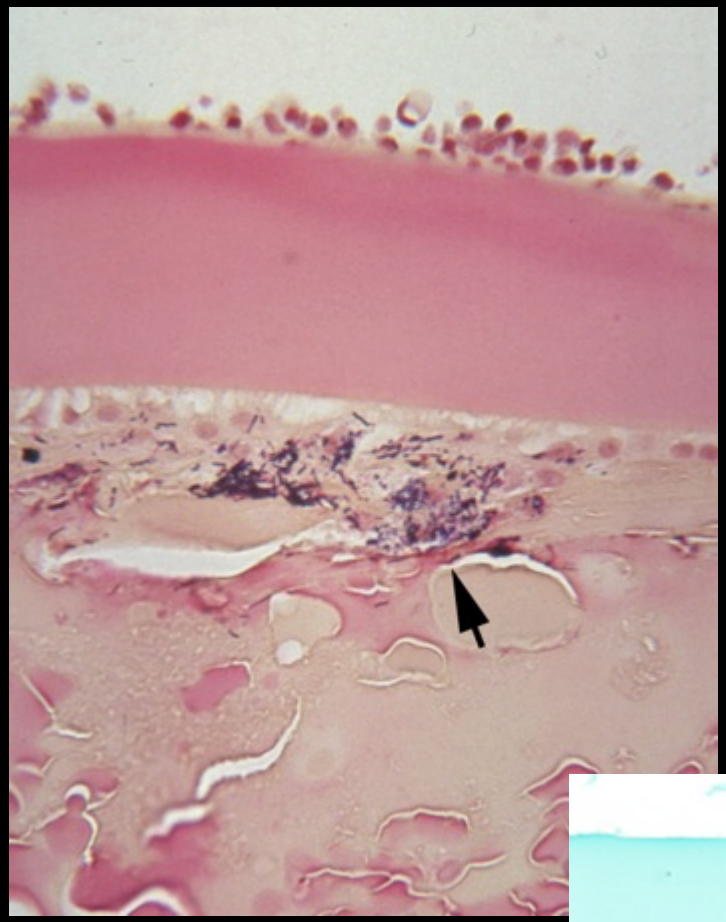
Septic Implantation Syndrome (10 cases)

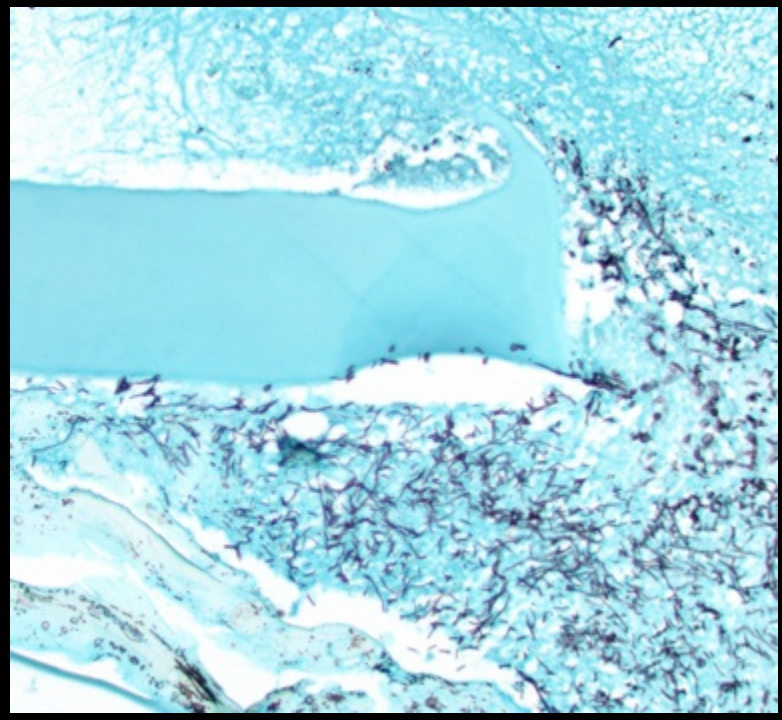


Lens capsule rupture with
a suppurative infiltrate into the lens

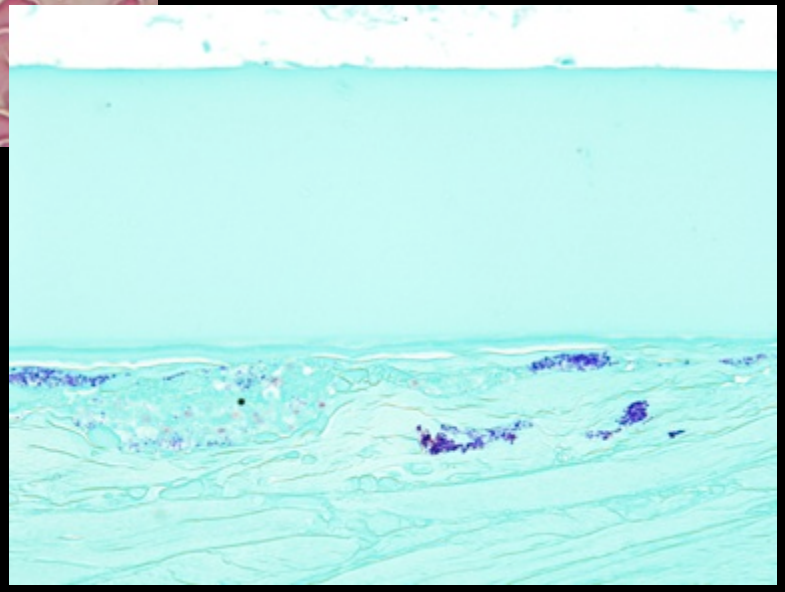


Gram+ Bacteria



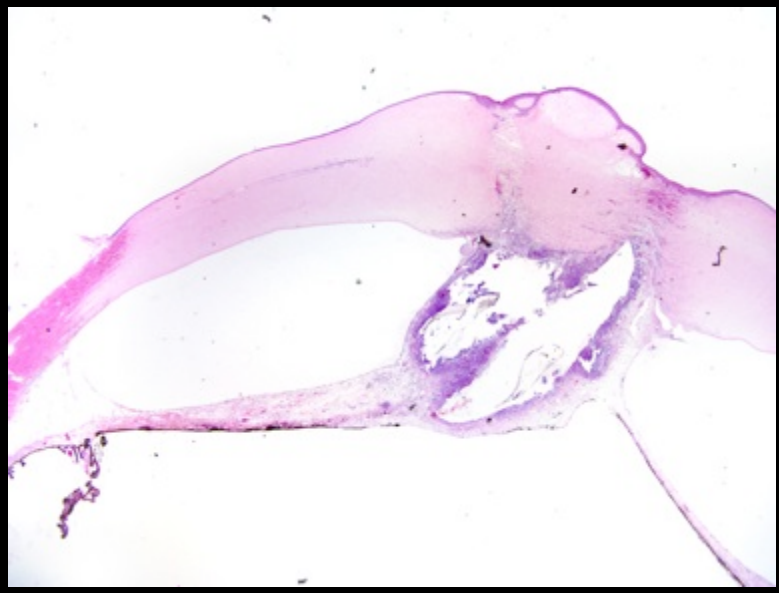


Mycotic

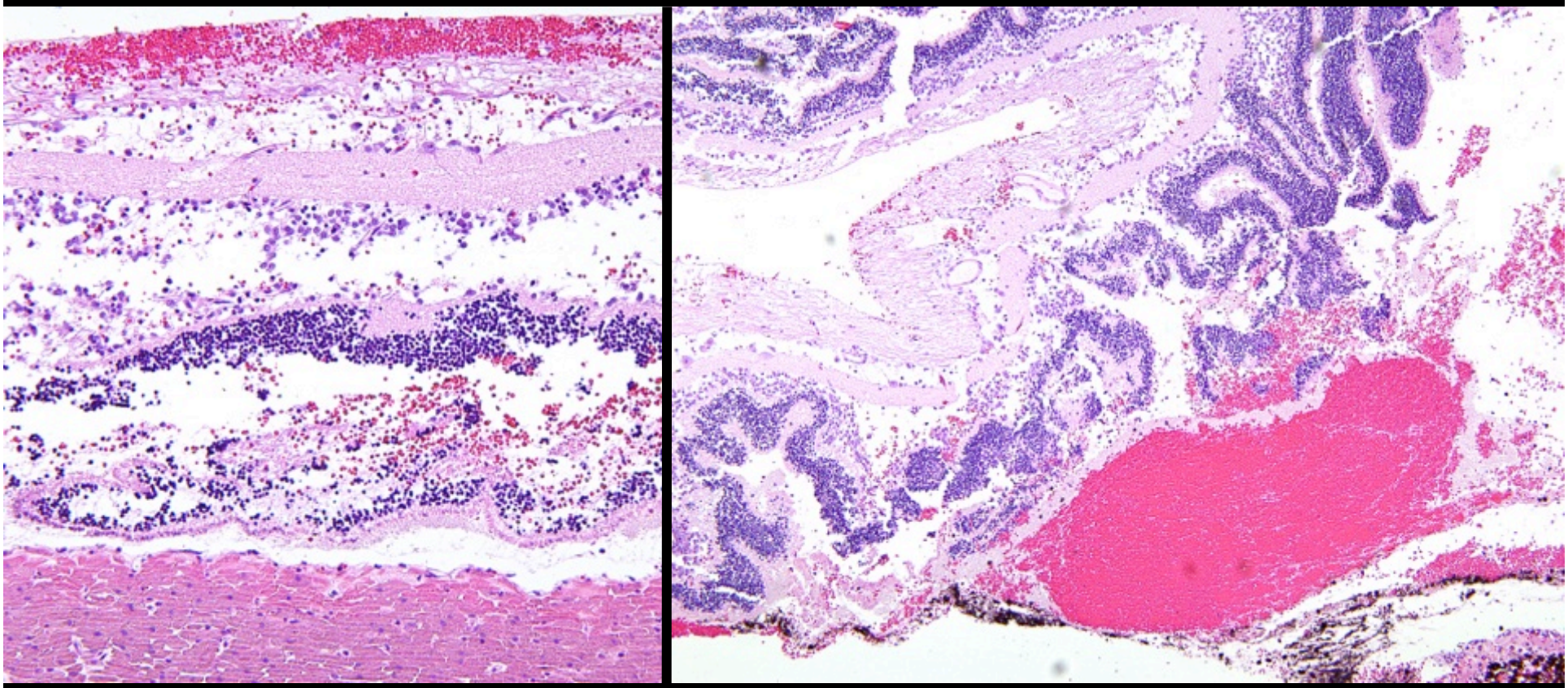


2 examples of
Mixed Bacteria

Septic Implantation Syndrome is Caused by a Cat Scratch Until Proven Otherwise

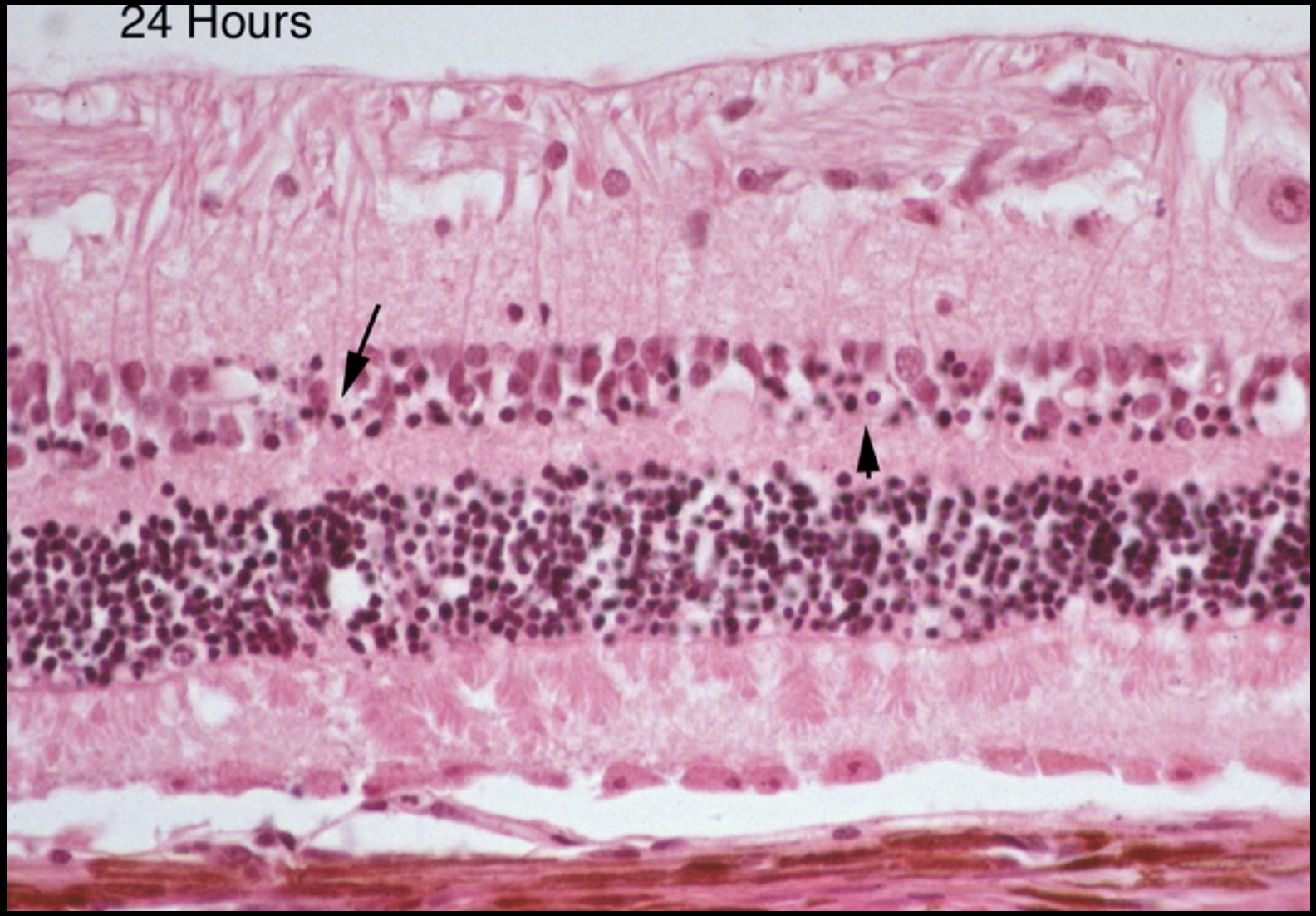


Blunt Trauma to the Retina

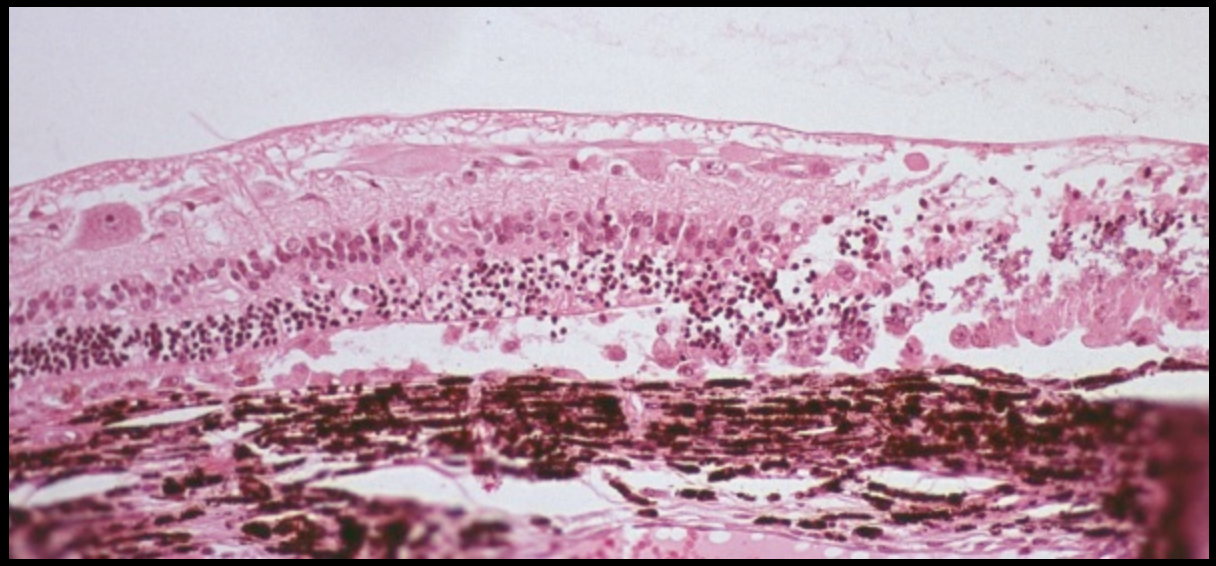


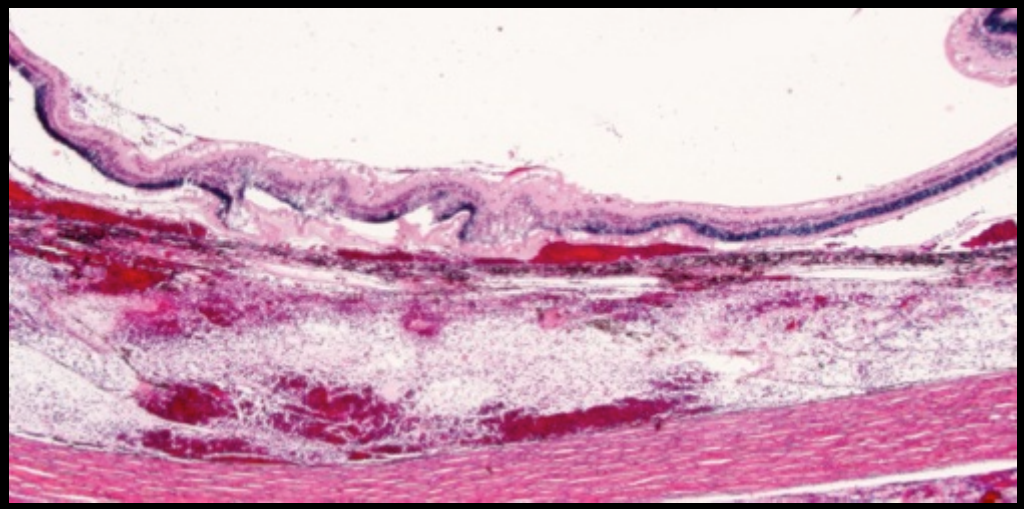
12 hours After Blunt Trauma

Retinal Effects of Blunt Trauma



Retinal Effects of Blunt Trauma

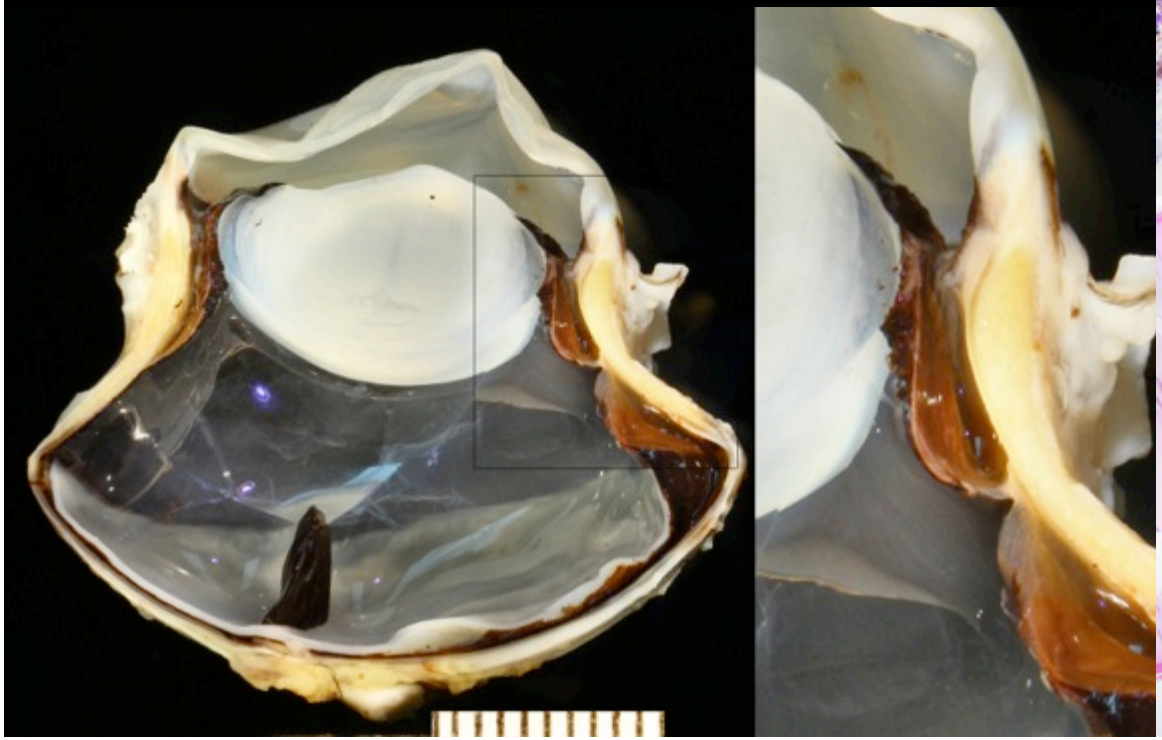


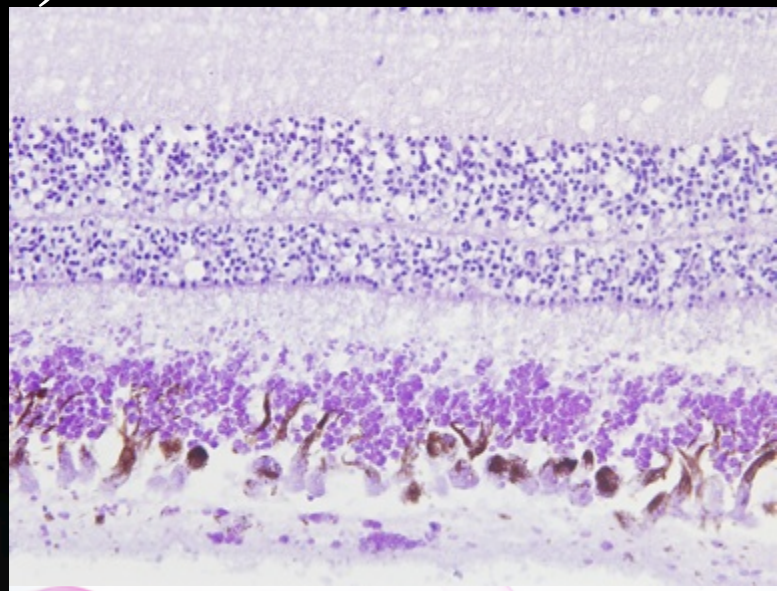


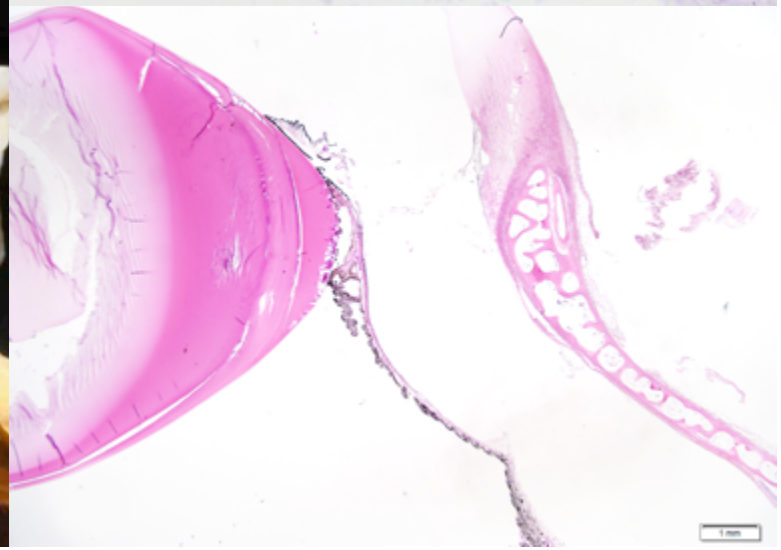
Retinal Effects of Blunt Trauma

Retinal Effects of Blunt Trauma Avian (Acute)

Barred Owl found by the side of the road



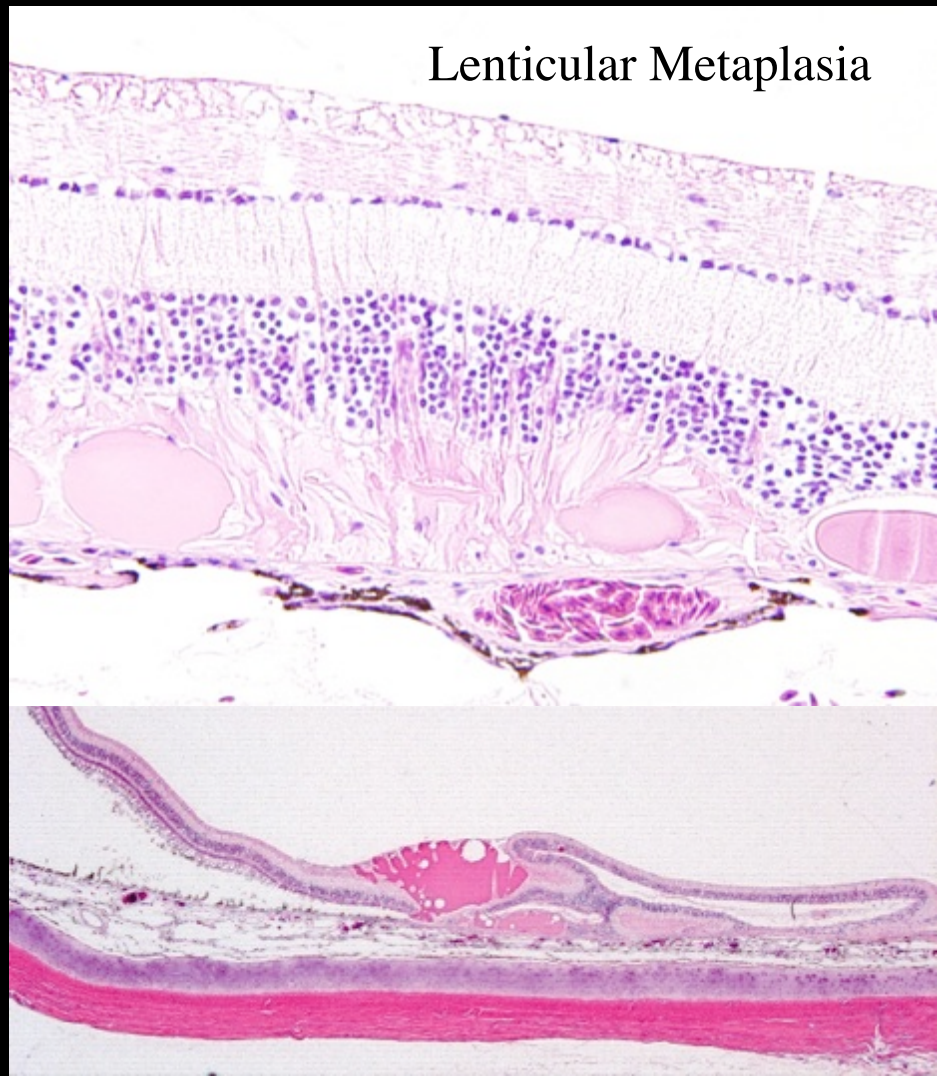




Retinal Effects of Blunt Trauma Avian (Chronic)

Great Horned Owl

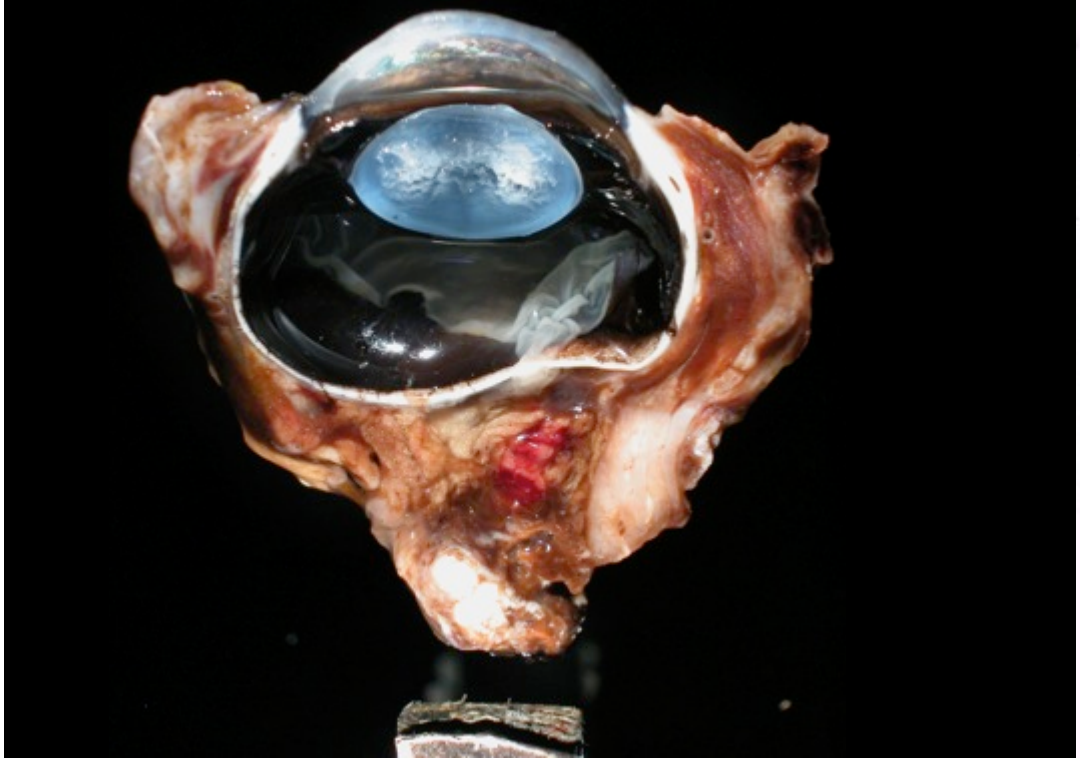
Lenticular Metaplasia

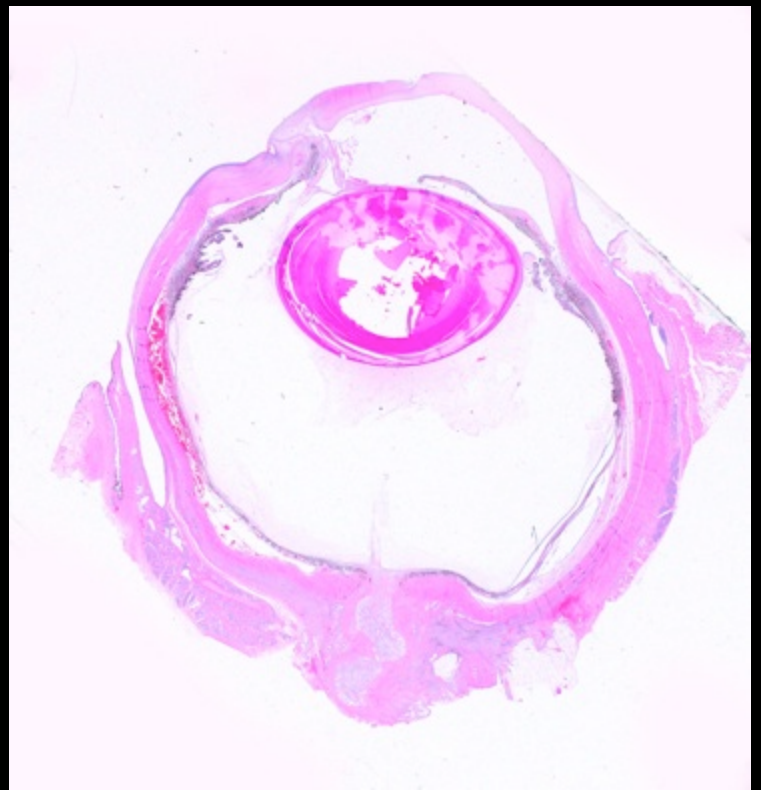


Proptosis

Big Dog/Little Dog

- 150 cases in dogs
  - 35 Shih Tzu, 15 Pekingese, 12 Pugs (just 7 bigger than Cocker Spaniel)
  - 69 less than 6 years and 31 more than 10

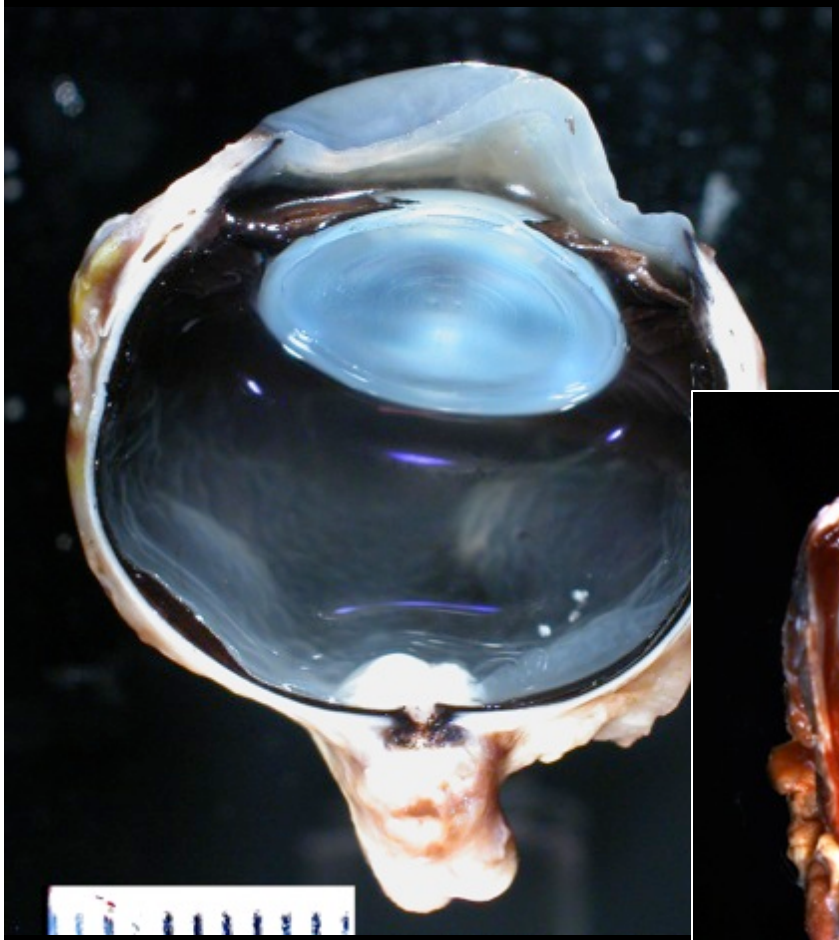


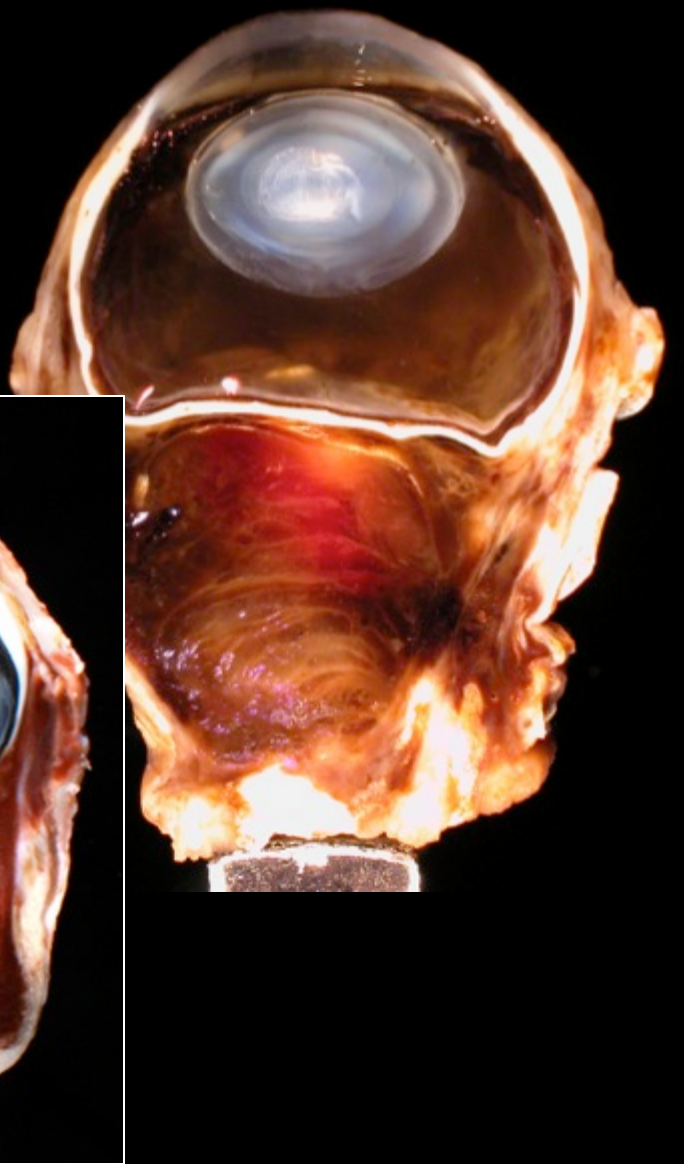


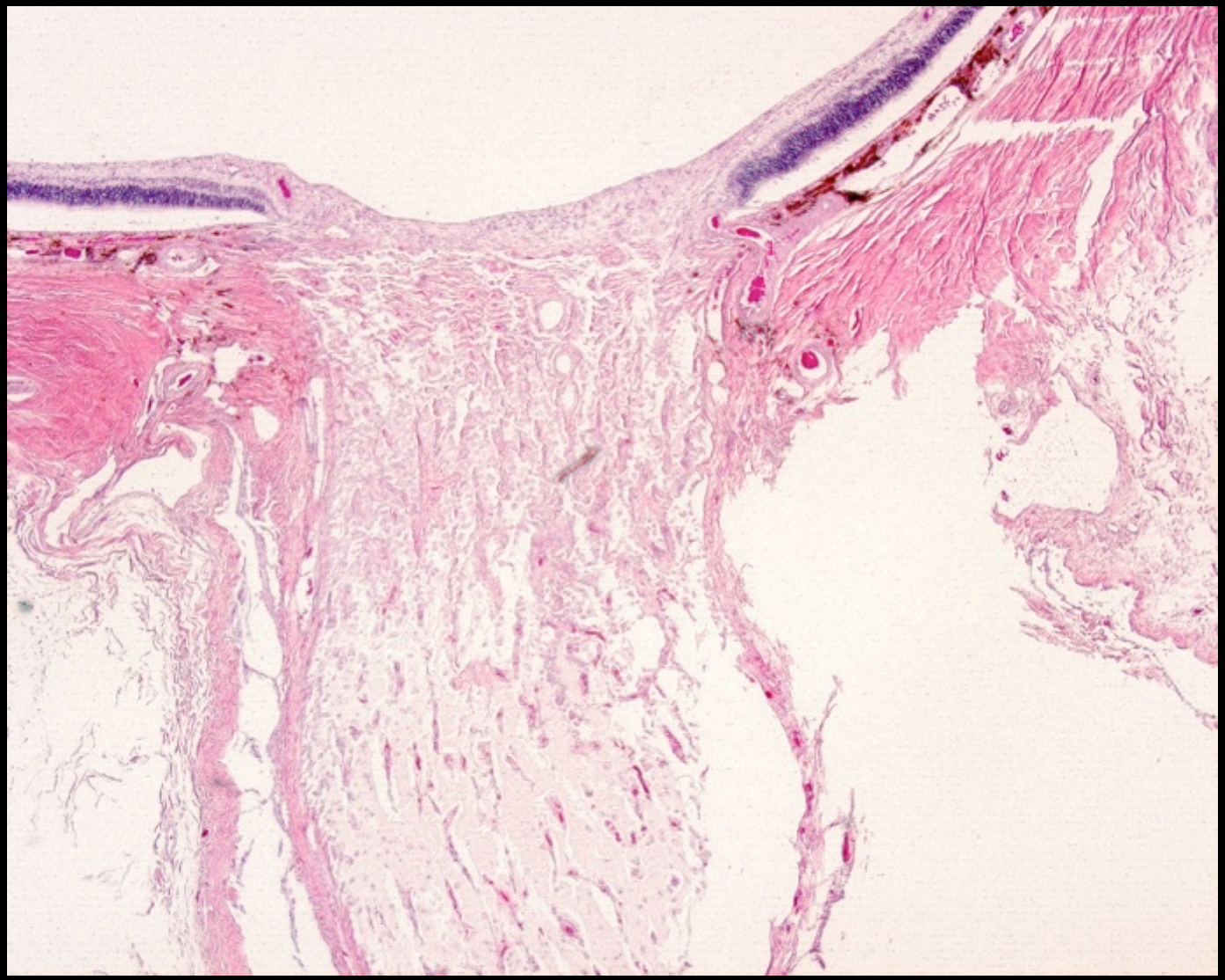
Proptosis
Typical Lesions Seen

- Muscle tearing
- Episcleral fibrosis
- Optic nerve necrosis
  - First pure necrosis
  - Second Gitter cells and malacia
  - Finally fibrosis and atrophy
- Extension of the conjunctival epithelium toward or beyond the equator
- Hair in the episclera
- Corneal desiccation

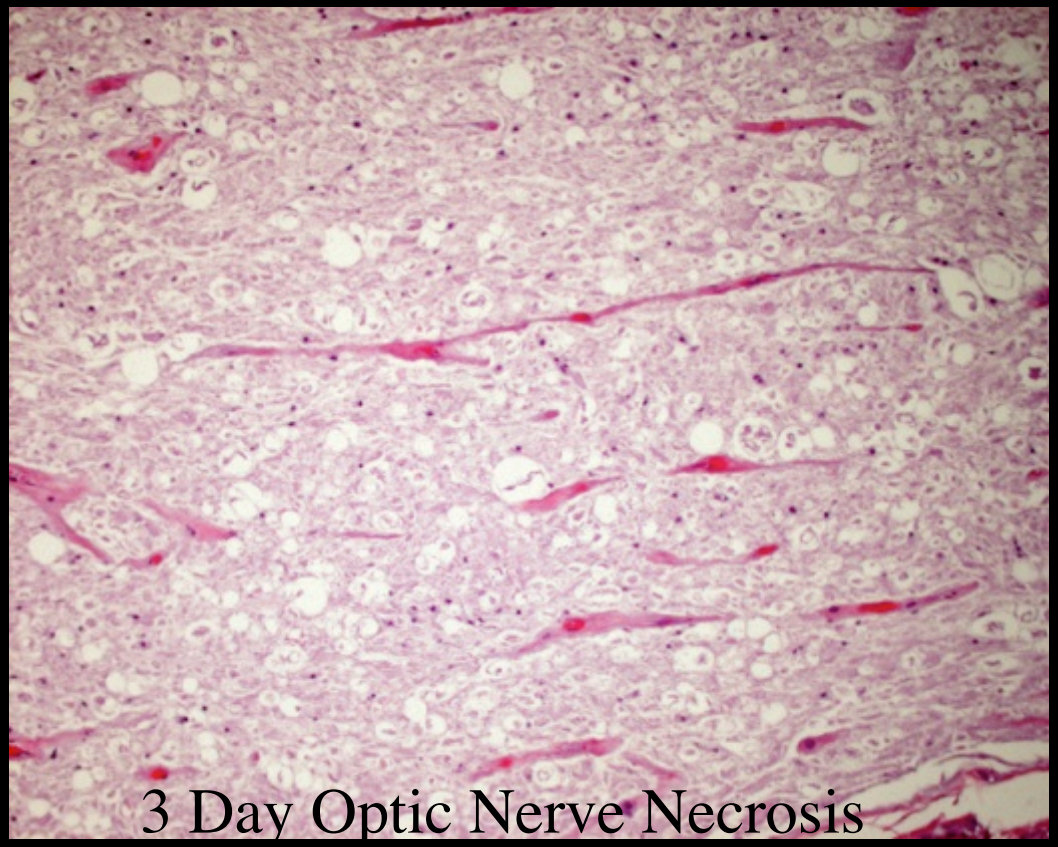
Optic Nerve Trauma/Proptosis



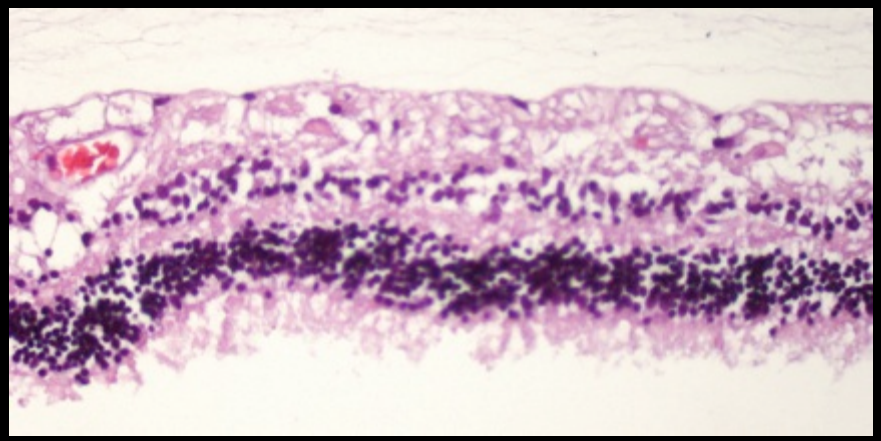


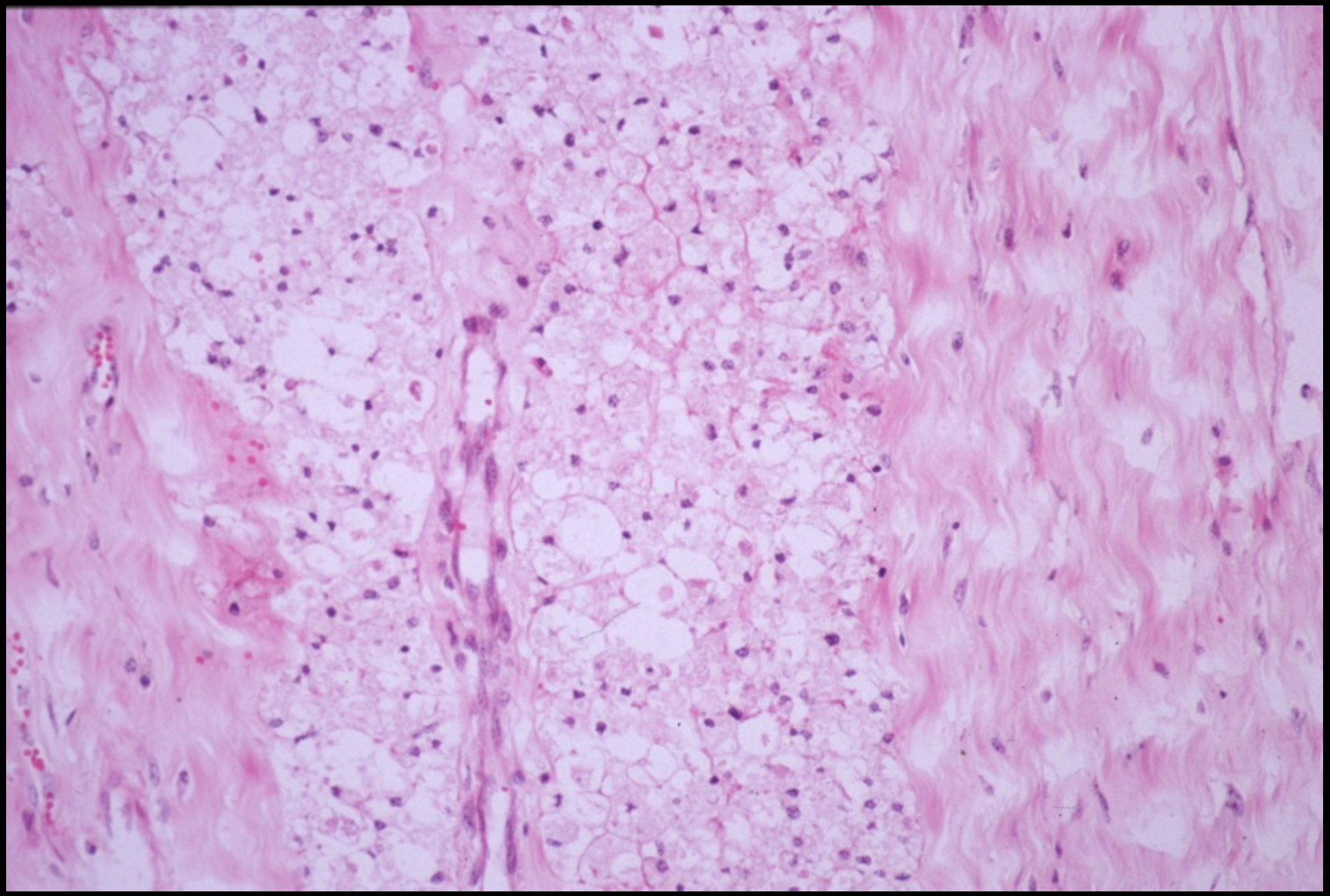


Acute Optic Nerve Necrosis

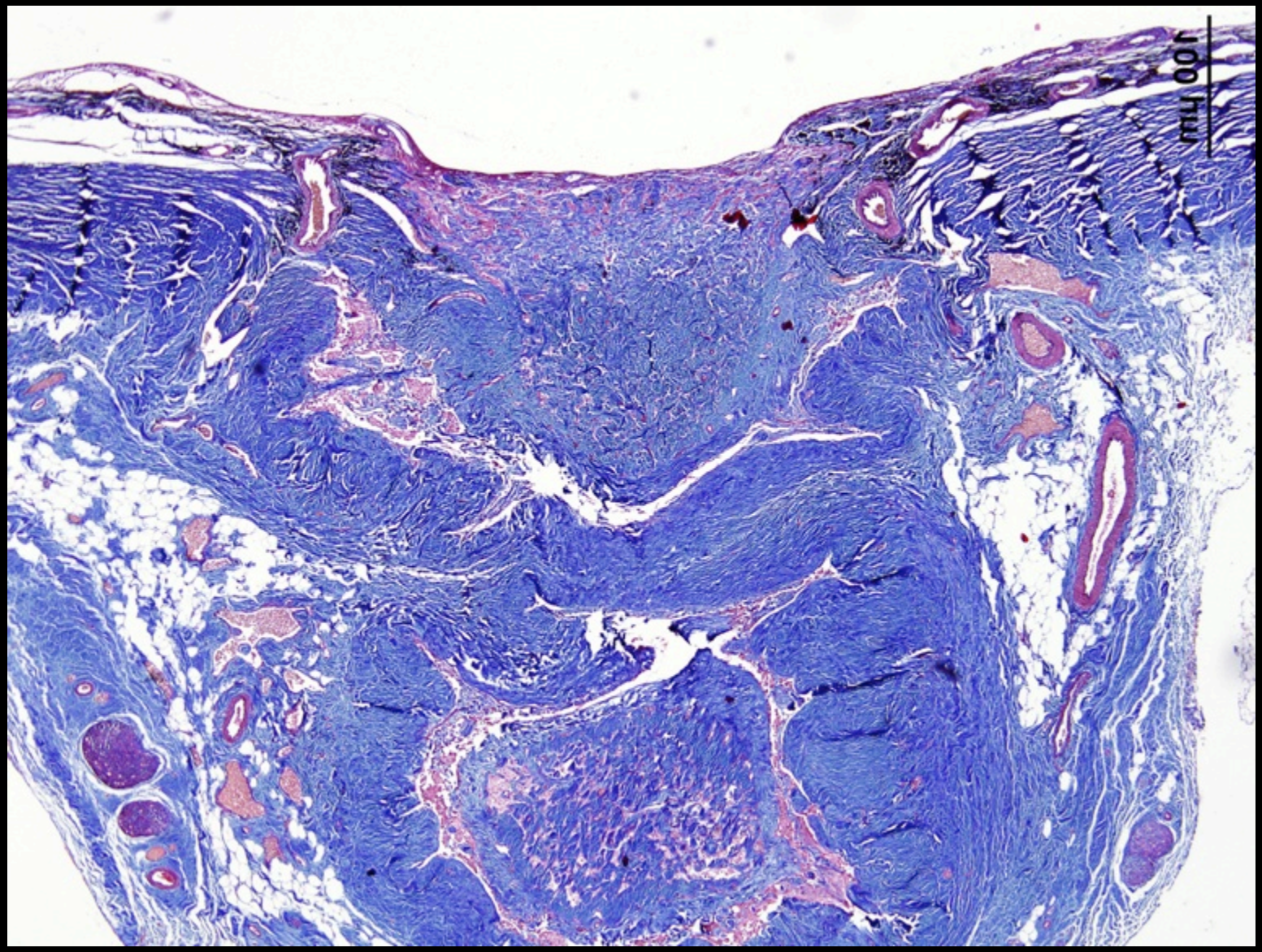


3 Day Optic Nerve Necrosis

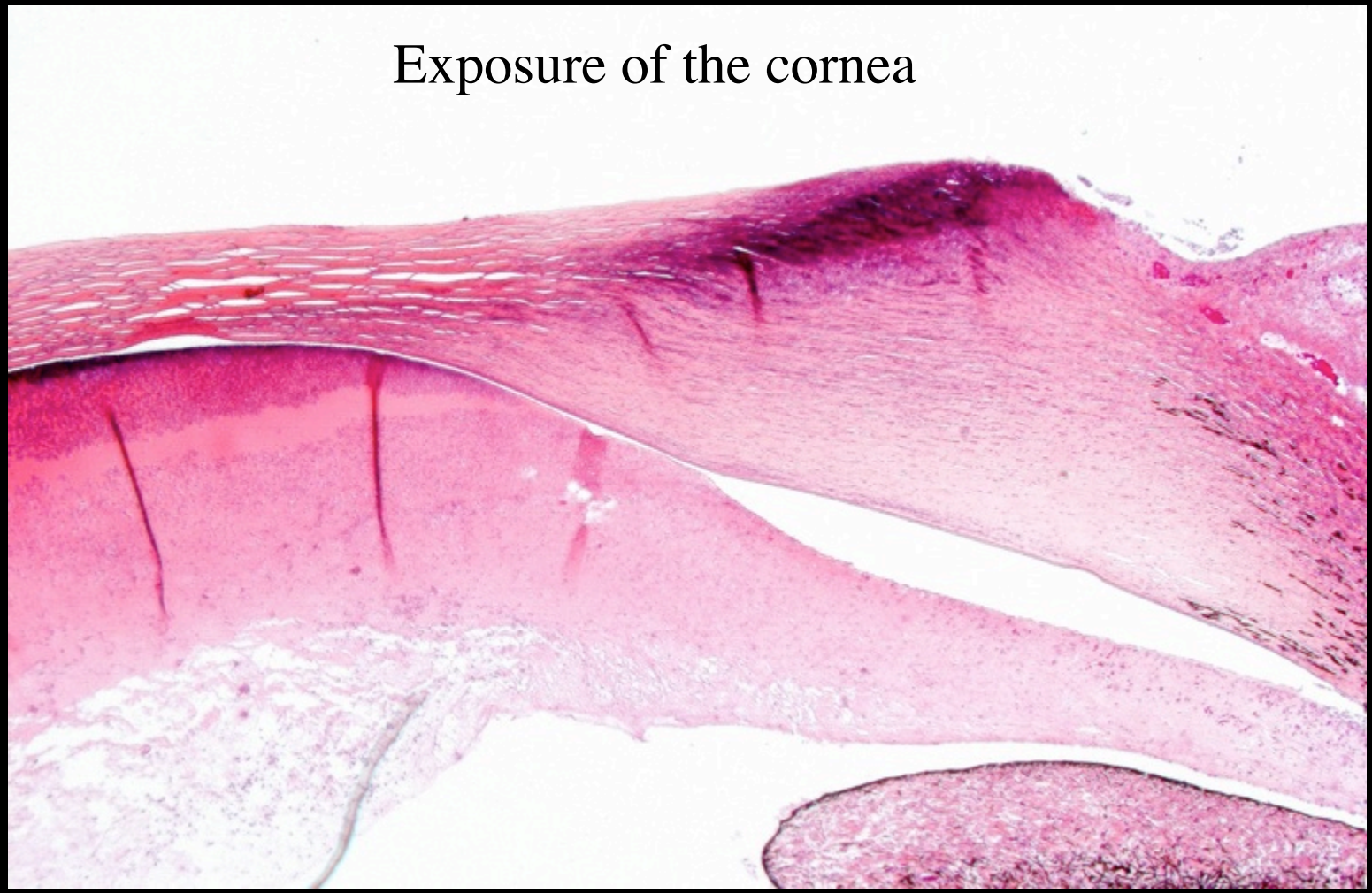




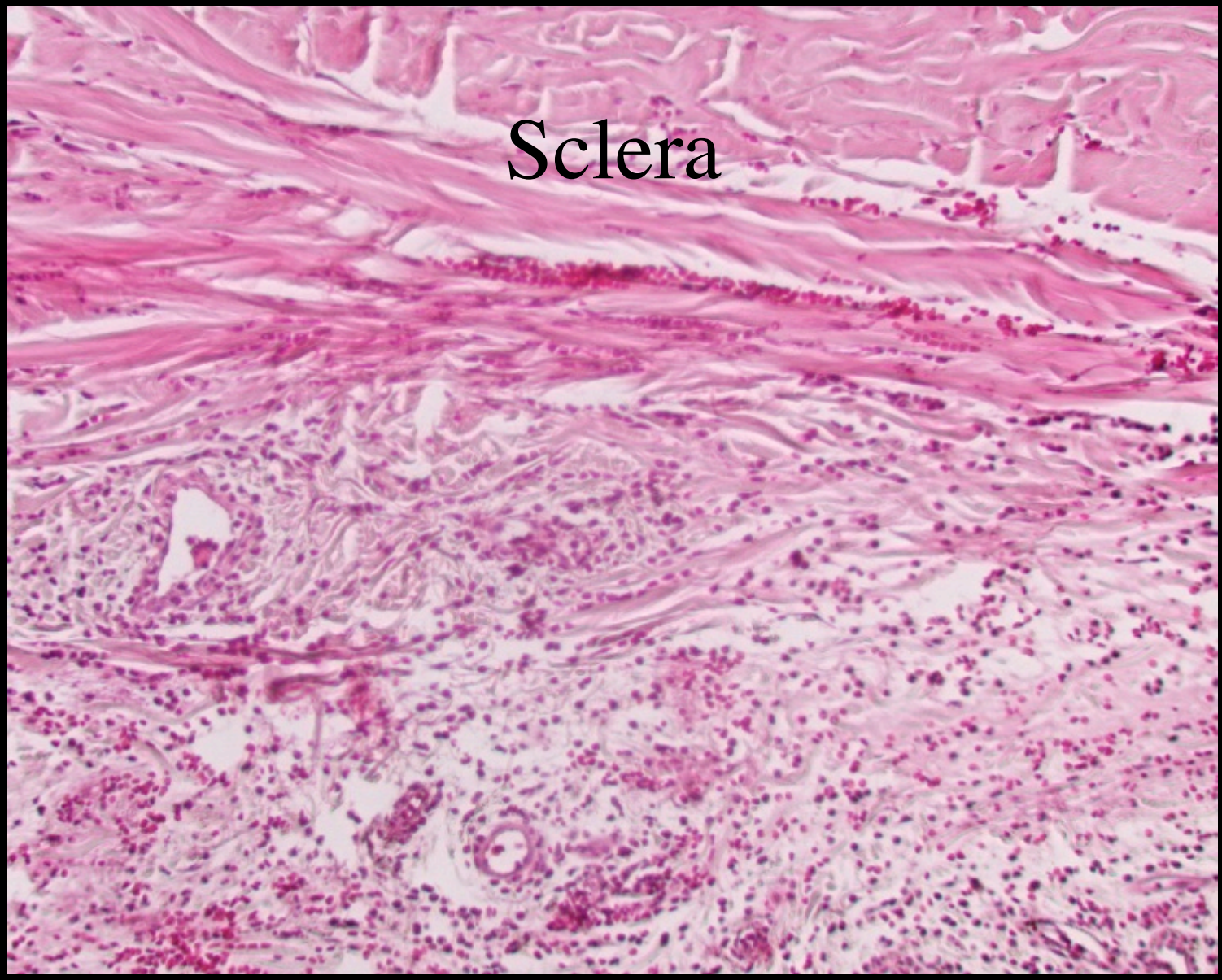
Optic Nerve Malasia, Gitter Cells



End-stage Fibrosis of the Optic Nerve (Trichrome Stain)



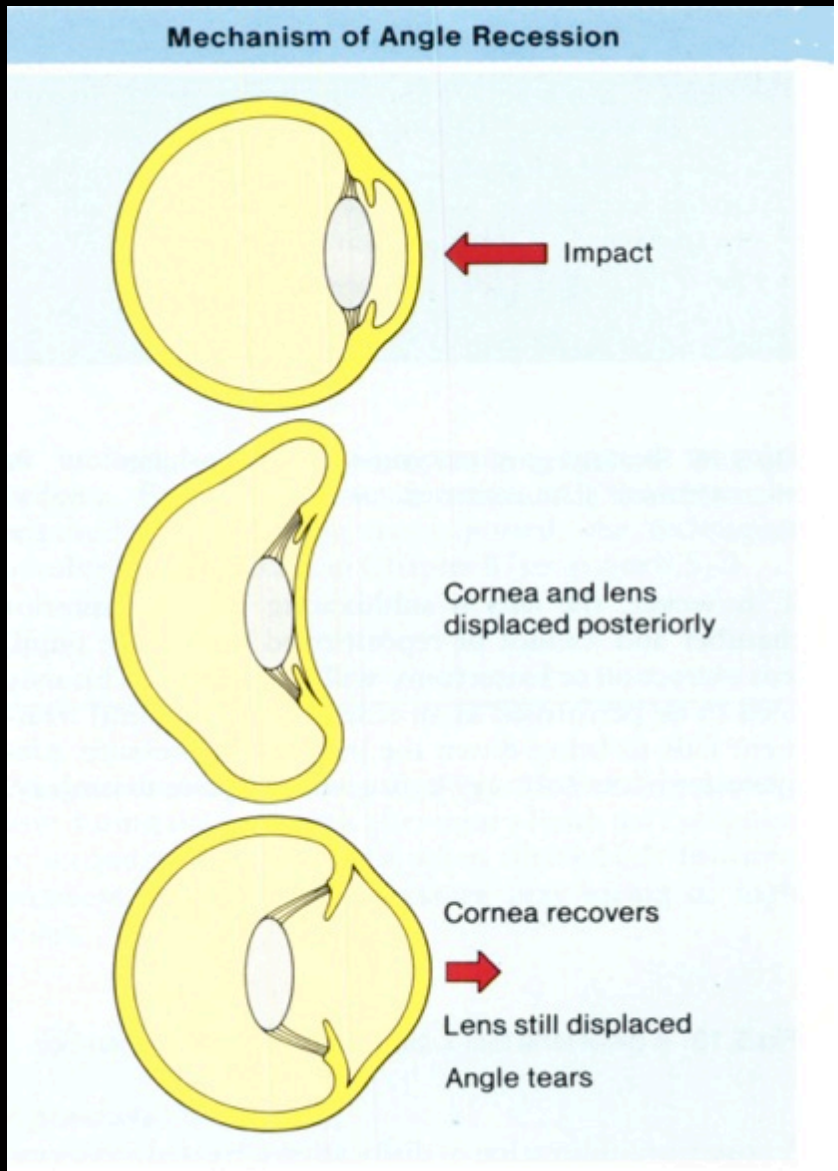
Corneal Desiccation

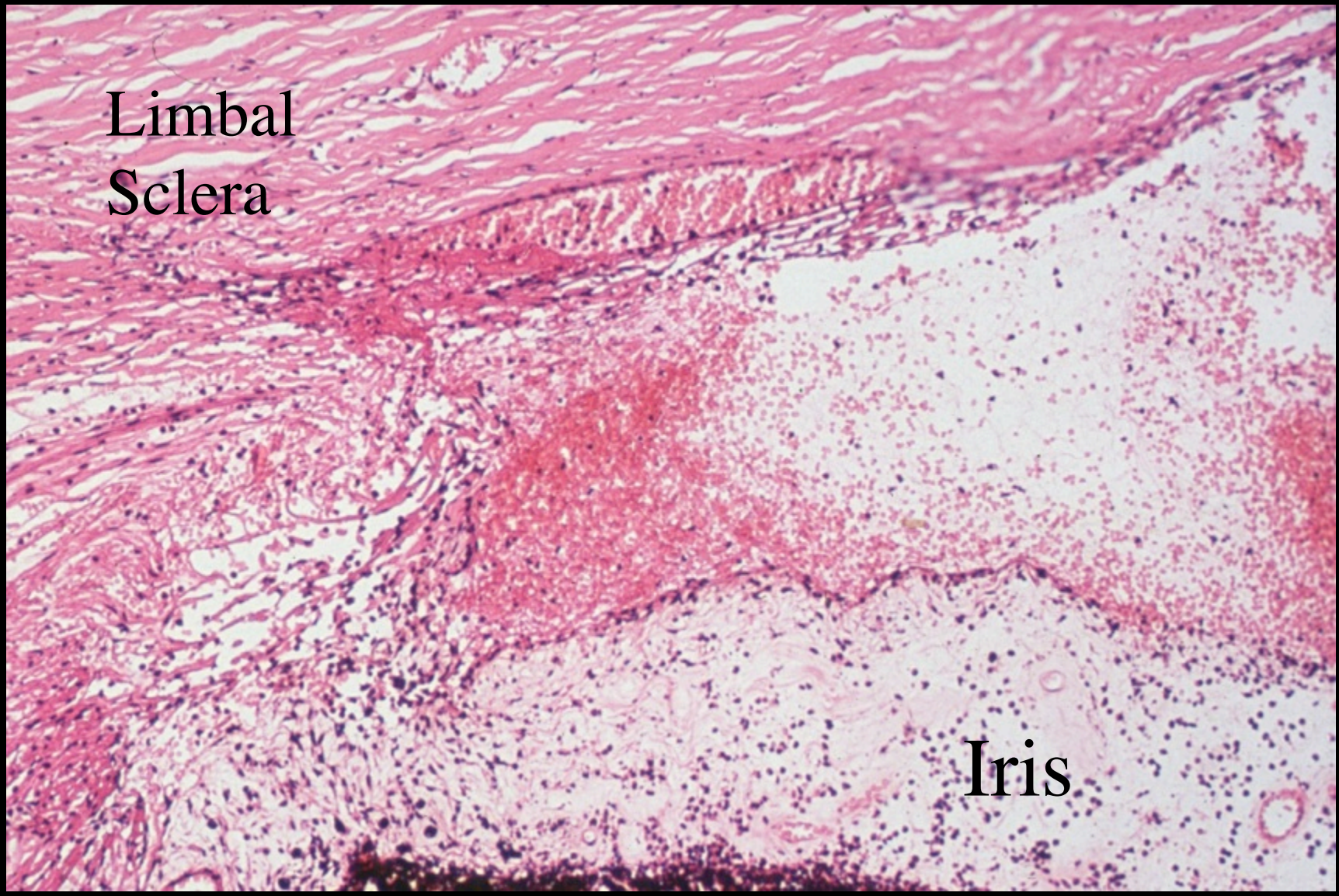


Episcleral Fibrosis

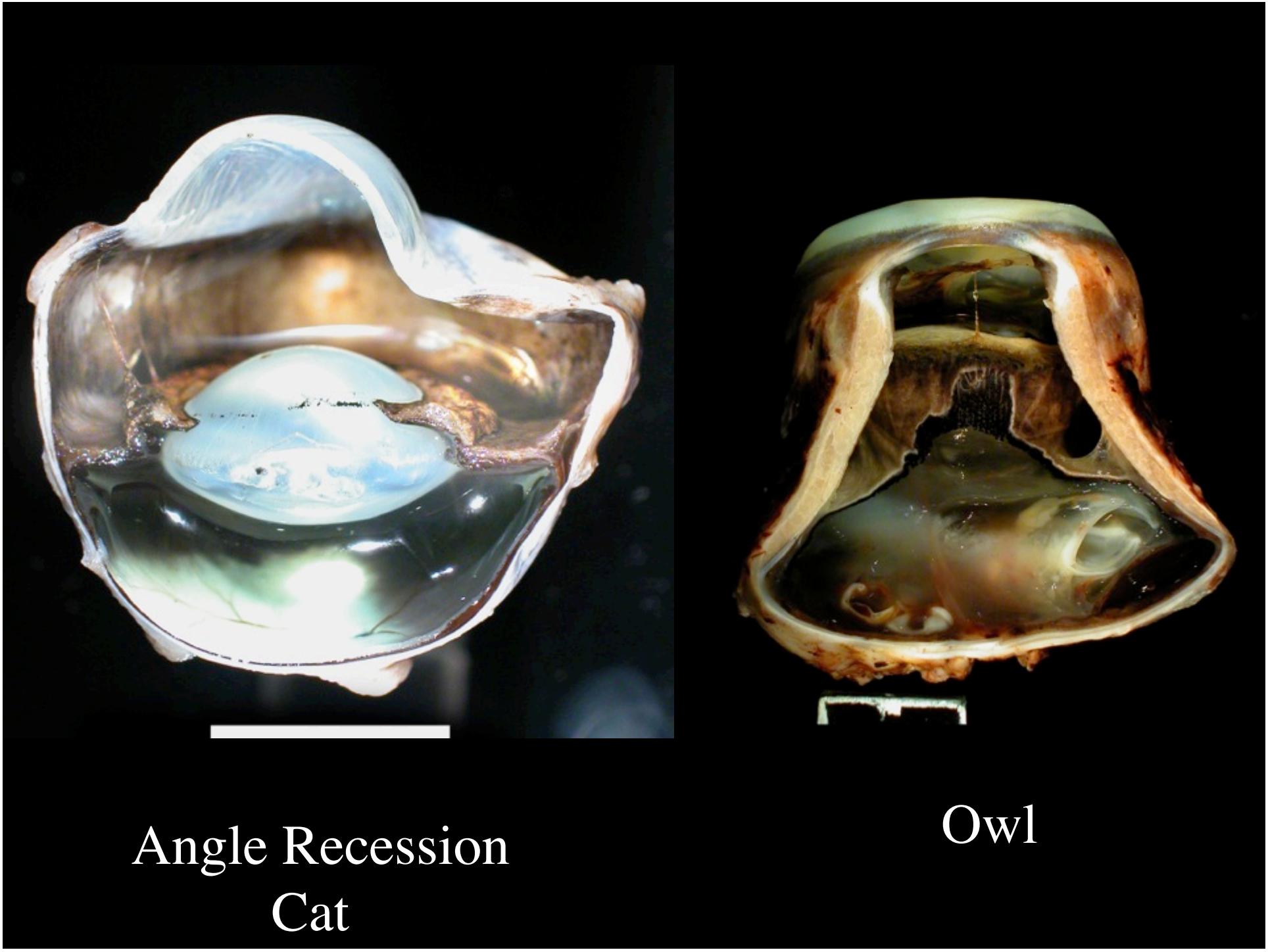
Contusion Glaucoma/ Angle Recession Glaucoma

- 57 cases in dogs
  - No particular breed
  - 16 less than 6 years-old
  - 21 greater than 10 years-old
  - 22 male and 34 female
- 278 cases in cats
  - 141 DSH, 23 DLH, 10 Siamese
  - 43 less than 6 years-old
  - 139 greater than 10 years-old
  - 184 male and 85 female





Acute Traumatic Cyclodialysis



Angle Recession
Cat

Owl

Early-life Trauma
Anterior Chamber Collapse Syndrome

69 cases in the COPLOW archive

Species break down:

- 24 feline
- 40 canine
- 1 primate (rhesus)
- 1 marsupial (wallaby)
- 1 Avian (chicken)
- 1 Bovine (Holstein)
- 1 Equine (Arabian horse)

Early-life Trauma
Anterior Chamber Collapse Syndrome

69 cases in the COPLOW archive

Ages at Enucleation:

- Less than one year: 28
  - > 0.4: 4
  - > 0.6: 12
  - > 0.8: 9
  - 0.8 to 1 year: 3
- One to two years: 19
- Two to three years: 8
- Greater than 3 years: 14
  - Range = 4 to 12 years

Early-life Trauma
Anterior Chamber Collapse Syndrome

Symptoms Breakdown: n=70

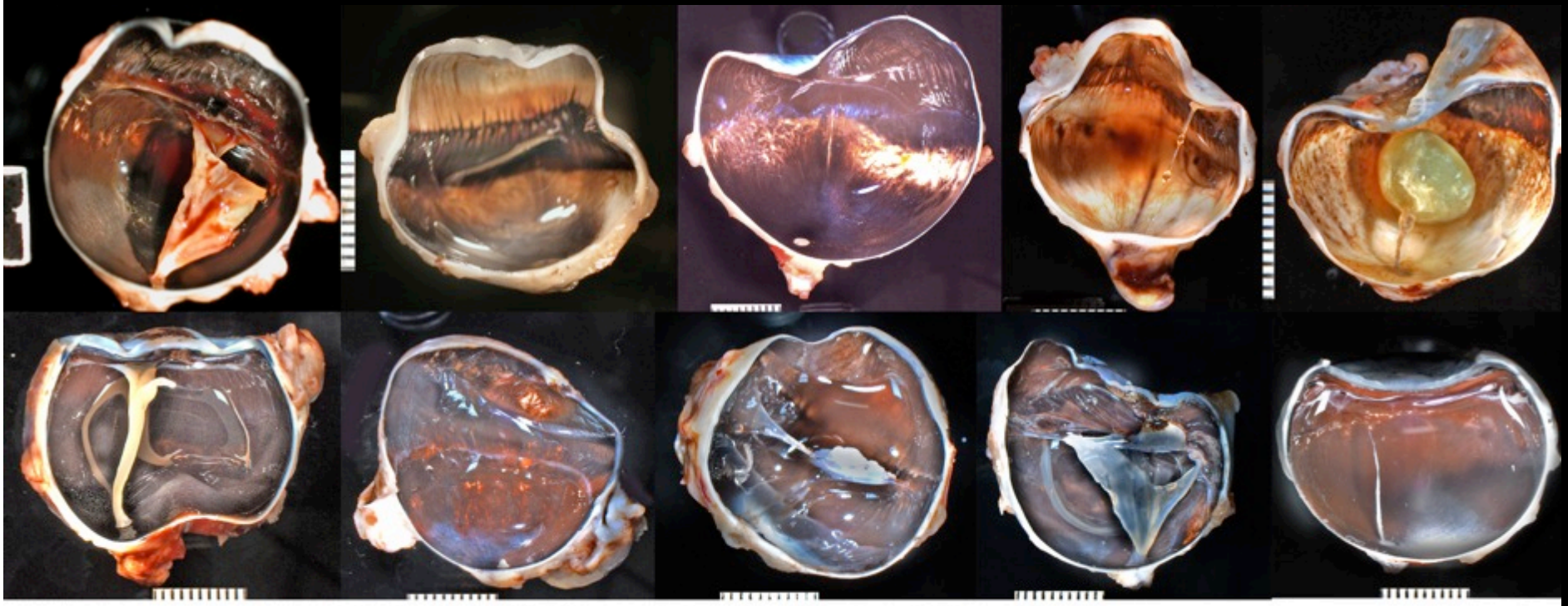
- Glaucoma: 54
- Buphthalmic: 42
- Both eyes effected: 3

Early-life Trauma
Anterior Chamber Collapse Syndrome

History

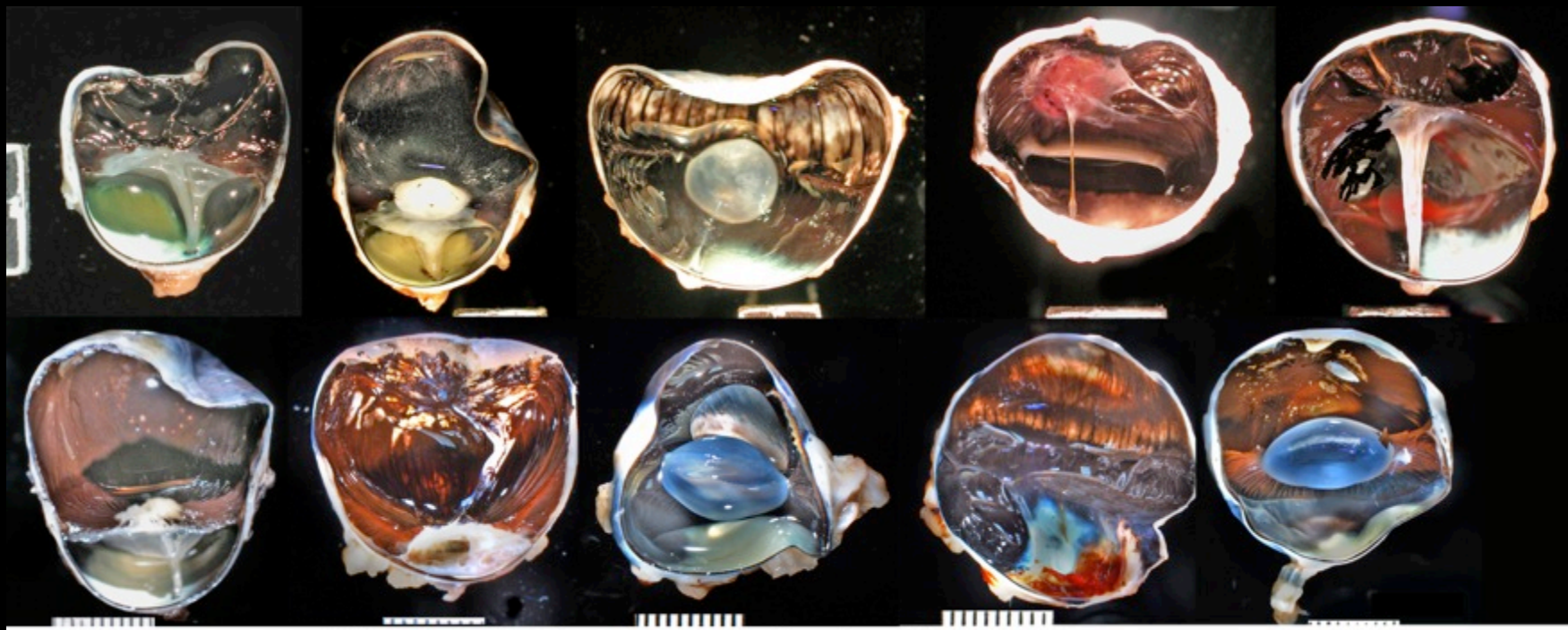
- Always/ since birth/congenital: 26
- Known injury 15
  - 8 under 1 month of age
  - 4 under 1 year of age
  - 1 under 2 years of age
- Since acquired: 10
  - 4 acquired under 6 months of age
  - 1 acquired at 4.5 years

Early-life Trauma
Anterior Chamber Collapse Syndrome



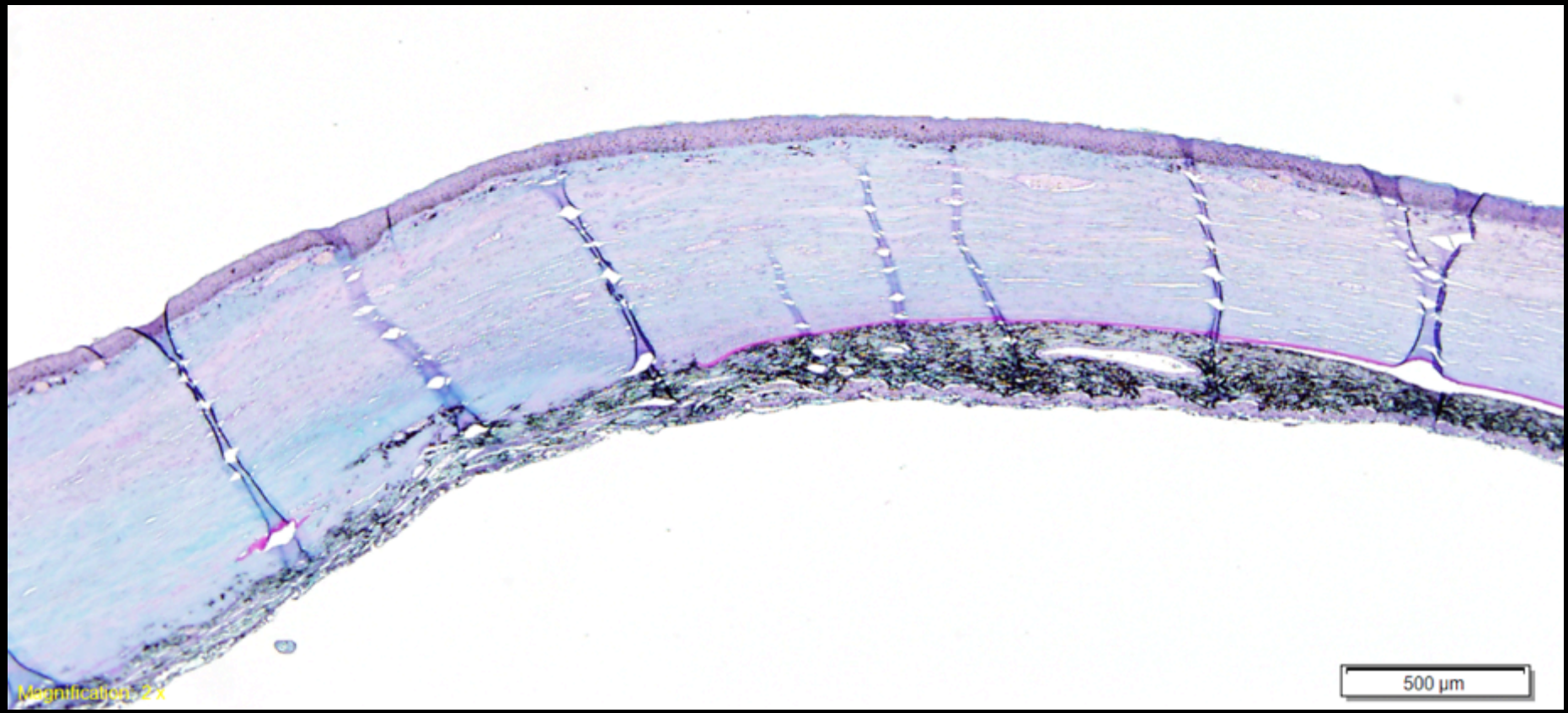
Canine Early-life Trauma / Anterior Chamber Collapse Syndrome

Early-life Trauma
Anterior Chamber Collapse Syndrome

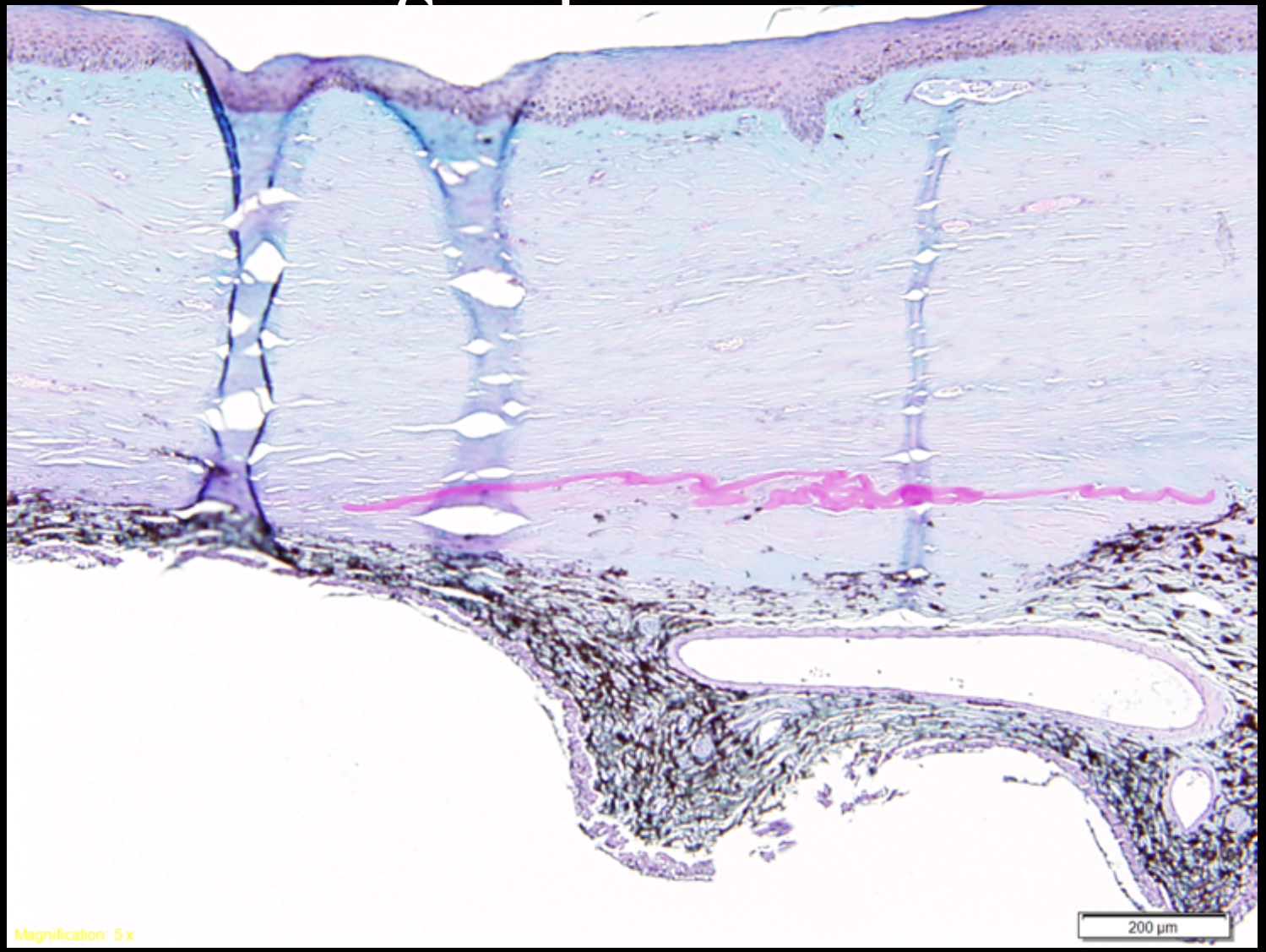


Feline Early-life Trauma / Anterior Chamber Collapse Syndrome

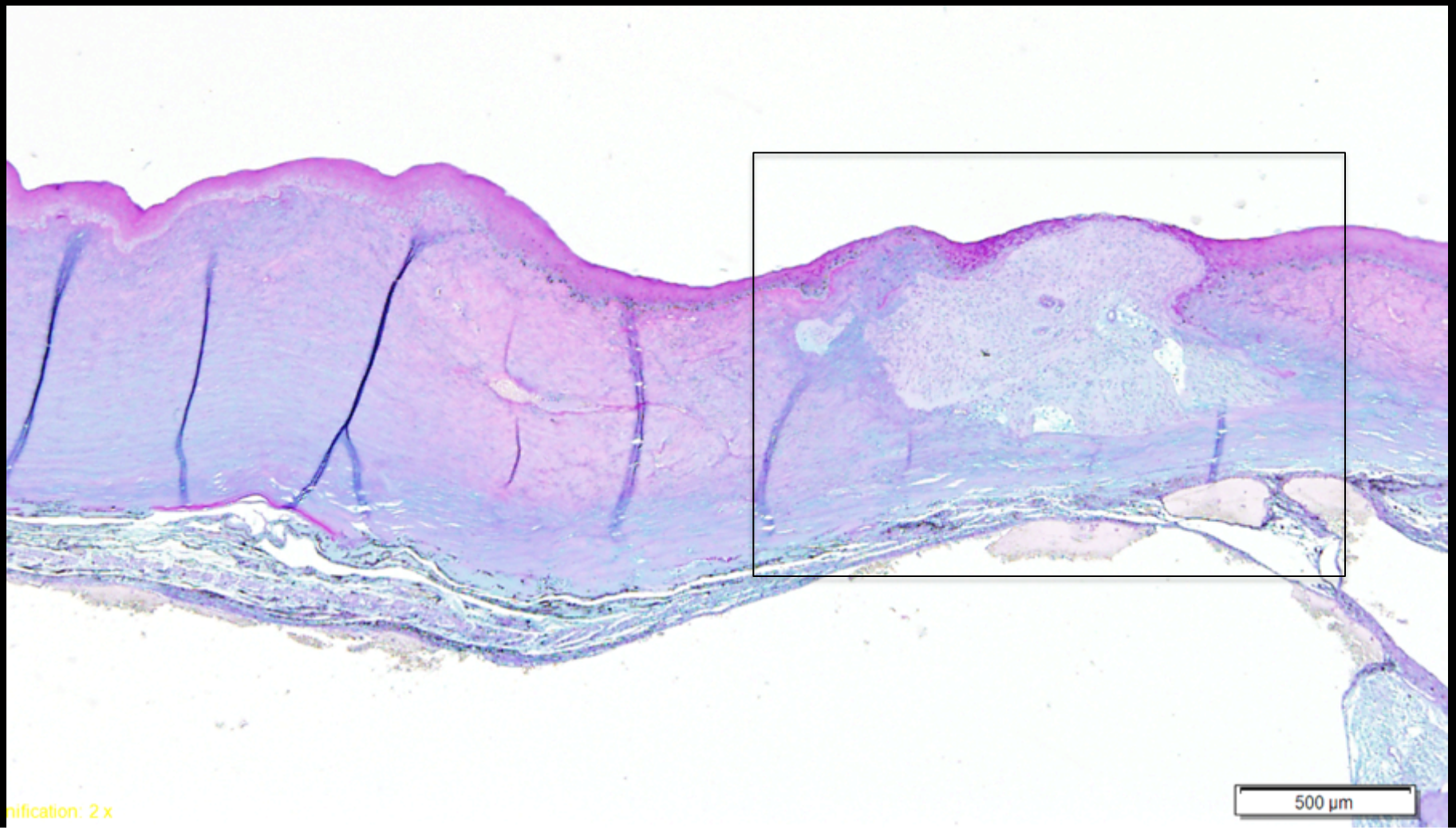
Early-life Trauma
Anterior Chamber Collapse
Syndrome



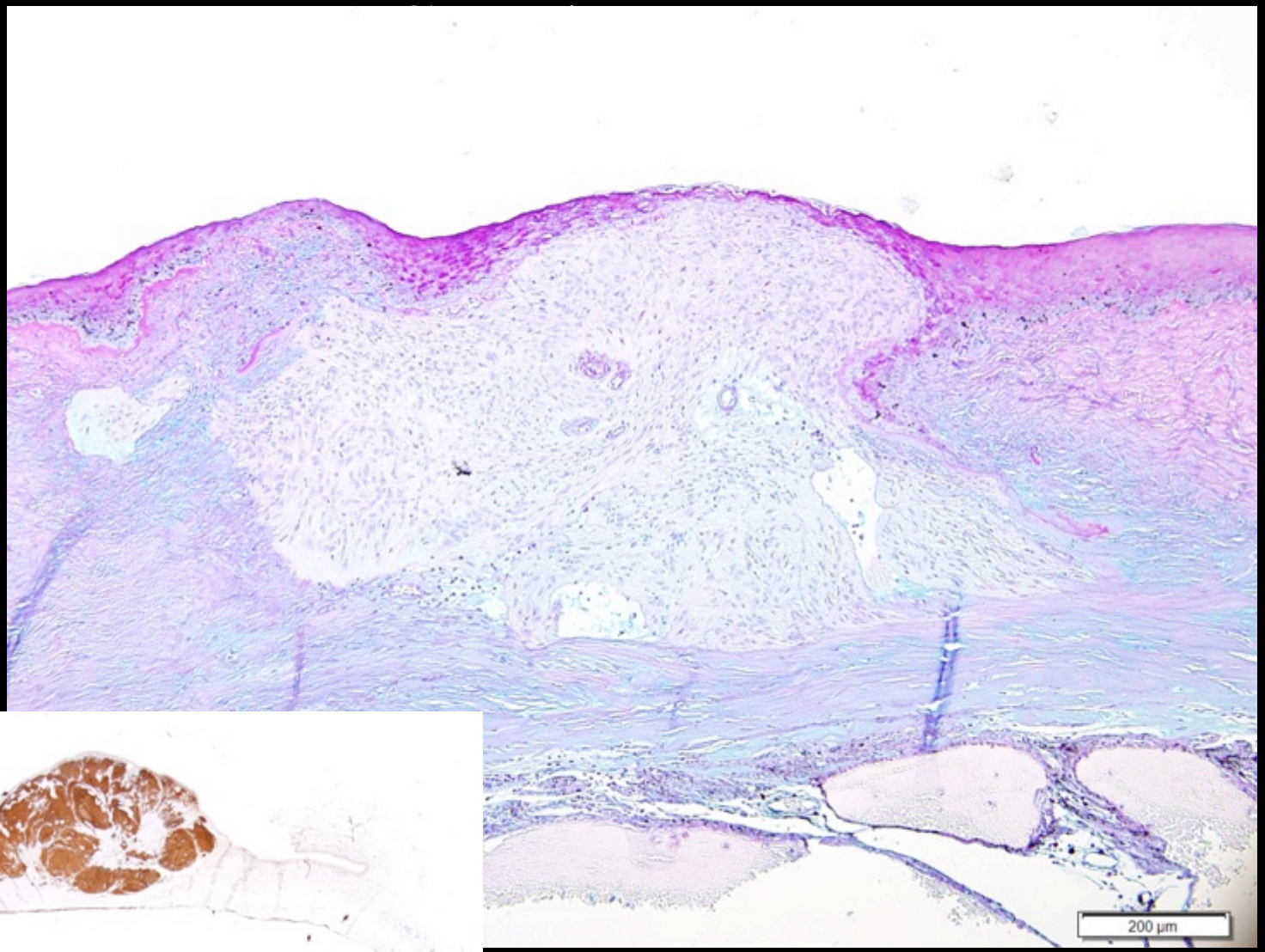
Early-life Trauma
Anterior Chamber Collapse

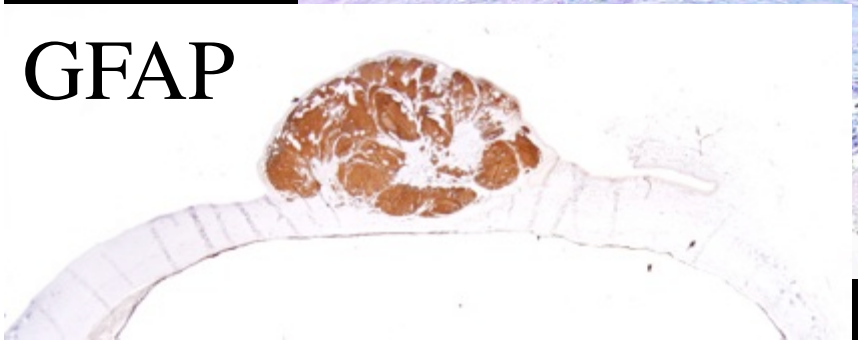


Early-life Trauma
Anterior Chamber Collapse Syndrome

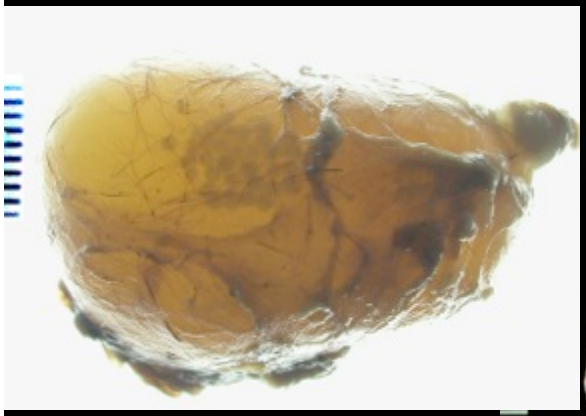


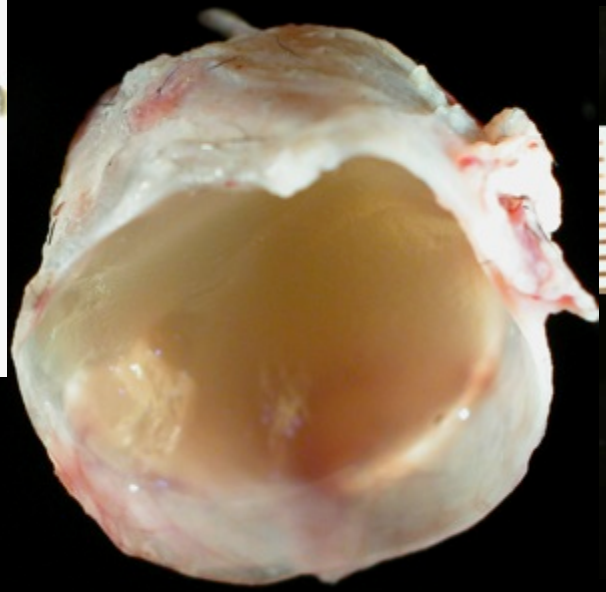
Early-life Trauma
Anterior Chamber Collapse





Histologic Effects of Surgical & Non-Surgical Ocular Interventions

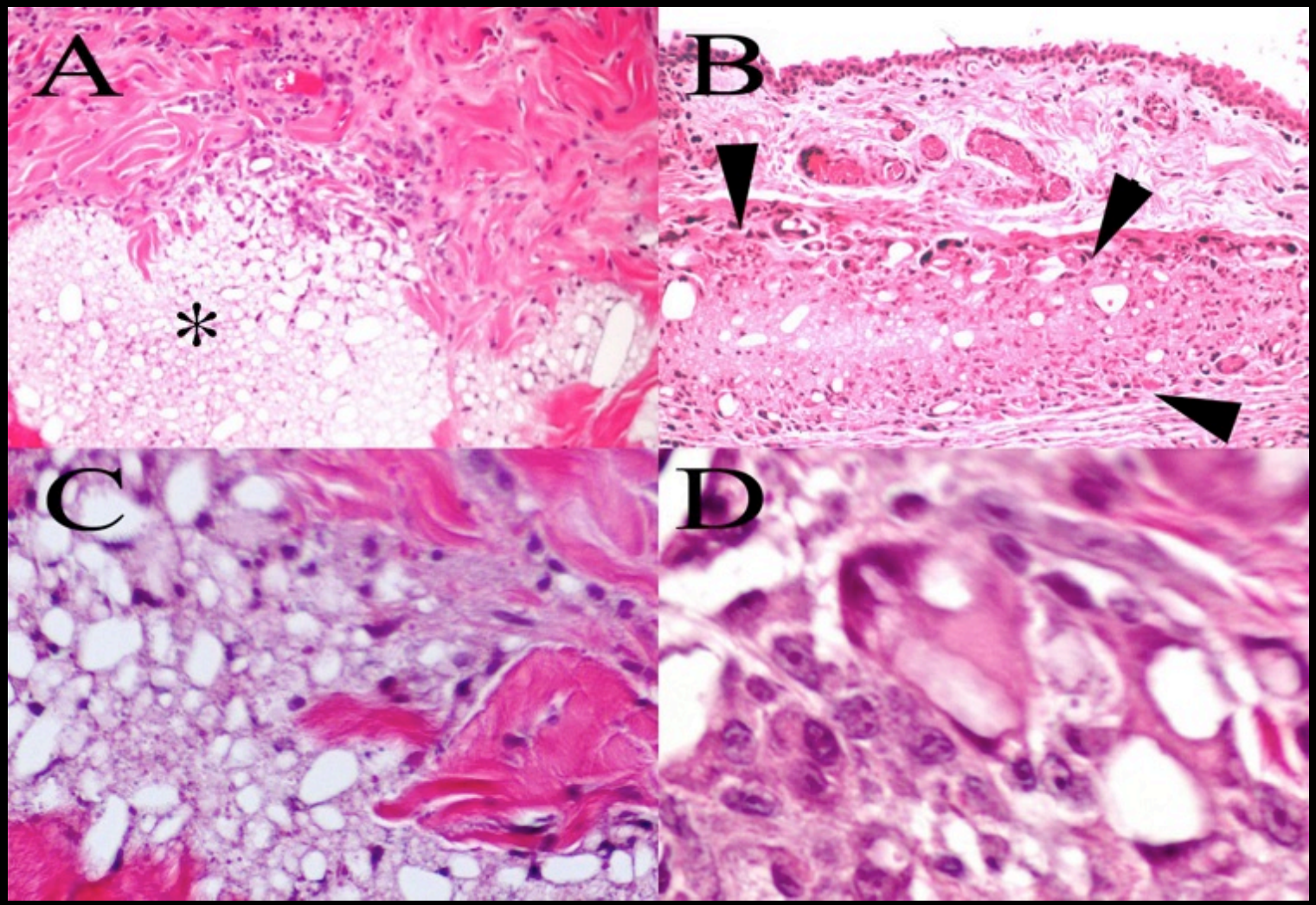




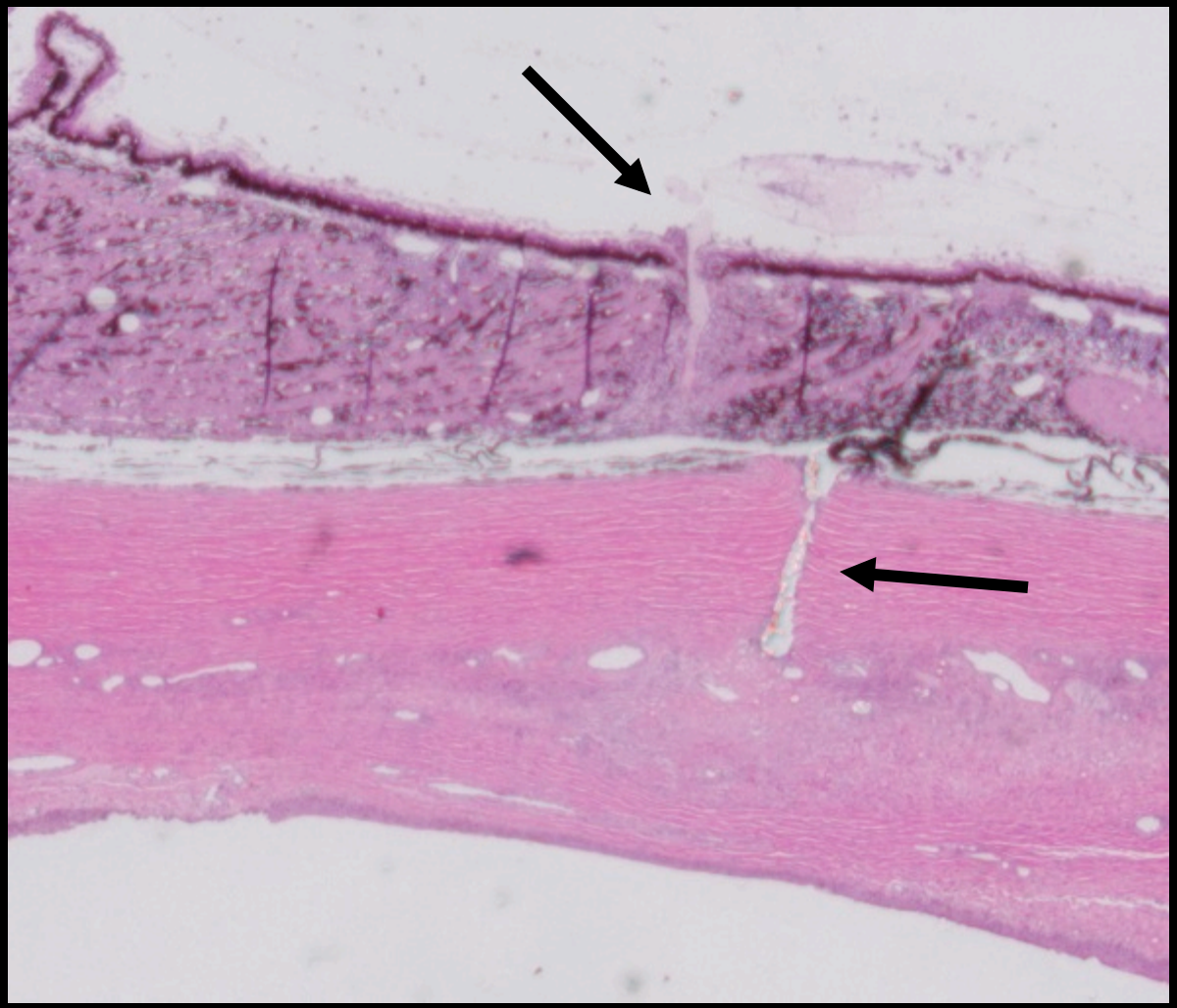
Orbital Conjunctival Cyst after Enucleation Surgery

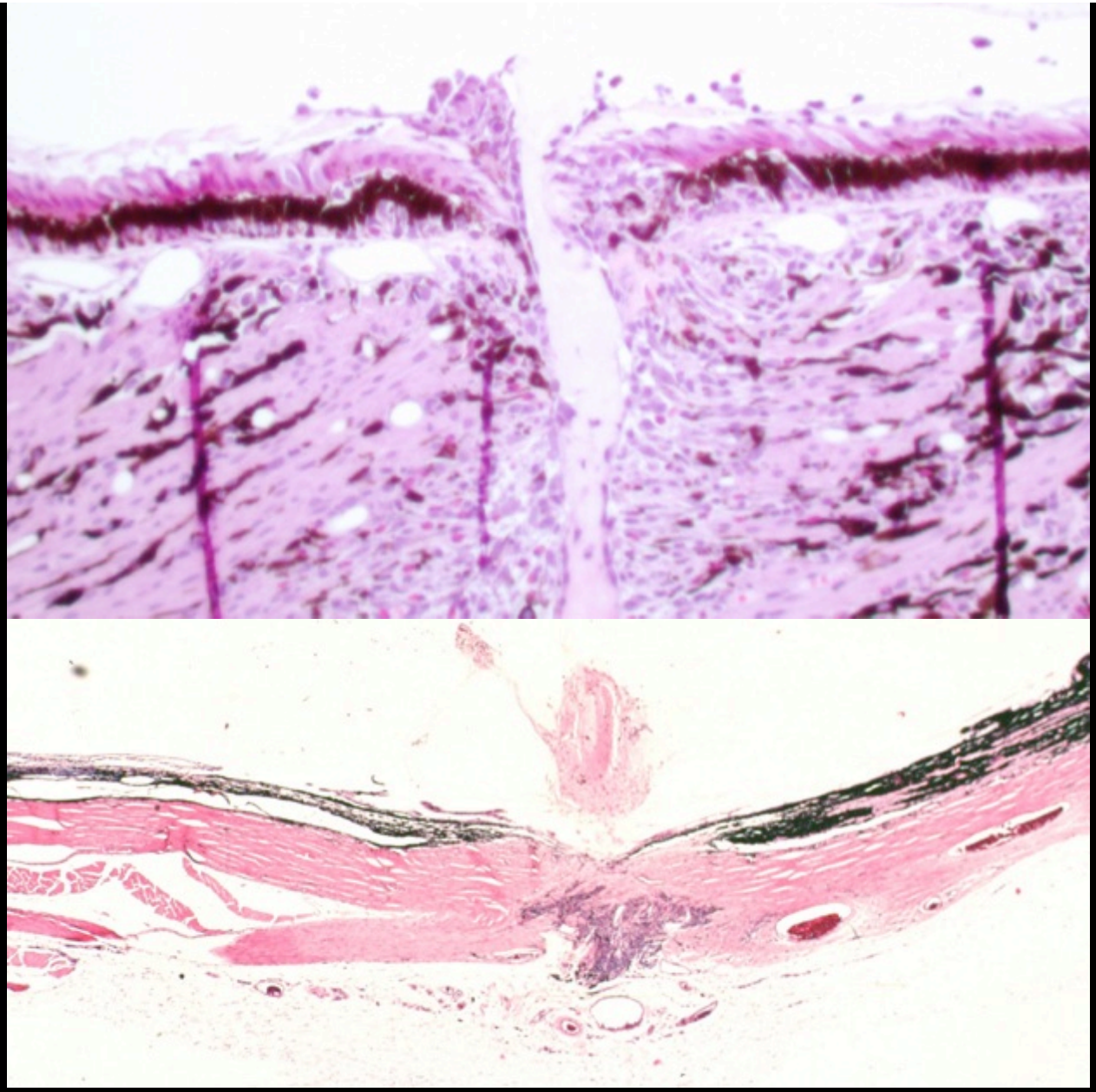
35 dogs *(10 Shih Tzu 5 Labrador)* 16 Cats *(11 DSH)*

Conjunctival Depo Injection

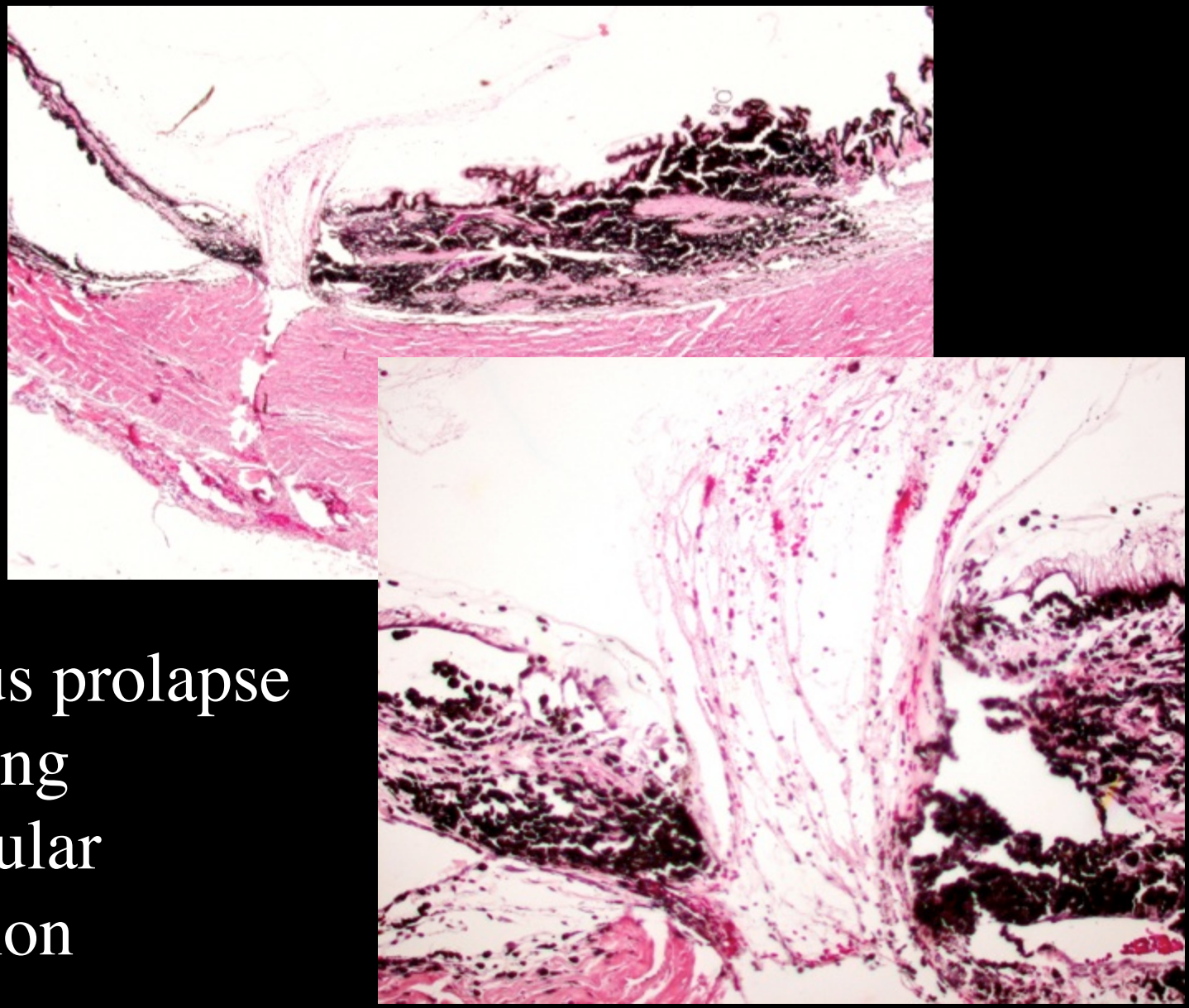


Intraocular Injection



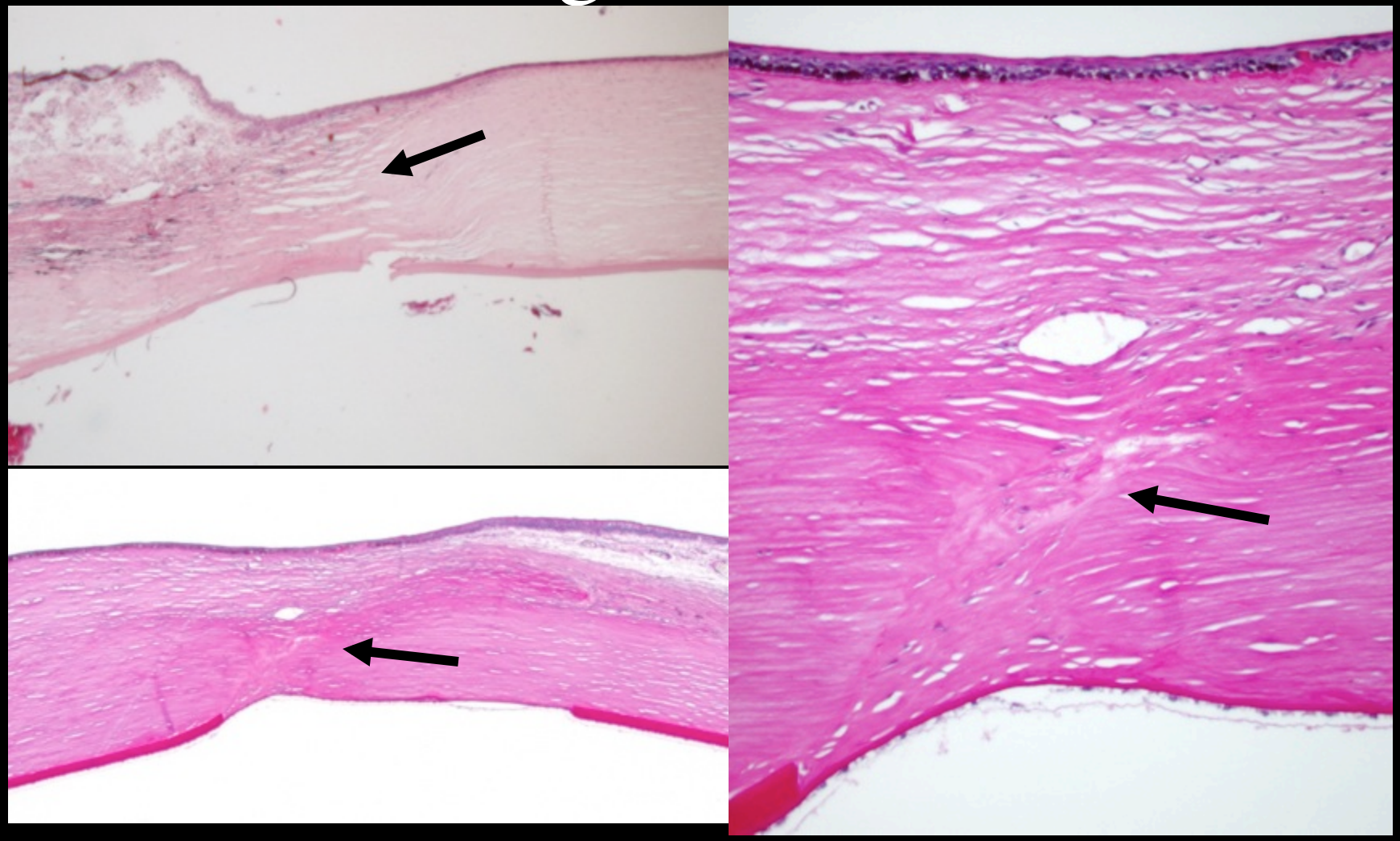


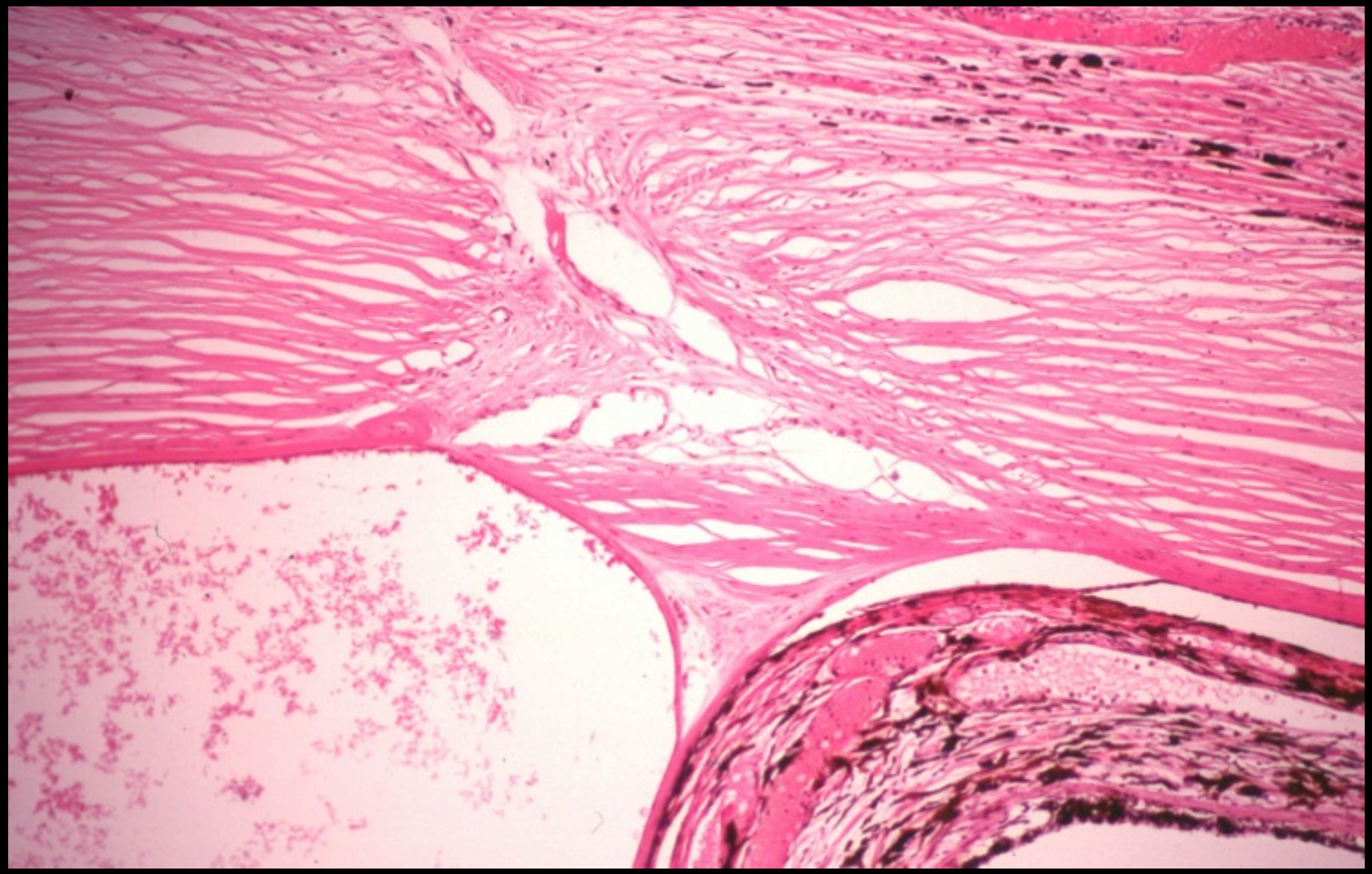
Intraocular injection sites



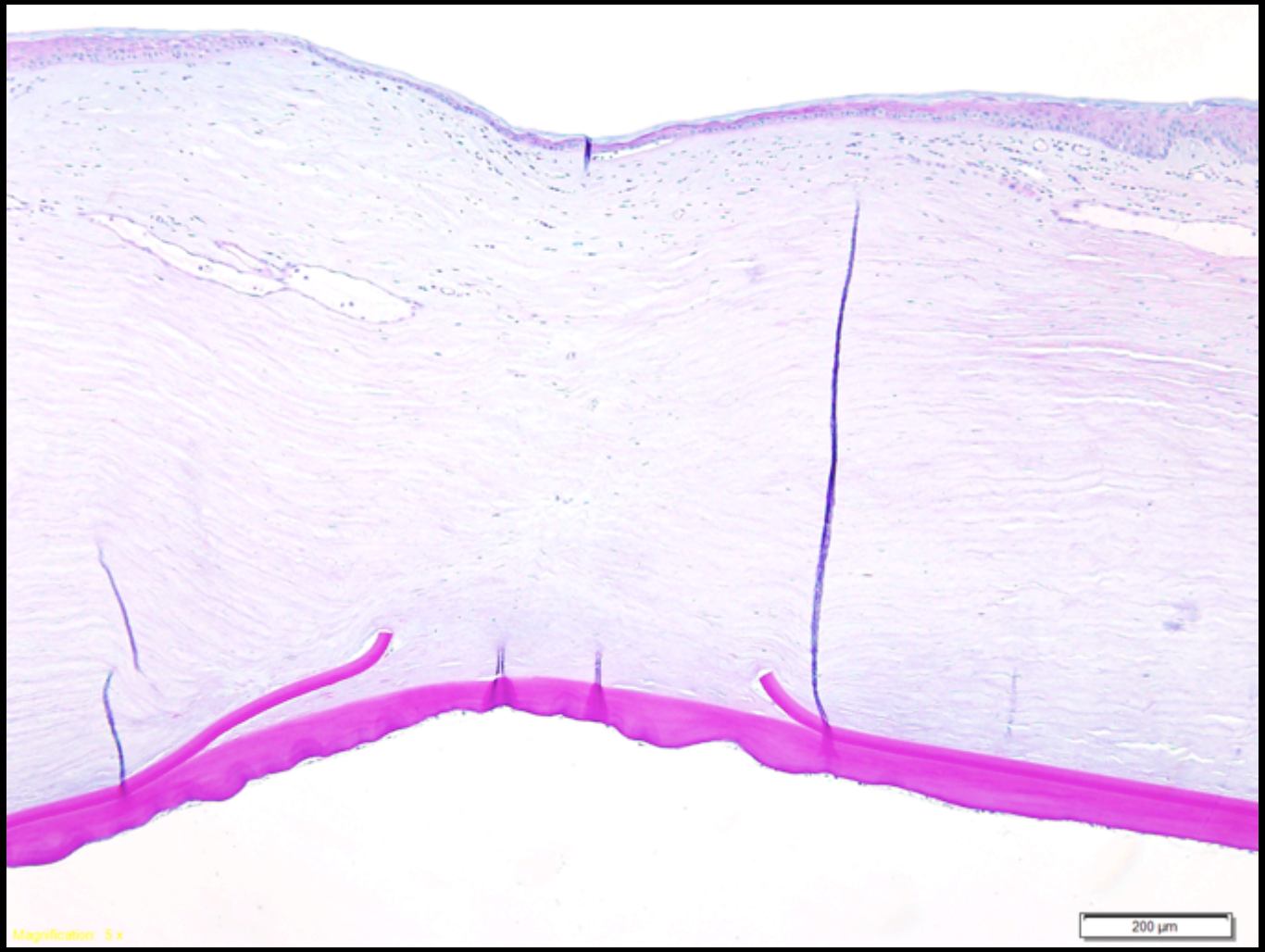
Vitreous prolapse following intraocular aspiration

Corneal Surgical Incision Sites

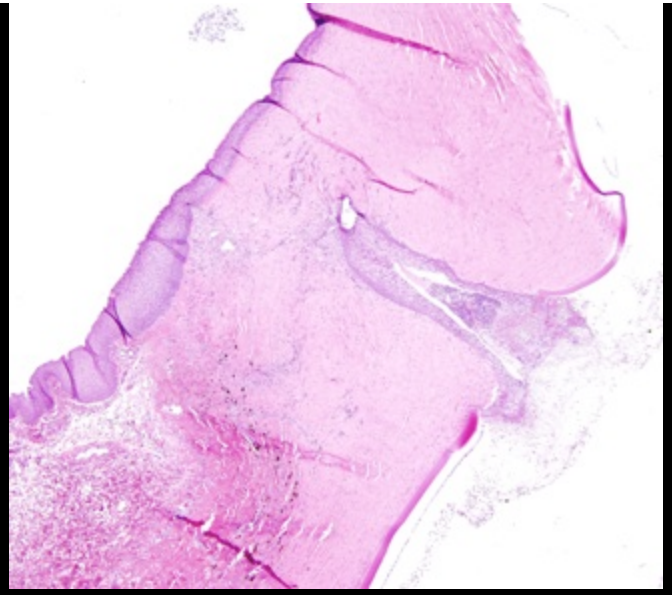


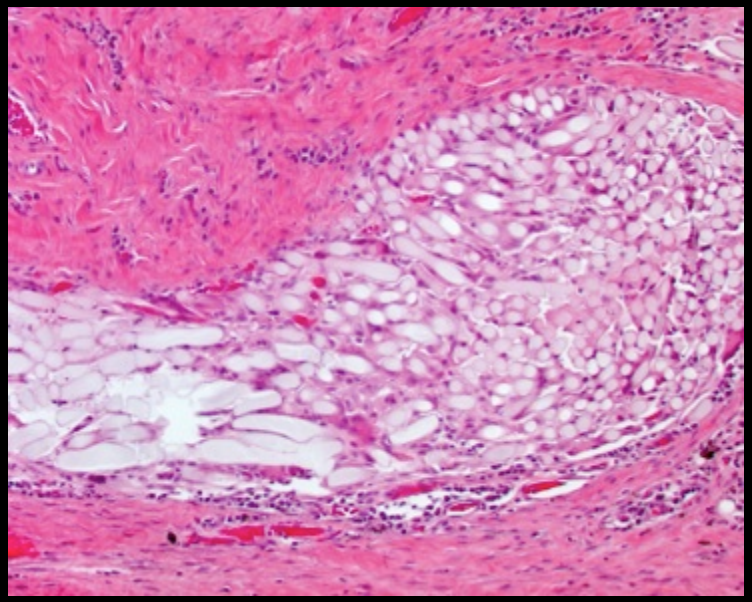


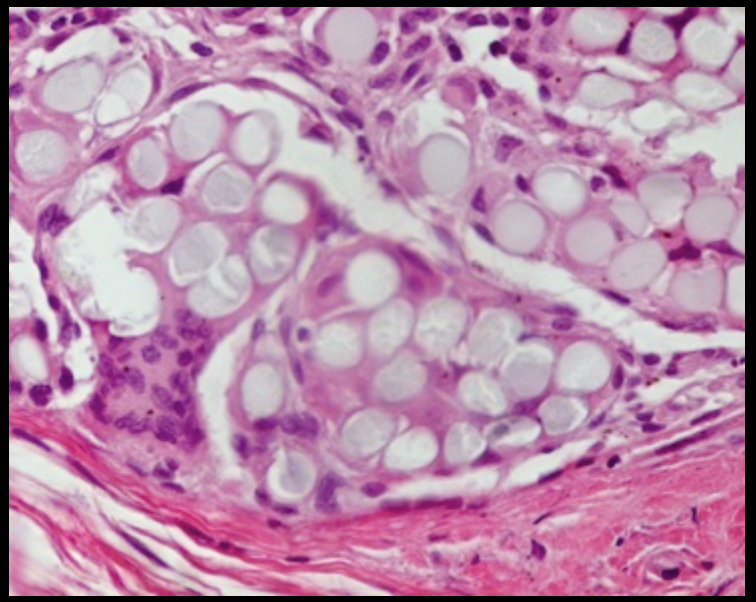
Corneal Surgical Incision Site - anterior synechia



Corneal Surgical Incision Site – 10 Years Post-op

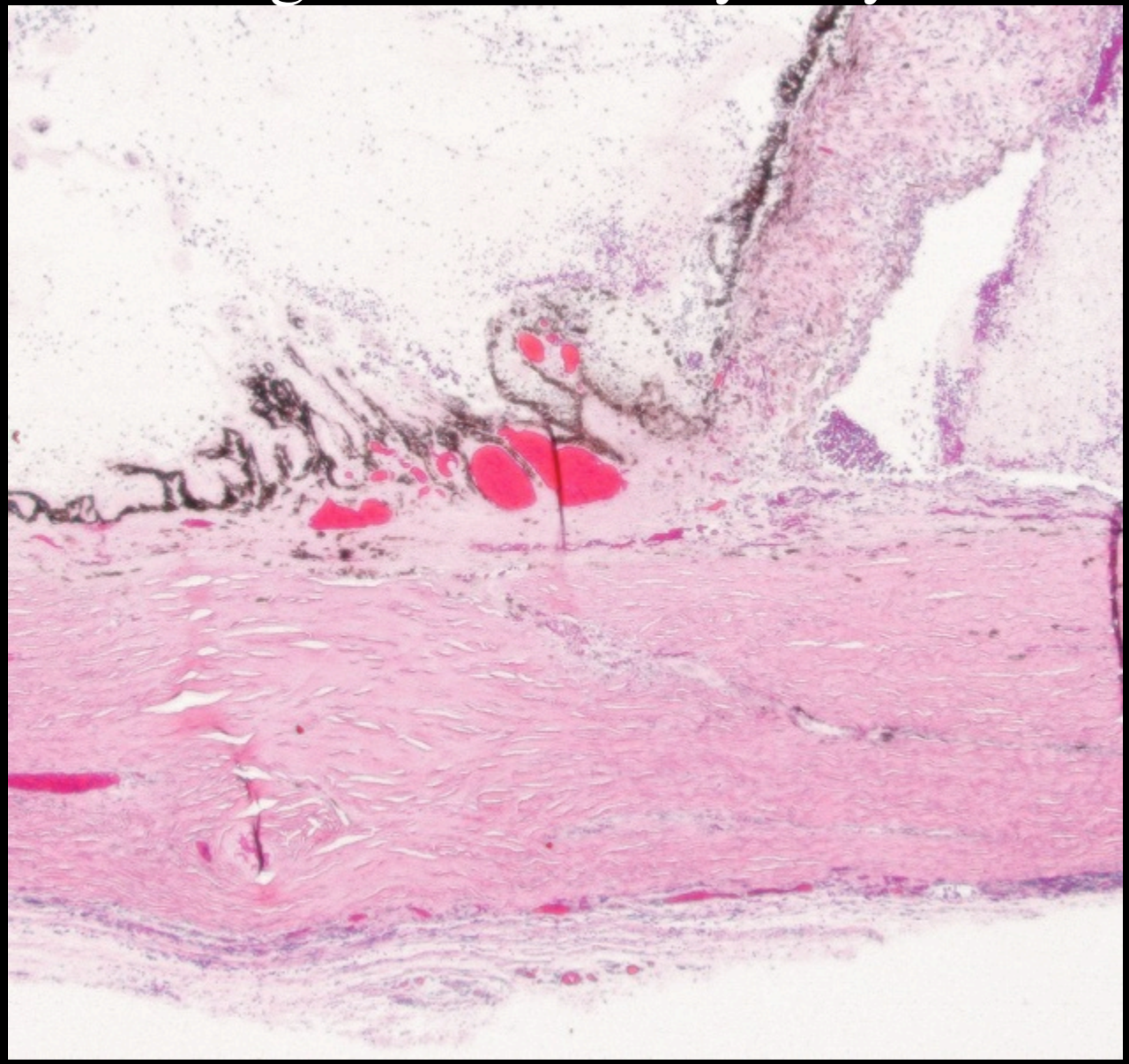


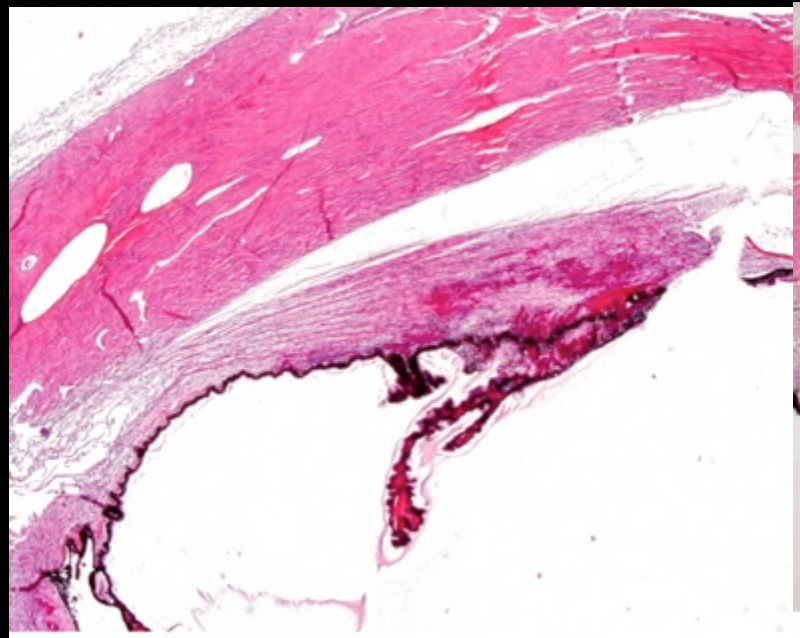




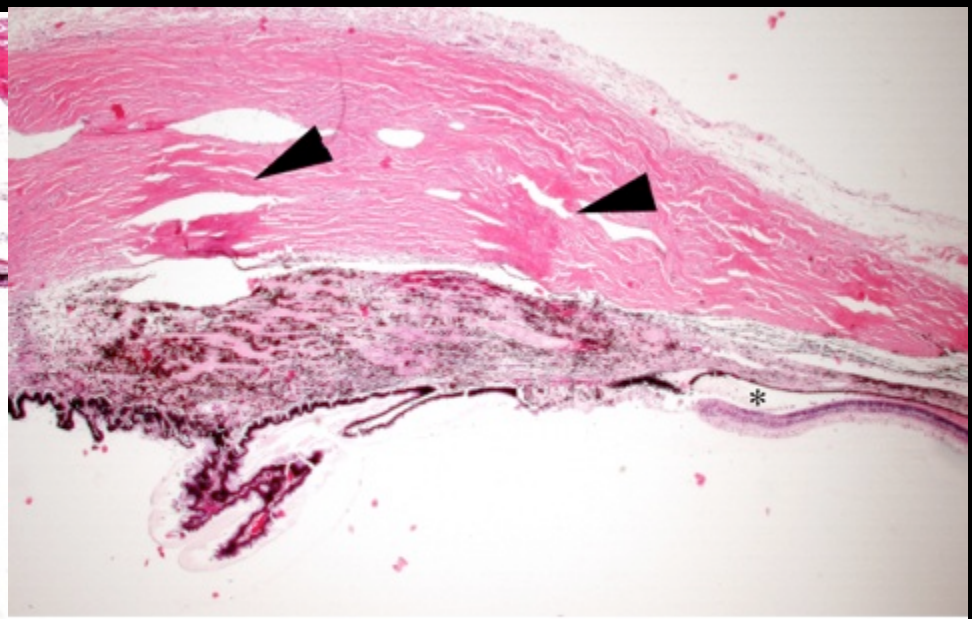
Wound Healing Problems

Laser Photocoagulation - ciliary body of blue-eyed dog



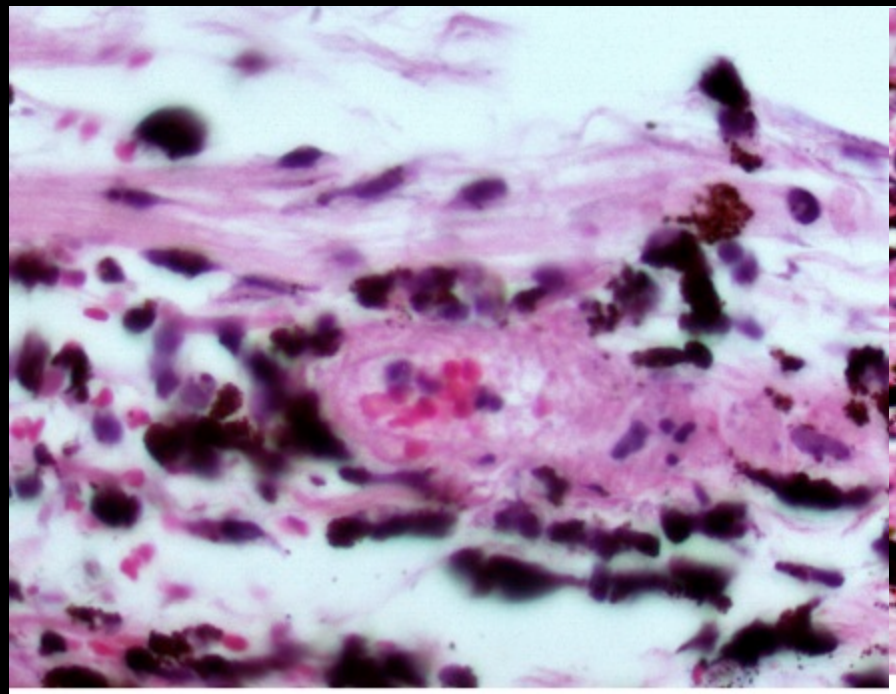


03rd1198 (4649) Blue Eye Stomal Necrosis

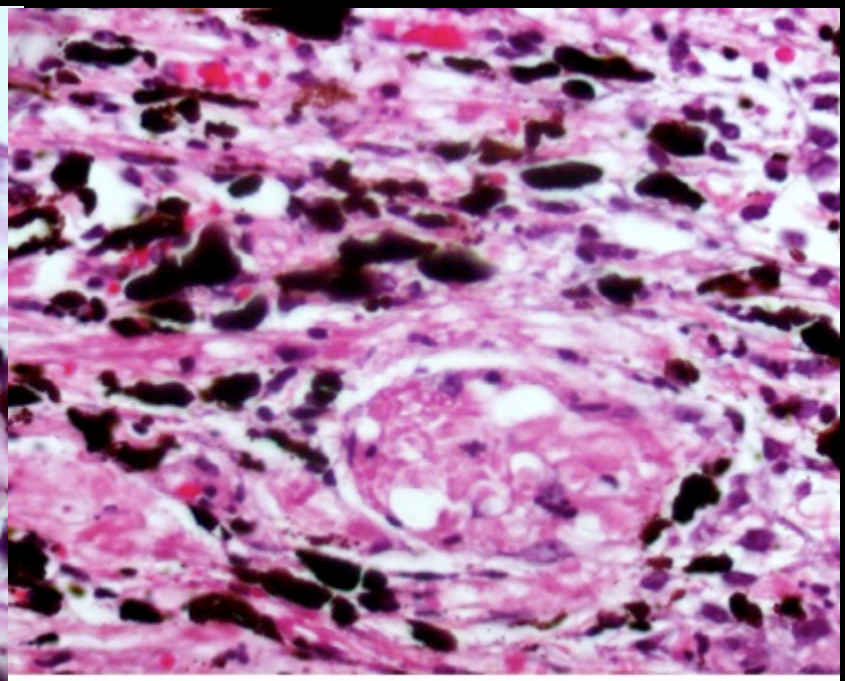


03rd1200 (4651) Double Burn & Retinal Detachment

Nerve and Vessel Necrosis

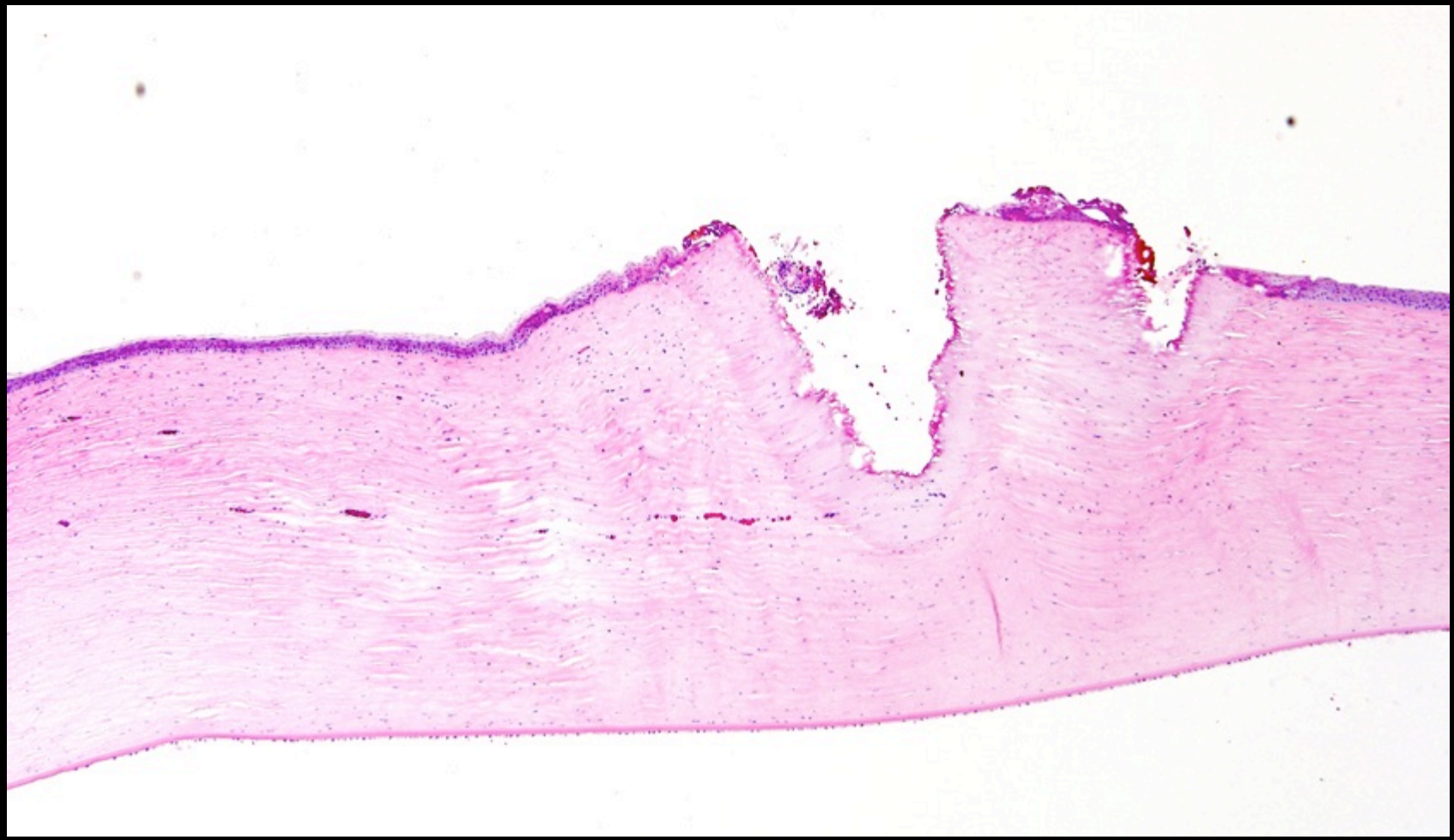


03rd1195 (4646) Blood Vessel Necrosis

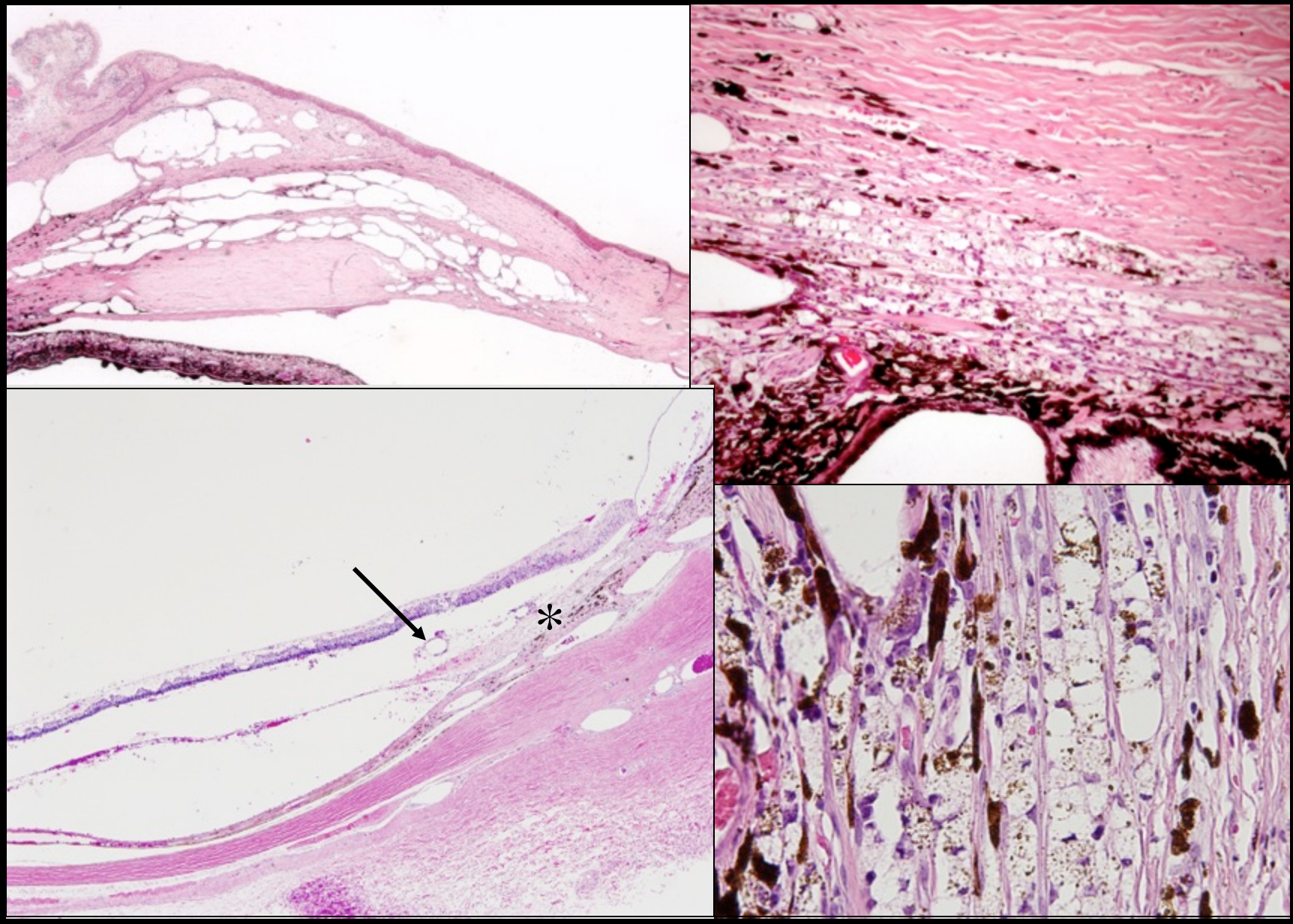


03rd1197 (4648) Nerve Necrosis

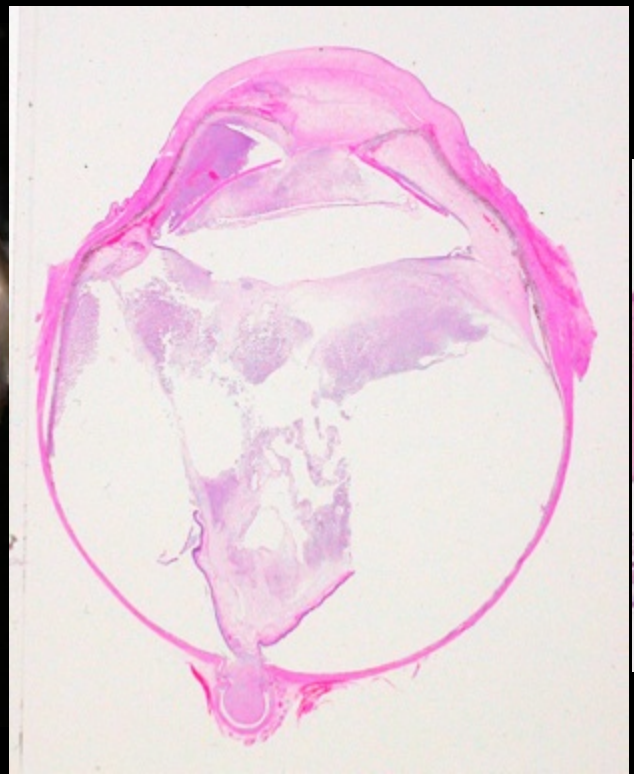
Laser Surgical Wound

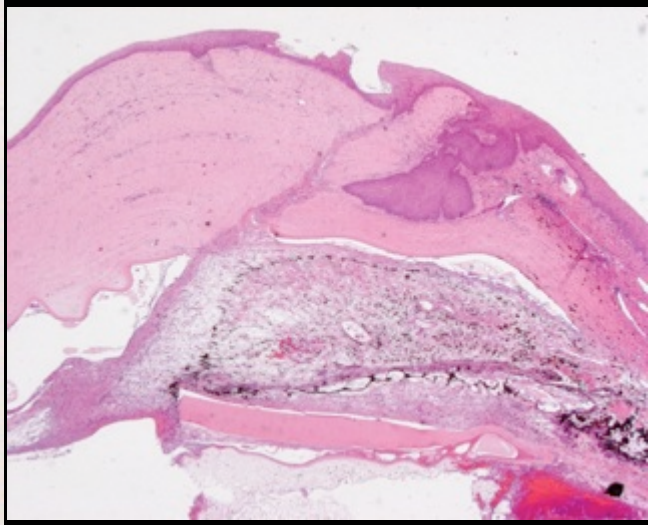


Complications Due to Silicone Oil

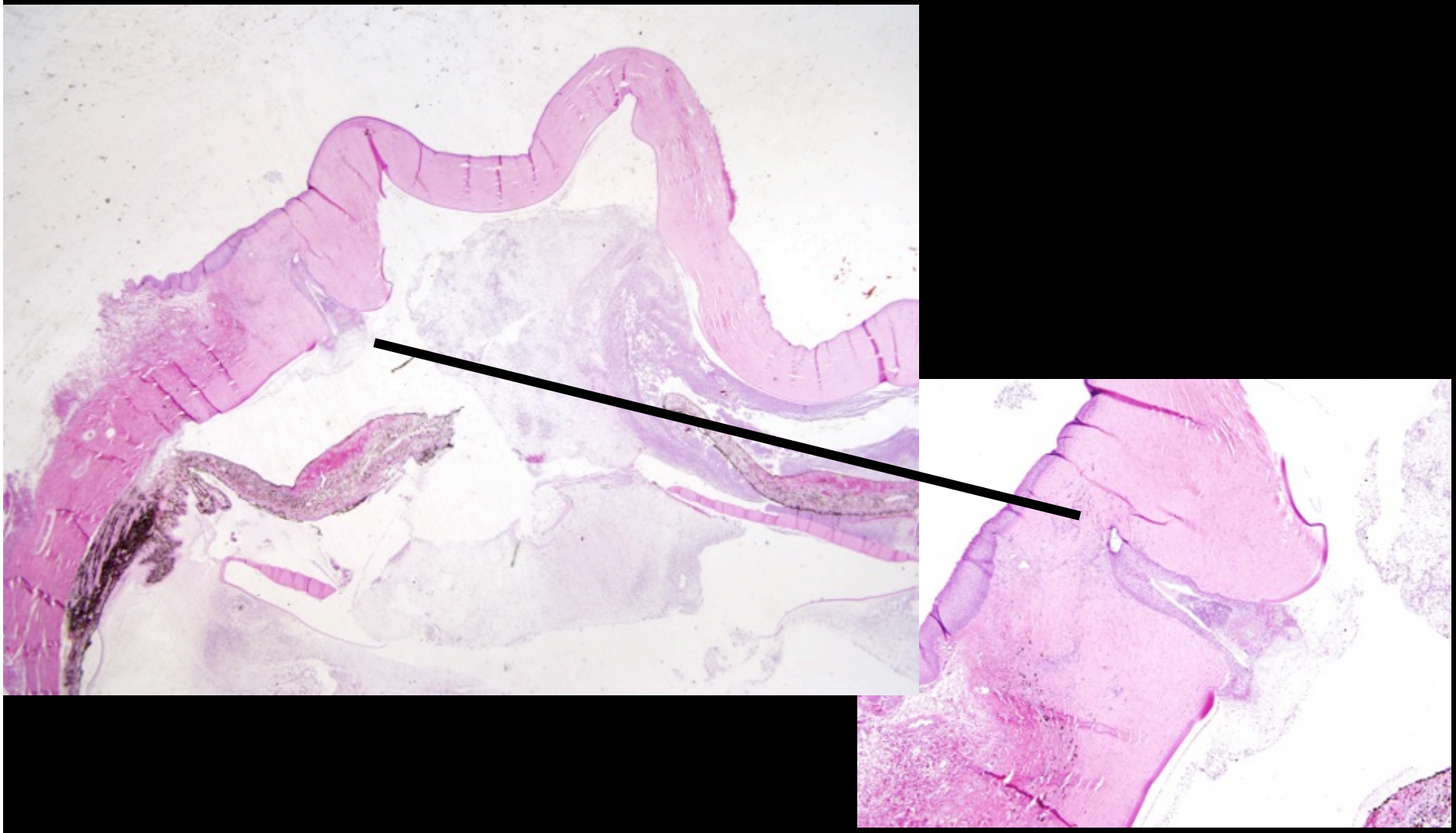


The morphology of eyes enucleated due to complications following phacoemulsification





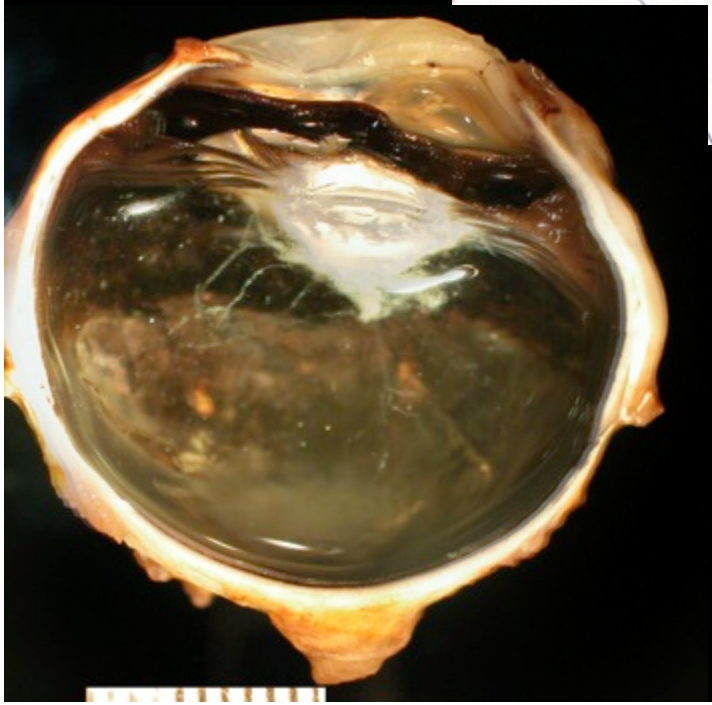
Dehiscence of the Surgical Wound and/or Epithelial Downgrowth

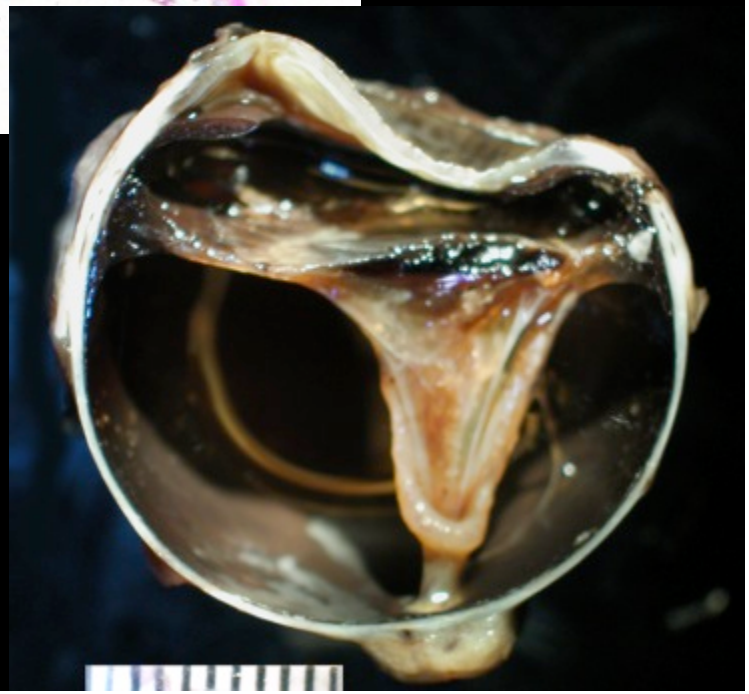


Complications following Phacoemulsification

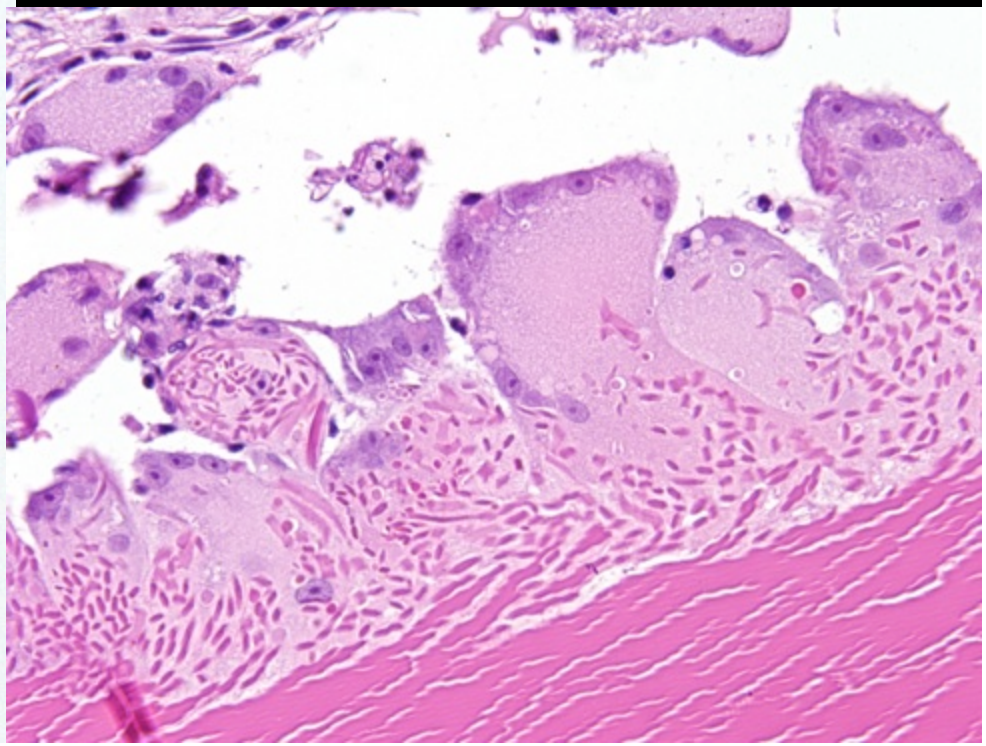
- The most frequent histopathological abnormalities detected were:
  - Endophthalmitis, shortly after surgery
  - Glaucoma, delayed onset
    - Retinal detachment and neovascular glaucoma
    - Posterior synechia
    - Lens epithelial membranes
- The most frequent clinical abnormalities reported were:
  - glaucoma (86%)
  - uveitis (82%)

Post-operative Glaucoma

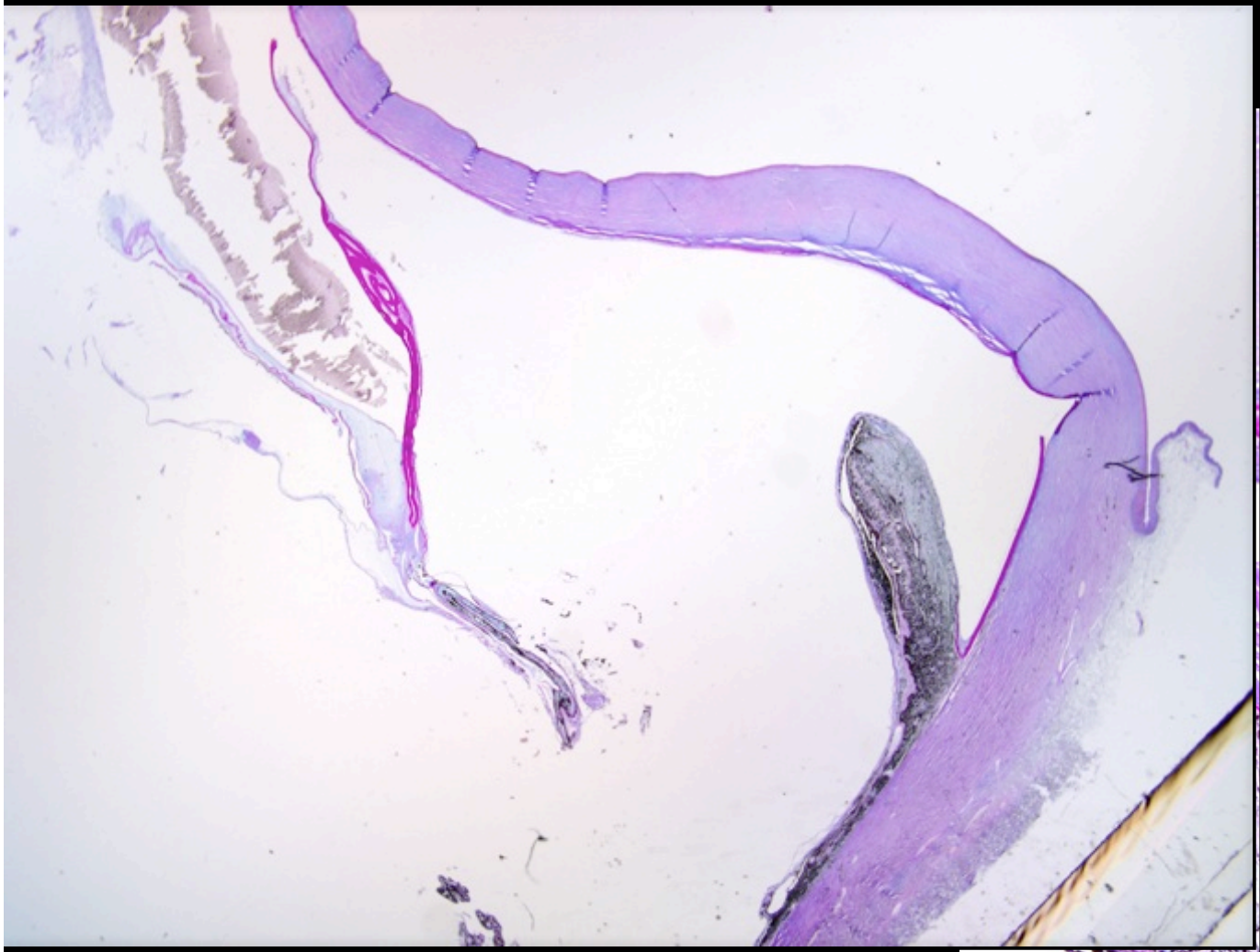


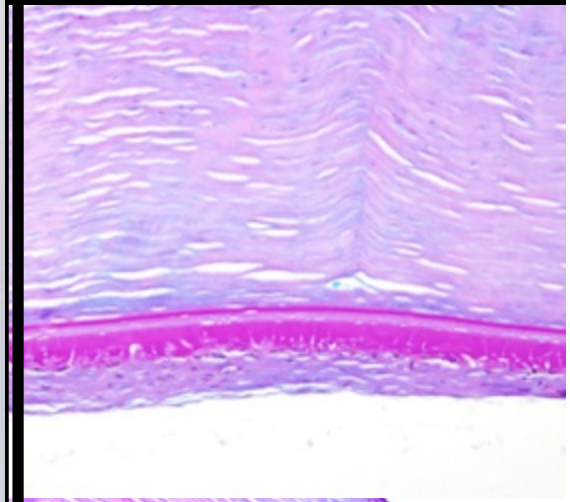


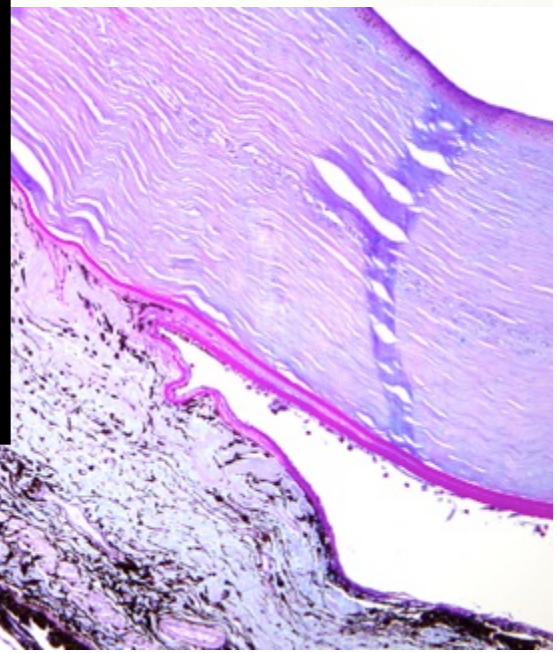
Exposure of Lens Protein -- Phacoclastic Uveitis



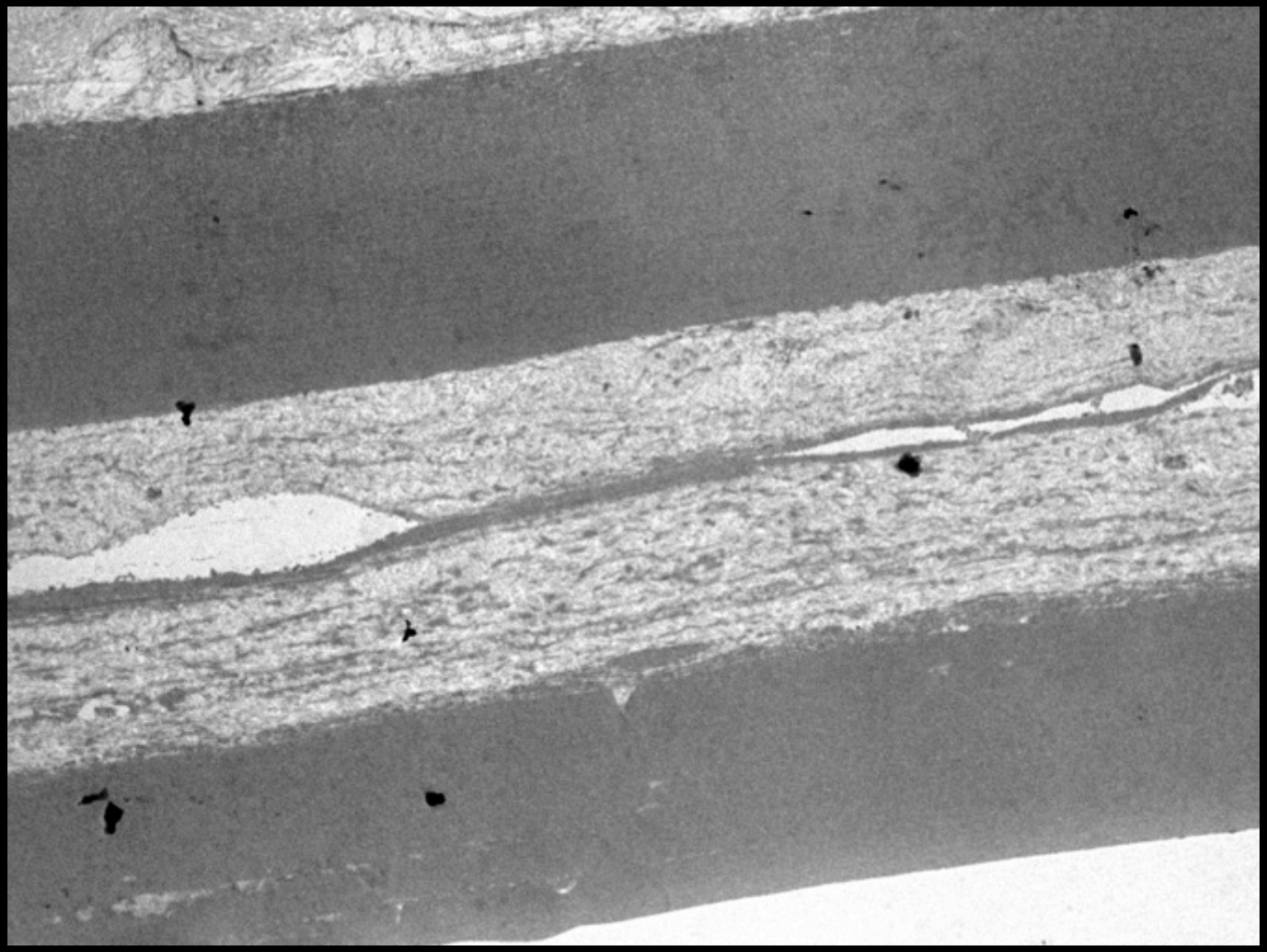
Endothelial and Descemet's Changes







Doubling of Descemet's Membrane

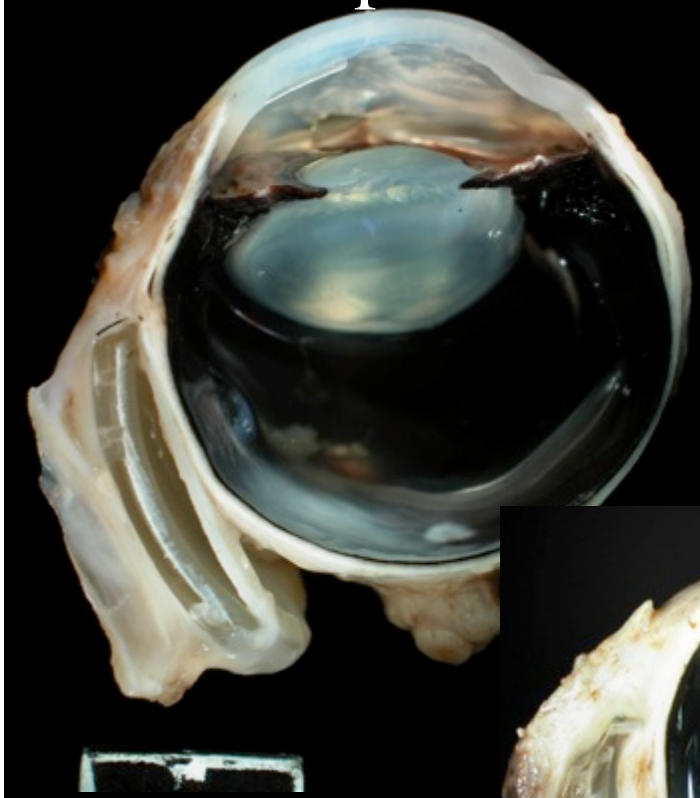


Five Problem Areas Identified

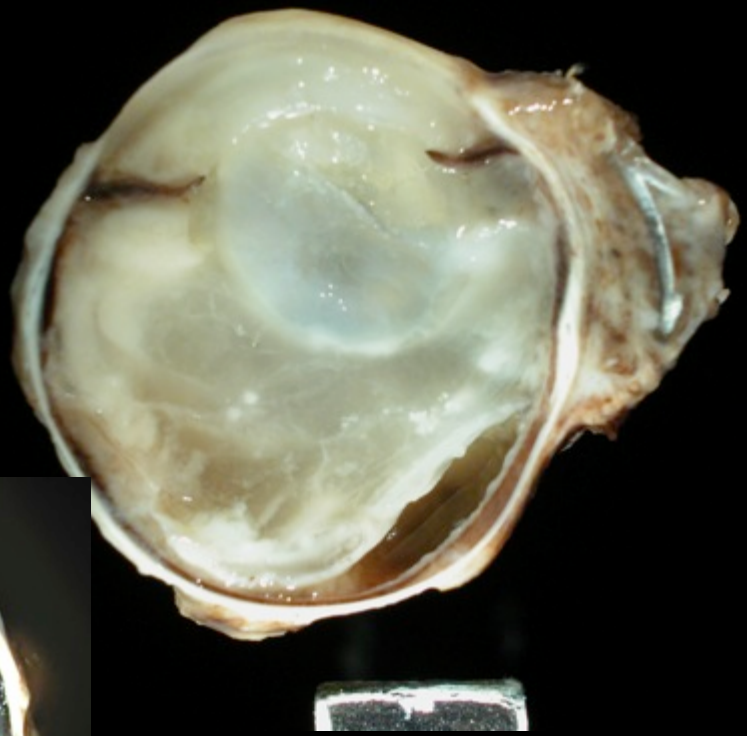
- PIFVMs
- Lens Fiber Regrowth
- Lens Epithelial Membranes
- Endophthalmitis
  - Dehiscence
  - Lens Protein Exposure
- Health of the Corneal Endothelium & Descemet's

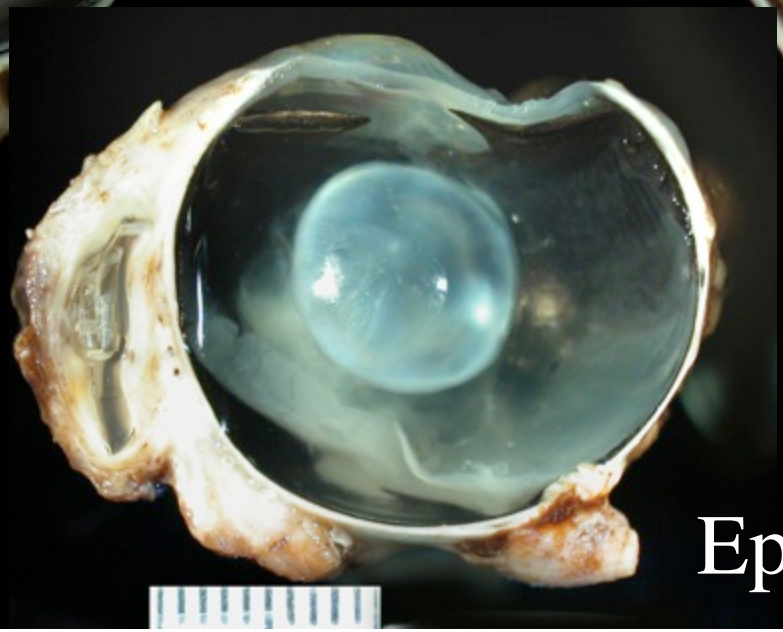
Gonioimplant, Ahmed Valve

Uncomplicated



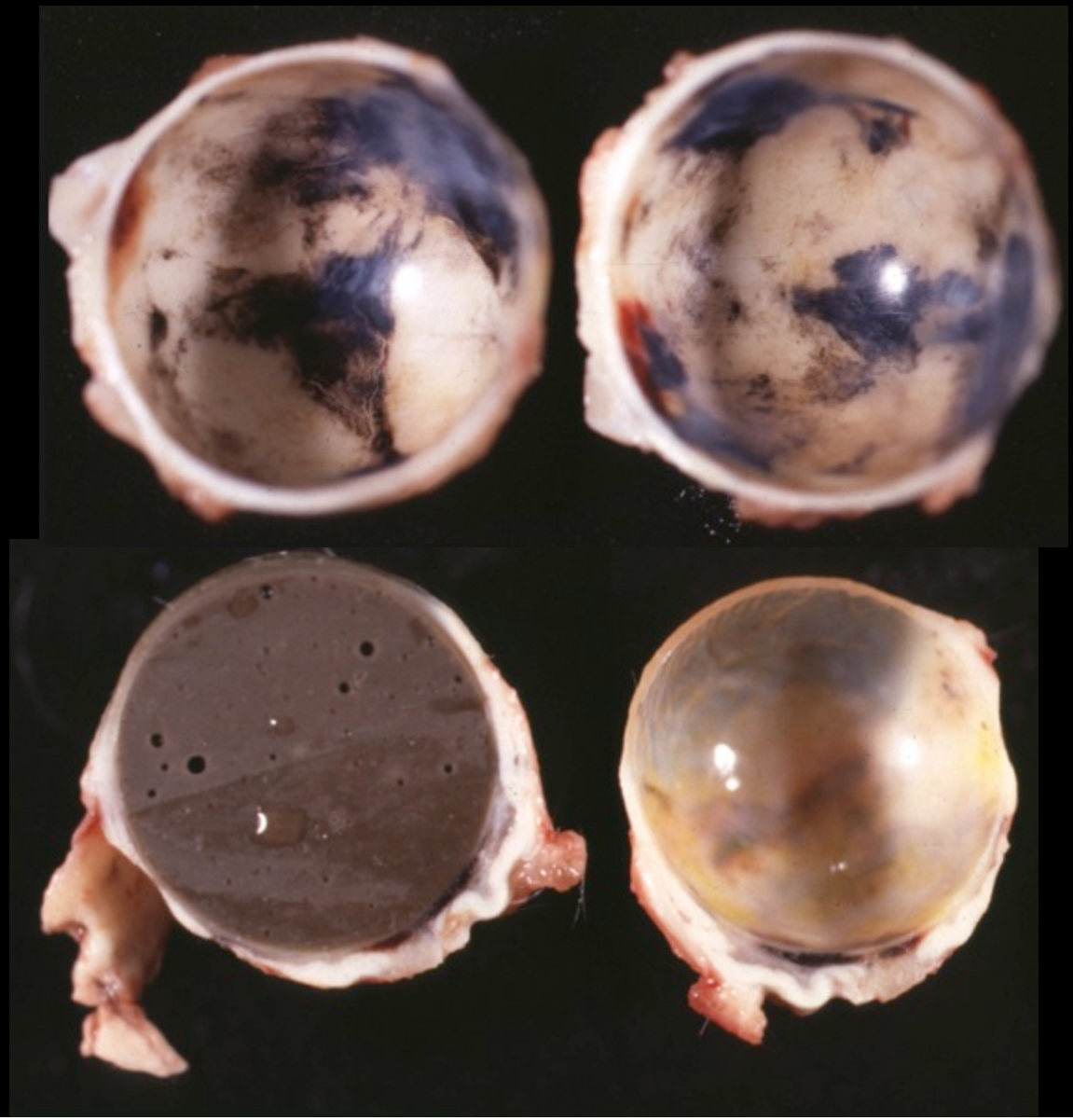
Dehiscence and Exposure

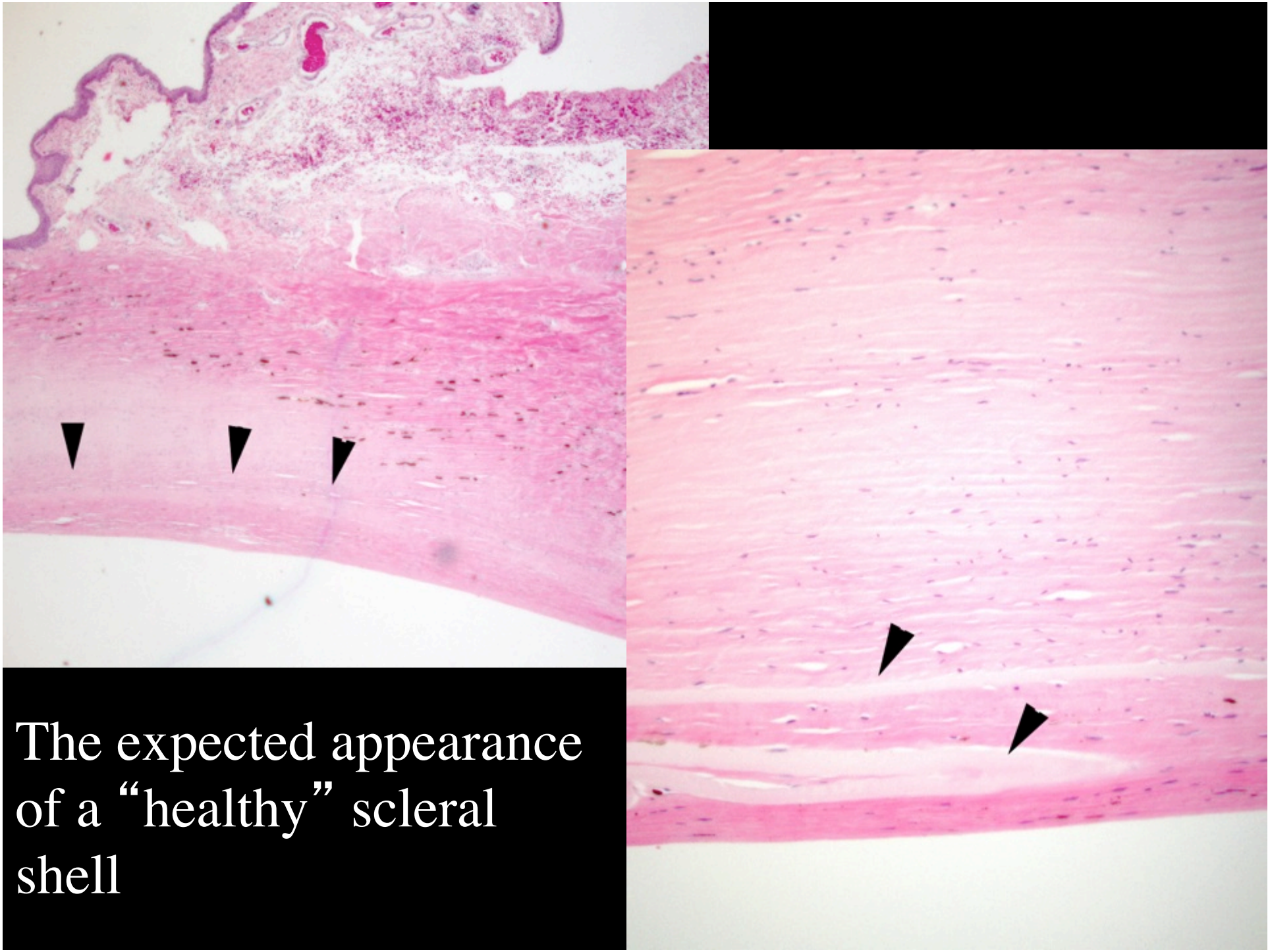




Epithelial Ingrowth

Intrascleral Prosthesis



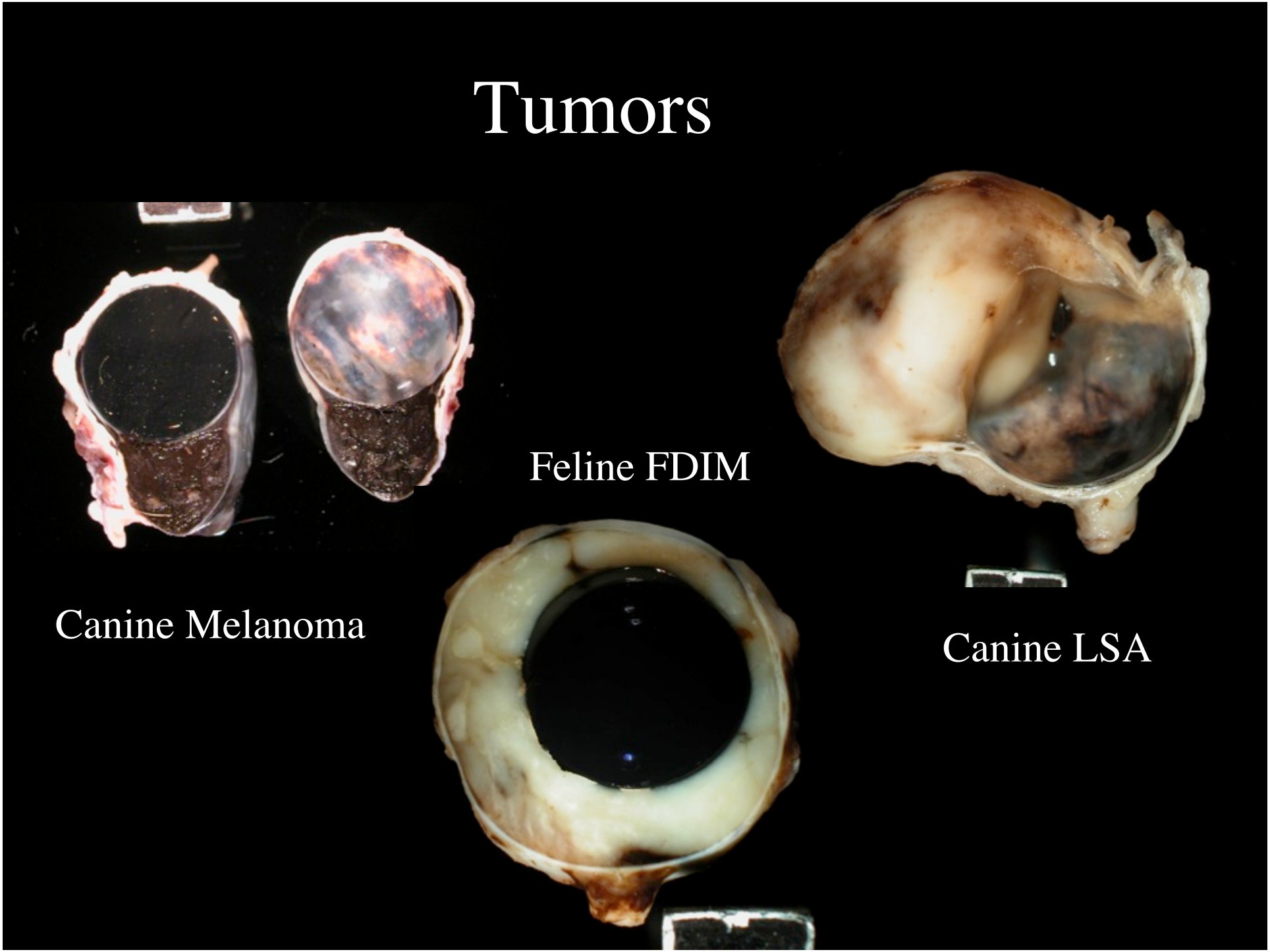


The expected appearance of a “healthy” scleral shell

Intrascleral Prosthesis Failures

- 62 in Dogs
  - 23 because of tumors
  - 12 because of epithelial downgrowth
  - 30 because of corneal degeneration
  - 28 had severe inflammation
- 11 in Cats
  - 9 because of tumors
    - 8 melanoma, 1 post-traumatic sarcoma

Tumors



Canine Melanoma

Feline FDIM

Canine LSA

Epithelial Down Growth