**EVALUATION OF BONE MINERALIZATION BY COMPUTED TOMOGRAPHY IN WILD AND CAPTIVE EUROPEAN COMMON SPADEFOOTS (*PELOBATES FUSCUS*), IN RELATION TO EXPOSURE TO ULTRAVIOLET B RADIATION AND DIETARY SUPPLEMENTS**

**van Zijll Langhout** M, Struijk RPJH, Könning T, van Zuilen D, Horvath K, van Bolhuis H, Maarschalkerweerd R, Verstappen F.

J Zoo Wildl Med. **2017** Sep;48(3):748-756.

**In what organ is calcidiol converted to calcitriol?**

1. **Kidney**
2. Spleen
3. Liver
4. Skin
5. Muscle

**Which group of European spadefoot (*Pelobates fuscus*) had the most bone mineralization on computed tomography?**

1. Juveniles with no UVB and dietary supplementation
2. **Adults with no UVB and dietary supplementation**
3. Juveniles with natural UVB and no dietary supplementation
4. Adults with natural UVB and no dietary supplementation
5. Wild adults

**GEOGRAPHIC AND INDIVIDUAL DETERMINANTS OF IMPORTANT AMPHIBIAN PATHOGENS IN HELLBENDERS (CRYPTOBRANCHUS ALLEGANIENSIS) IN TENNESSEE AND ARKANSAS, USA.**

Hardman RH, Sutton WB, Irwin KJ, McGinnity D, Reinsch SD, Freake M, Colclough P, Miller BT, Da Silva Neto JG, Souza M, Fitzpatrick B.

Journal of Wildlife Diseases. 2020 Oct;56(4):803-14.

**In a hellbenders (*Cryptobranchus alleganiensis*) with clinical ranavirus, what is the most likely location of its lesions?**

1. Dorsum
2. Tail
3. Mouth
4. Eyes
5. **Toes**

Watters, Jessa L., et al. "Seasonality in Batrachochytrium dendrobatidis detection in amphibians in central Oklahoma, USA." *Journal of Zoo and Wildlife Medicine* 50.2 (2019): 492-497.

Abstract: Chytridiomycosis, an infectious disease caused by the fungus Batrachochytrium dendrobatidis (chytrid or Bd), has not been well studied in Oklahoma. This is of particular concern regarding the connection between seasonality and chytrid infection. To further investigate this connection, chytrid prevalence and infection load were **quantified within amphibians in central Oklahoma from March to October**, across two sites in Oklahoma Co. and two sites in Cleveland Co. The results show a trend between seasonality and chytrid, **with spring and fall showing higher prevalence** and **summer showing lower prevalence, which coincides closely with the preferred chytrid growth temperatures**. Additionally, periods of high rainfall in May 2015 are linked to increased chytrid prevalence, as has been suggested by other research. Additionally, species exhibiting high chytrid prevalence follow the results of previous studies: Blanchard’s cricket frog (Acris blanchardi), American bullfrog (Rana catesbeiana), and southern leopard frog (Rana sphenocephala).

**Question:** Describe the life cycle of *Batrachochytrium dendrobatidis* (two stages).

**Ans:** Intracellular fungal bodies (thalli) mature to form zoosporangia in amphibian epidermis (epidermal hyperplasia and orthokeratotic hyperkeratosis with intracellular thalli visible on histology). Zoosporangia contain numerous infective, posteriorly flagellated motile zoospores that disperse in water, infect next host.

Rumschlag, S. L., & Boone, M. D. (2020). Lethal and sublethal amphibian host responses to batrachochytrium dendrobatidis exposure are determined by the additive influence of host resource availability. *The Journal of Wildlife Diseases*, *56*(2), 338-349.

Abstract: Host species may differ in their responses to pathogen exposures based on host energy reserves, which could be important for long-term trends in host population growth. Batrachochytrium dendrobatidis (BD) is a pathogen associated with amphibian population declines but also occurs without causing mass mortalities. The impact of BD in populations without associated declines is not well understood, and food abundance could play a role in determining the magnitude of its effects. We exposed American toad (Anaxyrus americanus), northern leopard frog (Lithobates pipiens), and cricket frog (Acris blanchardi) metamorphs to BD under low or high food treatments. Overall, anuran species responded differently to BD exposure and the combined effect of BD exposure and food abundance was additive. American toad survival was lowered by BD exposure and low food availability. Based on these results, we developed a population model for American toads to estimate how reductions in survival could influence population growth. We found that BD could reduce population growth by 14% with high food availability and 21% with low food availability. In contrast, survival of northern leopard frogs was high across all treatments, but their growth was negatively impacted by the additive effects of BD exposure and low food availability. Cricket frog growth and survival were unaffected by BD exposure, suggesting that this species is not sensitive to the effects of this pathogen in terms of growth and survival across environments of different quality in the time period examined. Our results showed that low food availability additively increased the species-specific lethal and sublethal impacts of BD on hosts, which could have implications for long-term host population dynamics.

**Question:**

A laboratory study showed which of the following to be true regarding American toad (Anaxyrus americanus), northern leopard frog (Lithobates pipiens), and cricket frog (Acris blanchardi) host responses to batrachochytrium dendrobatidis (BD) exposure and the additive influence of host resource availability?

1. American toads exposed to BD and low food had the lowest growth outcomes.
2. All cricket frogs and northern leopard frogs died with 24 days of exposure to BD.
3. High food abundance was not significantly associated with outcome in any species.
4. Female northern leopard frogs showed the slowest growth rates.
5. The effects of BD exposure and food abundance are unlikely to impact natural populations.

**Ans:** A

Causes of mortality in captive Panamanian golden frogs (*Atelopus zeteki*) at the Maryland zoo in Baltimore, 2001–2013.

Eustace, R., Wack, A., Mangus, L. and Bronson, E.

*Journal of Zoo and Wildlife Medicine*, 2018;49(2):324-334.

**Practice Question**

In a captive population of Panamanian golden frogs, what was the most common cause of death according to postmortem records?

1. Dermatitis
2. Polycystic kidney disease
3. Small intestinal obstruction
4. Sepsis
5. Tetany syndrome

Answer: A

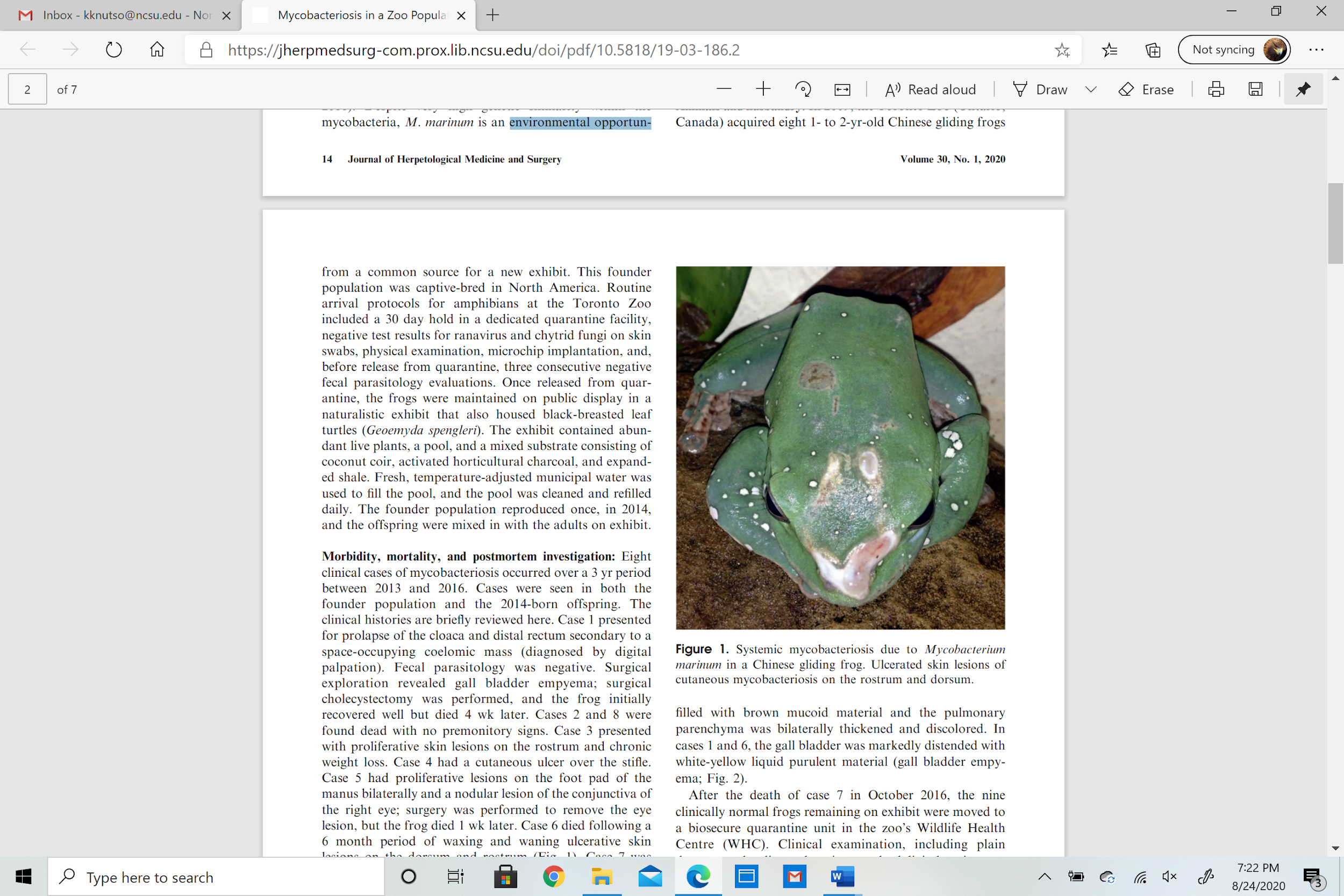
Mycobacteriosis in a zoo population of Chinese gliding frogs (*Rhacophorus dennysi*) due to *Mycobacterium marinum*.

Milnes, E.L., Delnatte, P., Lentini, A., May, K., Ma, J., Jamieson, F.B., Slavic, D. and Smith, D.A.

*Journal of Herpetological Medicine and Surgery*, 2020;30(1):14-20.

**Practice Question**

1. You are evaluating a Chinese Gliding Frogs (*Rhacophorus dennysi*) for ulcerative skin lesions. You take an impression smear for cytology of the skin lesions and results of a Ziehl-Neelsen stain are shown below. What is the most likely etiologic agent? What diagnostic test could you perform to confirm your suspicion?



Answer:

*Mycobacterium marinum*

Mycobacterial culture and speciation or PCR with sequencing

Questions:

1. Which of the following has been found to be the most common cause of mortality in captive caecilians?
   1. Dermatitis
   2. Cardiomyopathy
   3. Parasitism
   4. Trauma
   5. Renal failure
2. Which of the following is true regarding trombiculid mites (*Hannemania* sp.) in frogs?
   1. Only the nymph and adult stages of the life cycle are parasitic.
   2. The parasite causes morbidity by undergoing visceral migration.
   3. Fully aquatic frog species are more likely to be infected than more terrestrial species.
   4. Pustules on the skin are a characteristic lesion.
   5. There is often a positive correlation between snout-vent-length and intensity of infection.

In a recent study comparing Batrachochytrium dendrobatidis (Bd) in human made and natural wetlands, which of the following was found to be negatively correlated with Bd infections?

1. Water pH
2. Distance to the nearest road
3. Human made wetlands
4. Water temperature
5. Population density

Answer: D

Occupancy models provide a more accurate estimation of disease prevalence by incorporating which of the following into the statistical analysis?

1. Detection probability
2. Transmission rate
3. Subclinical infection rate
4. Seasonal variation
5. Mortality rate

Answer: A