

# EXOTIC OPHTHALMOLOGY CASES

---

Sarah Ozawa, DVM, DACZM  
Assistant Professor Exotic Animal Medicine  
North Carolina State University

# OBJECTIVES

- Recognize common ophthalmic diseases of zoological companion animal species.
- Recommend appropriate diagnostic workups for these cases.
- Identify species-specific anatomy and how it may relate to a disease process.

# CASE — SCREECH OWL

- Western screech owl
- Unknown trauma

Initial observations?



slido



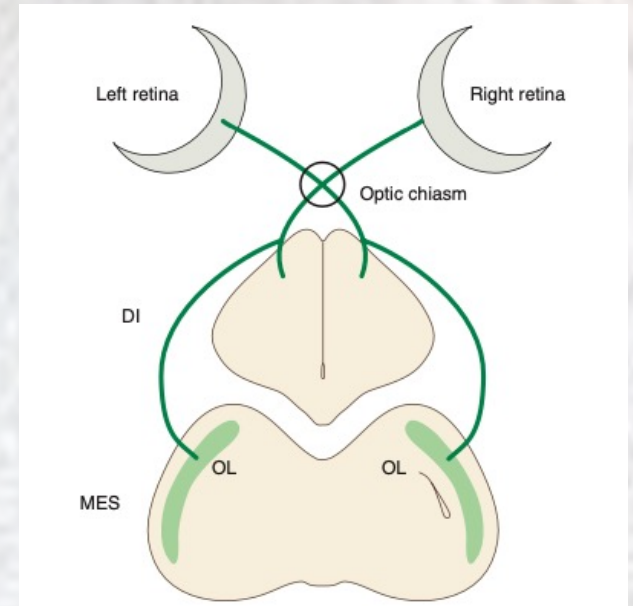
**What abnormality do you see?**

ⓘ Start presenting to display the poll results on this slide.

# AVIAN ANATOMY AND PHYSIOLOGY

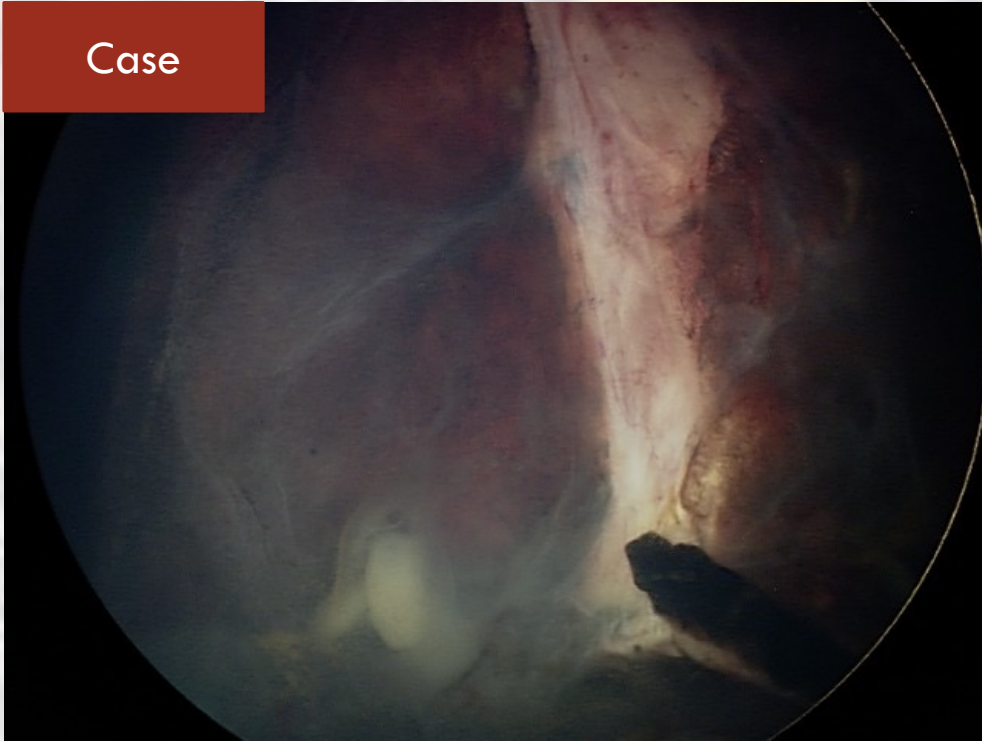
How do you assess vision in a bird?

- Inconsistent pupillary light response
  - Iris contains striated muscle
  - Complete decussation at the optic chiasm (lack consensual)
- Birds lack a menace response
- Tracking (avoid auditory cues)
- Navigation

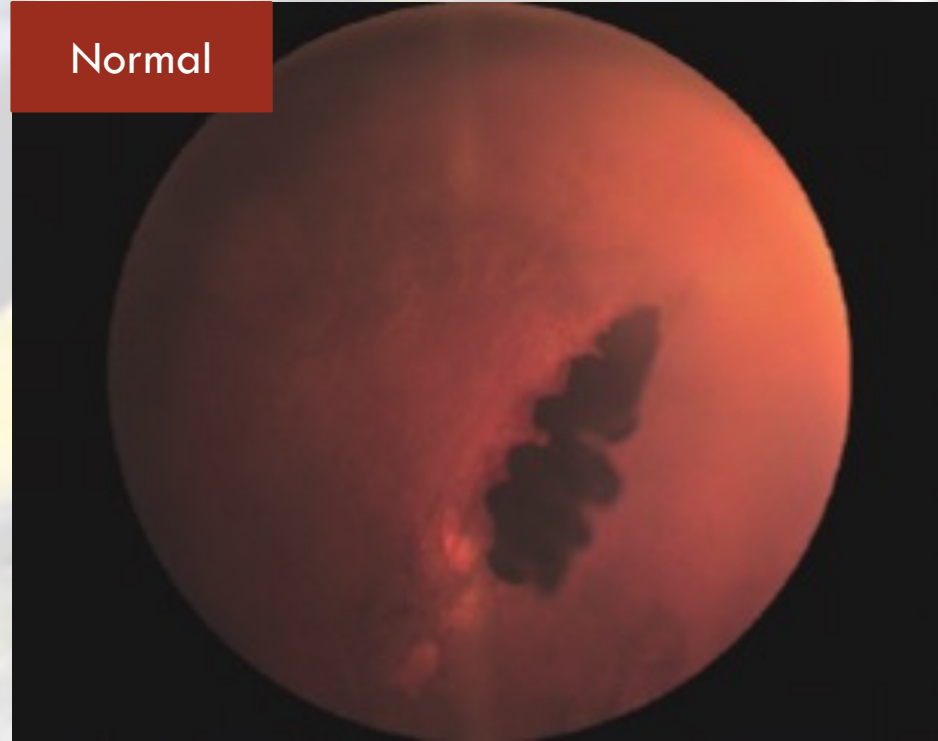


# RETINAL EXAMINATION

Case

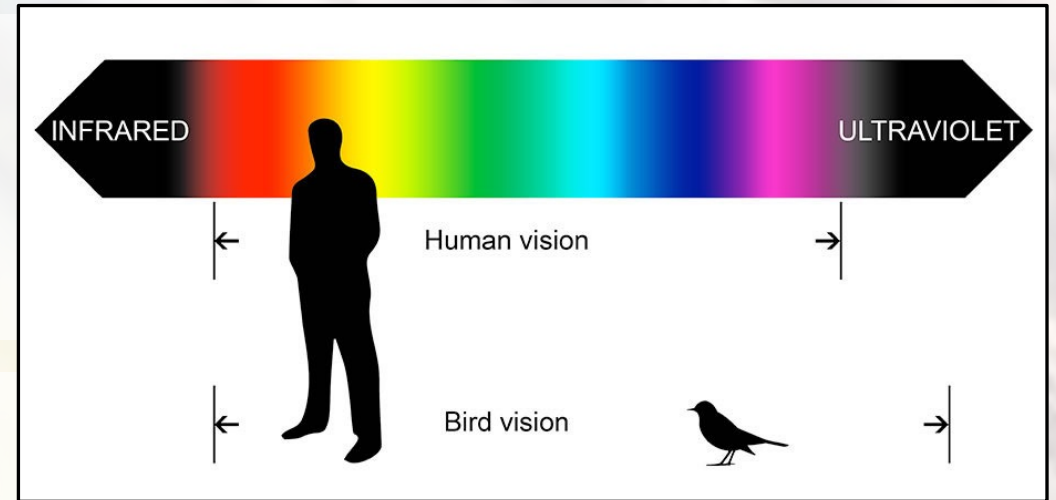


Normal



# AVIAN RETINAL ANATOMY

- **Pecten** – functionality debated
- Avascular retina = **anagiotic**
- Atapetal
- Fundic coloration differs
- Fovea present in most species
- Vision is tetrachromatic or pentachromatic



# ANOTHER CASE OF TRAUMA

- Hit by car screech owl
- Ruptured left eye
- Non-viable

Options for this bird?





slido

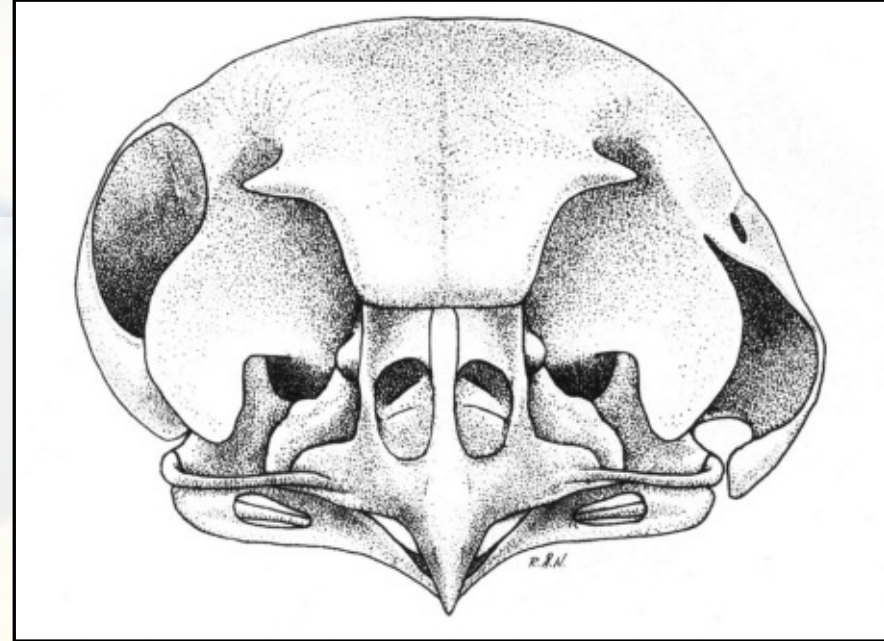


**What treatment option would you select for this bird?**

ⓘ Start presenting to display the poll results on this slide.

# PREY TRACKING IN OWLS

- = hearing + vision
- Sensitive hearing
- Asymmetrical ears



Development of ear asymmetry in the American barn owl (*Tyto furcata pratincola*)

Markus Krings\*, Laura Roskamp, Hermann Wagner

Institute of Biology II, RWTH Aachen University, Worringerweg 3, D-52074 Aachen, Germany

# OCULAR ANATOMY

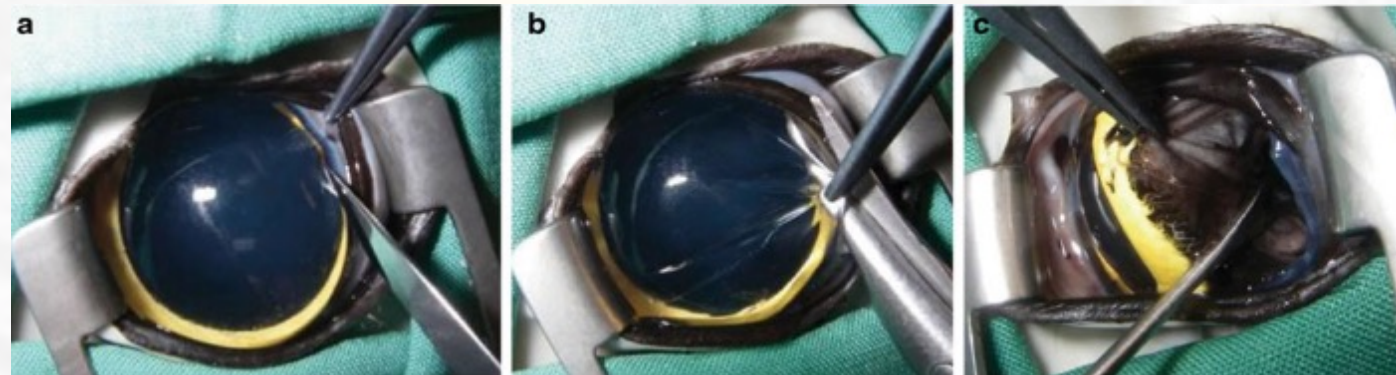
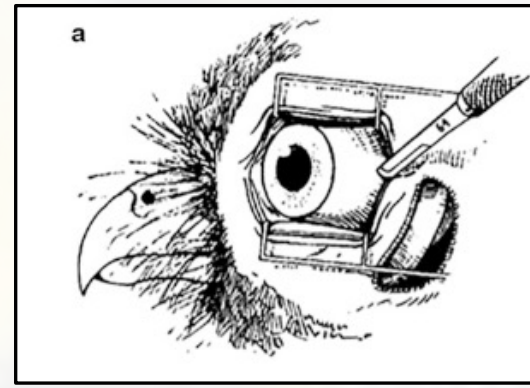
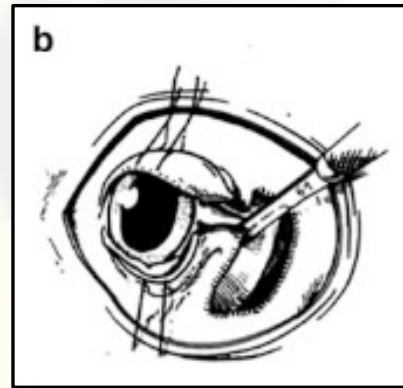


Great-Horned Owl skull with  
sclerotic ring in orbital cavity  
Photo courtesy C. Otte

- Limited eye movement
- Head movement nearly 360 degrees
- Complete bony orbit
- Scleral ossicles
- Ophthalmic plexus

# TREATMENT OPTIONS

- Euthanasia
- Long-term medical care
- Enucleation
- Evisceration



# CASE: AMAZON PARROT

- 40 year old M yellow-napped amazon parrot
- Owner noticed color change to the eye

Initial observations?



# CRYSTALLINE CORNEAL DEPOSITS

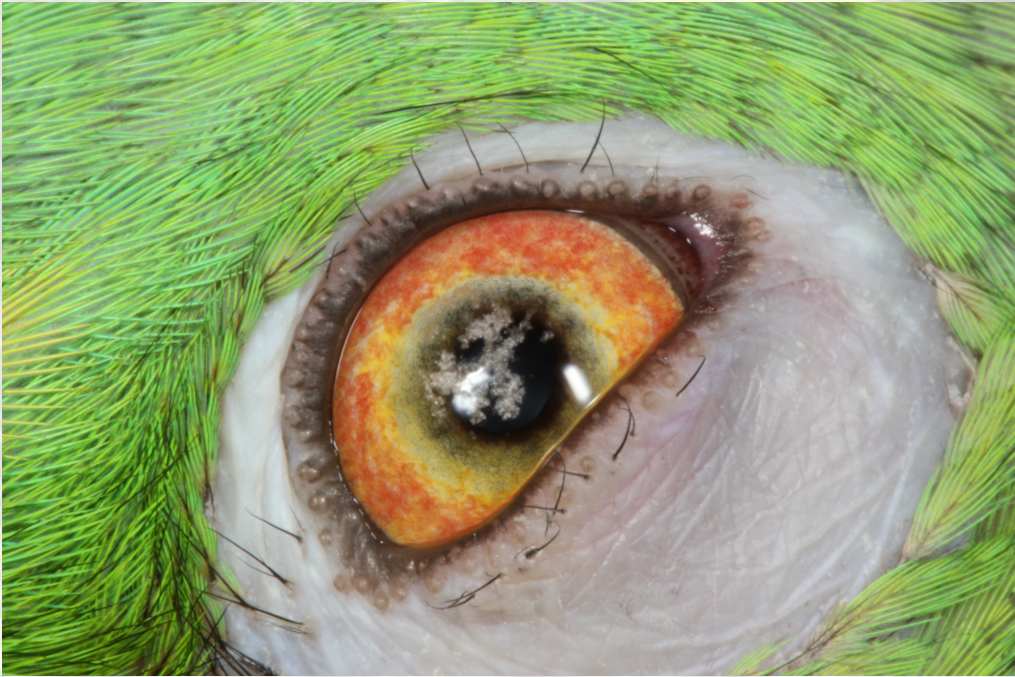


Photo credit: Moore

- Common
- Usually asymptomatic
- Predispose to ulceration
- Etiology unknown
- Attempts of immunosuppressive treatment
- Regression rare

# CORNEAL LIPID DEGENERATION

- Uncommon
- Age a common factor
- Often progressive
- Can cause blindness
- No treatment

## Lipoidal corneal degeneration in aged falcons

Bret A. Moore,\* Joanne R. Paul-Murphy,† Kathleen L. Adamson,‡ Richard R. Dubielzig,§ Thomas Kern,¶ Ben J. Gonzales,\*\* Peregrine Wolff†† and Christopher J. Murphy‡‡§§



# AMPHIBIANS TOO!

- Lipid keratopathy
- Suspected to be dietary related
  - Elevated cholesterol
- Older animals
- Often bilateral

*Journal of Zoo and Wildlife Medicine* 32(3): 305–319, 2001  
Copyright 2001 by American Association of Zoo Veterinarians

## **CORNEAL LIPID DEPOSITION IN CUBAN TREE FROGS (*OSTEOPILUS SEPTENTRIONALIS*) AND ITS RELATIONSHIP TO SERUM LIPIDS: AN EXPERIMENTAL STUDY**

**Catherine M. Shilton, B.Sc., D.V.M., D.V.Sc., Dale A. Smith, D.V.M., D.V.Sc.,  
Graham J. Crawshaw, B.Vet.Med., Dipl. A.C.Z.M., Eduardo Valdes, Ph.D.,  
Charlotte B. Keller, Dr. Med. Vet., Dipl. A.C.V.O., E.C.V.O., Graham F. Maguire, B.Sc.,  
Phil W. Connelly, Ph.D., and Jim Atkinson, Ph.D.**

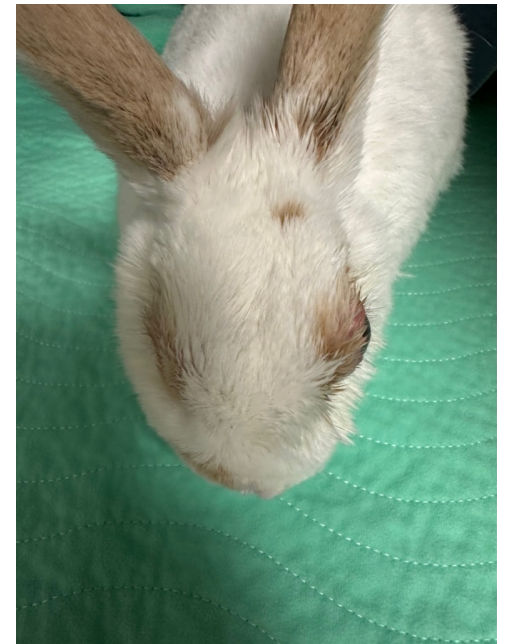




# CASE — RABBIT

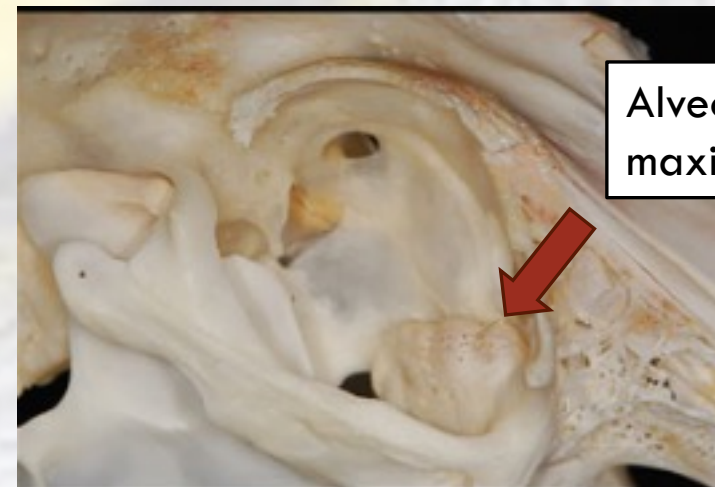
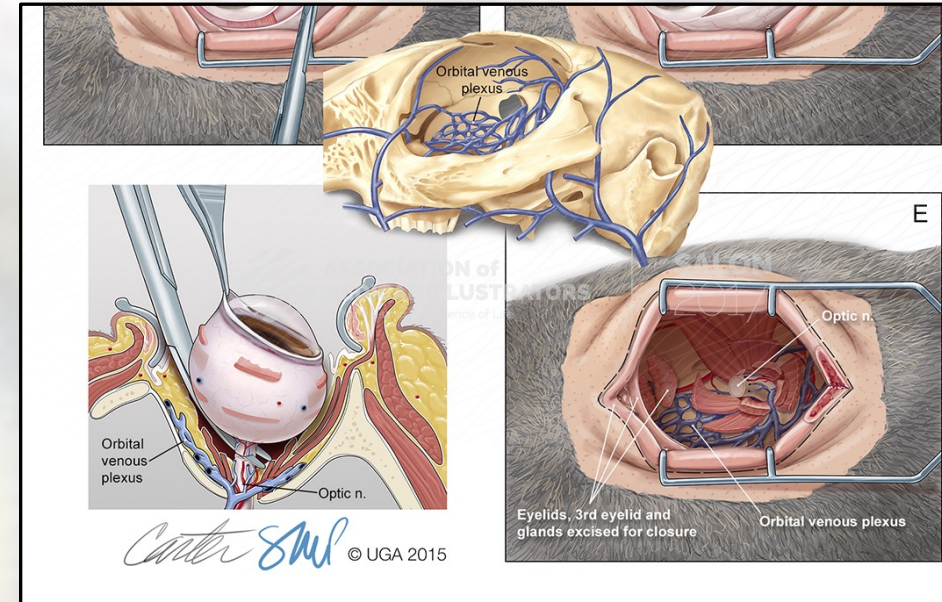
- 8 year old MN rabbit
- Dyspnea
- Referred for imaging

Initial observations?



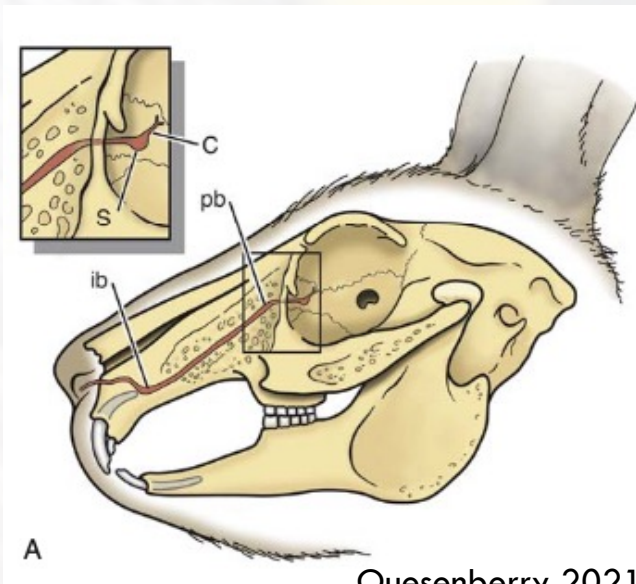
# EXOPHTHALMIA DIFFERENTIALS

- Retrobulbar mass or mass-effect
  - Abscess – dental associated or non-dental
  - Neoplasia
- Cranial thorax mass
- Is this buphthalmia?
  - Glaucoma

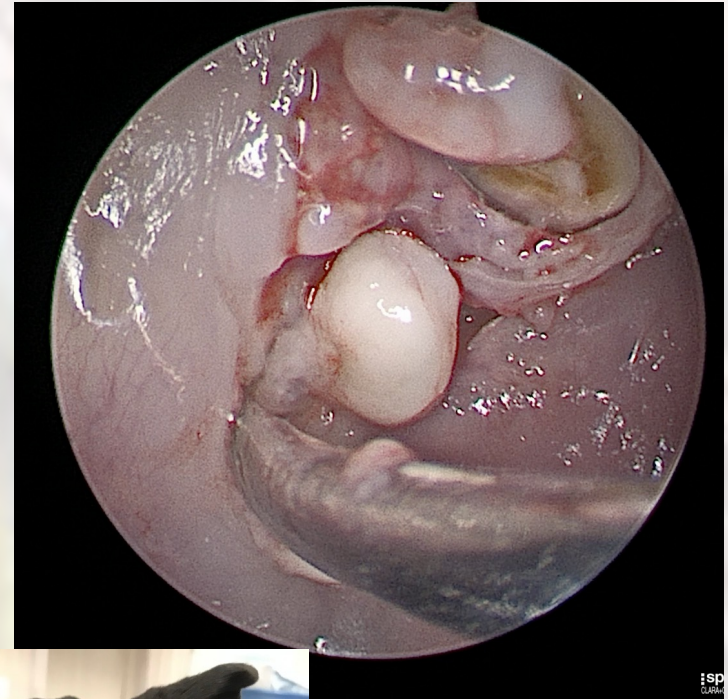


# HOW ELSE CAN DENTAL DISEASE CAUSE OCULAR DISEASE?

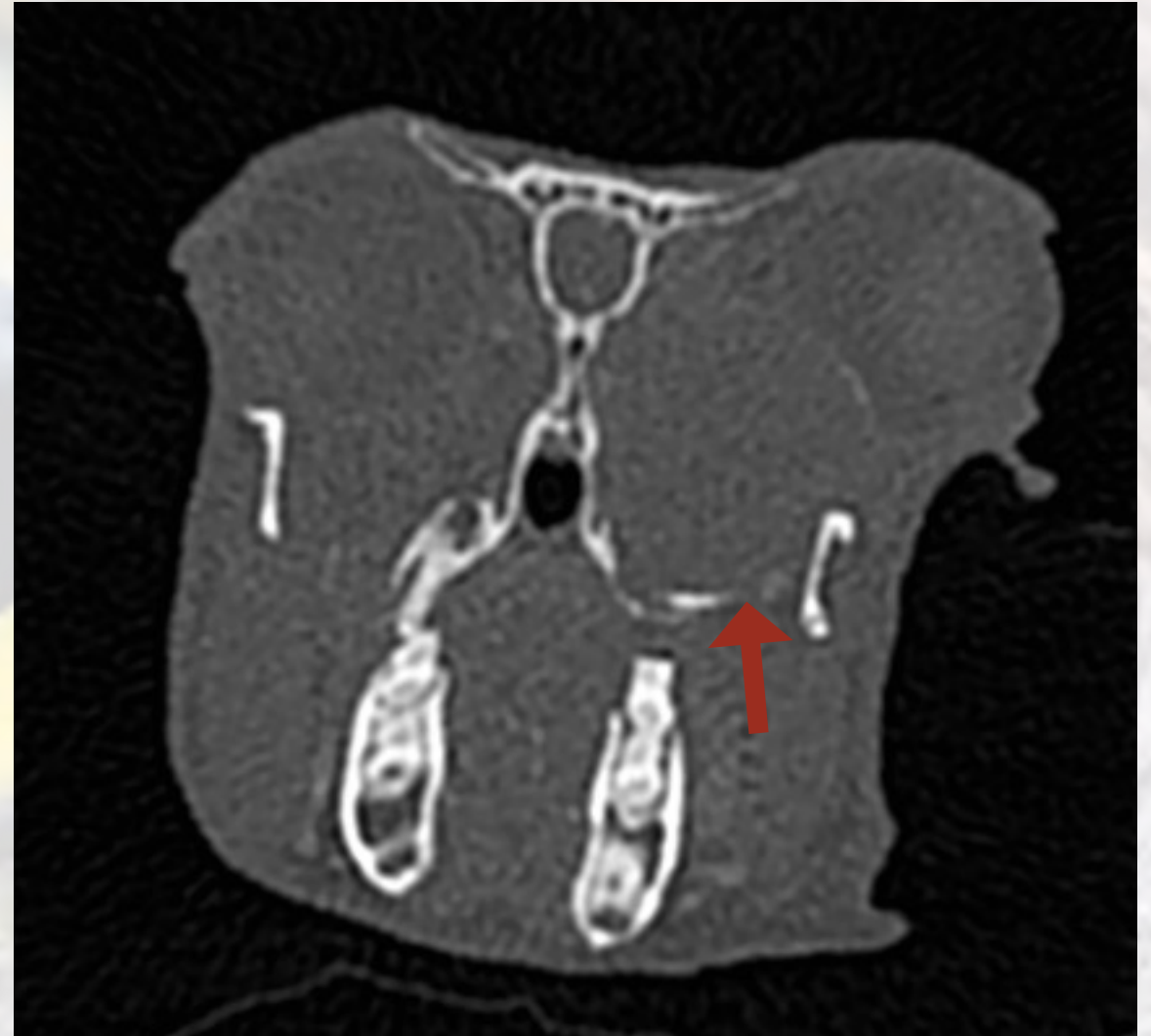
- Nasolacrimal duct
- Dacryocystitis



Quesenberry 2021



# DIAGNOSTICS



# THYMOMAS IN RABBITS

- Thymus persists throughout life
- Benign tumor
- Clinical signs – dyspnea, exophthalmia
- Treatment
  - Radiation
  - Steroids
  - Surgery



Outcomes and survival times of client-owned rabbits diagnosed with thymoma and treated with either prednisolone or radiotherapy, or left untreated

Alyssa Palmer<sup>a</sup>, Chih Chun Wu<sup>b</sup>, Yasutsugu Miwa<sup>b</sup>, Michelle Turek<sup>c</sup>, Kurt K. Sladky<sup>c,\*</sup>

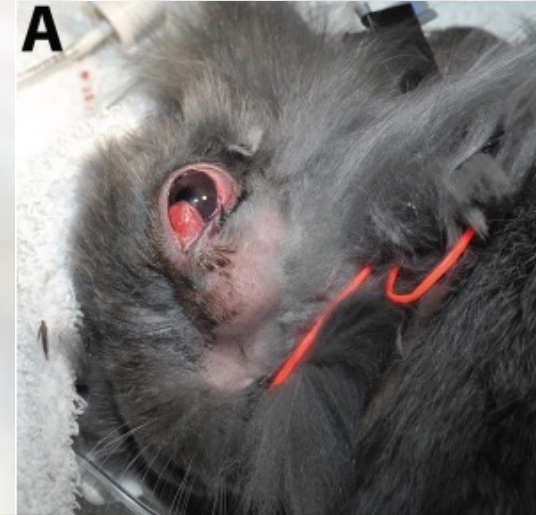
<sup>a</sup> Department of Medical Sciences, University of Wisconsin School of Veterinary Medicine, Madison WI, USA

<sup>b</sup> Miwa Exotic Animal Hospital, 1-25-5 Komagome, Toshima-ku, Tokyo, Japan

<sup>c</sup> Department of Surgical Sciences, University of Wisconsin School of Veterinary Medicine, Madison WI, USA

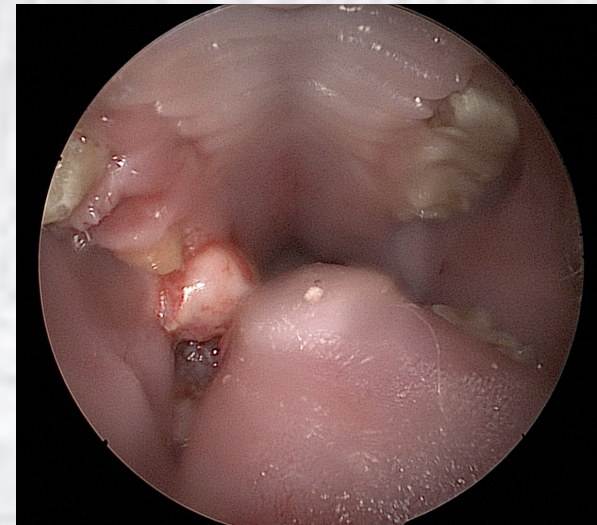
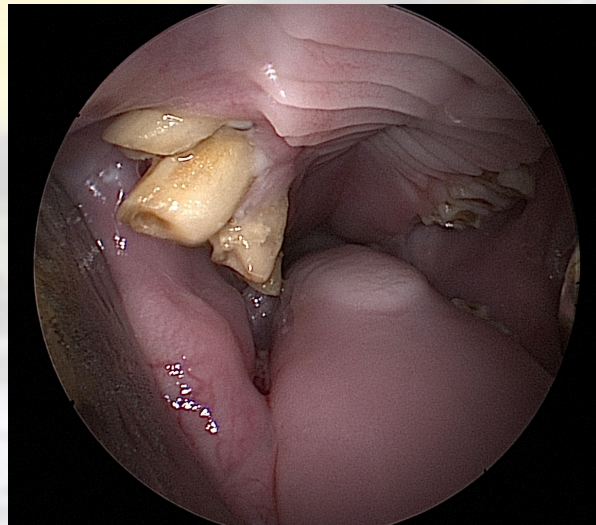
# TREATMENT OPTIONS – RETROBULBAR ABSCESS

- Treat exposure keratitis
- Enucleation
  - \*Retrobulbar plexus!
- Zygomatic arch removal
- Abscess debridement
- Dental extraction
- Long-term antibiotics



**Long-term systemic antibiotics and surgical treatment can be an effective treatment option for retrobulbar abscesses in rabbits (*Oryctolagus cuniculus*): 21 cases (2011–2022)**

Ivana Levy, DVM, and Christoph Mans, Dr med vet, DACZM\*



slido



**Which antibiotic would you select for this retrobulbar mass if you could not obtain a culture?**

ⓘ Start presenting to display the poll results on this slide.

# REMINDER ANTIBIOTICS IN RABBITS

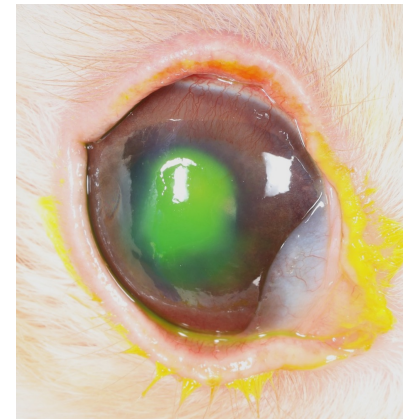
- Hindgut fermenting species!
- What antibiotics **CANNOT** be used **orally** in rabbits?
  - Penicillin
  - Lincomycin
  - Ampicillin, amoxicillin
  - Cephalosporins
  - Erythromycin





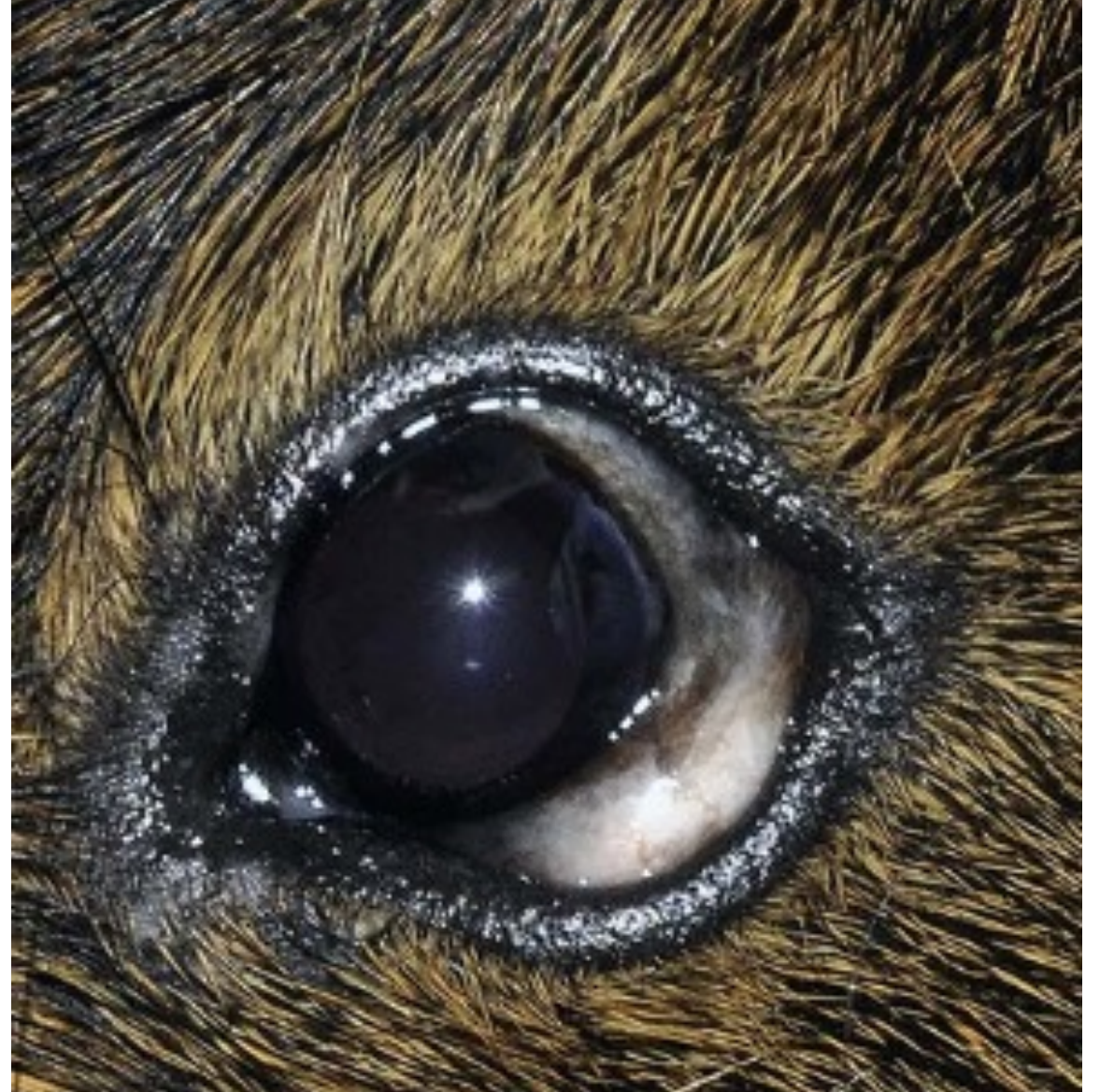
# TREATMENT OPTION — CORNEAL ULCER

- Indolent ulcer
- Corneal debridement
- Topical
  - Lubrication
  - Antibiotics
  - Serum
- Contact lens
- Temporary tarsorrhaphy



# CASE: GUINEA PIG

- 5 yr. old Fl guinea pig
- Tissue around the eye
- Diagnosis
  - “Pea eye”
  - Fat deposits
  - Benign



# CASE: GUINEA PIG

- 3 yr. old Ml guinea pig
- White mass in the eye
- Diagnosis
  - Osseous metaplasia
  - Benign

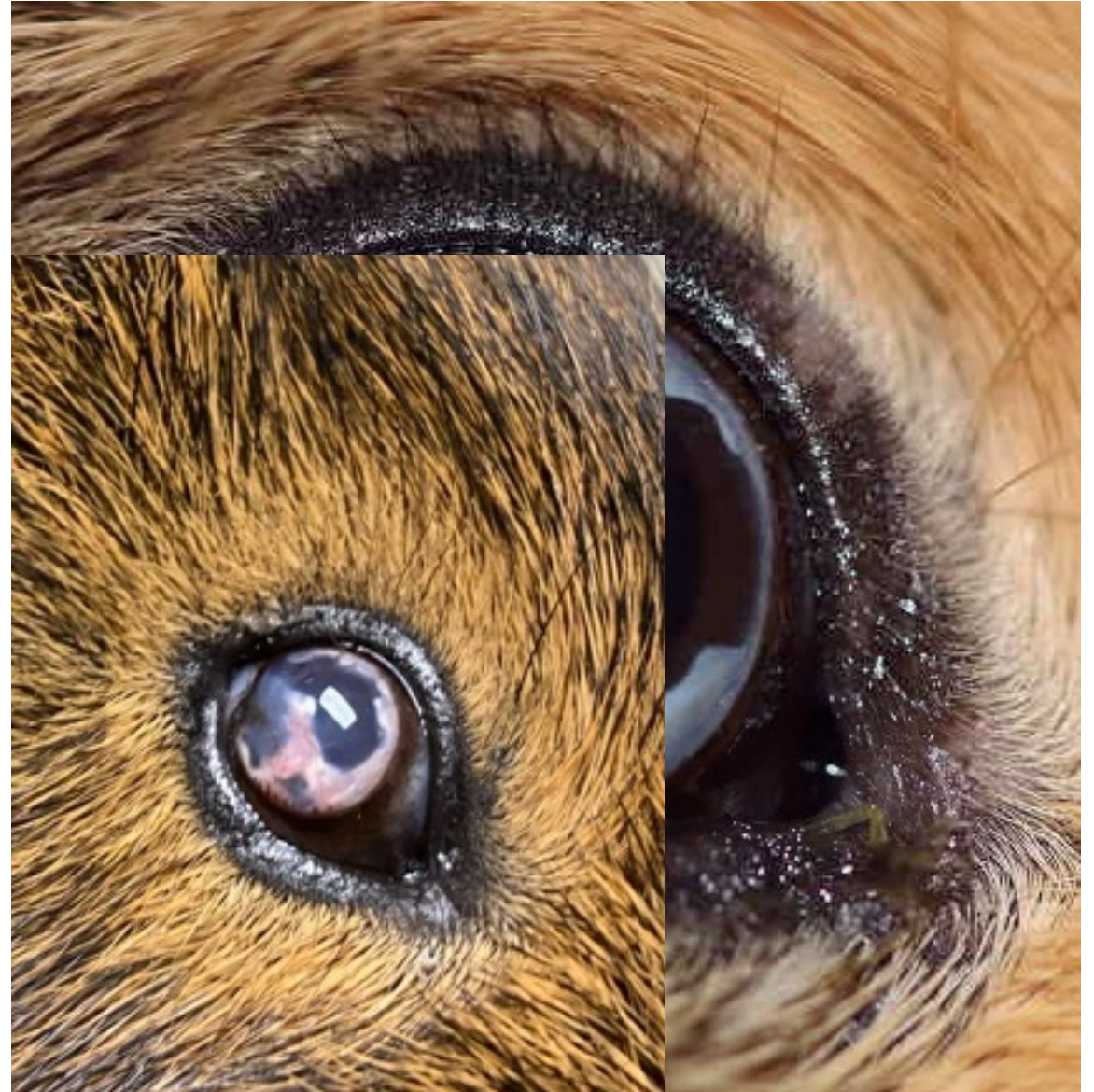
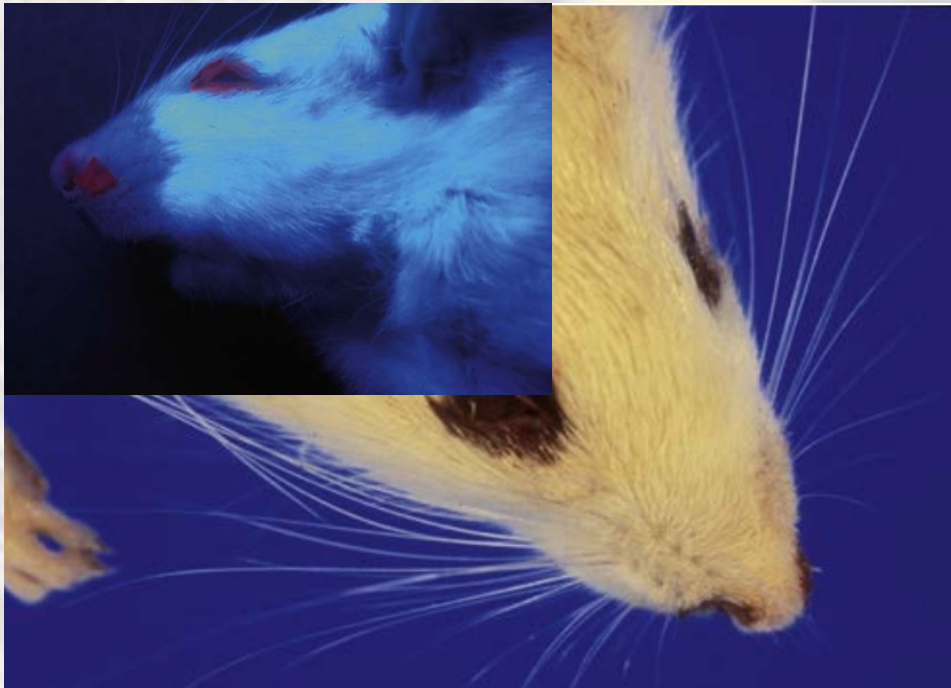


Photo credit: Sadar

# CASE: RAT



- 2 year old MI rat
- Increased respiratory effort
- Red discharge from the eyes
- What is your diagnosis?
  - **Chromodacryorrhea**
  - Harderian gland → porphyrin
  - Decreased grooming and increased production with disease

# CASE — LEOPARD GECKO

- 5 yo M leopard gecko
- Presented for squinting
- Bilateral conjunctivitis and keratitis
- Husbandry
  - No UV light
  - Temperature 75-90F
  - Housed on paper towels
  - Fed mealworms from a pet store




Small Animals, Exotic, & Avian  
**Diagnosis, treatment, and outcome of and risk factors for ophthalmic disease in leopard geckos (*Eublepharis macularius*) at a veterinary teaching hospital: 52 cases (1985–2013)**

What nutritional deficiency may lead to these signs?

# HYPOVITAMINOSIS A

- Squamous metaplasia and hyperkeratosis
- Mainly insectivores
- Pre-formed vitamin A may be required

## Evaluation of $\beta$ -carotene assimilation in leopard geckos (*Eublepharis macularius*)

Ophélie Cojean  | Stéphane Lair | Claire Vergneau-Grosset

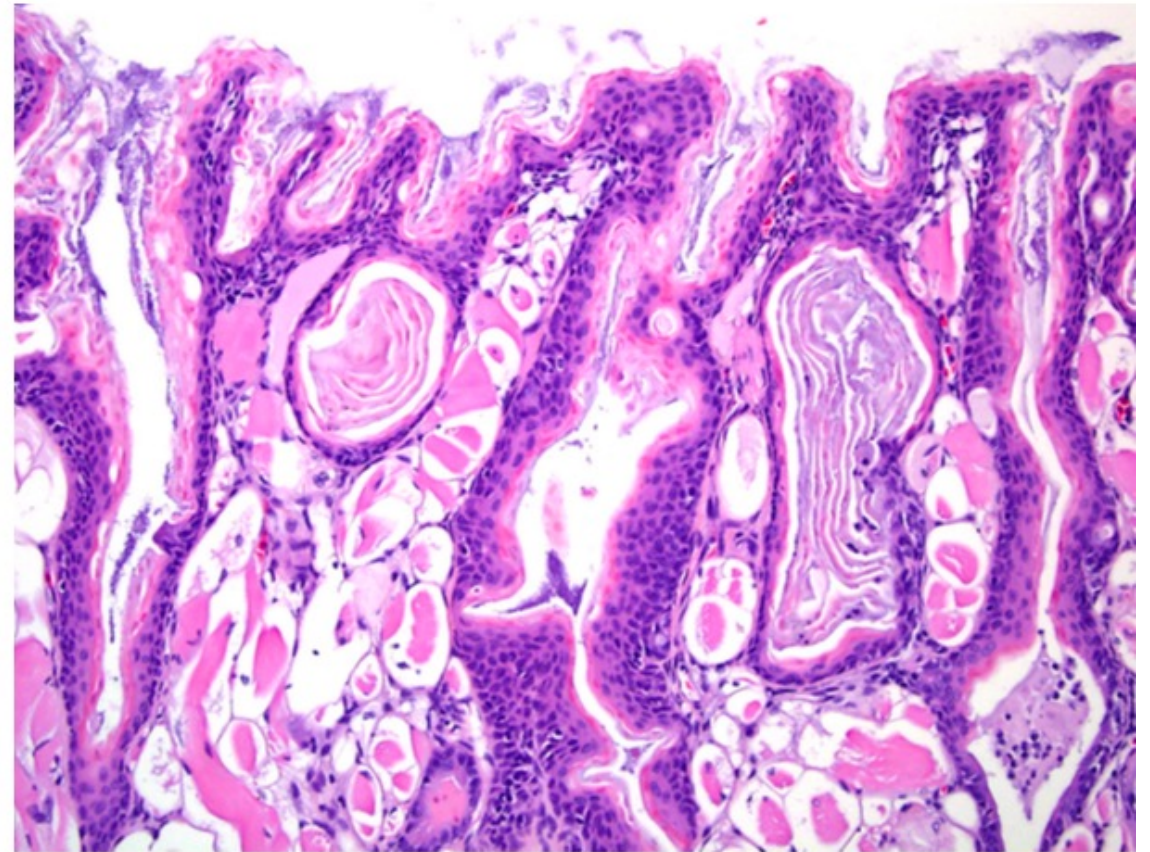
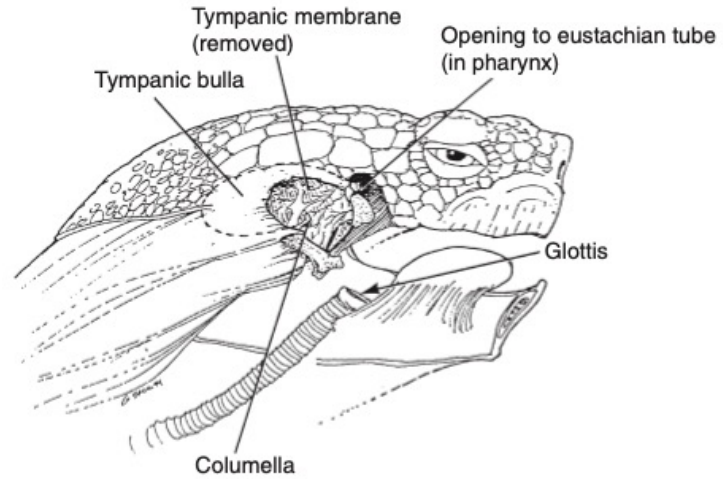


Photo credit Terio 2018

# CLINICAL SIGNS

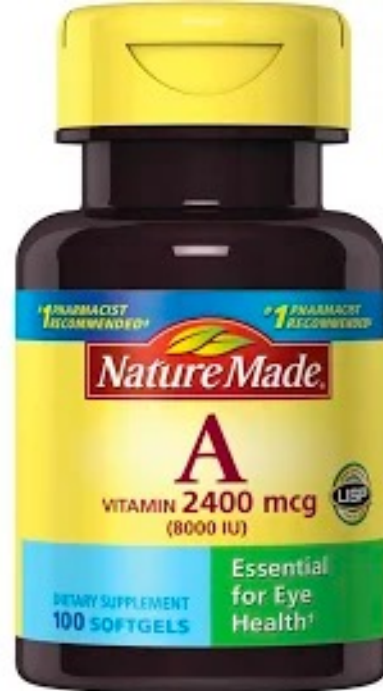
- Ocular: swelling, lacrimal gland obstruction, keratitis
- Stomatitis, tongue swelling
- Tympanic abscesses
- Gout
- Dysecdysis and coloration changes
- Pneumonia
- Hyporexia and lethargy





# HYPOVITAMINOSIS A IN WILD TURTLES





# HYPOVITAMINOSIS A

- Most often diagnosed on history and exam
- Treatment
  - Oral supplementation
  - Care with injectable
  - Nutritional adjustments



# CASE — BOX TURTLE

- Adult M box turtle
- Found on the side of the road
- Periorbital swelling
- Oculonasal discharge
- +/- oral plaques

Differentials?



# VIRAL INFECTIONS OF TURTLES

- Herpesvirus
- Ranavirus
- Mycoplasma
- Concurrent stomatitis +/-



Mader 2019

*Journal of Zoo and Wildlife Medicine* 47(1): 256–270, 2016  
Copyright 2016 by American Association of Zoo Veterinarians

## **RANAVIRUS EPIZOOTIC IN CAPTIVE EASTERN BOX TURTLES (*TERRAPENE CAROLINA CAROLINA*) WITH CONCURRENT HERPESVIRUS AND MYCOPLASMA INFECTION: MANAGEMENT AND MONITORING**

**Richard R. Sim, D.V.M., Matthew C. Allender, D.V.M., Ph.D., Dipl. A.C.Z.M., LaTasha K. Crawford, V.M.D., Ph.D., Allison N. Wack, D.V.M., Kevin J. Murphy, B.S., Joseph L. Mankowski, D.V.M., Ph.D., Dipl. A.C.V.P., and Ellen Bronson, med. vet., Dipl. A.C.Z.M.**

# CASE — BOA

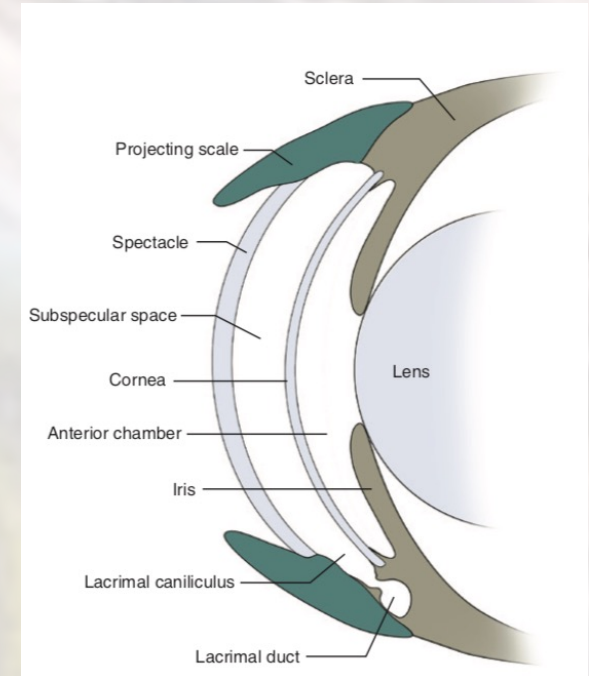
- Adult in a private collection
- Change in eyes noted by keeper

Initial observations?



# RETAINED SPECTACLE

- Spectacle = fused transparent epidermis
  - **Snakes**, some geckos, some lizards
  - Subspectacular space
- Dysecdysis = abnormal shed
- Treatment
  - Avoid premature shed removal
  - Improve **hydration**
  - Gentle removal of the spectacle



# CASE — FISH

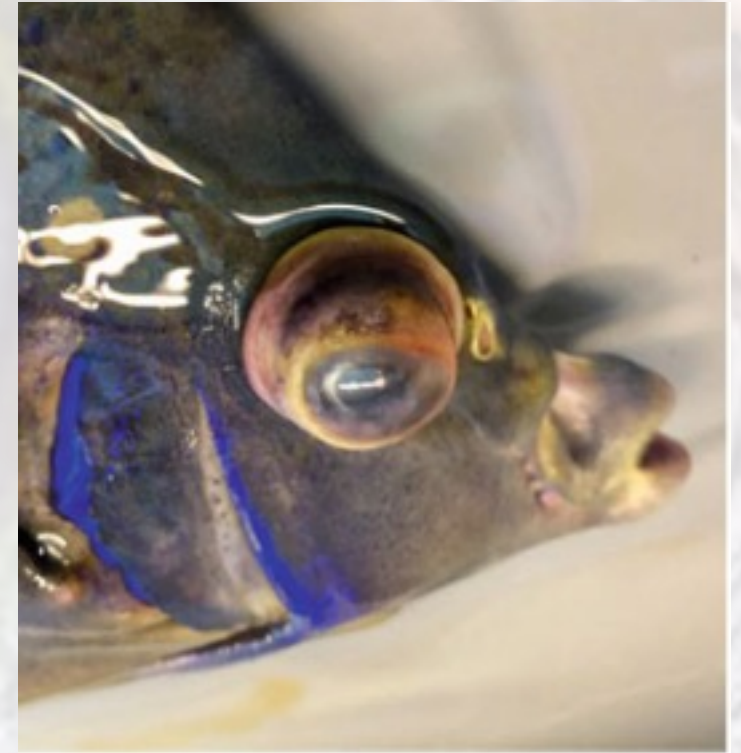
- Adult Fusilier
- Changes to OS
- Issues with the water pump a week ago.

Initial observations?



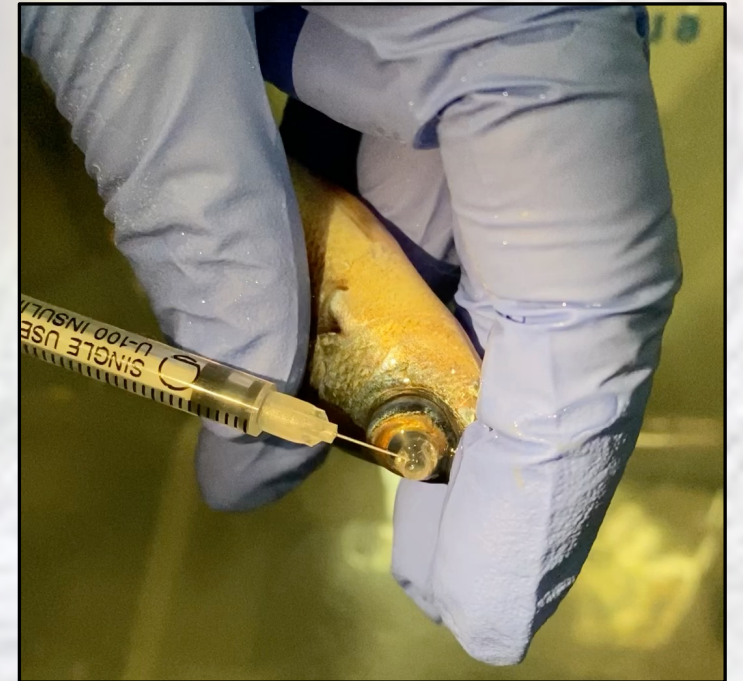
# “GAS BUBBLE” DISEASE

- Accumulation of ocular gas
- Due to supersaturation or barotrauma
  - Oxygen
  - CO<sub>2</sub>
  - Nitrogen
- Ocular pathology may result



# TREATMENT

- Prevent further gas accumulation
- Aspirate removal of gas
- Carbonic anhydrase inhibitor
- Hyperbaric therapy





# QUESTIONS?

---

[sozawa@ncsu.edu](mailto:sozawa@ncsu.edu)

