

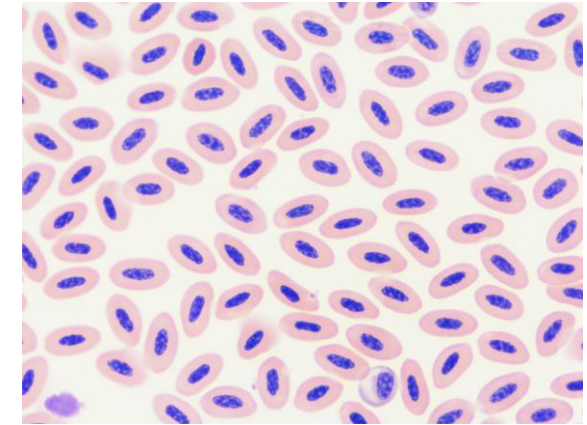
Infectious Diseases of Reptiles and Amphibians



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Animal Classes

- Many species
 - >12.000 reptile species (non-avian reptiles)
 - >8.000 amphibian species
- Reptiles and amphibians are ectotherms
- Metabolisms and physiology differ from those of mammals and between the different groups and species
- Wild animals:
 - Often hide disease
 - Animals may be severely ill before anyone notices



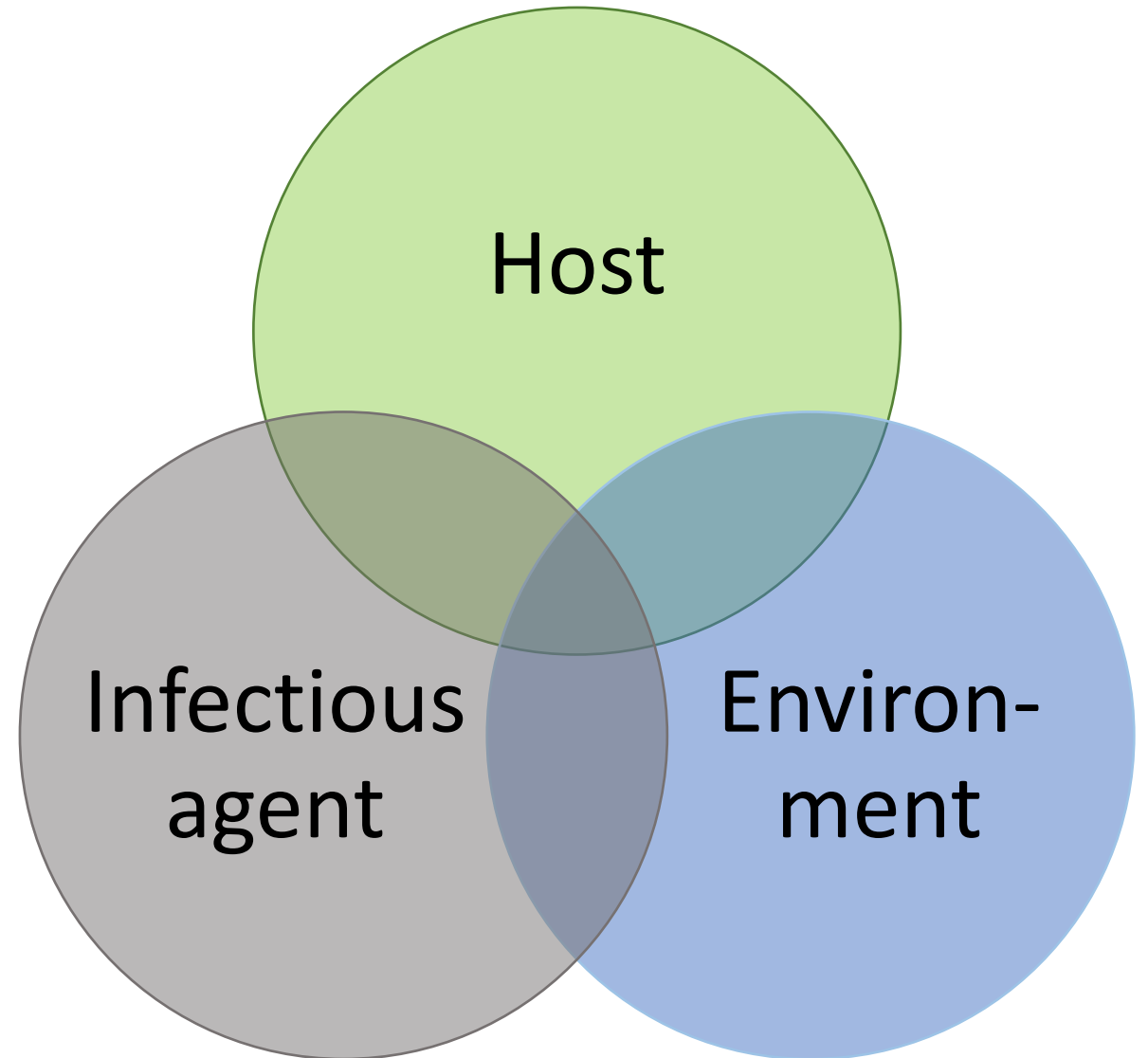
Infectious Diseases

- History:
 1. Zoonoses
 2. Model pathogens
 3. Animal health
 4. Microbiome
 5. Pathogen discovery



Basic considerations

- Infection and disease
 - In many cases, disease is multifactorial



Reptiles

- Currently viruses in >25 families with many different species and strains
 - Increasing numbers discovered regularly
- Numbers of bacteria uncounted
 - Many facultative pathogens
 - Some possibly emerging and with new hosts and species (chlamydia, mycoplasmas)
- Increasing numbers of fungal pathogens described
- Many parasites
 - Differences between wild animals and those in managed care

Amphibians

- Currently viruses in >25 families with many different species and strains
 - Increasing numbers discovered regularly
- Numbers of bacteria uncounted
 - Many facultative pathogens
- Fungi includes important pathogens as well as opportunistic pathogens
 - Chytrid fungi
- Many parasites

Reptile and amphibian pathogens

- Many have been shown to cause persistent infections
 - Herpesviruses
 - Ranaviruses
 - Serpentoviruses
 - Arenaviruses
 - Adenoviruses
 - Mykoplasmas
 - Cryptosporidia
 - TINC
 - And many others

Infectious disease diagnostics

- Can be divided into two categories
 - Detection of the infectious agent
 - Detection of the immune response
- Important to understand what individual tests determine as well as possible problems associated with them
- What are you trying to find out?

Pathogen detection

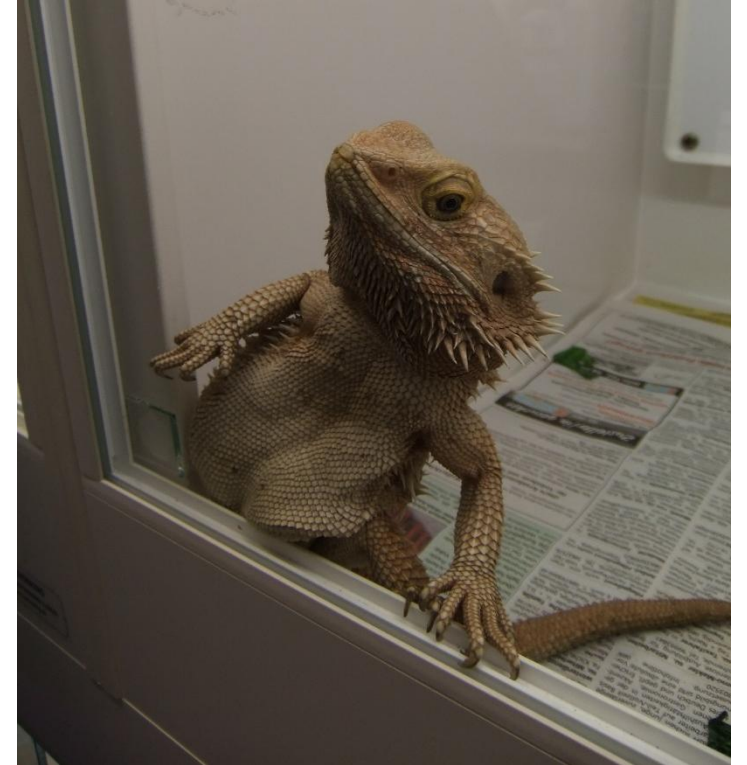
- Shows that pathogen is present in sample
 - Choice of sample is crucial
 - Negative result does not mean pathogen is not elsewhere in reptile
 - Detection of a virus does not mean that virus is necessarily causing disease

Detection of host immune response

- Shows that reptile has had an immune response to a pathogen
 - Does not necessarily show whether a pathogen is currently present
 - Does not show that pathogen is causing disease
 - Does not show whether an animal is immune to a specific pathogen
 - Looking at changes over time can be useful

Immune system

- Inate and adaptive immune systems
- Humoral and cell mediated factors
- Immune response depends on:
 - Temperature
 - Season, hibernation
 - Species
 - Sex
 - Reproductive status
 - Environmental toxines



Humoral Response

- Antibody based
- Available tests look for humoral immune response
- Takes time to develop
 - Several weeks in reptiles (Lock et al, 2003)
- Antibody detection methods used in reptile diagnostics:
 - Virus neutralization
 - Hemagglutination inhibition
 - ELISA

Overview

1. Infectious diseases of amphibians

- a. Global amphibian declines and chytrid fungi
- b. Other fungal and bacterial infections of amphibians
- c. Select viruses of amphibians:
 - i. Ranaviruses (amphibians and reptiles)
 - ii. Herpesviruses of amphibians

2. Infectious diseases of reptiles

- a. Viruses of reptiles
- b. Bacterial infections of reptiles
- c. Fungal infections of reptiles
- d. Select endoparasites of reptiles

3. Case discussions and wrap-up

Thank you for your attention!



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