Fundus Interpretation Made Real

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Ocular Fundus

- Posterior portion of eye examined with ophthalmoscope
- Composite structure
  - Retina
  - Choroid/tapetum
  - Sclera
  - Optic disc

Fundus Examination

- Direct ophthalmoscopy
- Indirect ophthalmoscopy
  - Monocular indirect scope (PanOptic)
  - Hand-held lens/focal light source
  - Binocular indirect ophthalmoscope

Direct Ophthalmoscope

- 15X magnification
- Upright image
- Least expensive

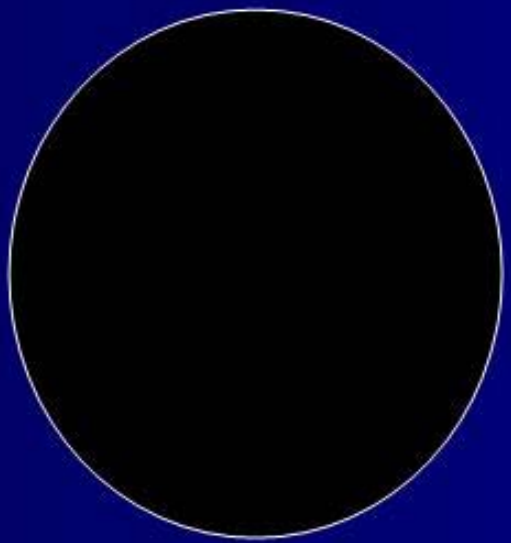
Direct Ophthalmoscope

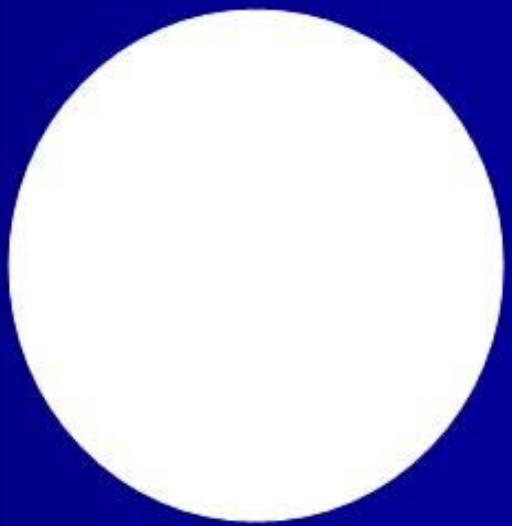
- Limited field of view
- Poor penetration through opaque media
- Time consuming technique
- No stereopsis
- Risk of injury due to proximity to patient

Direct Ophthalmoscope

- Select 0 diopter setting
- View tapetal reflection from 25cm
- Move toward eye, observing clarity of media
- Examine from a distance of 2-3 cm, assessing optic disc, retinal blood vessels, and general variations in fundus color and reflectivity

Direct Ophthalmoscope





Monocular Indirect : Welch-Allyn PanOptic®

- Easiest to use
- Upright image
- 3x magnification, giving larger field of view than direct
- Safer working distance than direct

Monocular Indirect : Welch-Allyn PanOptic®

- More expensive than direct
- Smaller field of view than indirect

Binocular Indirect

- 3-dimensional image (stereopsis)
- Safest working distance
- Penetrates opaque media
- 2x magnification provides largest field of view

Indirect Lens

- Less magnification provides greater field of view
- 30 D magnifies 2x
- 20 D magnifies 4x
- 14 D magnifies 8x

Binocular Indirect

- Most expensive
- Proficiency requires practice!
- Inverted, reversed image

"Poor Man's" Indirect

- Combines handheld light source with indirect lens

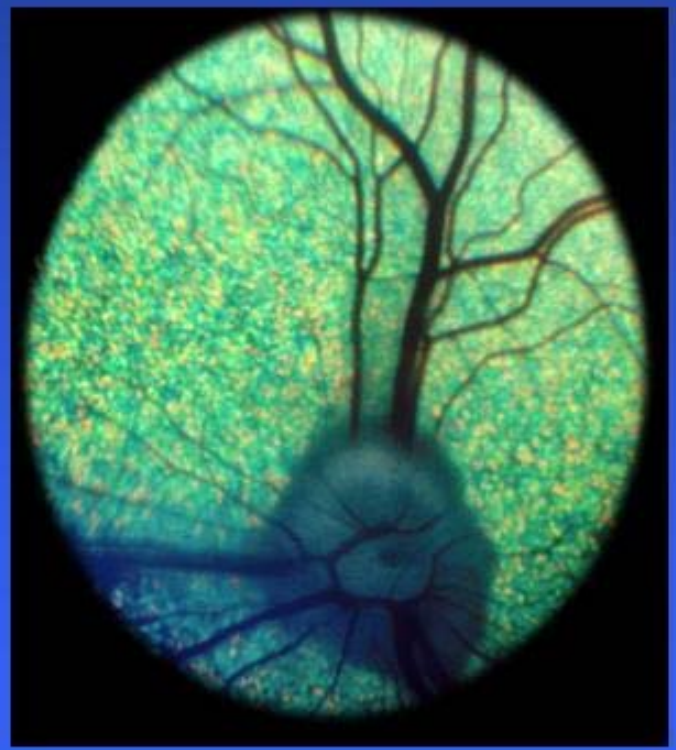
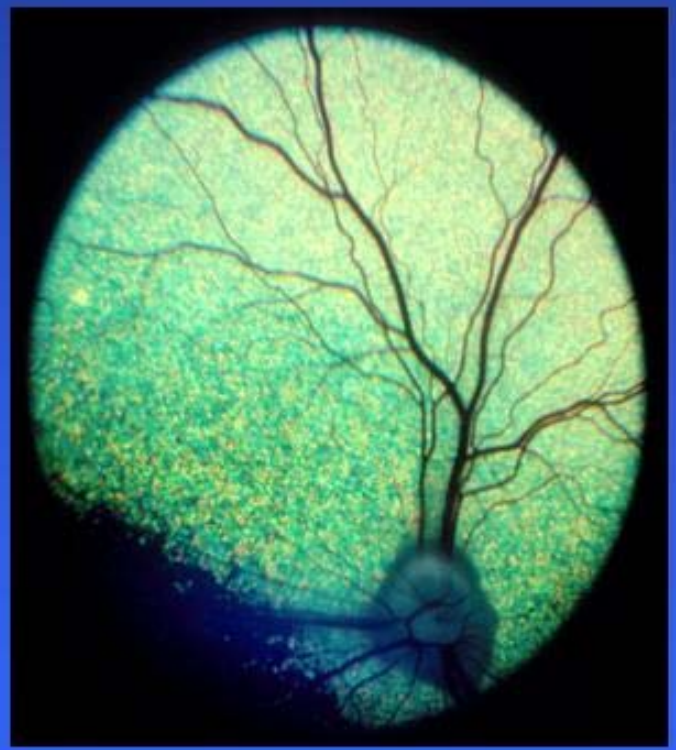
"Poor Man's" Indirect

- Advantages
  - Least expensive
  - Quick screening tool
- Disadvantages
  - Occupies both hands
  - Inverted, reversed image

Indirect Technique

- Examine at eye-level and arm's length
- Direct light to obtain tapetal reflection
- Place lens in path of light, 2-4cm in front of eye, adjusting slightly back and forth to give best virtual image
- Maintain alignment of your eye with light source and lens but change angle of view to examine other fundus areas

Fields of View

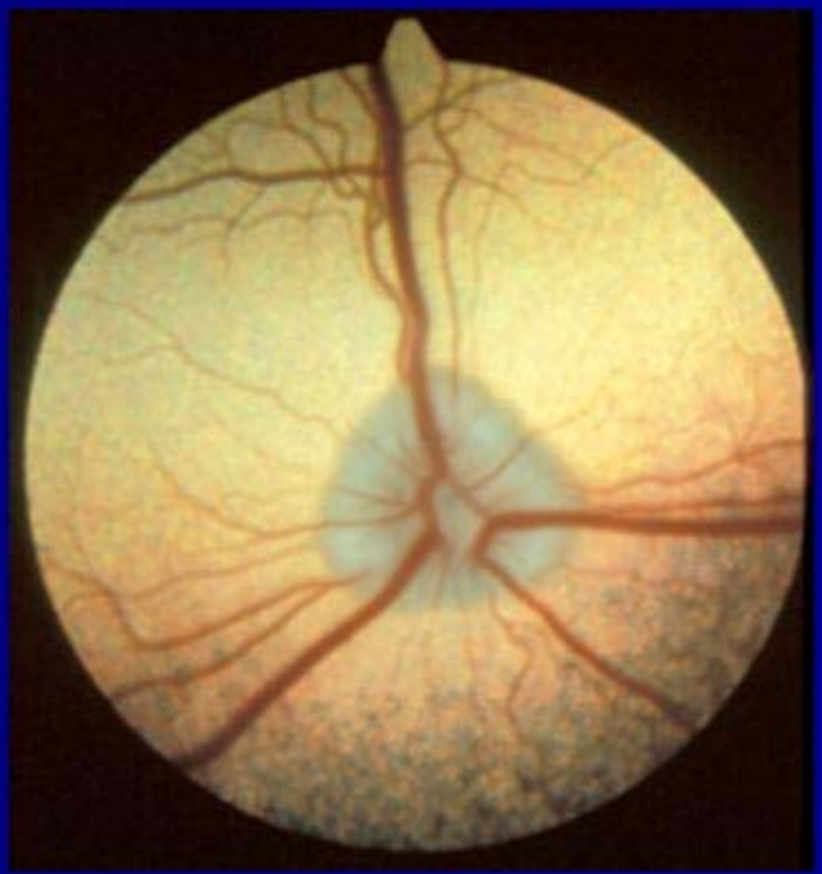




Ocular Fundus

- General features
  - Tapetal region
  - Non-tapetal region
  - Area centralis
  - Optic disc or papilla
  - Retinal vessels

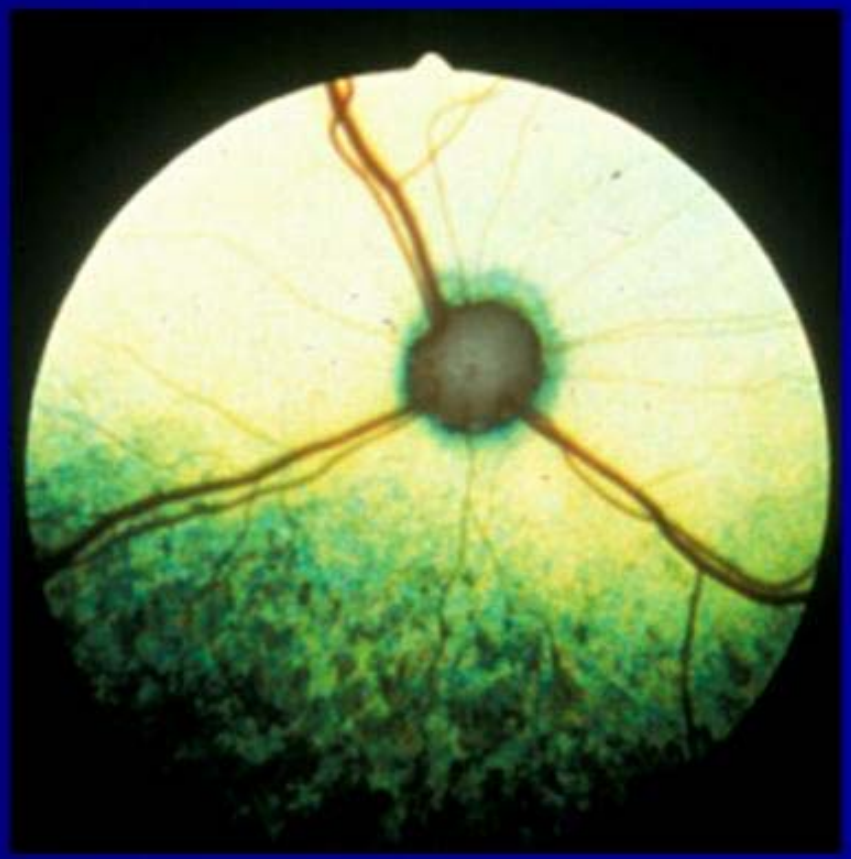
Canine Fundus

- Optic disc
  - Shape
  - Location
  - Associated vessels
- Retinal vessels
- Tapetum
- Tapetal junction
- Non-tapetum



Feline Fundus

- Optic disc
  - Shape
  - Location
  - Associated vessels
- Retinal vessels
- Tapetum
- Tapetal junction
- Non-tapetum

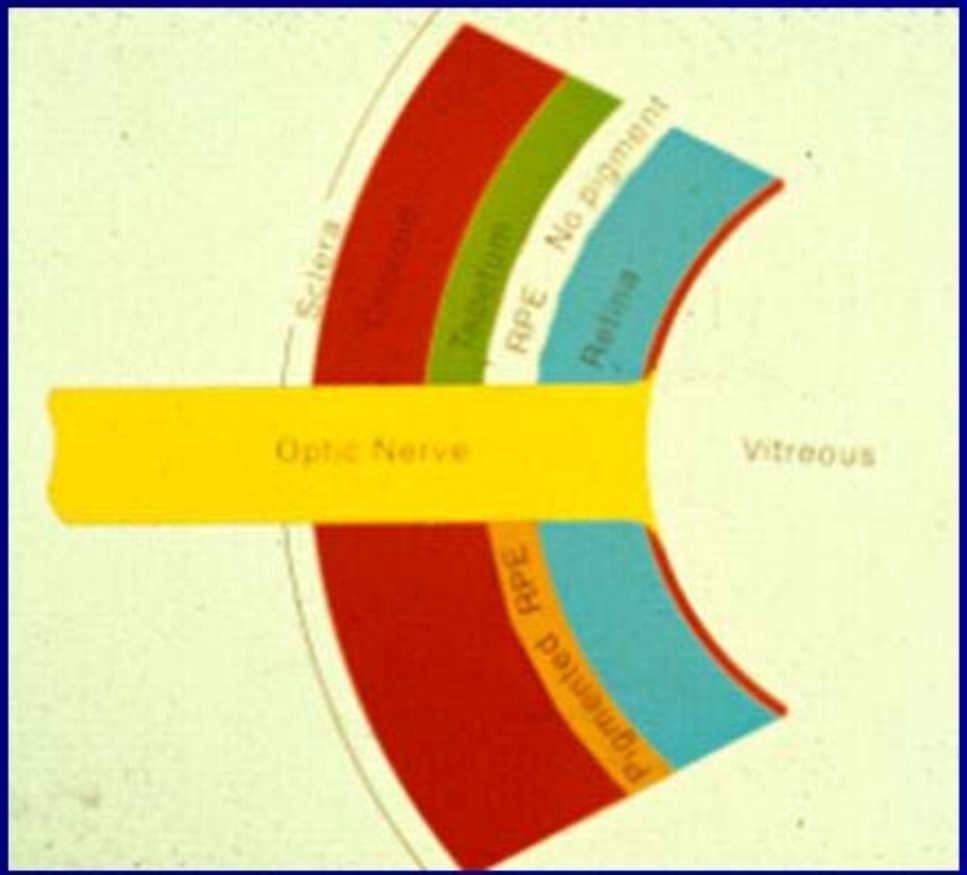


Ophthalmoscopic Lesions

- Changes in one or more of the layers that create the composite fundus
- Each layer has a limited repertoire of responses
- Successful interpretation = recognizing the effect of these limited changes on the composite picture

Fundus Model

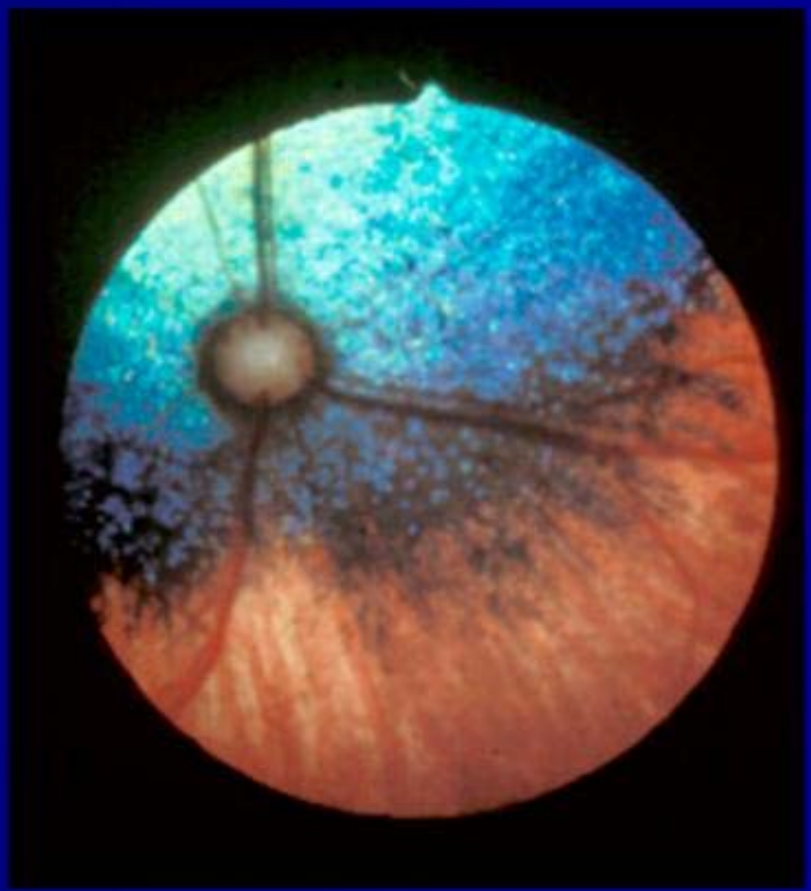
- Sclera
- Choroid
  - Vessels
  - Pigment
  - Tapetum
- Retina
  - RPE
  - Neurosensory retina
  - Vessels
- Optic disc

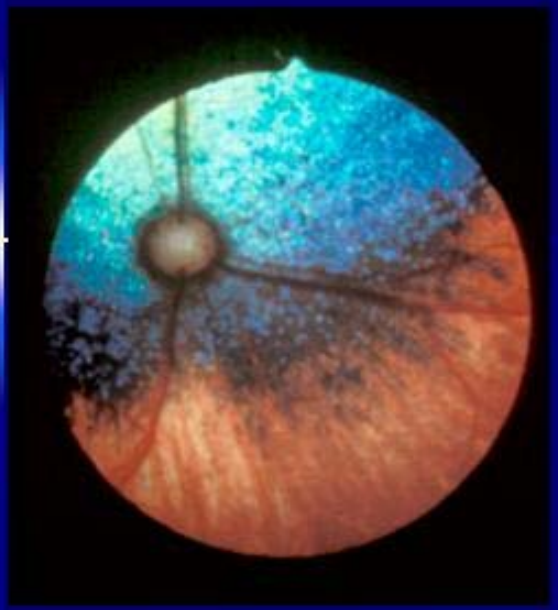


AAHA2007:MBGlaze

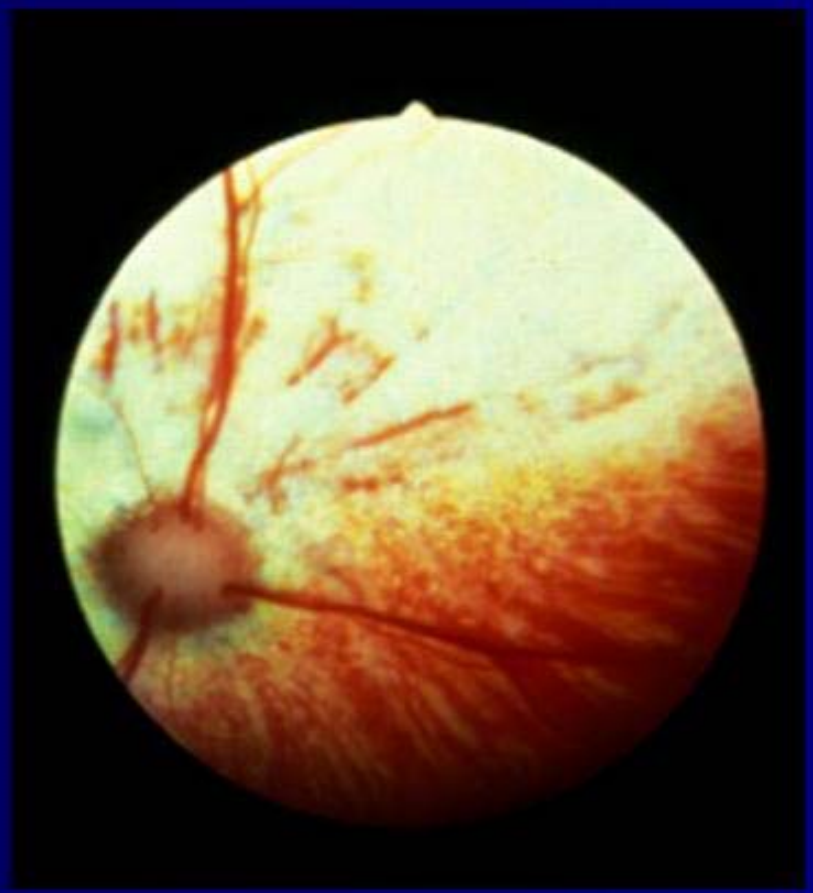
Patient #1

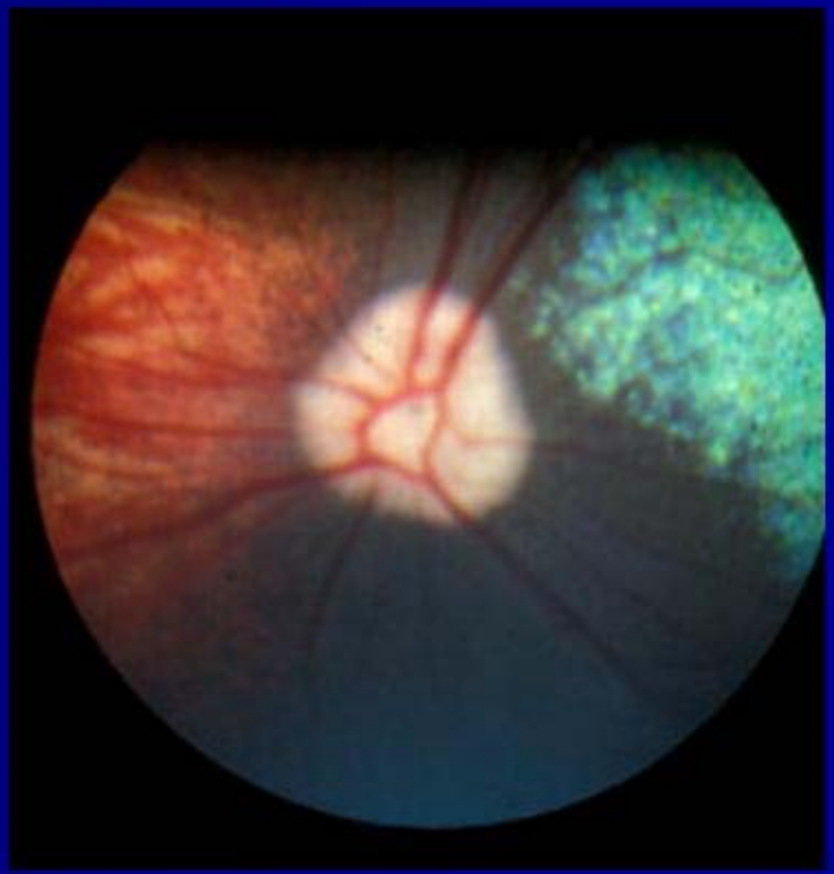
- 5 yr old F/S DSH
- Retinal "hemorrhage" diagnosed at yearly exam
- No vision change
- No health concerns





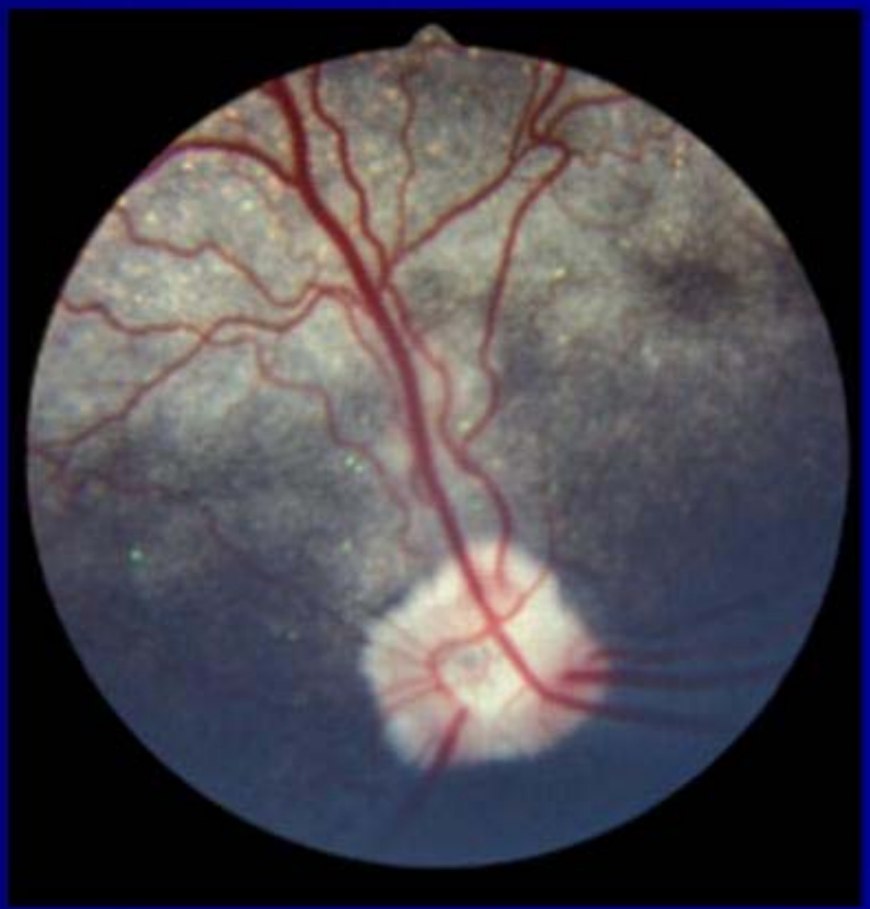
↓ Nontapetal Pigmentation

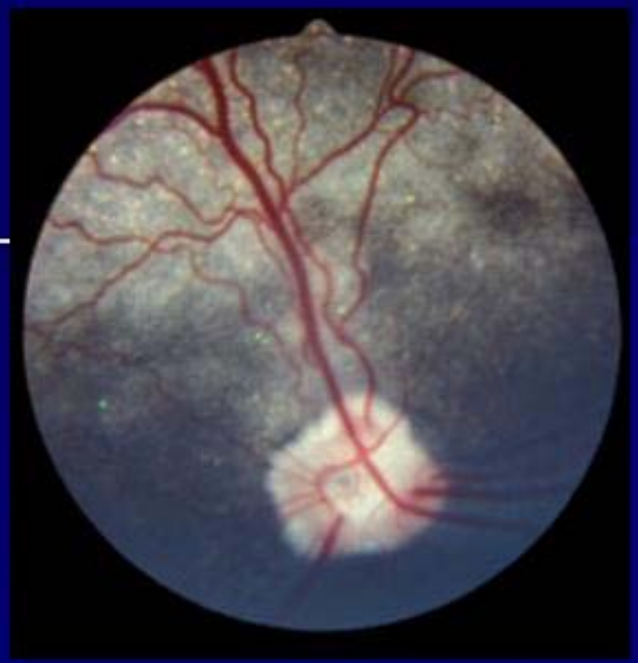




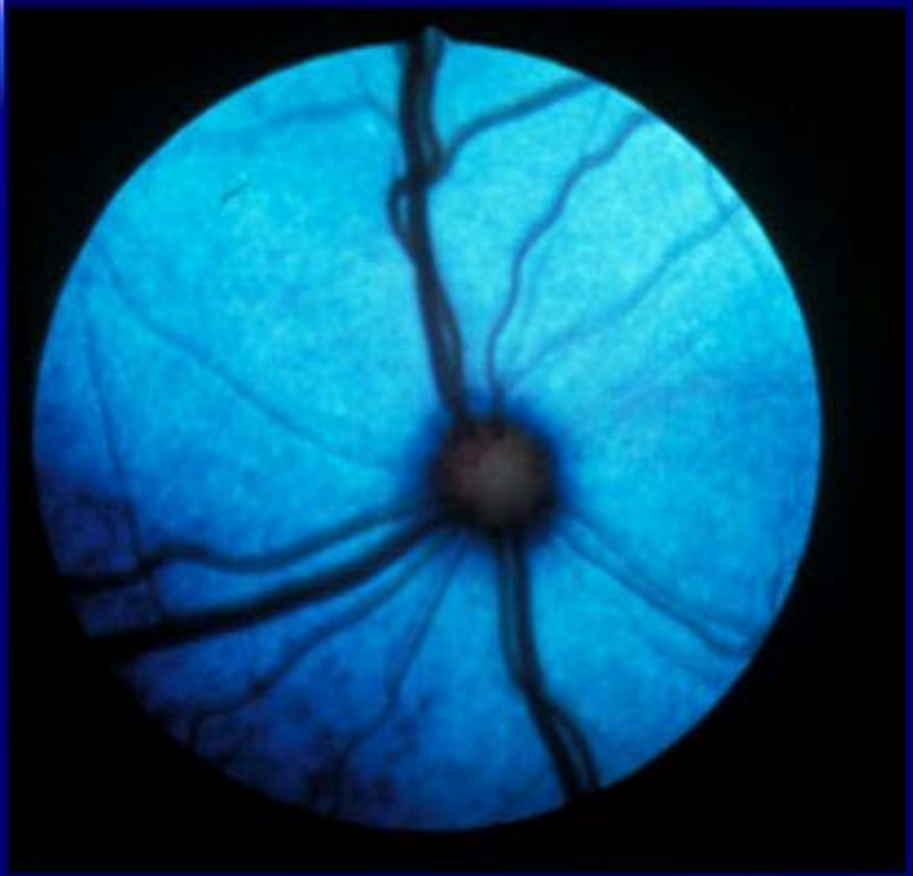
Patient #2

- 2 yr old M/N Beagle
- Coincidental finding at yearly health maintenance exam
- No history of ocular disease or vision change

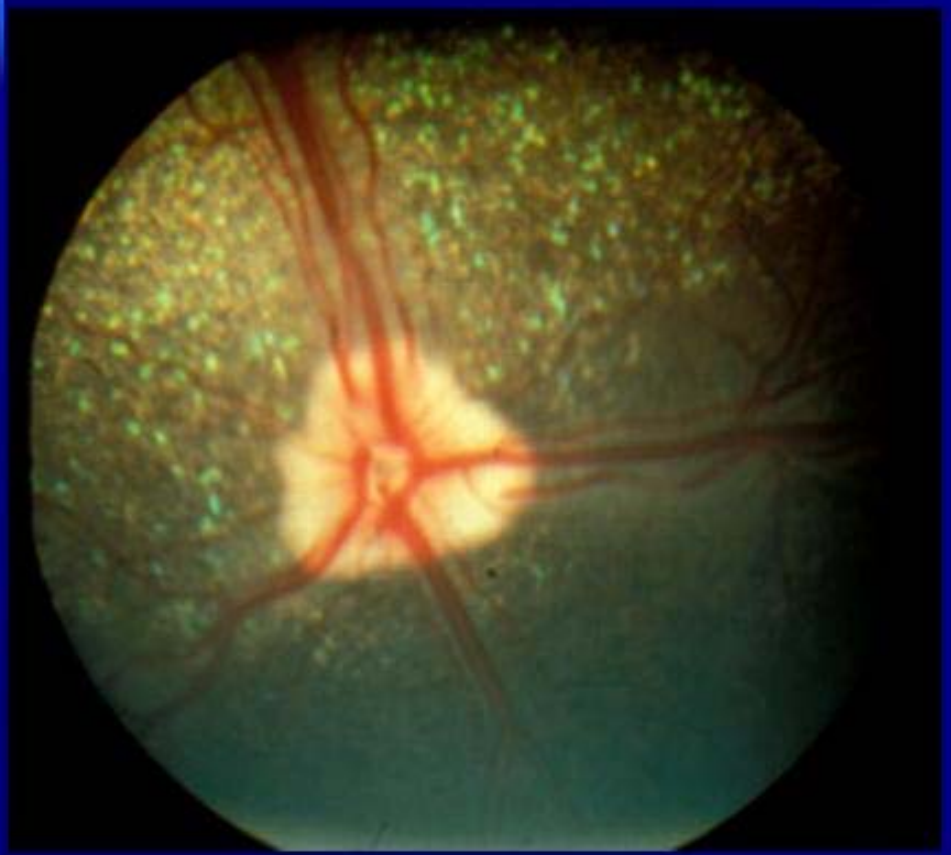


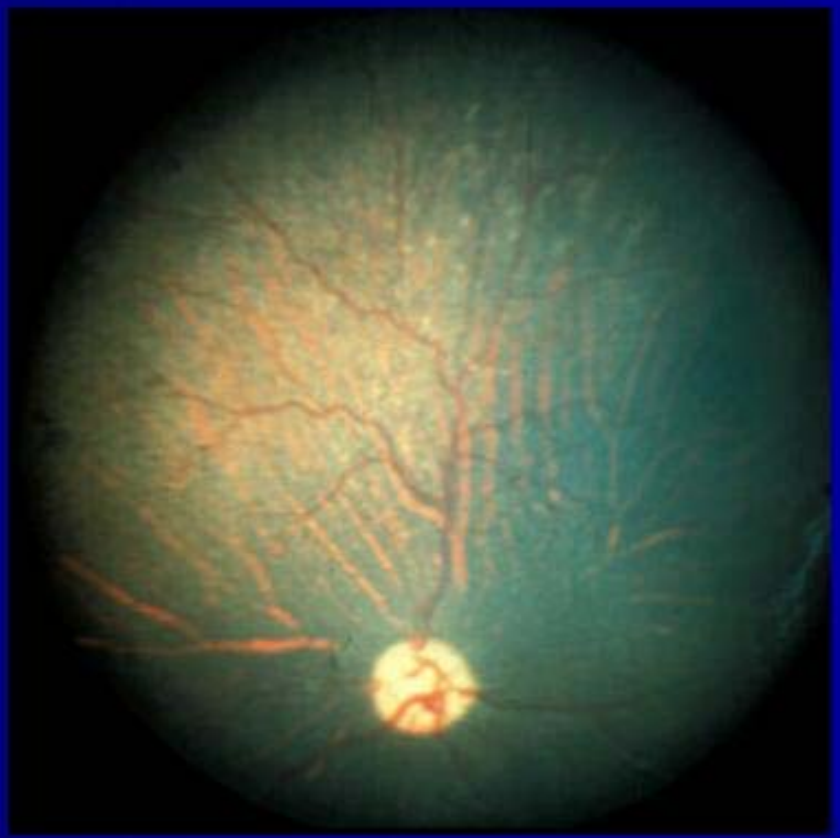


↓ Tapetal Development



↓ Tapetal Development



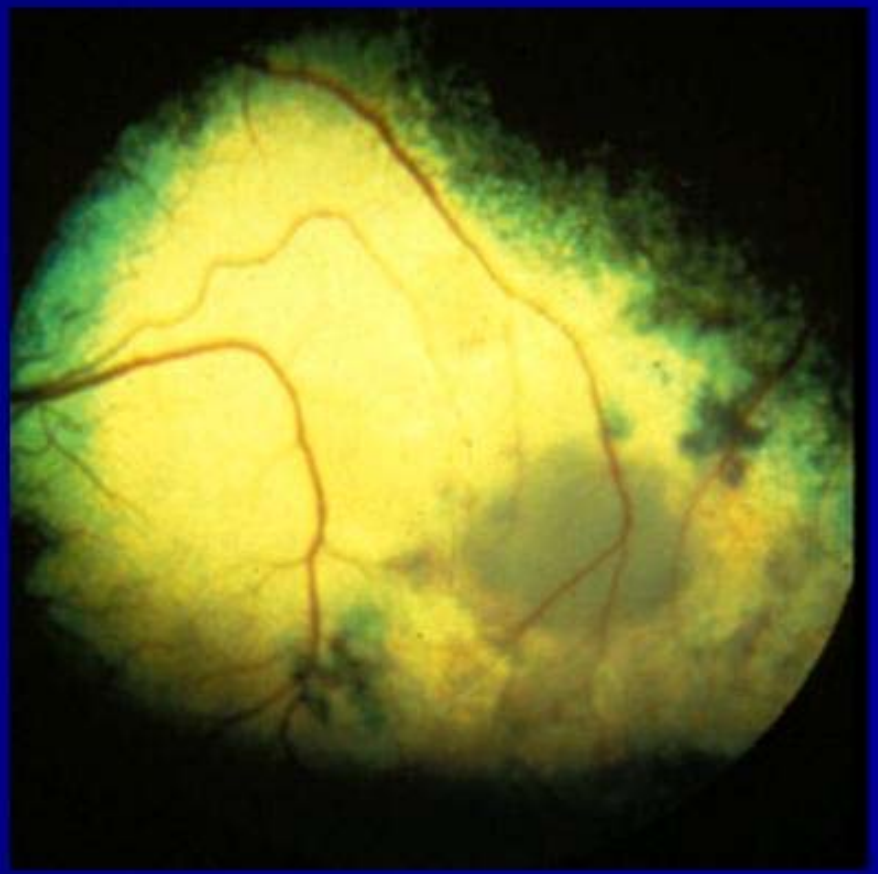


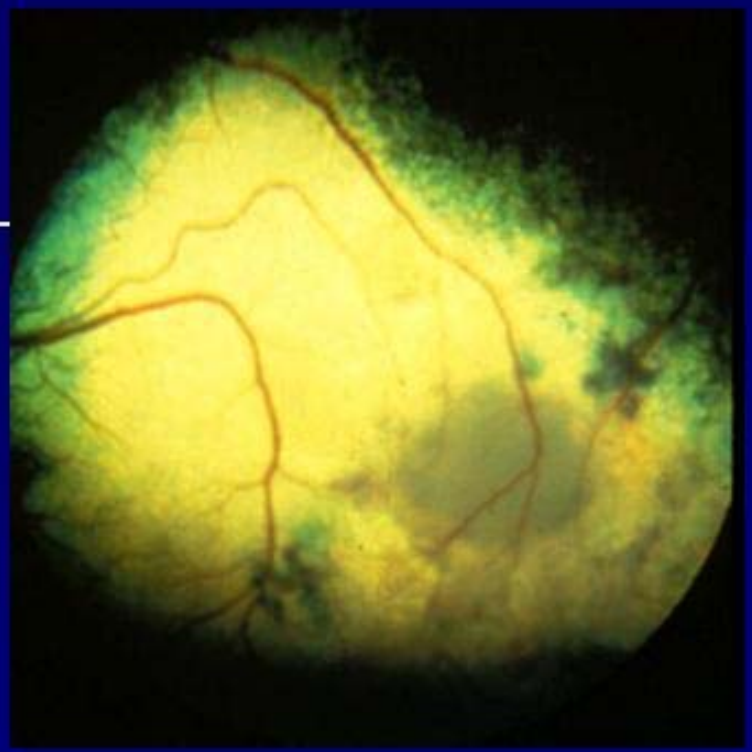
Patient #3

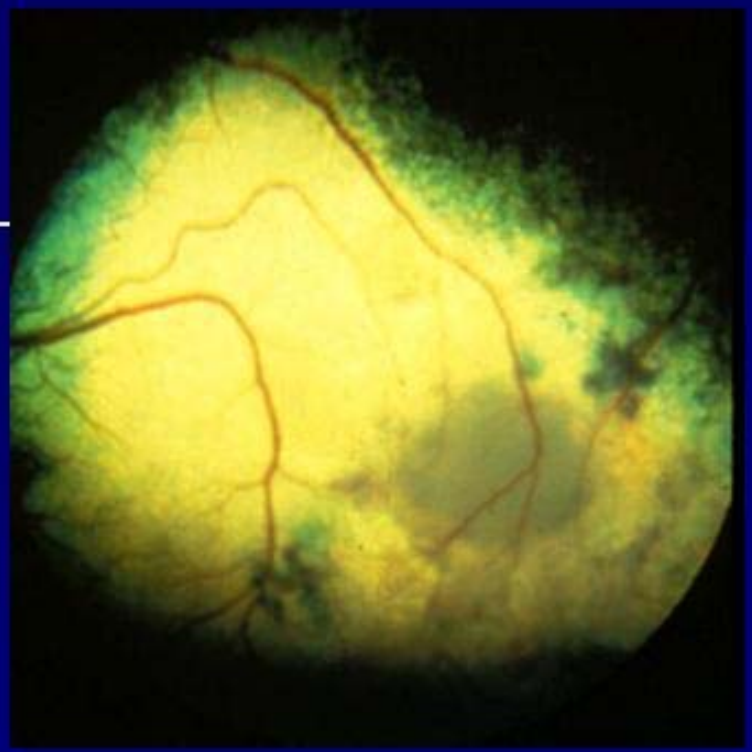
- 3 yr old F/S DSH
- Recent history of tearing OS
- No change in vision

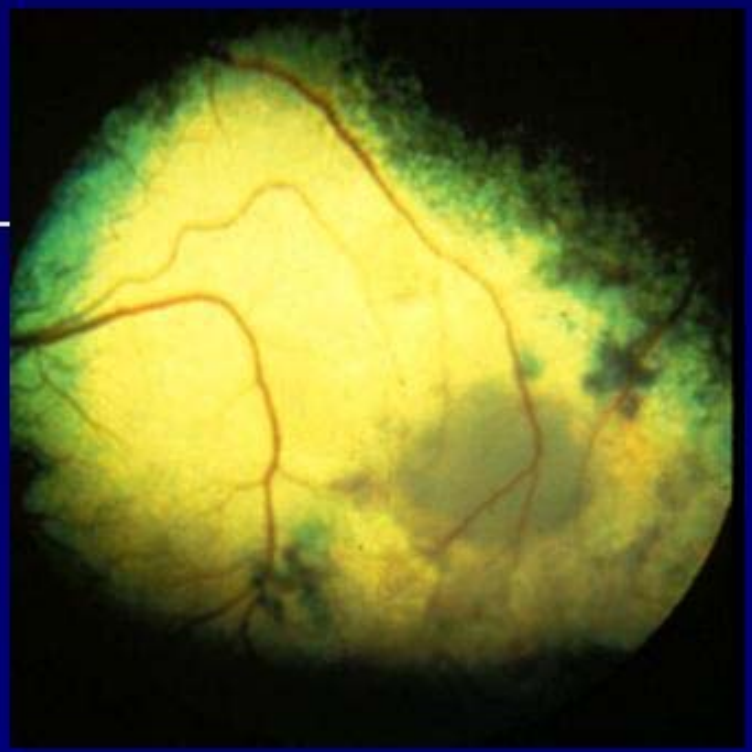
Patient #4

- 1 yr old intact male Walker Hound
- Poor hunting performance
- Weight loss, fever, lymphadenopathy

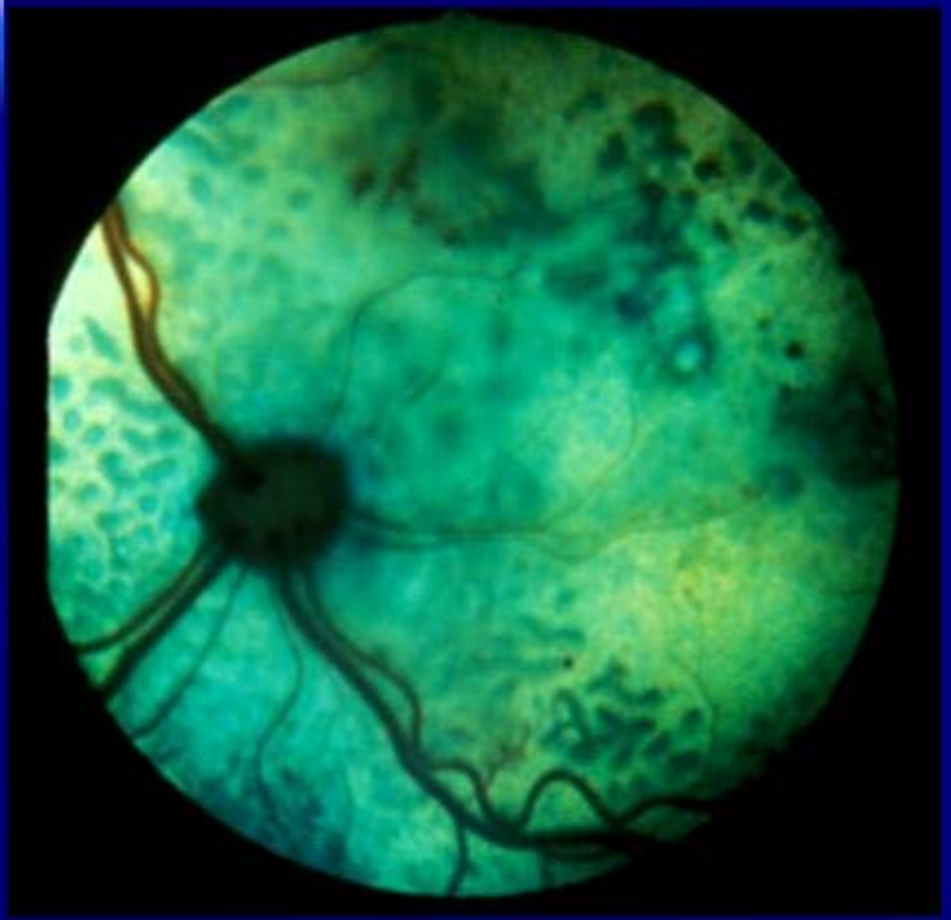


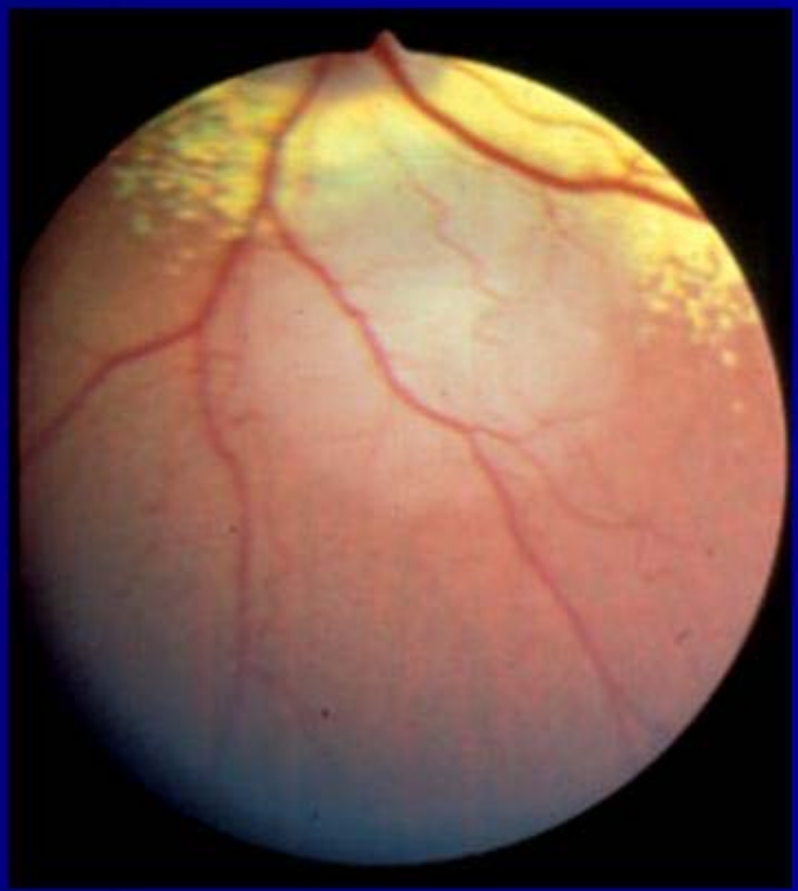






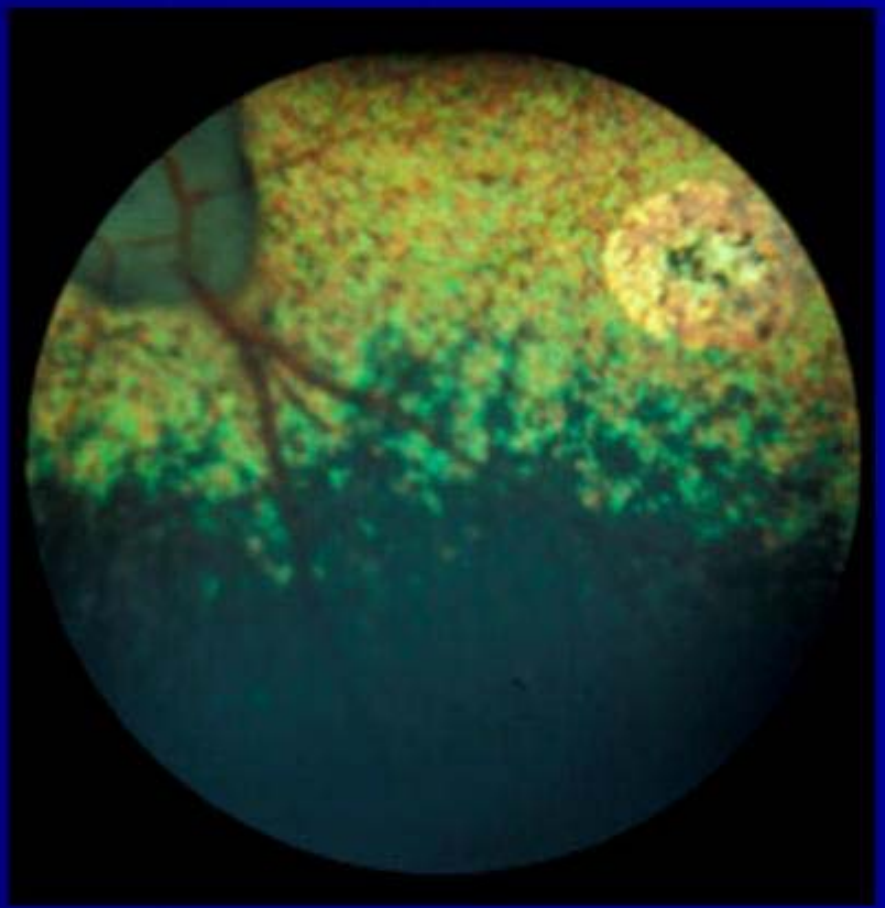
Active Chorioretinitis

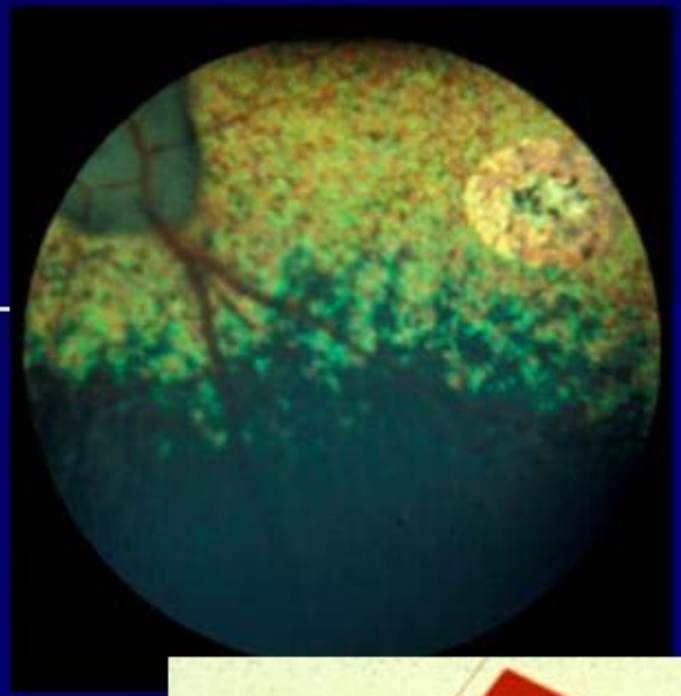


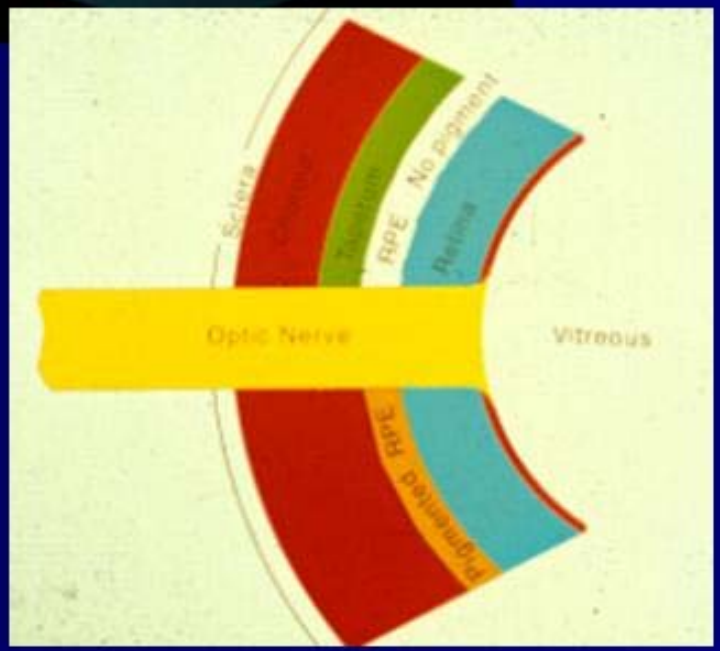


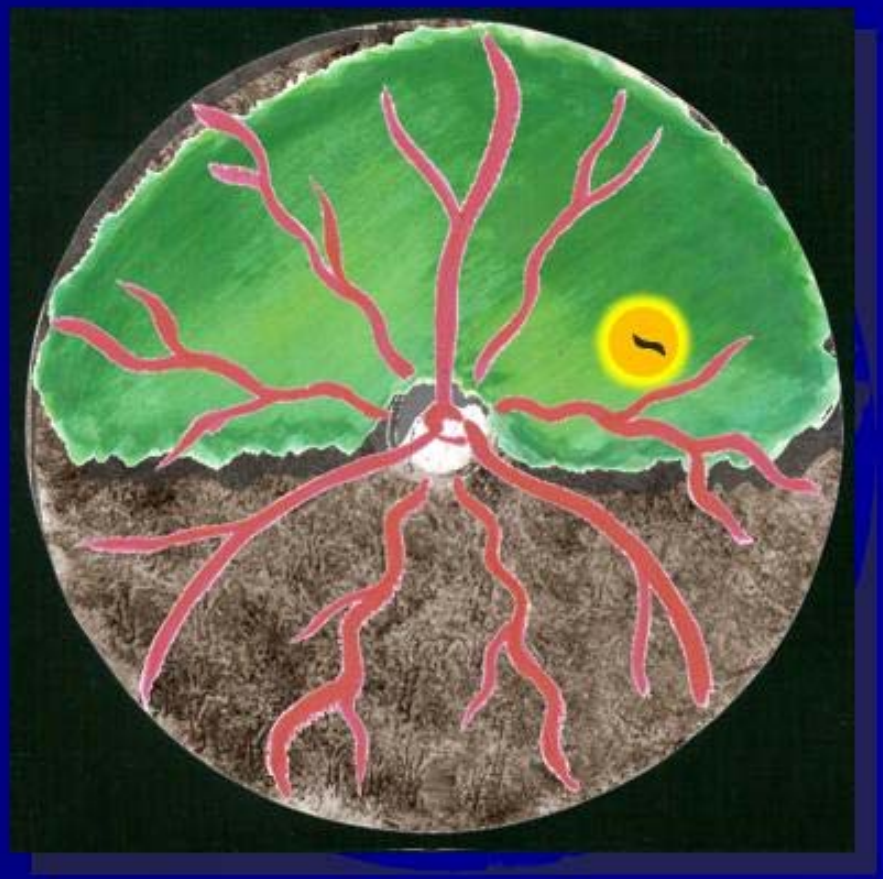
Patient #5

- 4 yr old M/N Golden retriever, routine health maintenance
- Eyes examined each year, with no prior abnormalities
- Medical history unremarkable

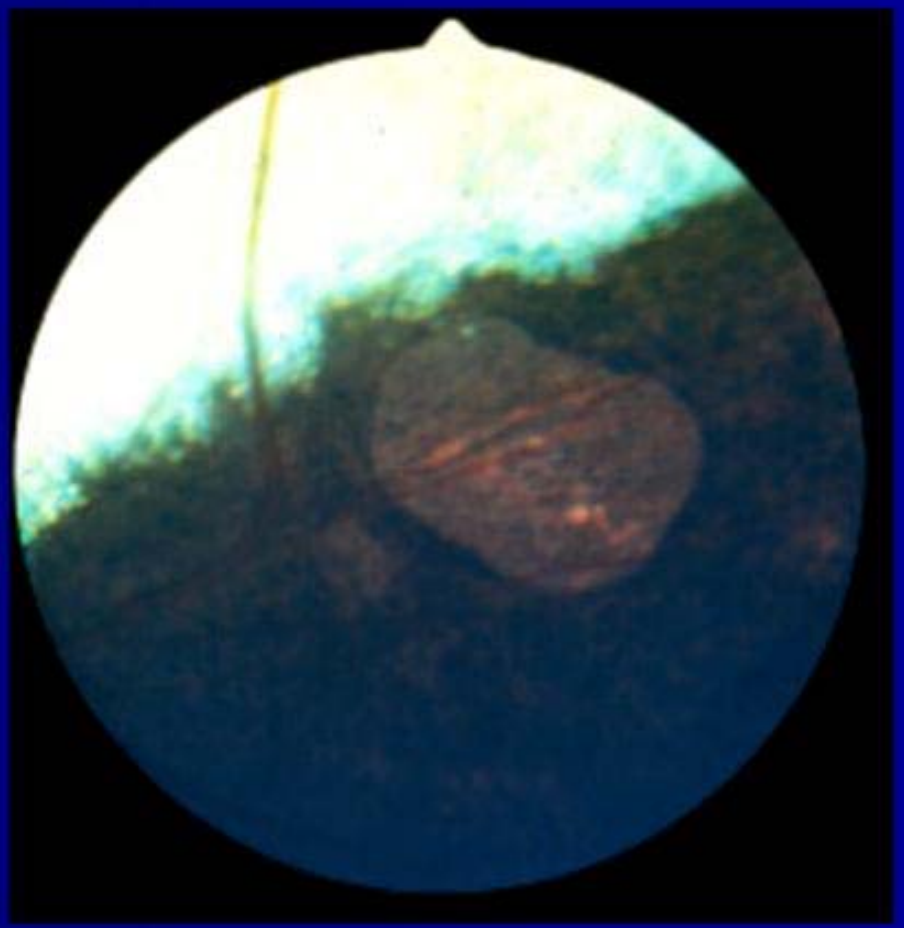





Sclera
Choroid
Tapetum
RPE
No Pigment
Retina
Optic Nerve
Vitreous
Pigmented RPE

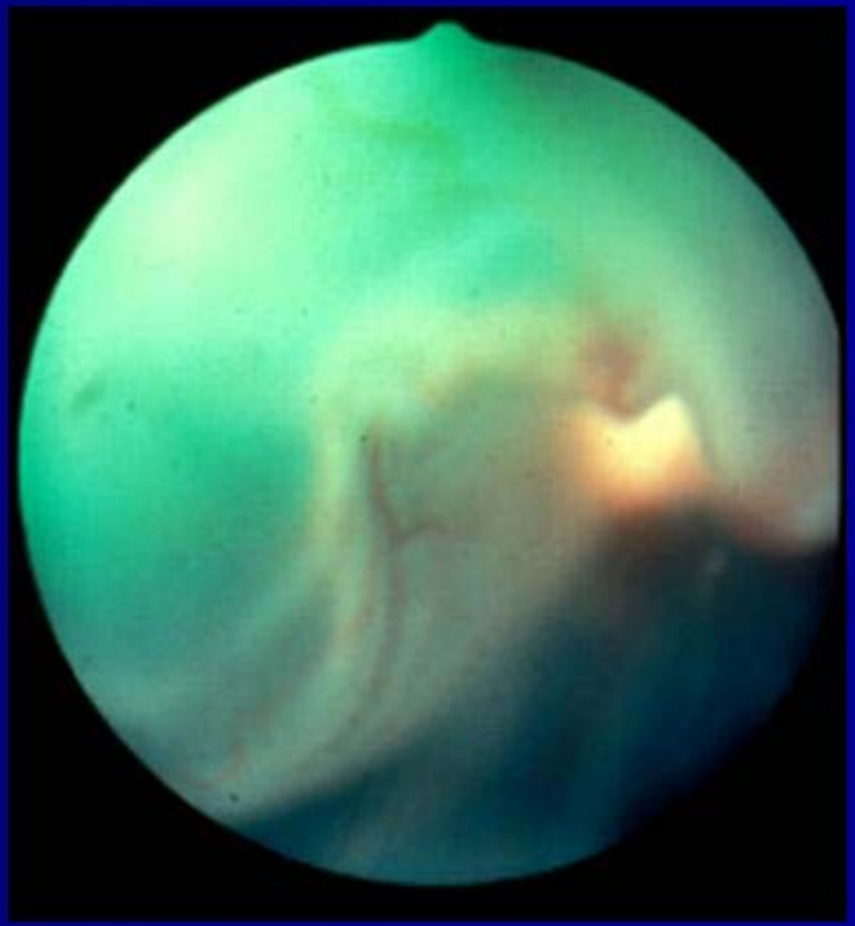


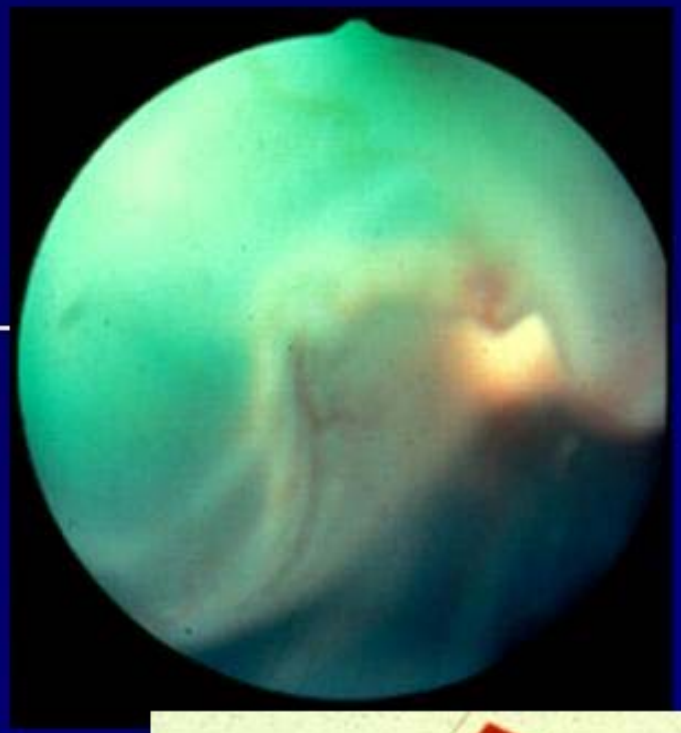
Inactive Chorioretinitis

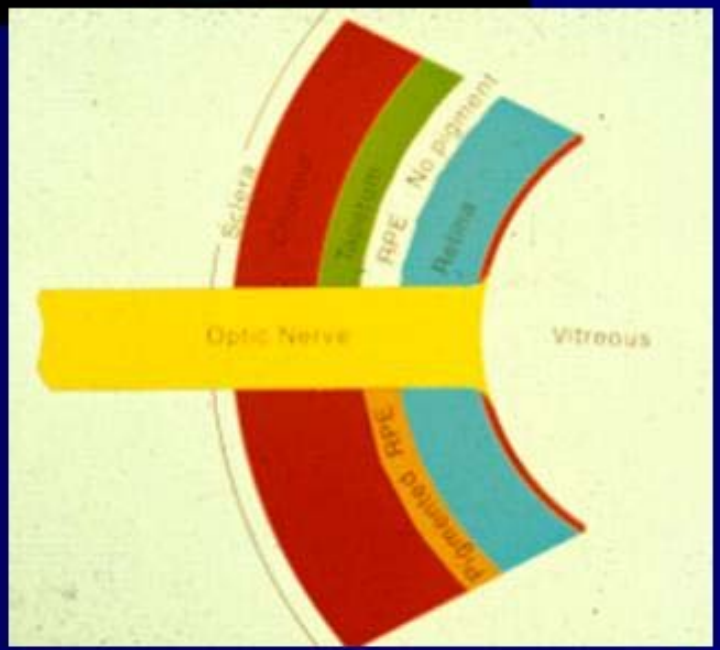


Patient #6

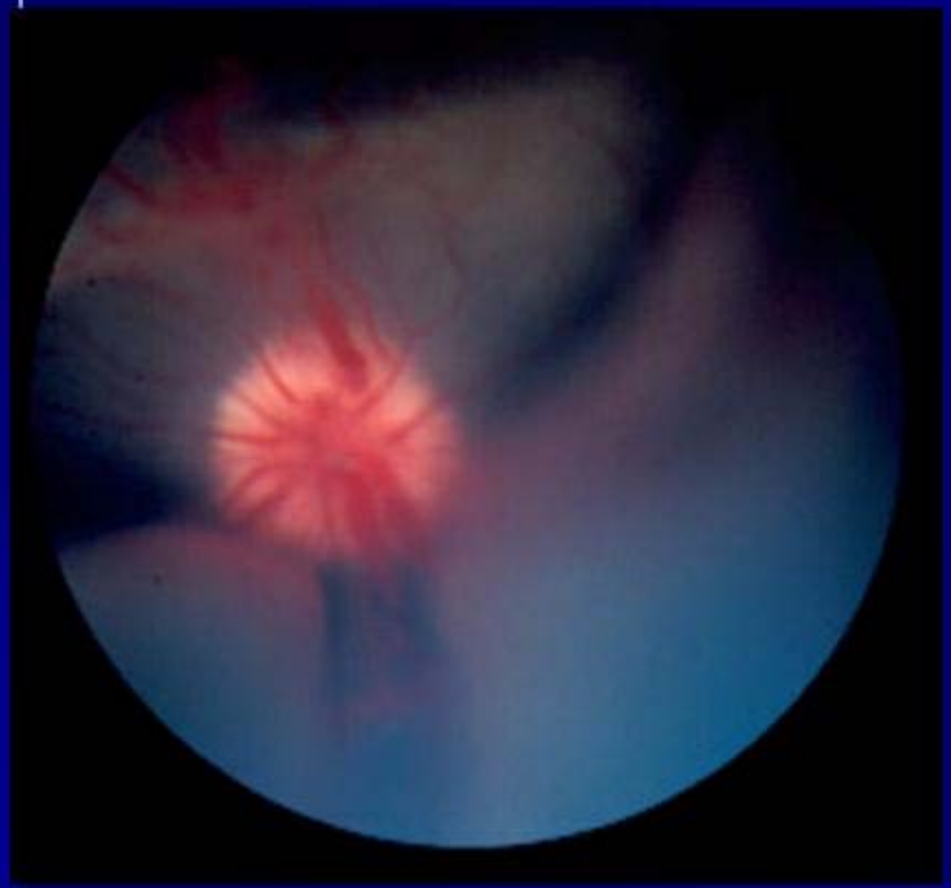
- 3 yr old M/N Shih tzu
- No previous eye problems
- Poor PLR noted in one eye at annual exam
- Fundus detail poor

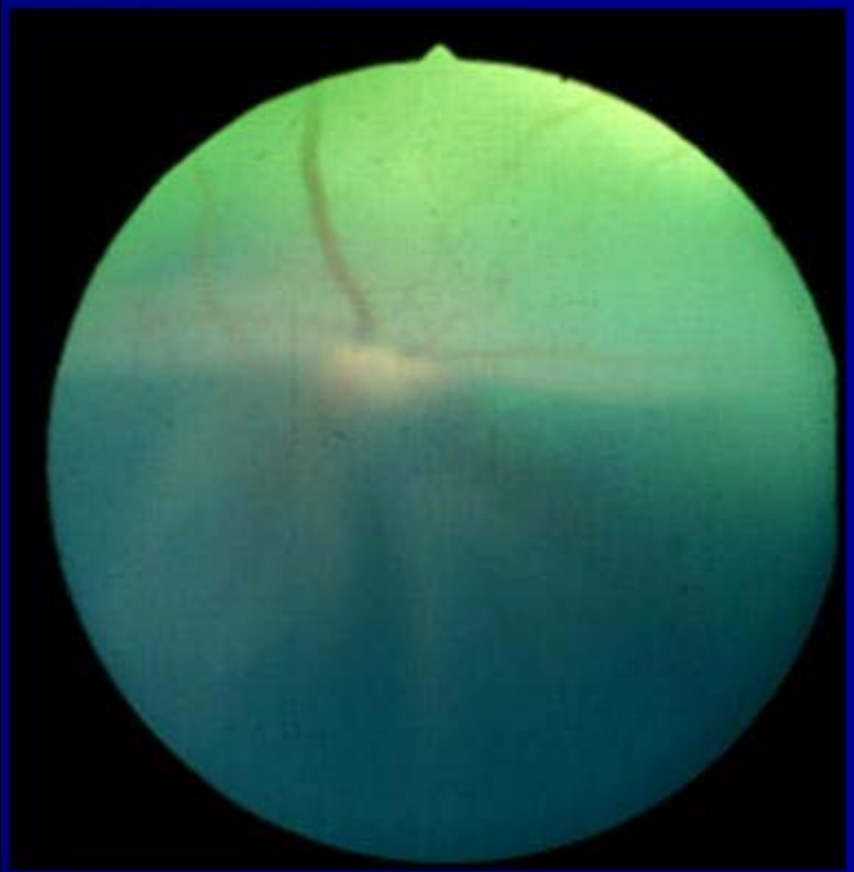





Sclera
Choroid
Tapetum
RPE
No pigment
Retina
Optic Nerve
Vitreous
Pigmented RPE

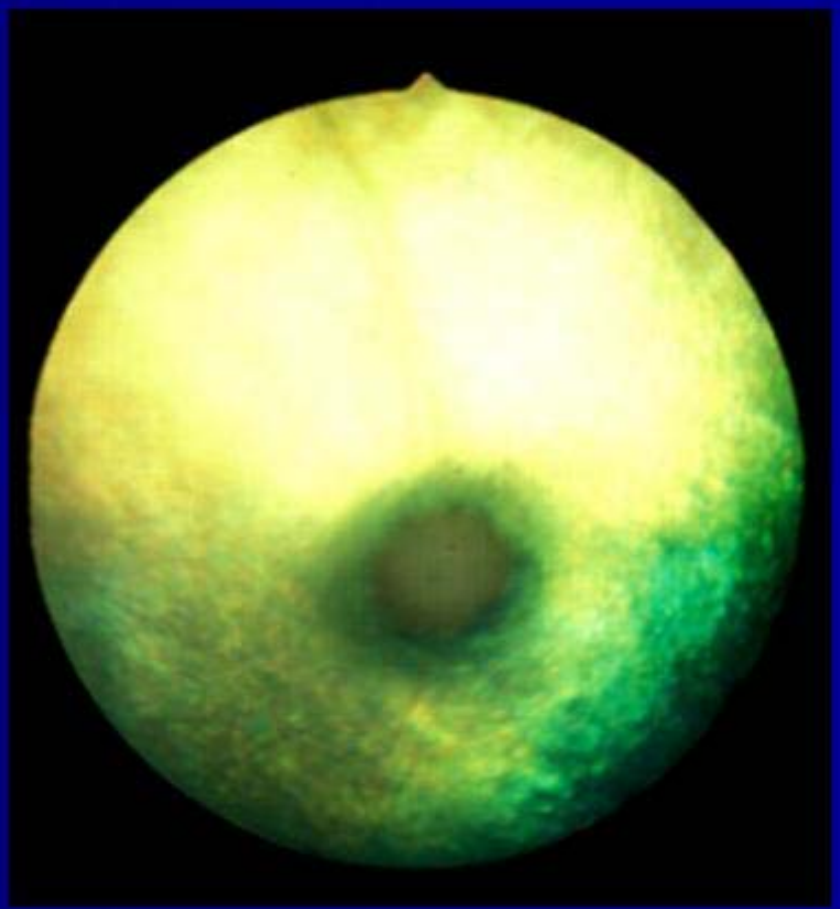
Retinal Detachment

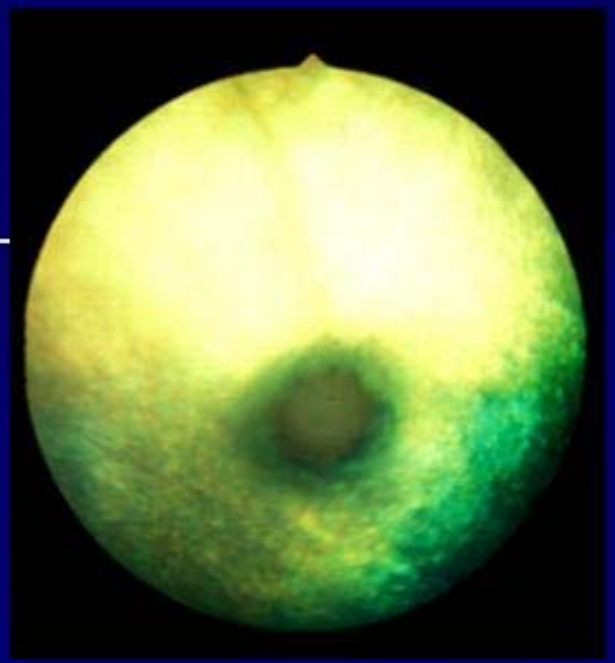




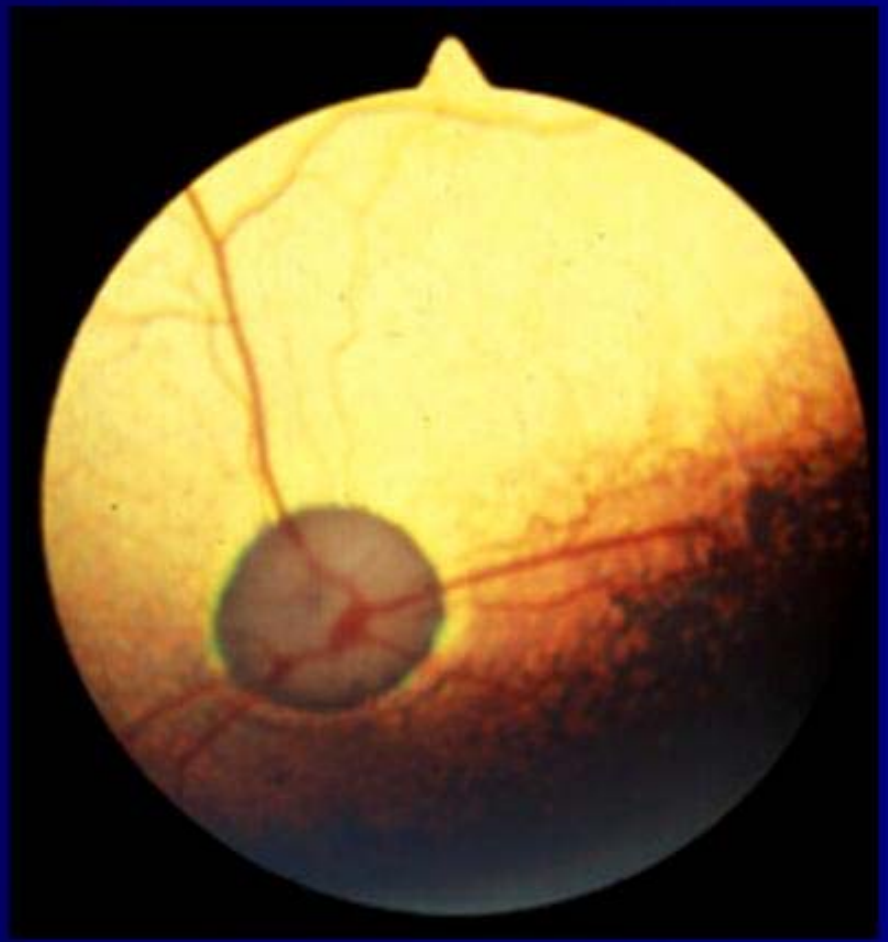
Patient #7

- 2 yr old F/S Abyssinian
- Gradual vision loss
- Dilated pupils
- No pain/discharge





Retinal Atrophy



Patient #8

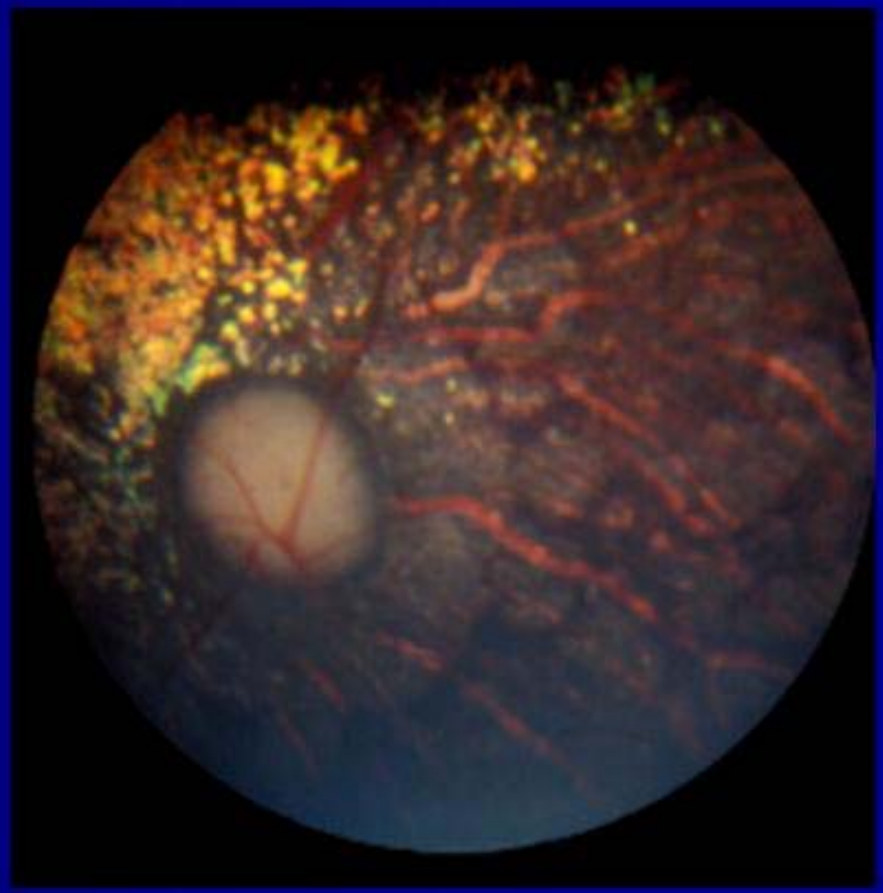
- 2 yr old M Golden retriever
- Routine pre-breeding exam

Sensory Retina

- Thinner
- Thicker
  - Edema and cells
  - Folds
- Separation from RPE
- Vascular changes

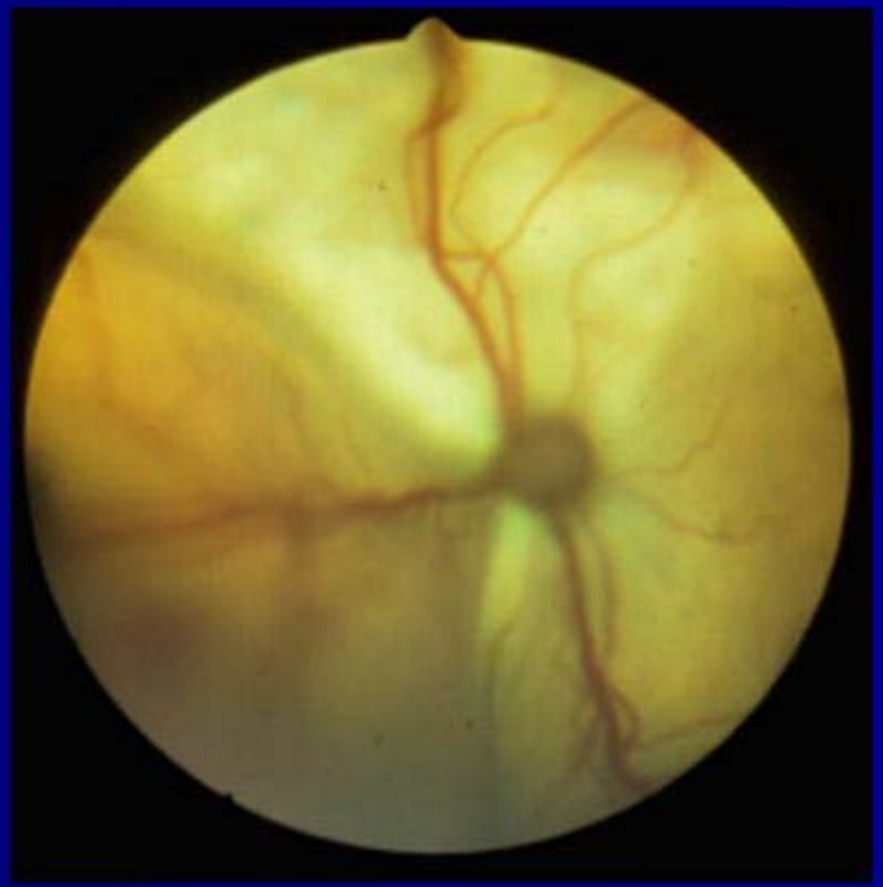
Retinal Pigmented Epithelium (RPE)

- Increased pigmentation
- Decreased pigmentation



Tapetum

- "Reflects" changes in surrounding layers
  - Increased reflectivity
  - Decreased reflectivity

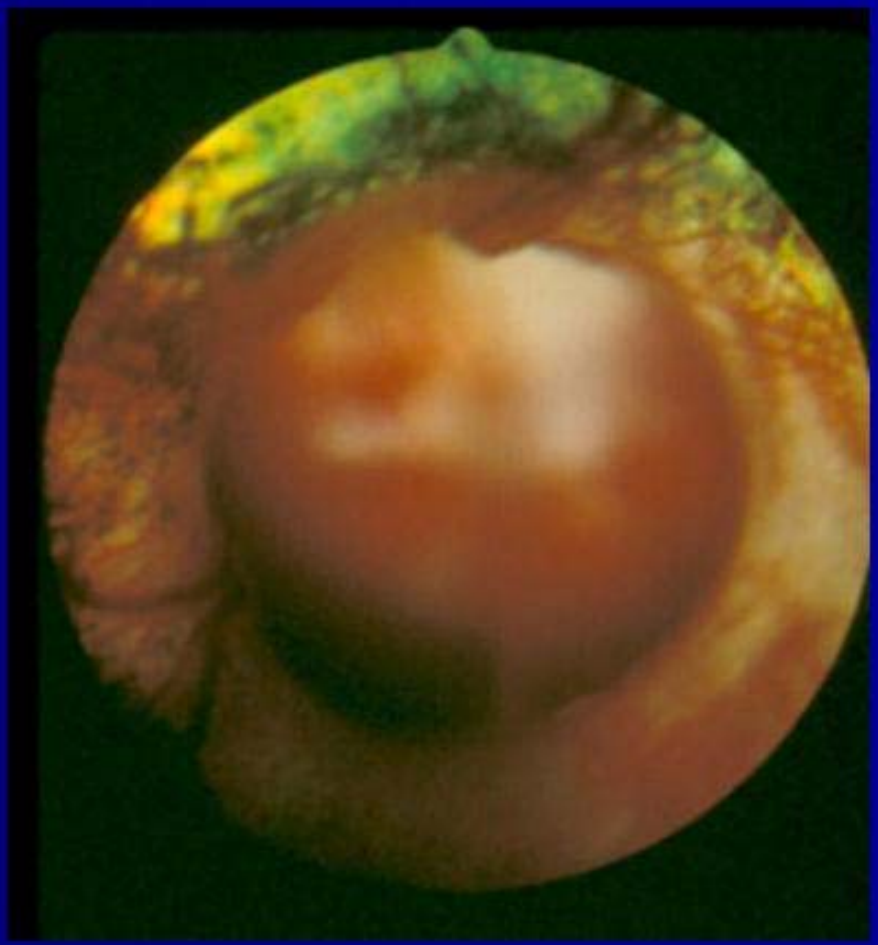


Choroid

- Thinning
- Thickening

Sclera

- Visibility depends on overlying pigment and tapetum
- Abnormalities rare
- Pathology
  - Congenital thinning
  - Inflammatory thickening



Optic Disc

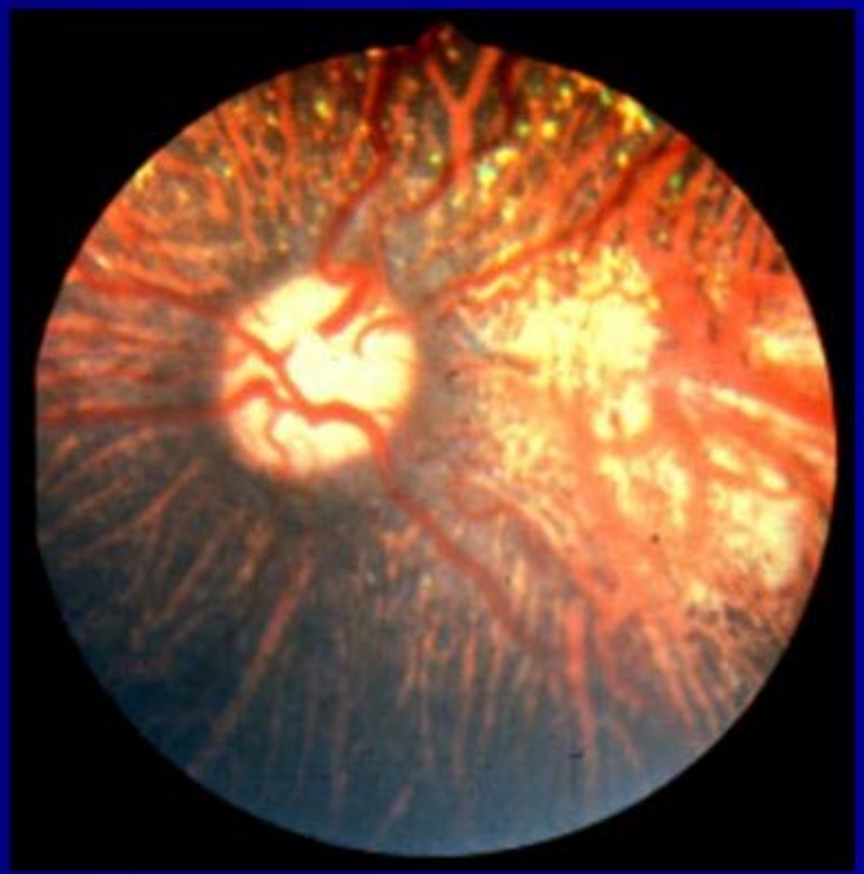
- Changes in size
  - Too small
  - Too large
- Changes in color
  - Hyperemic
  - Pale

Collie Eye Anomaly

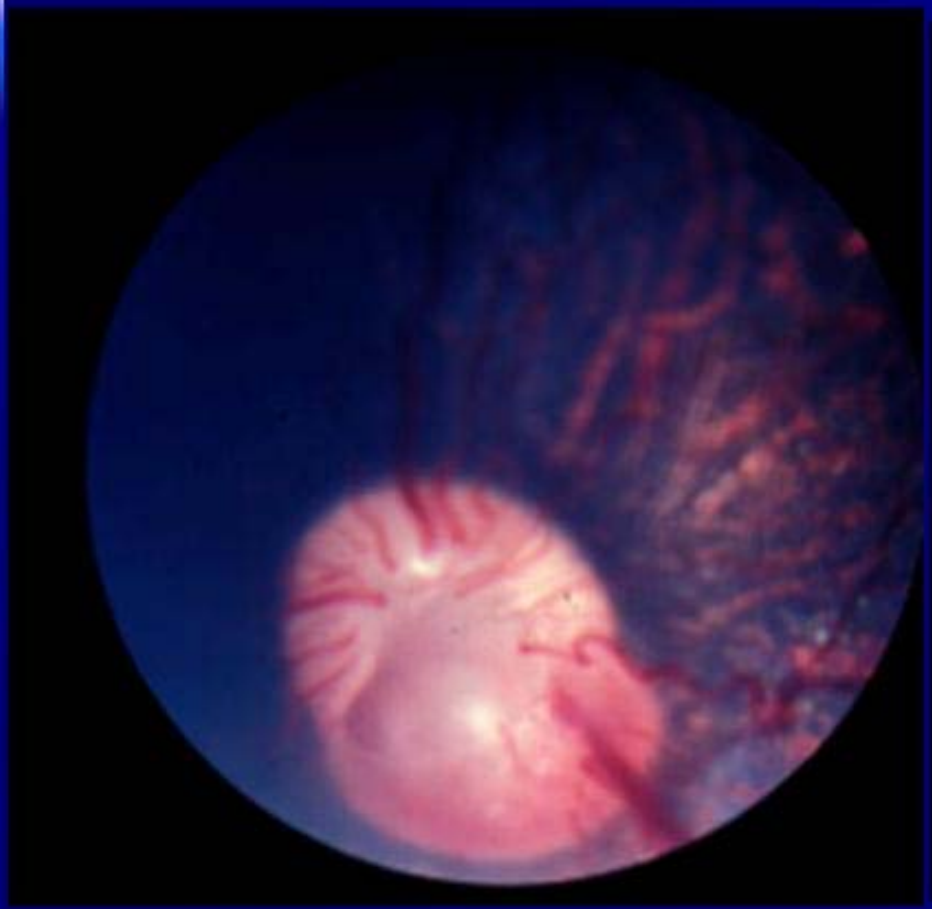
- 80-85% of breed in U.S. is affected
- Also affects Shelties, Border collies, Australian shepherds infrequently
- Congenital, non-progressive disease
- Recessive trait
- Blinding in most severe form

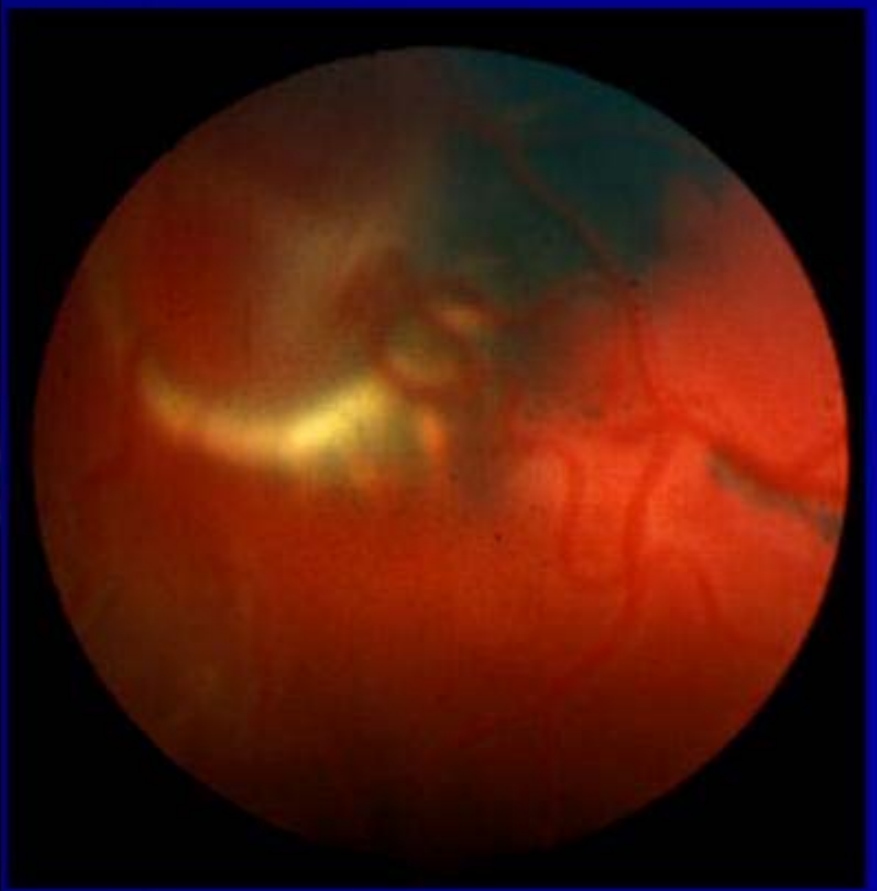
Collie Eye Anomaly

- Vessel tortuosity
- Choroidal hypoplasia
- Disc coloboma
- Scleral ectasia
- Retinal detachment



Collie Eye Anomaly





Retinal Dysplasia

- Affects Labrador retrievers, Springer spaniels, others
- Congenital, non-progressive disease
- Recessive trait in most; incomplete dominant trait theorized in Labrador
- Blinding in most severe form

Retinal Dysplasia

- Multifocal folds

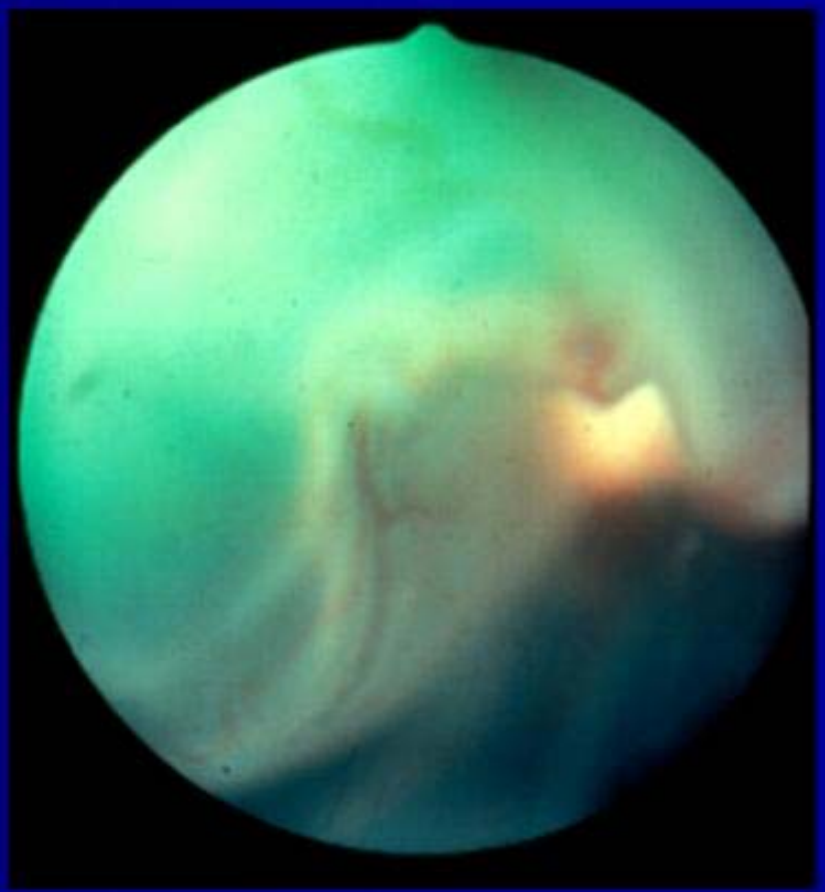
Retinal Dysplasia

Retinal Dysplasia

- Geographic dysplasia: large, irregular area of disorganized retina

Retinal Dysplasia

- Congenital retinal "non-attachment"
- Blind puppy if bilaterally affected



Skeletal Dysplasia

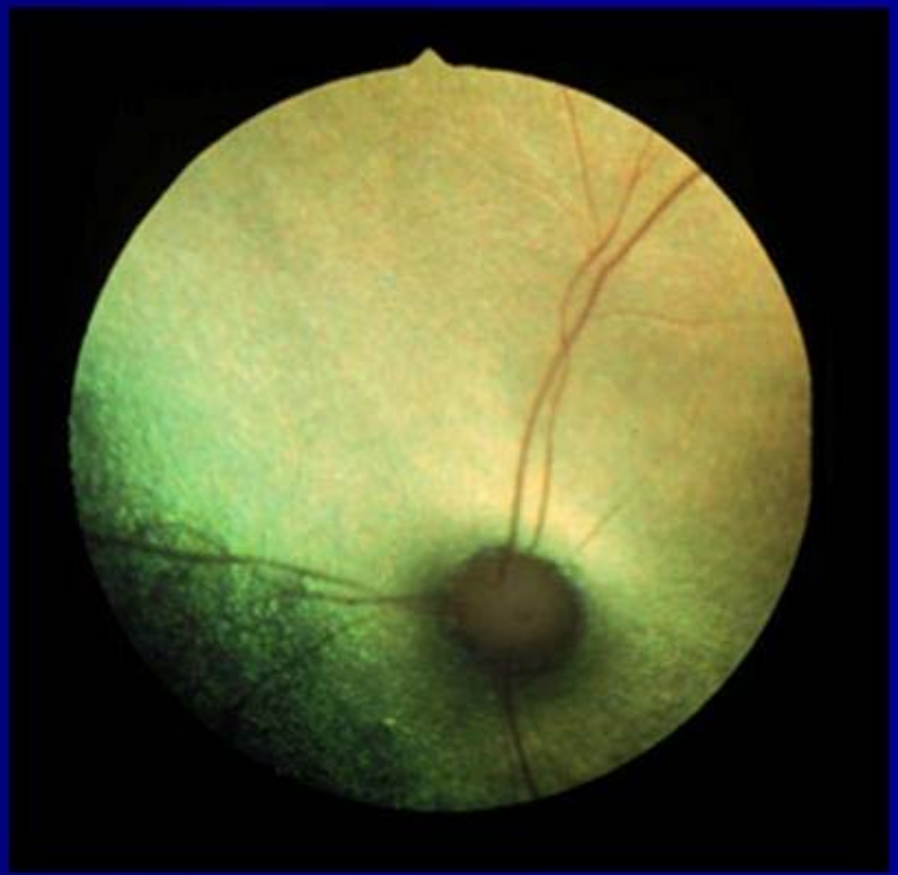
- Skeletal deformities in Labradors

Progressive Retinal Atrophy

- Generalized retinal degeneration
- Ultimately blinding
- Affects many breeds of dog, few cats
- Varying mechanisms determine age of onset
- Recessive trait in almost all cases

Progressive Retinal Atrophy

- Night blindness, progressing to total loss of vision
- Retinal thinning, with tapetal hyper-reflectivity
- Retinal vessel attenuation



Progressive Retinal Atrophy