

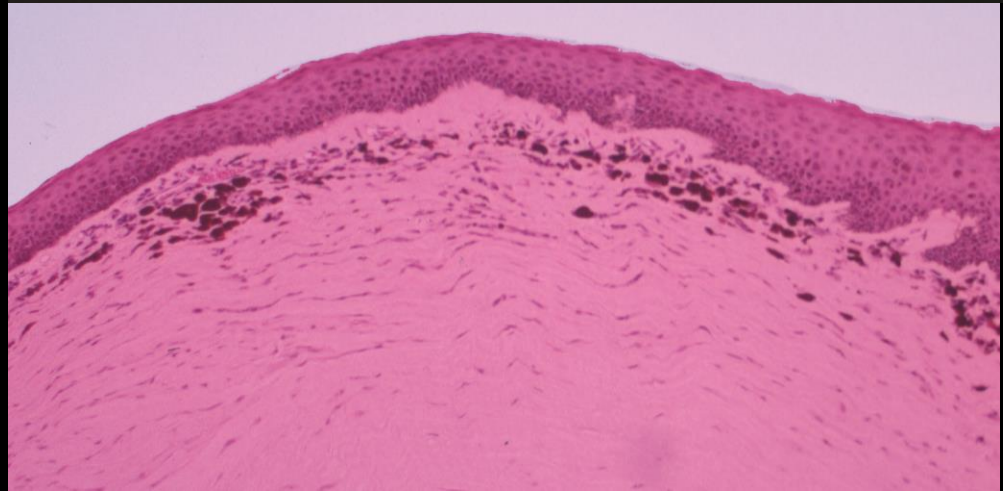
Diseases of the Cornea

Dick Dubielzig

Chronic Superficially Oriented Keratitis

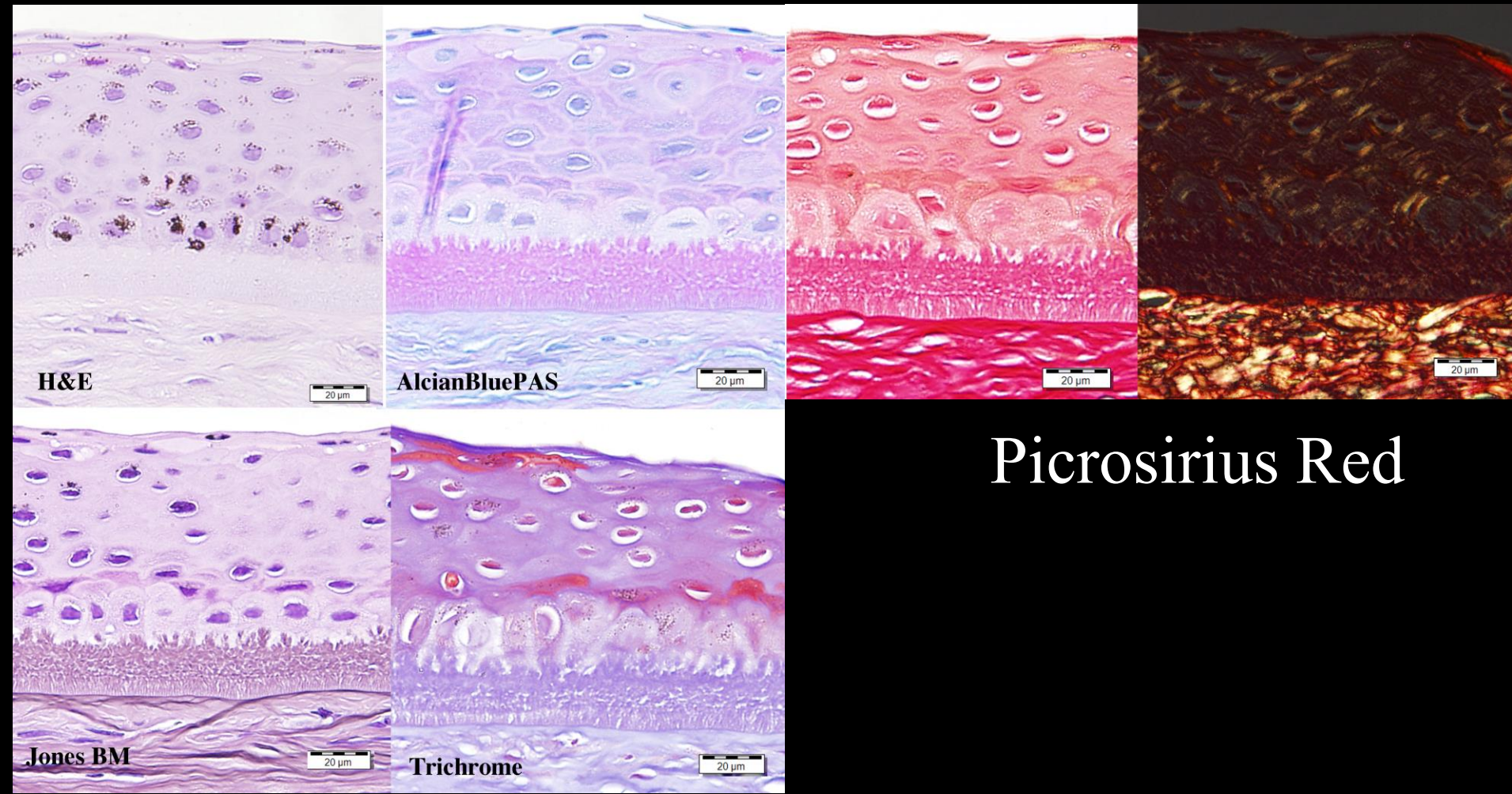
- Exposure
- Dry eye
- Denervation
- Irritation
- Risk of neoplasia

Alone, this is not a reason to submit a globe for histopathology so we see complicated cases at COPLW



Repeated Corneal Ulceration

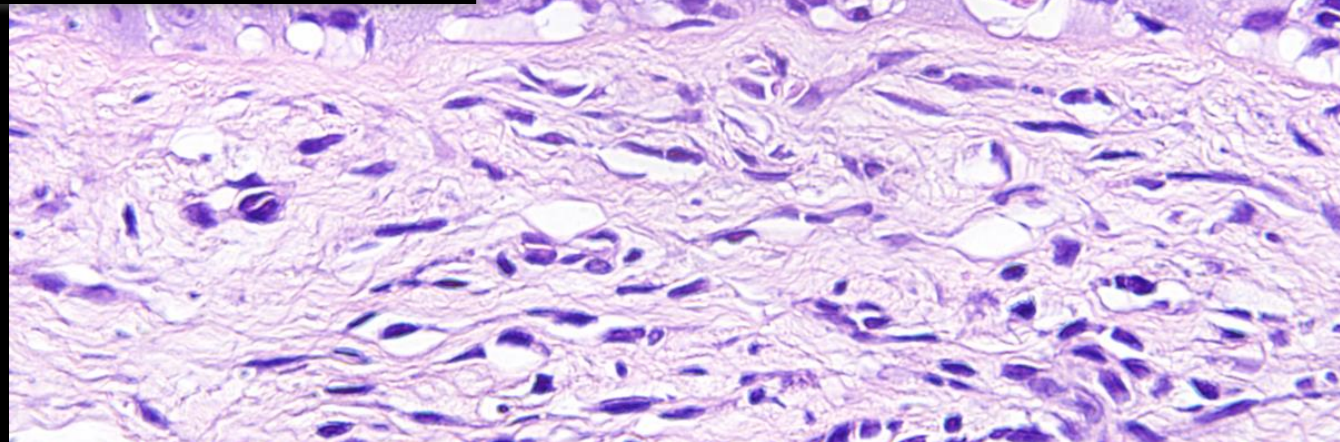
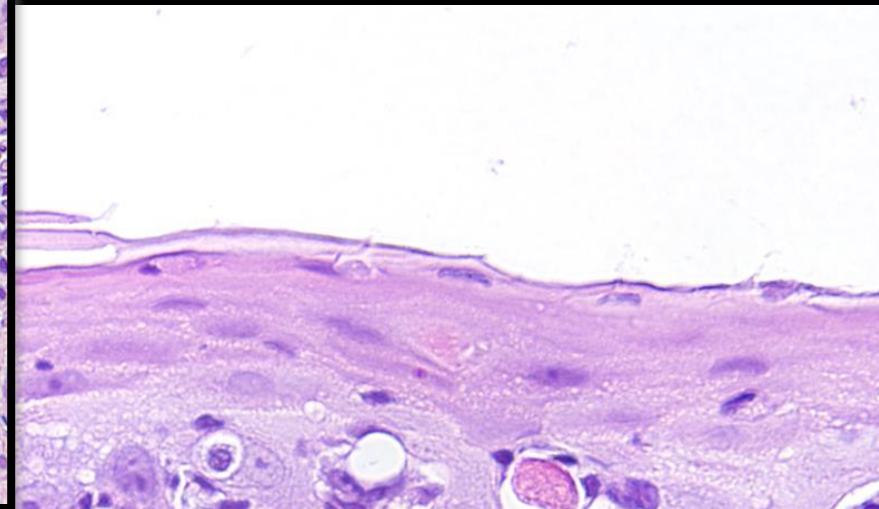
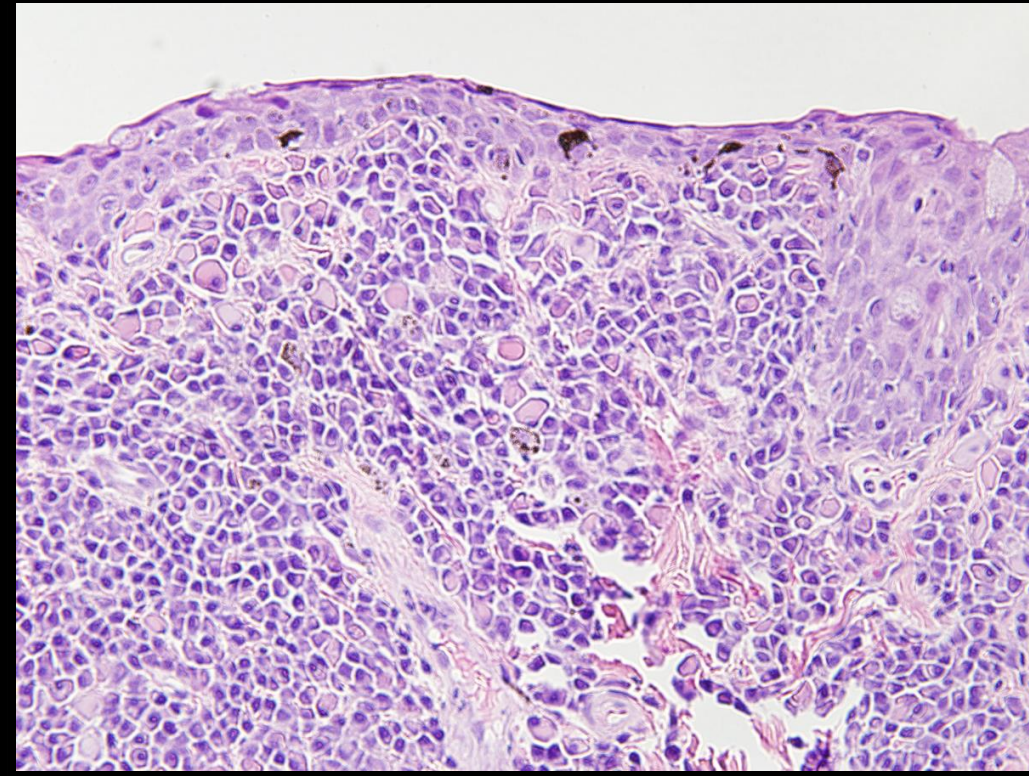
Basement Membrane Thickening



Picrosirius Red

Canine Pannus

Superficial Keratitis



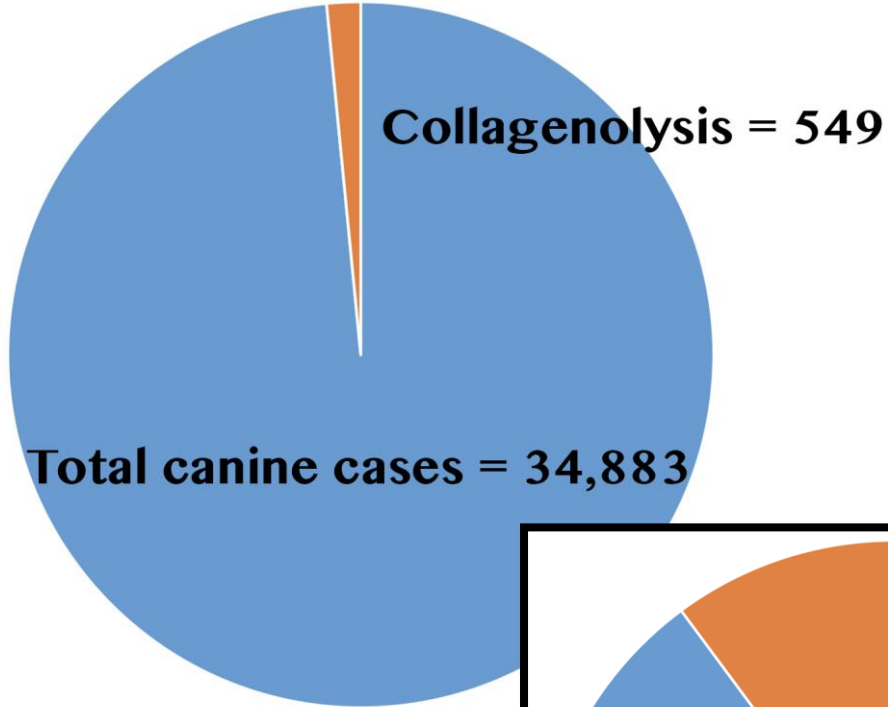
Collagenolytic Keratitis



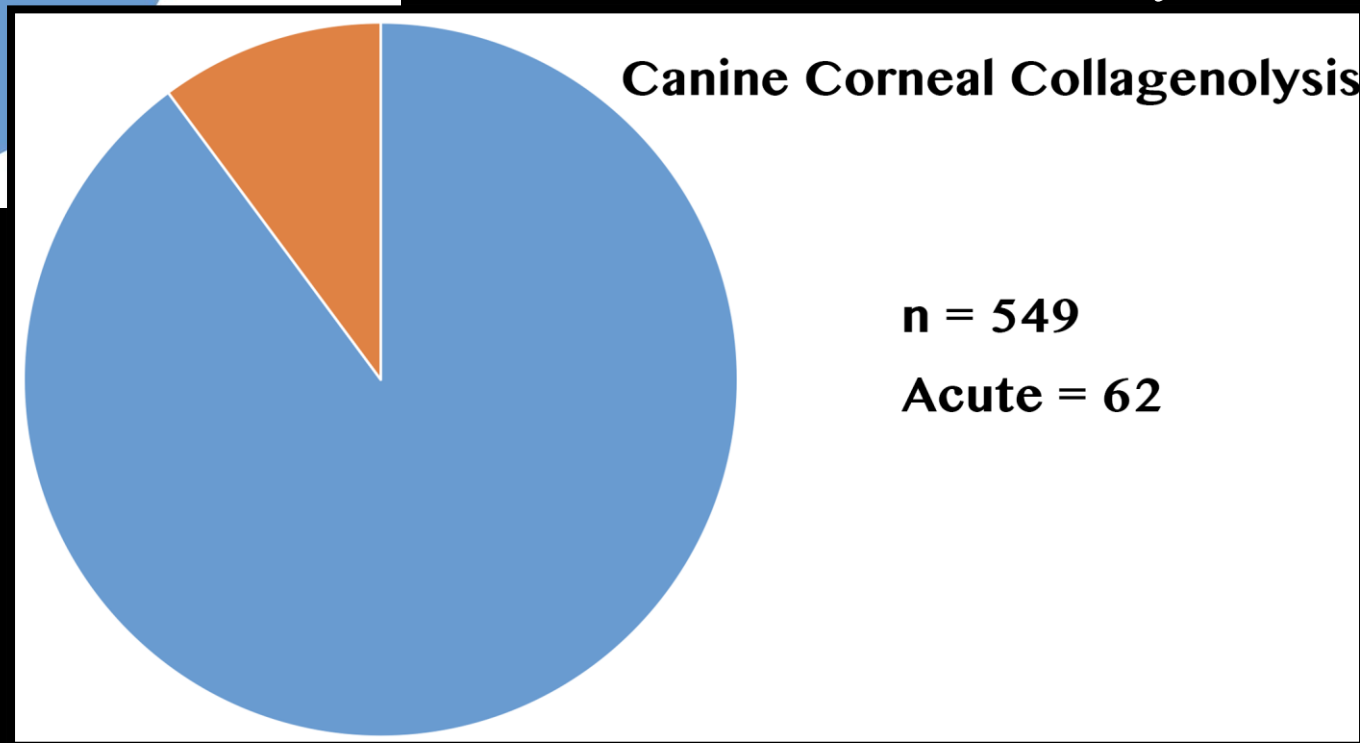
Elizabeth Adkins



Collagenolytic Keratitis

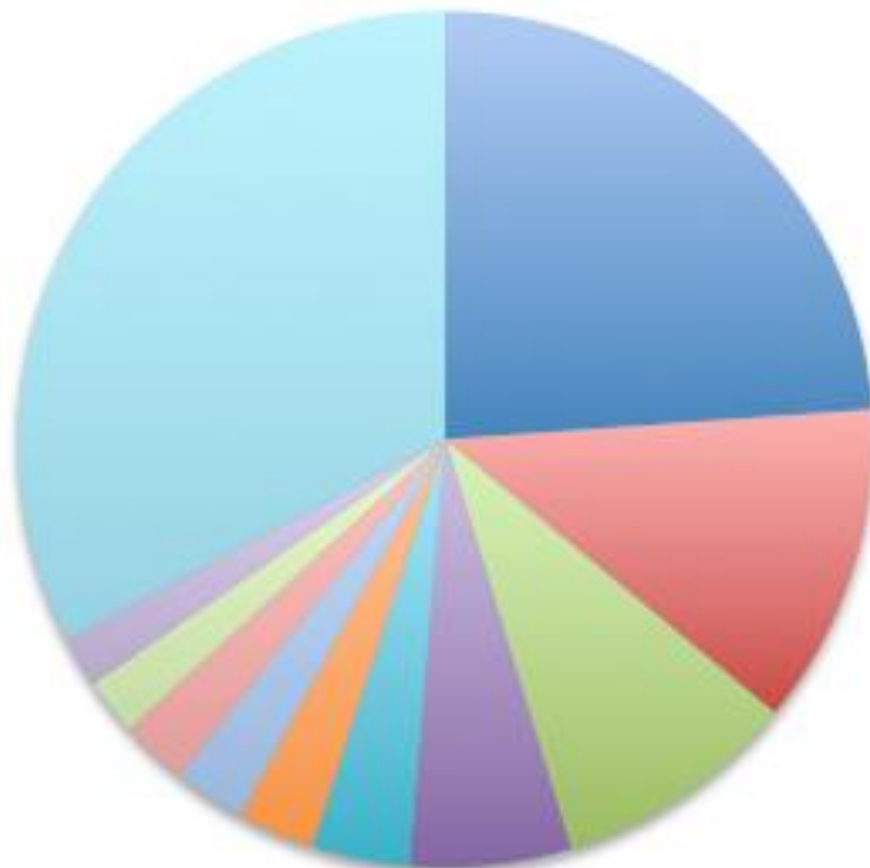


0 to 4 days



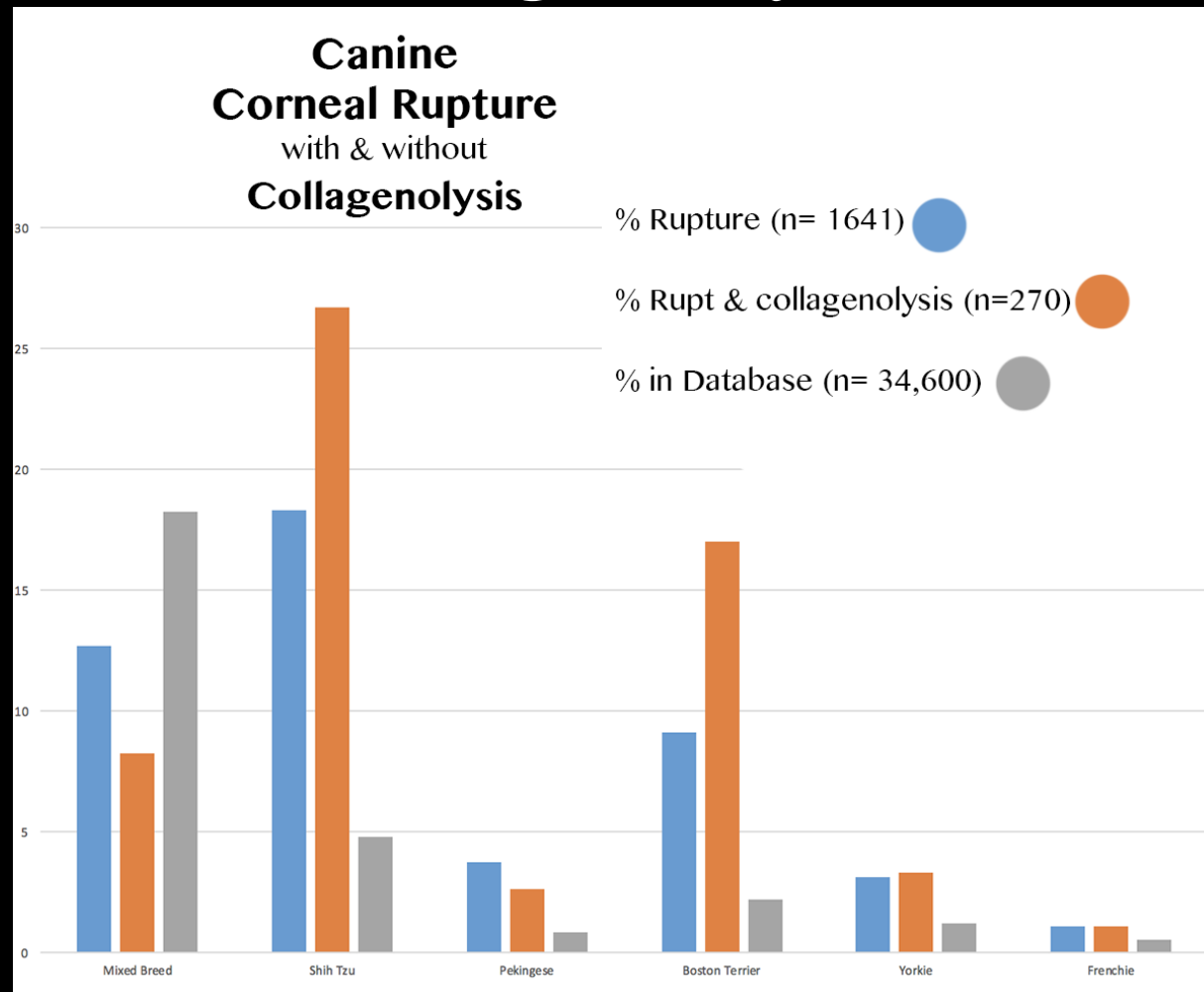
Collagenolytic Keratitis Breeds

% with Collagenolysis



- Shih Tzu
- Boston Ter
- Mixed
- Pug
- Chihuahua
- Pekingese
- Lab Ret
- Yorkie
- Pomeranian
- Bichon Frise
- Other

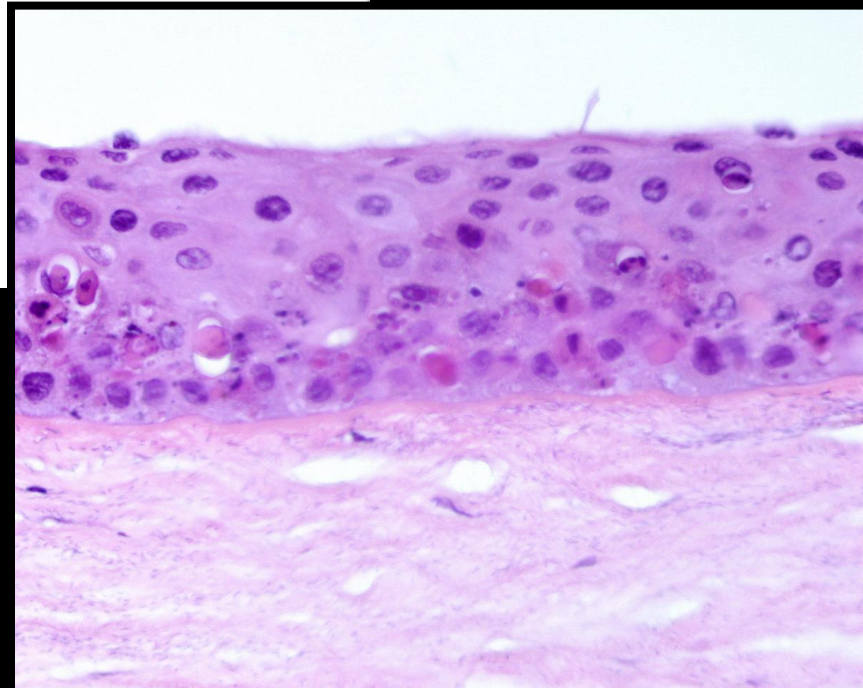
Corneal Perforation Breeds with and without Collagenolysis



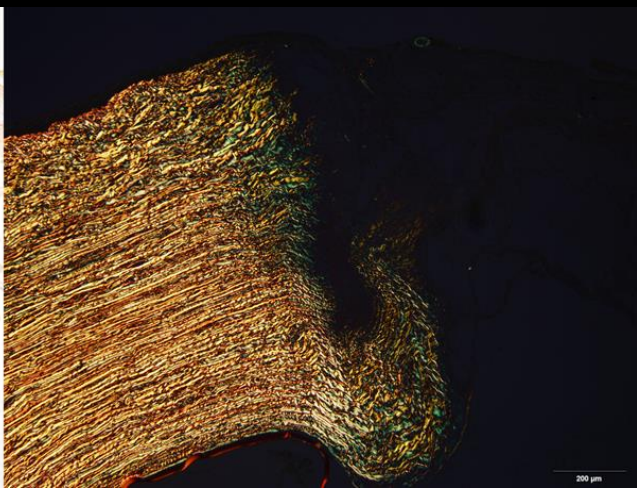
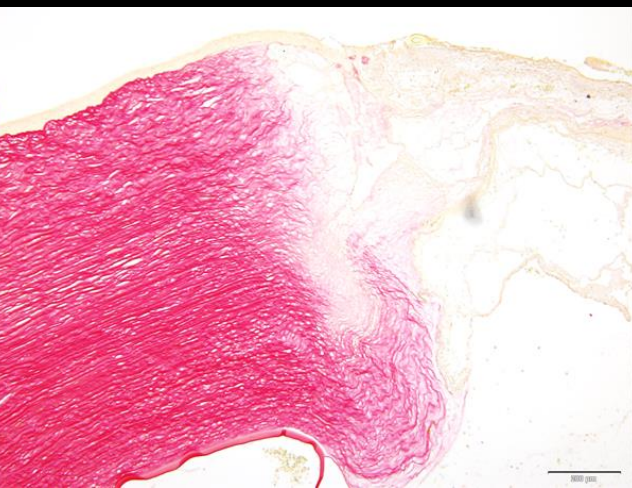
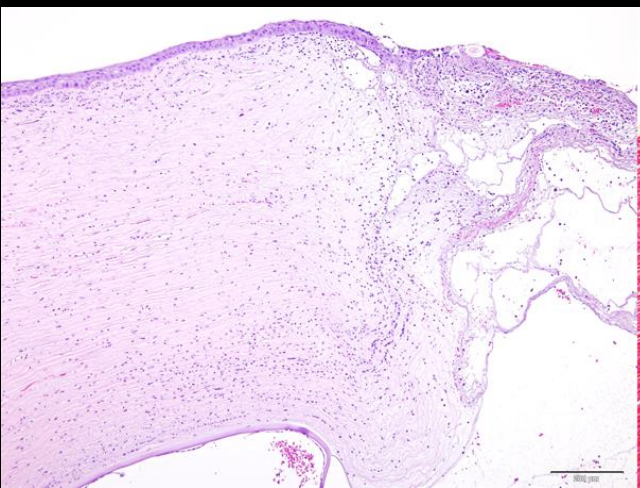
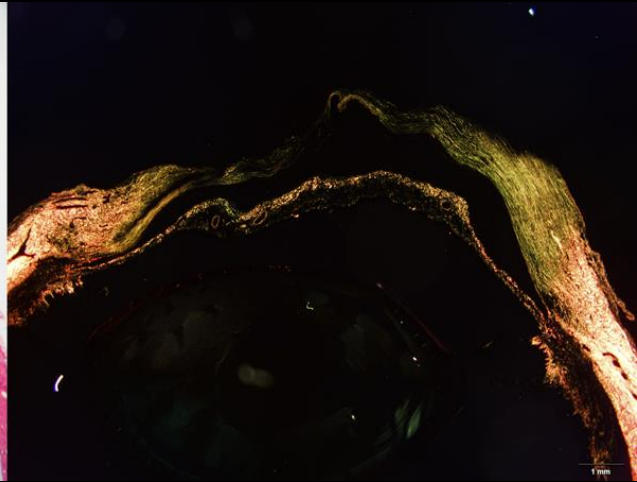
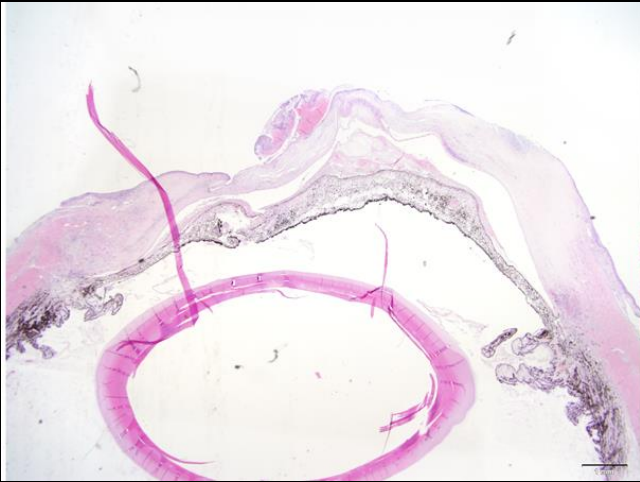
Collagenolytic Keratitis Bacteria



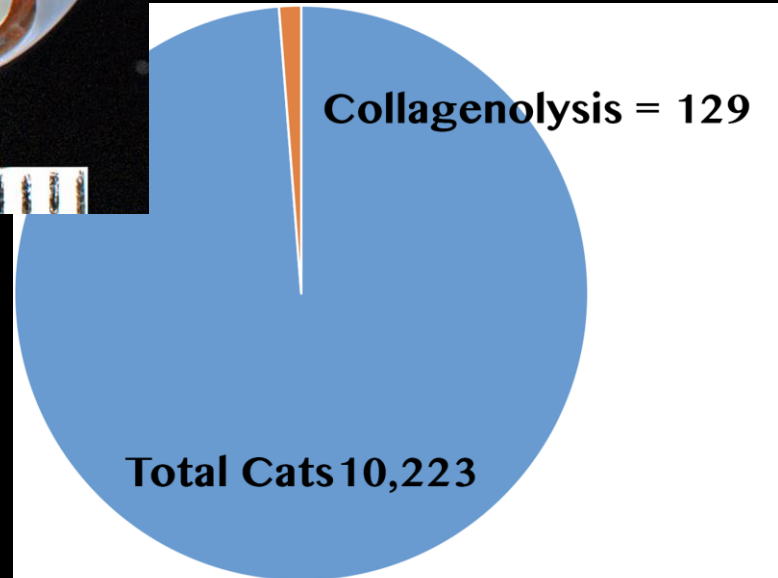
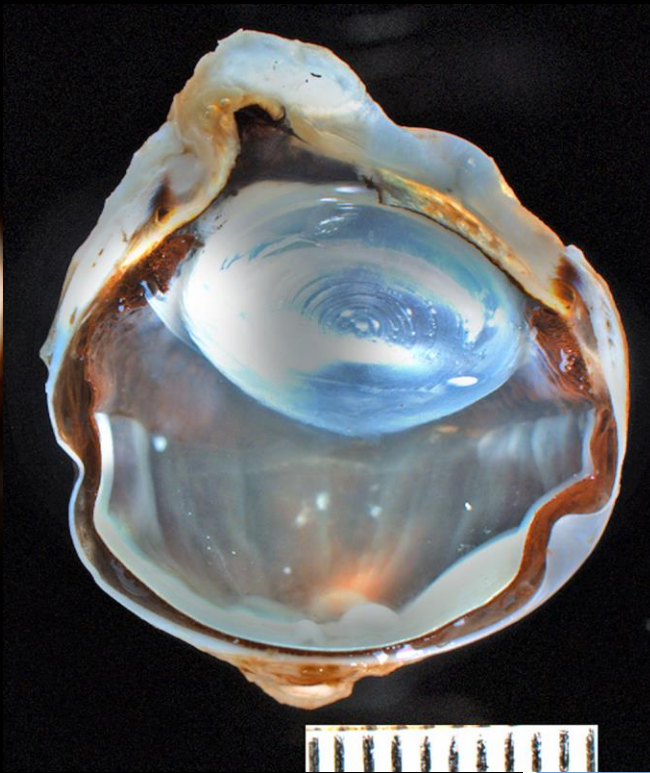
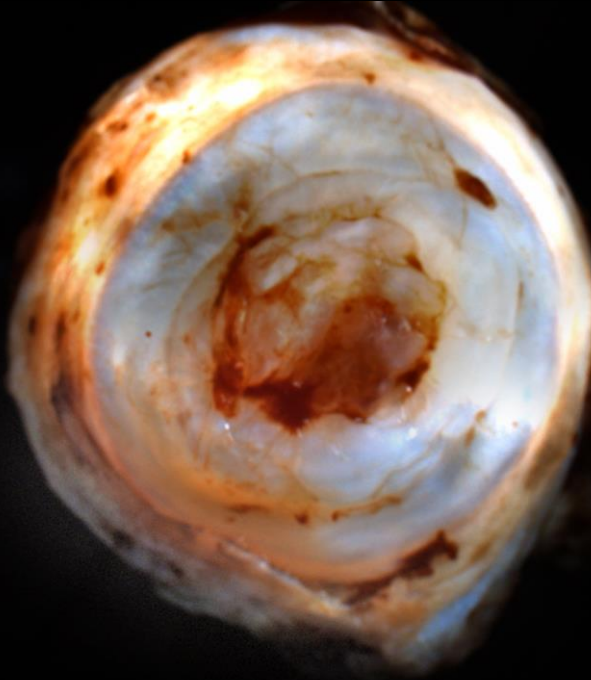
- % Collagenolysis w/o Bacteria
- % Collagenolysis & Bacteria



Collagenolytic Keratitis Histopathology



Collagenolytic Feline



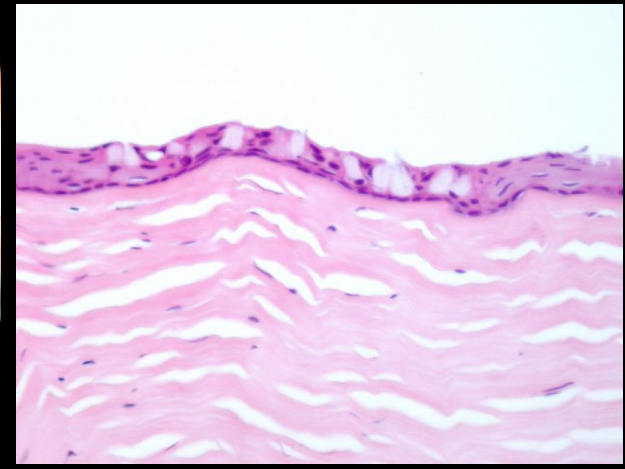
Feline

Corneal Epithelial Stem Cell Depletion

Epithelial Attenuation

Suspected Herpes

- 81 cases in the database
- All ages (median age is 11 years)
- 51 males and 27 females
- Conjunctivalization



Feline Early-life Eye Disease

35 cases in the COPLow database

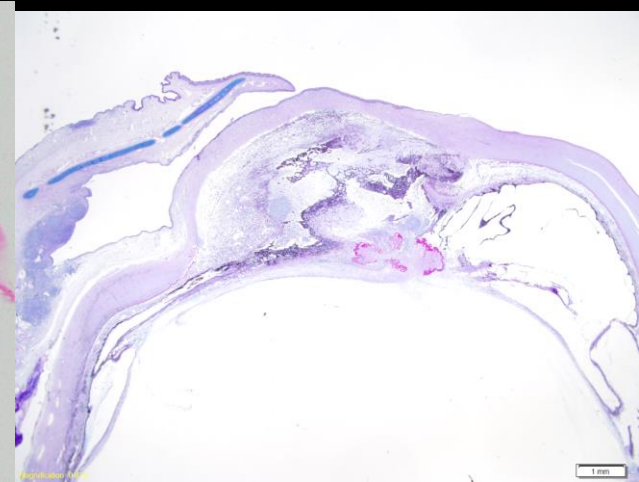
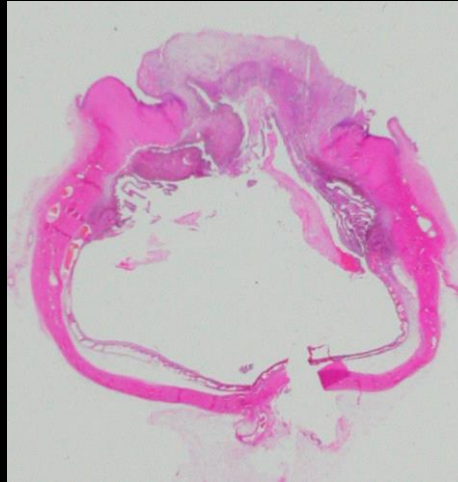
- 20 of 35 less than one year old
- 15 cases older than 1 YO Ave. = 4.7 years
 - *These older cats have comfortable eyes*
- *????* From a identified as from a shelter
- Characteristics
 - Axial corneal defect with iris prolapse
 - Symblepharon
 - Suspect Herpes on clinical description
 - Conjunctivalization
 - + or – inflammation
 - Often lens extrusion

Feline Early-life Eye Disease

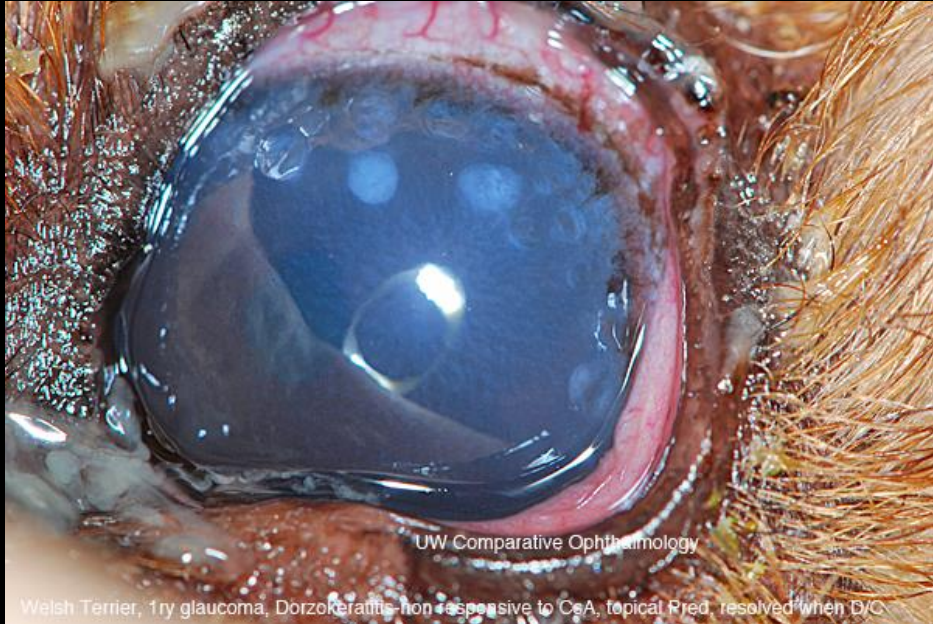


OD

OS



Dorzolamide or Brinzolamide keratitis



Images from Ellison Bentley, not sampled for histology
Inflammation disappeared when the drugs were discontinued

Dorzolamide or Brinzolamide keratitis

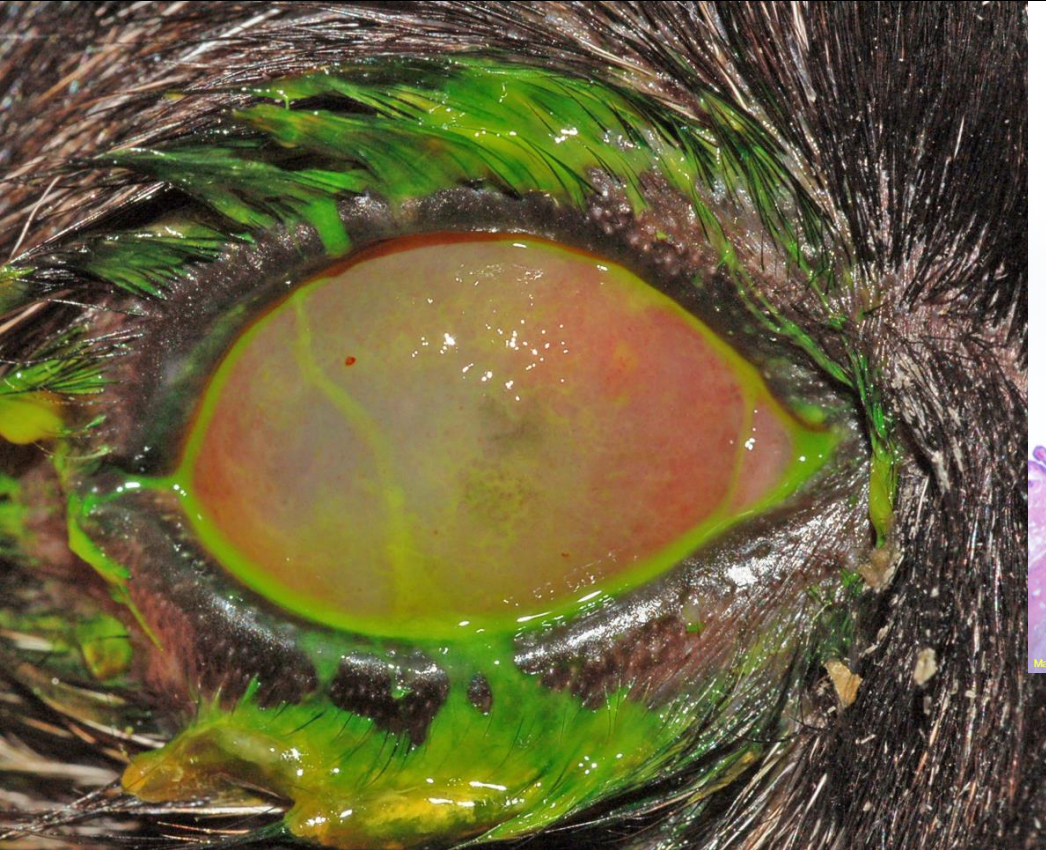
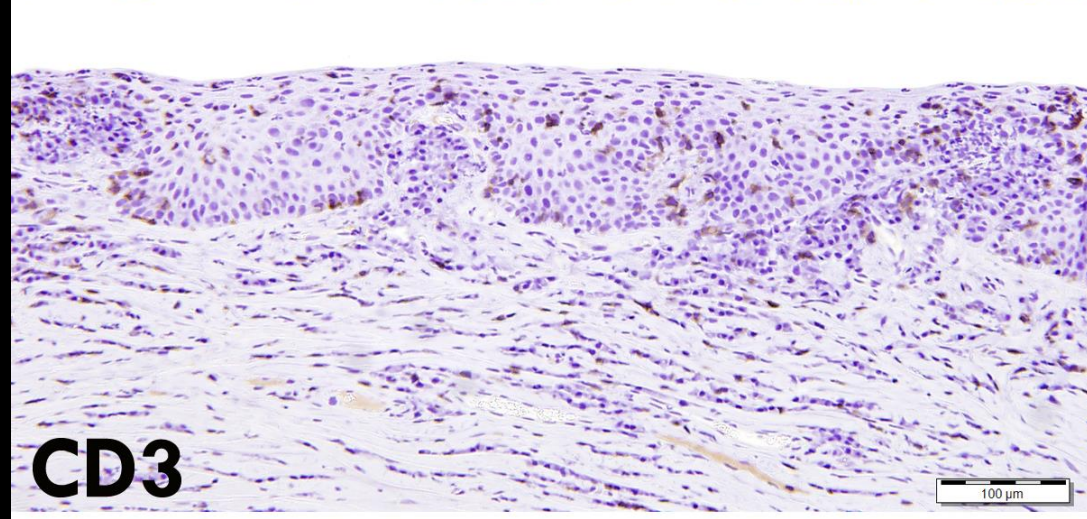
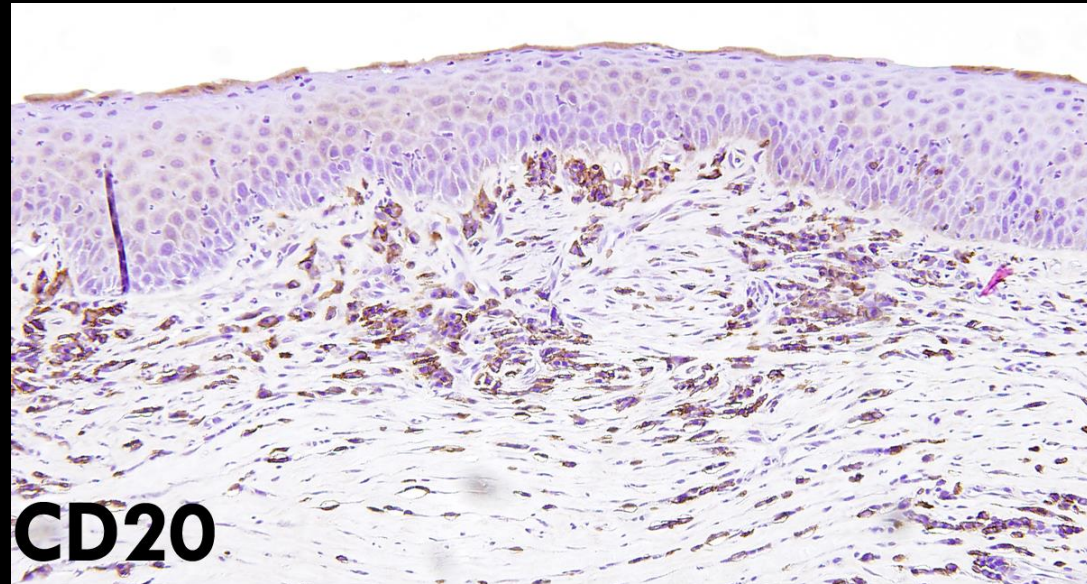
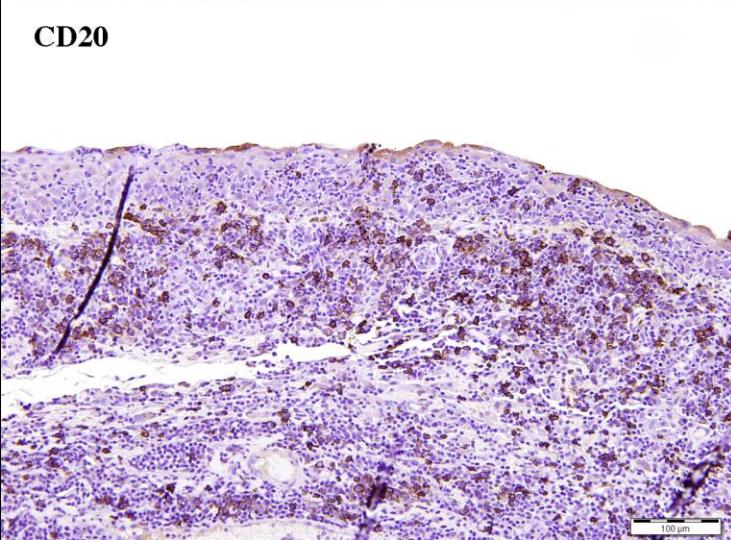
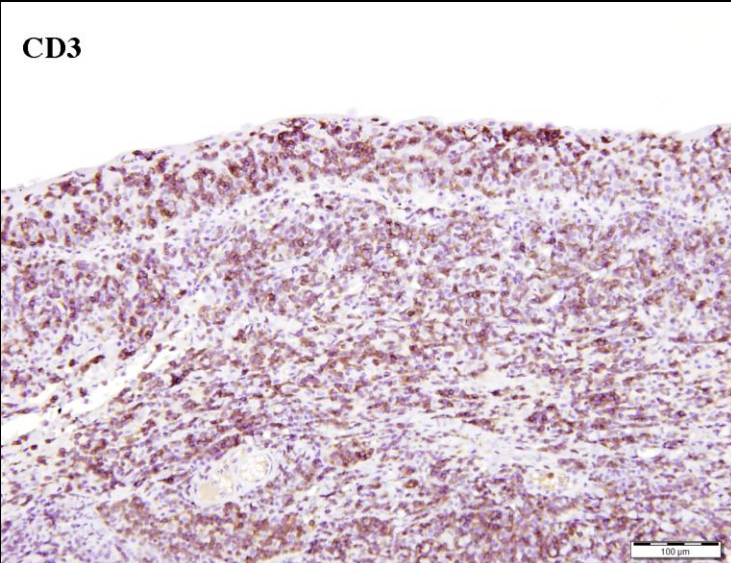


Image from Elizabeth Adkins, globe removed

Dorzolamide or Brinzolamide keratitis - histology



Indolent Ulcer (Dog or Cat)

“Superficial Chronic Corneal Epithelial Defects”
SCCEDs

Globes are seldom removed with this condition as a primary diagnosis

This is a frequently made diagnosis in the COPLOW archive

Morphologic criteria

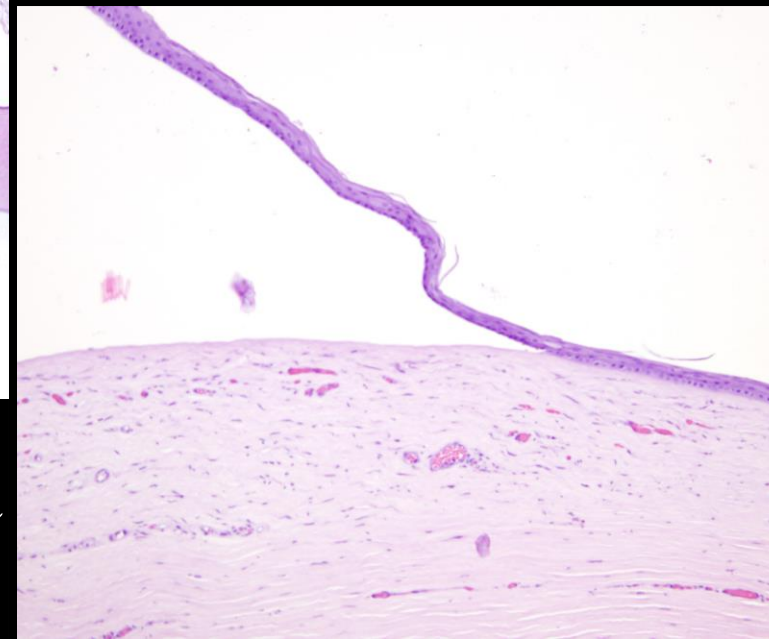
- Separation of the epithelium from the stroma

- Loss of epithelial polarity and loss of basal cells

- Cell-free zone in the superficial stroma

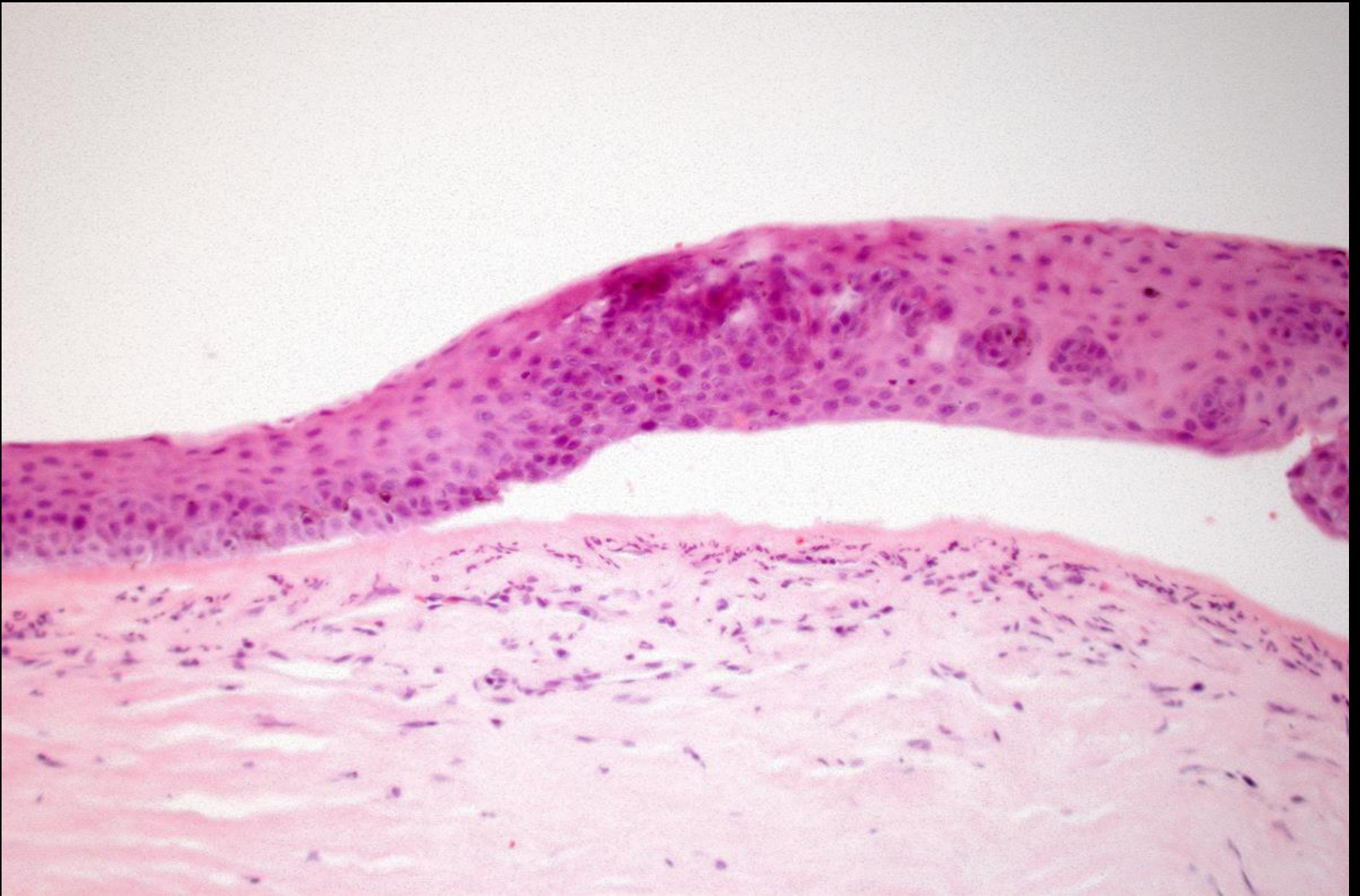
Indolent ulcer can exist in the corneal alone or as part of other severe changes

Indolent Ulcer (Dog or Cat)



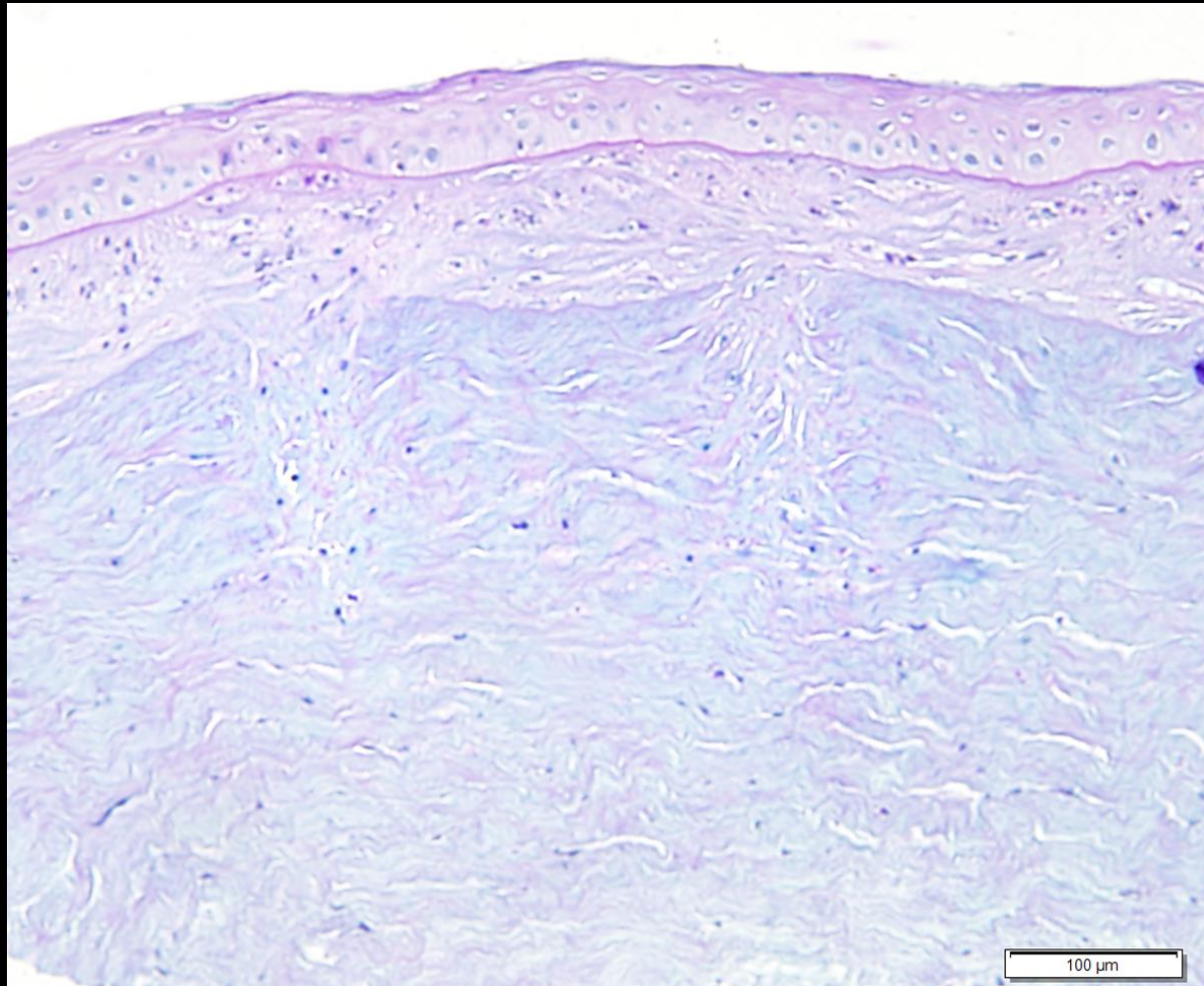
Often the pattern of disease suggests edema and bullae formation

Indolent Ulcer (Dog or Cat)



Indolent Ulcer (Dog or Cat)

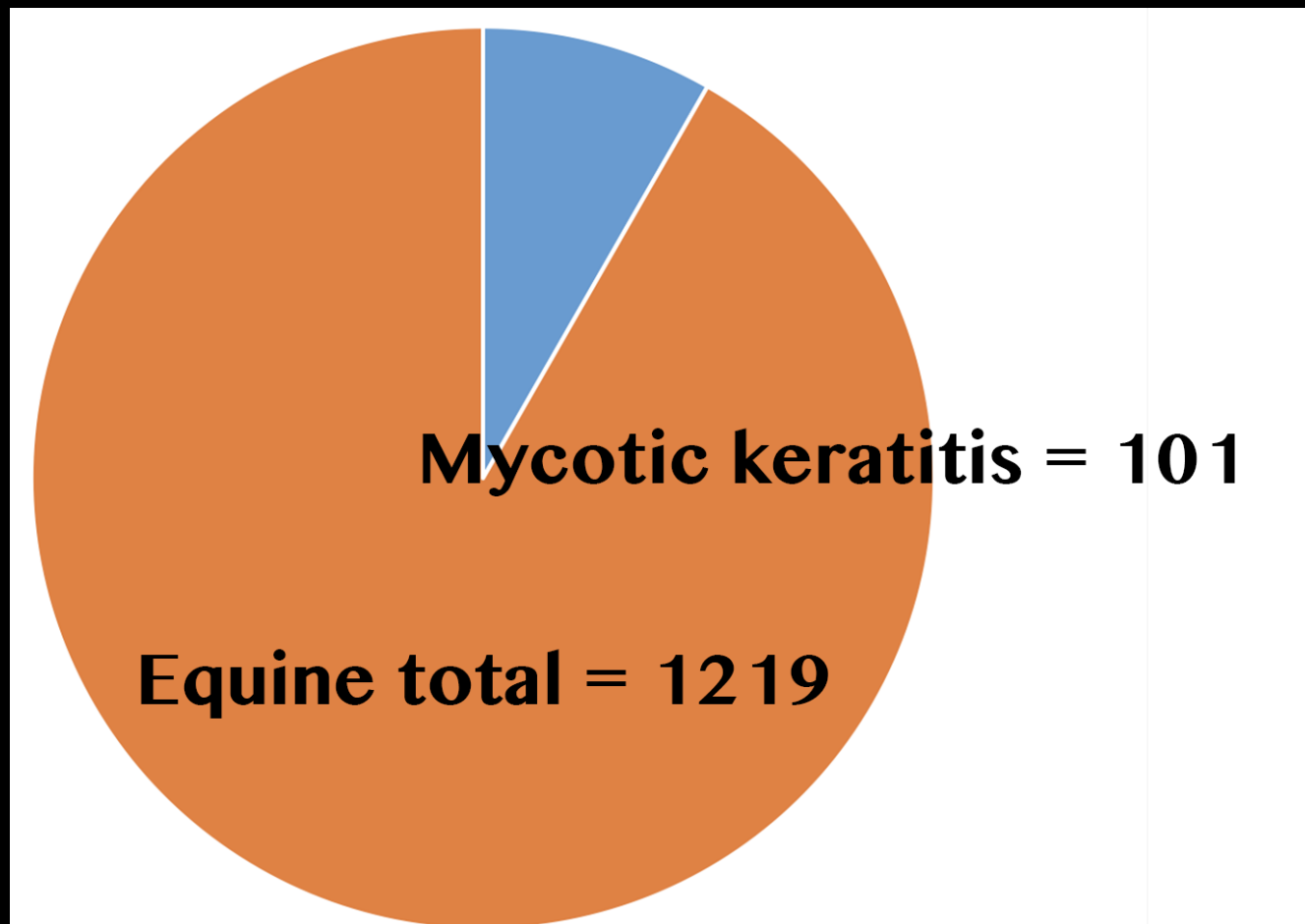
After Grid Keratotomy



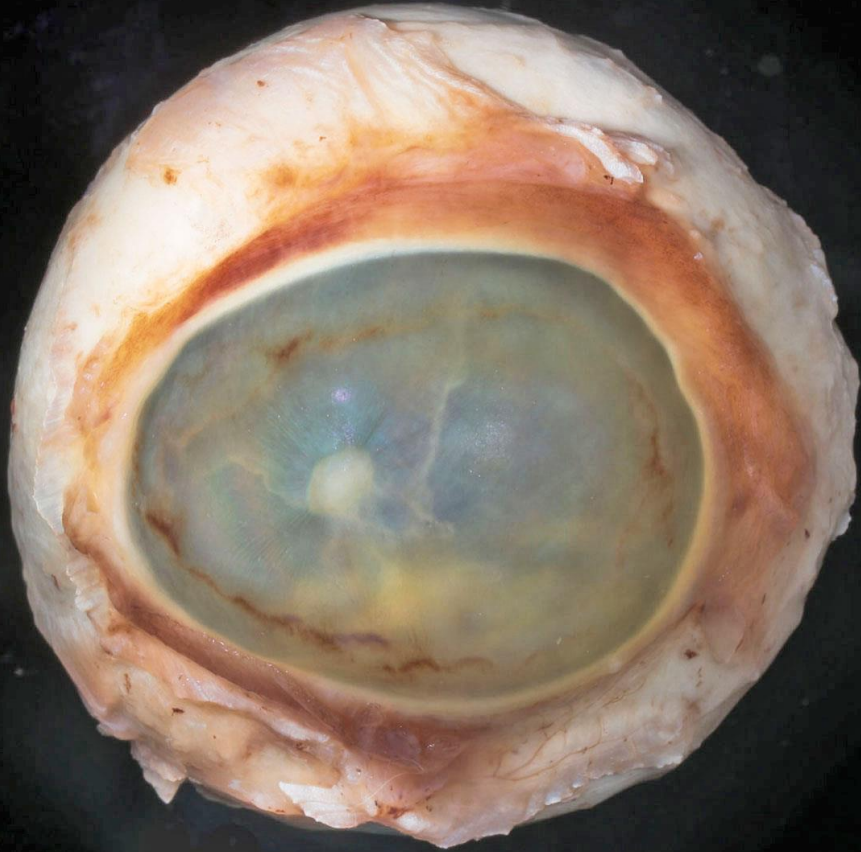
Mycotic Keratitis

Dogs 40 cases

Horses 101 Cases



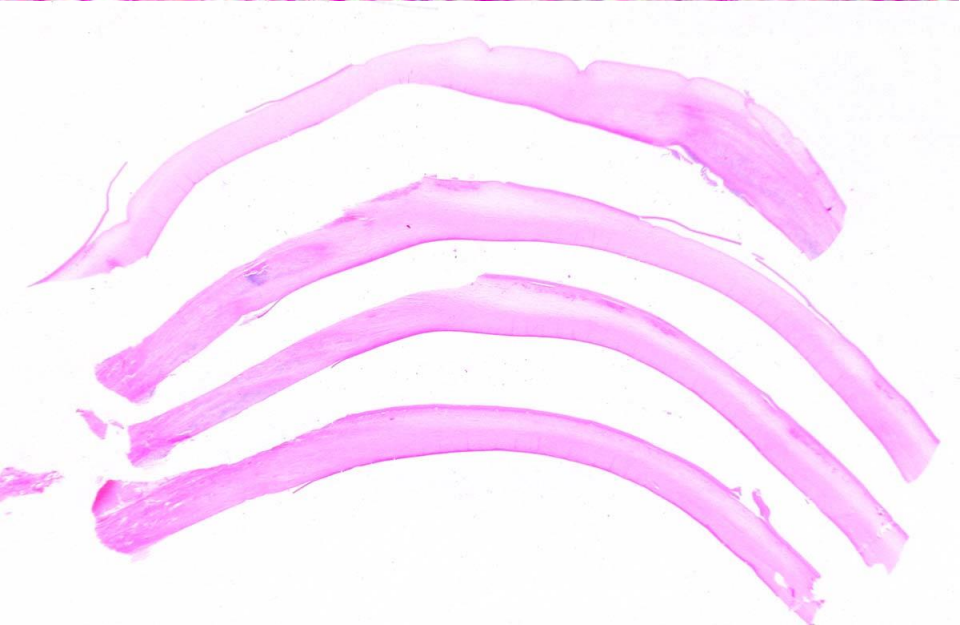
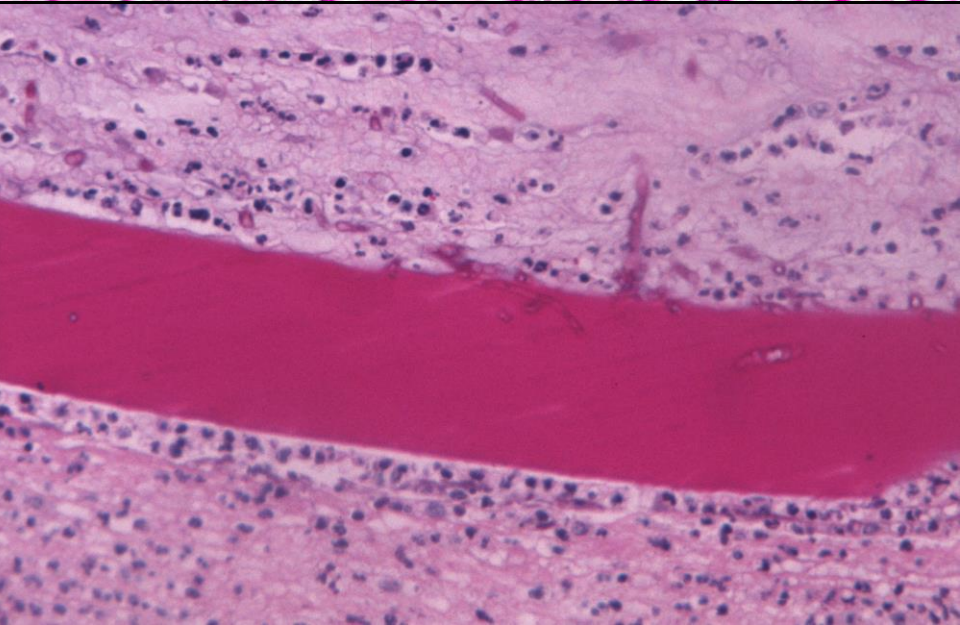
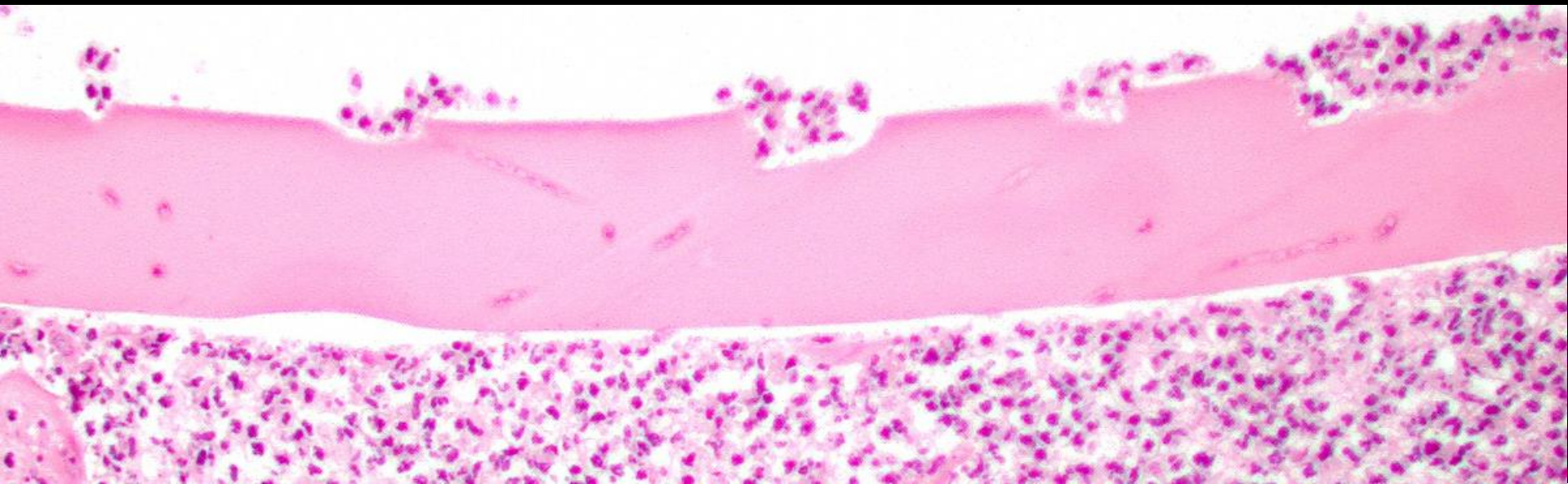
Equine Mycotic Keratitis



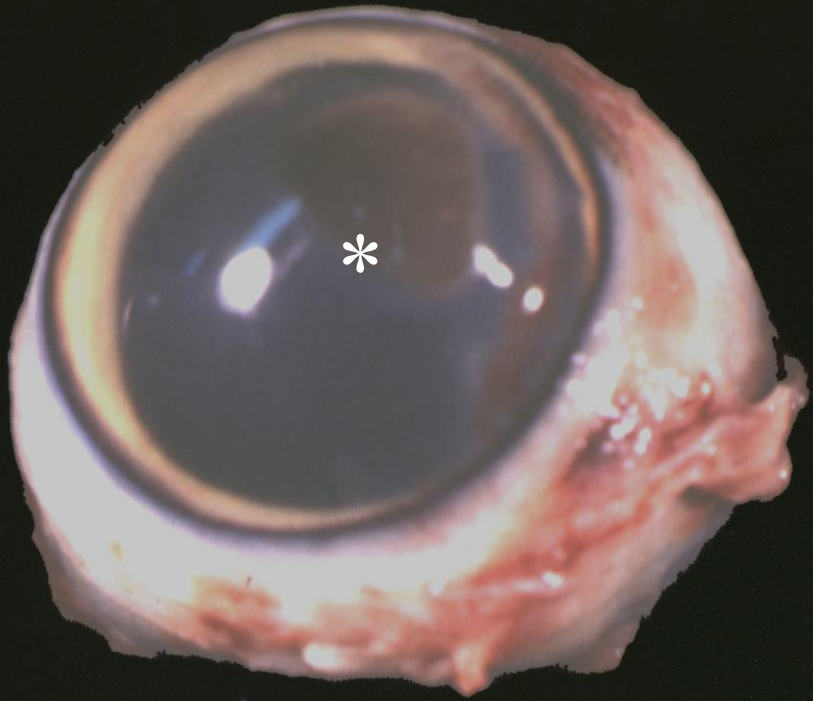
Equine Mycotic Keratitis



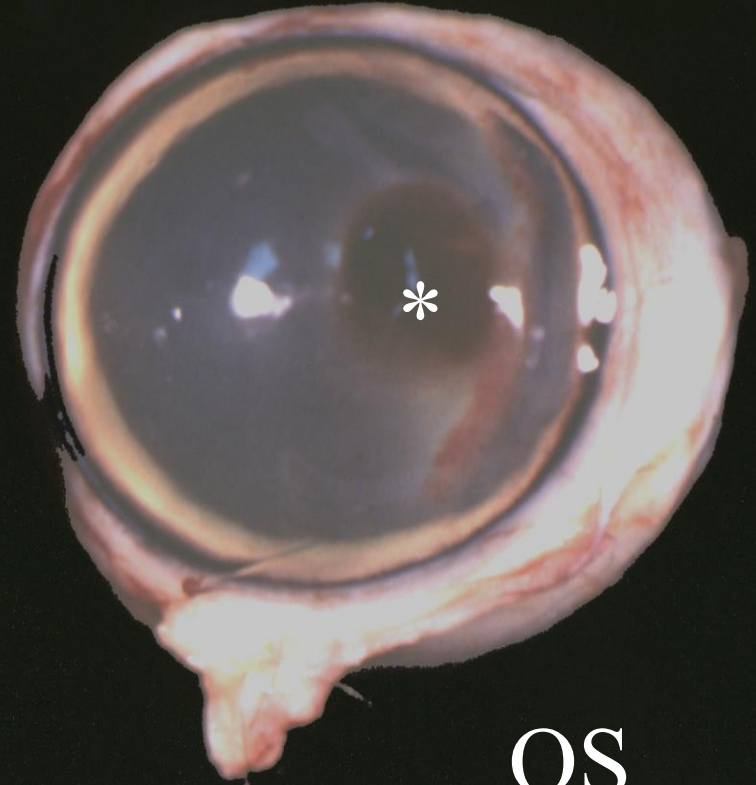
Equine Mycotic Keratitis



Feline Corneal Sequestrum



OD

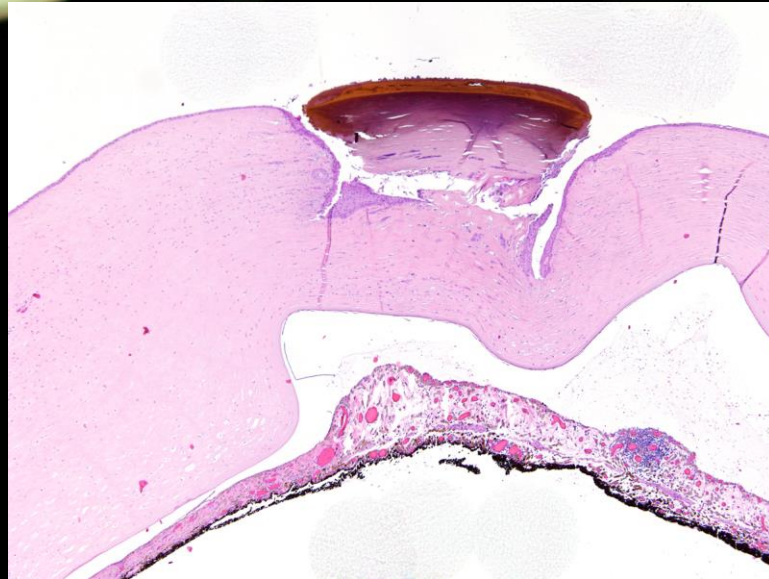
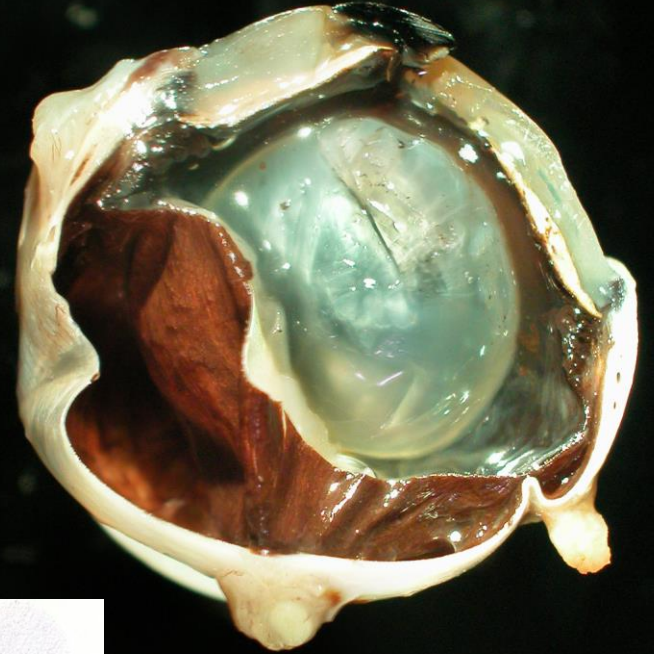
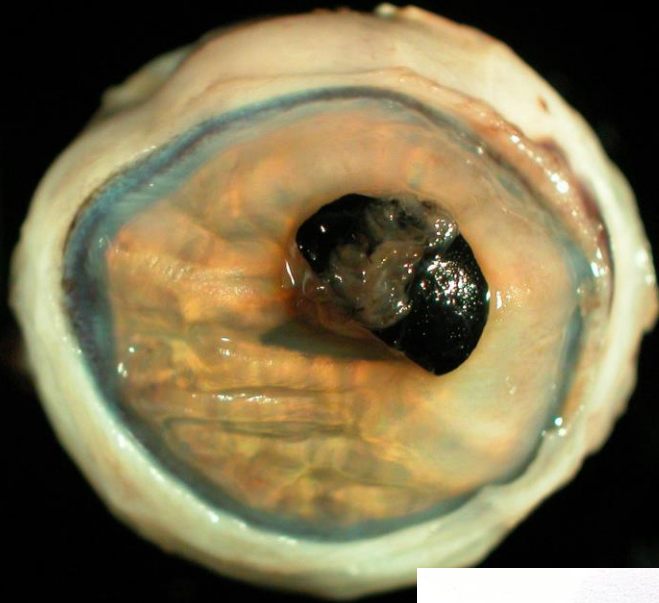


OS

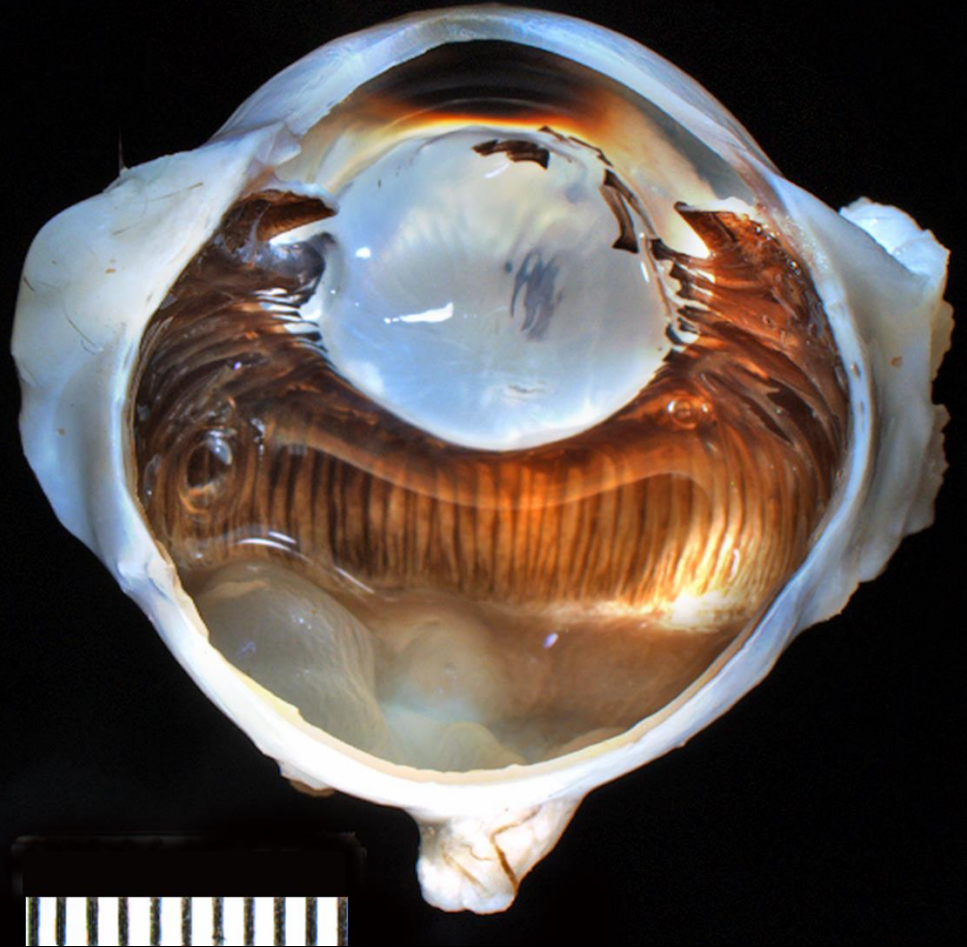
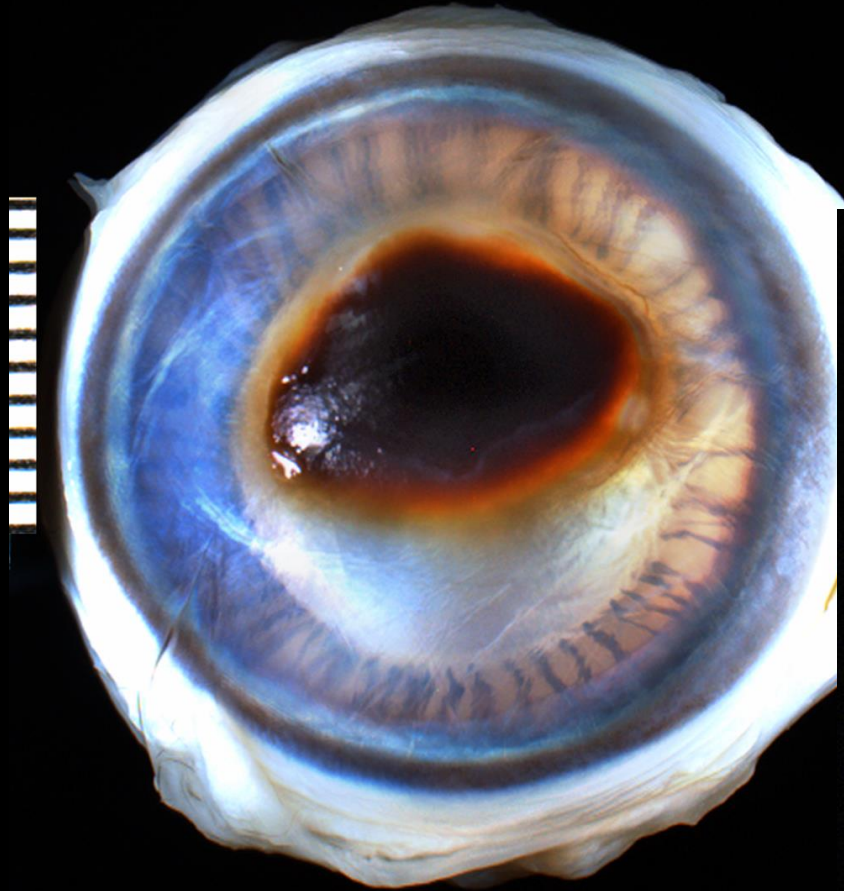
Feline Corneal Sequestrum



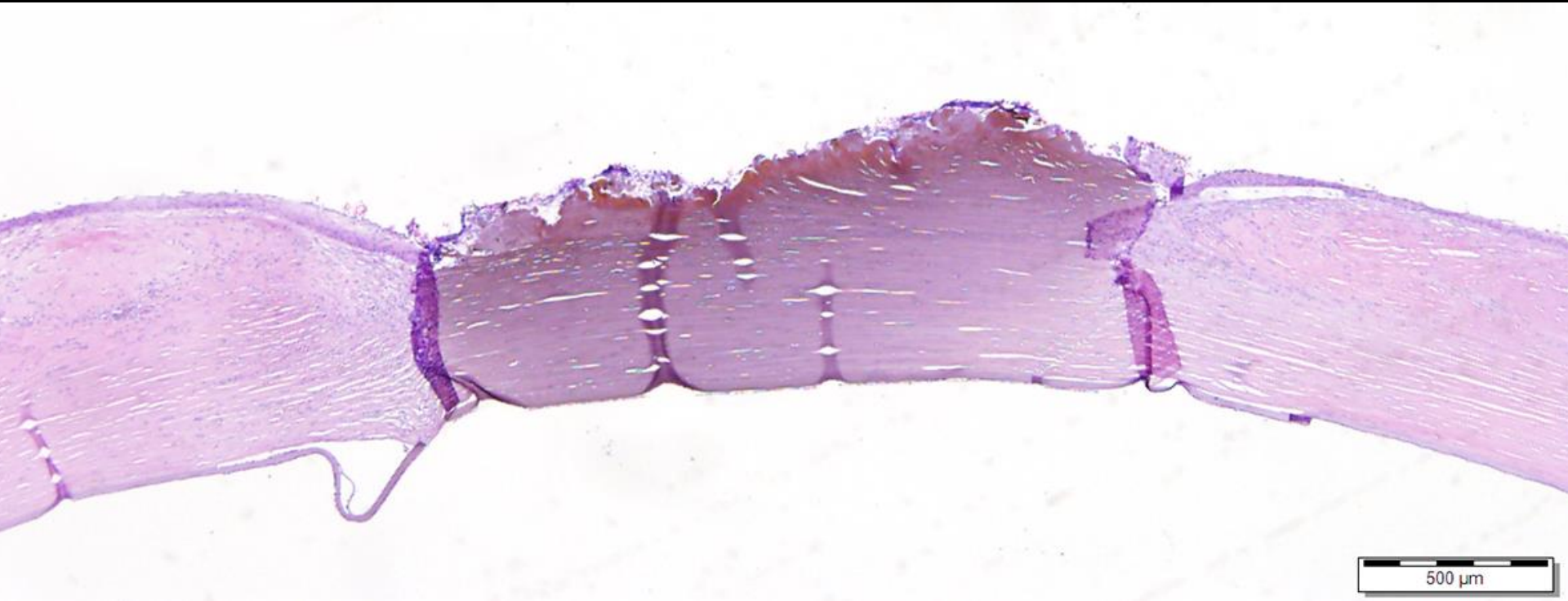
Feline Corneal Sequestrum



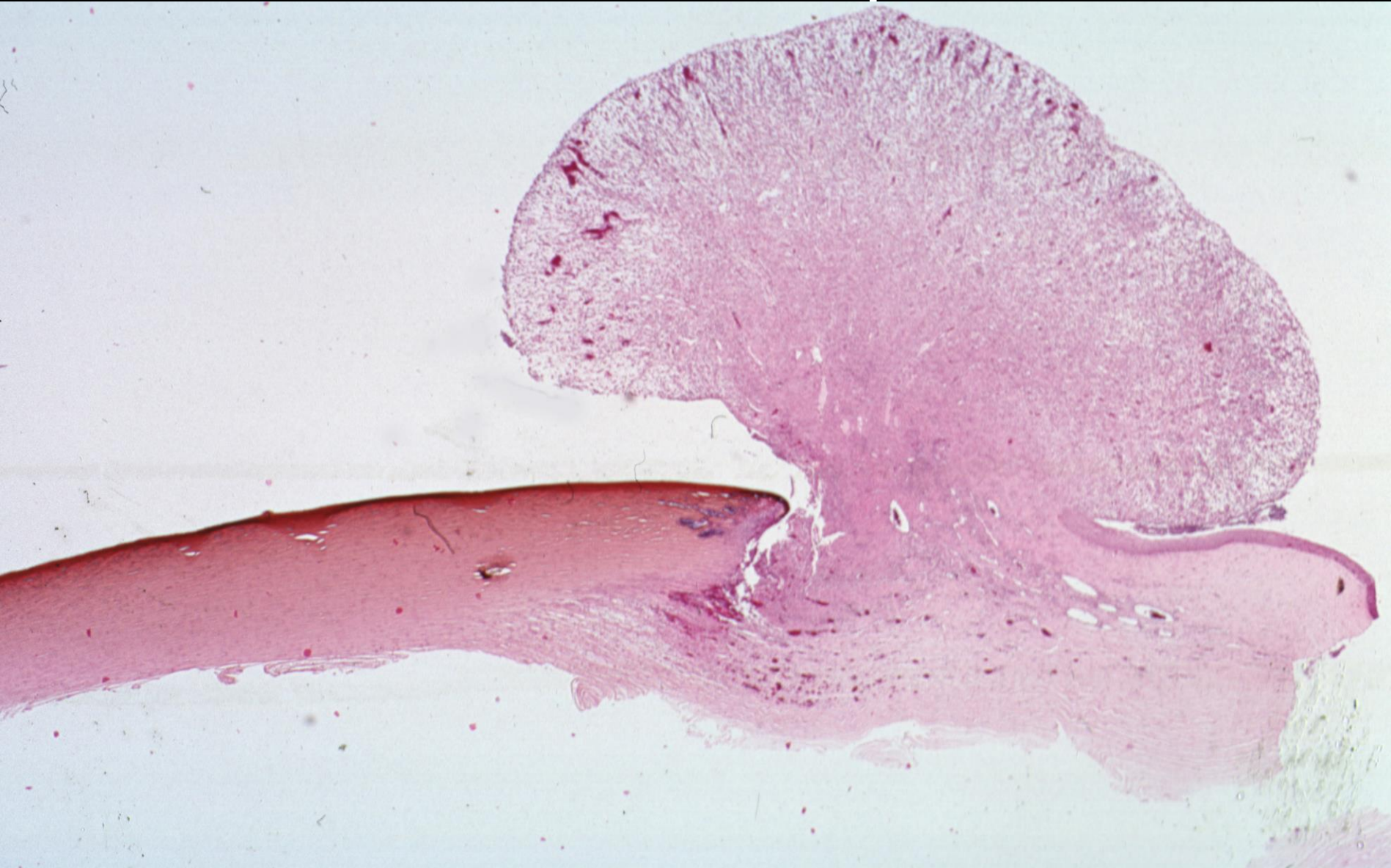
Feline Corneal Sequestrum



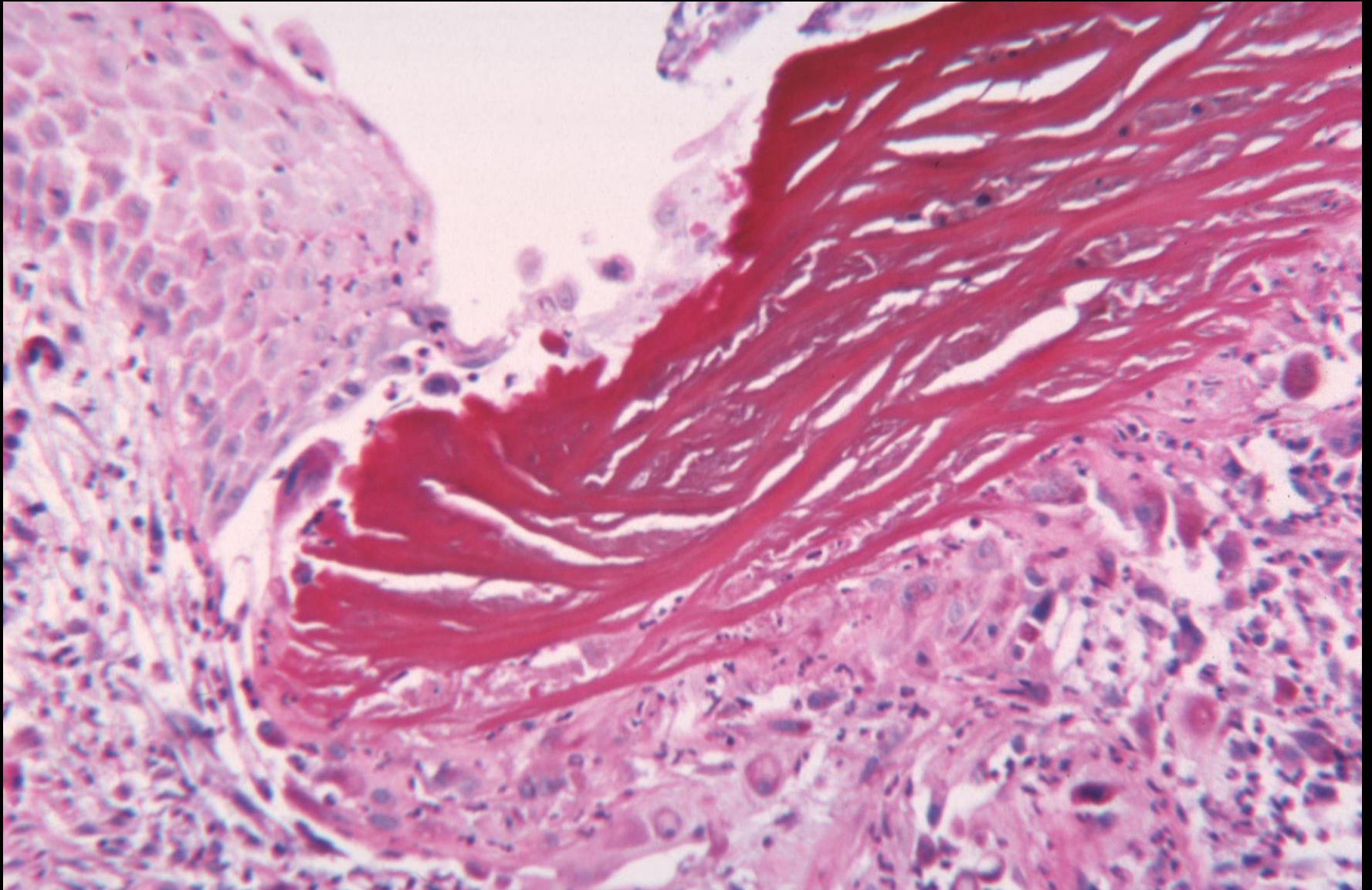
Feline Corneal Sequestrum



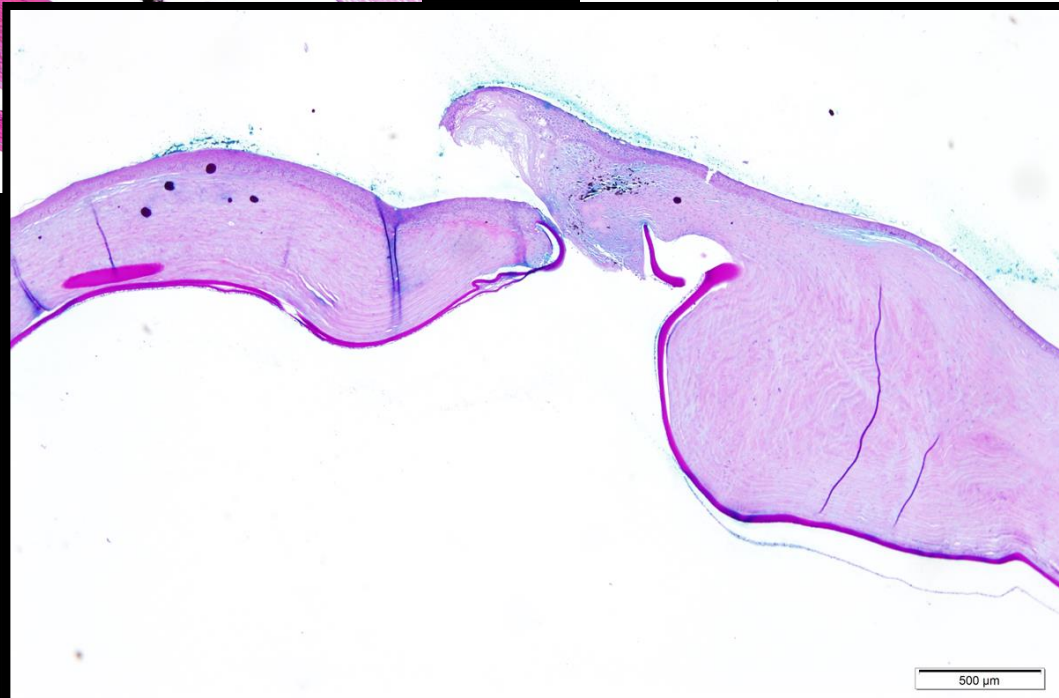
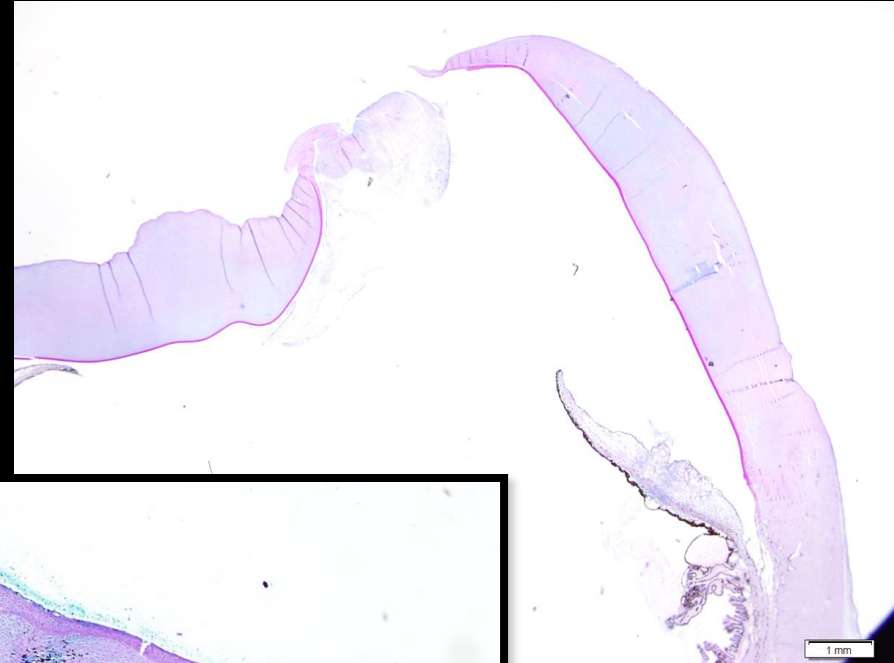
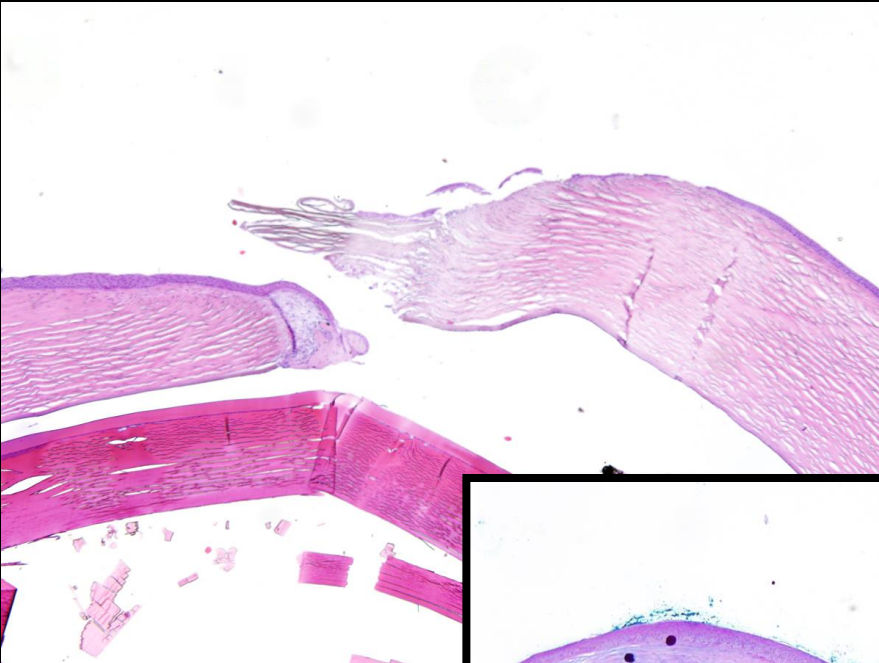
Feline Corneal Sequestrum



Feline Corneal Sequestrum



Feline “Hole-in-the-Eye”



Feline

“Hole-in-the-Eye”

14 Cases

Ages: 3 less than 10

Sequestrum



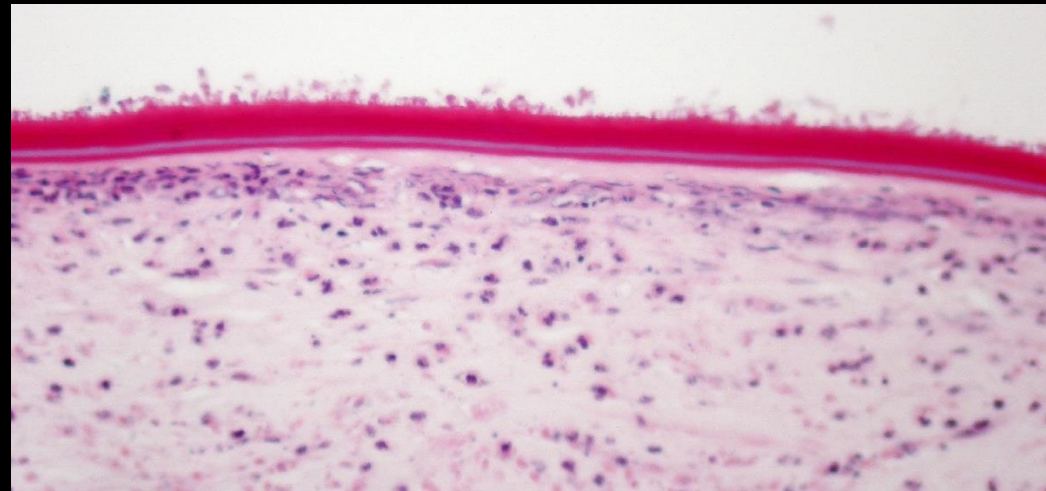
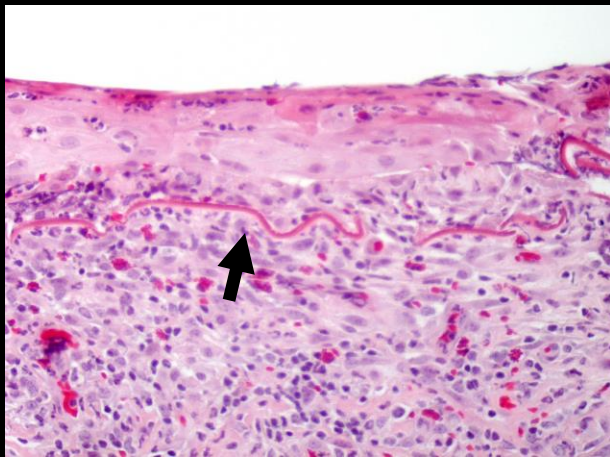
1	5.00
1	8.00
1	8.50
1	10.50
1	10.80
1	13.60
2	14.00
2	15.00
1	16.00
1	17.00
1	19.00

Equine Corneal Sequestrum

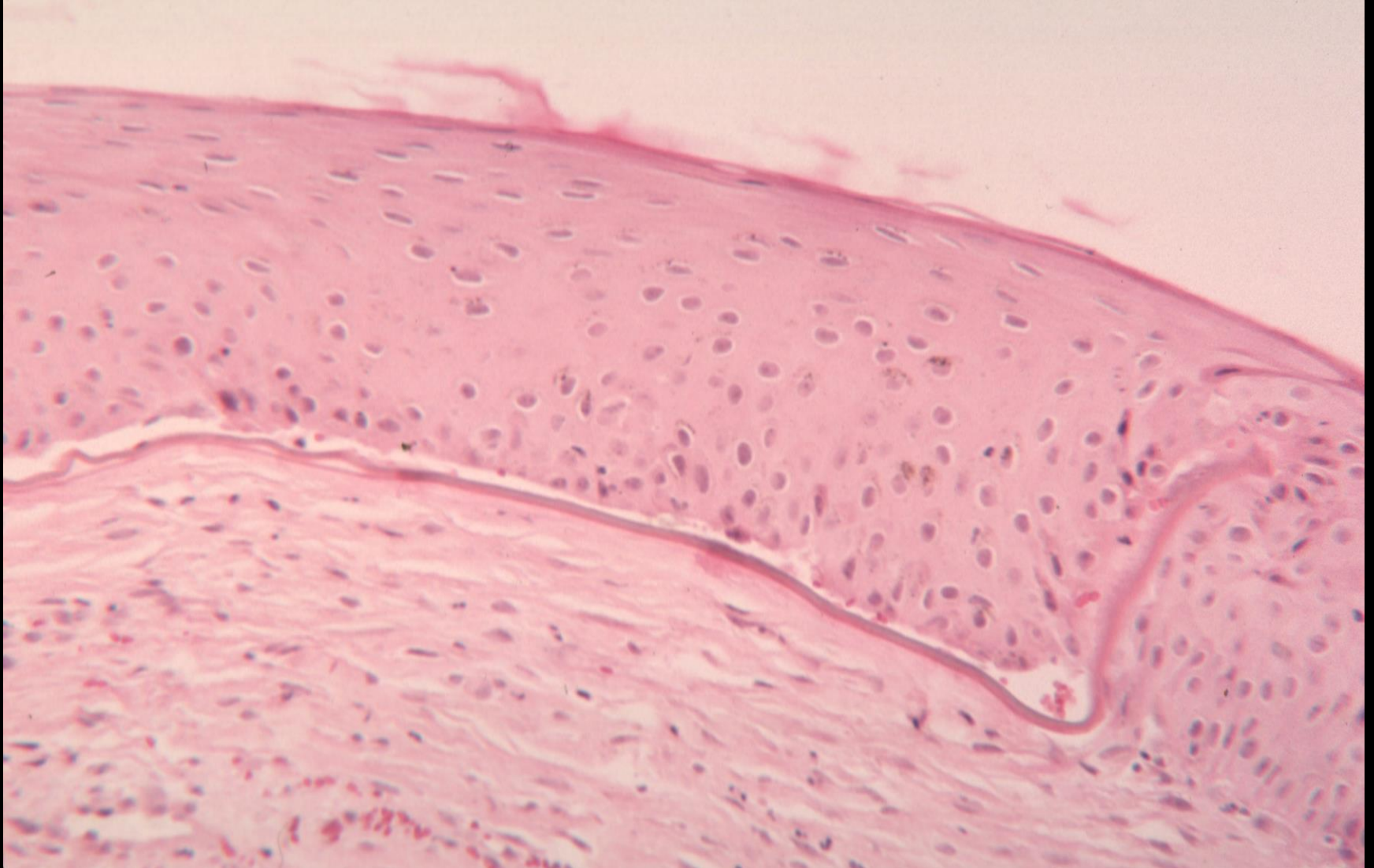
19 cases

1	0 breed not specified
3	Arabian
3	quarterhorse
2	Swedish halfbred
1	Swiss halfbred
3	thoroughbred
2	trotter
4	warmblood

- Non-healing superficial ulcers
- Peripheral cornea
- Epithelial non-attachment
- +/- eosinophils
- Very thin eosinophilic membrane
- Occasional eosinophil basic protein

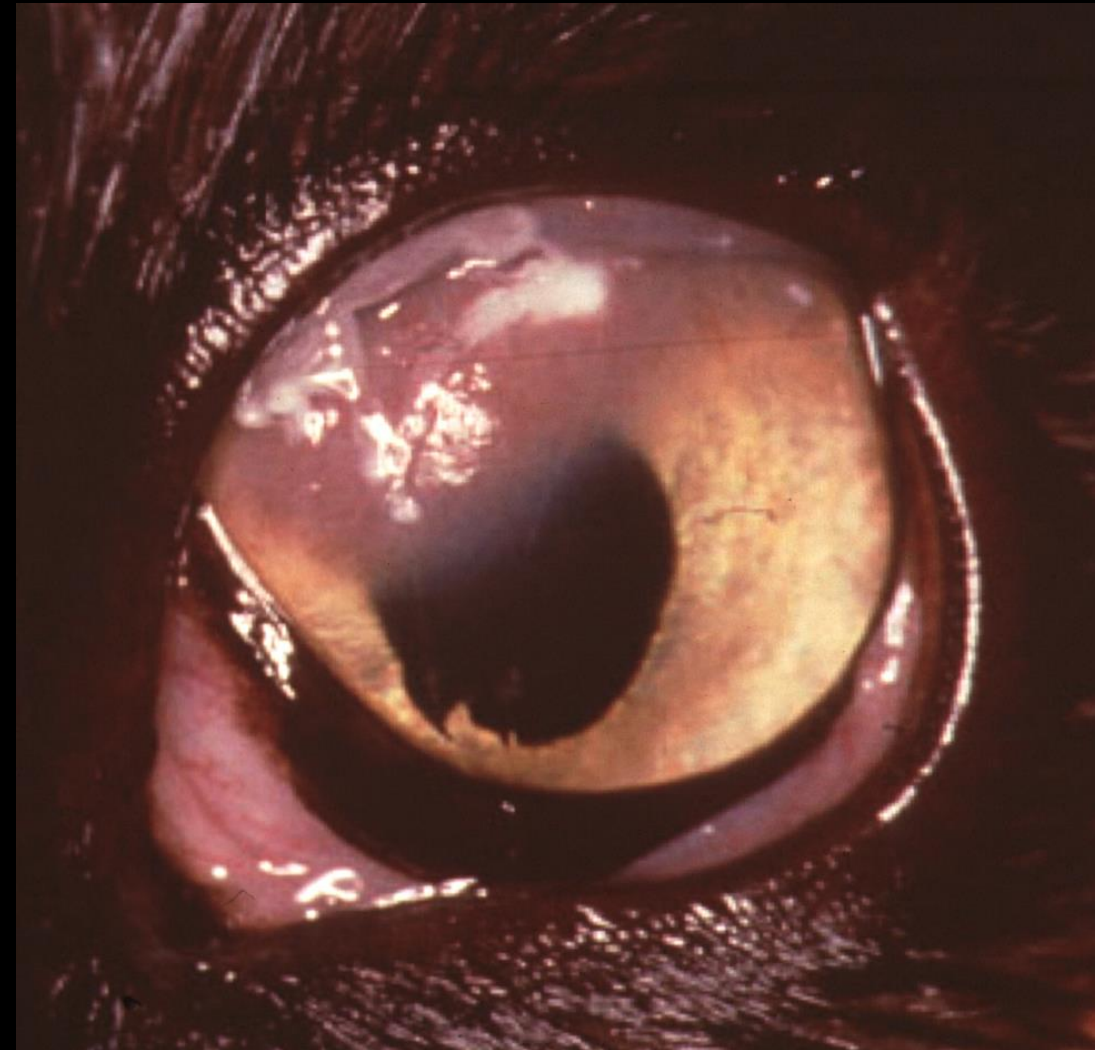


Equine Corneal Sequestrum



Feline Eosinophilic Keratitis

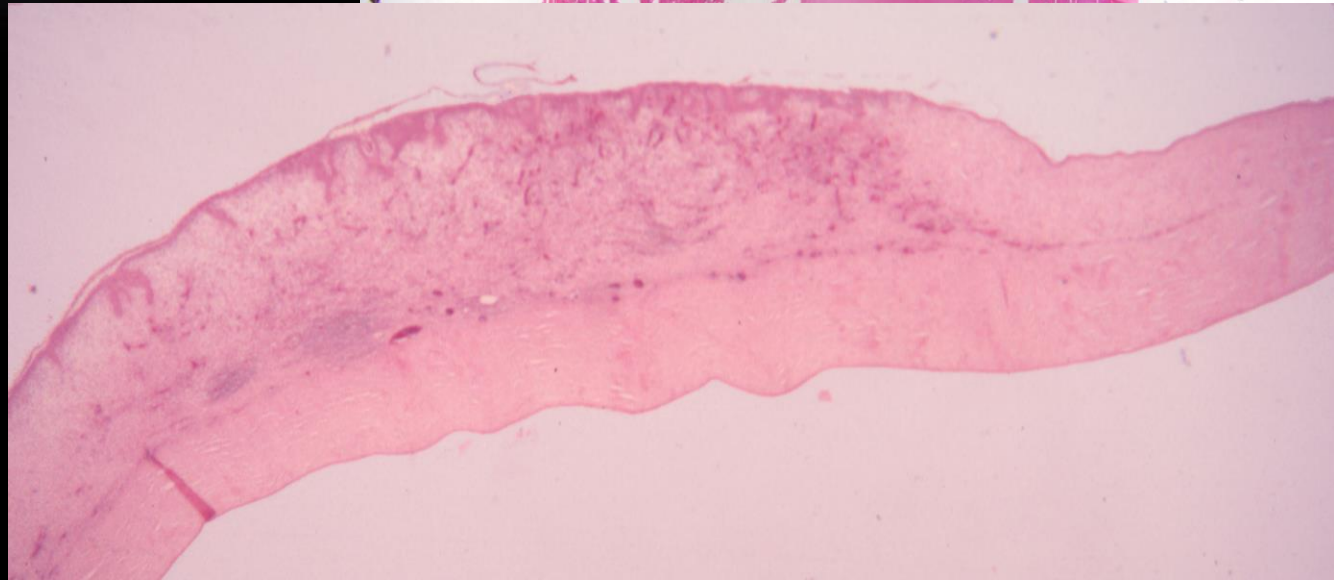
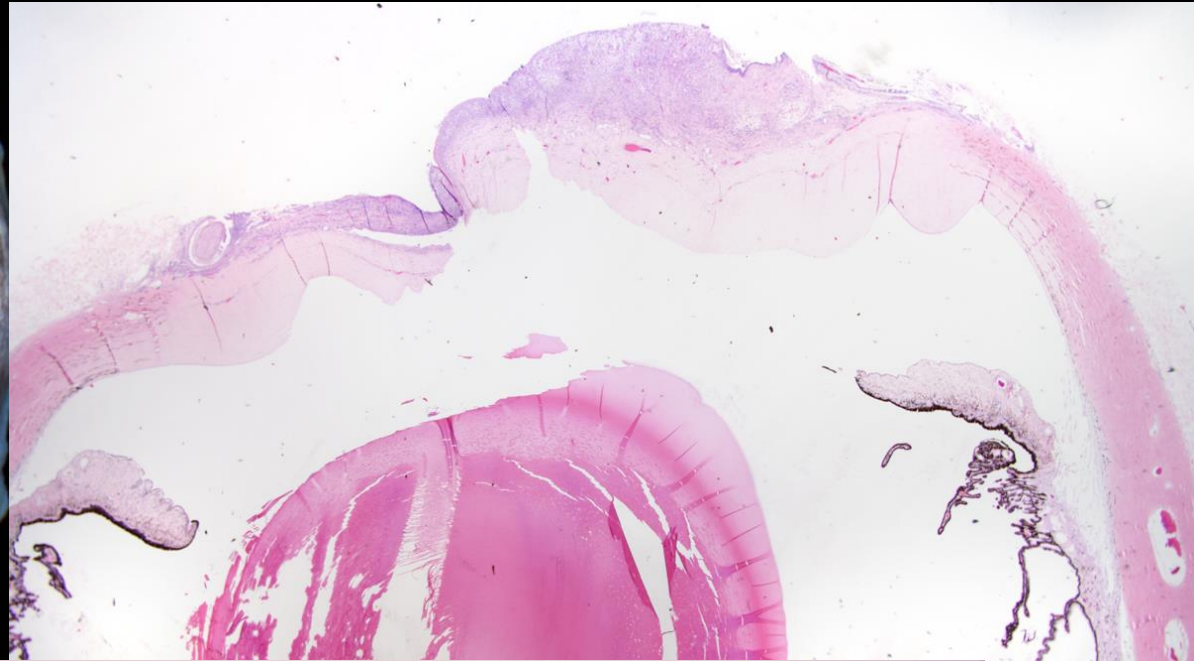
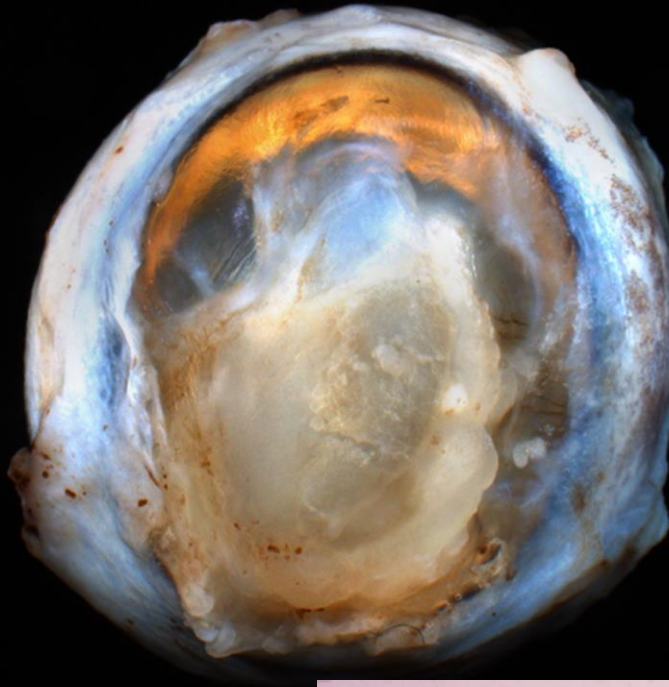
46 cases



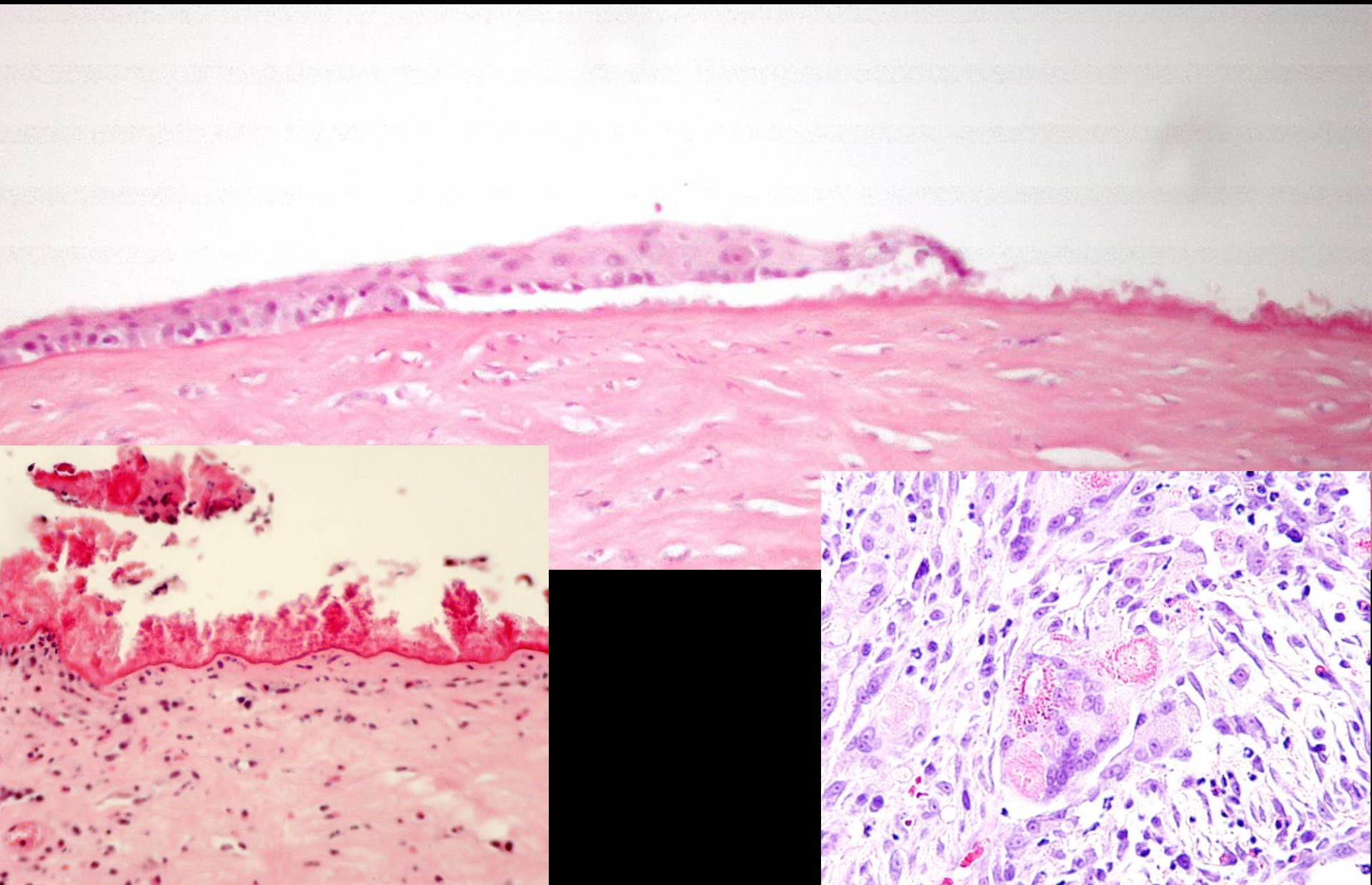
2	0 breed not specified
1	1 mixed breed
4	domestic longhair
30	domestic shorthair
1	Exotic shorthair
2	Himalayan
2	Persian
2	ragdoll
1	russian hairless
1	Siamese

26.1%	12	OD
63.0%	29	OS
2.2%	1	OU
8.7%	4	X

Feline Eosinophilic Keratitis

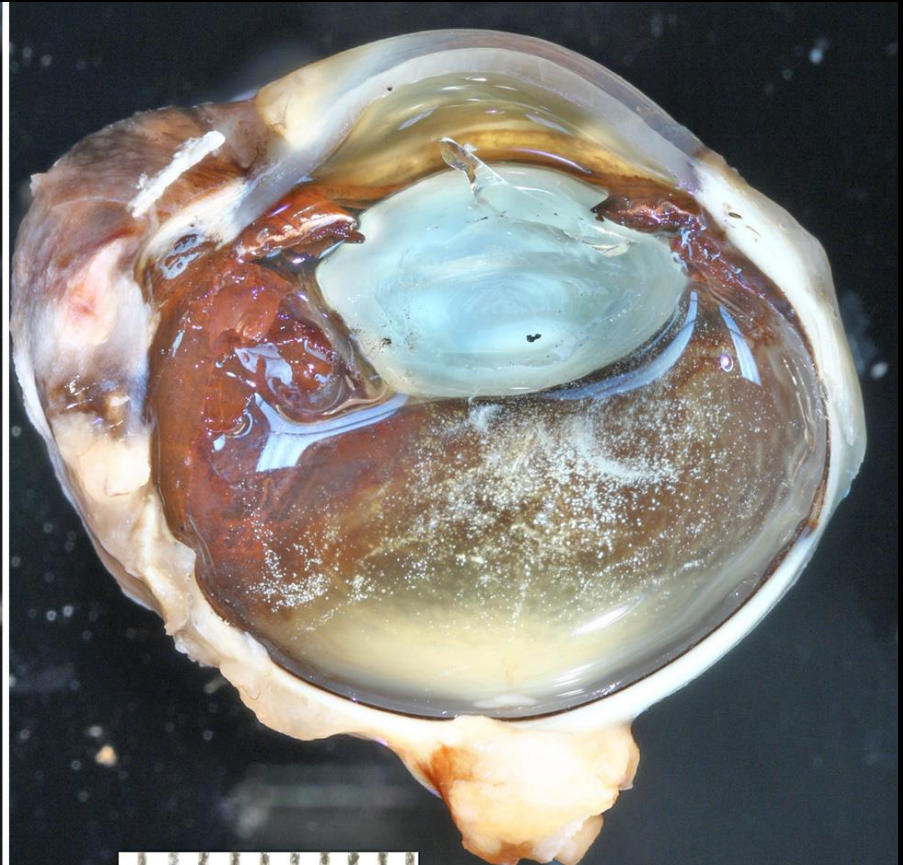


Feline Eosinophilic Keratitis

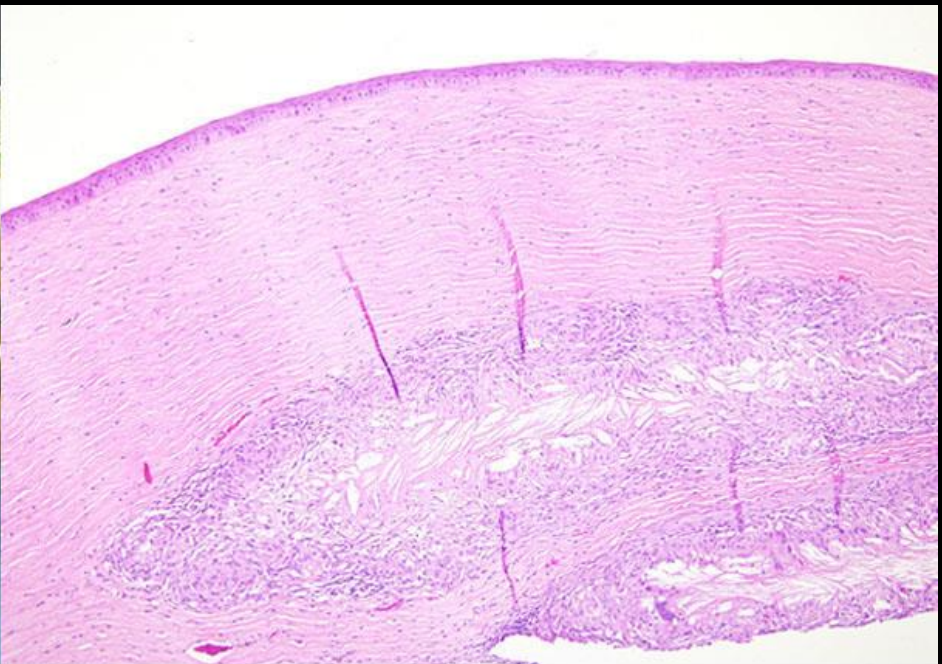
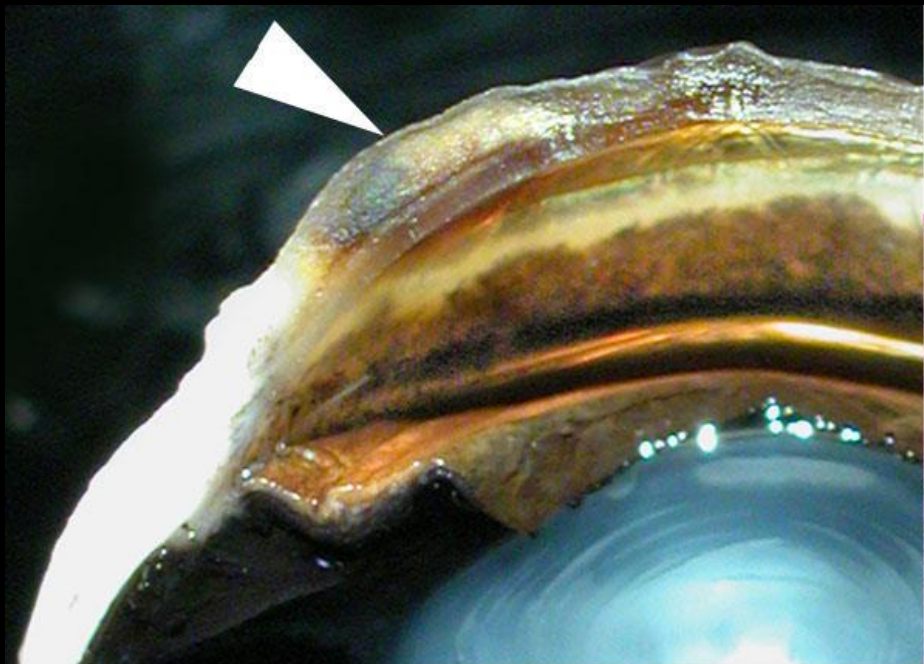


Stromal Deposits - Lipid

- Primary lipid keratopathy (seldom submitted to COPLOW)
- *Secondary to a limbal mass lesion*
- Age, metabolic, systemic disease(seldom submitted to COPLOW)

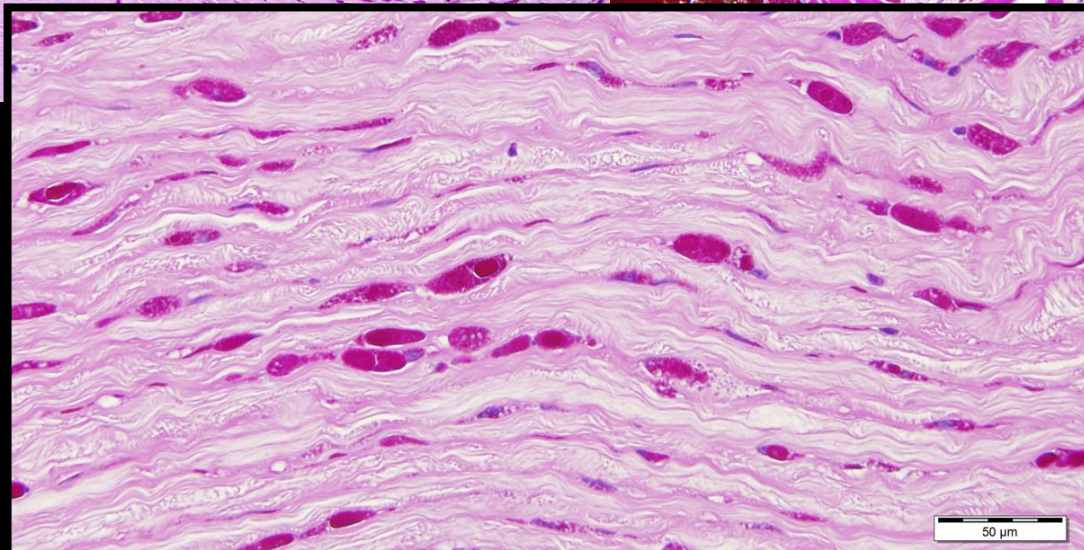
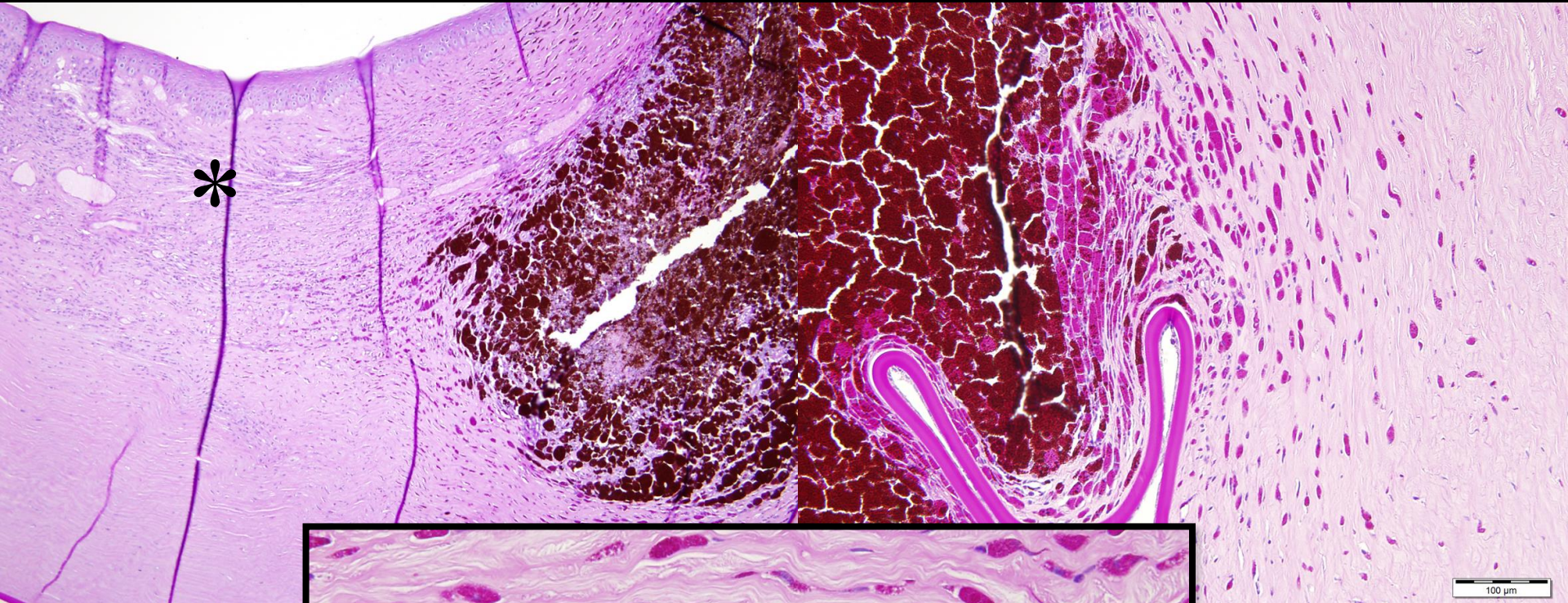


Stromal Deposits - Lipid

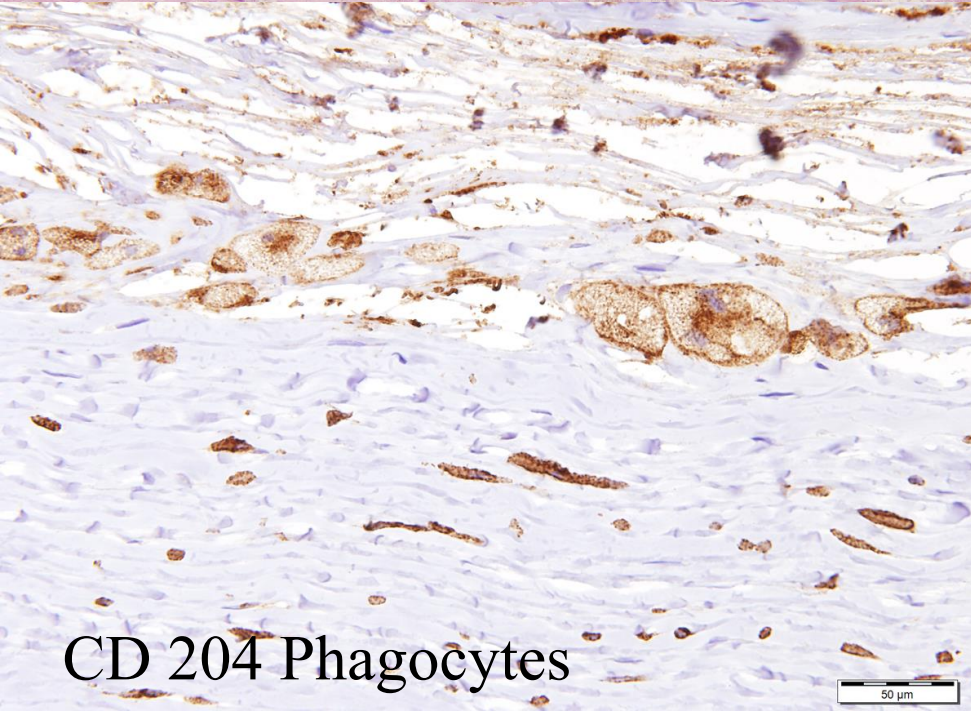
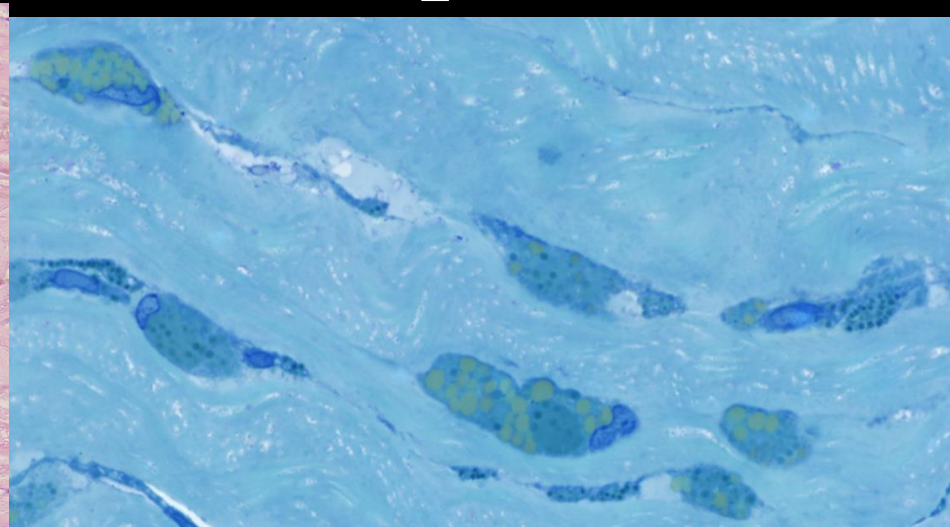
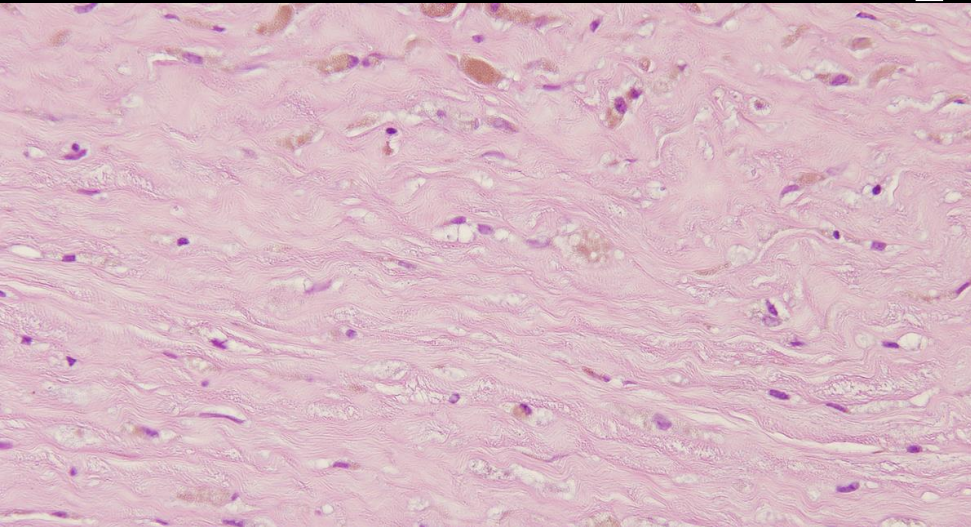


Cholesterol Canine

Stromal Deposits - Lipid

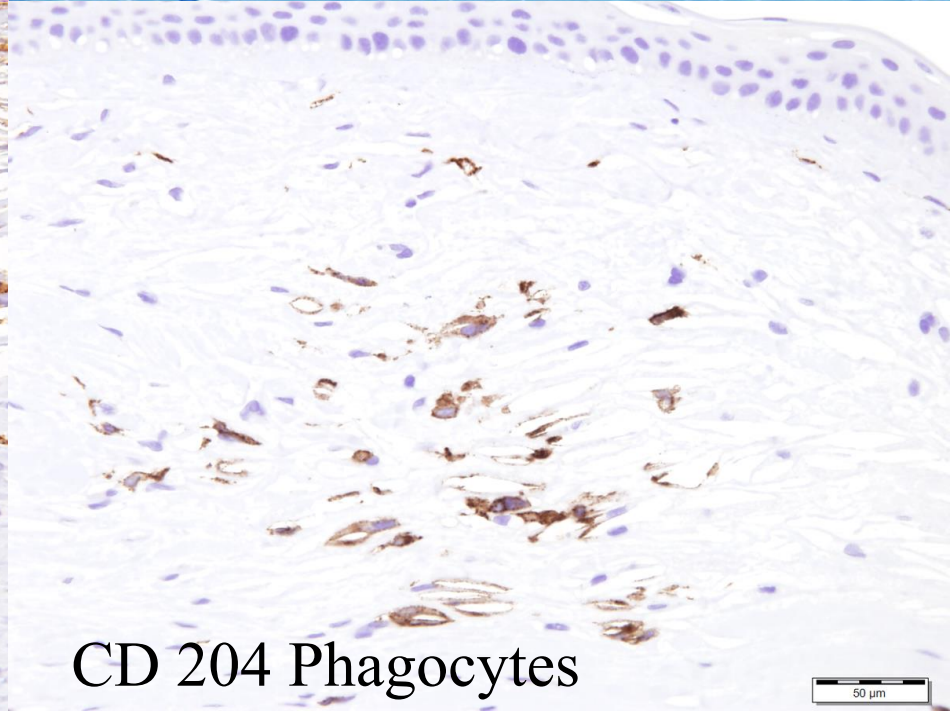


Stromal Deposits - Lipid



CD 204 Phagocytes

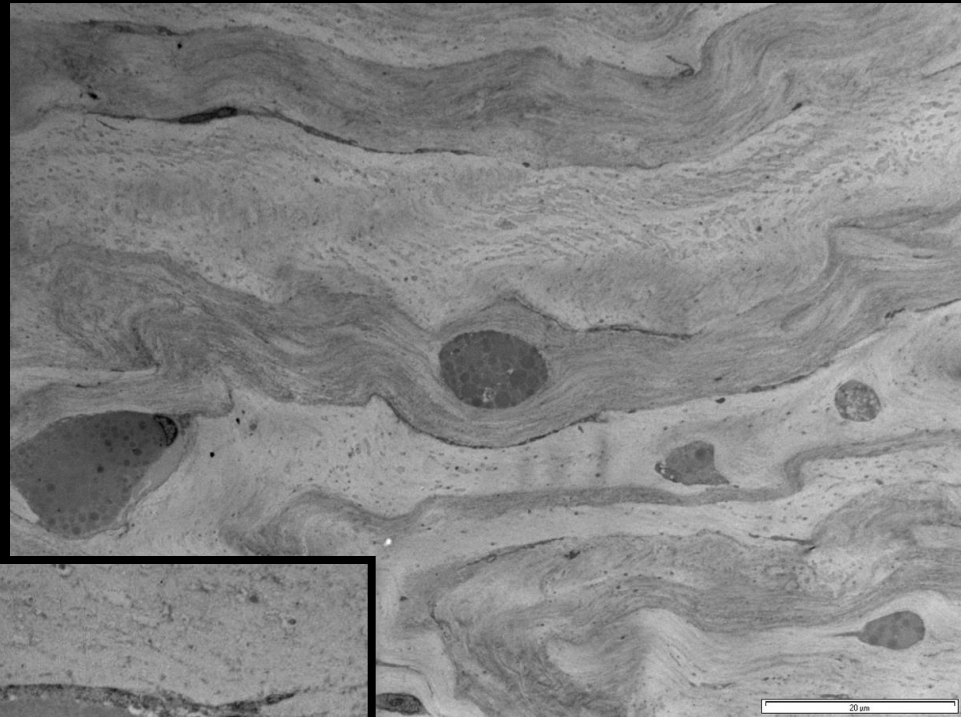
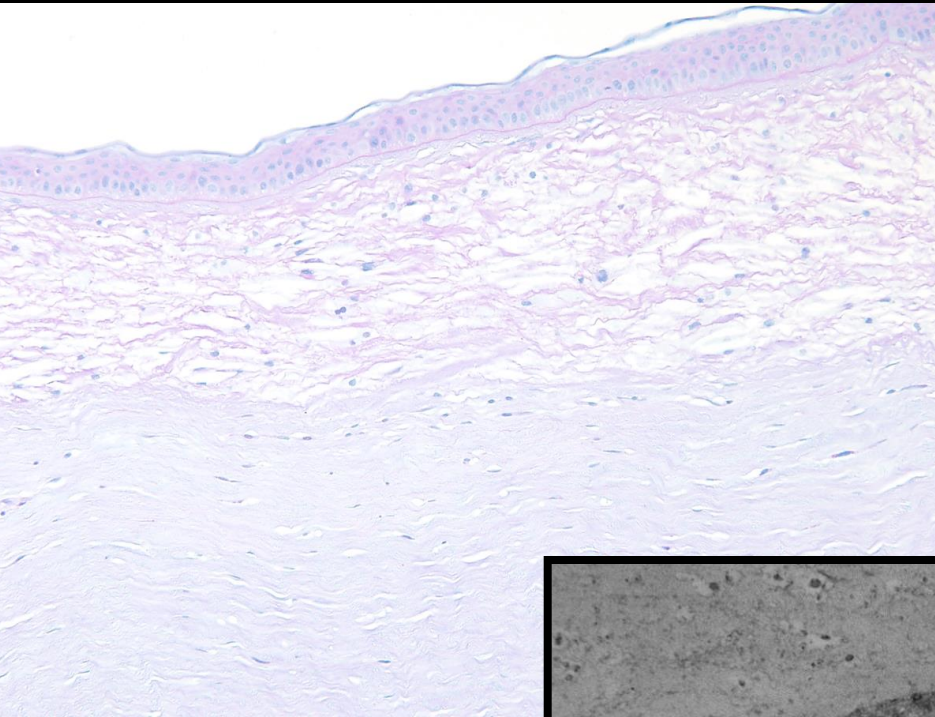
50 μ m



CD 204 Phagocytes

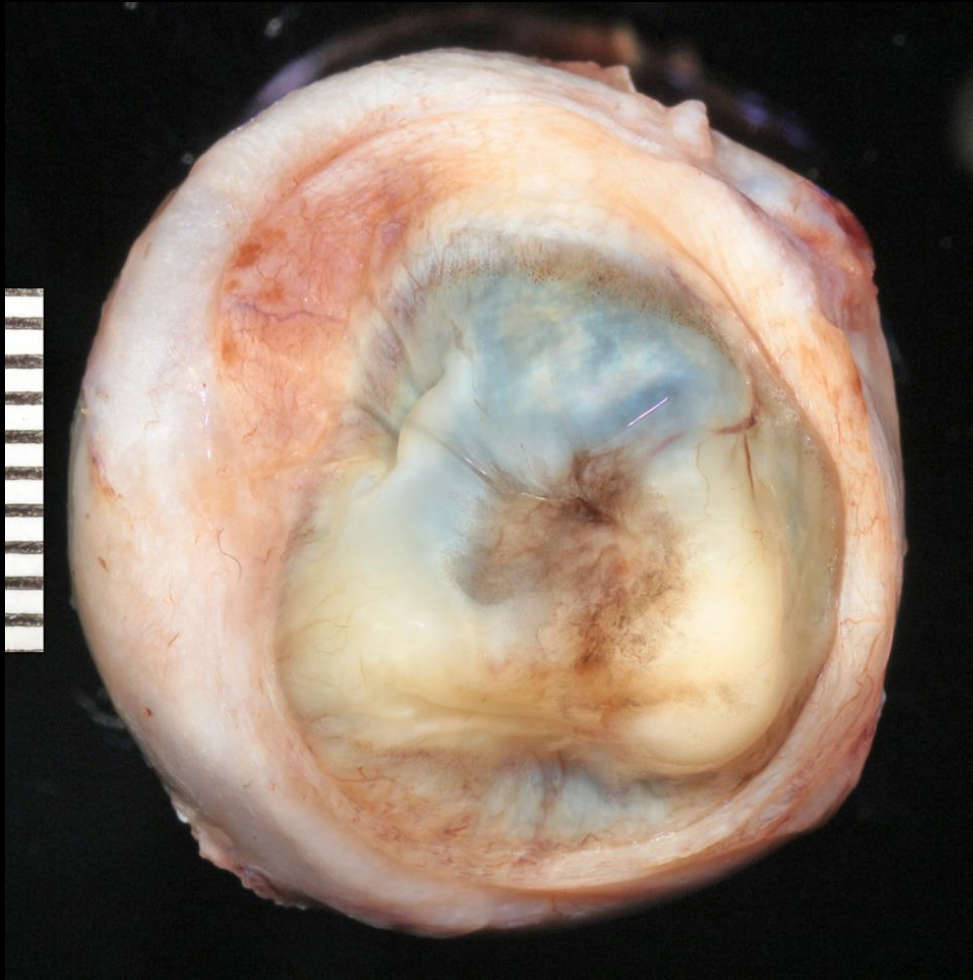
50 μ m

Stromal Deposits - Lipid



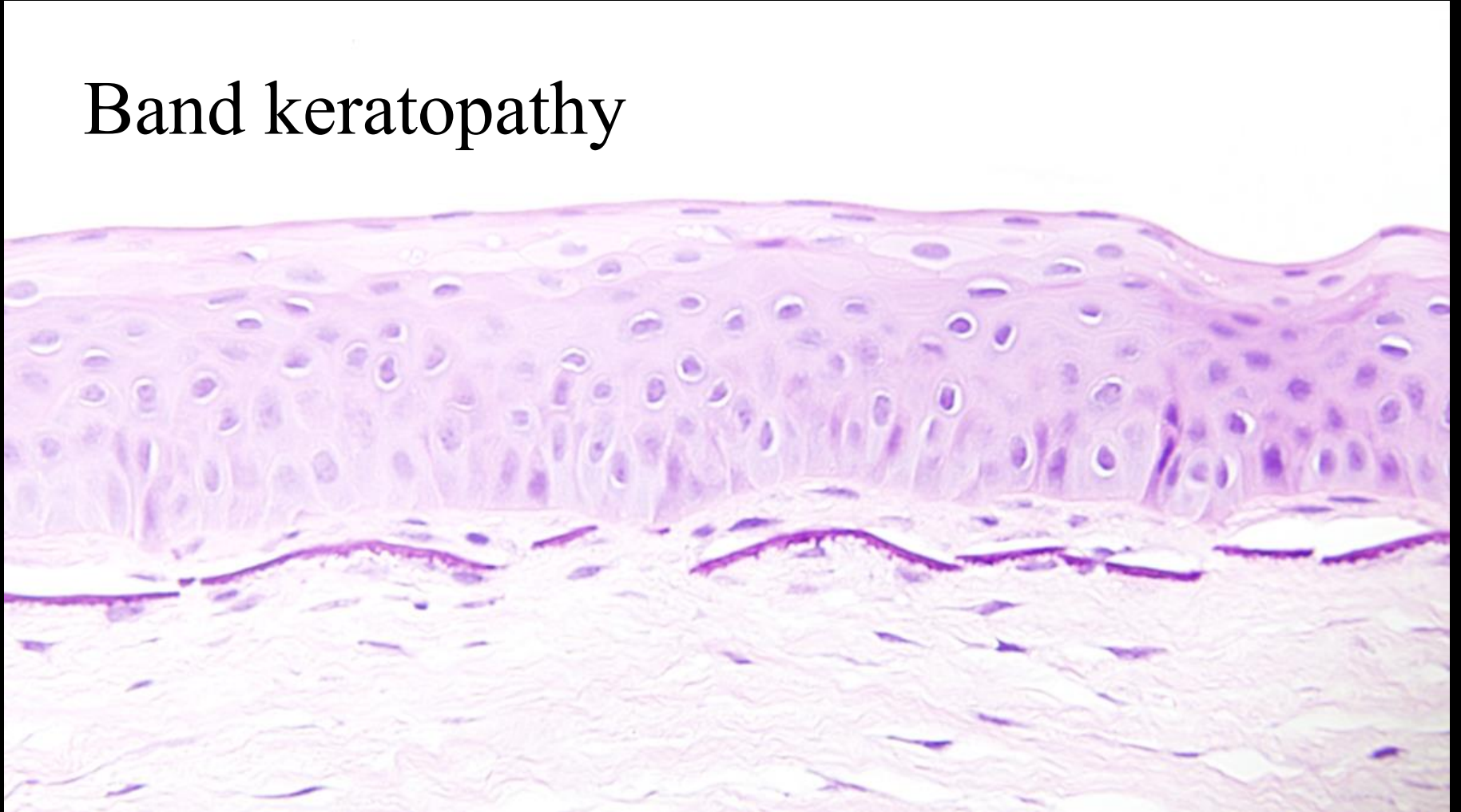
Stromal Deposits – Lipid

Idiopathic or Metabolid Dz

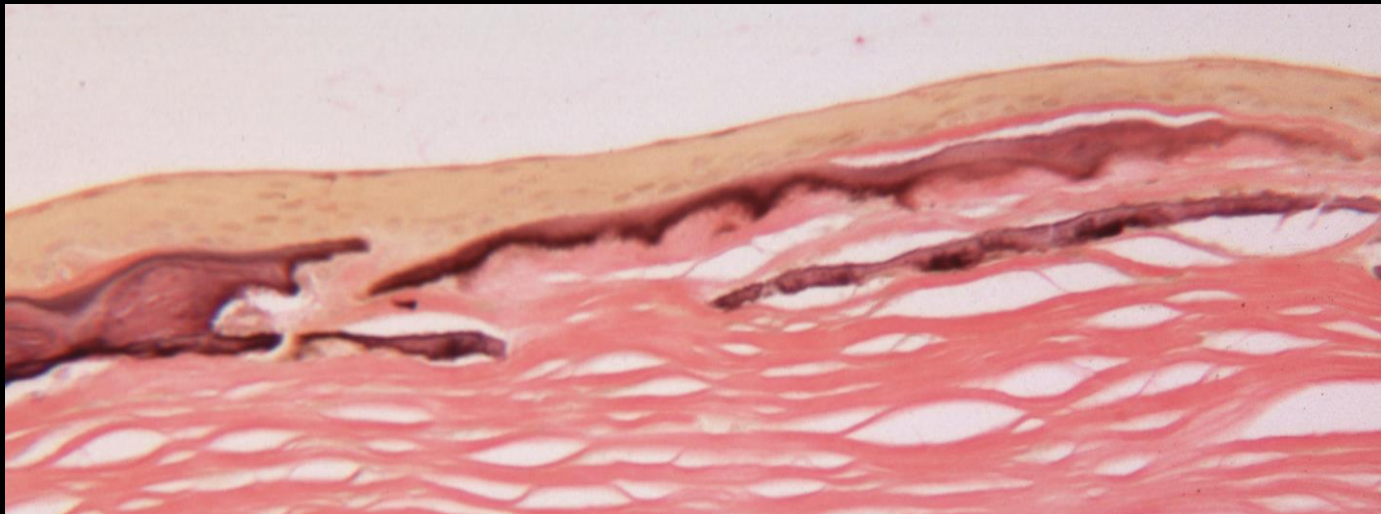
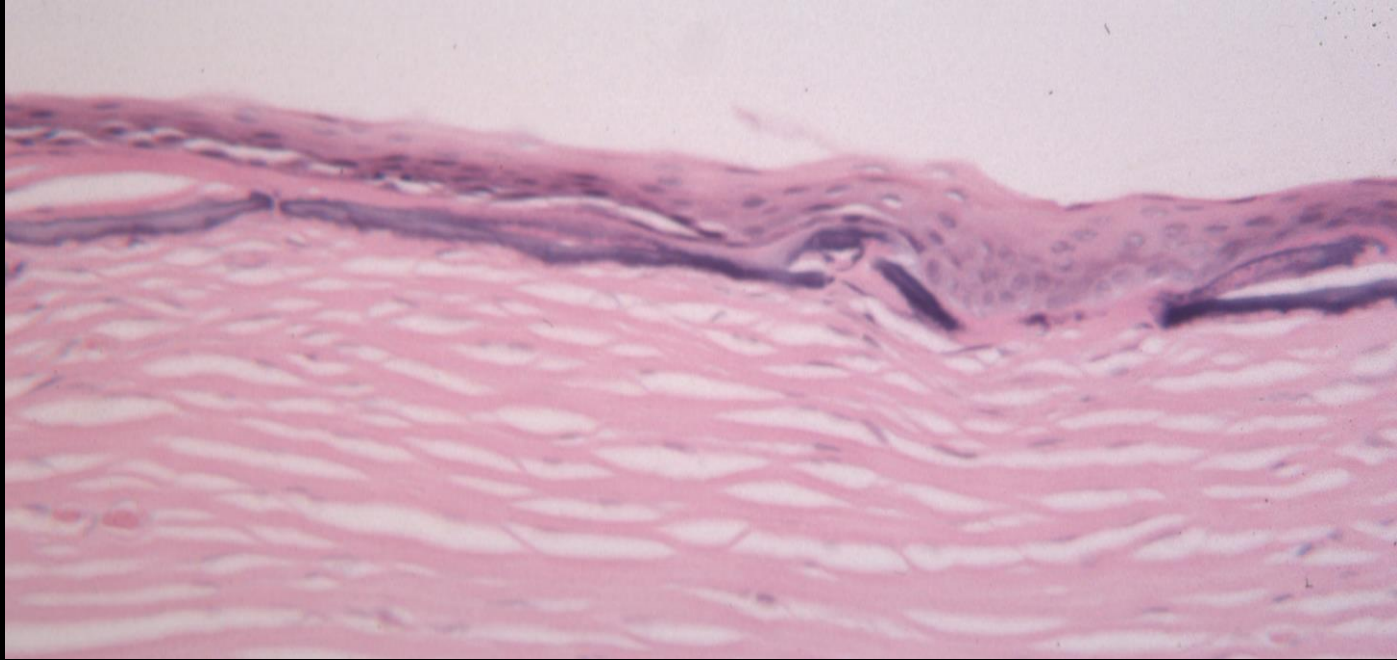


Stromal Deposits - Mineral

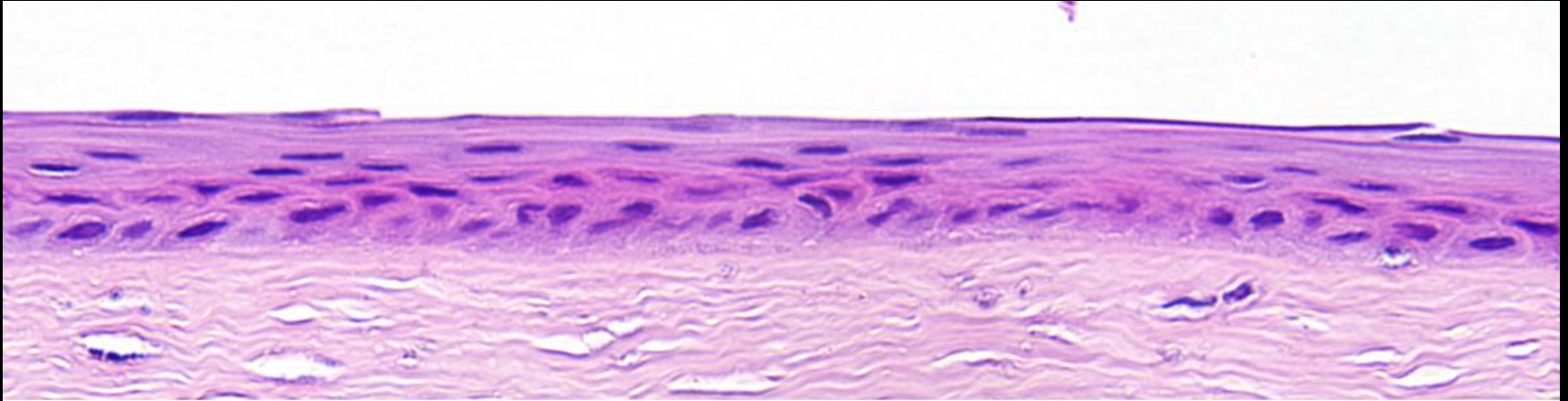
Band keratopathy



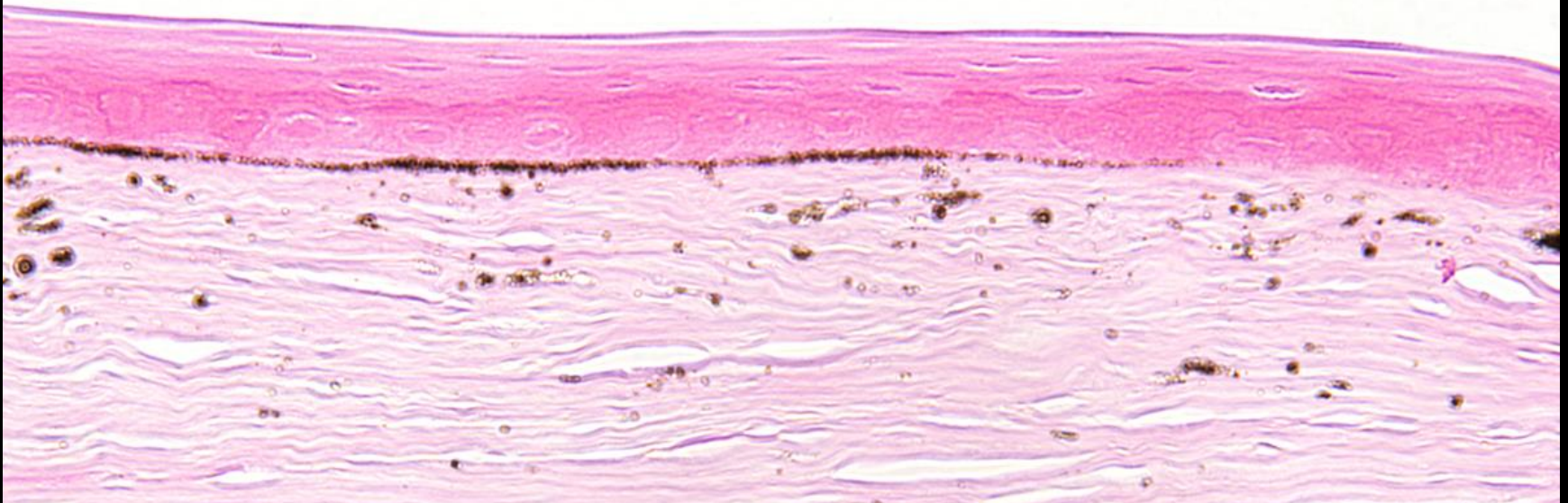
Band Keratopathy



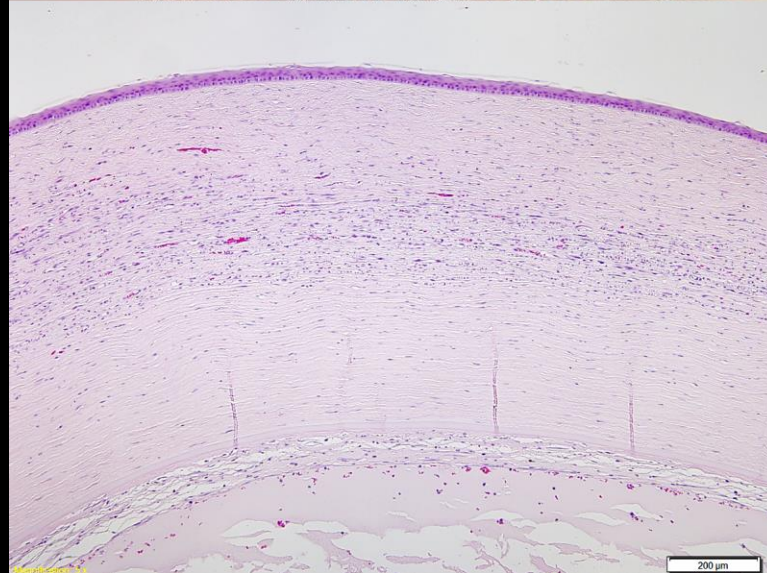
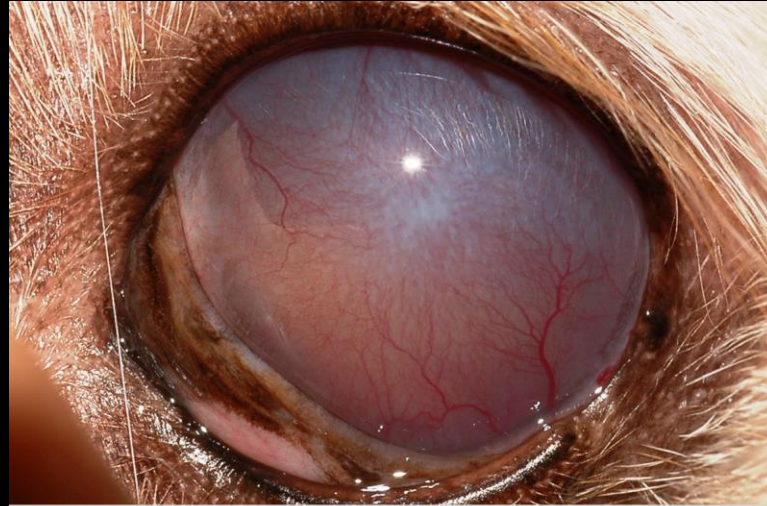
Stromal Deposits - Mineral



Stroma Mineralization



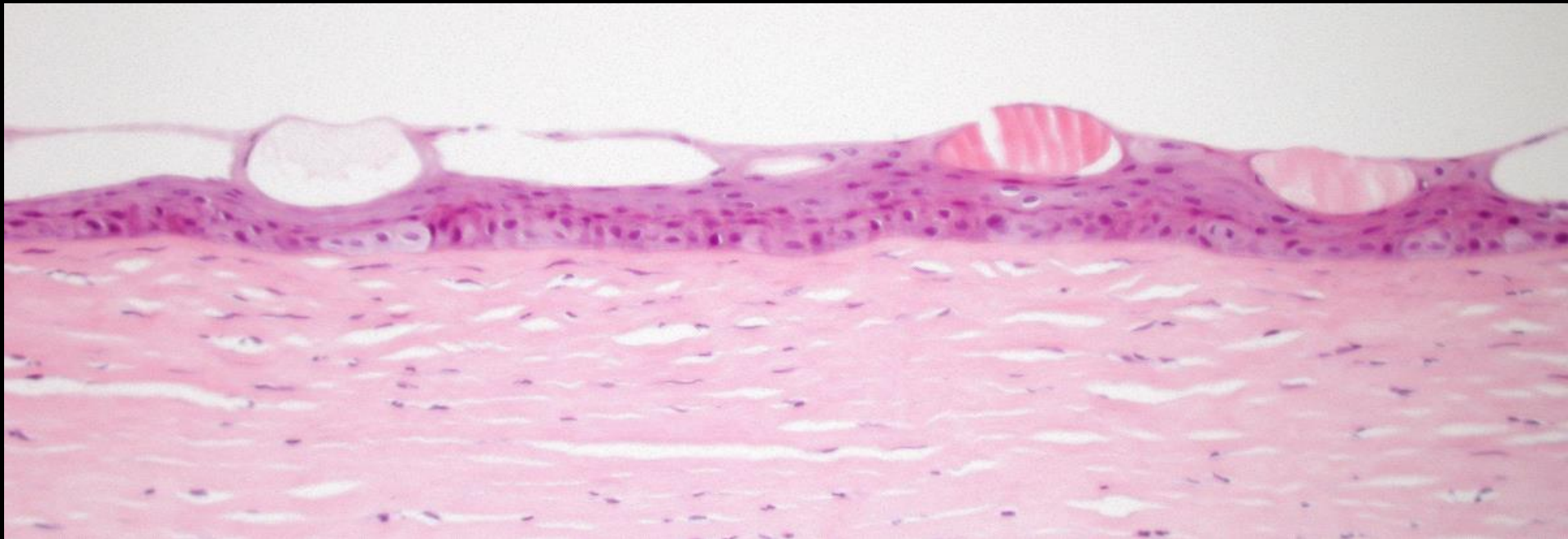
Corneal Stromal Keratitis



Corneal Stromal Edema

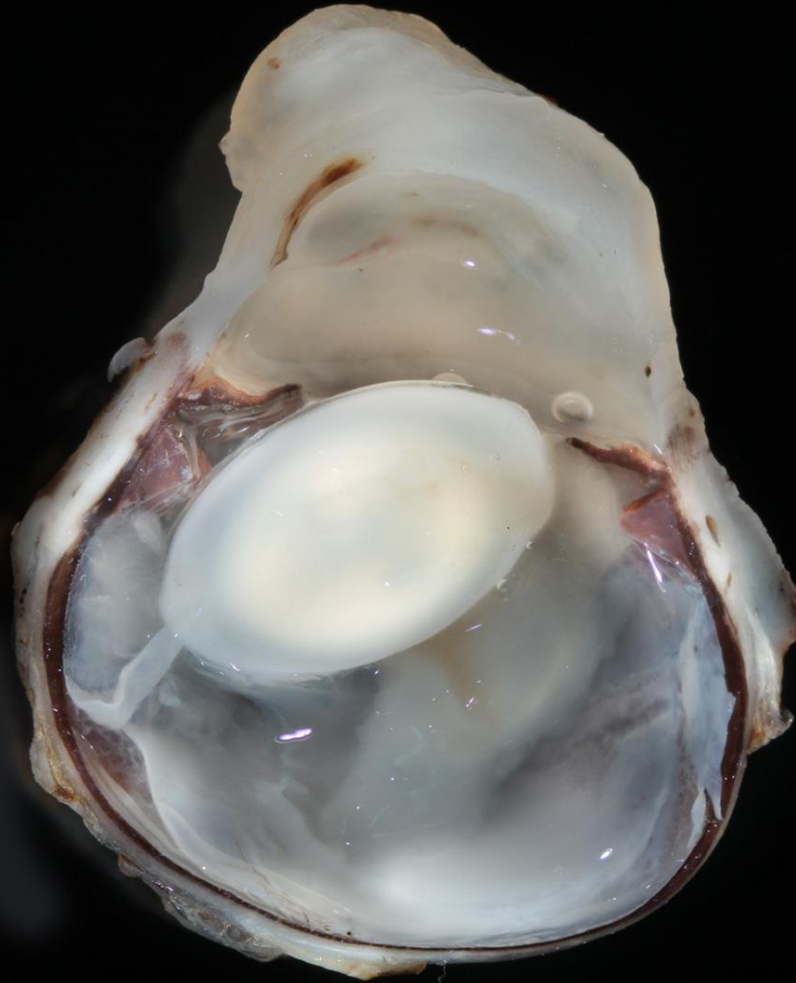


Corneal Stromal Edema



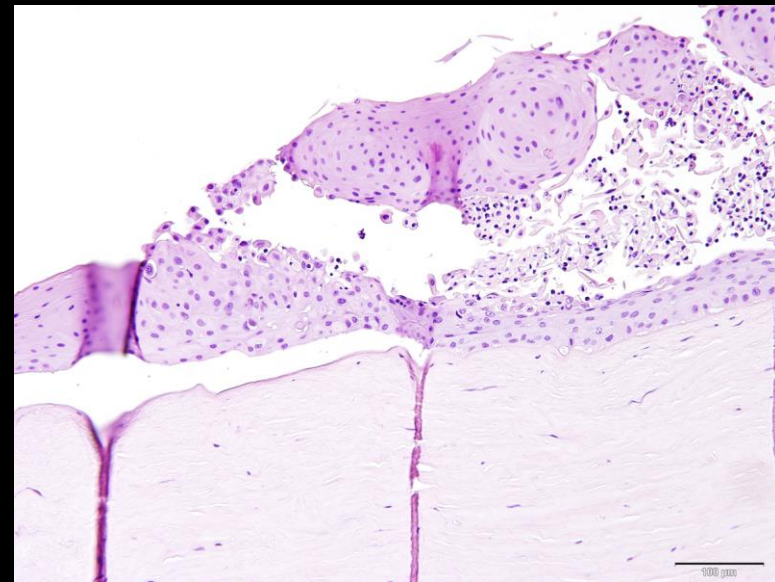
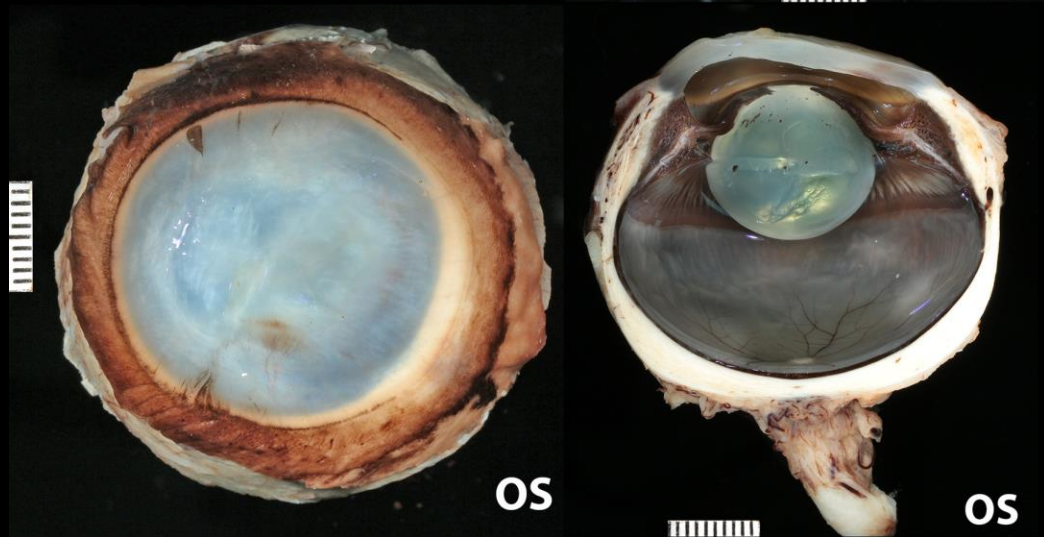
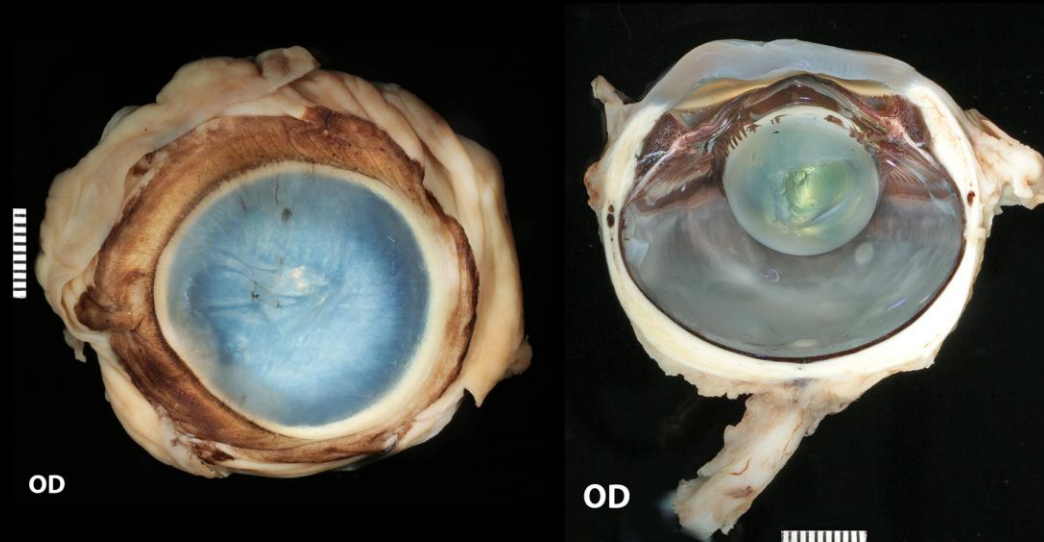
Corneal Stromal Edema

Corneal Hydromps DM Break



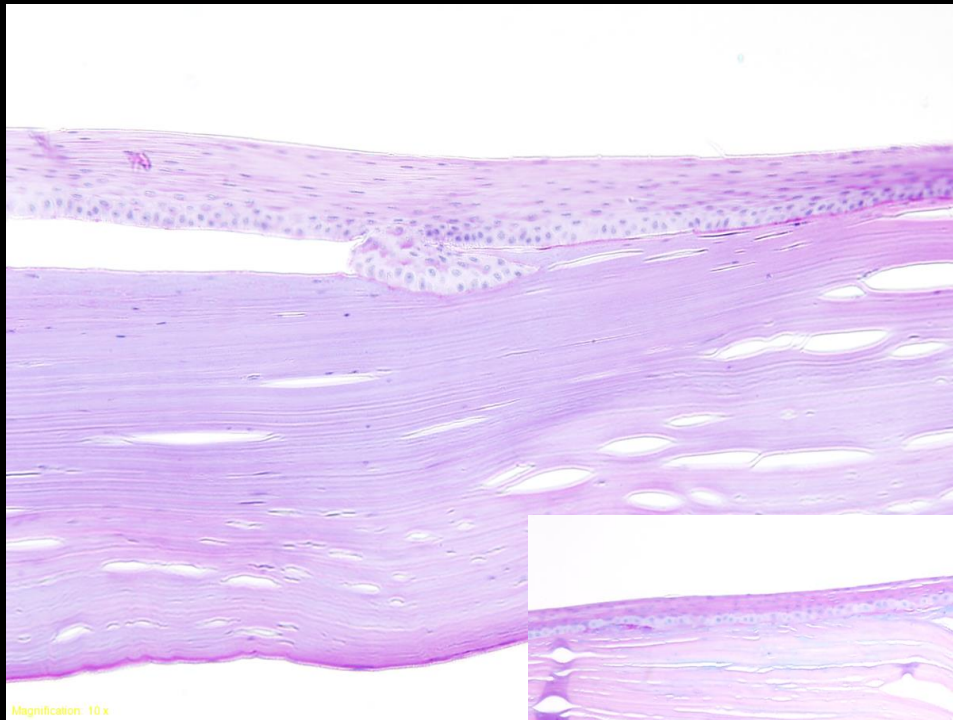
Degenerative Keratopathies

Odariid Keratopathy *Pinnipeds*

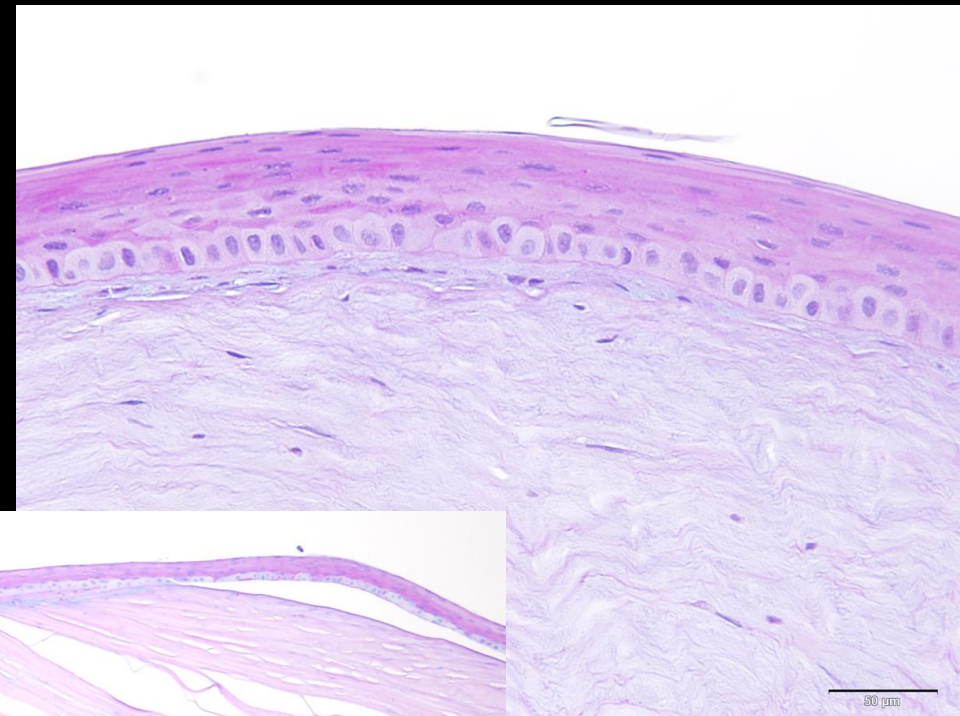


Degenerative Keratopathies

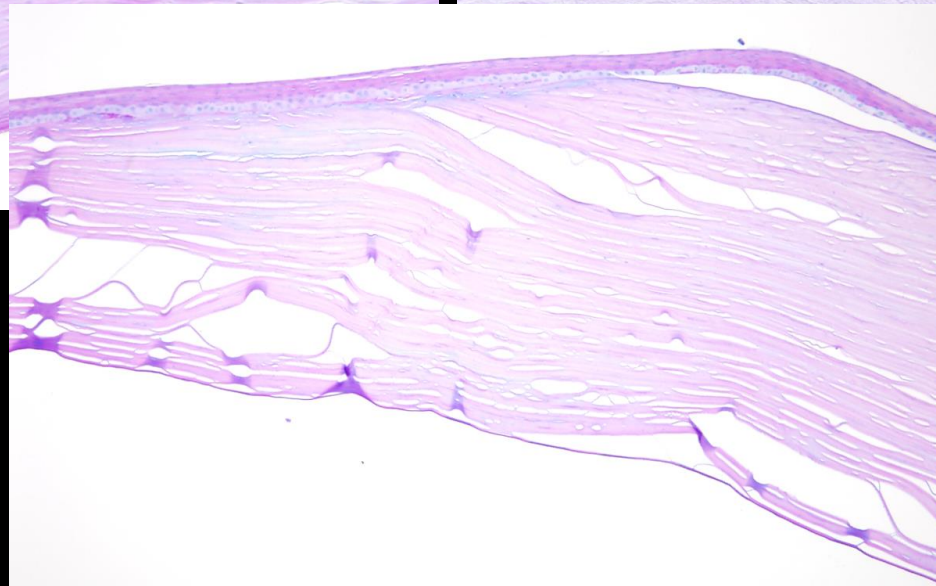
Odariid Keratopathy *Pinnipeds*



Magnification: 10x



500 µm



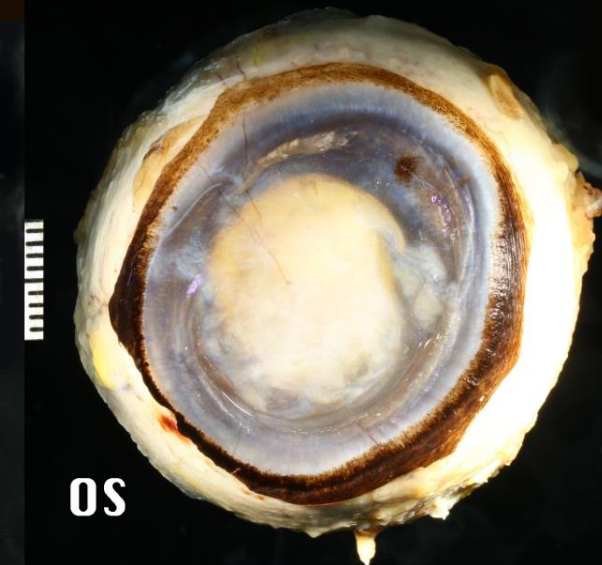
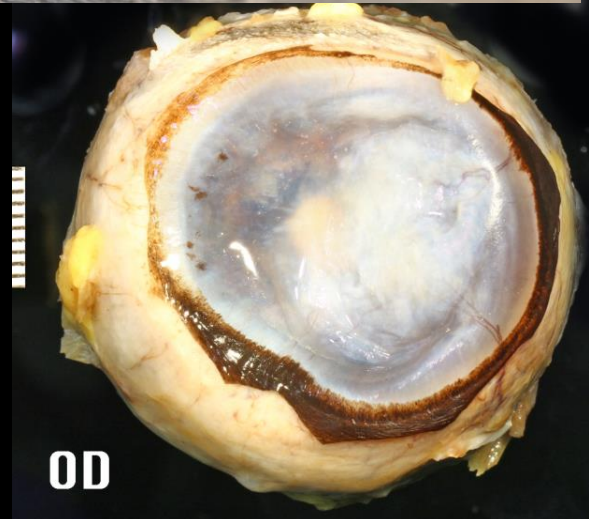
200 µm

Degenerative Keratopathies

Corneal Amyloid, Pinnipeds

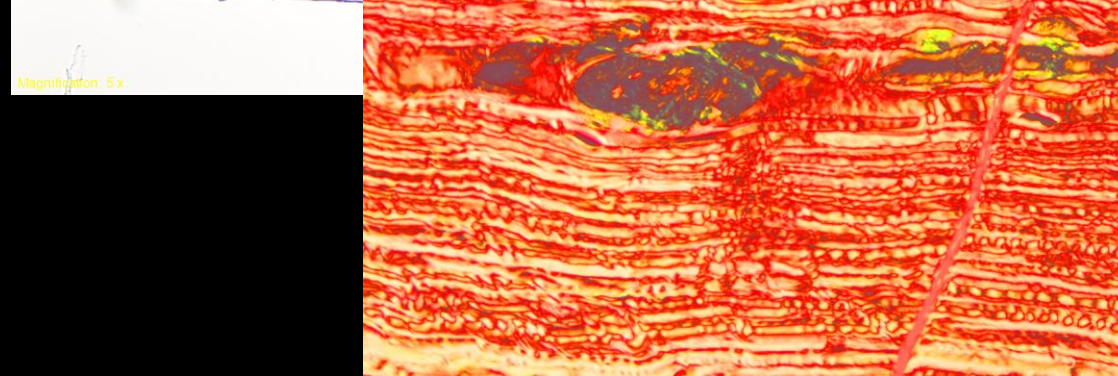
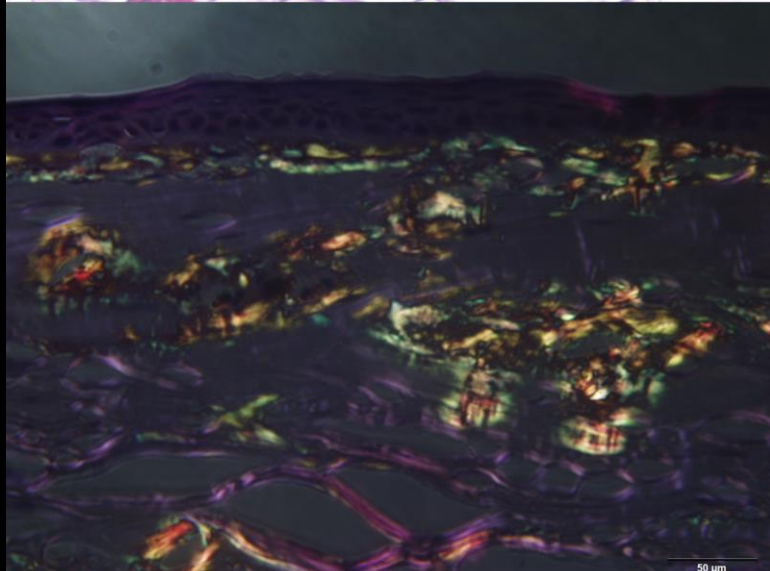
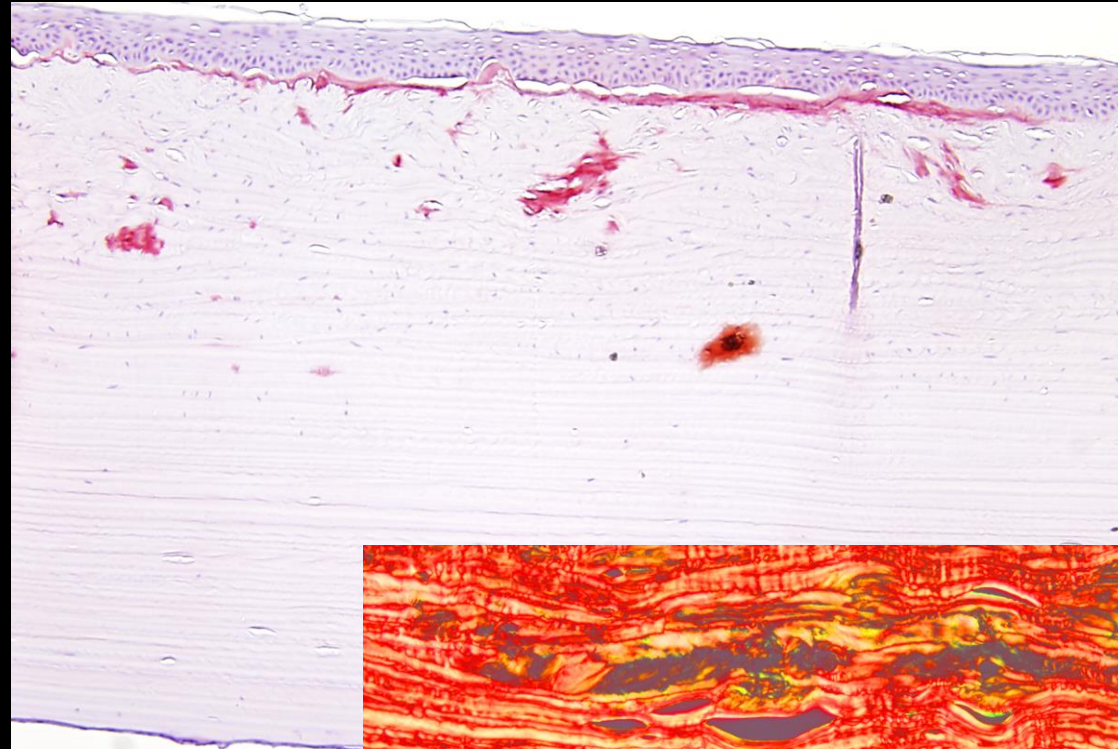
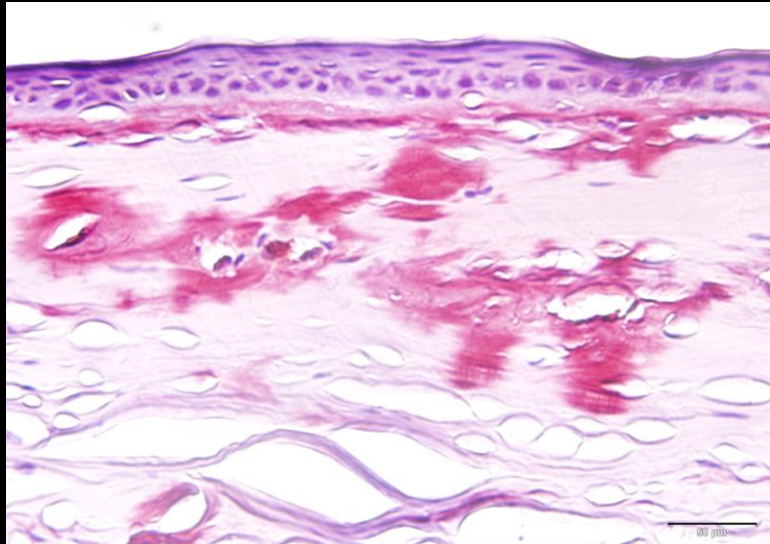
13 cases in the COPLOW Database

All California Sea Lions



Degenerative Keratopathies

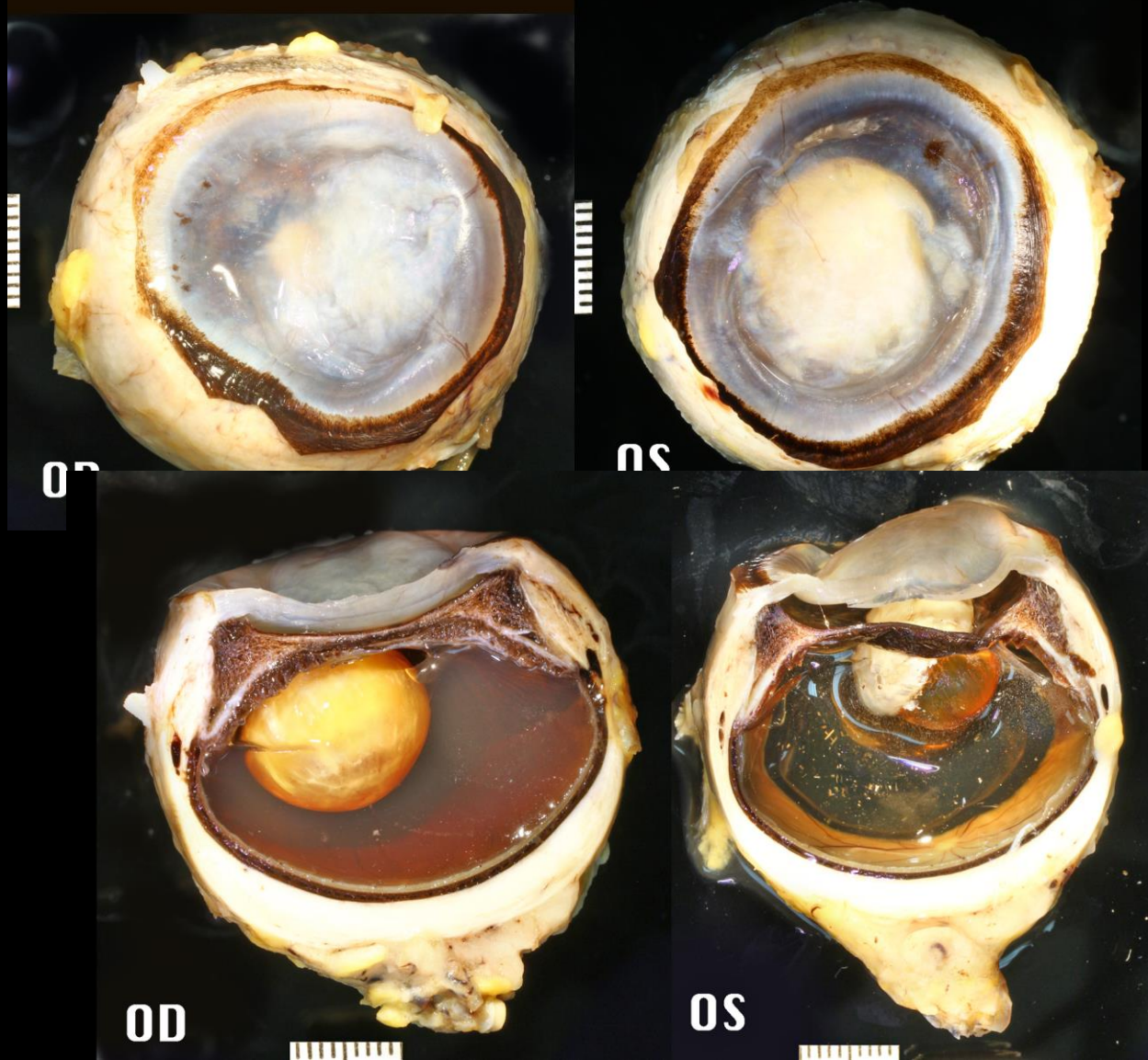
Corneal Amyloid, Pinnipeds



Magnification: 5x

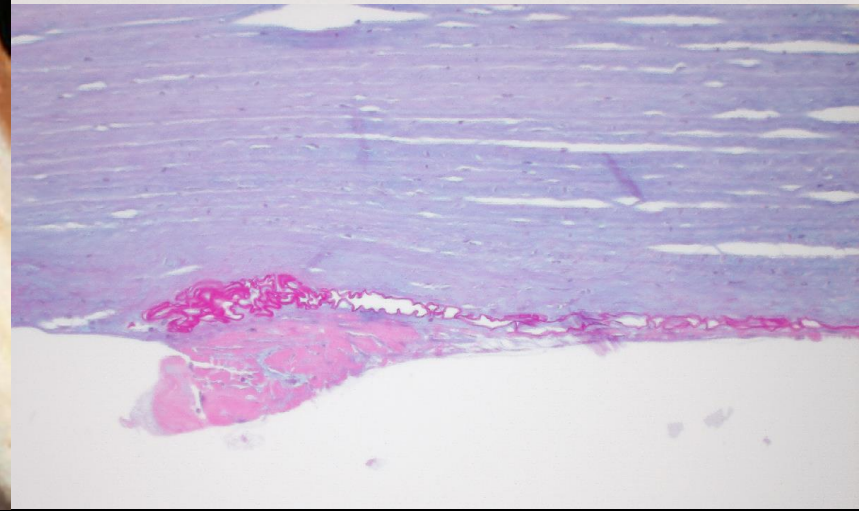
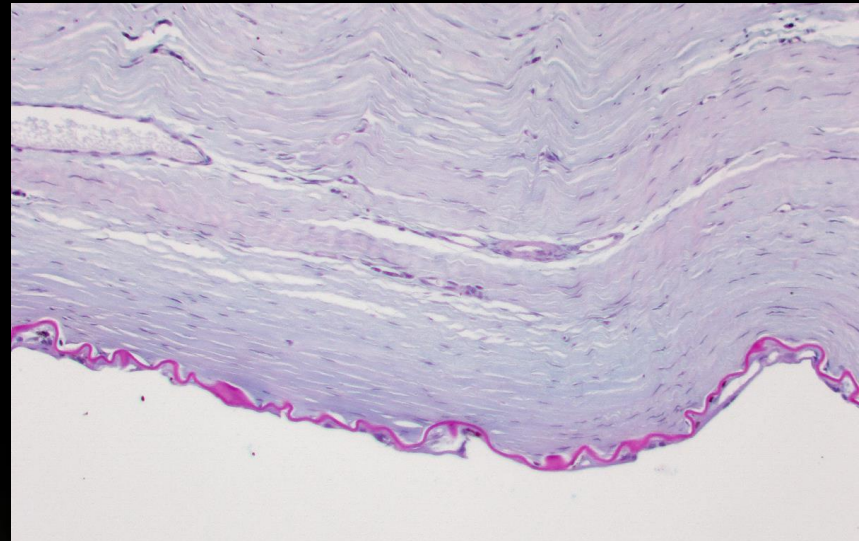
Degenerative Keratopathies

Cataract, lens Luxation, Pinnipeds



Degenerative Keratopathies

Cataract, lens Luxation, Pinnipeds



Degenerative Keratopathies

Horizontal Keratopathy of Dolphins



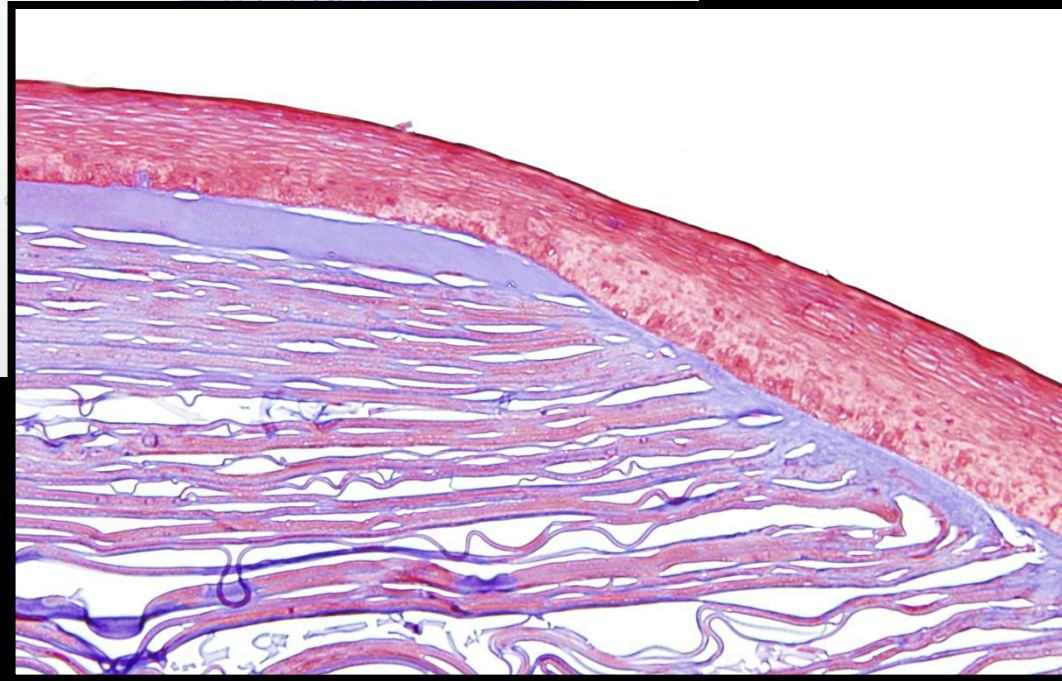
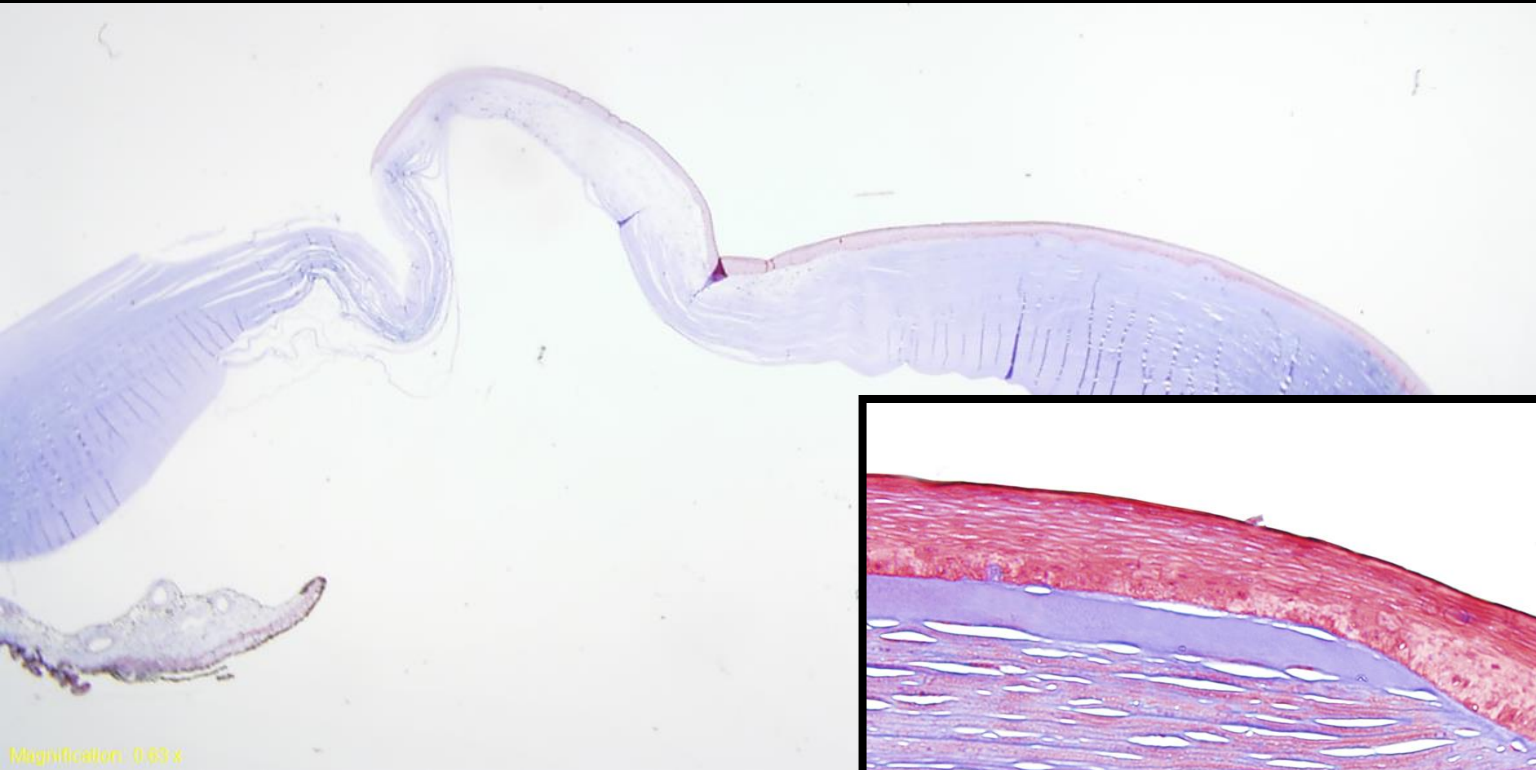
From Carmen Colitz



OS

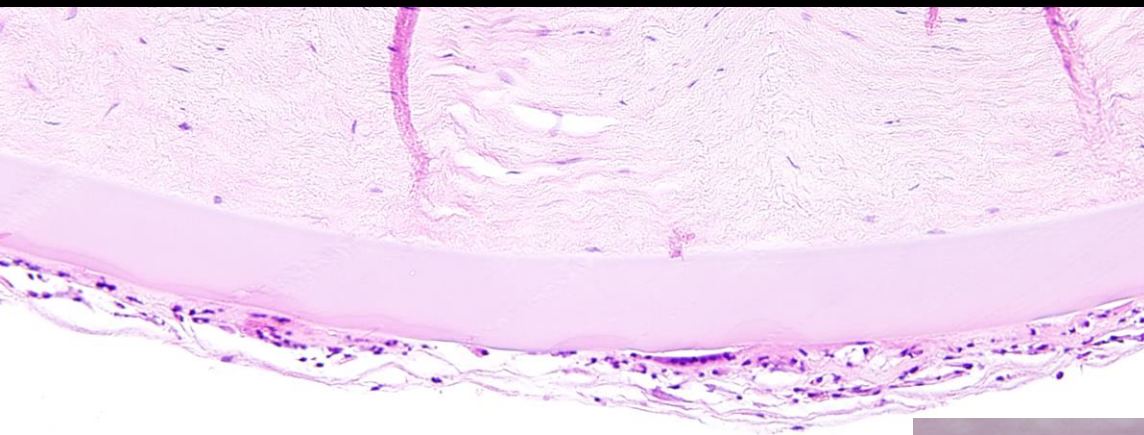
Degenerative Keratopathies

Horizontal Keratopathy of Dolphins

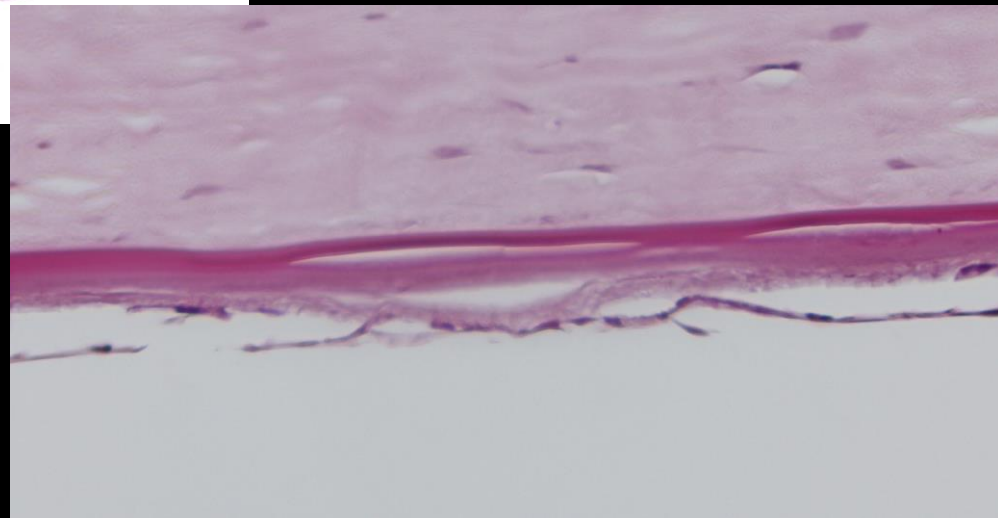


Corneal Endothelial Diseases

The Boston Terrier has a breed related corneal endothelial dystrophy but the histopathology is non-specific and usually consists of a retrocorneal membrane.

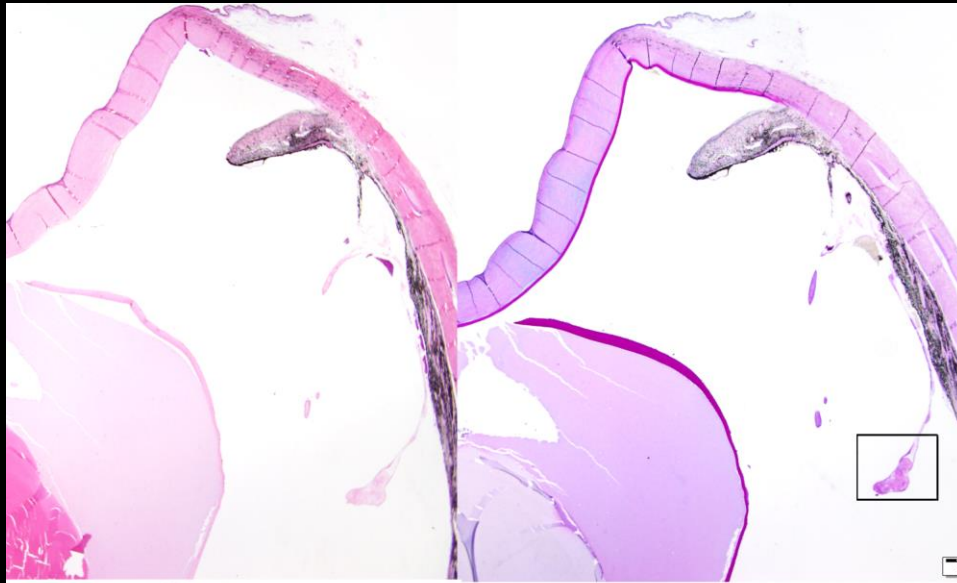


Magnification: 10 x



Corneal Endothelial Diseases

Other possible canine endotheliopathies

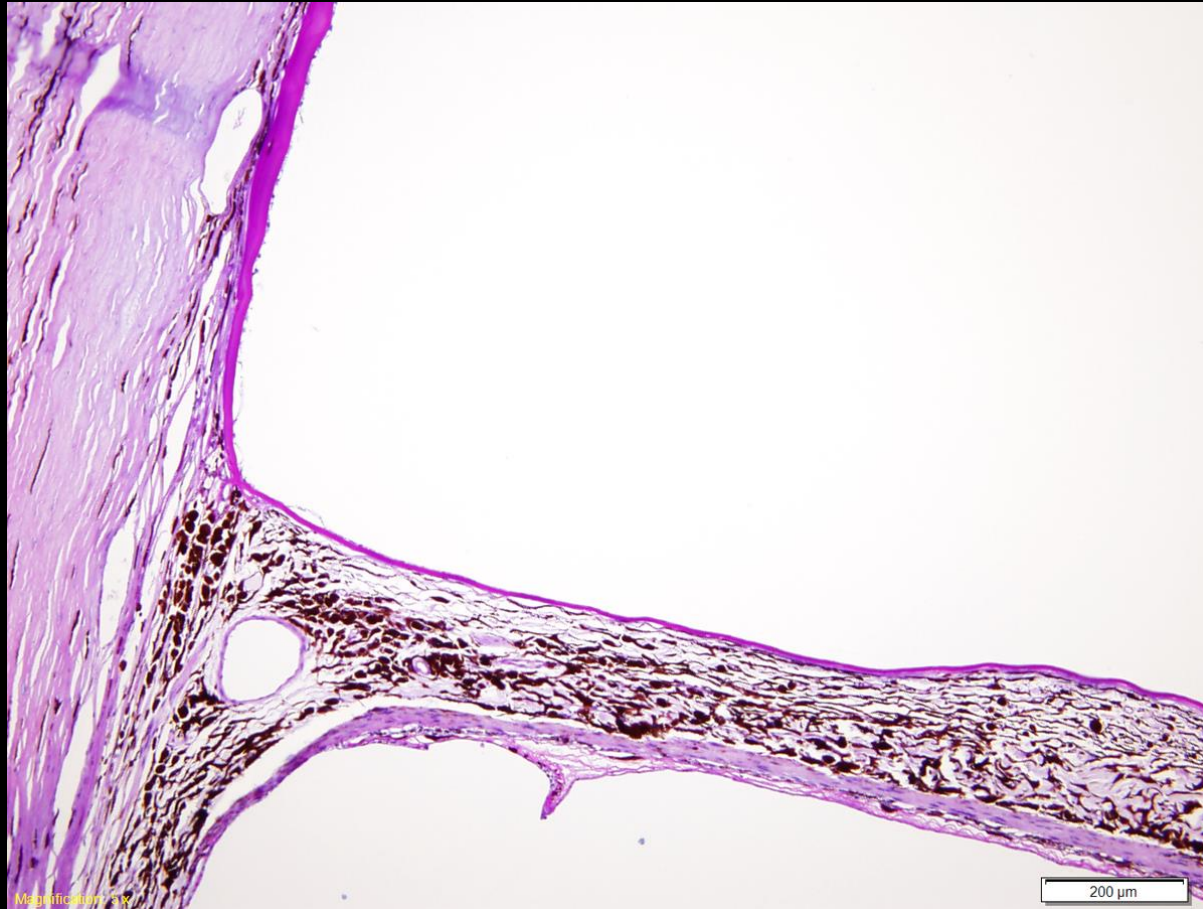


Endotheliopathy with extension over the iris and ciliary body



Corneal Endothelial Diseases

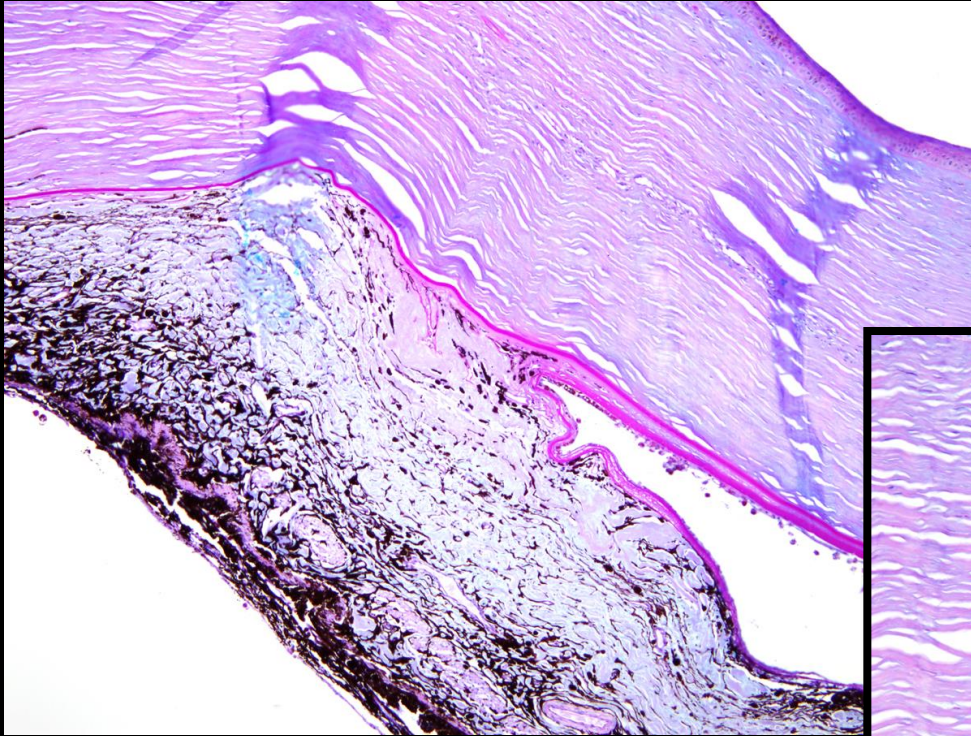
Other possible canine endotheliopathies



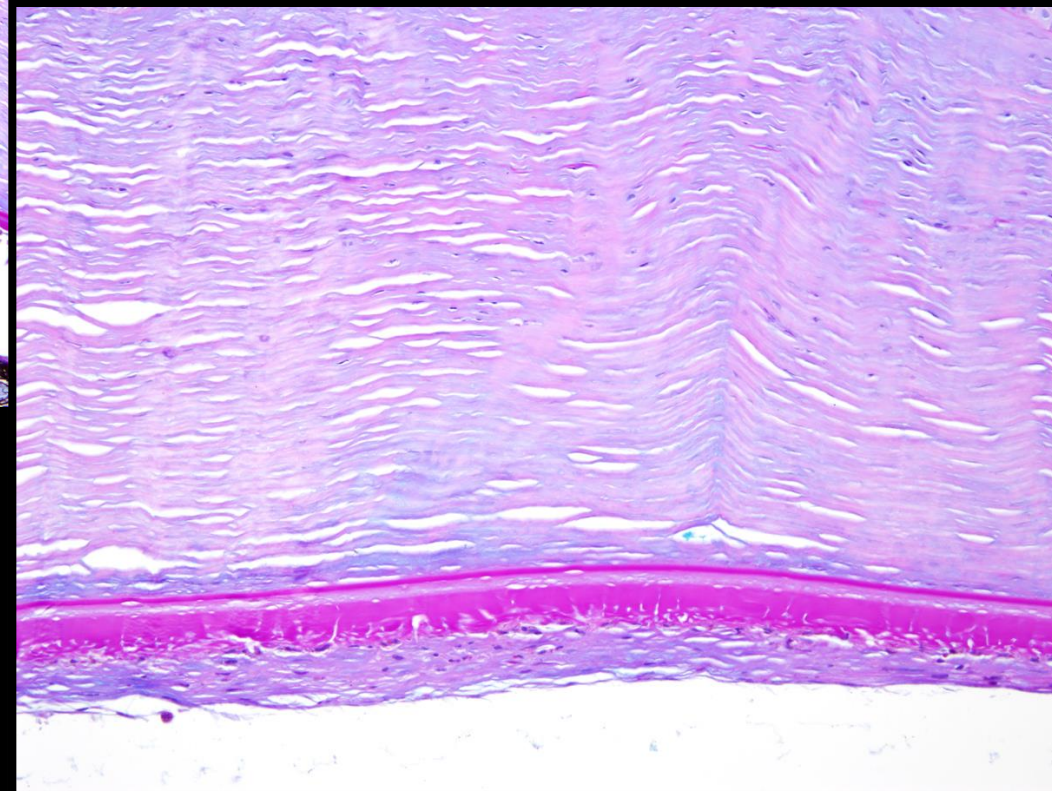
Endotheliopathy with extension over the iris and ciliary body

Corneal Endothelial Diseases

Other possible canine endotheliopathies



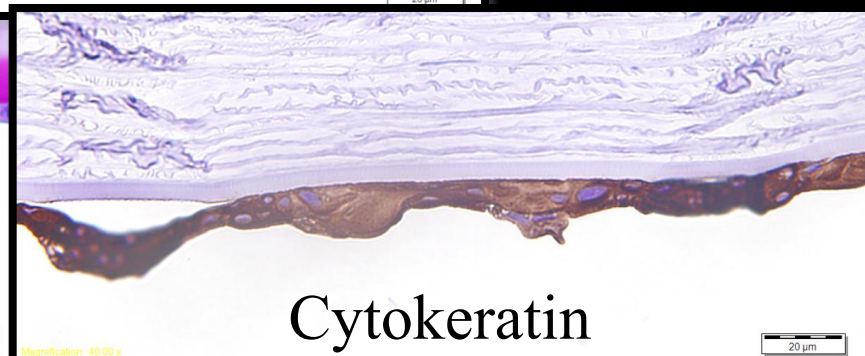
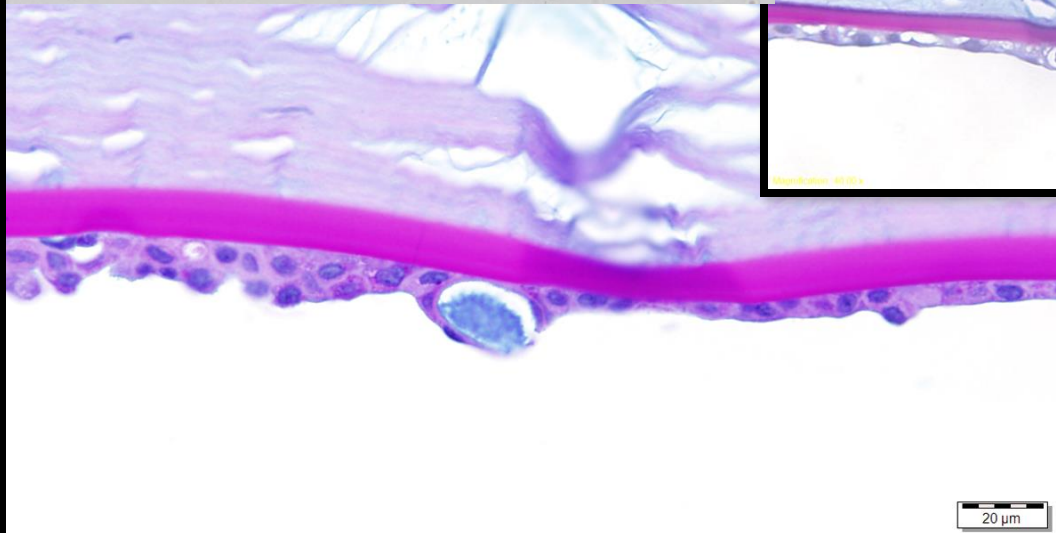
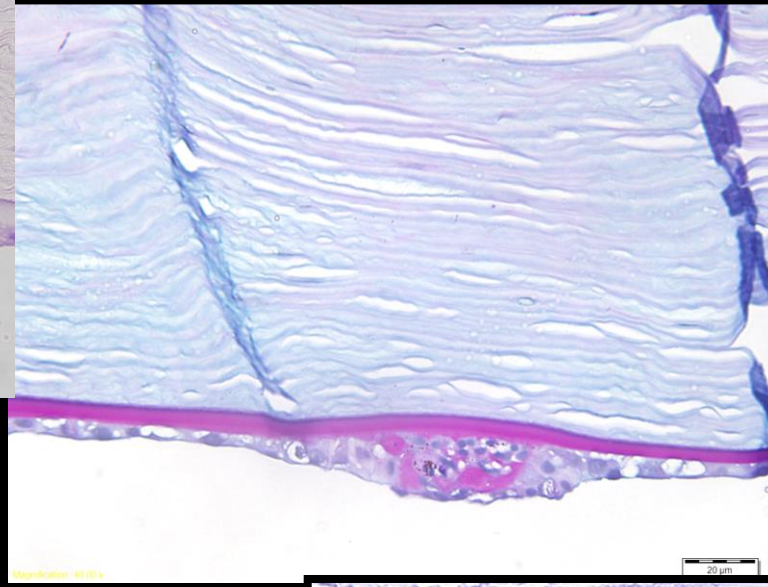
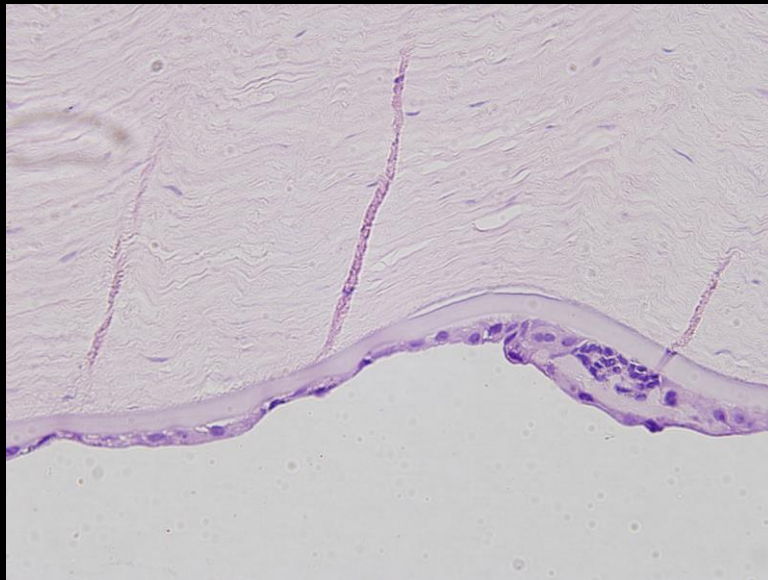
Endotheliopathy with extension over the iris and ciliary body



Corneal Endothelial Diseases

Other possible canine endotheliopathies

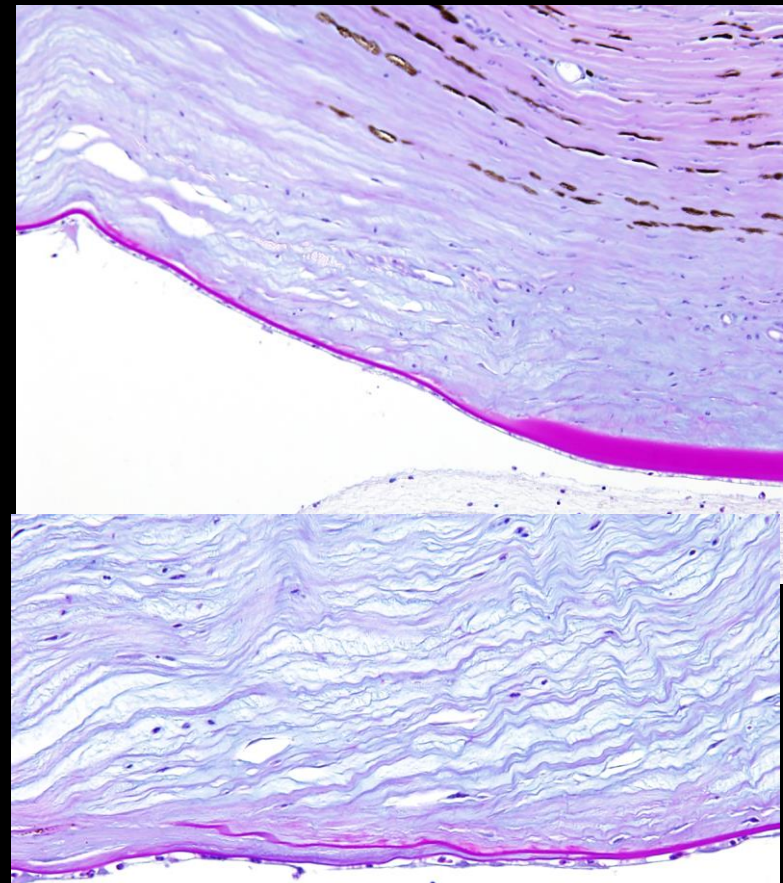
Endotheliopathy with epithelial phenotype



Cytokeratin

Corneal Endothelial Diseases

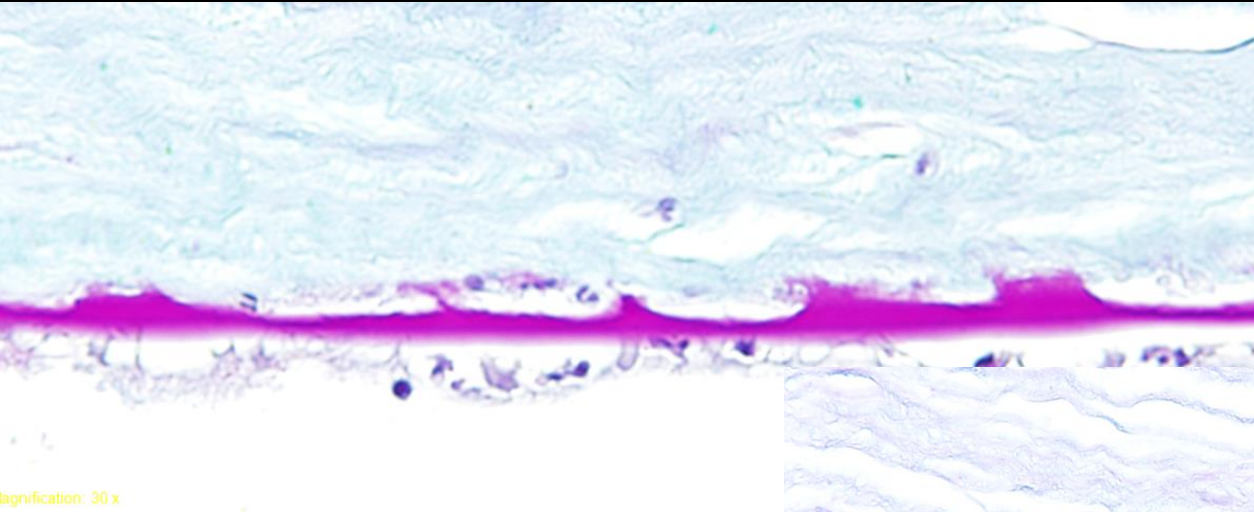
Possible feline endotheliopathies



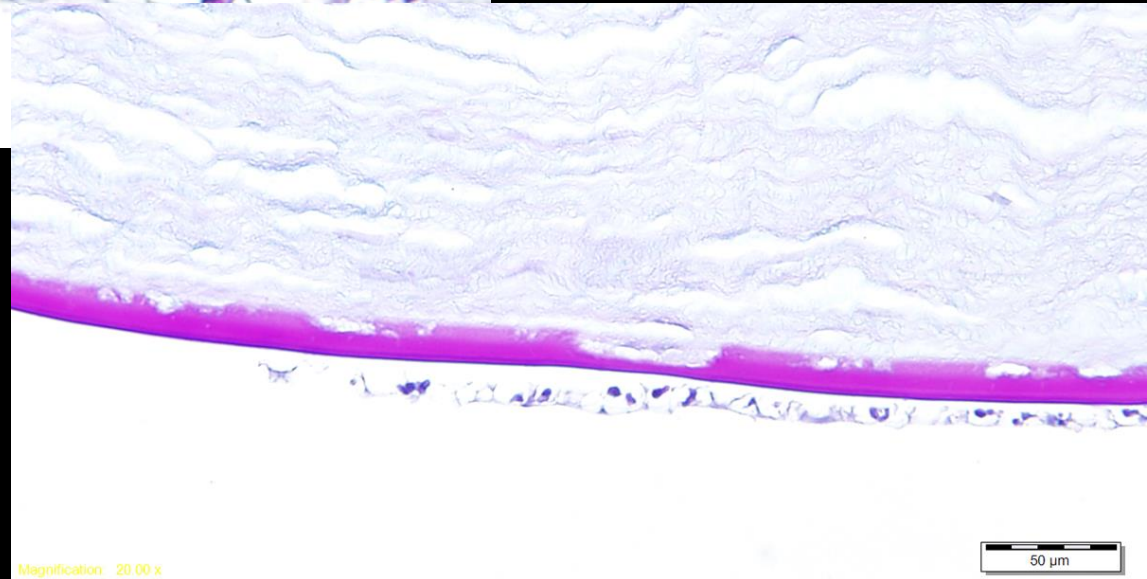
Bilateral megacornea with

Corneal Endothelial Diseases

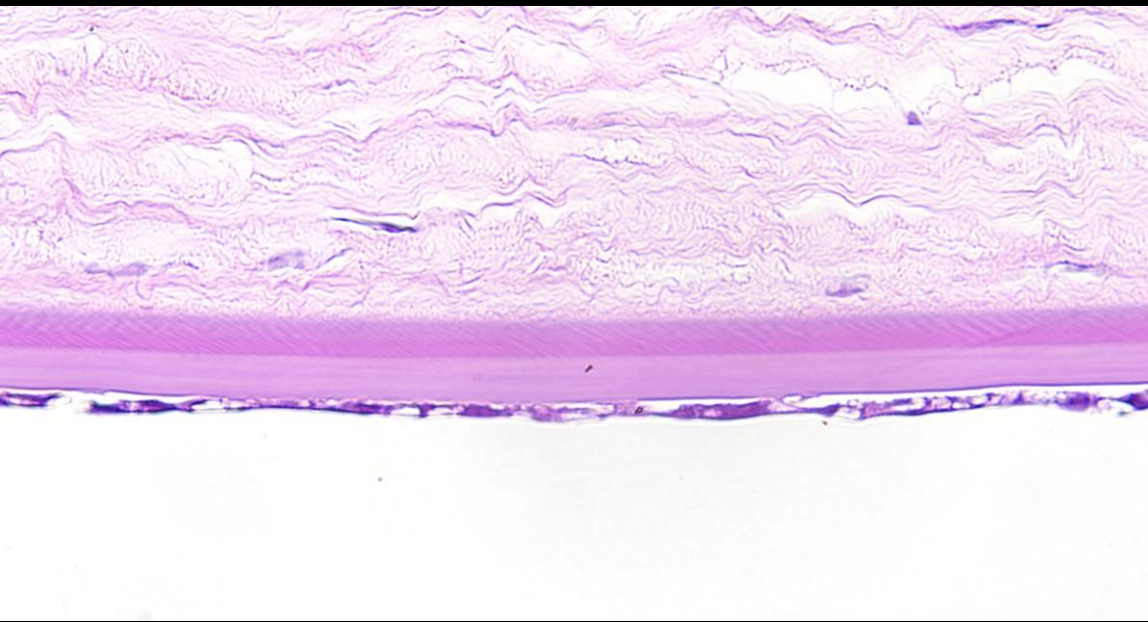
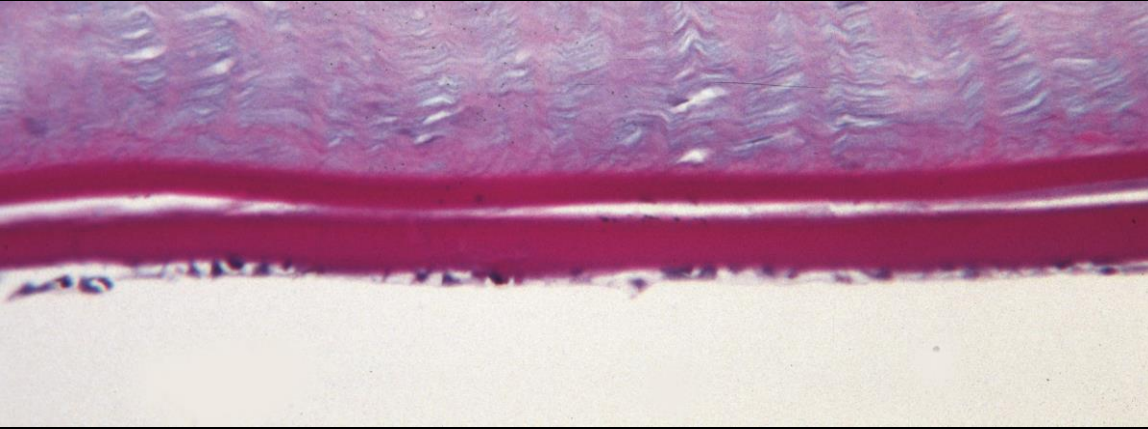
Possible feline endotheliopathies



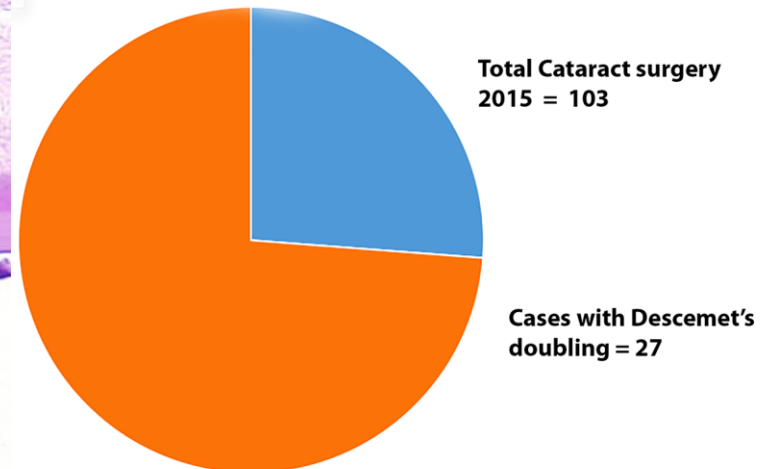
Feline endothelial dysplasia
with a *moth-eaten* phenotype



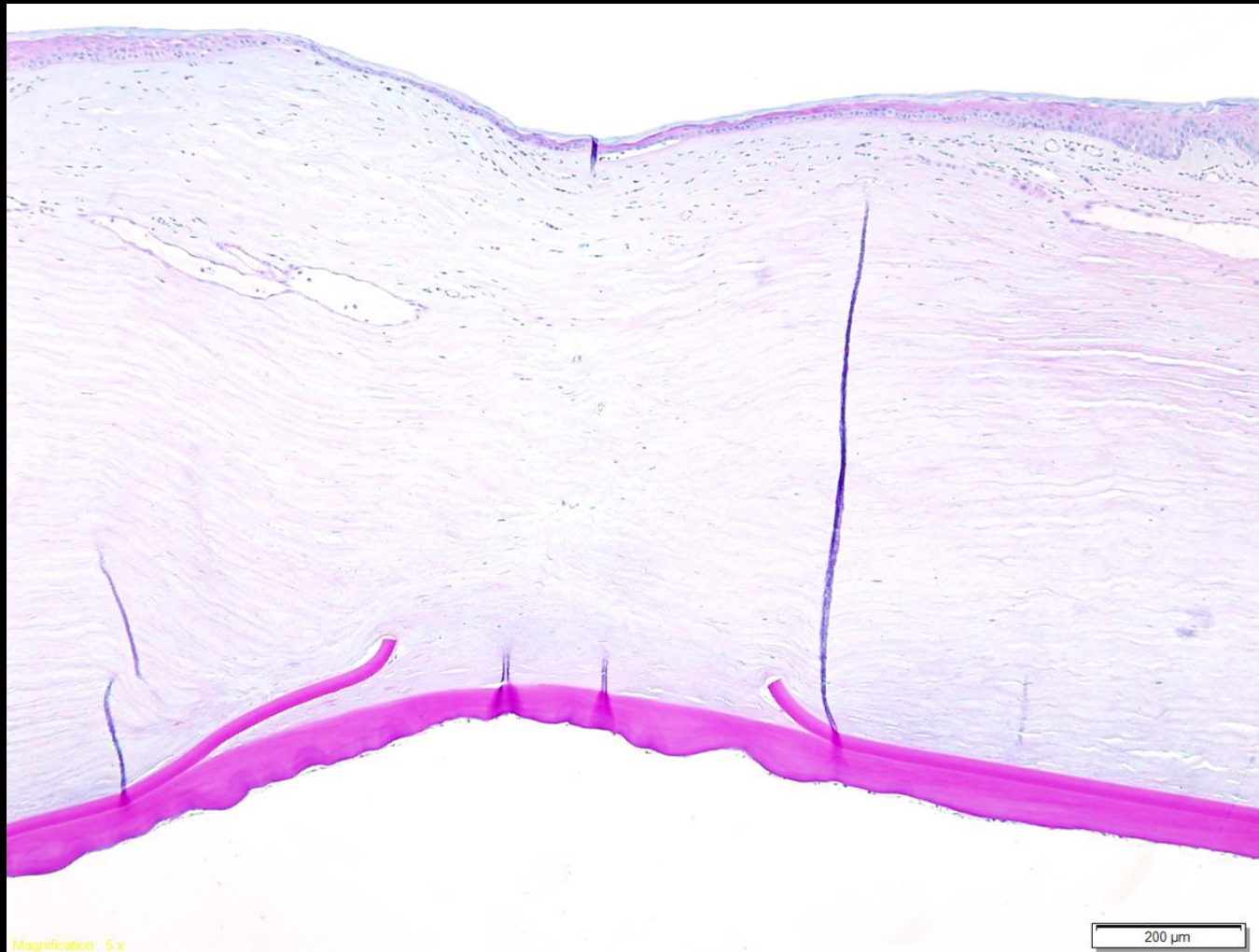
Mechanical Damage to Endothelium Leading to Descemet's Membrane Doubling



This phenomenon is seen in trauma and post-operative globes

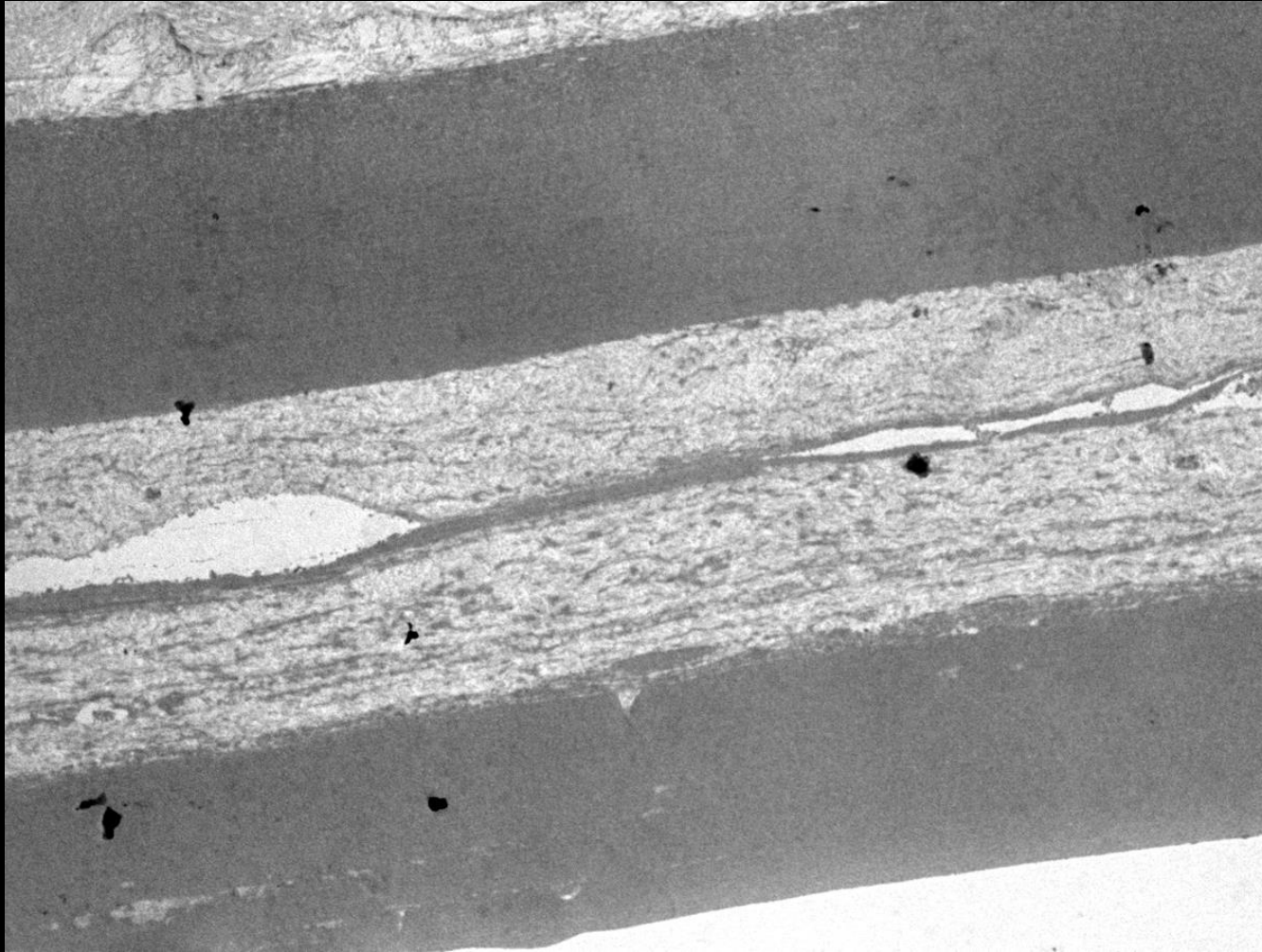


Mechanical Damage to Endothelium leading to Descemet's Membrane Doubling



This phenomenon is seen in trauma and post-operative globes

Mechanical Damage to Endothelium leading to Descemet's Membrane Doubling



This phenomenon is seen in trauma and post-operative globes

Post-traumatic epithelial inclusion cyst

