Rowe Referrals

Intraocular disease

Anterior Segment:

Cornea

Anterior chamber

Iris

Posterior chamber

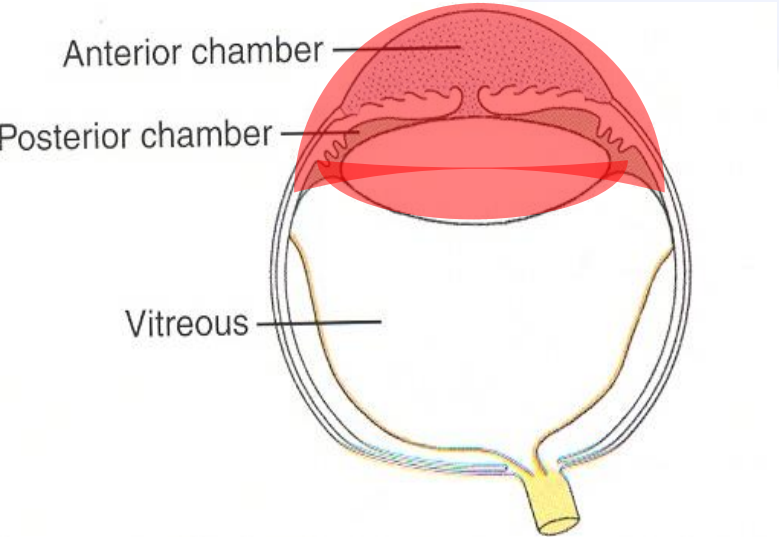
Lens

Posterior Segment

Vitreous

Parsplana

Retina & Choroid



Intra-ocular disease

Anterior segment disease

- Uveitis
- Glaucoma
- Cataract

Posterior segment disease

- Systemic hypertension and its effect on the retina
- Sudden onset blindness
- PRA

What to remember about anterior segment disease?

- Uveitis - think systemic disease
- Glaucoma is a bad disease - measure the pressure and seek expert advice asap to maximise outcome
- Cataracts - earlier operated on the better the prognosis, cataracts can cause life long lens induced uveitis with or without surgery so long term management is as important as early surgery

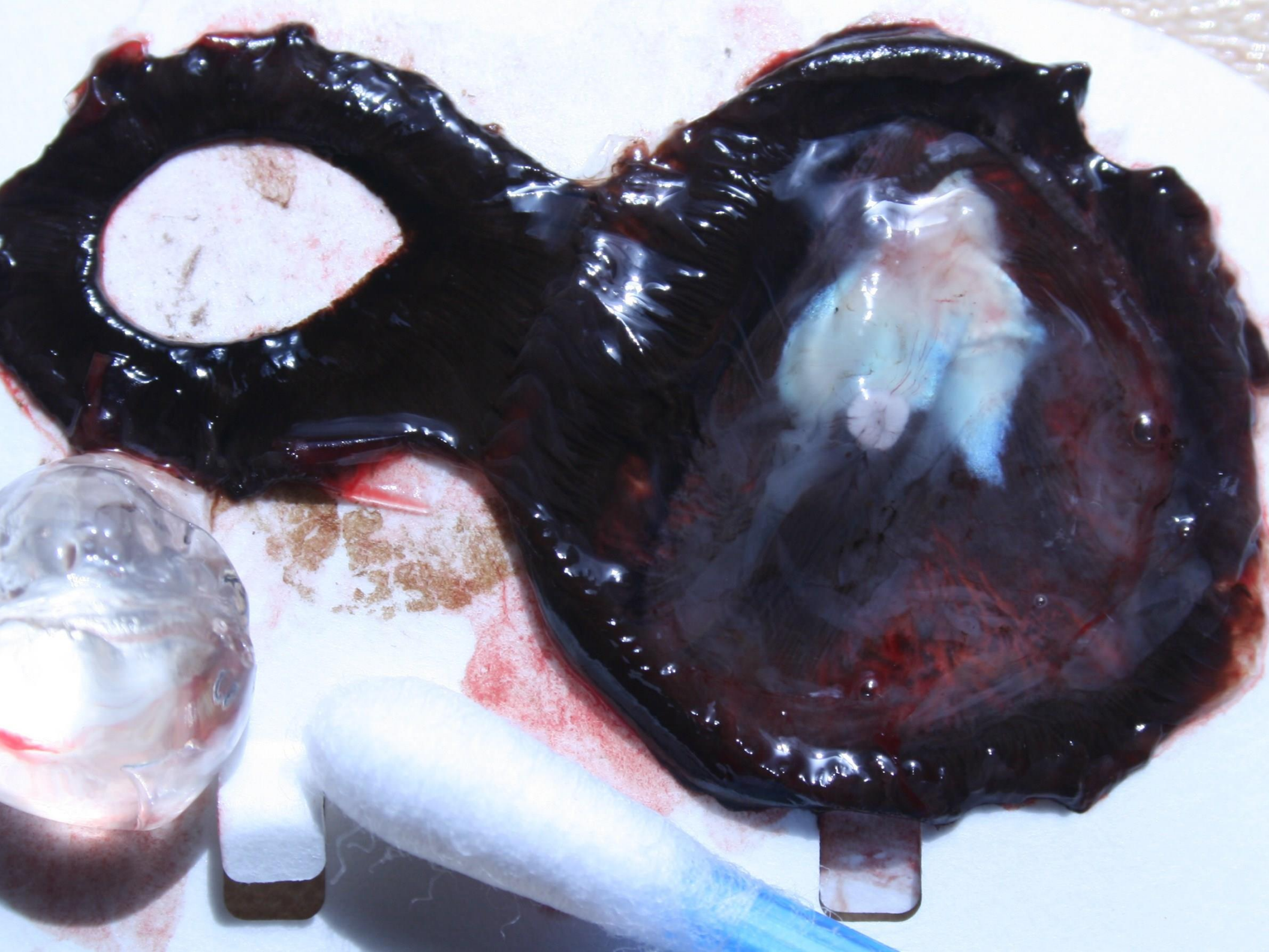
Anterior segment disease

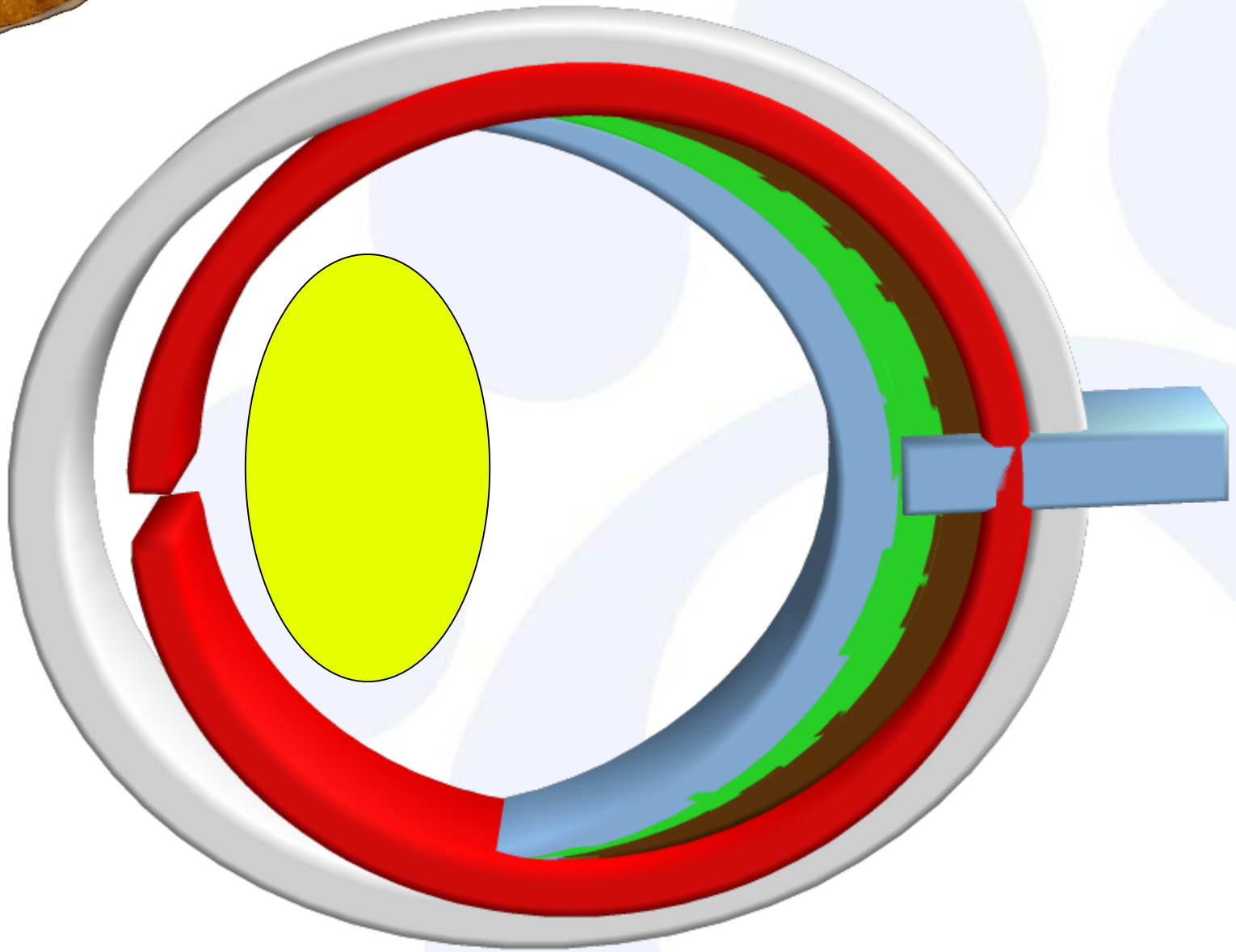
- Anterior Uveitis
- Glaucoma
- Cataract

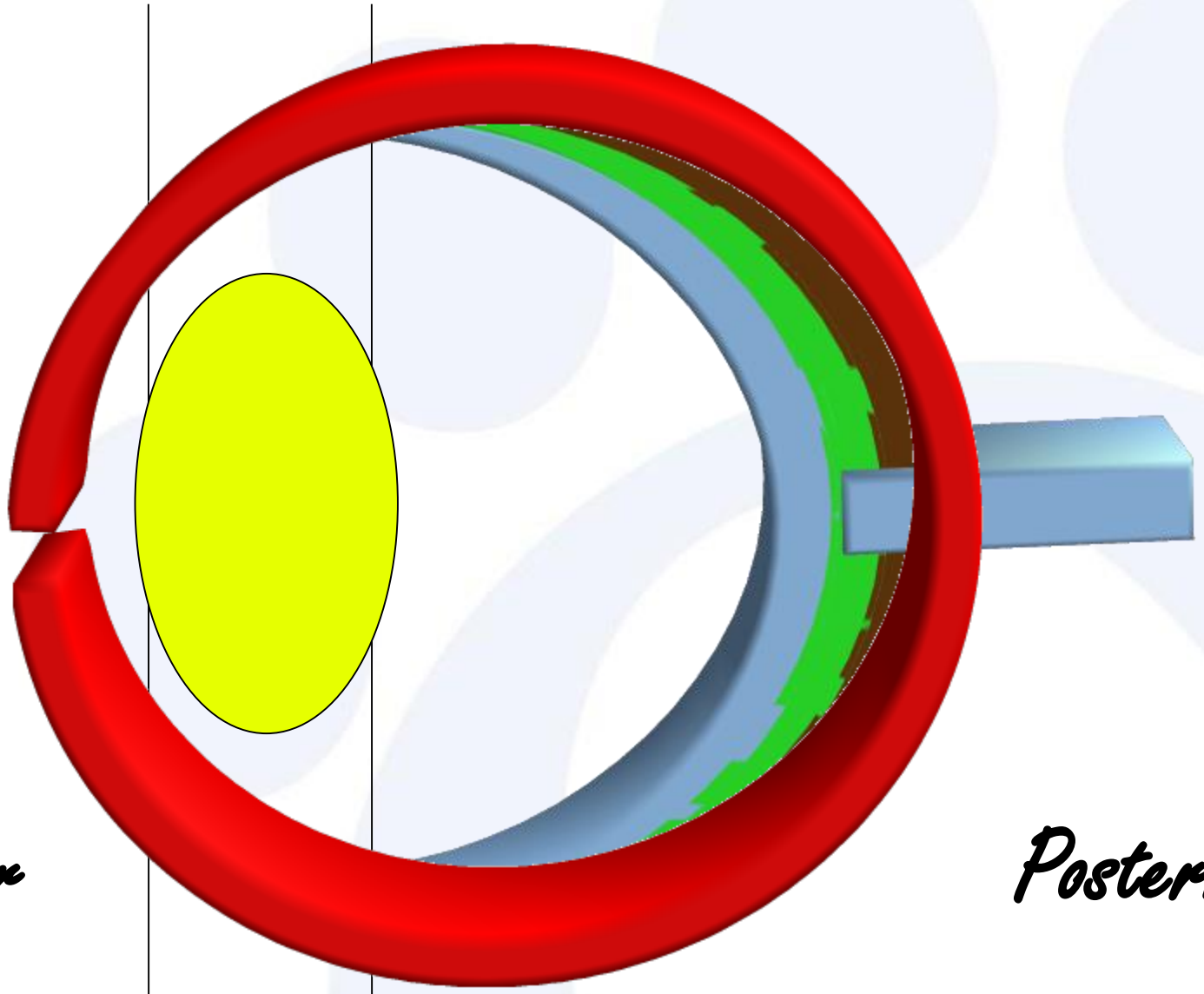
Anterior Uveitis

The Uveal tract

Galen AD129-216





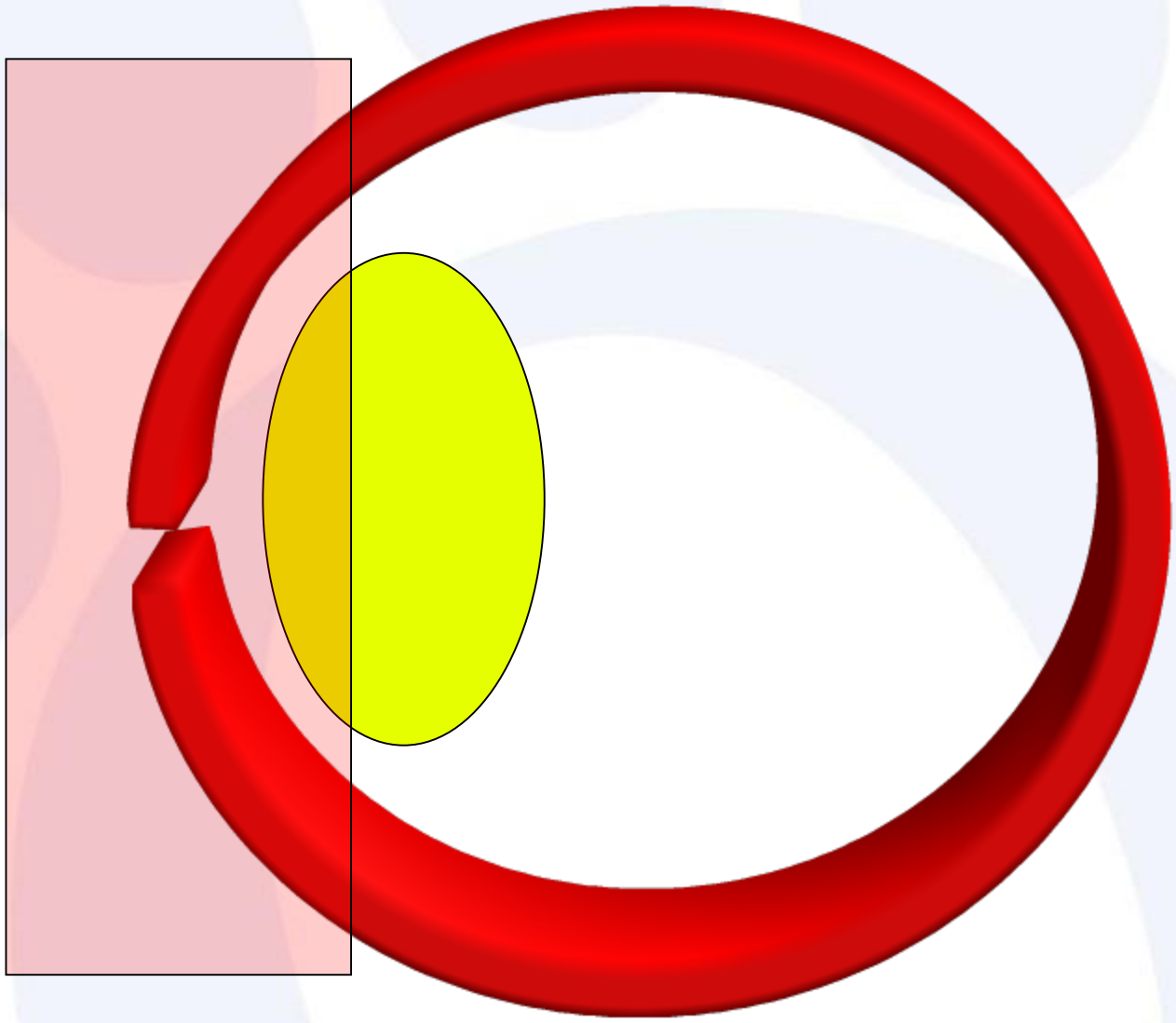


Anterior

Posterior

Intermediate

Anterior uvea - iris



The eye as an immune privileged site

Limited immune cell entry

NO lymphatic drainage

Active immune tolerance to foreign antigens Anterior chamber acquired immune deviation (ACAID)

Sir Peter Medawar

The father of organ transplantation.

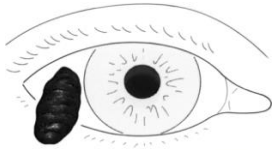
Nobel prize 1960

Sympathetic ophthalmia

Release of ocular antigens following massive unilateral ocular injury leads to a delaye, often blinding, granulomatous uveitis of BOTH eyes from 2wks to 66years after injury

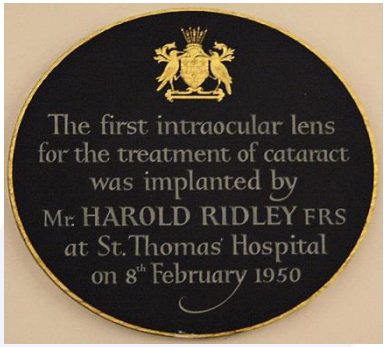
Tx: Oral mercury and leaches on to the conjunctiva

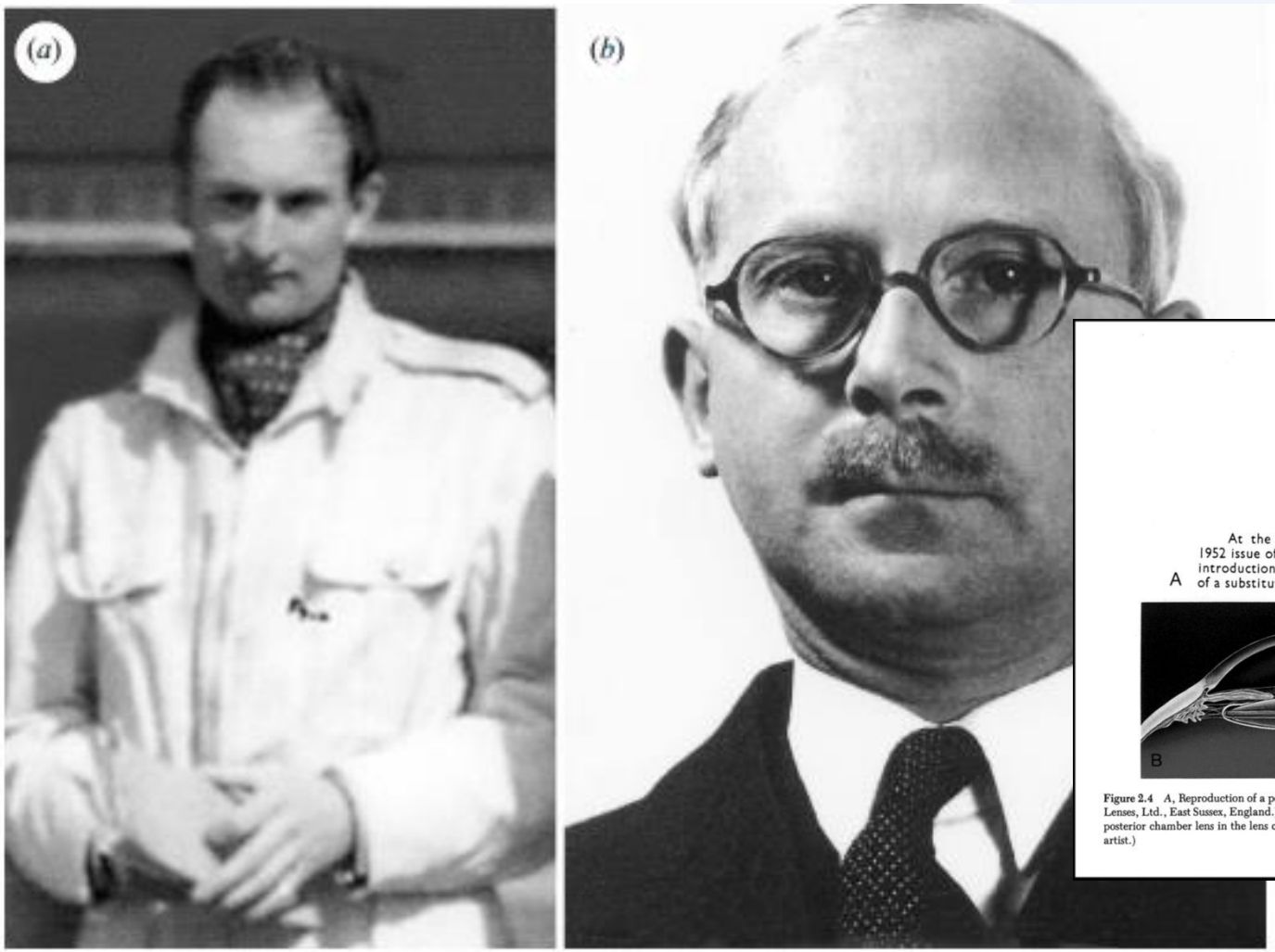
(sim to uveodermatological syndrome in man and dogs)



Louie Braille 1809-1852

Damaged eye with needle at age 3, lost other eye to SO when it became infected.





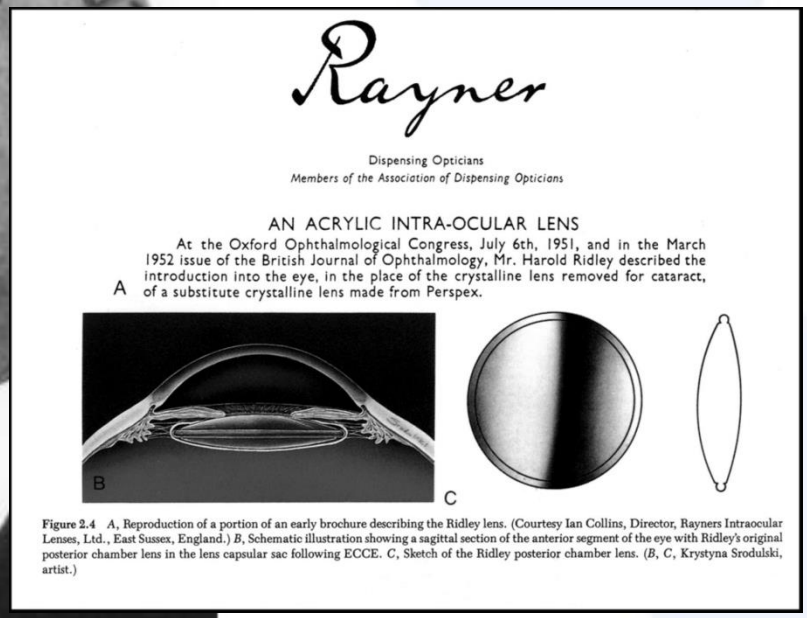


Figure 2.4 *A*, Reproduction of a portion of an early brochure describing the Ridley lens. (Courtesy Ian Collins, Director, Rayners Intraocular Lenses, Ltd., East Sussex, England.) *B*, Schematic illustration showing a sagittal section of the anterior segment of the eye with Ridley's original posterior chamber lens in the lens capsular sac following ECCE. *C*, Sketch of the Ridley posterior chamber lens. (*B*, *C*, Krystyna Srodulski, artist.)

Figure 2. (*a*) Flight Lieutenant Gordon 'Mouse' Cleaver, of 601 Squadron, RAF Tangmere. Without realizing it, Cleaver played a major role in helping to launch one of the major advancements in eye surgery. Ridley saw several pilots with the same type of injury, and this was crucial to the invention of the IOL. However, Cleaver is the only pilot for whom records were available. (*b*) Harold Ridley in the late 1940s. Ridley recognized the significance of Cleaver's injuries with respect to his idea of an IOL, and this began the 'count down' that would culminate in the invention of the IOL.

ACAID

- Br J Exp Pathol. 1948 Feb;29(1):58-69.
  - Immunity to homologous grafted skin; the fate of skin homografts transplanted to the brain, to subcutaneous tissue, and to the anterior chamber of the eye.

DEVELOPMENT OF MOUSE EGGS IN THE ANTERIOR CHAMBER OF THE EYE

MEREDITH N. RUNNER[1]
Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine

TWELVE FIGURES

INTRODUCTION

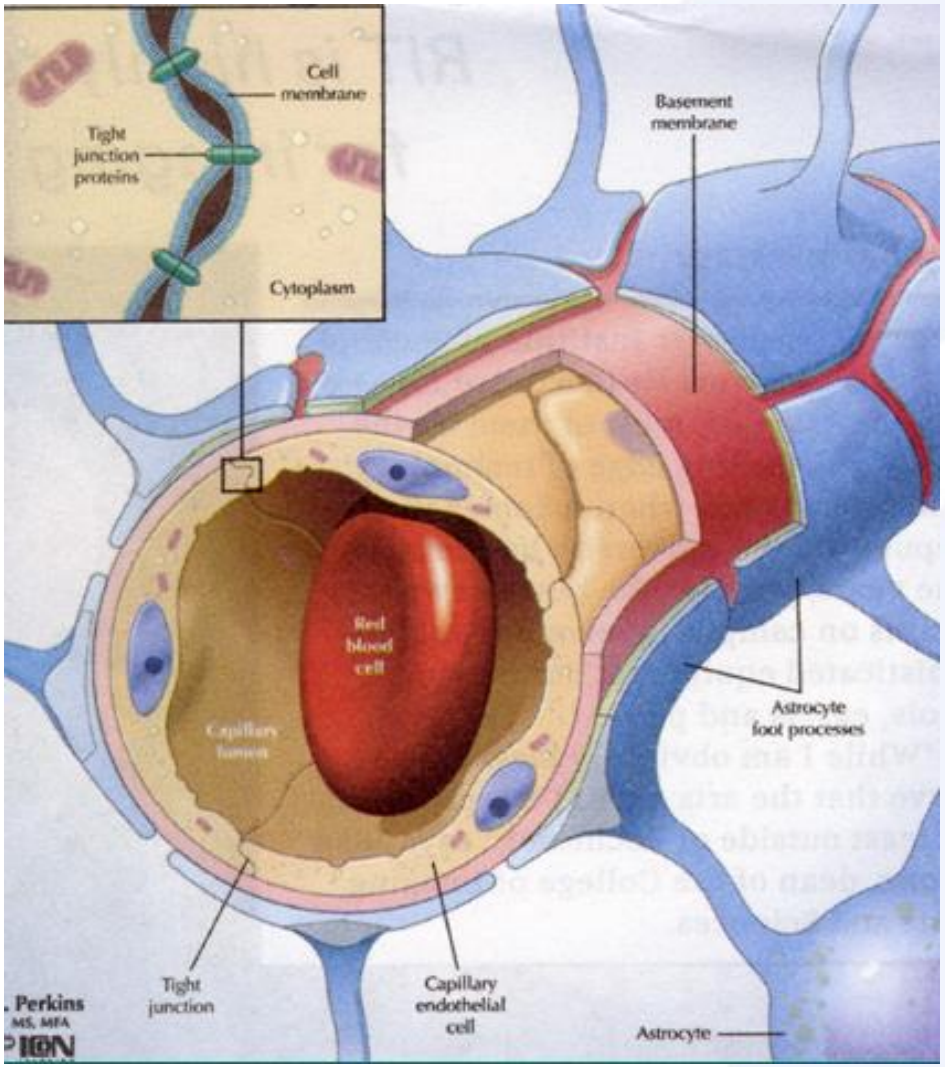
Current literature pertinent to factors necessary for preimplantation development of eggs of mammals is imbued with the essential role played by the maternal organism. Evidence demonstrating the importance of maternal hormones, secretions and decidual reactions for development from fertilization through implantation has been negative in character since it has indicated that early development will not occur in their absence. A direct and positive approach to the problem has been precluded by the fact that efforts to maintain and observe mammalian eggs in vitro from fertilization through implantation have failed.[2] Nevertheless available data seem to warrant the conclusion that the gestational physiology of the mother is a prerequisite for development of the free-living stages and for implantation. There exists, to my knowledge, however, no positive evidence which precludes the possibility that the events of preimplantation development may be autonomous if and when it becomes possible to culture mammalian eggs through these stages.

[1] Finney-Howell Medical Research Fellow on leave of absence from the Department of Zoology, University of Connecticut, Storrs.

[2] The most successful in vitro attempts so far reported have been those of Pincus and Werthessen ('38) who succeeded in maintaining rabbit eggs from early to late blastocysts (requiring 100 hours in utero) and Lewis and Gregory ('29) who filmed continuous development of the rabbit egg. The latter project was accomplished by securing a sequence of stages each of which was kept alive through several cell divisions.

THE ANATOMICAL RECORD, VOL. 98, NO. 1
MAY, 1947

Uveitis starts as blood ocular barrier compromise

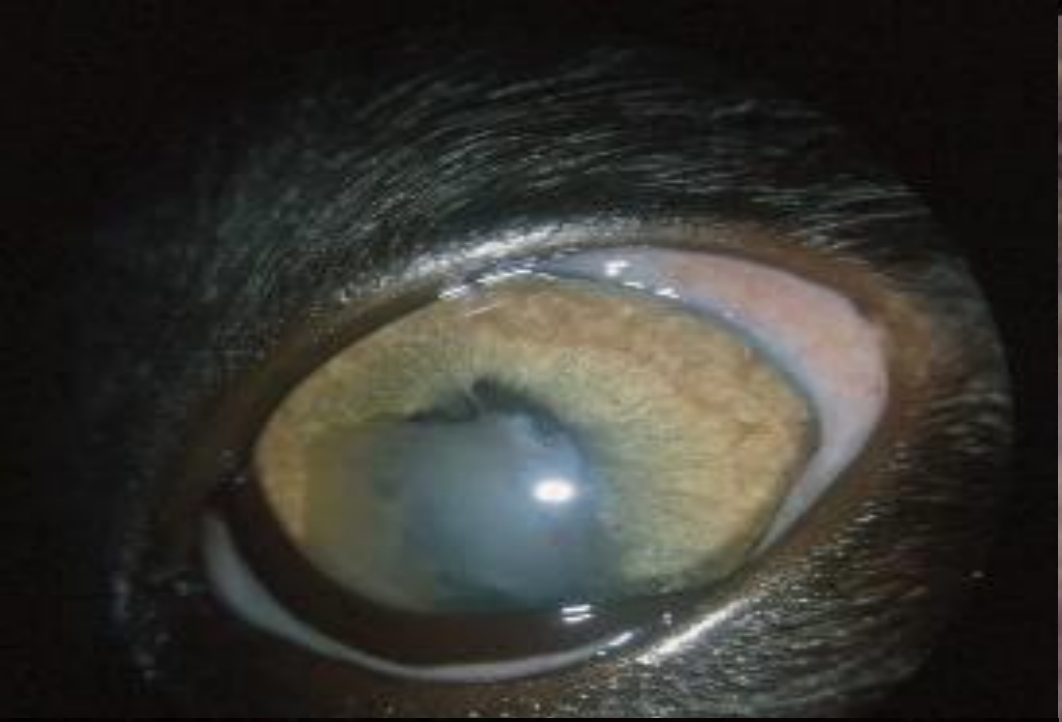


- Blood vessels of iris, ciliary body and choroid become thickened, congested and leaky.
- Cells and mediators enter the eye – PMNs then LCs and inflammatory cytokines

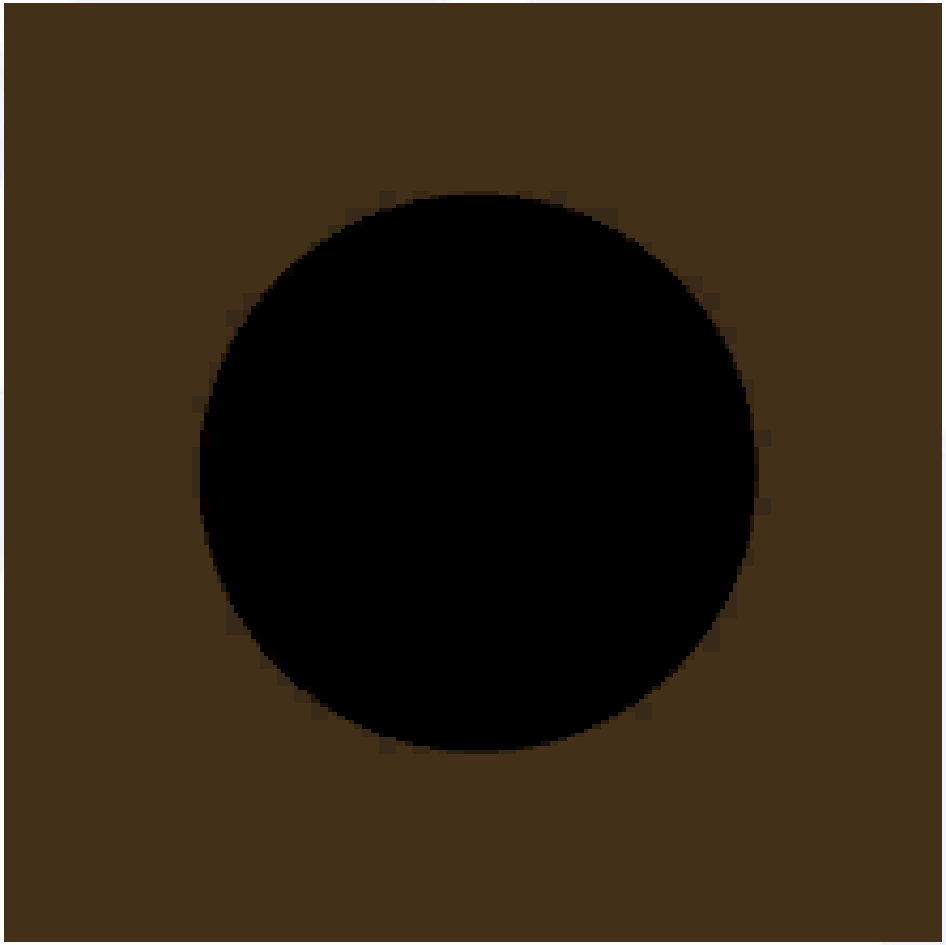
Anterior Uveitis: acute phase

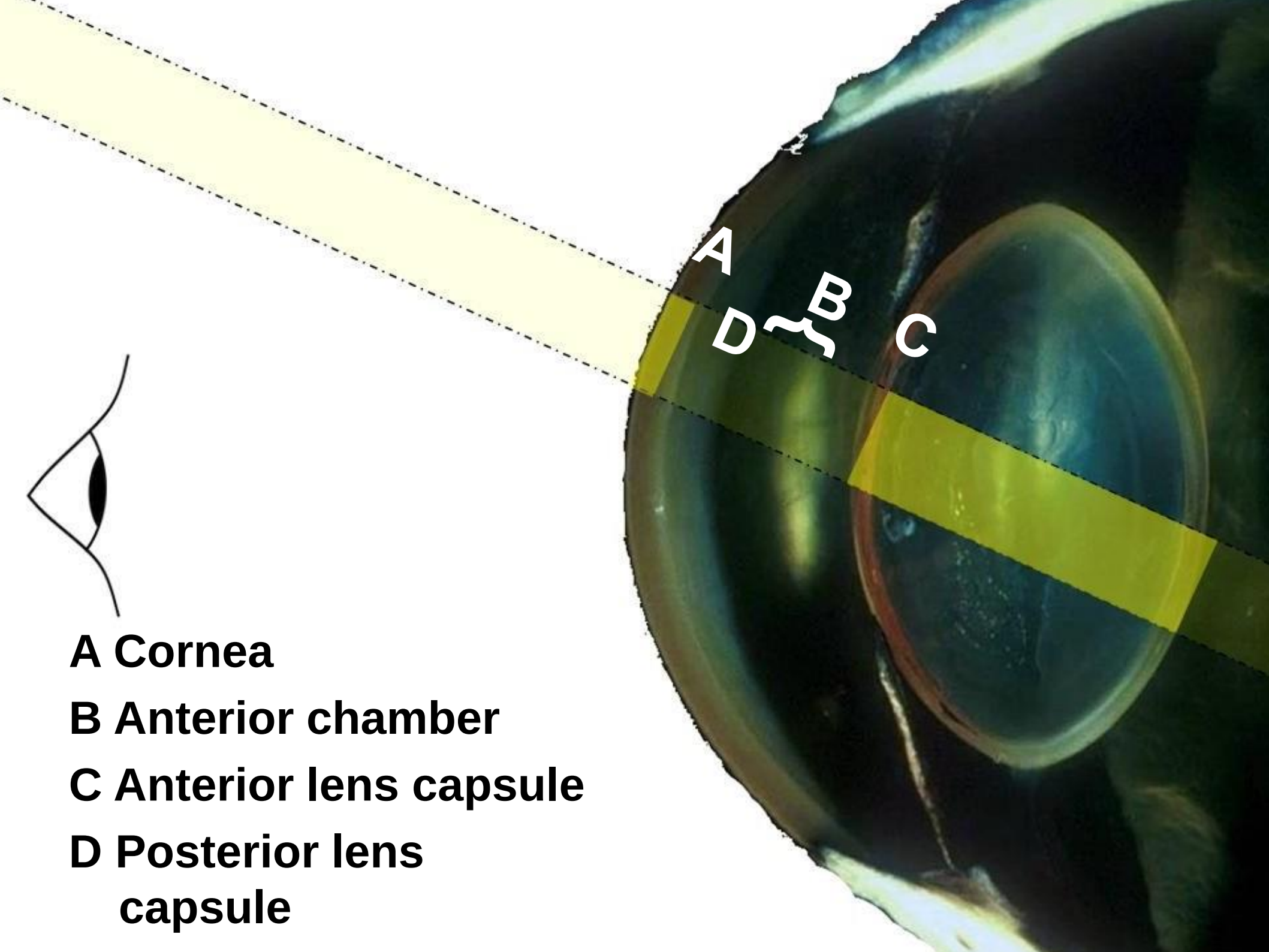
- “Red eye”
- Miosis
- Swollen iris
- Change iris colour
- Pain (Enophthalmos, serous disharge, photophobia)
- Reduced IOP
- Aqueous flare
- +/- Hyphema

- Later phase changes:
- Anterior chamber exudates (hypopyon)
- Posterior synechia
- Pigment on anterior lens capsule




Aqueous flare



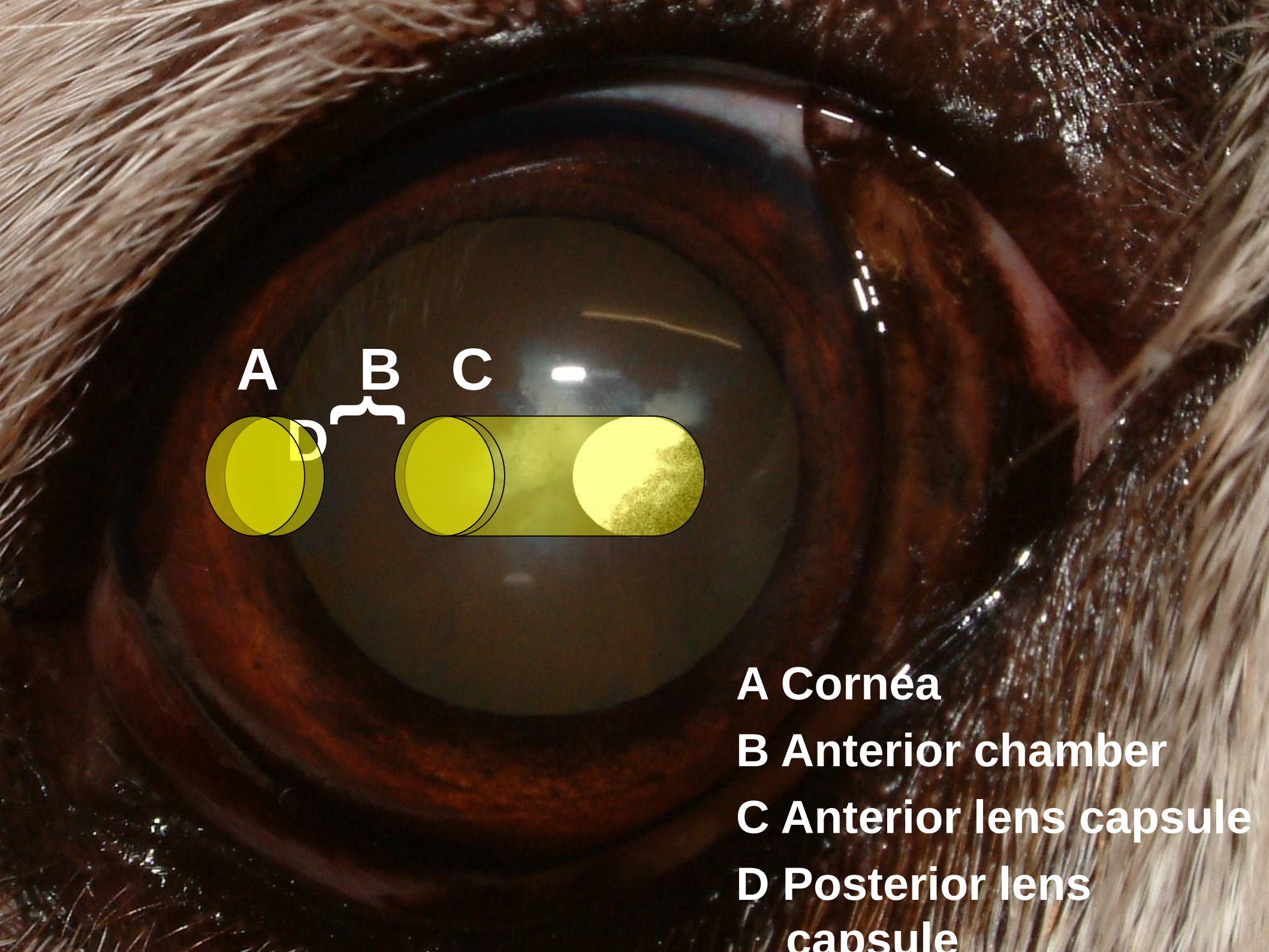


A Cornea

B Anterior chamber

C Anterior lens capsule

D Posterior lens capsule



A Cornéa

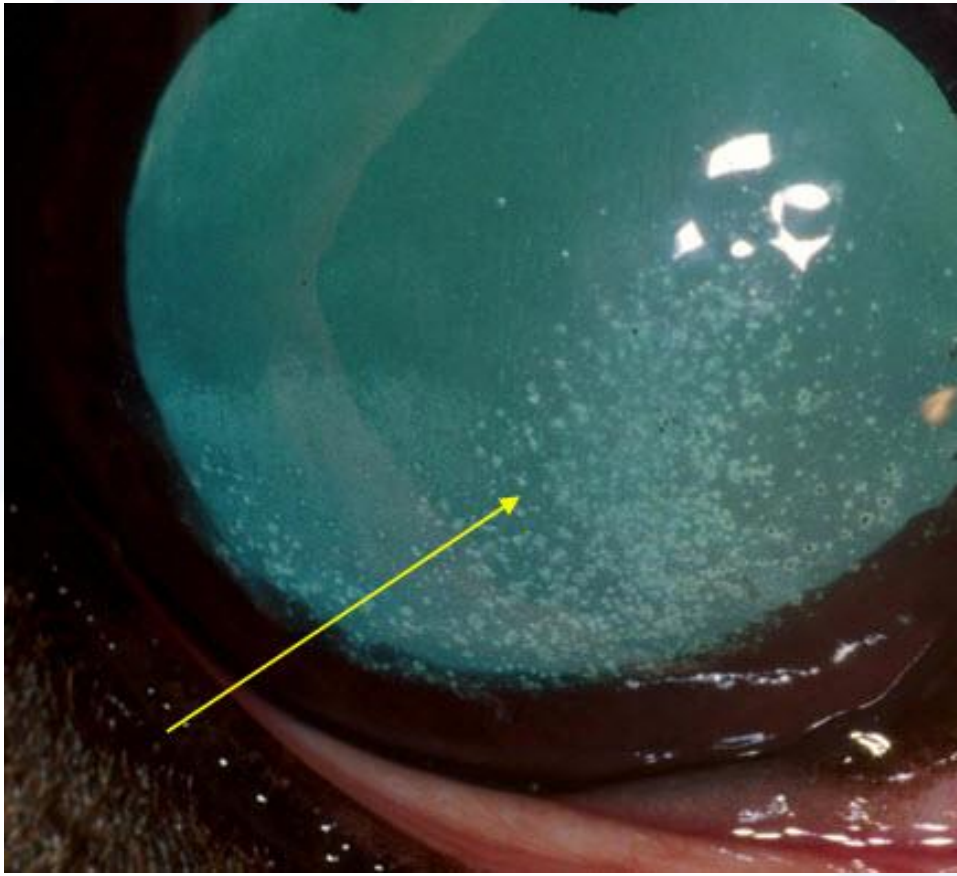
B Anterior chamber

C Anterior lens capsule

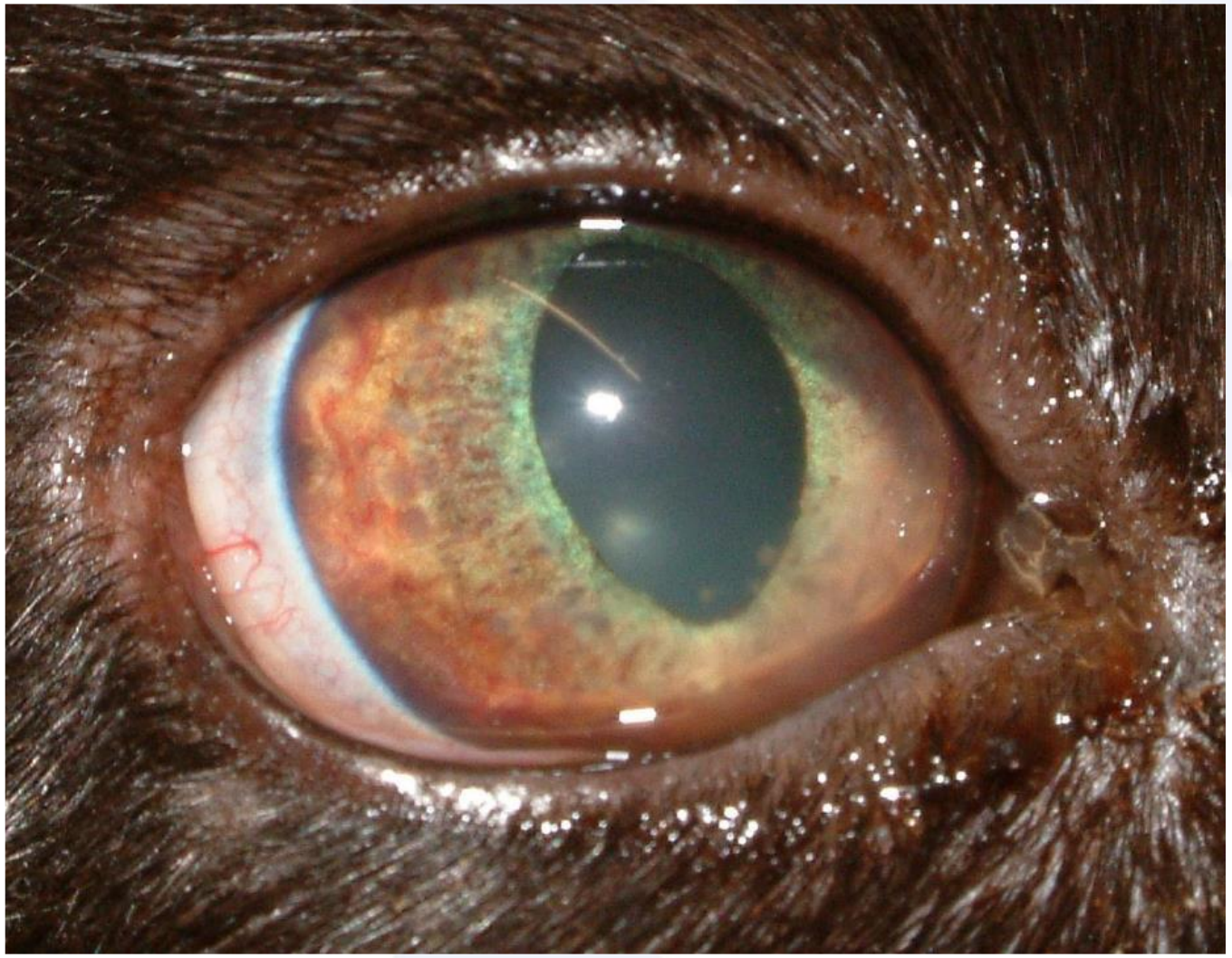
D Posterior lens capsule

Chronic anterior uveitis

- Keratitic precipitates
- Iris hyperpigmentation
- Loss iris architecture
- Synechiae (iridal adhesions)
- Cataract (sub capsular)



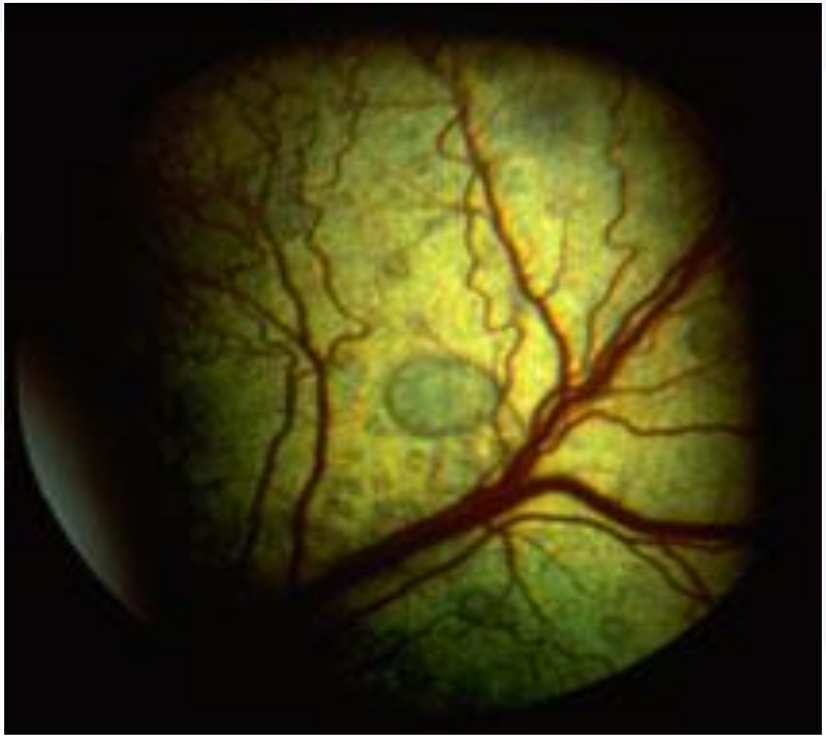
Lymphocytic uveitis

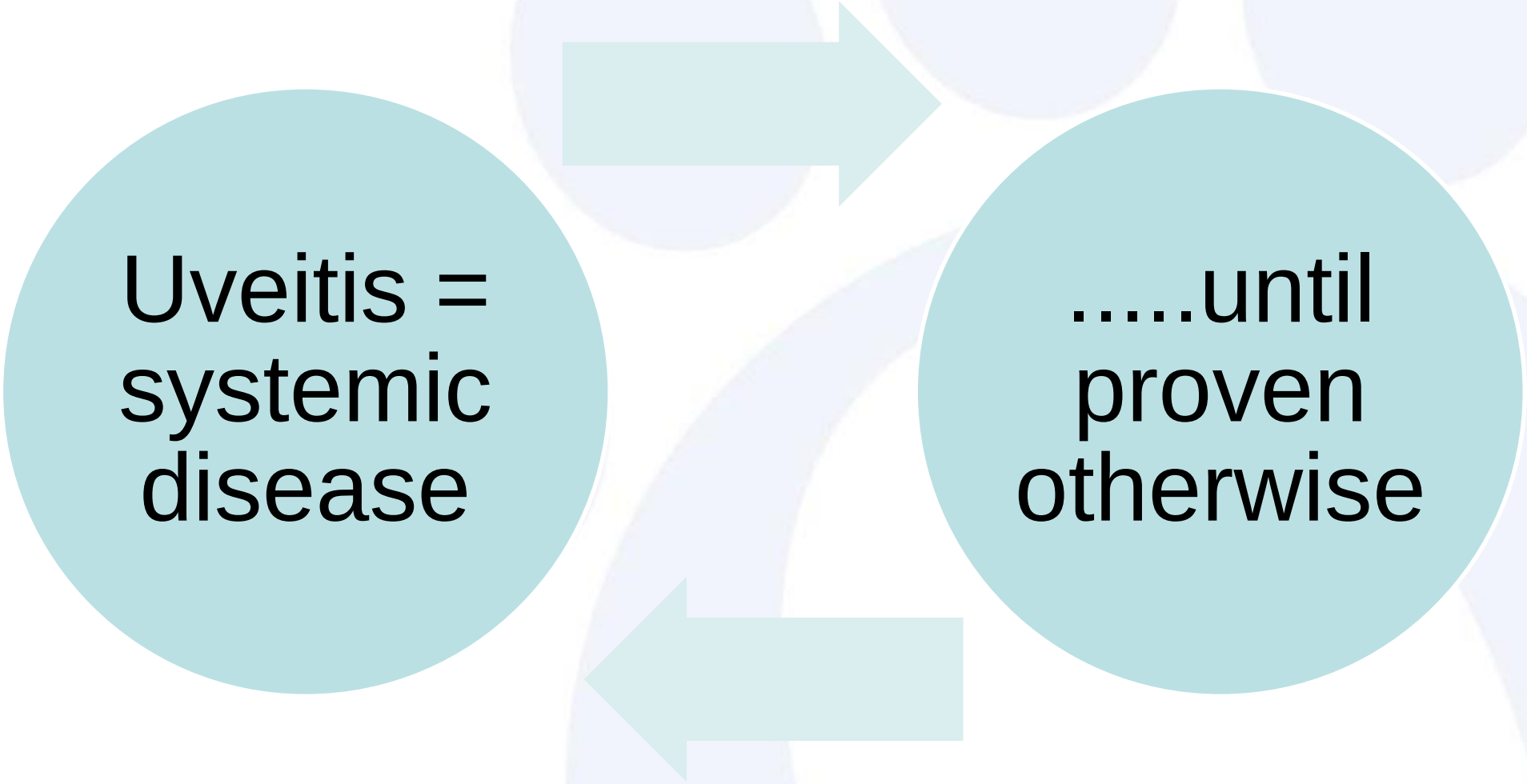


Posterior uveitis (chorioretinitis)

- HYPO reflective lesions in tapetum
- White/grey areas in non-tapetum
- Perivascular cuffing
- Retinal detachments
- Retinal hemorrhage

CDV




Uveitis = systemic disease
.....until proven otherwise

Causes of uveitis

Systemic disease

ANY	• Toxaemia • bacteraemia
Cats	• FeLV • FIV • Toxoplasma (FIV) • FIP
Dogs	• Toxoplasma, neospora • pyometra

Trauma

Sharp	• Cat scratch • Black thorn
Blunt	• RTA etc
Extension or periorb dz	• Retrobulbar mass • Abscess

Treatment

- Identify and eliminate cause if possible
  - E.g. phacoemulsification if lens induced
- Steroids
  - Prednisilone topically and or per os
- Atropine
  - Stabilises blood ocular barrier
  - Relieves miosis

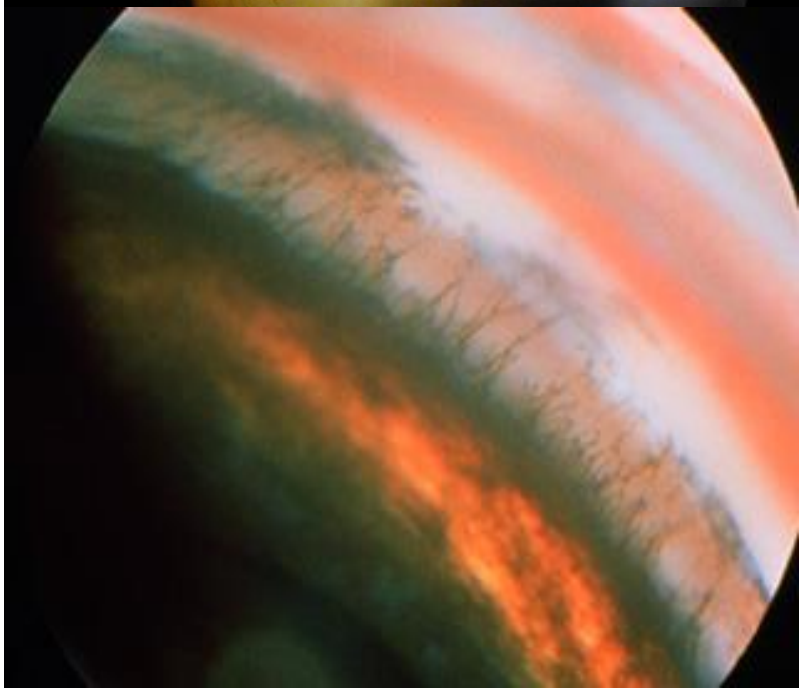
Prognosis

- Cause dictates
- Progression to:
  - 2nd glaucoma
  - Cataract
  - Retinal detachment

Glaucoma

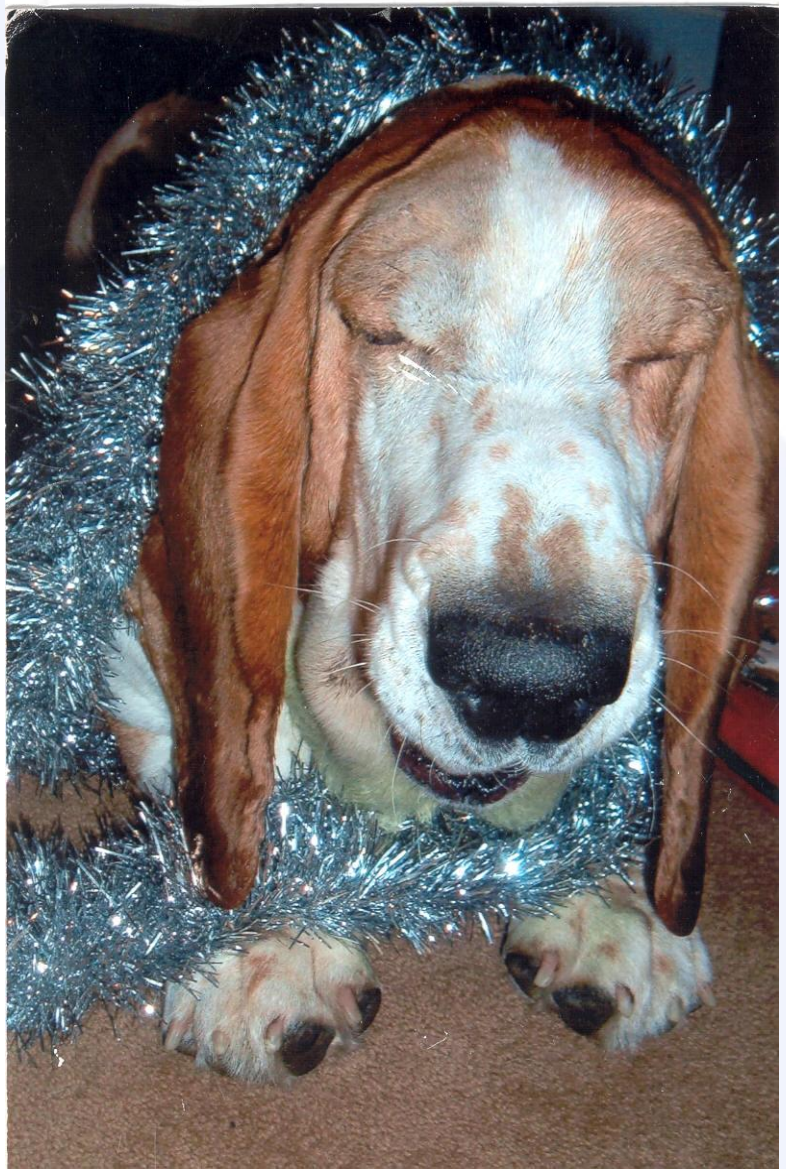
- What is glaucoma?
- Clinical signs?
- Treatment
  - Medical
  - Increase drainage
  - Destroy CB
  - Primary lens luxation


corbis



Our greatest challenge

- Commonest reason for enucleation
- Commonly bilateral
- Painful
- First eye often blind before second presents
- Medication expensive and doomed to failure
- Surgical options carry best long term prognosis



What causes glaucoma?

- Blocked drains
- Primary
- Secondary
  - Lens luxation
  - Uveitis eg cataracts
  - Neoplasia
  - Trauma

Breed predispositions:

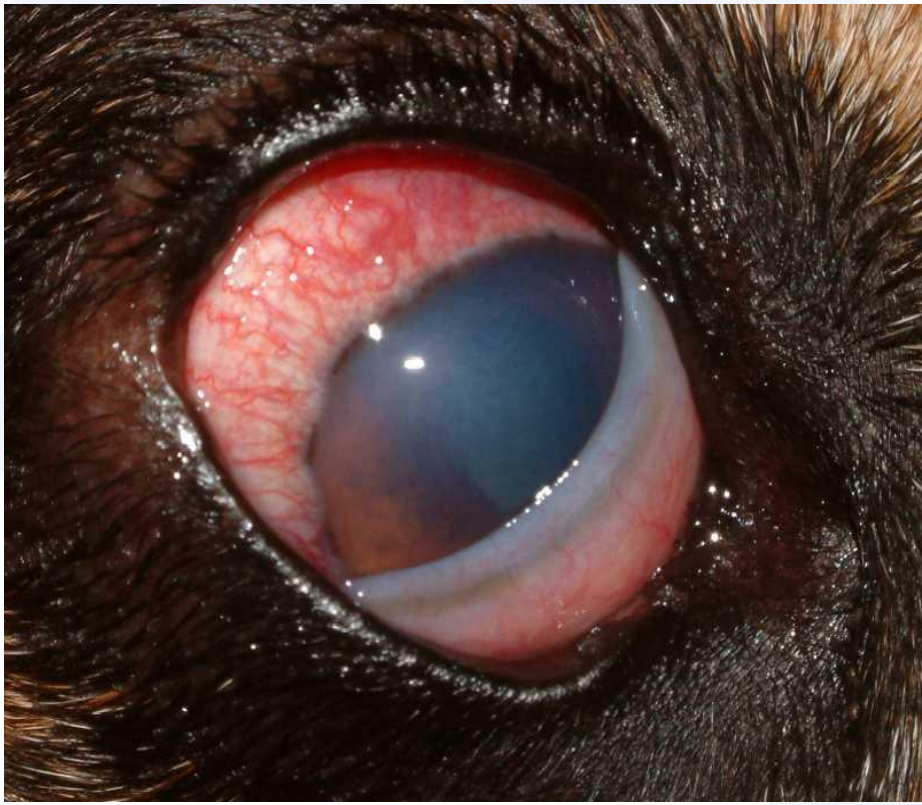
Afghan Akita Alaskan Malamute Basset Hound Beagle Border Collie Boston Terrier Bouvier des Flanders Chihuahua Cocker Spaniel Cairn Terrier Corgi, Cardigan Welsh Corgi, Pembroke Welsh Chow Dachshund Dalmatian Dandie Dinmont Terrier English Springer Spaniel Fox Terrier, Smooth-coated Fox Terrier, Wire-haired Great Dane Maltese Manchester Terrier Miniature Pinscher Norfolk Terrier Norwegian Terrier Norwich Terrier Poodle Saluki Schnauzer, Giant Scottish Terrier Sealyham Terrier Siberian Husky Samoyed Shih Tzu Skye Terrier Tibetan Terrier Welsh Terrier Welsh Springer Spaniel West Highland White Terrier Whippet

Some cat breeds with a predisposition are:

Persians Siamese Some Domestic Shorthairs

Signs of glaucoma:

- Dogs with glaucoma always have uveitis
- +/- dilated pupil
- Corneal oedema
- Episcleral congestion
- Pain (Terriers)
- Hints:
  - Early ***diagnosis*** essential
  - You can't guess IOP
  - Get a tonometer (cotton bud)
  - Always have a bottle of travatan somewhere in the practice

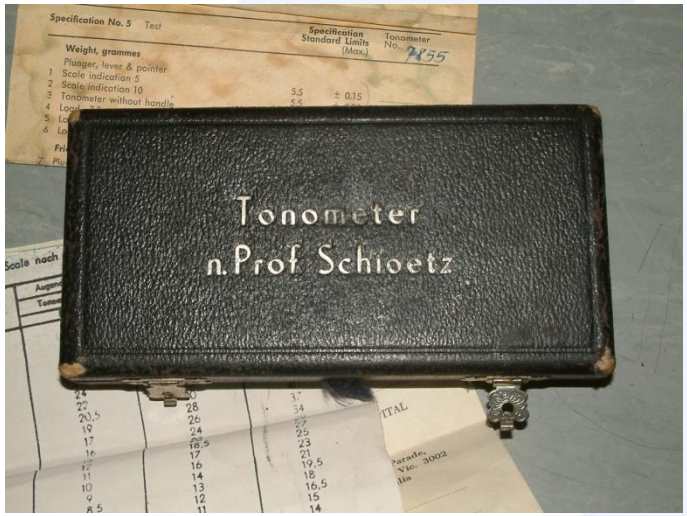


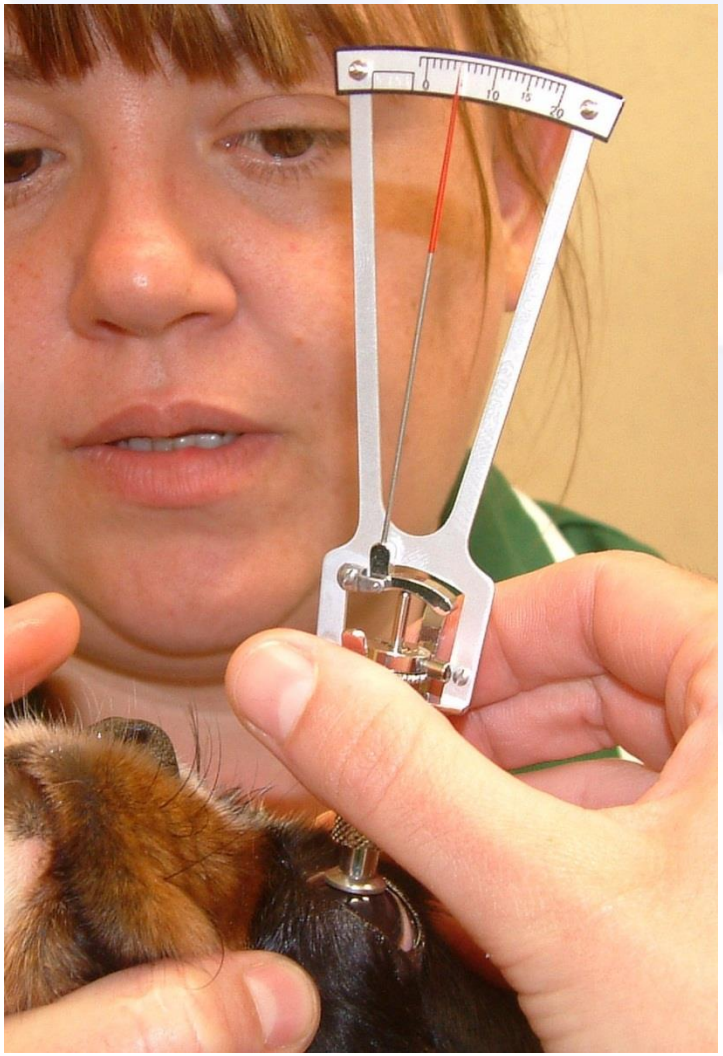
- *Uveitis or Glaucoma?*

Tonometry: Tonovet

Tonometry: Tonopen

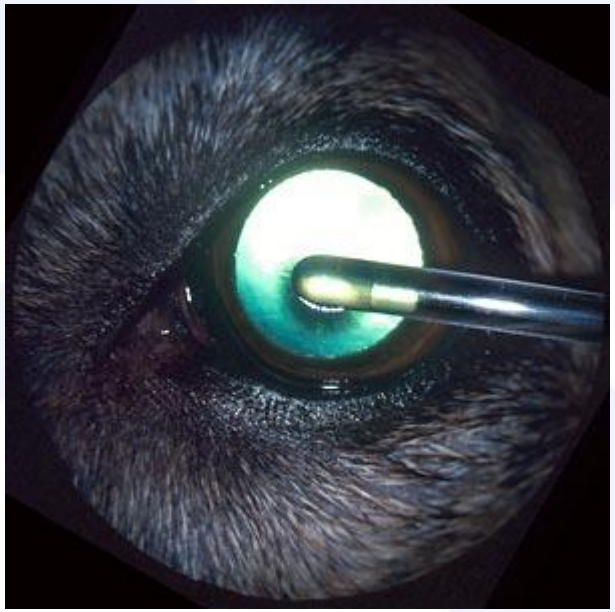
Tonometry: Shiotz





Tonometry: Cotton bud

- ***Gentle*** indentation of the eye at or just caudal to the limbus allows an estimate of intra-ocular pressure to be made.



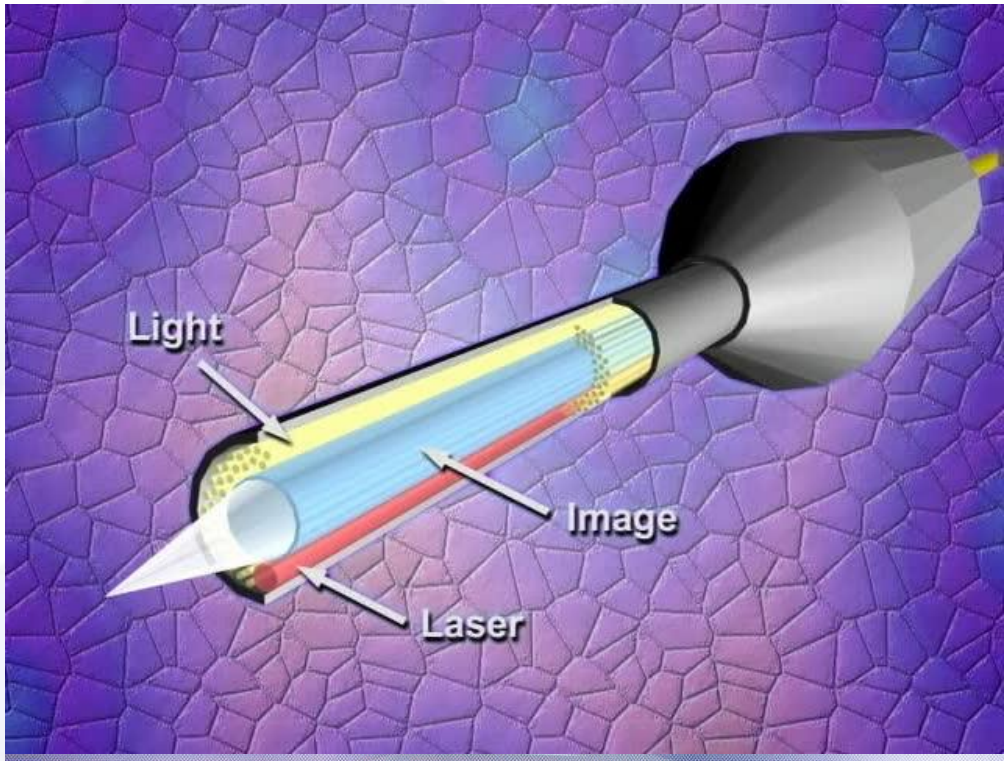
Medical treatment

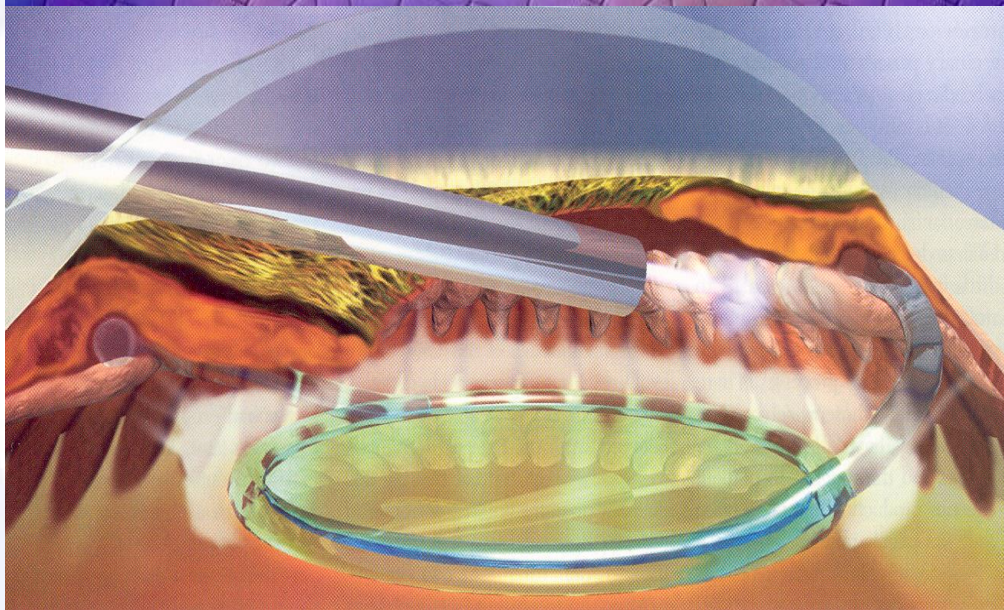
- Doomed to failure!
- Aims:
  - Reduce production
  - Increase outflow
  - Reduce uveitis
  - Protect retina

- Prostaglandins
- Carbonic anhydrase inhibs
- Beta blockers

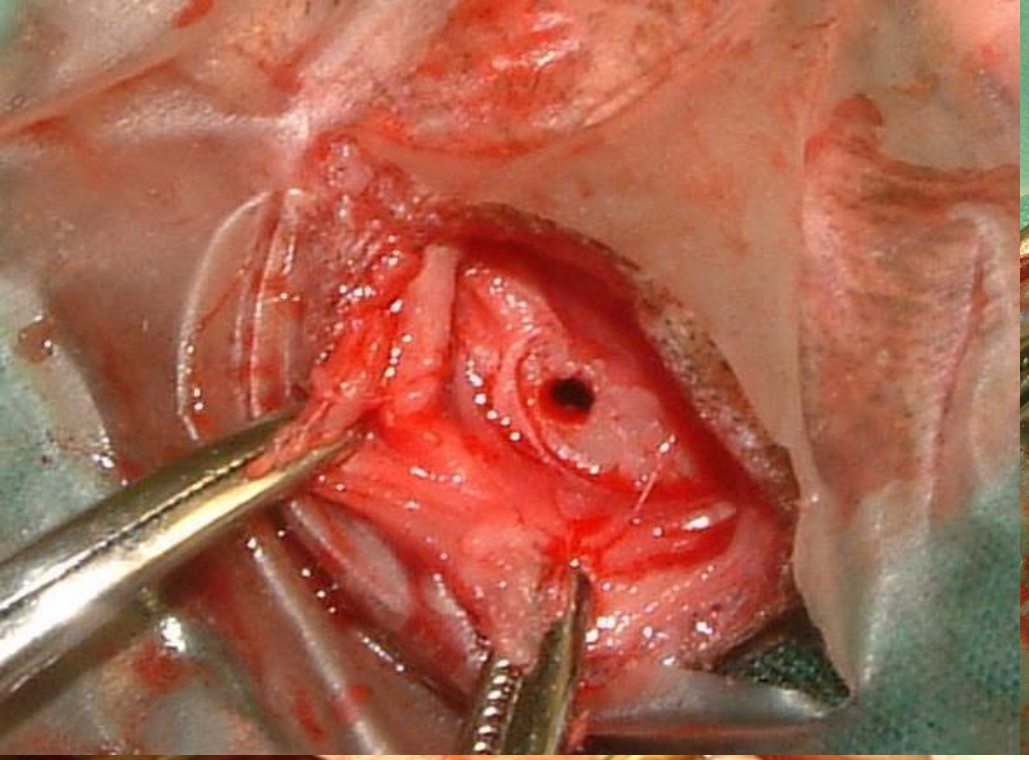
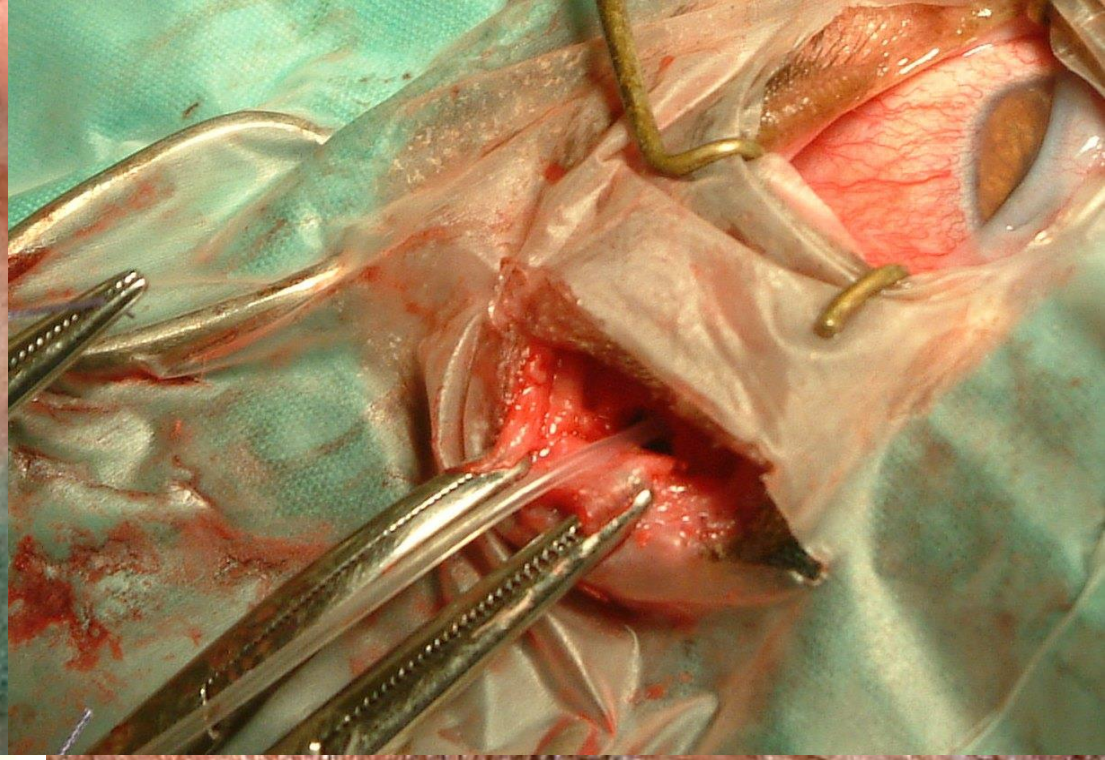
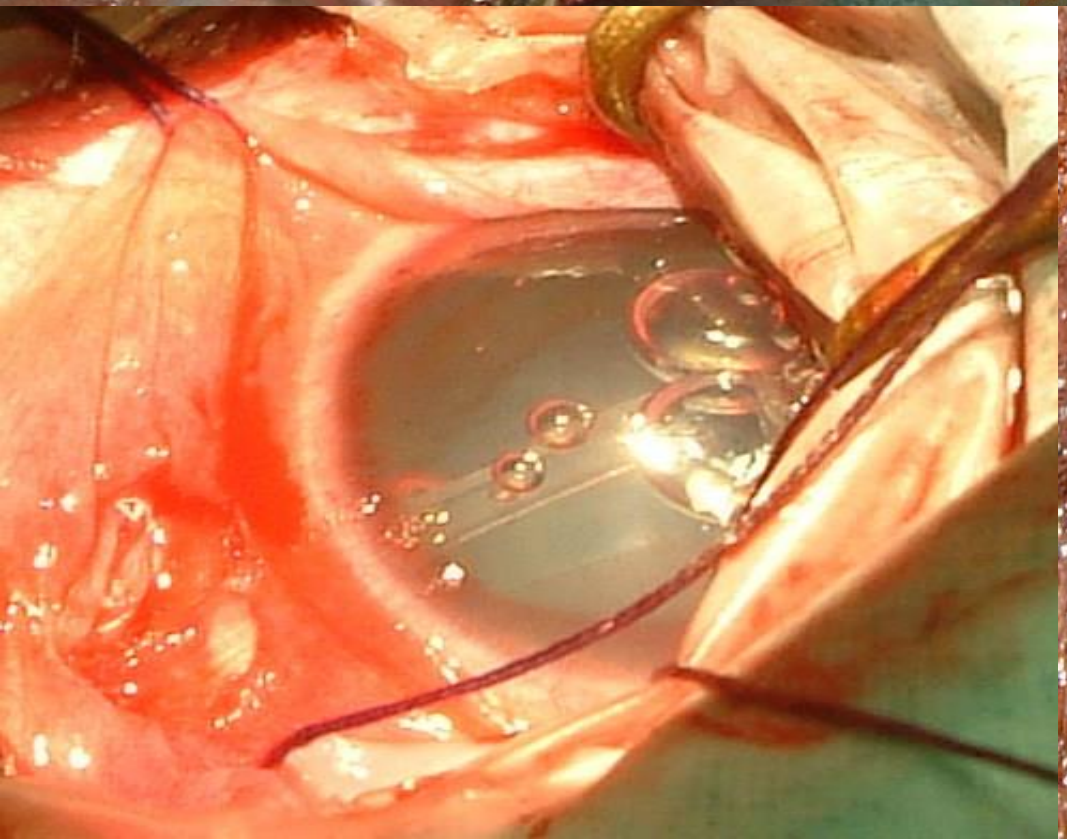
Surgery: Decrease production

Endoscopic cyclophotocoagulation ECP

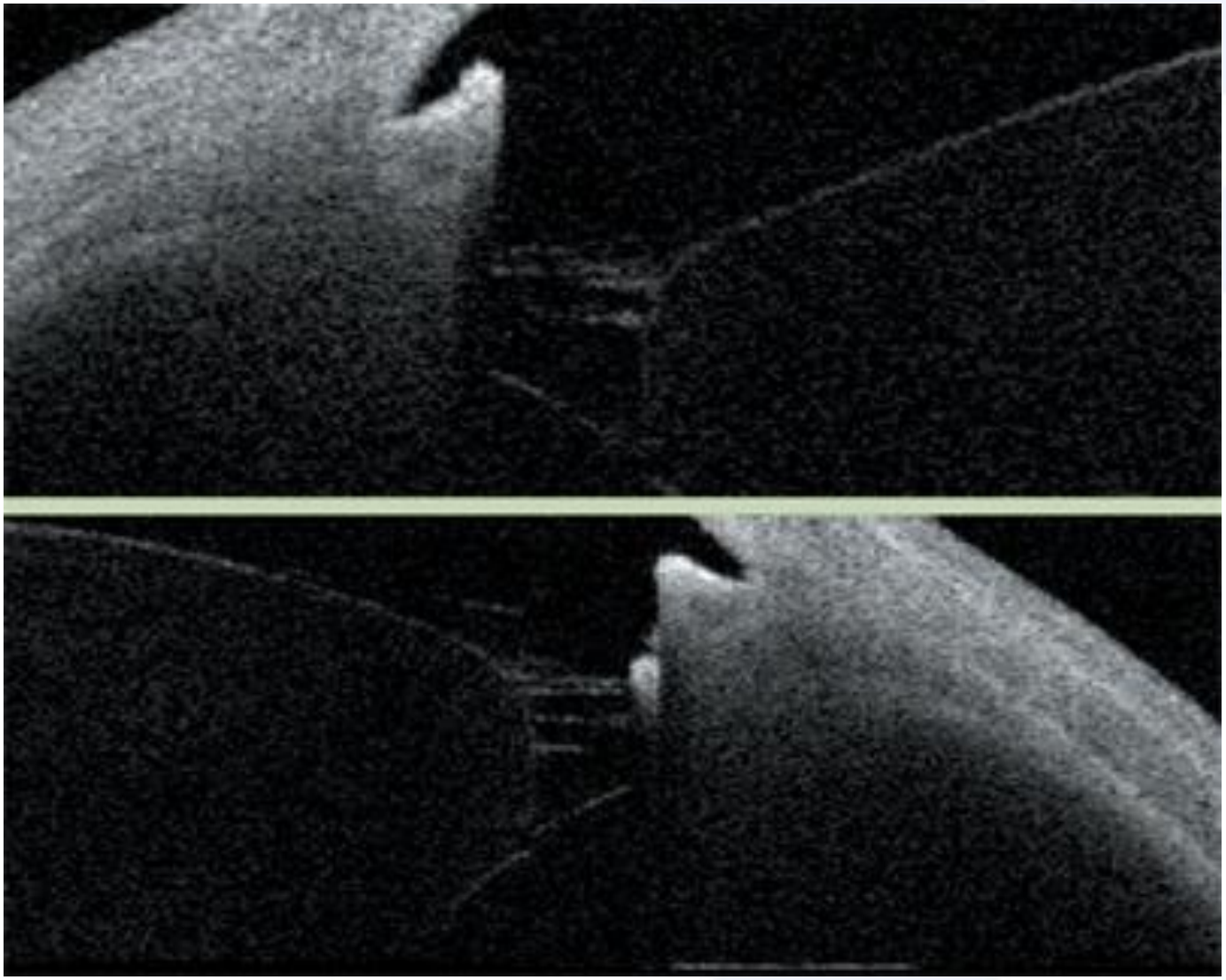


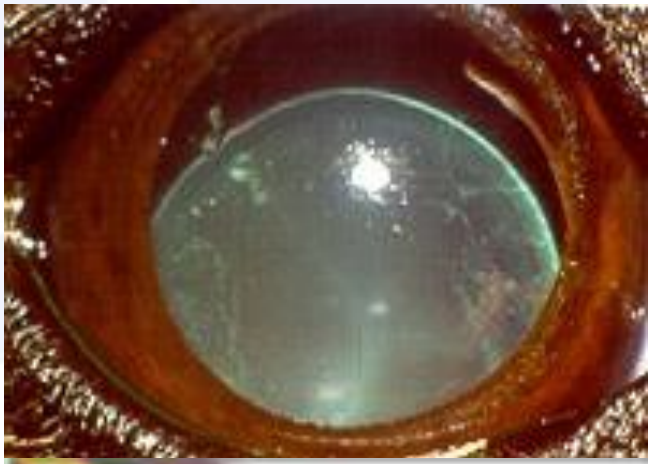


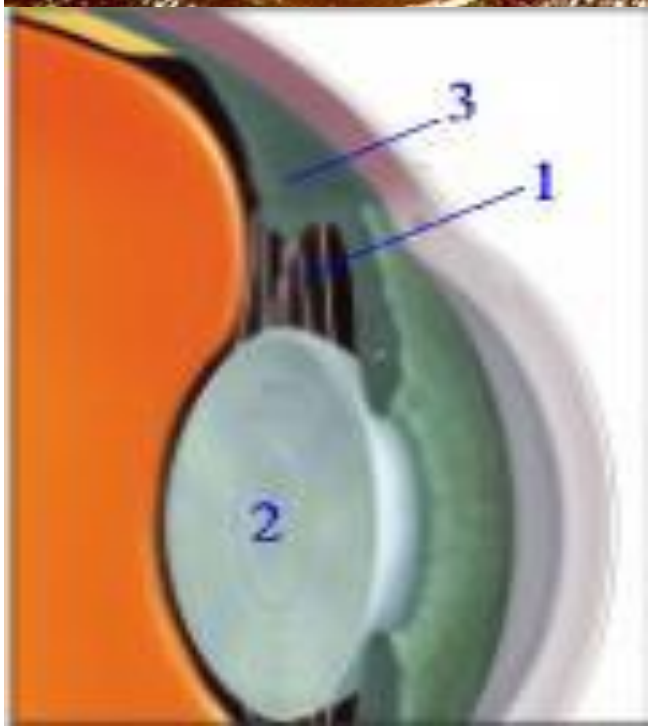
Surgery: Increase drainage
Glaucoma shunts


Primary lens luxation





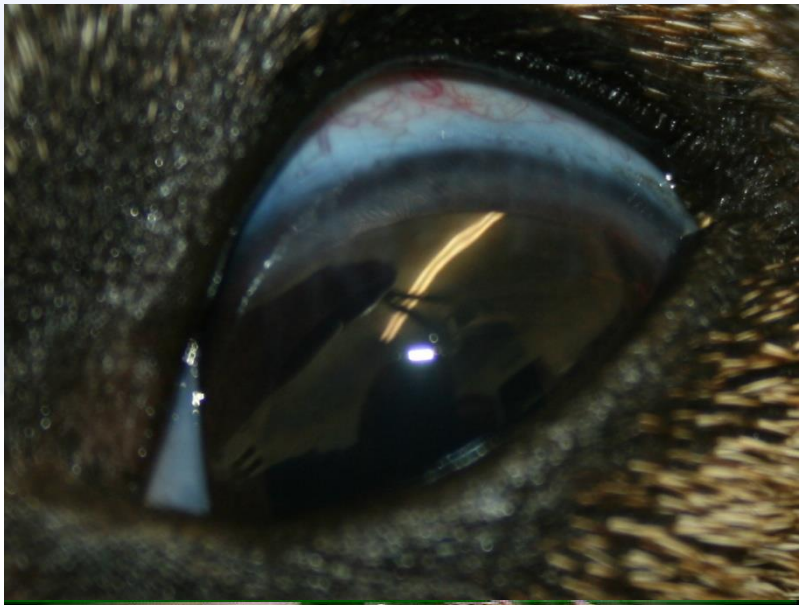


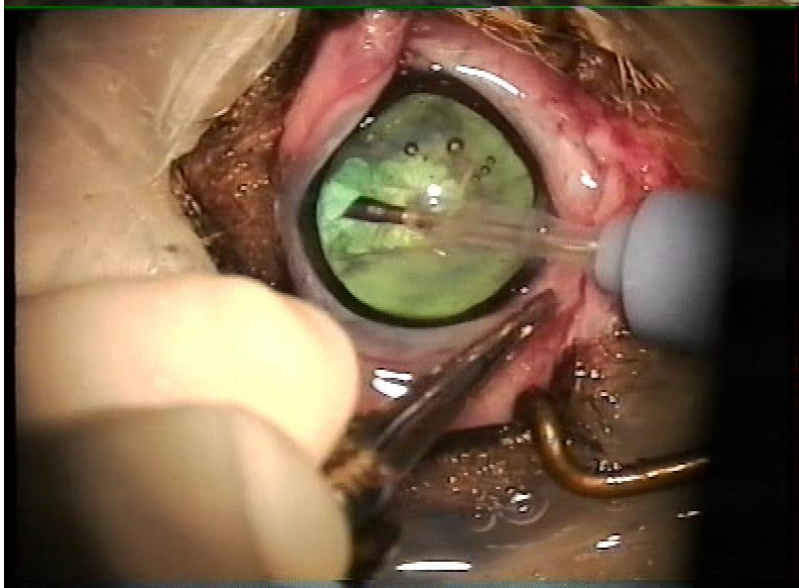
Primary lens luxation

- Ophthalmic emergency
- Terrier breeds
- Collies
- Head shaking exacerbates
- Often presents when 2nd eye goes
- Often glaucoma in “normal eye” due to subluxated lens
- Prognosis related to stage diagnosis
- Long term glaucoma risk despite surgery

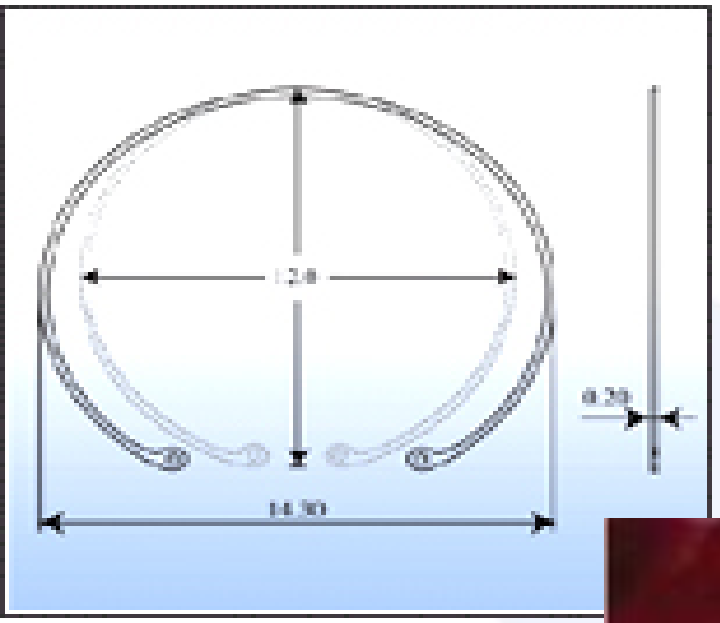
Primary lens luxation

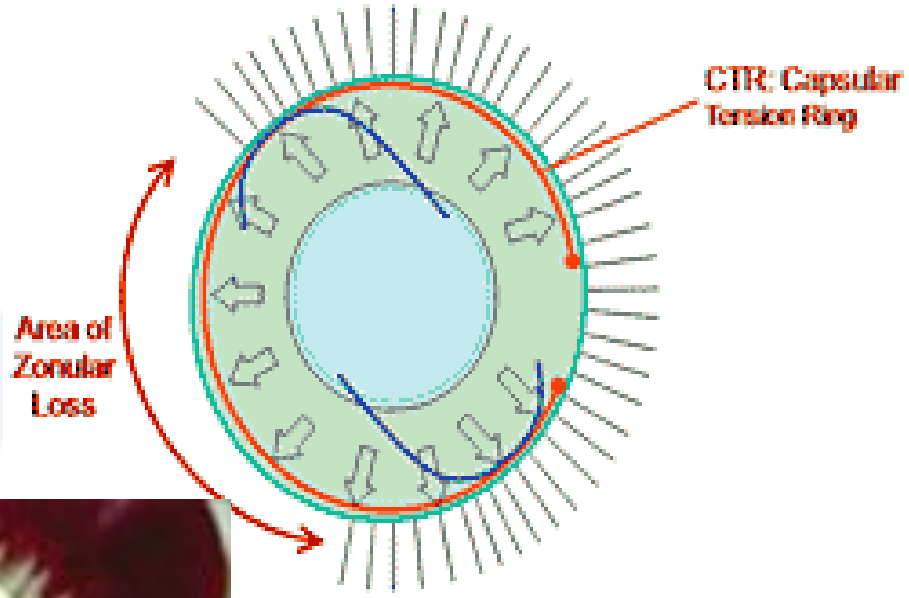
- Luxated lenses:
  - Emergency procedure
  - Open sky technique traditional
  - Phacolensectomy quicker healing & better long term prognosis
  - Sutured IOL possible
- Sub luxated lens:
  - Better prognosis
  - Elective
  - IOL and CTR may be poss
  - Travatan (TWICE daily)



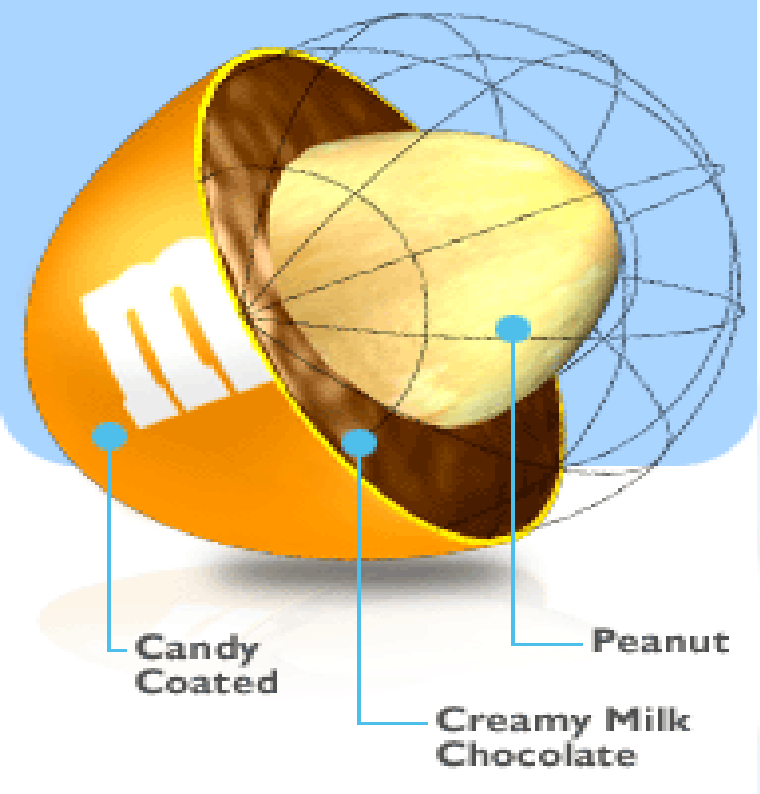


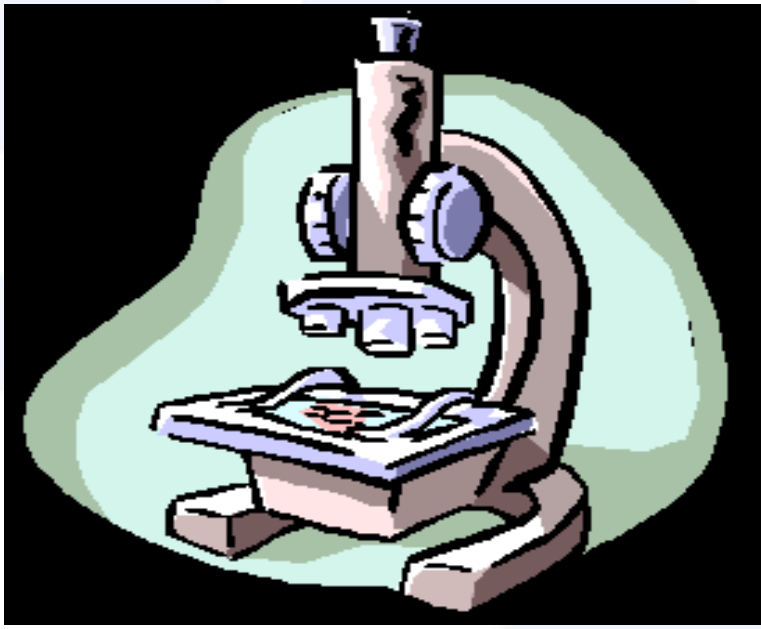
Capsular tension rings

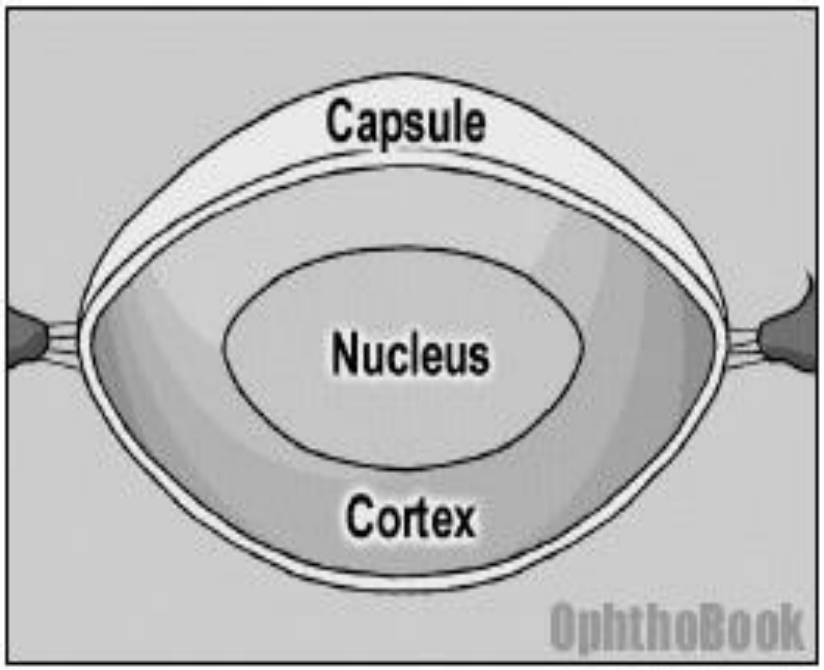


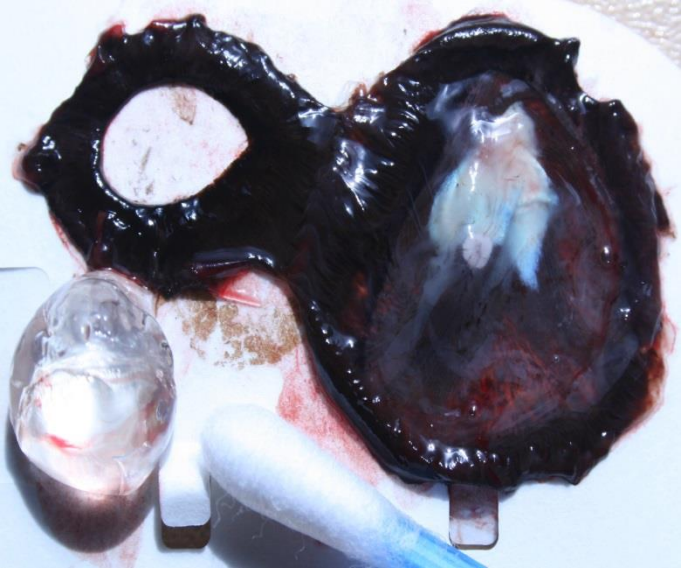


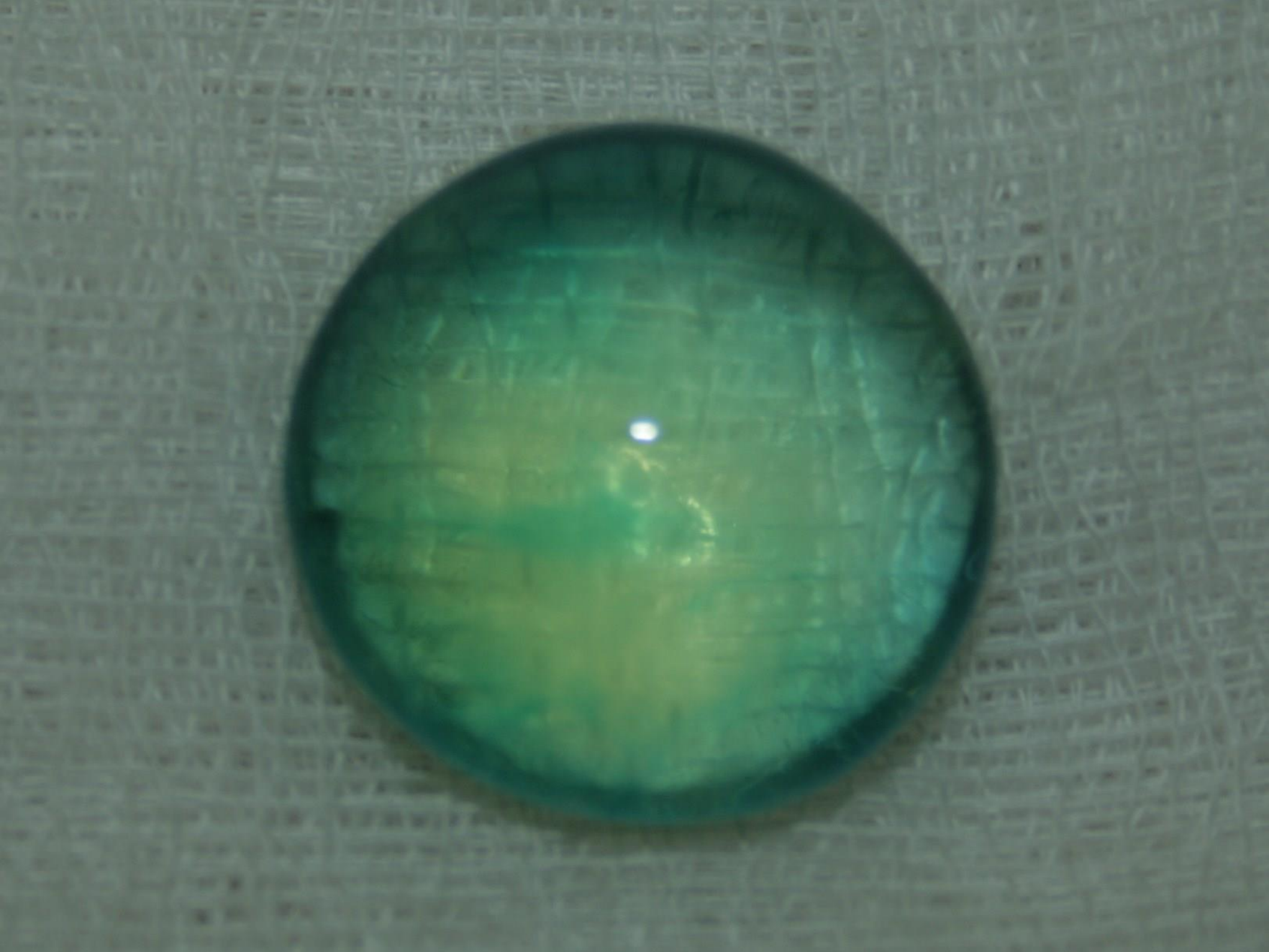
The lens

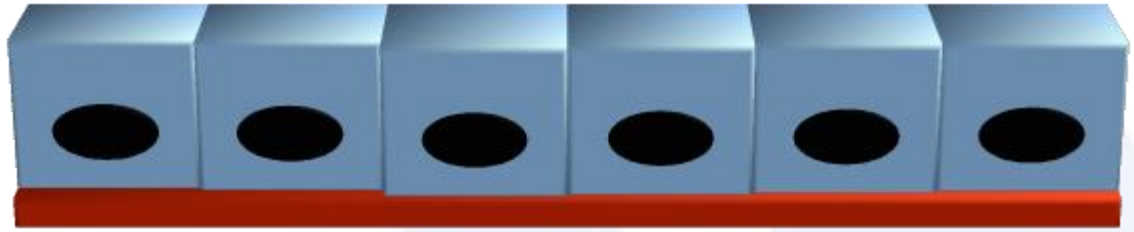

Candy Coated
Peanut
Creamy Milk Chocolate

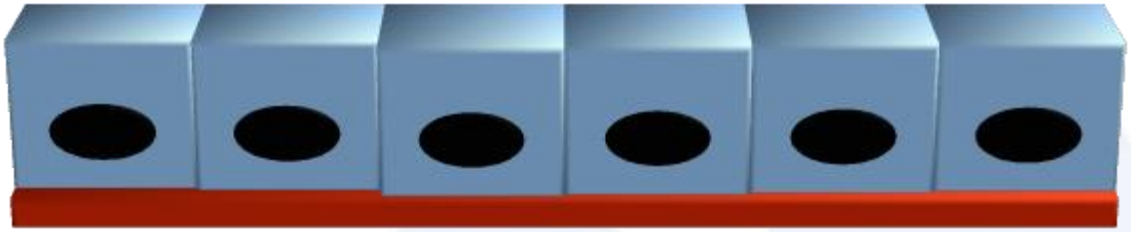


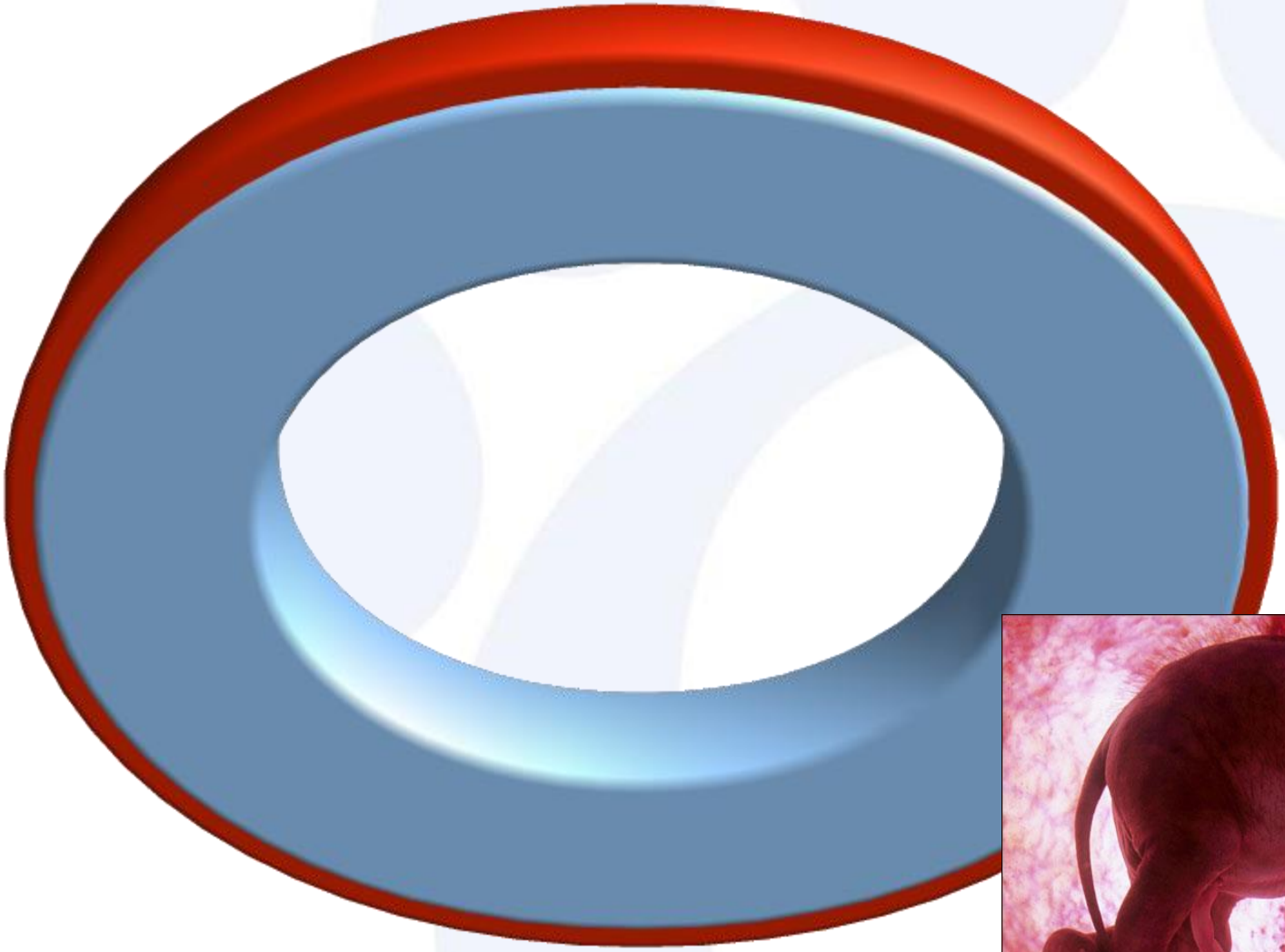

Capsule
Nucleus
Cortex
OphthoBook

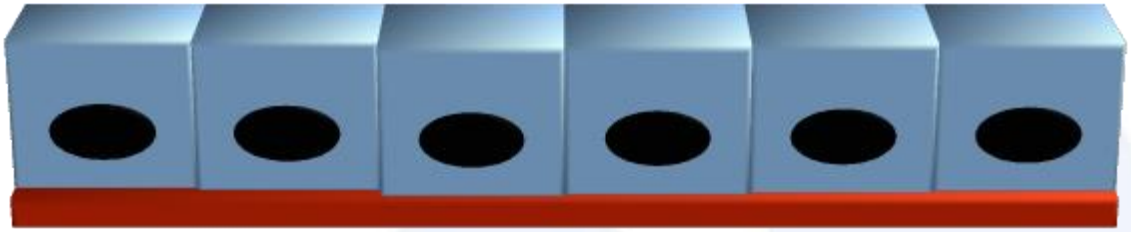


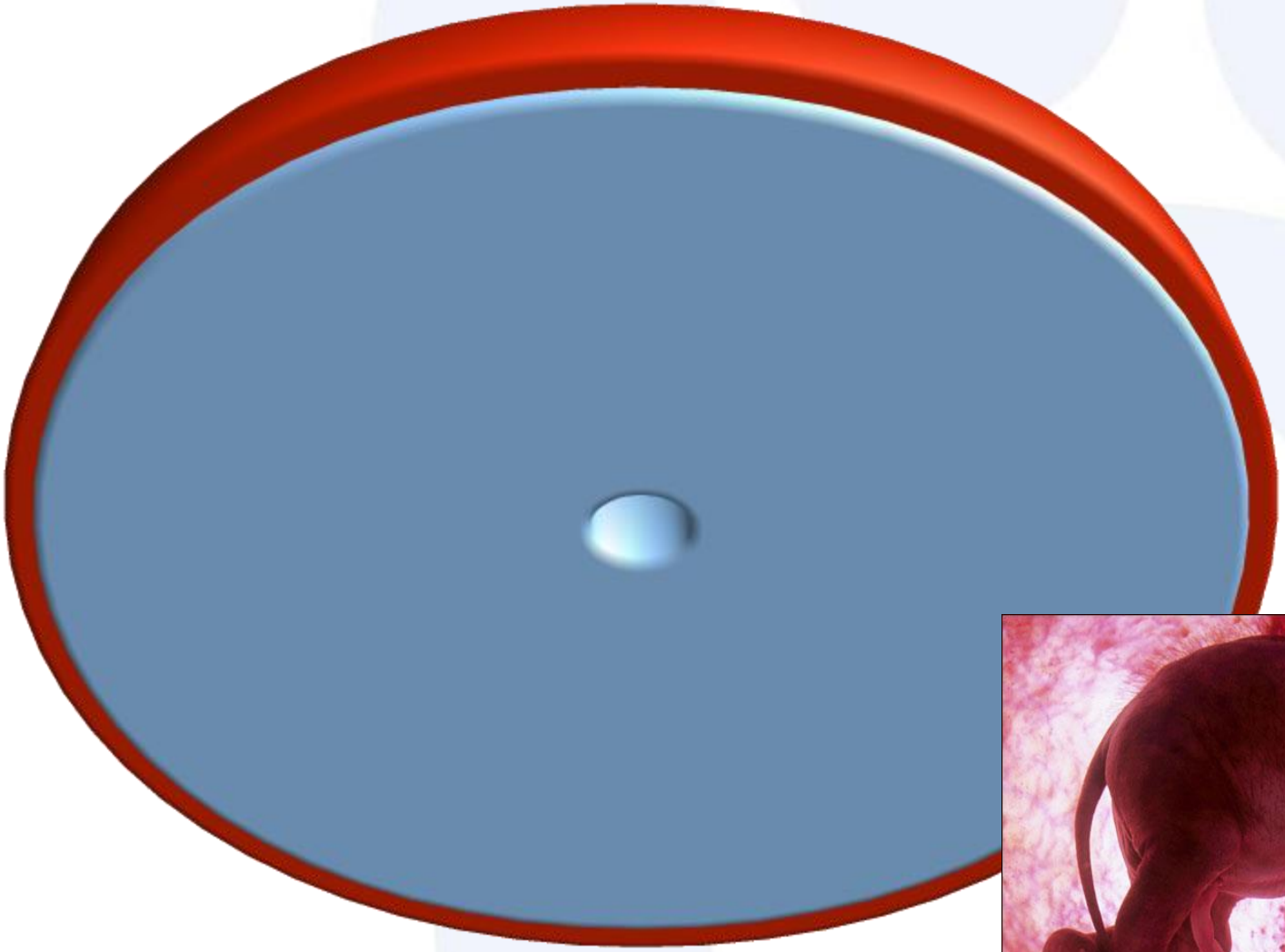


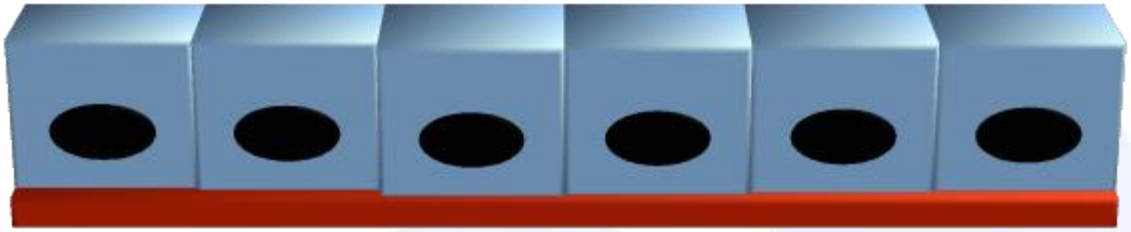


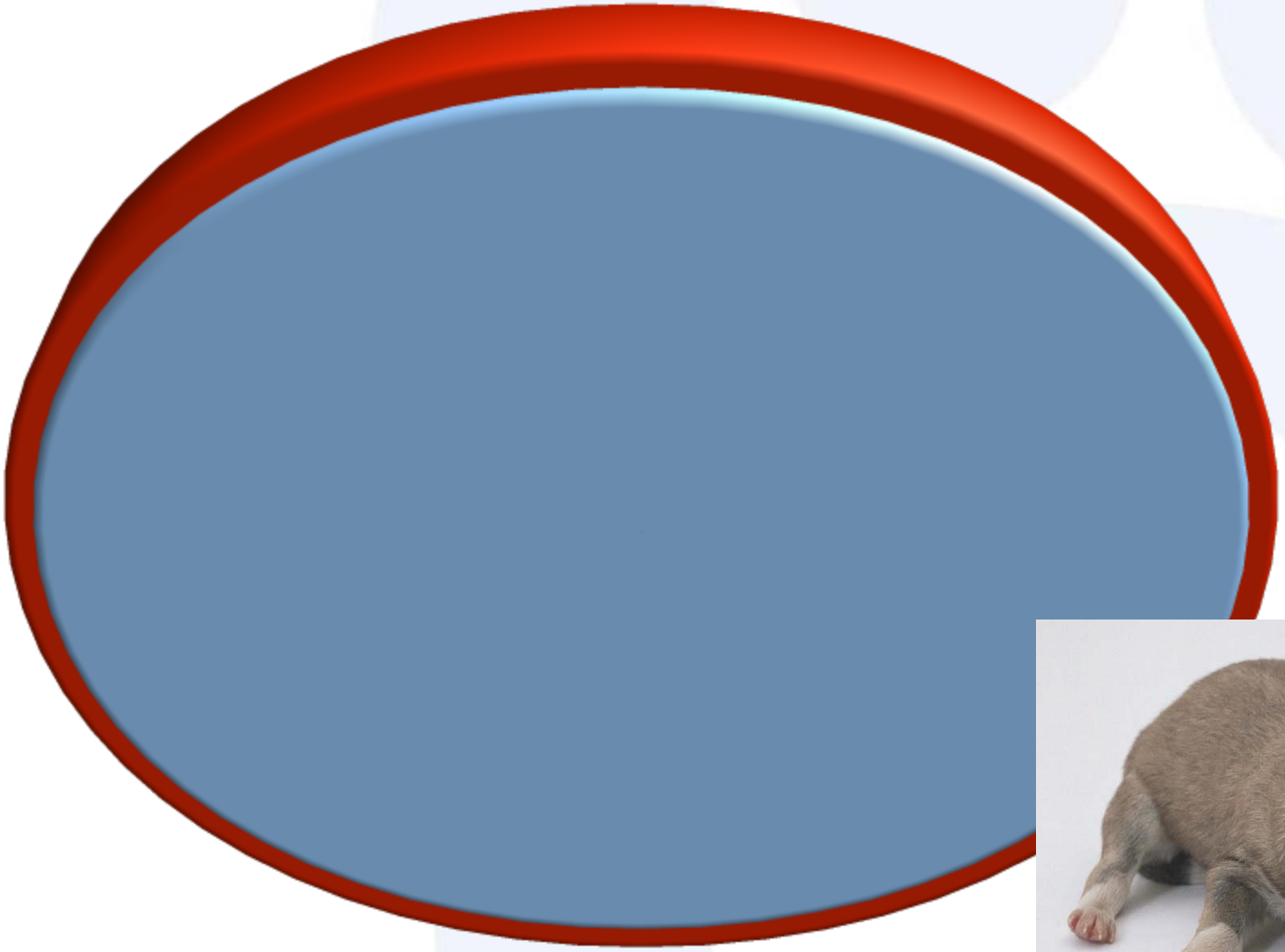


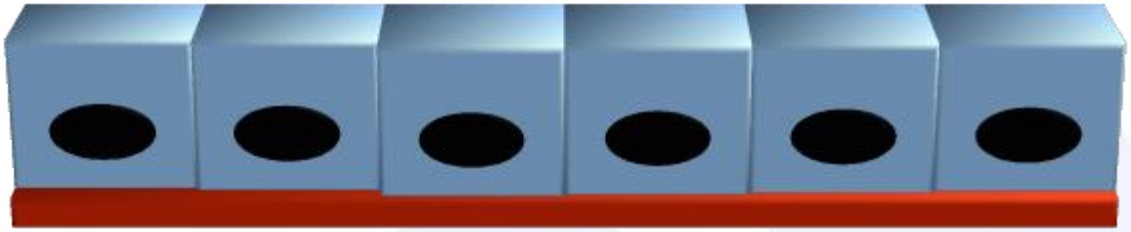


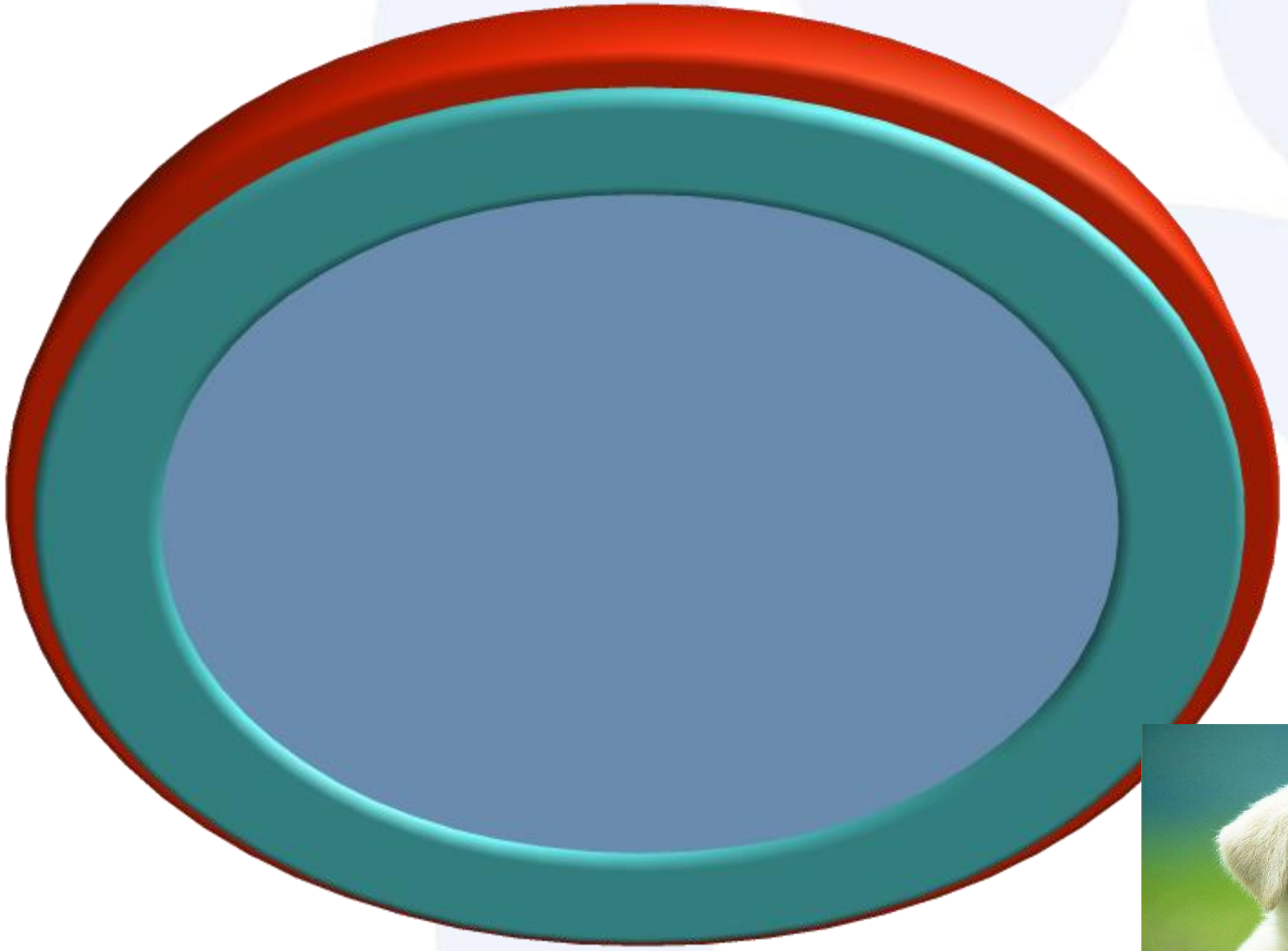


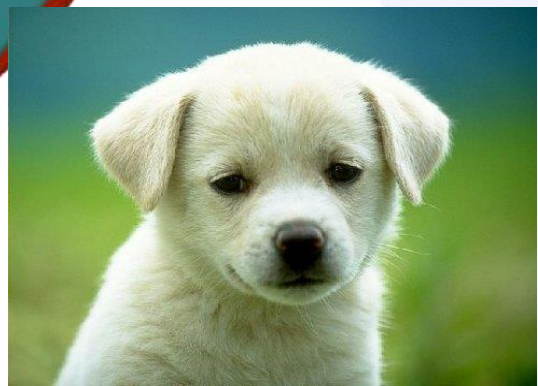


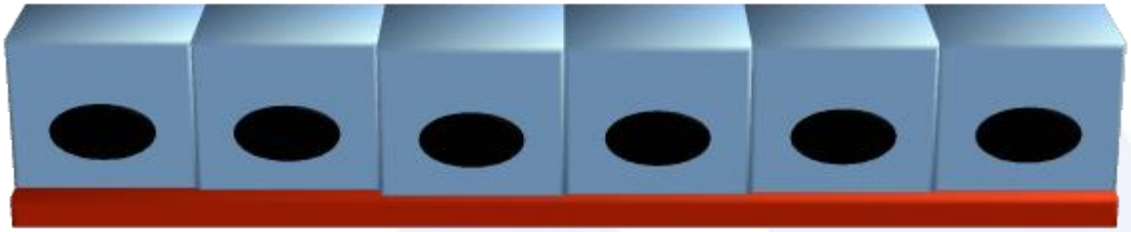


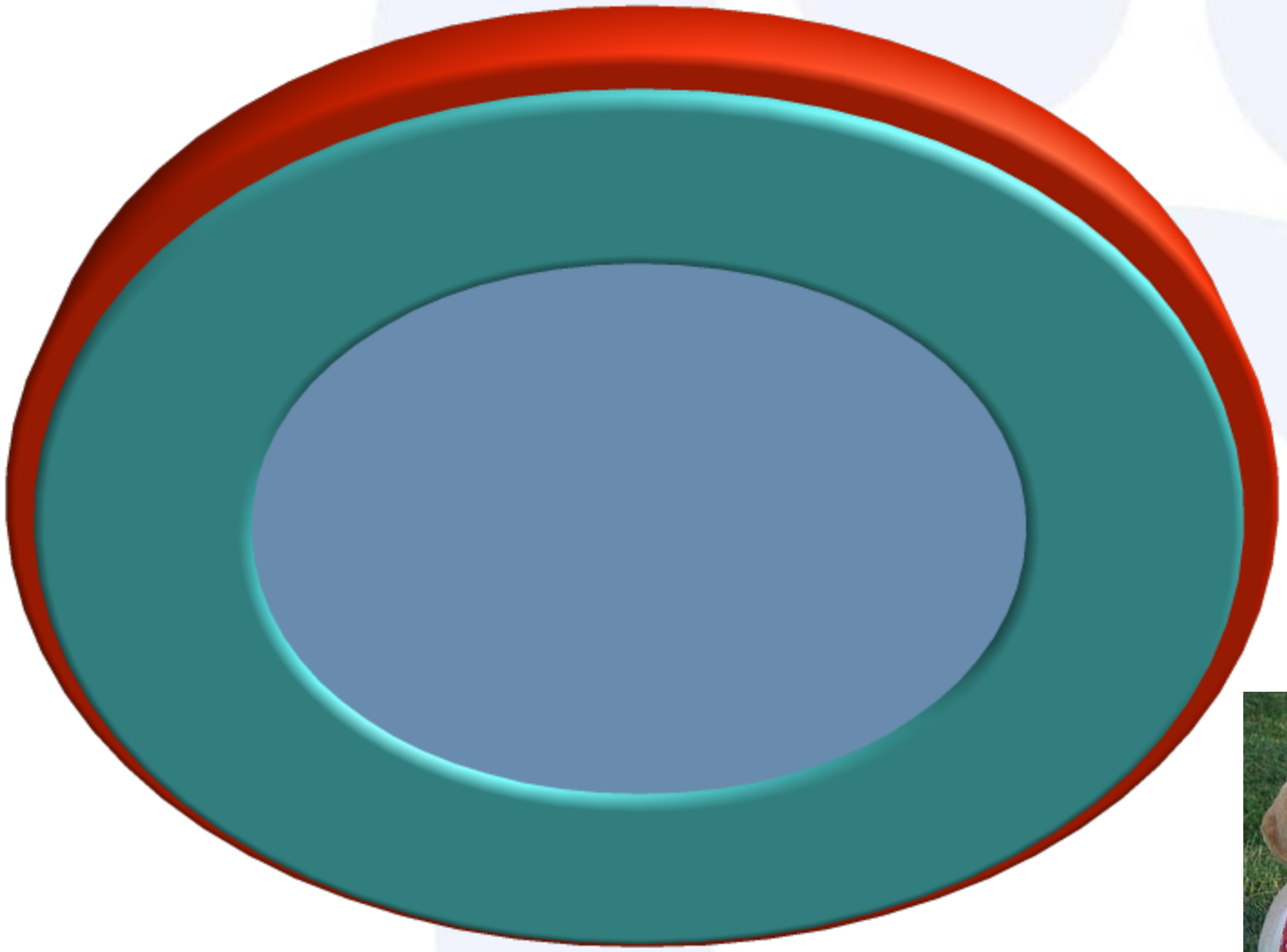


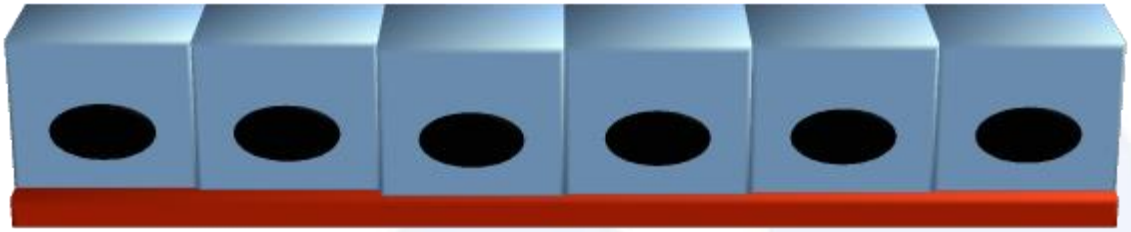


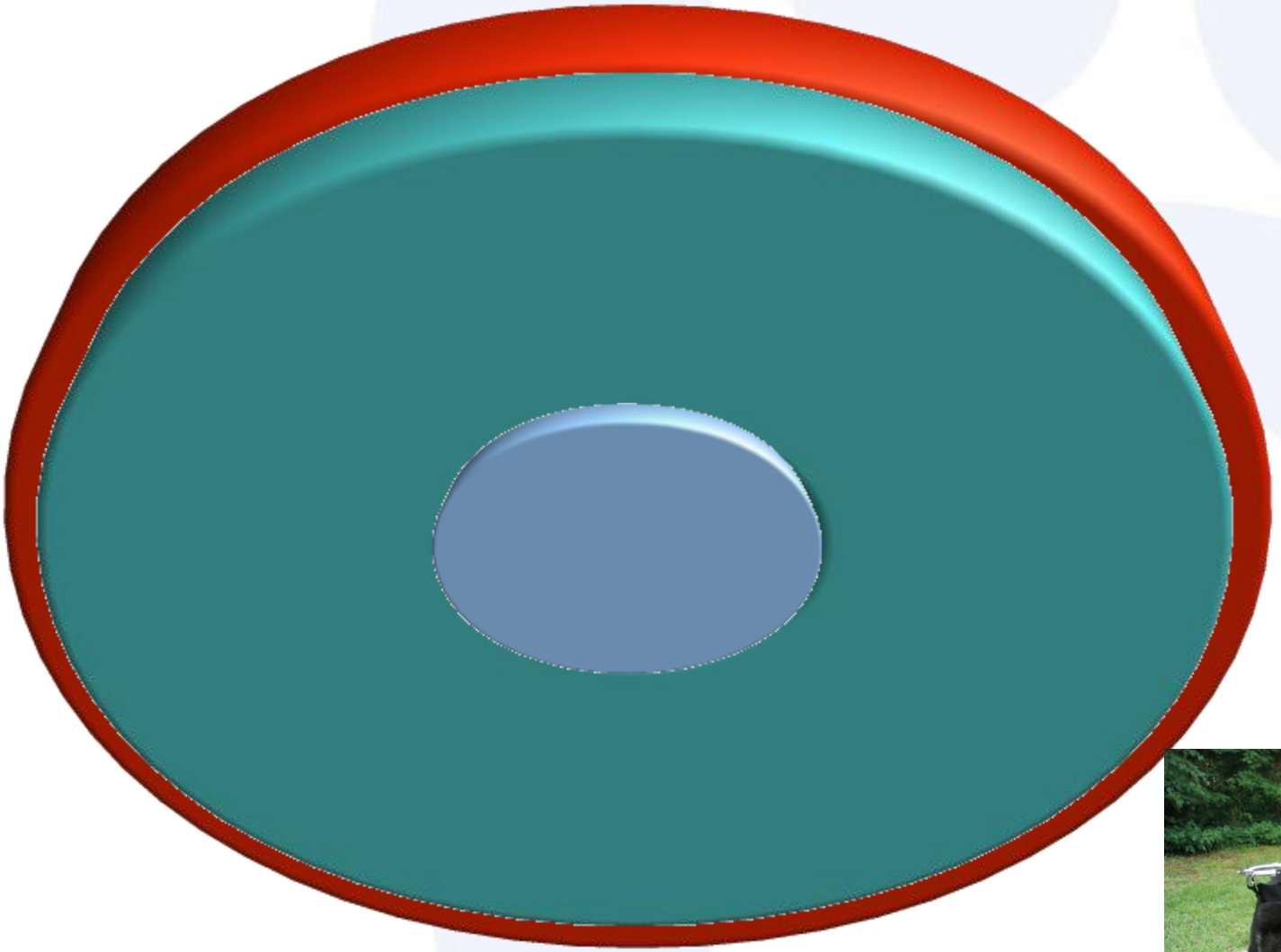




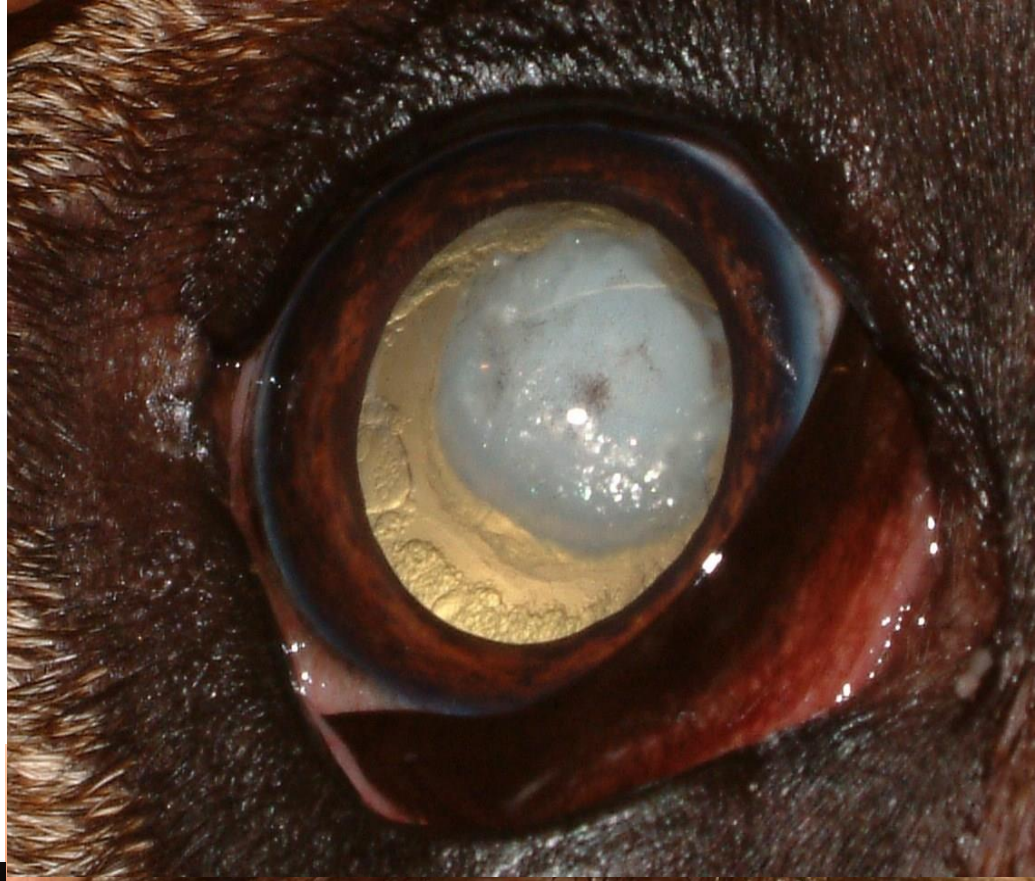


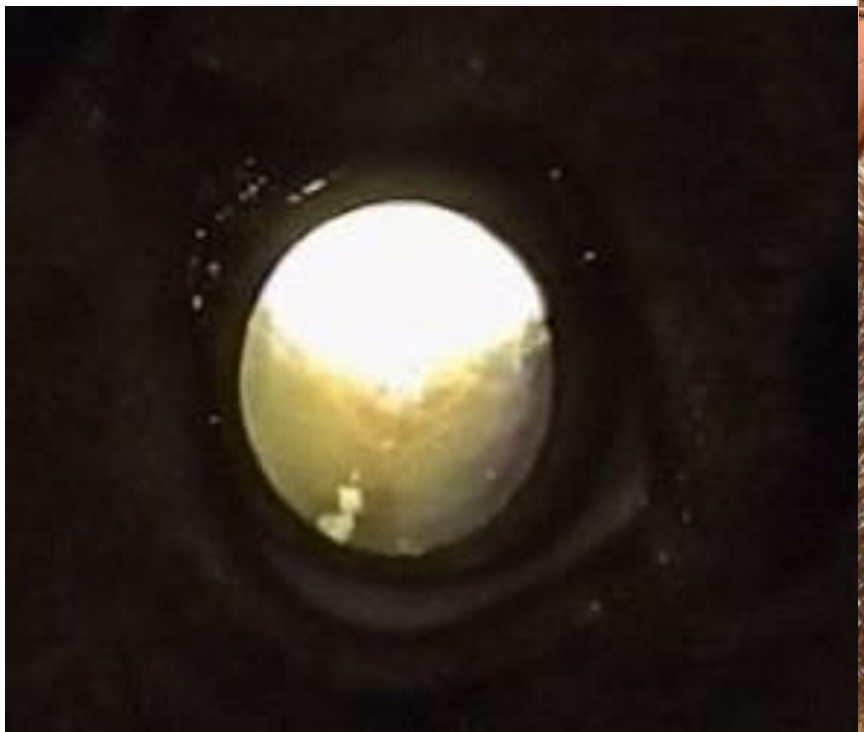






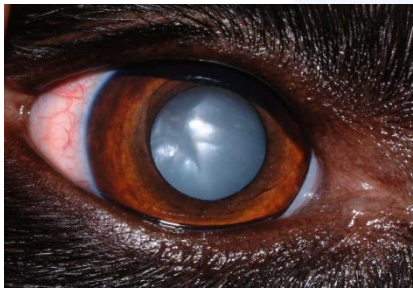

first year growth
rainy season
dry season
scar from forest fire



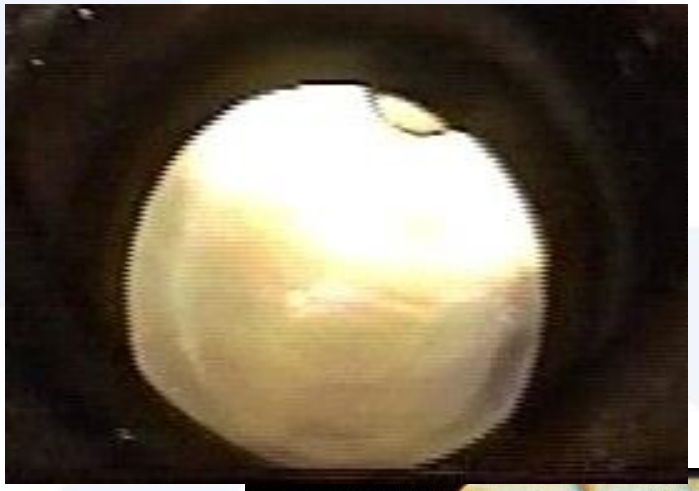


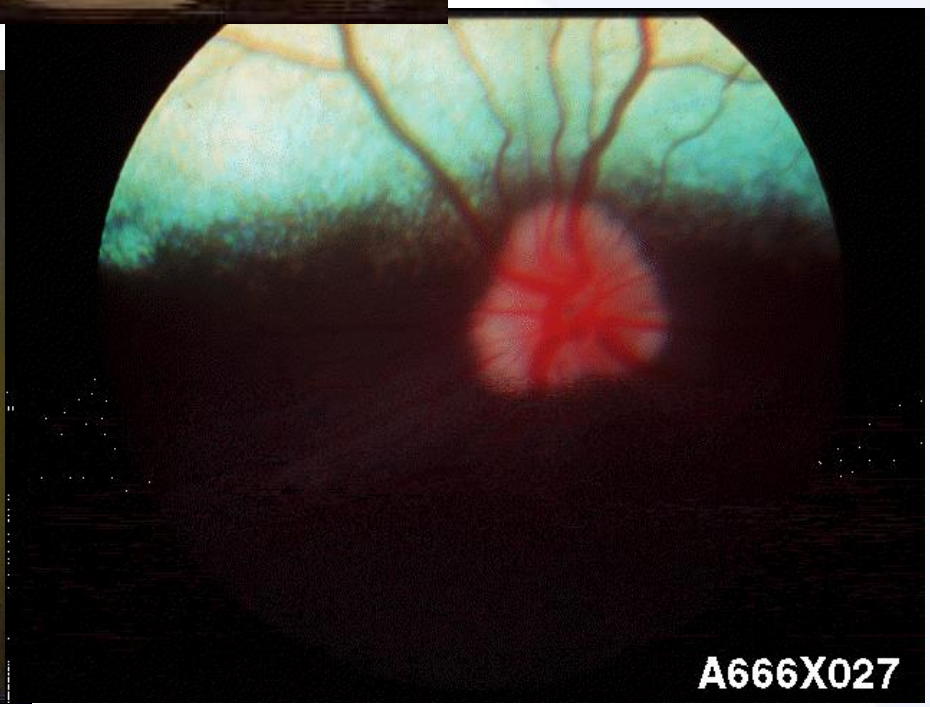
Cataracts

- What are cataracts?
- What causes cataracts?
- Cataract surgery is expensive so I can ignore them.. can't I?
- Case selection ?
- What happens in cataract surgery?

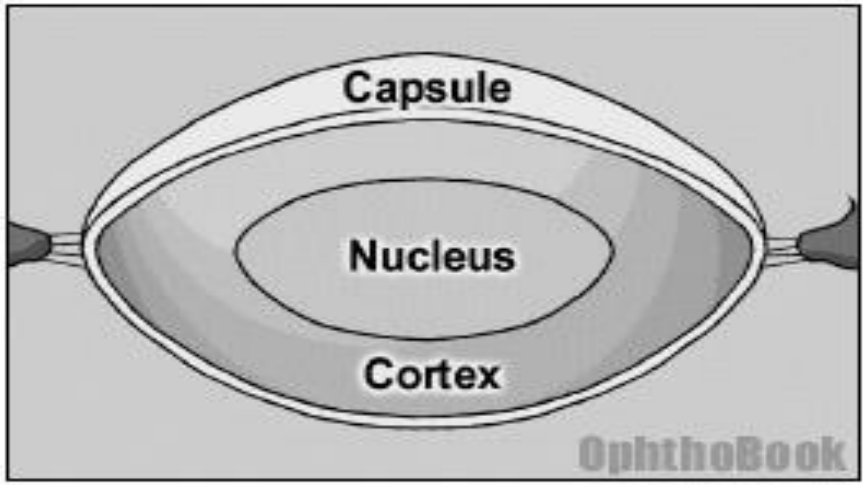


What are cataracts?



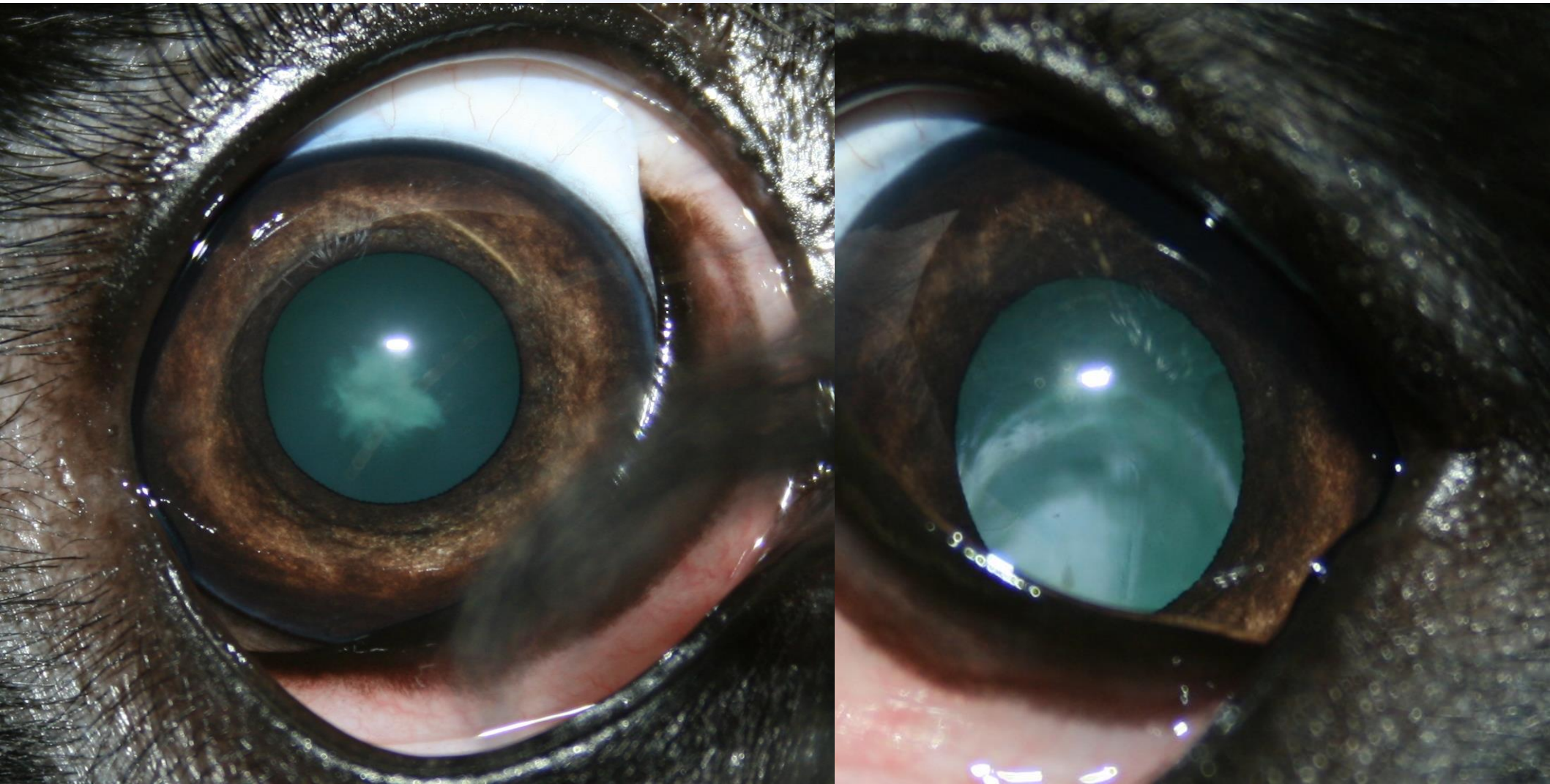



first year growth
rainy season
dry season
scar from forest fire


Capsule
Nucleus
Cortex
OphthoBook

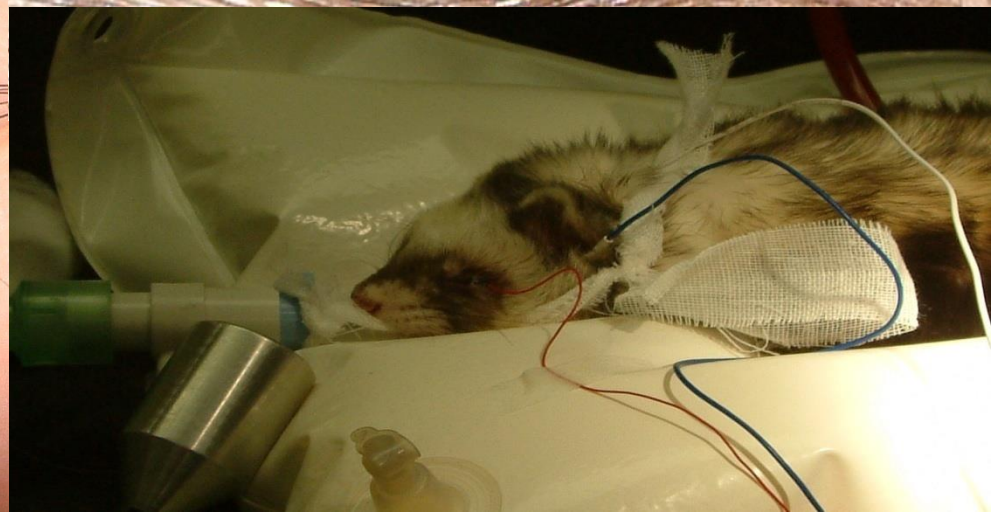
Causes of cataract

Congenital (nuclear)

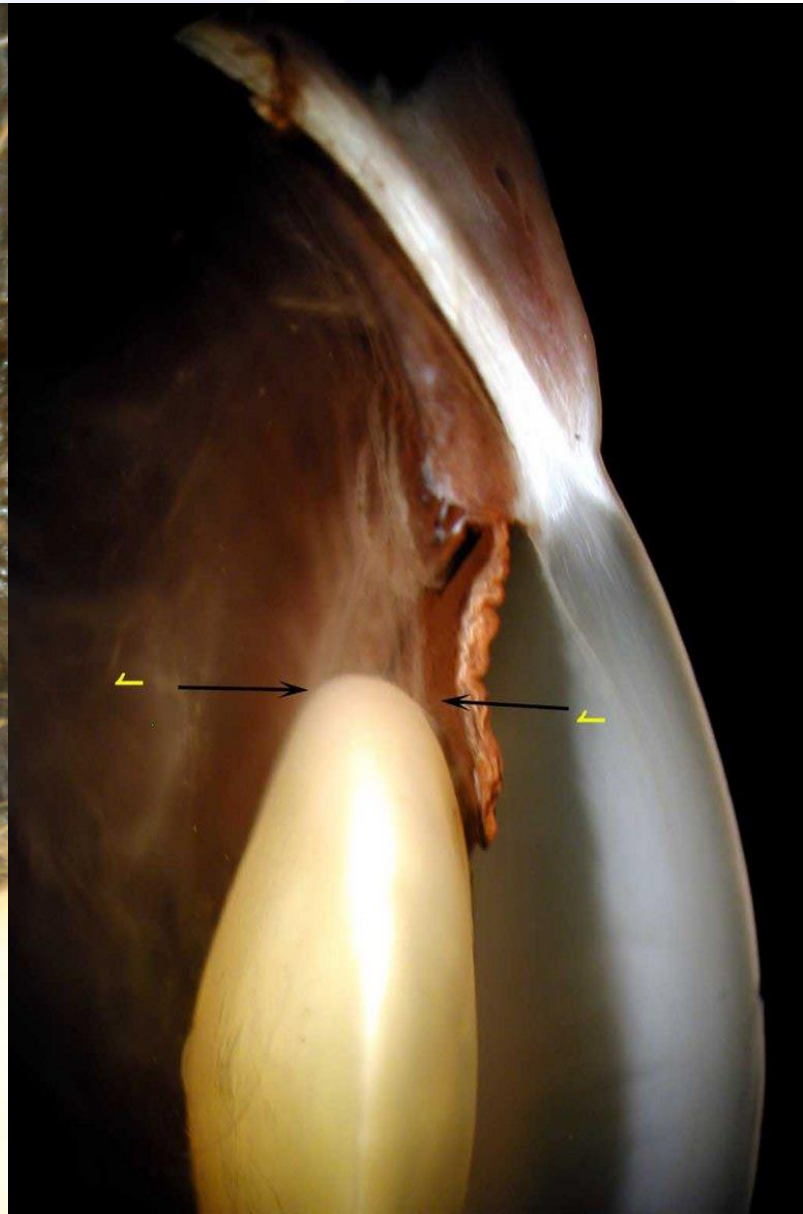


Nutritional (milk replacer)

Diabetes

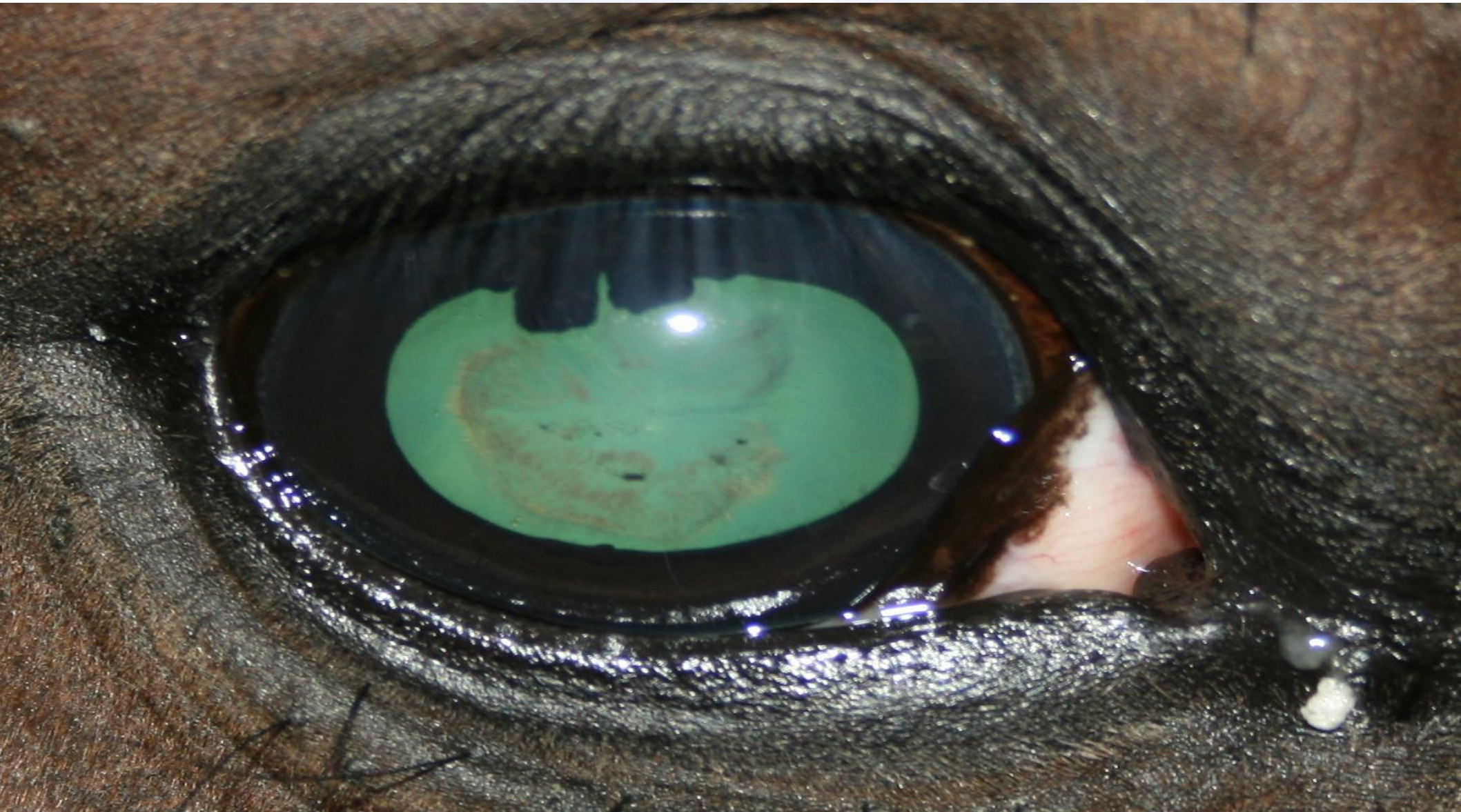


Trauma



Hulio

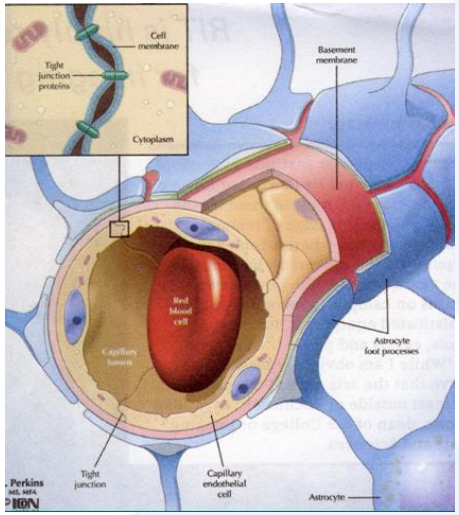
Uveitis

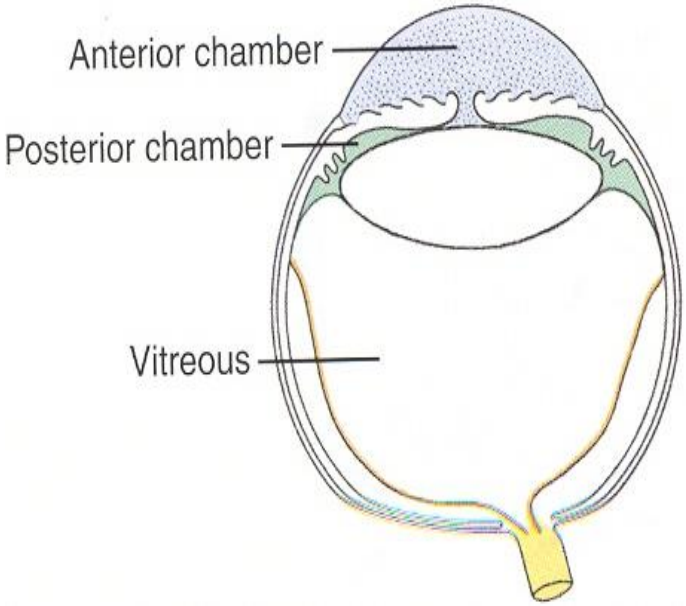


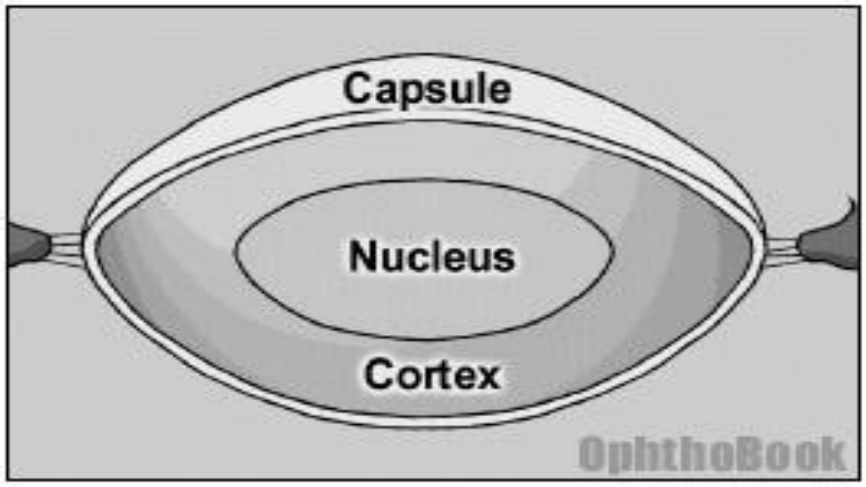
Retinal degeneration (PRA)

Lens induced uveitis

LIU: Why?


Cell membrane
Tight junction proteins
Cytoplasm
Basement membrane
Red blood cell
Capillary lumen
Astrocyte foot processes
Tight junction
Capillary endothelial cell
Astrocyte

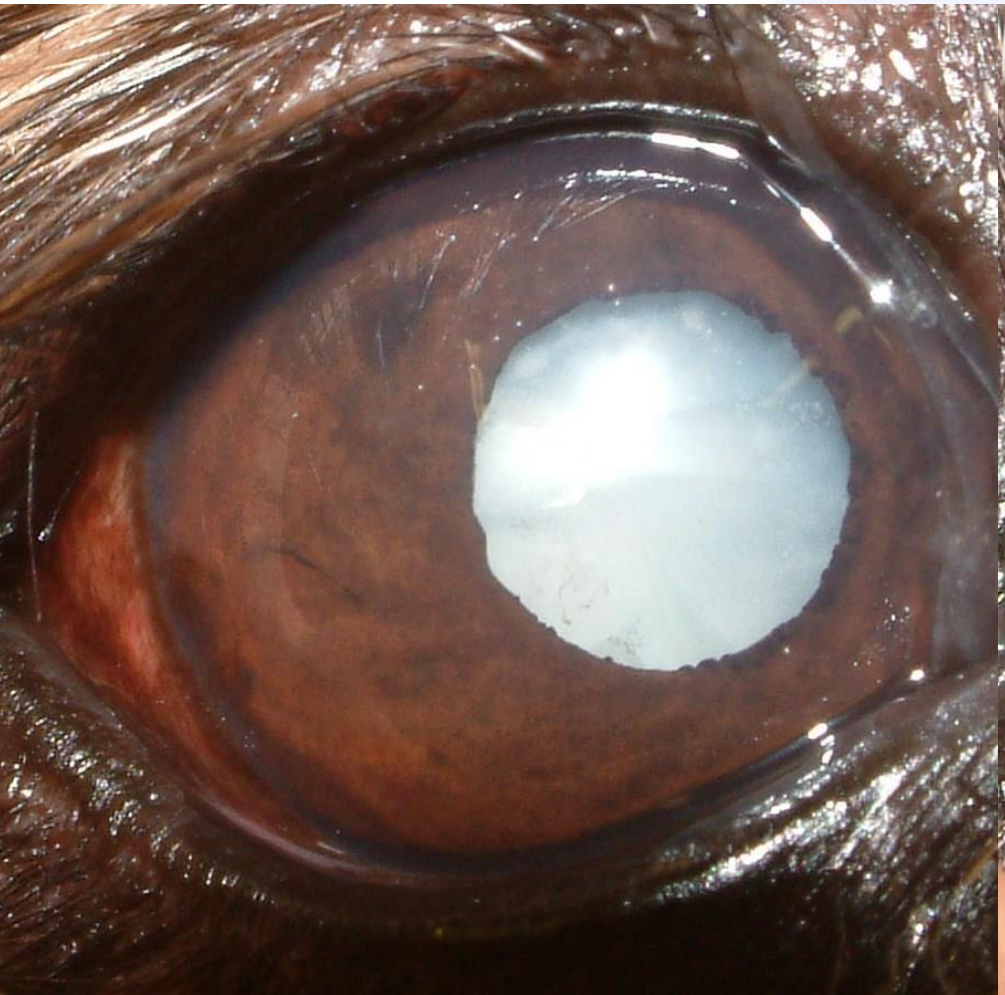

Anterior chamber
Posterior chamber
Vitreous


Capsule
Nucleus
Cortex
OphthoBook

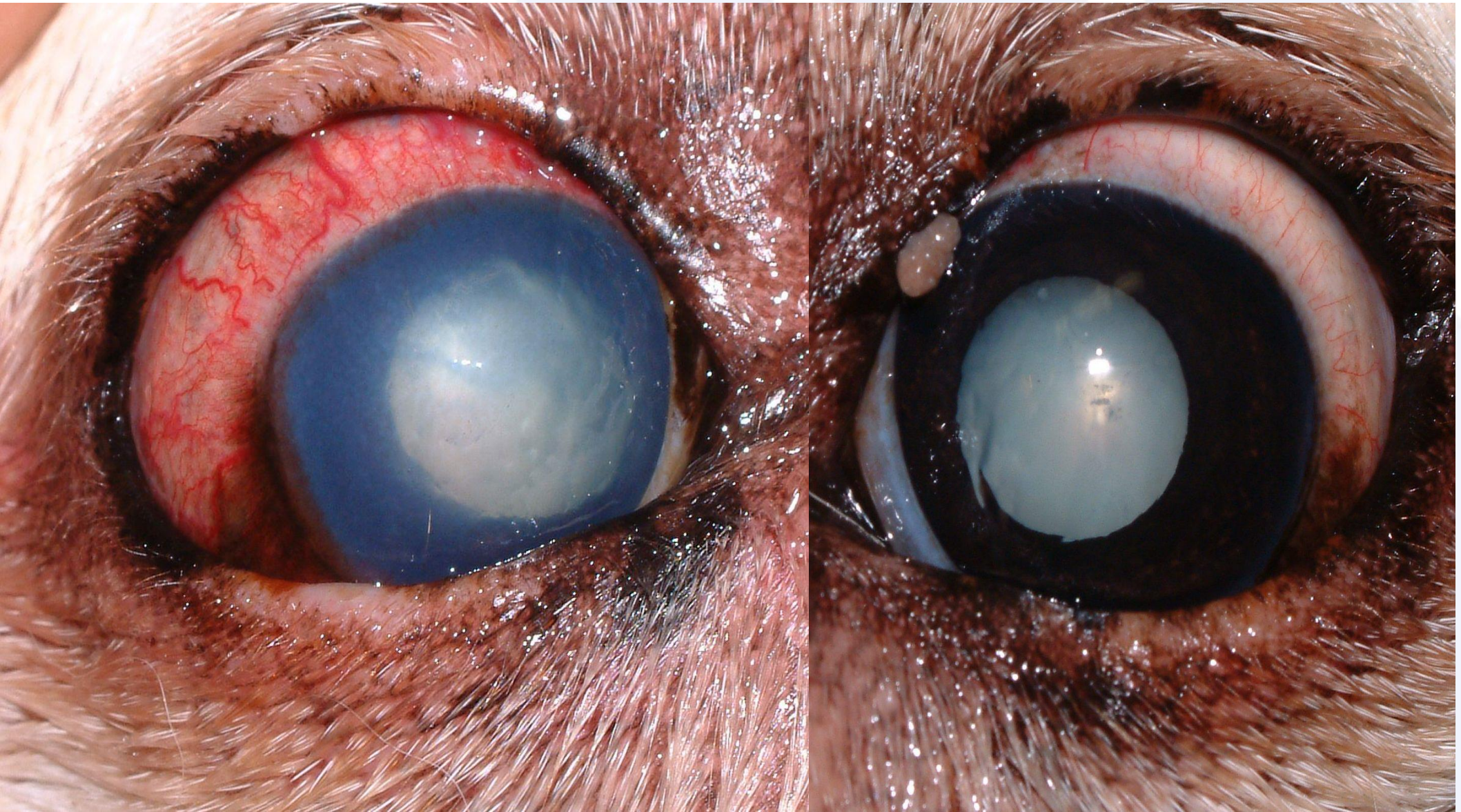
Sequelae vs risks of surgery

- No surgery
  - Lens induced uveitis
  - Glaucoma
  - Retinal detachment
  - Enucleation
  - Nil visual prognosis
- Surgery
  - Lens induced uveitis
  - Glaucoma
  - Retinal detachment
  - Enucleation
  - 90% + visual prognosis

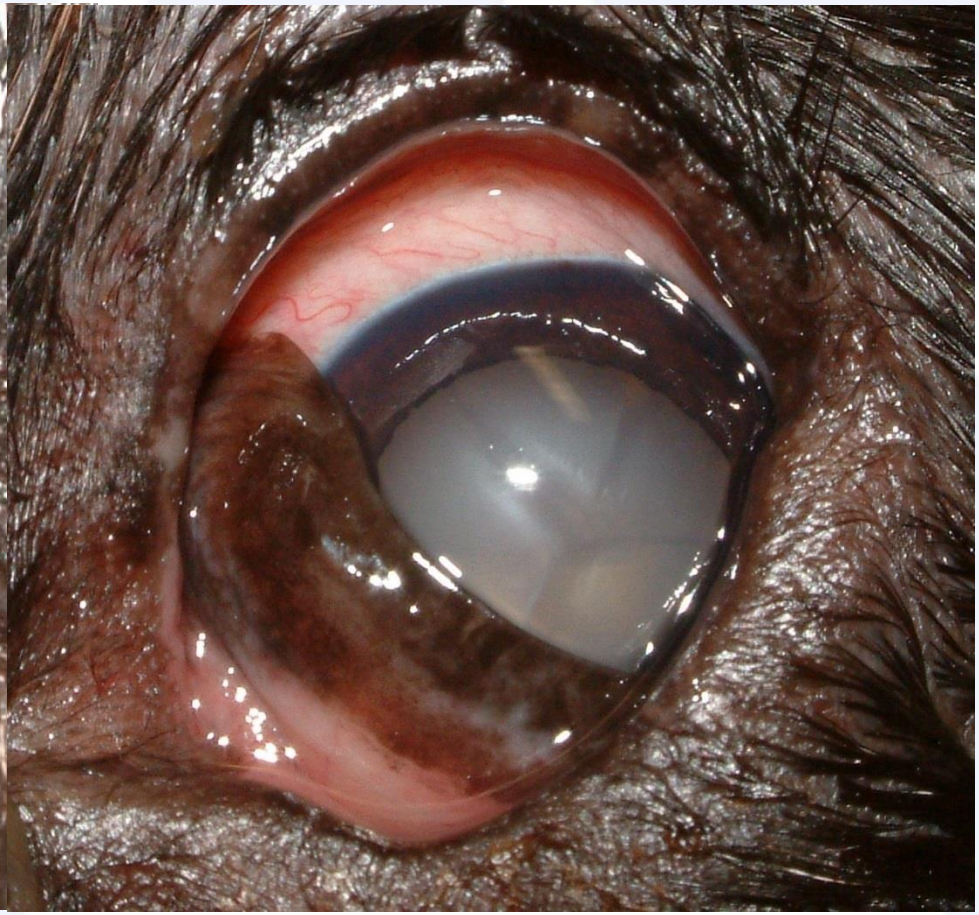
LIU: Digby



LIU: Bozzer



Intumescent cataracts



Pre surgical screening

- General health
- Temperament
- Commitment

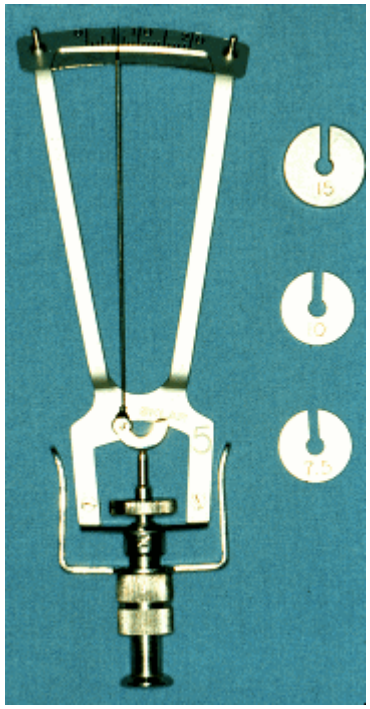
- Will removing cataract restore vision?
- What are the health risks?
- What are the ocular risks?

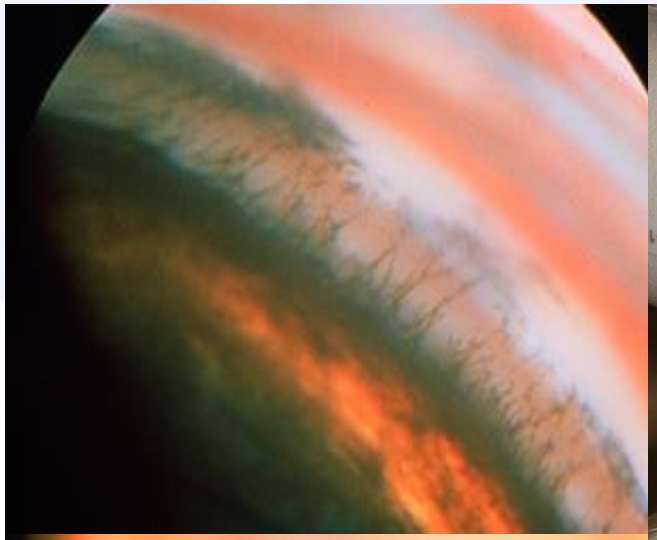
Stage 1: Eye exam

- Temperament
- STT
- IOP
- Corneal health
- Evidence of uveitis
- Stage cataract
- Evidence of vision
  - History of night blindness?
  - The Dazzle – the poor man's ERG

Dazzle reflex

Stage 2: Glaucoma risk



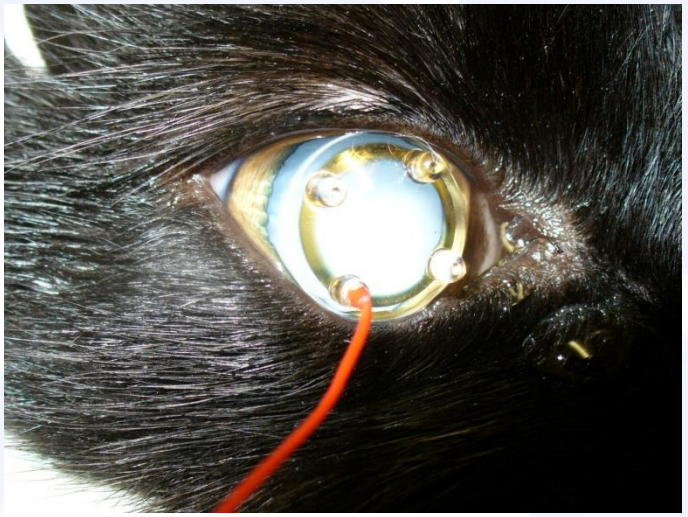


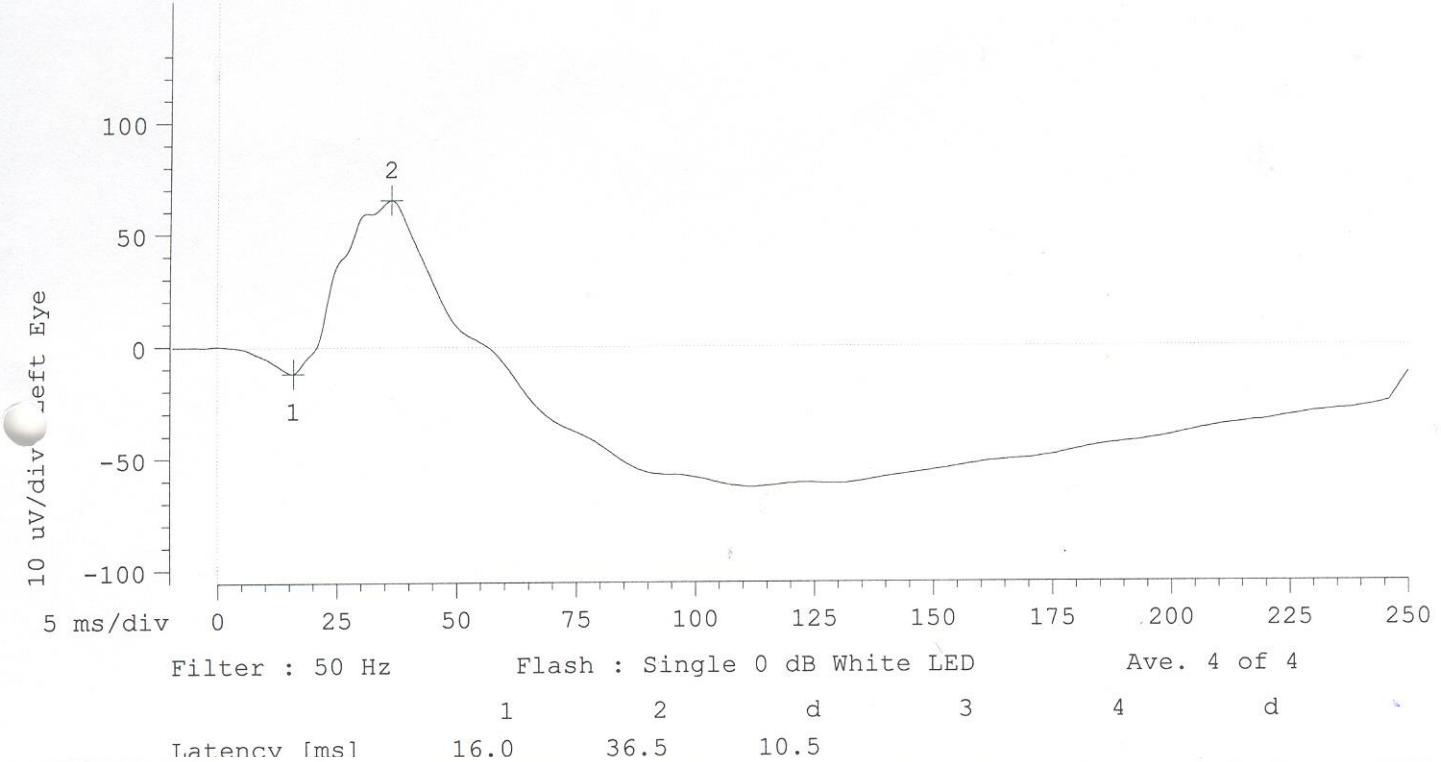
Stage 3: Ultrasound

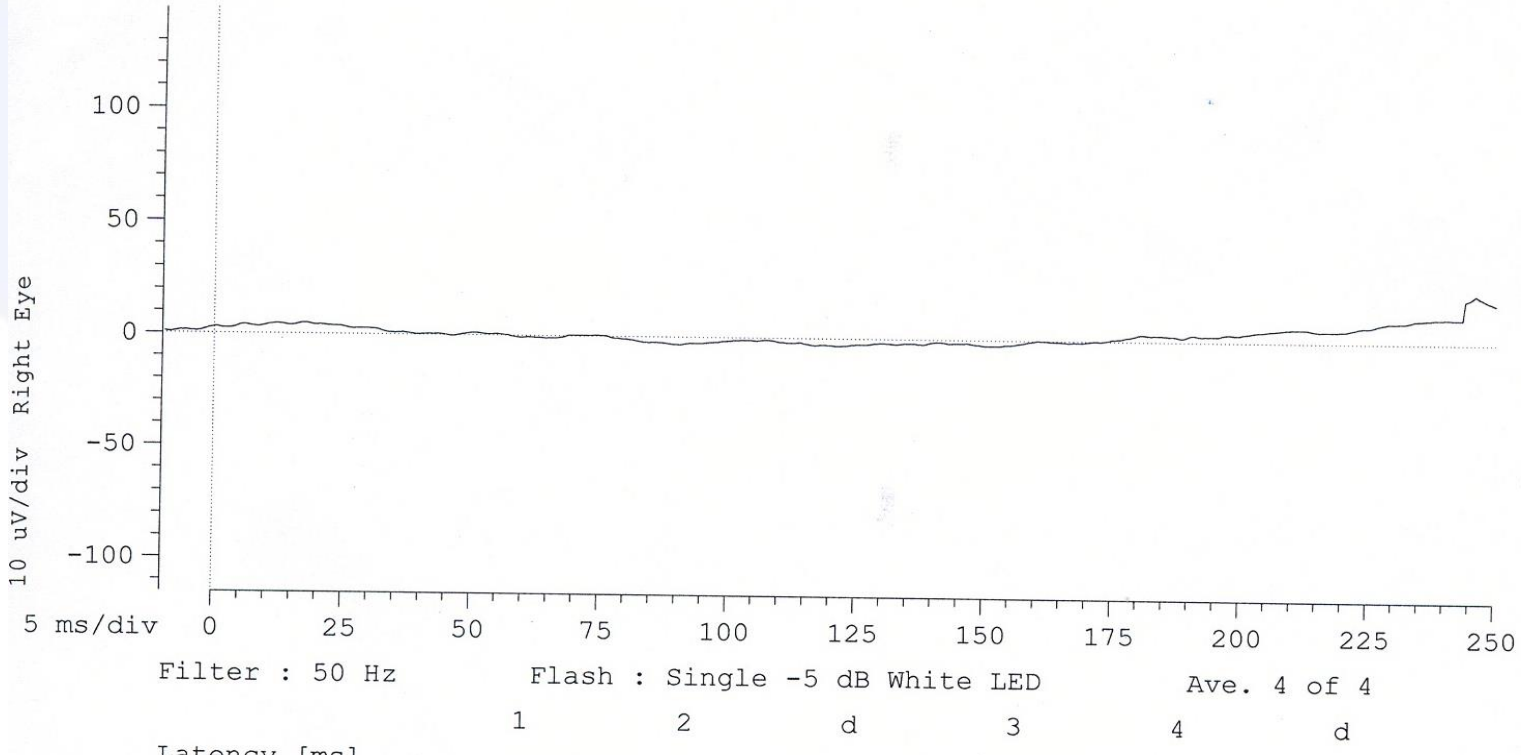
- Retinal detachment
- Vitreous
- Lens size
- Lens rupture
- Neoplasia

Stage 4: Electroretingram (ERG)

- Quantify retinal function
- Sedation
- Recording electrodes
- Light stimulation



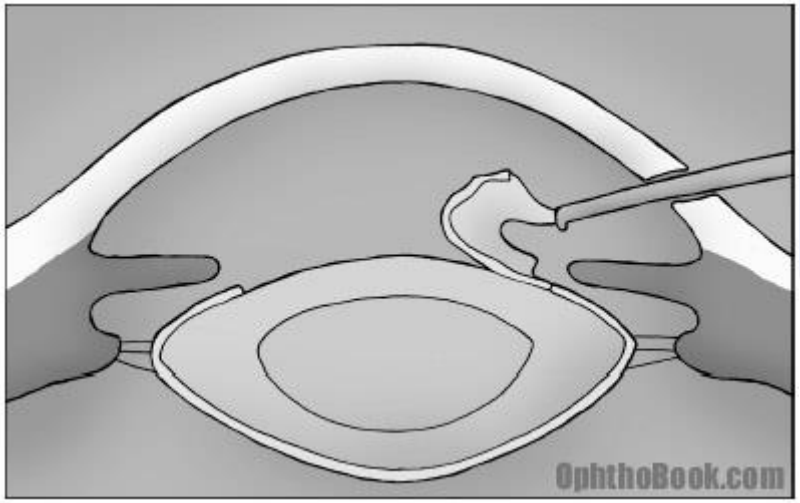

100
50
0
-50
-100
2
1
10 uV/div Left Eye
5 ms/div
0
25
50
75
100
125
150
175
200
225
250
Filter : 50 Hz
Flash : Single 0 dB White LED
Ave. 4 of 4
1
2
d
3
4
d
Latency [ms]
16.0
36.5
10.5

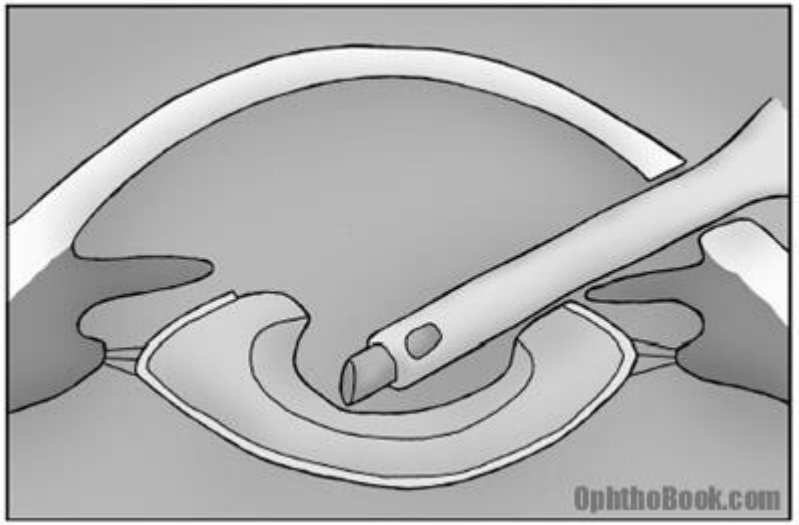

100
50
0
-50
-100
10 uV/div Right Eye
5 ms/div
0
25
50
75
100
125
150
175
200
225
250
Filter : 50 Hz
Flash : Single -5 dB White LED
Ave. 4 of 4
1
2
d
3
4
d
Latency [ms]
Amplitude [uV]

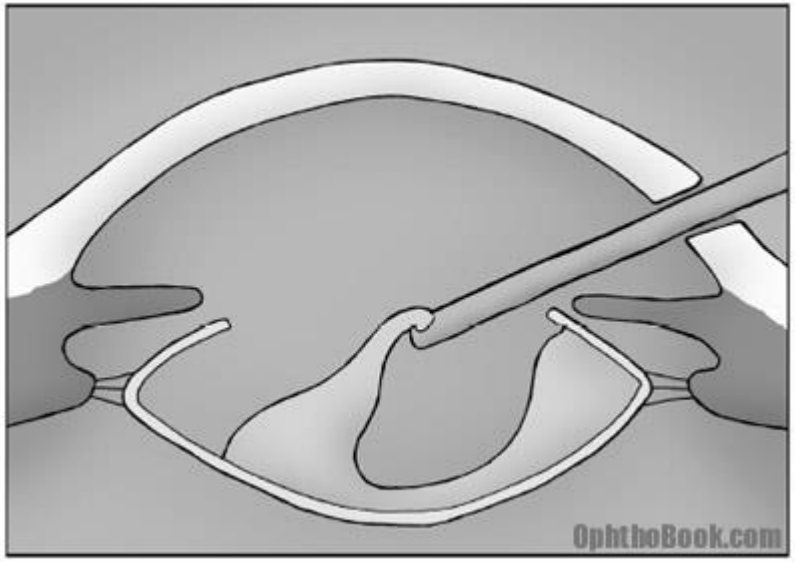
Pre-treatment

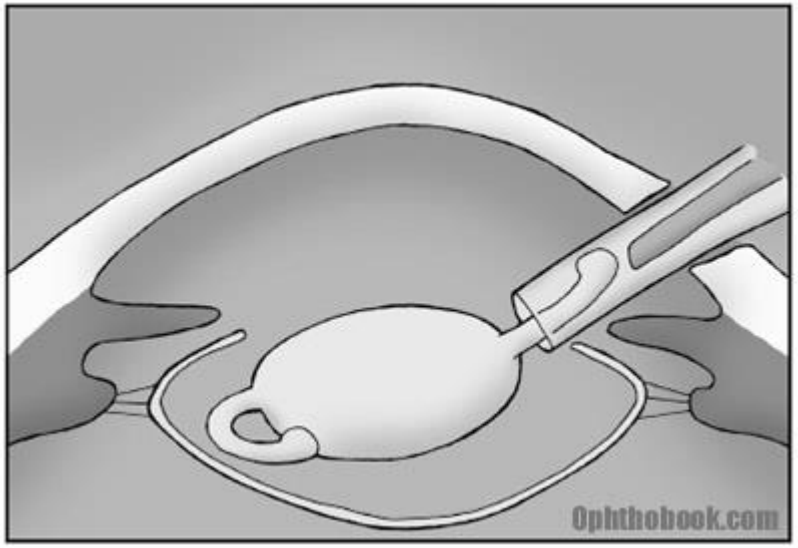
- Immunosuppress eye
- Improve corneal health if appropriate
- Assess tolerance of medication
- 7-14 days
- Topical steroids or non steroidals
- Oral Cyclosporine
- Oral NSAID's or steroids

Surgery: Phacoemulsification

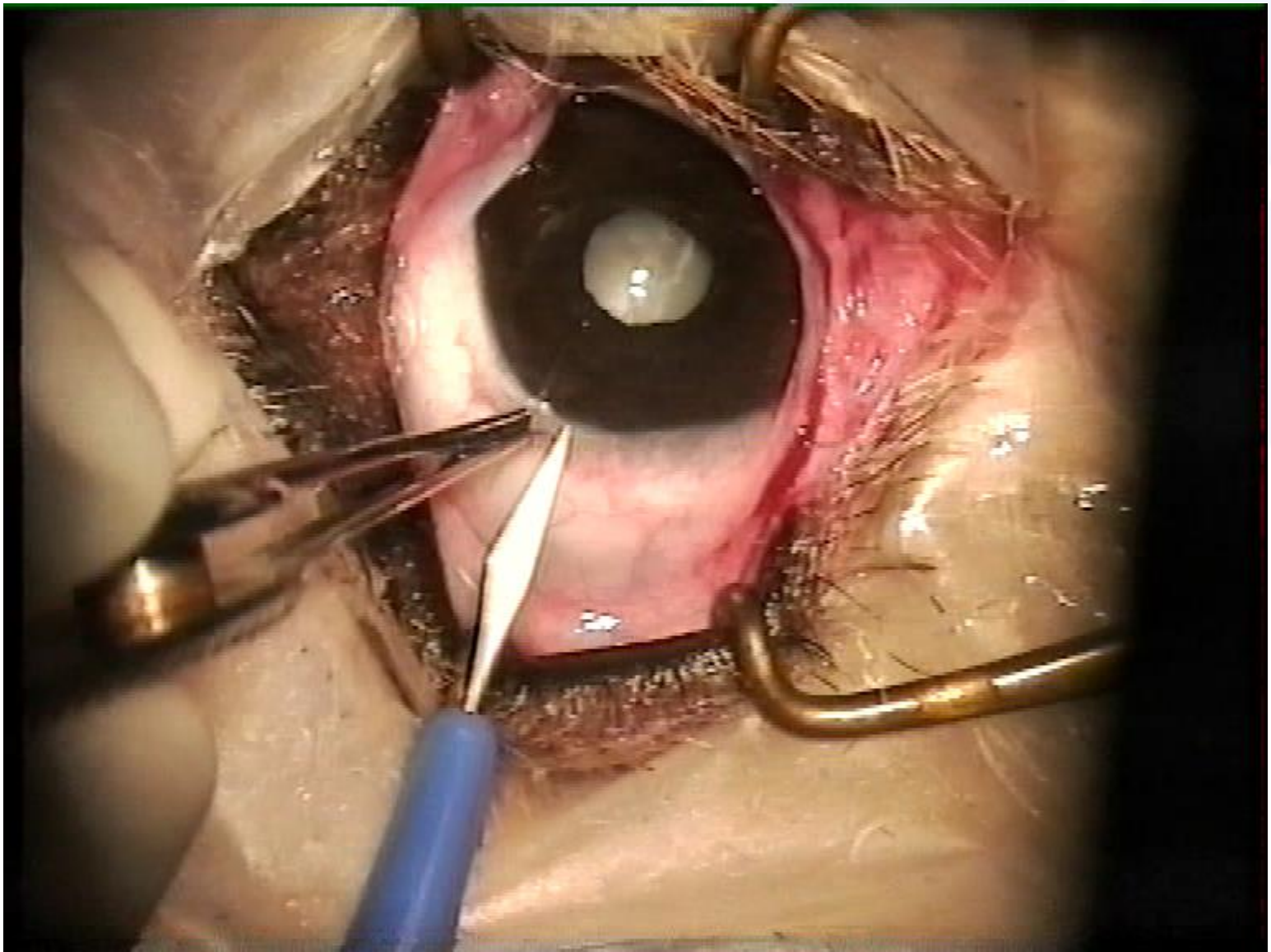




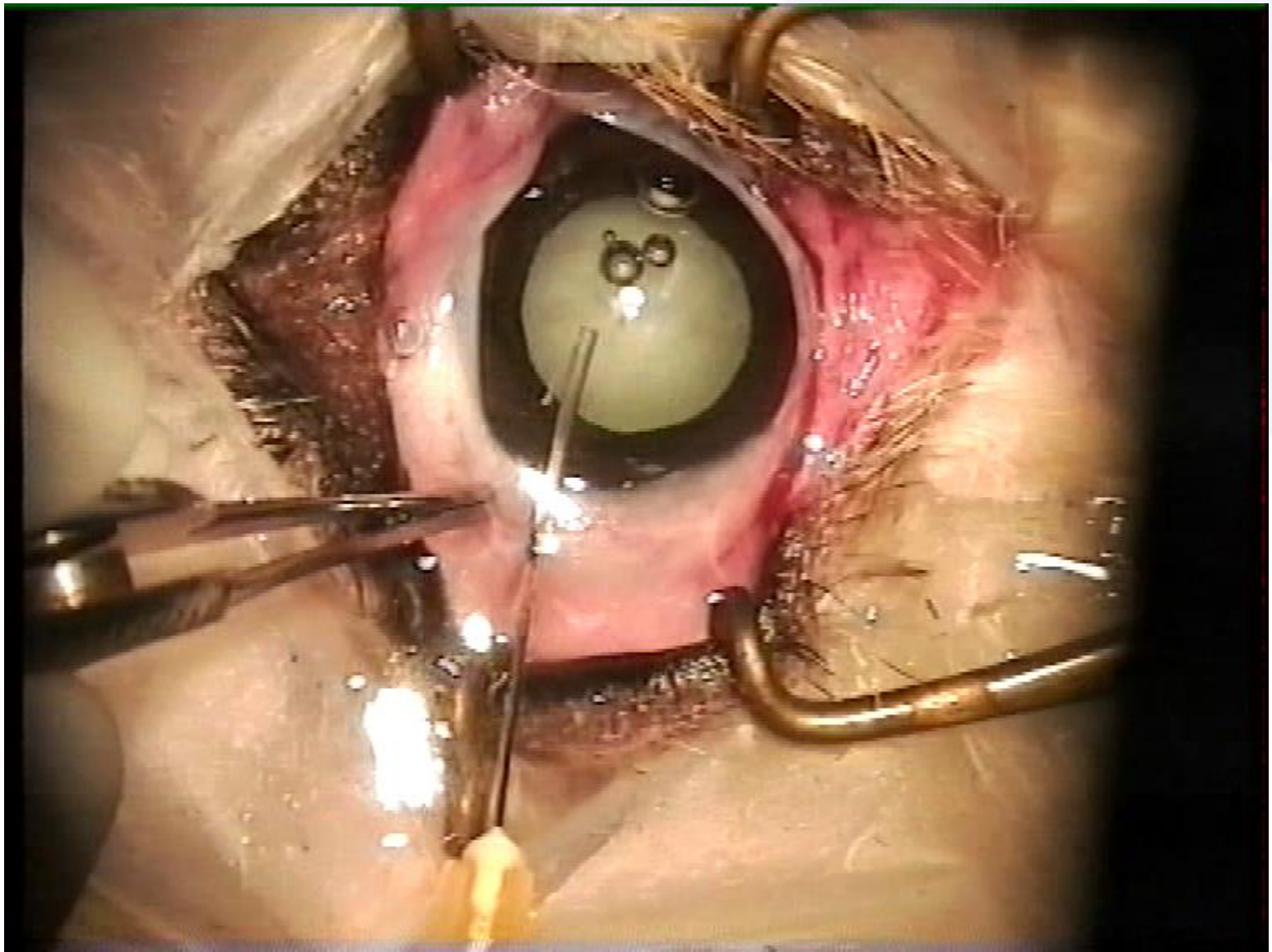




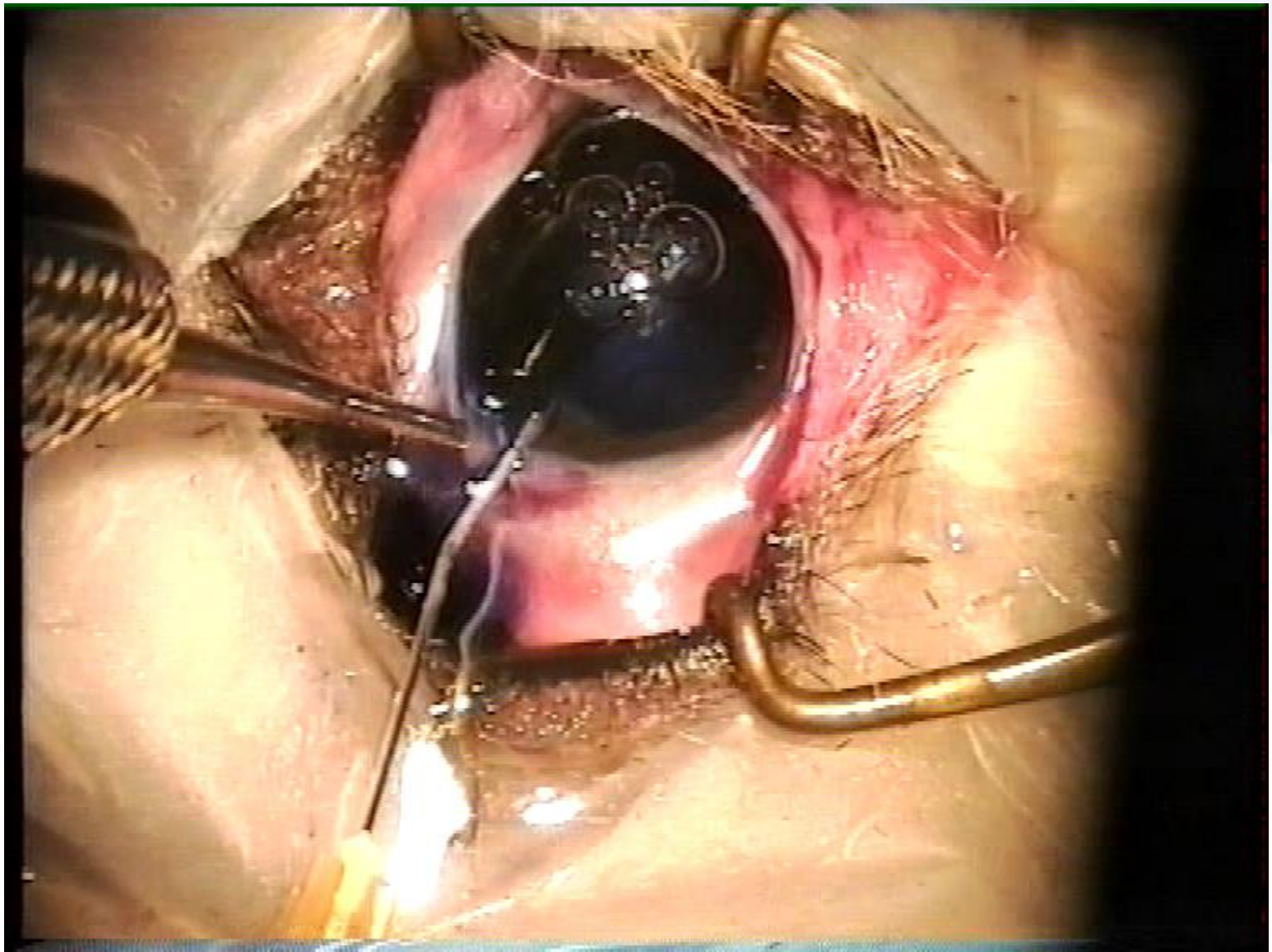
Giving port



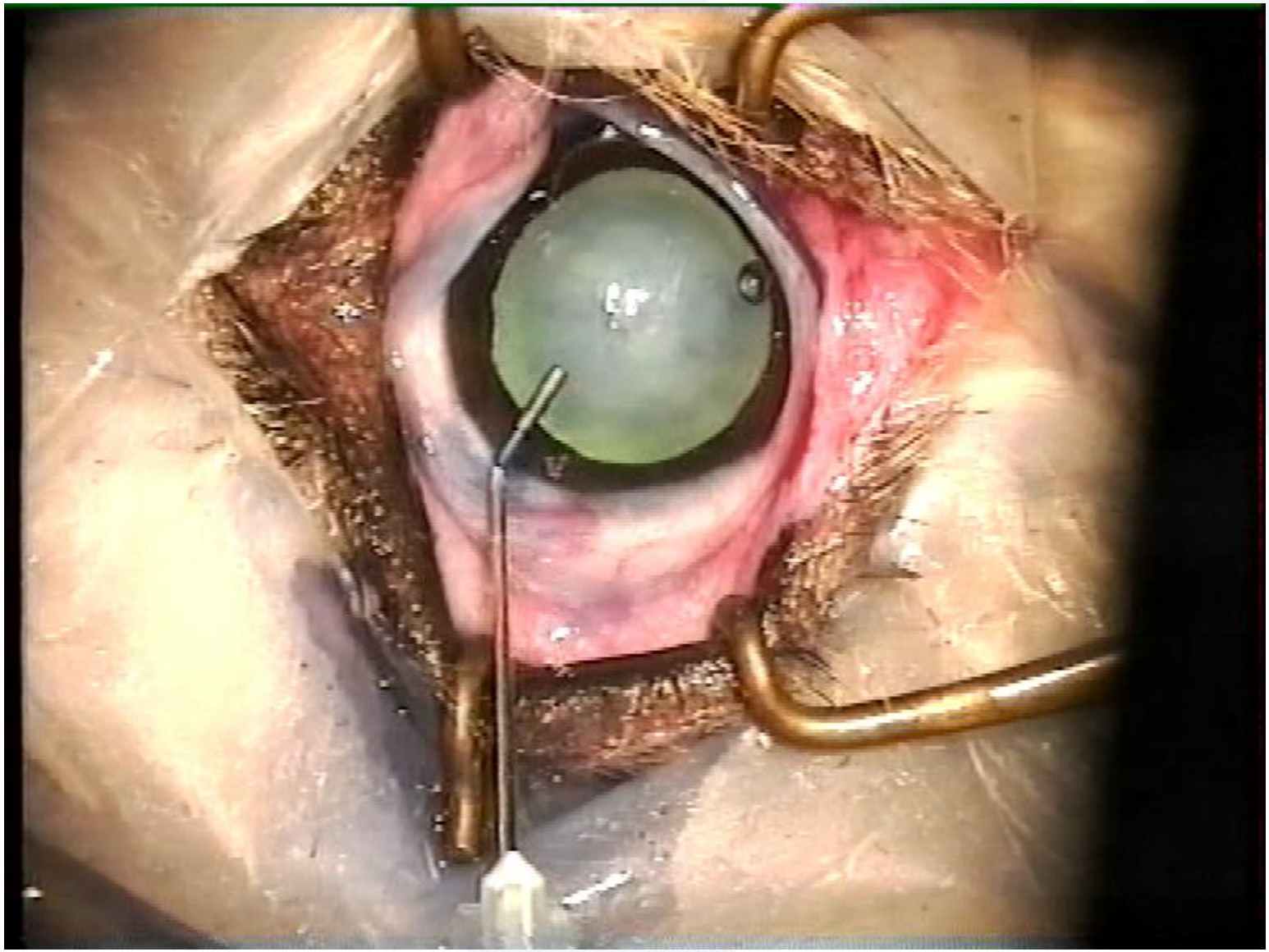
Dilation



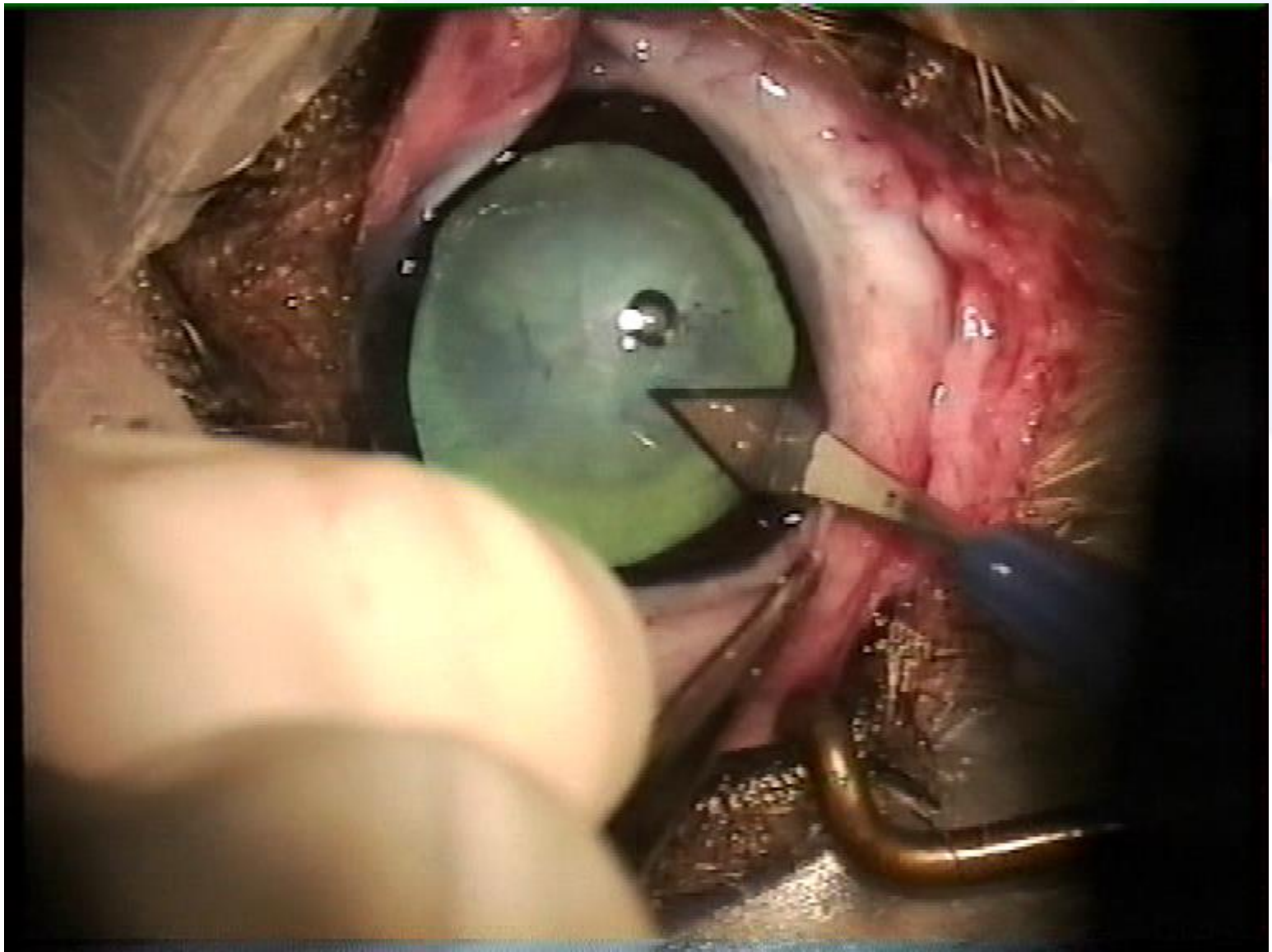
Capsule staining



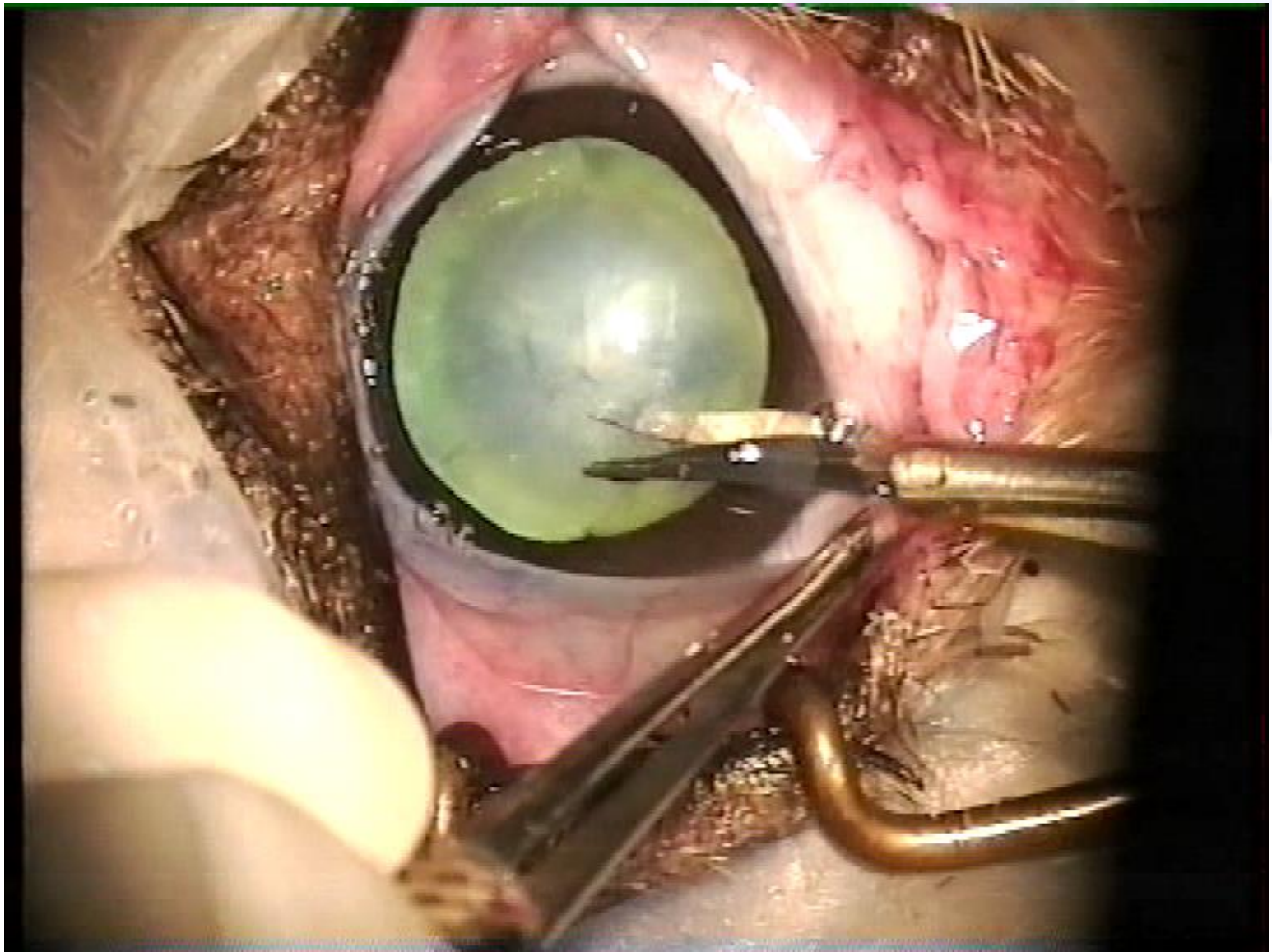
Viscoelastic



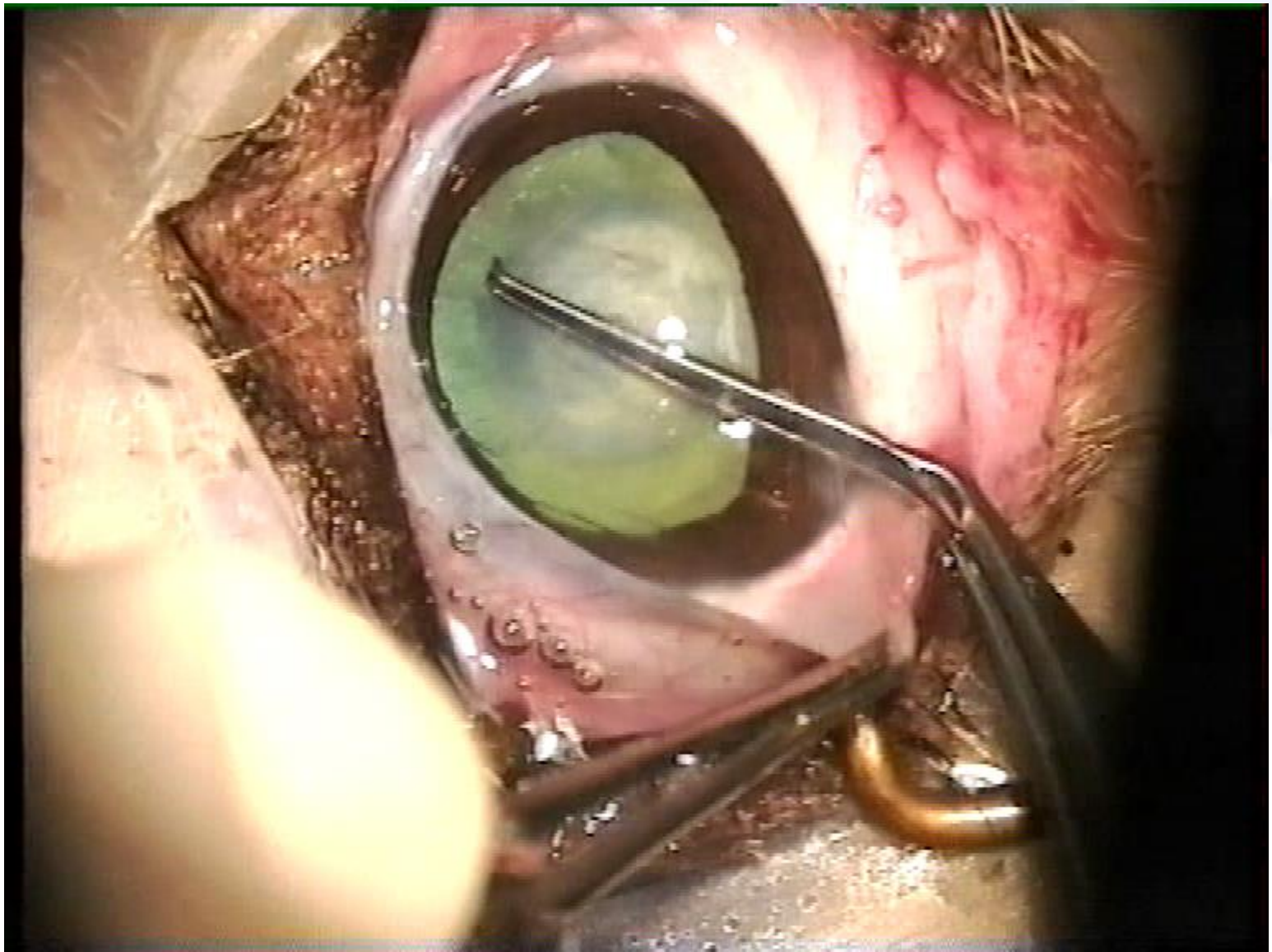
Phaco port incision



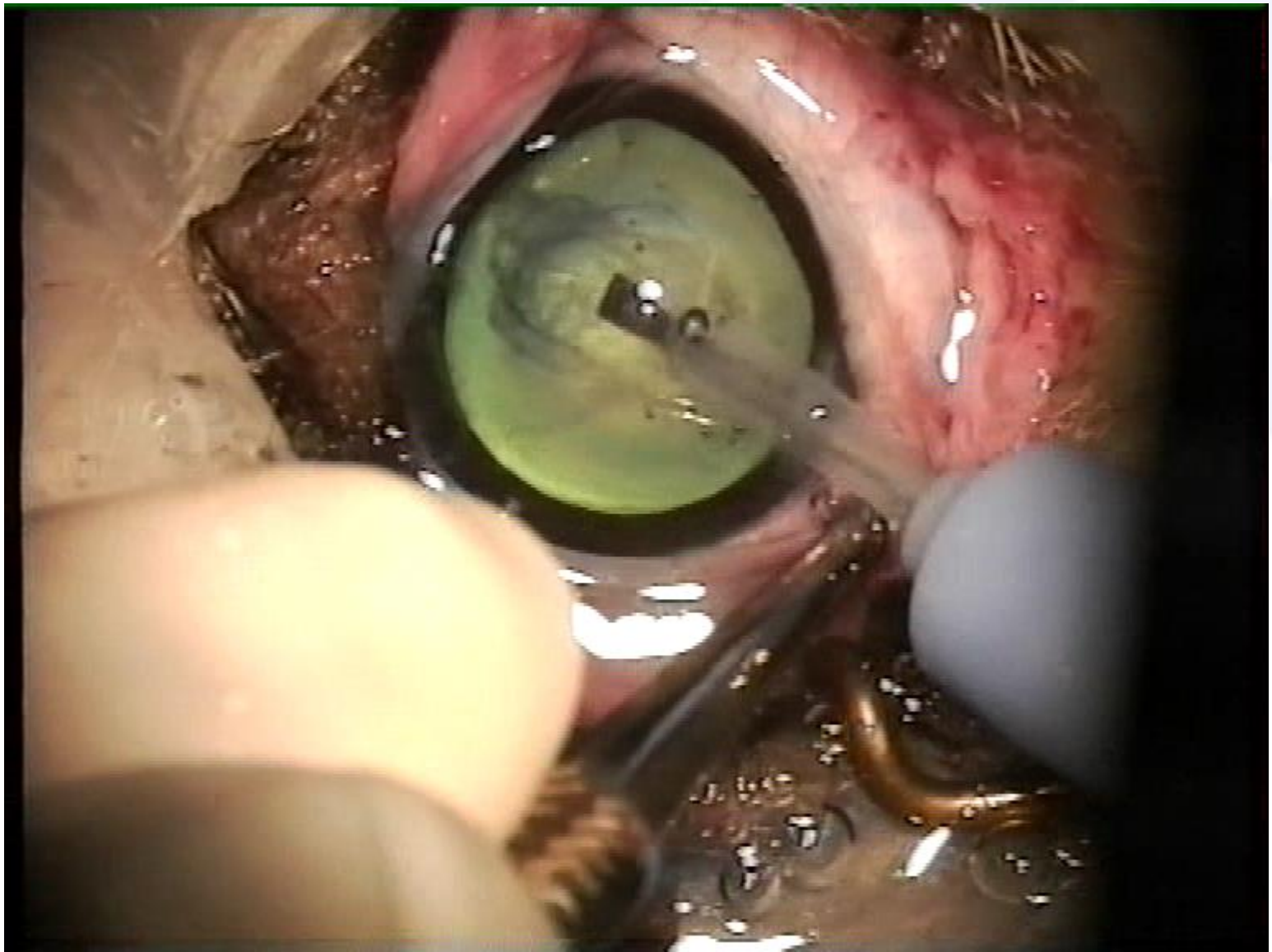
Capsulotomy



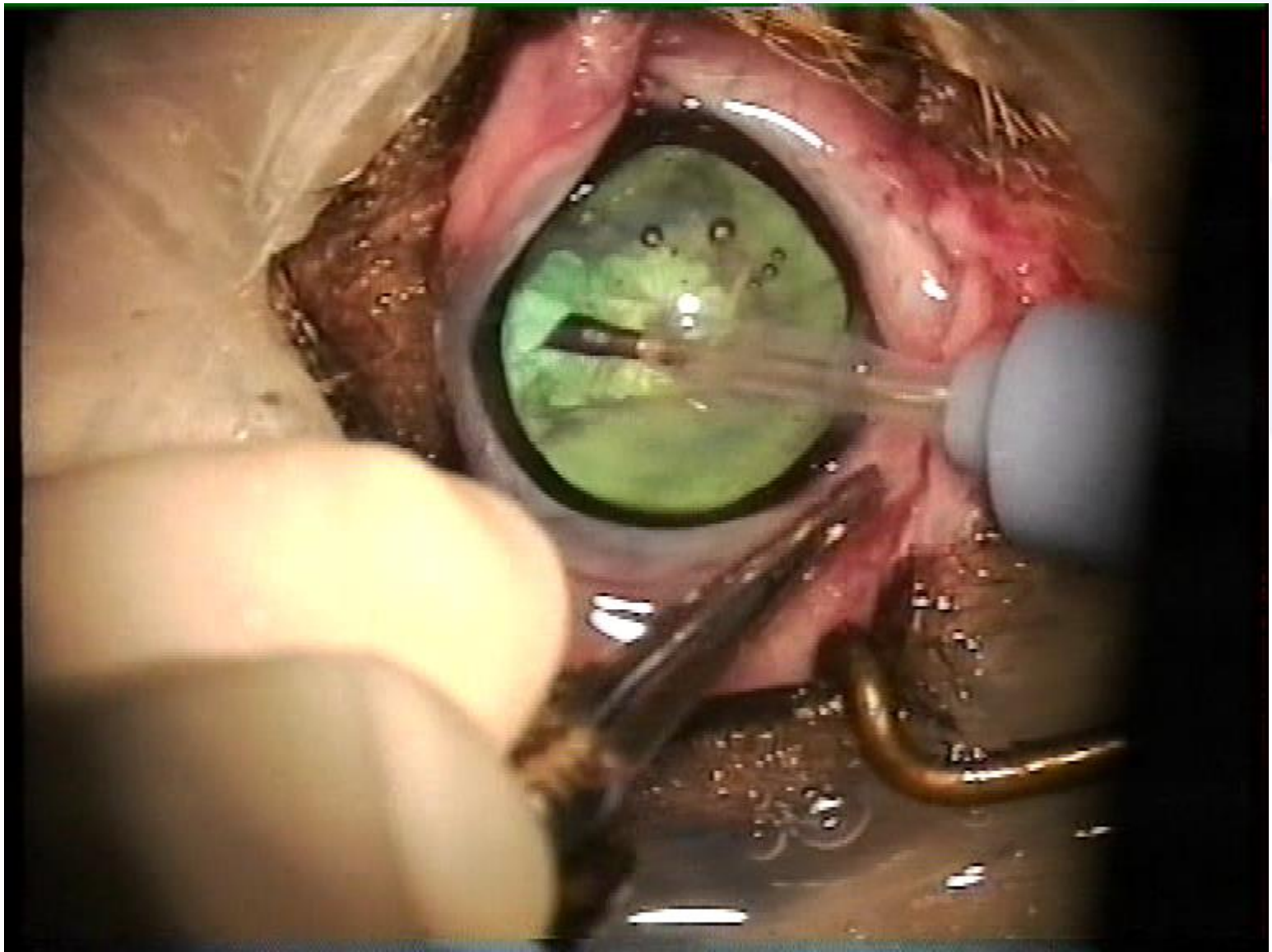
Capsulorhexis



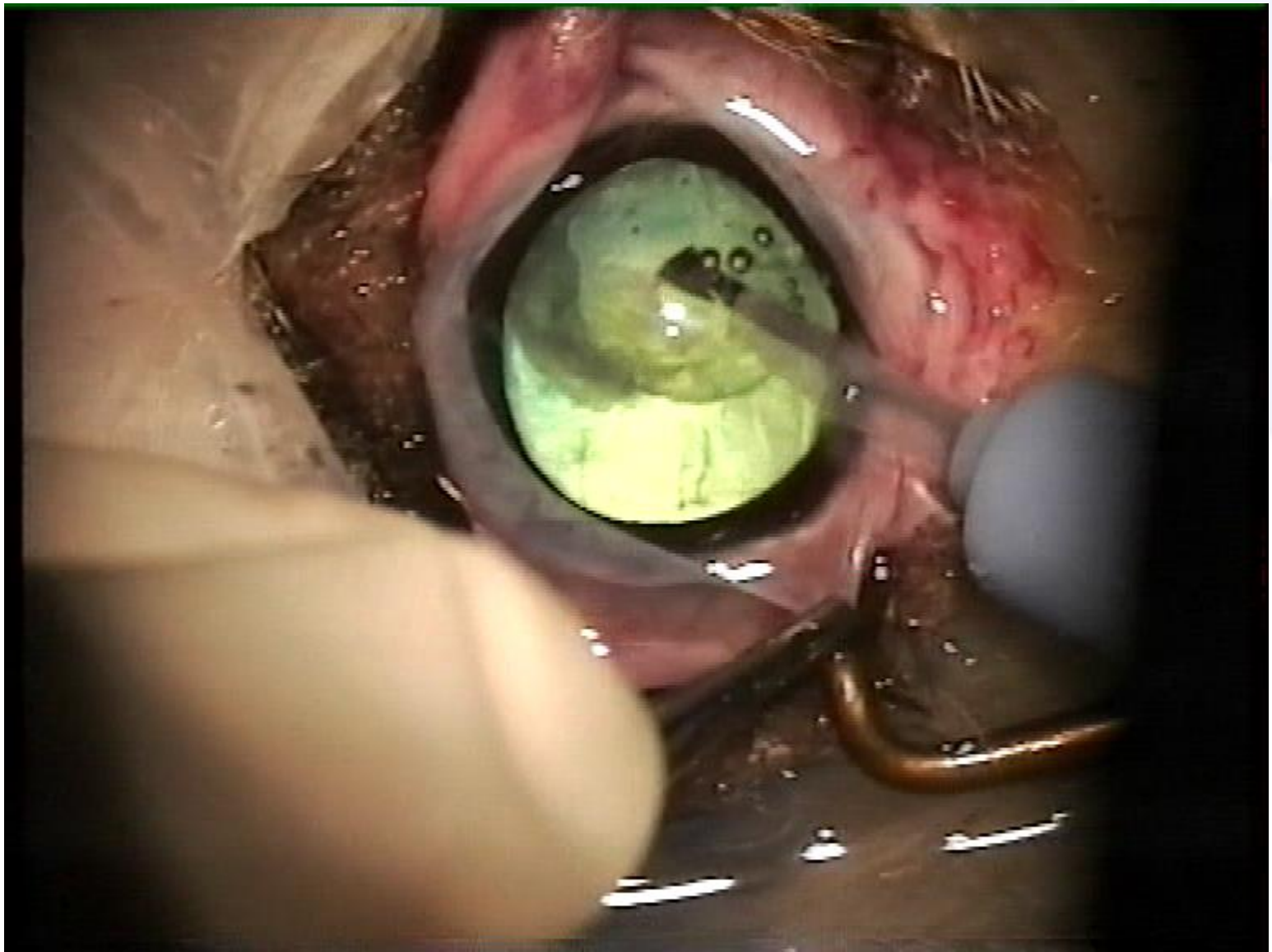
Sculpting

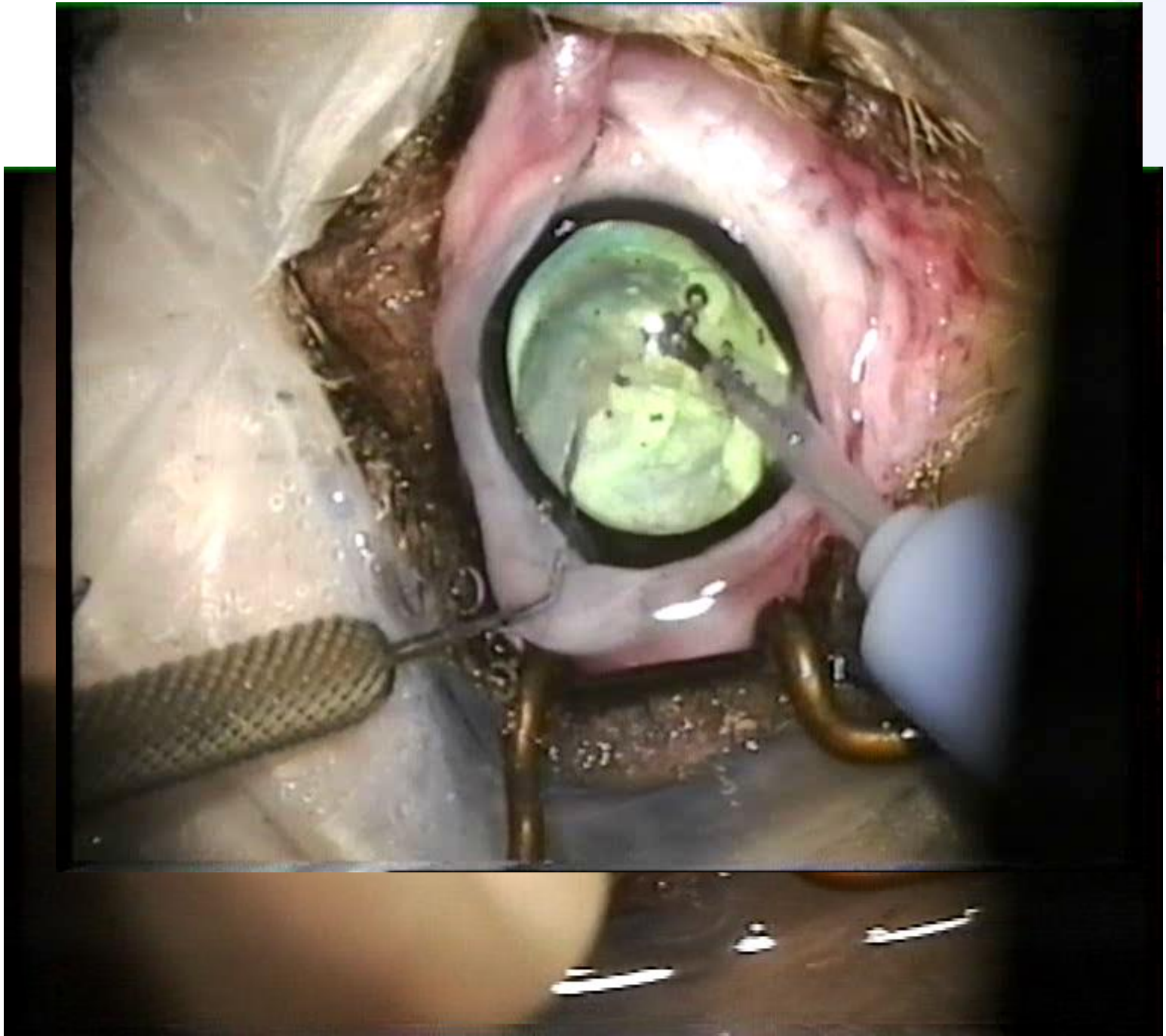


Sculpting

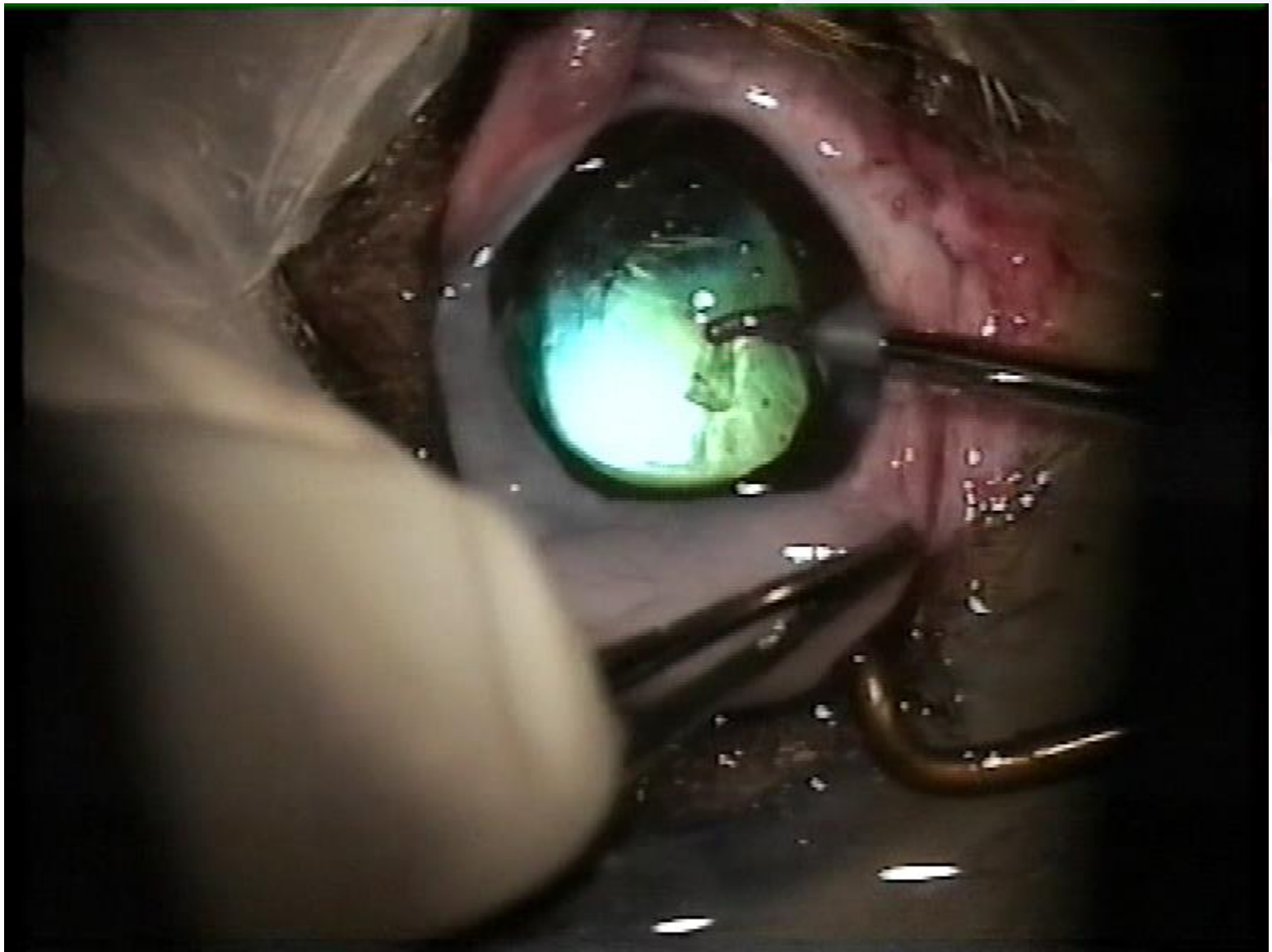


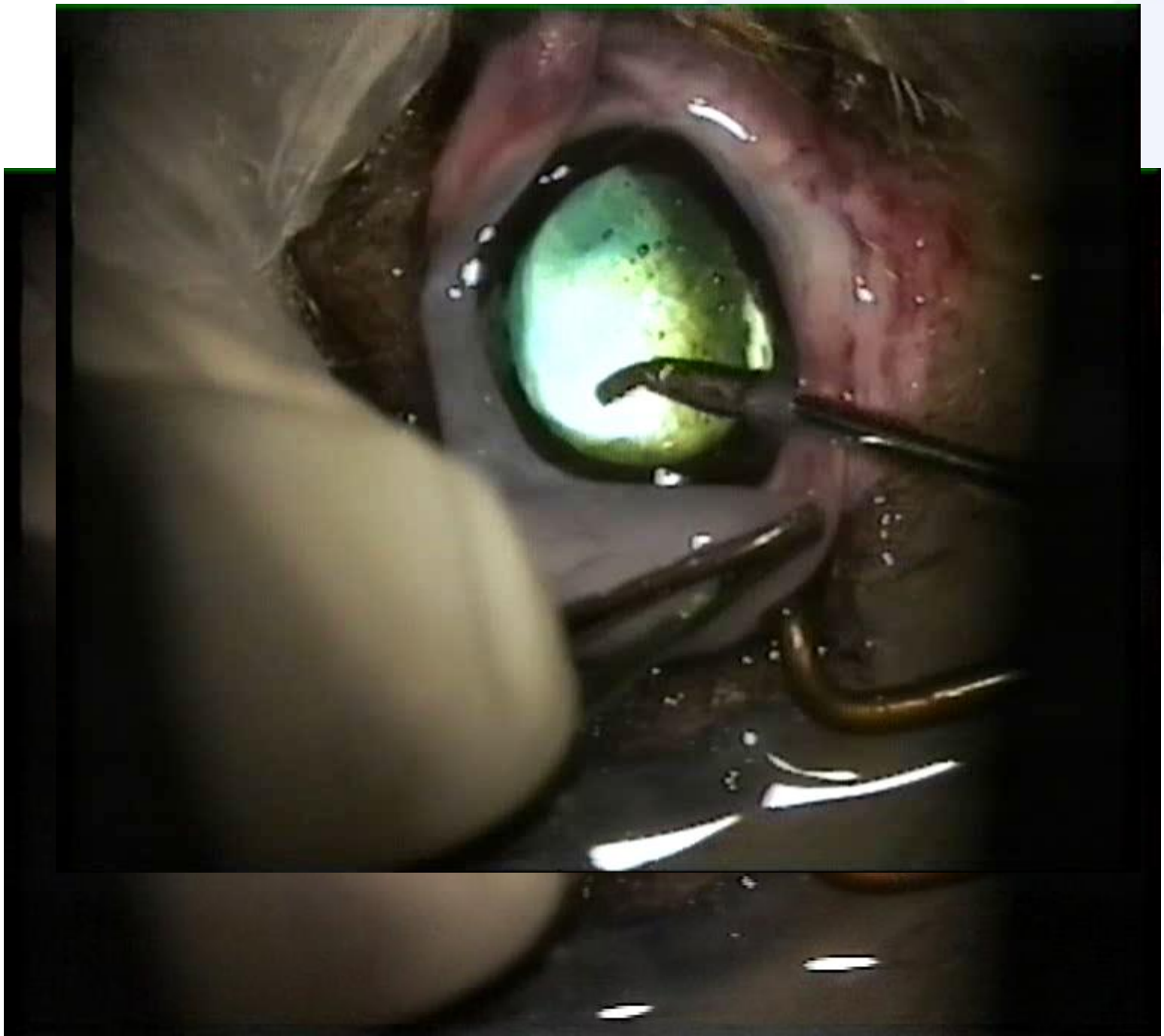
Nucleus removal



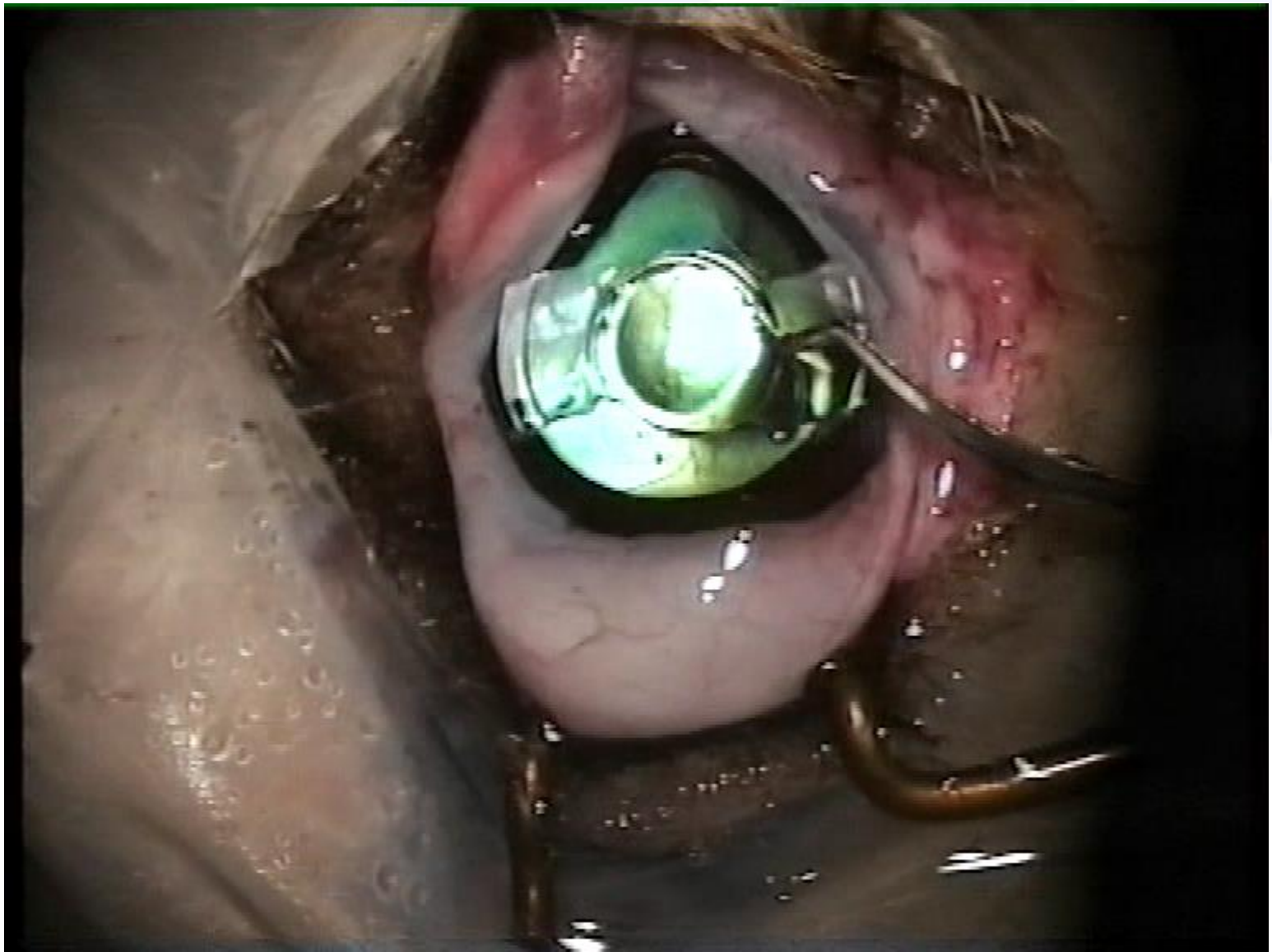


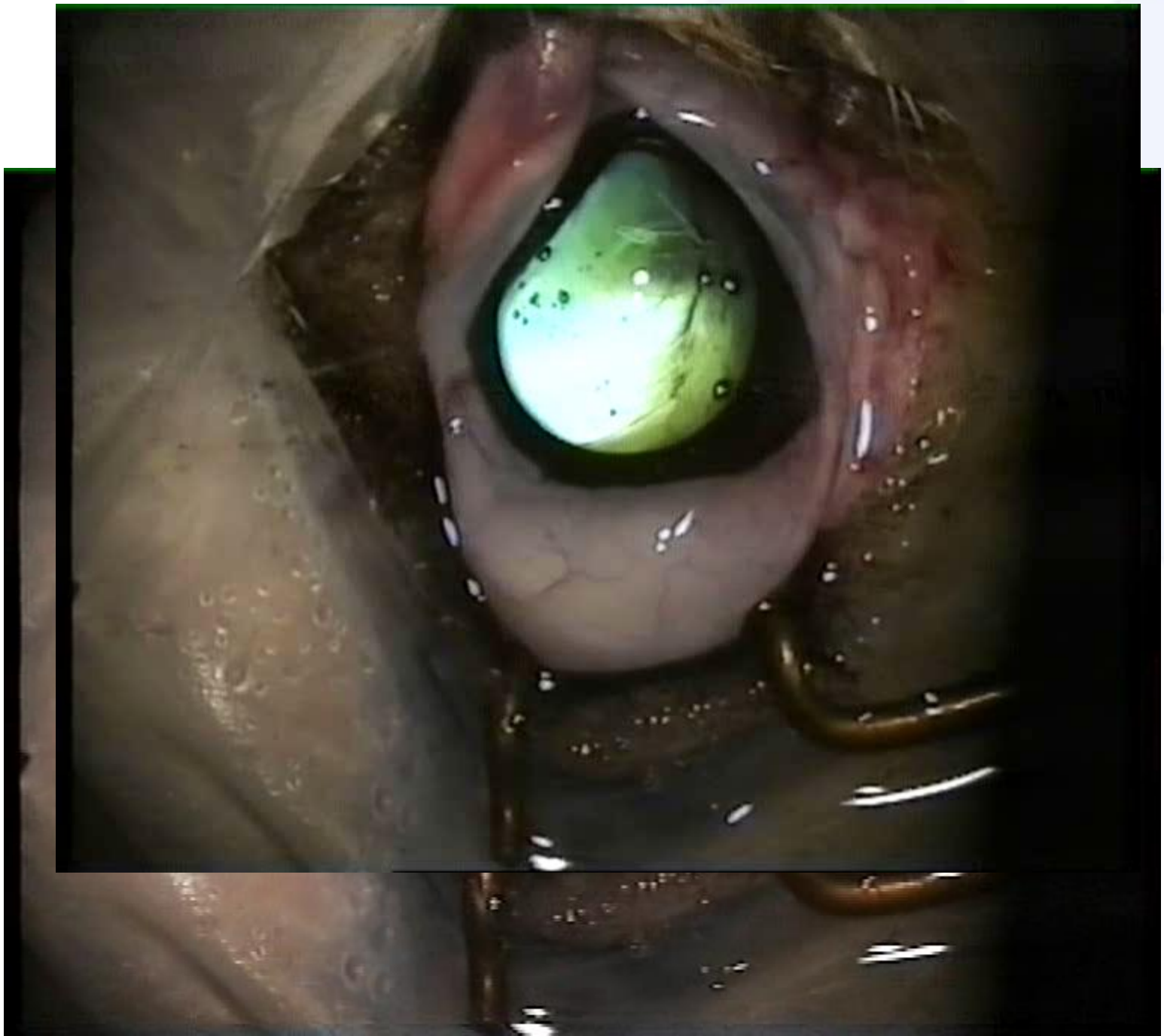
Cortex removal



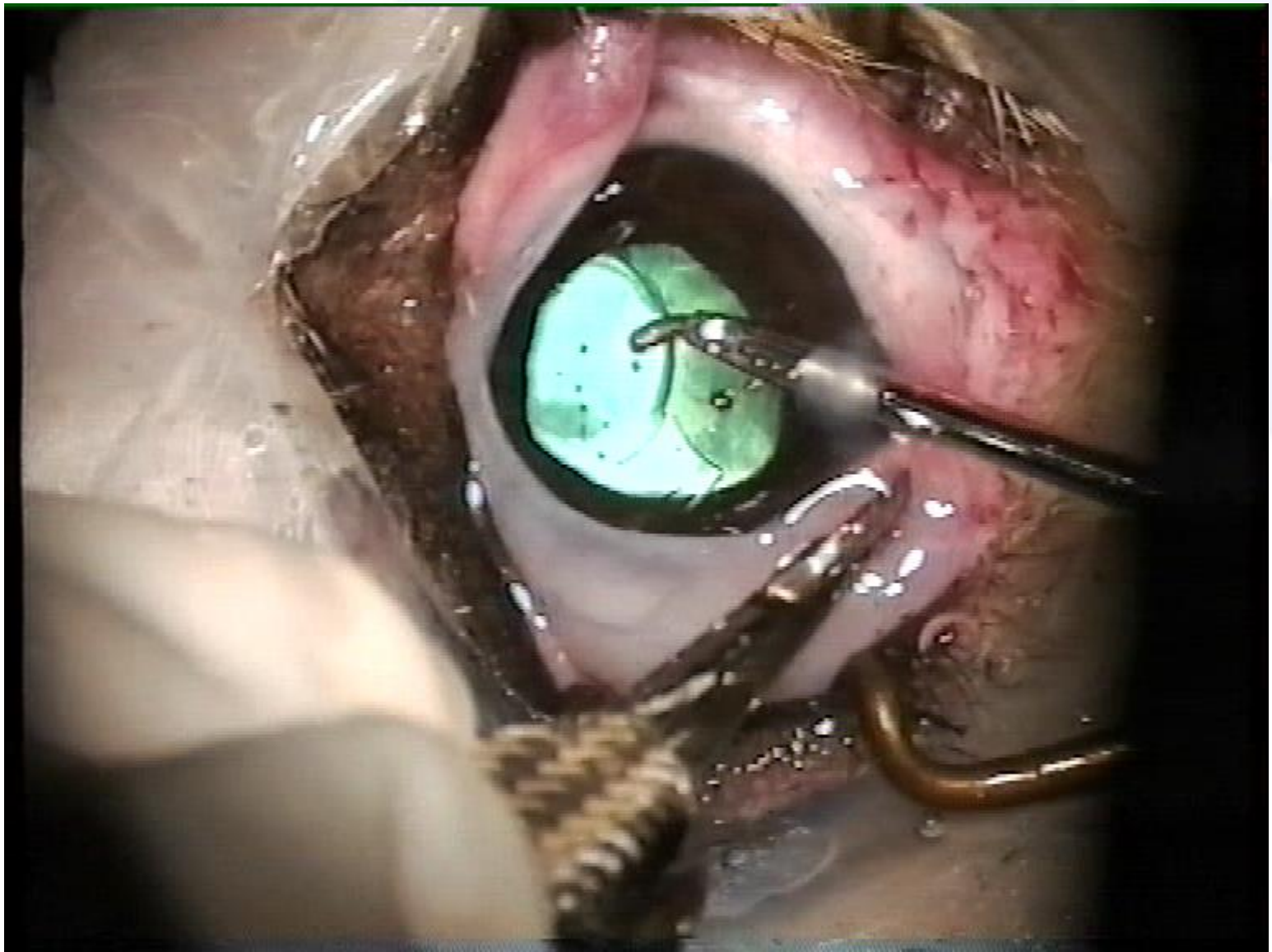


IOL

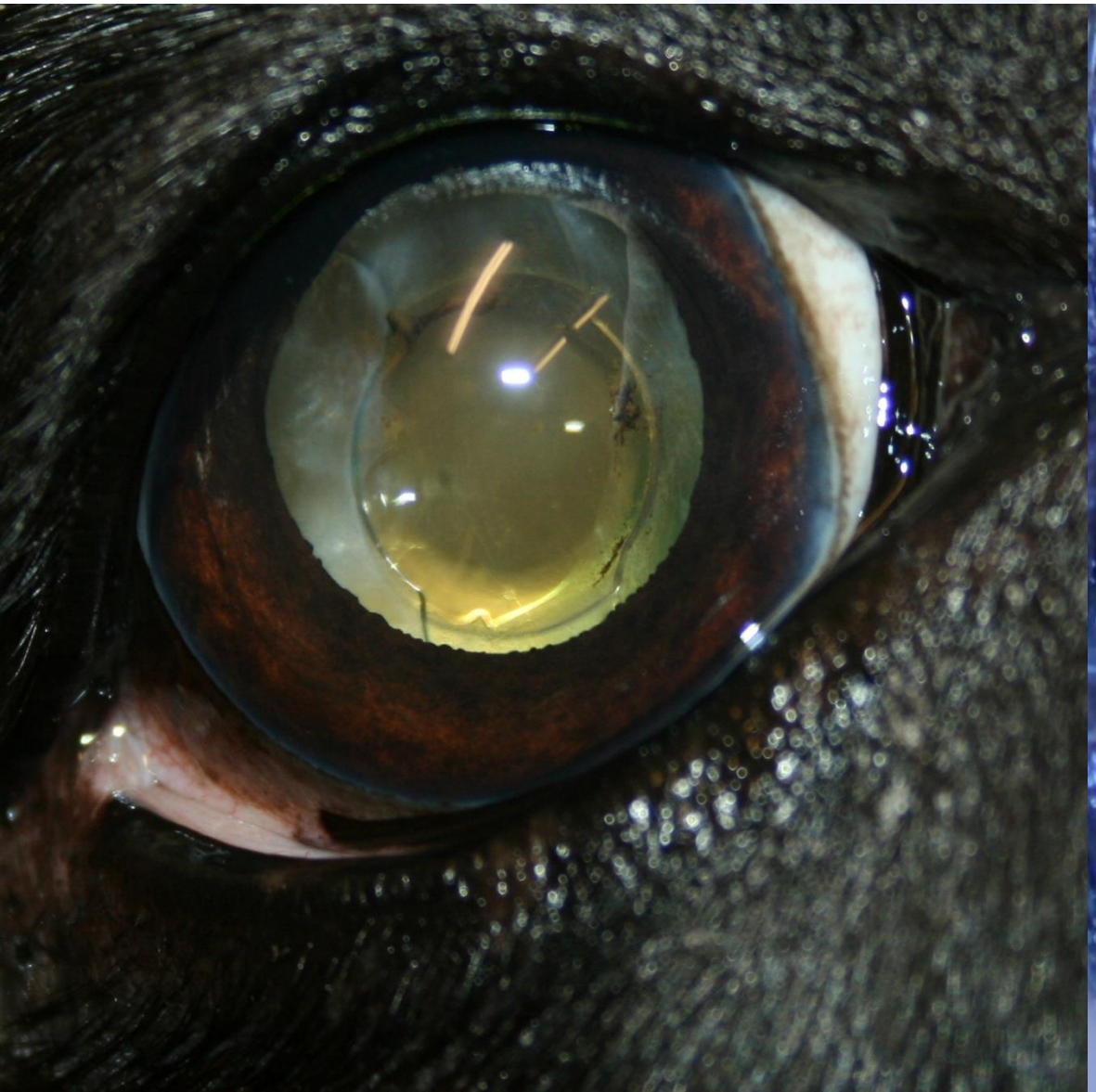


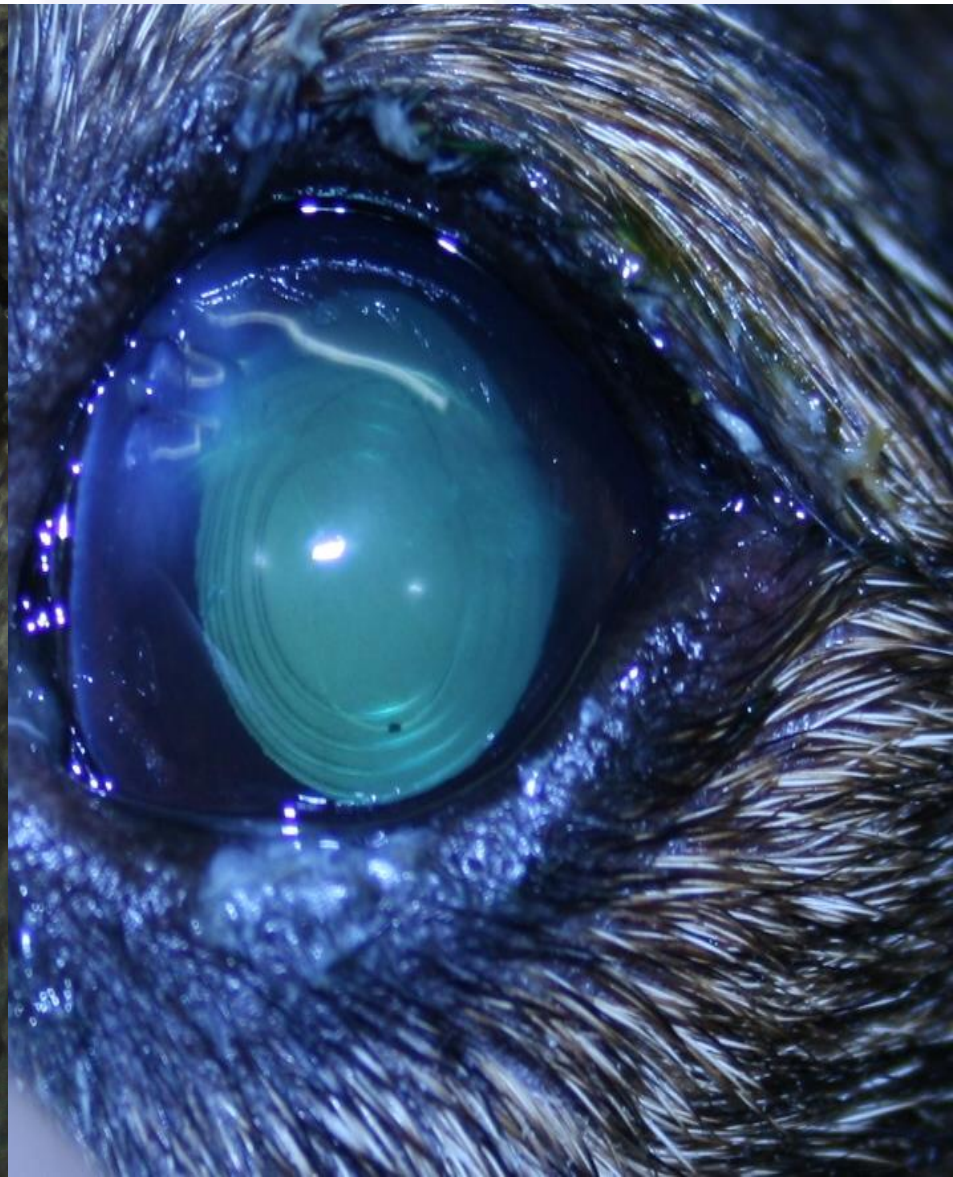


Surgery

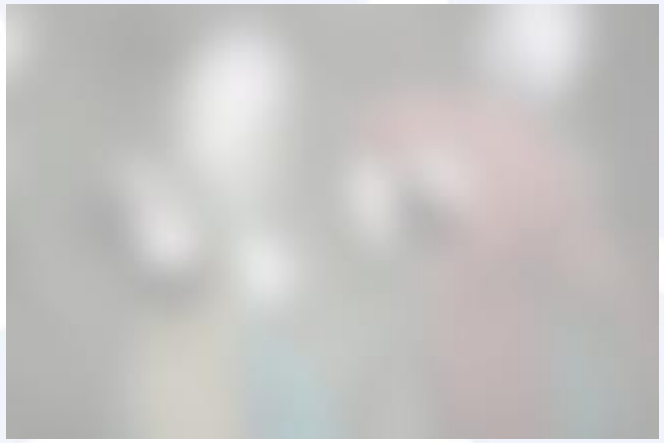


Intra-ocular lenses





Why use an IOL?



Posterior segment disease

An overview

What to remember from the anterior segment disease lecture?

- Uveitis - think systemic disease
- Glaucoma is a bad disease - measure the pressure and seek expert advice asap to maximise outcome
- Cataracts - earlier operated on the better the prognosis, cataracts can cause life long lens induced uveitis with or without surgery so long term management is as important as early surgery

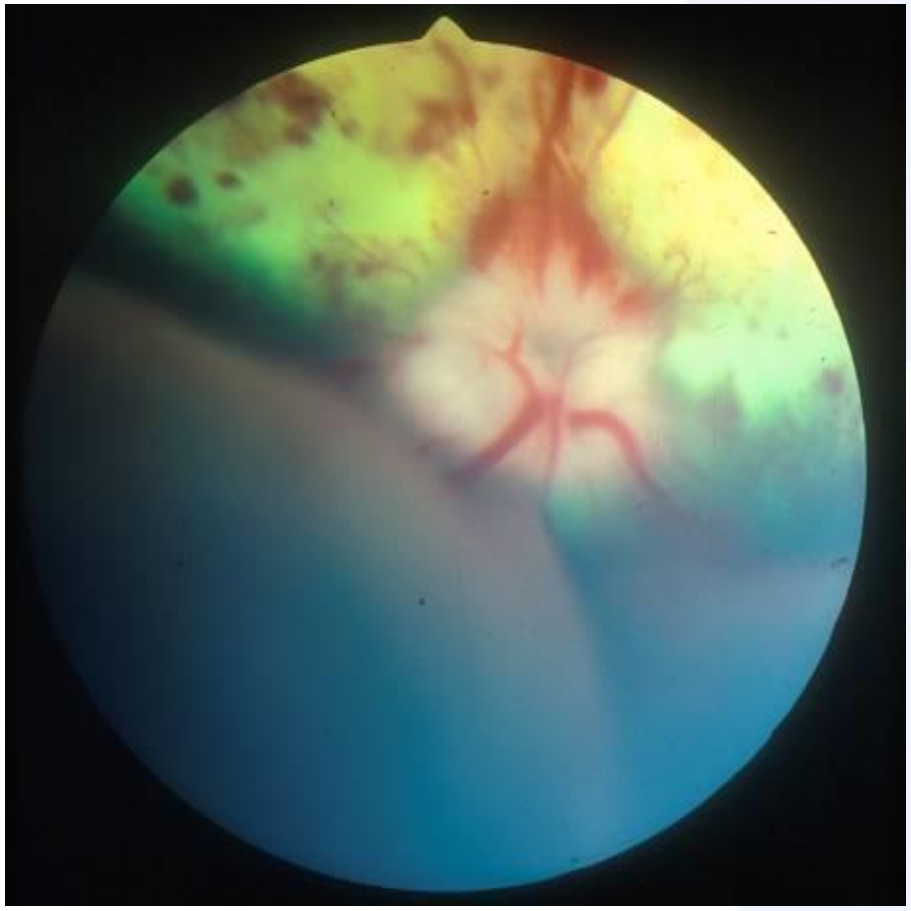
Rowe Referrals

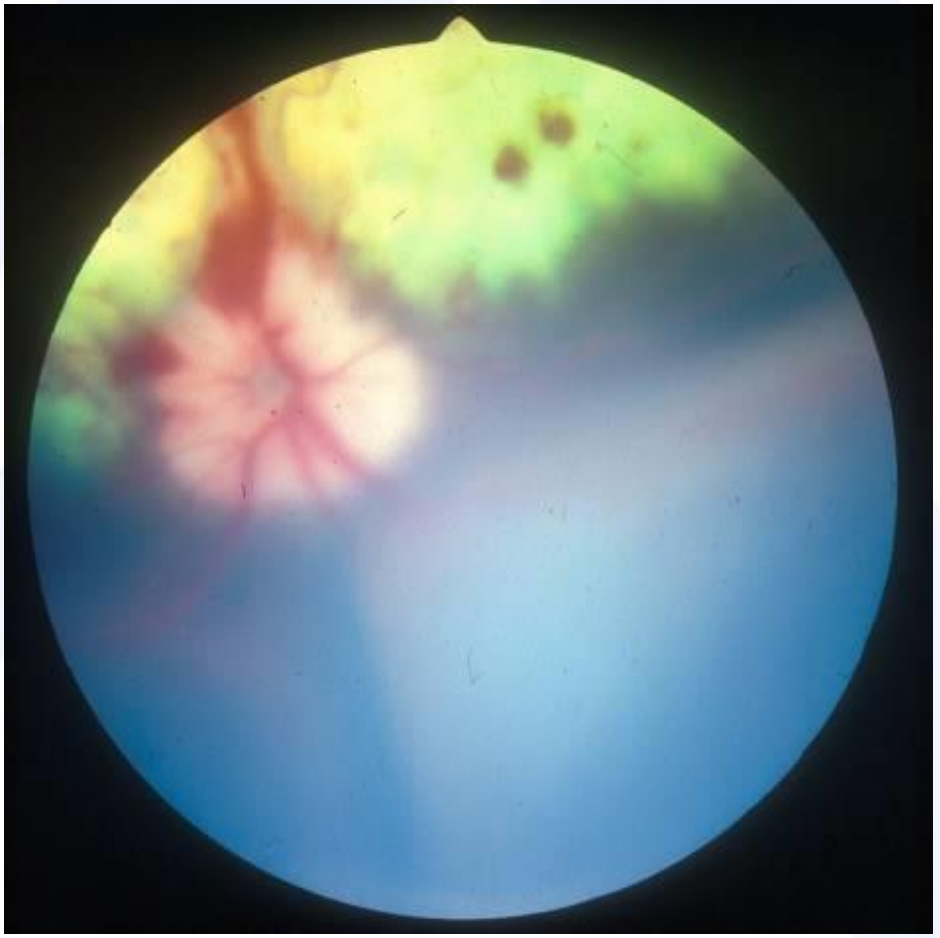
Posterior segment disease

What to remember about the posterior segment?

- Dazzle response a simple test of retinal function even if can’t see retina
- Use ultrasound if can’t see retina
- The retina is beautiful and complex - look at lots
- Some drugs can cause irreversible blindness - Enrofloxacin in cats , Ivermectin in dogs

Hypertension~ dogs & cats

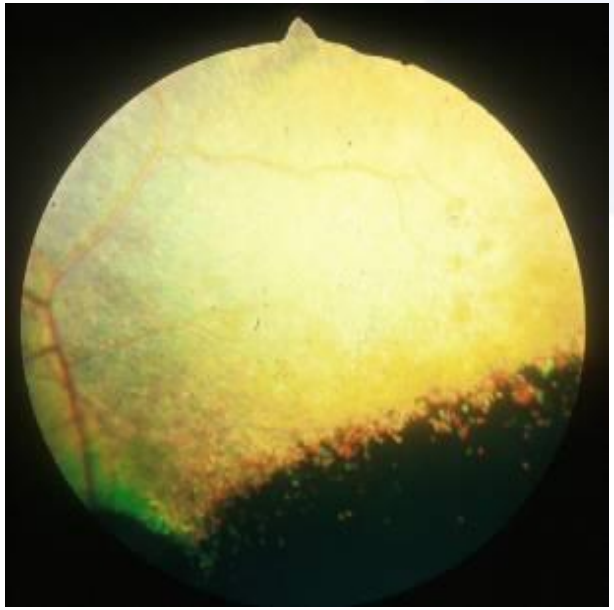


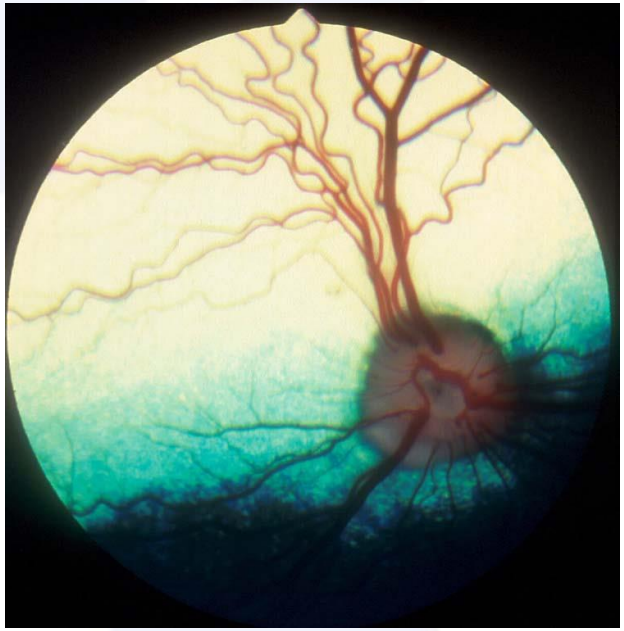


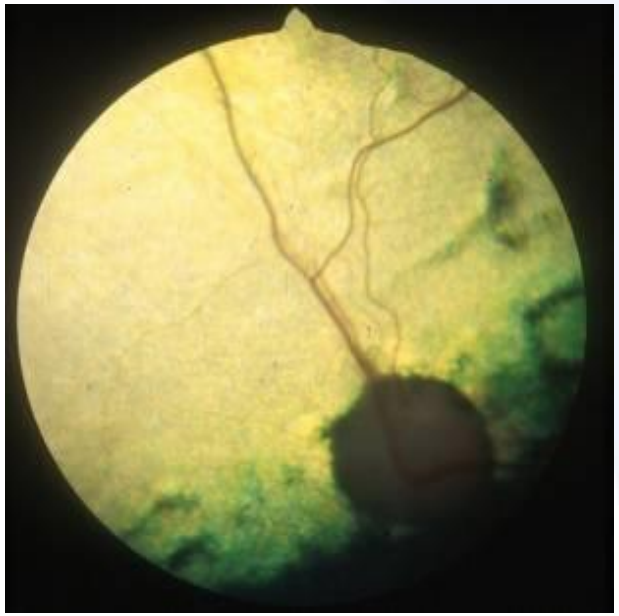
Hypertension may present as intraocular bleeding or blindness due to retinal vascular lesions and detachment.

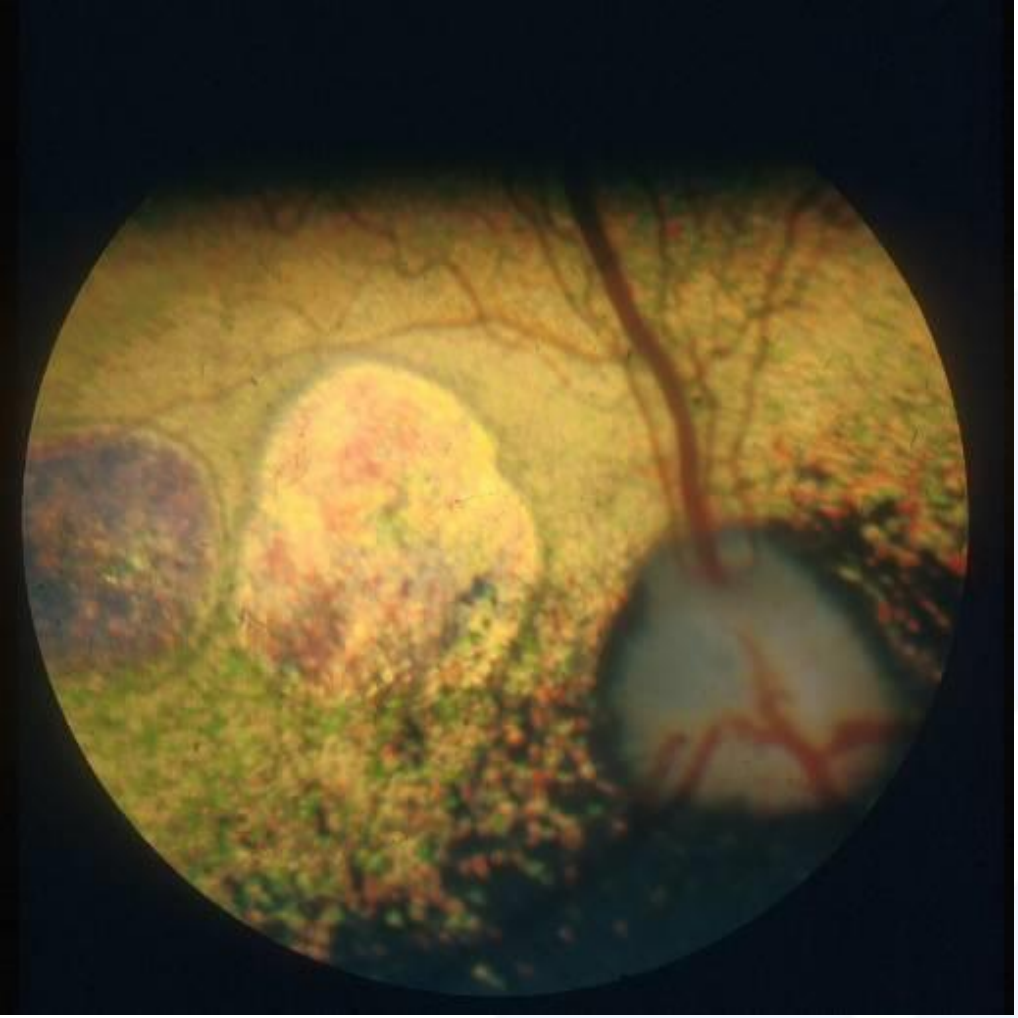
Generalised Progressive Retinal Atrophy

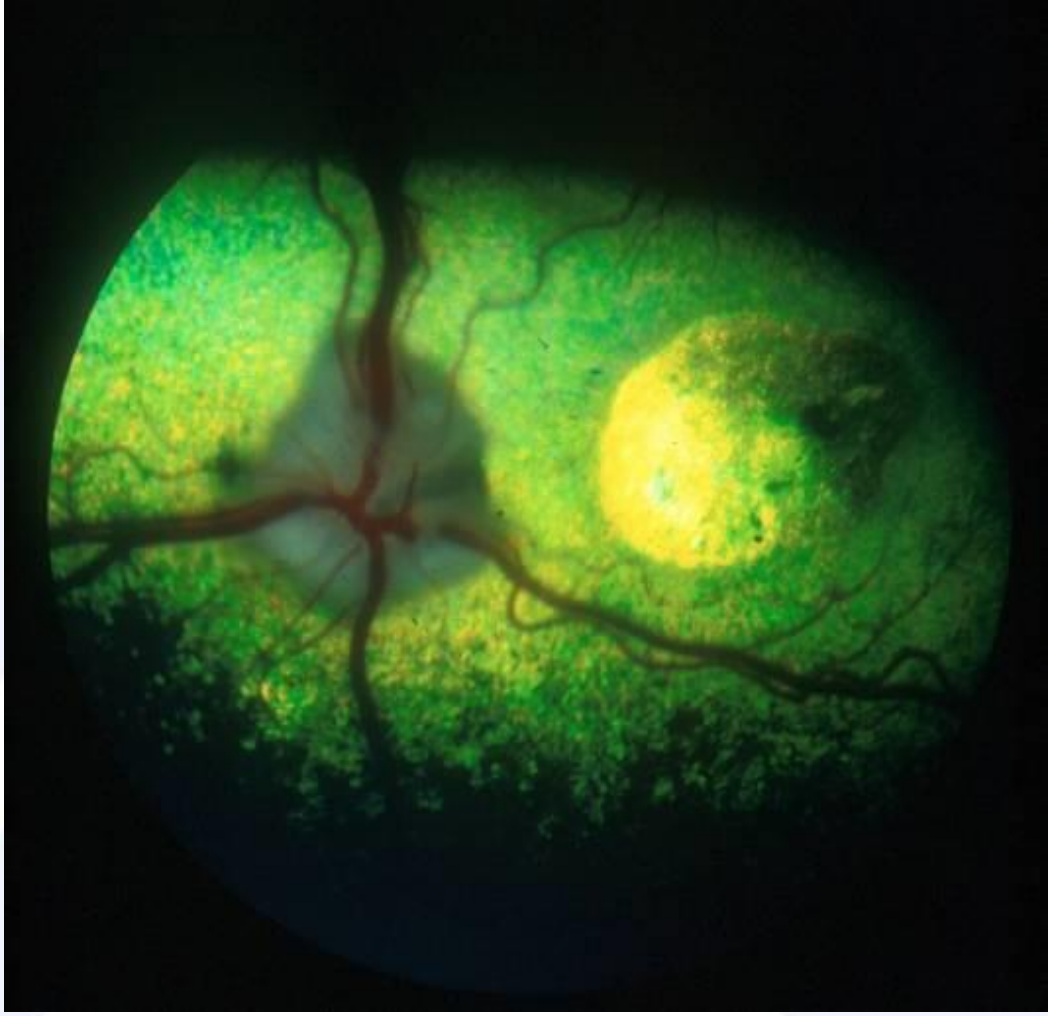
Adult onset progressive hereditary pan-retinal degeneration resulting in total blindness.
Night vision lost first.
Several recognised breeds but especially:
English cocker, Miniature poodle & labrador









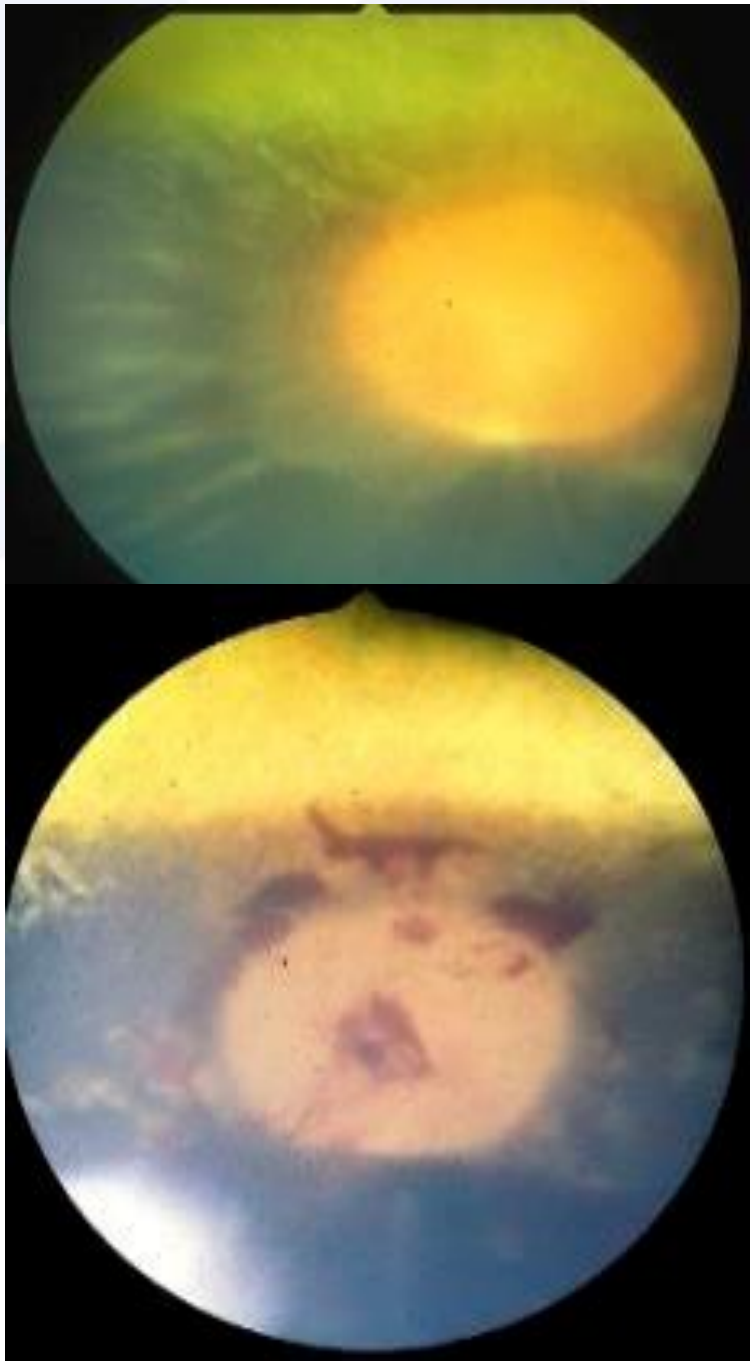


“Post-inflammatory retinopathy”

Hyperreflective retinal scars due to (presumed) resolved inflammation

Optic neuritis

- Signs?
  - –Dazzle negative
  - –Dilated non-responsive pupil
  - –ONH swelling/H+
- Cause?
  - Septicaemia
  - Extension CNS inflammatory disease e.g. GME dogs



What to remember from the posterior segment lecture?

- Dazzle response a simple test of retinal function even if can’t see retina
- Use ultrasound if can’t see retina
- The retina is beautiful and complex - look at lots, remember coat colour affects and think in layers
- Some drugs can cause irreversible blindness - Enrofloxacin in cats , Ivermectin in dogs