Amphibian Diseases and Pathology

Debra L. Miller, DVM, PhD

Associate Professor/Veterinary Pathologist
Veterinary Diagnostic and Investigational Laboratory
The University of Georgia, College of Veterinary Medicine

Adjunct Associate Professor
Center for Wildlife Health
Department of Forestry, Wildlife and Fisheries
The University of Tennessee, Knoxville

Definitions:

- Pathology = absence from normal.
- Disease = a condition that impairs normal function
- Pathogen = organism that is capable of causing disease (viruses, bacteria, fungi, parasites)
- Not all pathogens cause disease all of the time
- Not all diseases are caused by pathogens (ex: diabetes, most cancers)

PLEASE REALIZE:

- Symptom is used in HUMAN medicine NOT for animals
  - Things we feel and the patient describes to the physician
- Signs occur in Humans and Animals
  - Things we can measure or observe

Gross External Changes (what you might find in the field)

- Swollen body or legs: edema
- Red coloration: erythema
- Red depressions where skin is missing: ulcerations
- Scrapes and scabs: abrasions
- Missing limbs: malformations, necrosis of distal limbs, trauma
- Sheets of missing skin on limbs: degloving
- Thickened or unshed skin: Proliferation of the skin
- Bumps: parasitic or other organisms cysts
- Loss of pigment in teeth of tadpoles

Edema Erythema

Loss of pigment in keratin 'teeth' of tadpoles

Proliferation / thickening of skin
Excessive shedding

http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Frog+Chytrid+fungus

Missing Limbs

Degloving

Lumps and Bumps

From Dr. Keel, SCWDS

Ulcerations

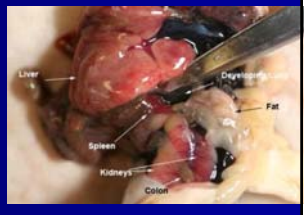
Abrasions

SEASONAL or ABNORMAL?

Gross Internal Changes: what you might see on necropsy

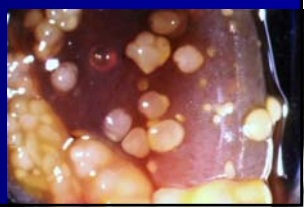
- Swollen pale liver: Fatty change
- Tan spots in organs (esp. liver, kidney): possible necrosis
- Round cysts or lumps: Granulomas or parasitic cysts
- Red organs: possible hemorrhage or congested vessels

Pale organs

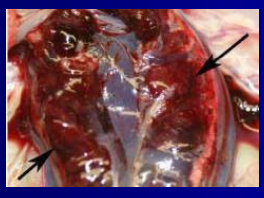


Tan areas on organs

Cysts and Nodules



Hemorrhages



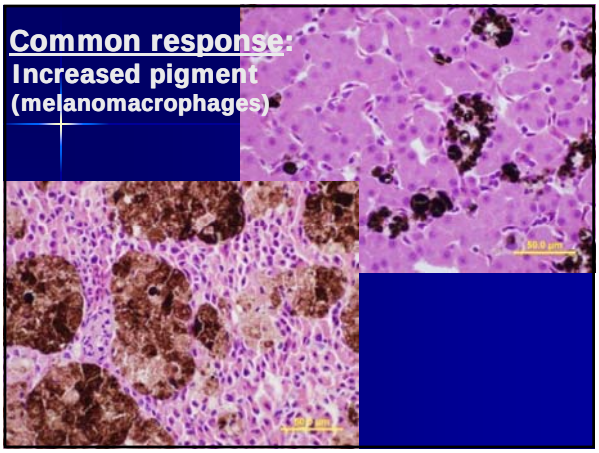
BE AWARE OF NORMAL STRUCTURES!

Histopathological Changes: what you might see under the microscope

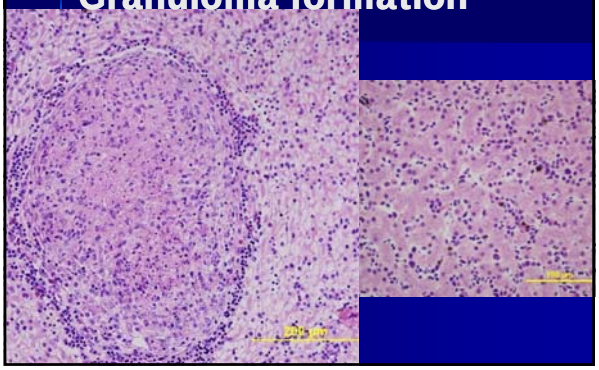
- Increase in Melanomacrophage Centers
- Granulomas
- Necrosis (dead cells/organs) or degeneration (compromised cells/organs including fatty change in liver)
- Hemorrhage or congested vessels
- Bacteria
- Fungi
- Viral Inclusions
- Parasites

Common response:

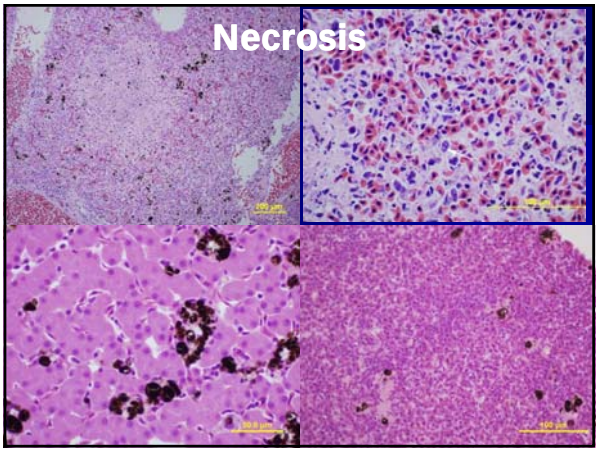
Increased pigment
(melanomacrophages)



Common response = Granuloma formation

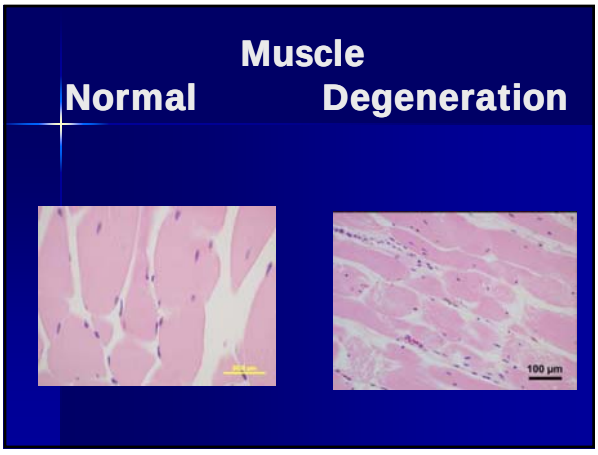


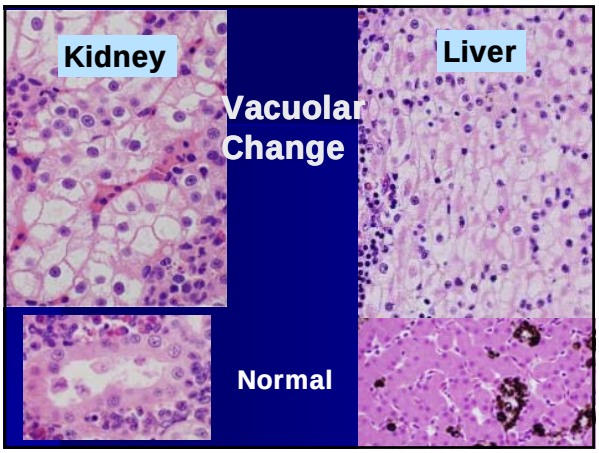
Necrosis

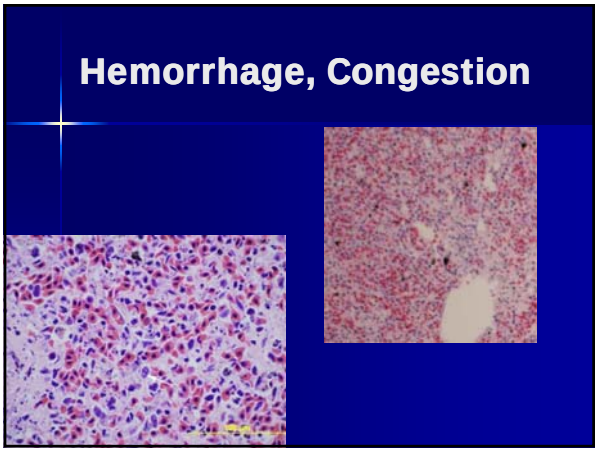


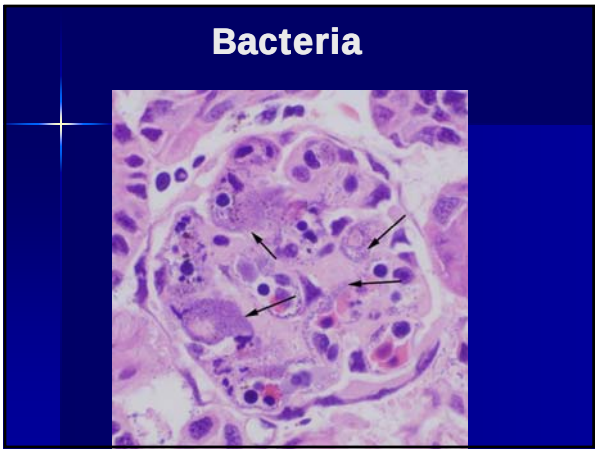
Muscle

Normal Degeneration




Kidney
Liver
Vacuolar Change
Normal

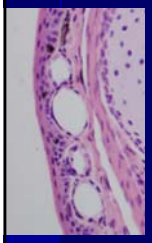

Hemorrhage, Congestion

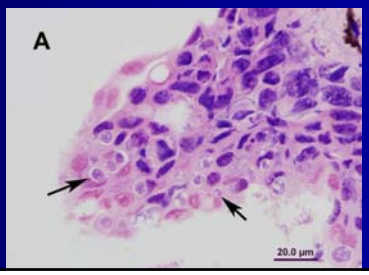

Bacteria

Fungi Skin:

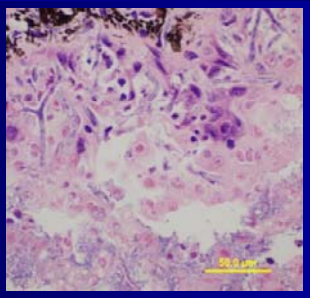
Normal

Bd

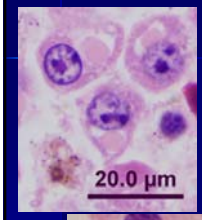


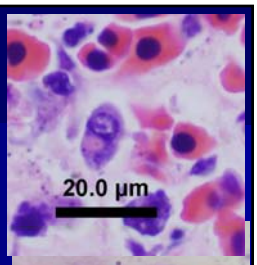


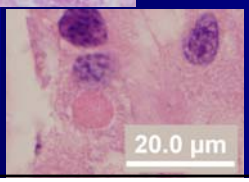
Other fungi

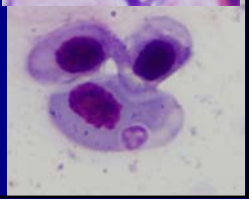


Inclusions

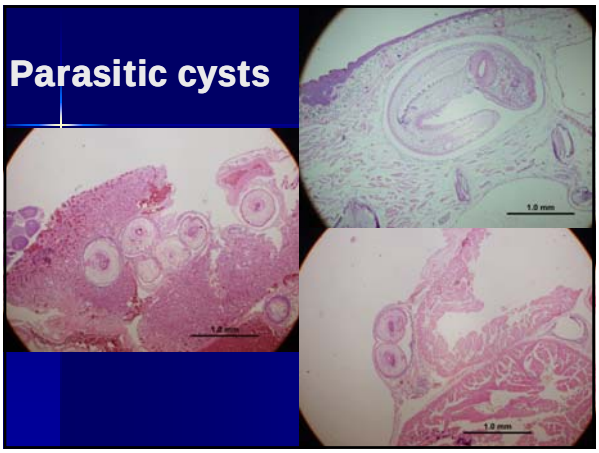




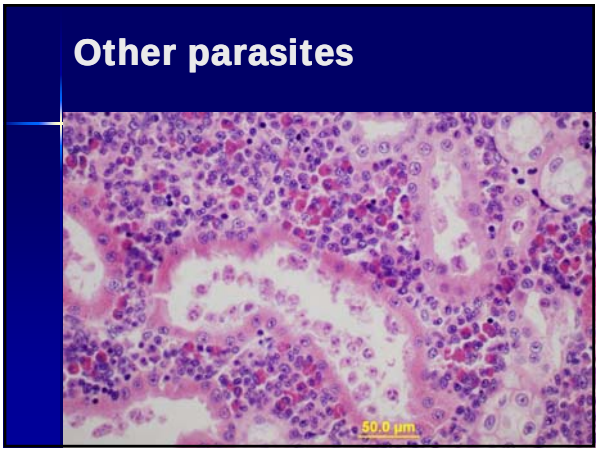




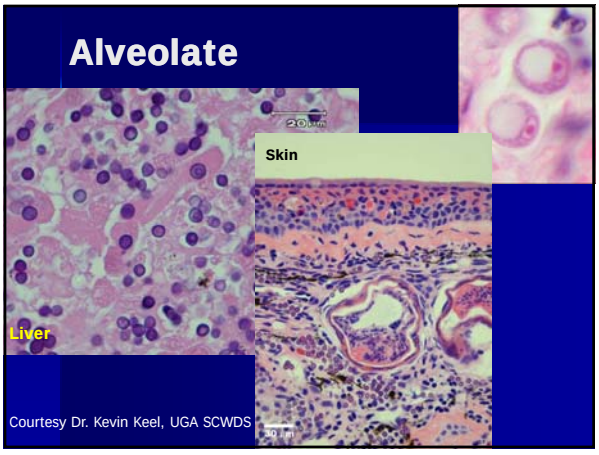
Parasitic cysts



Other parasites



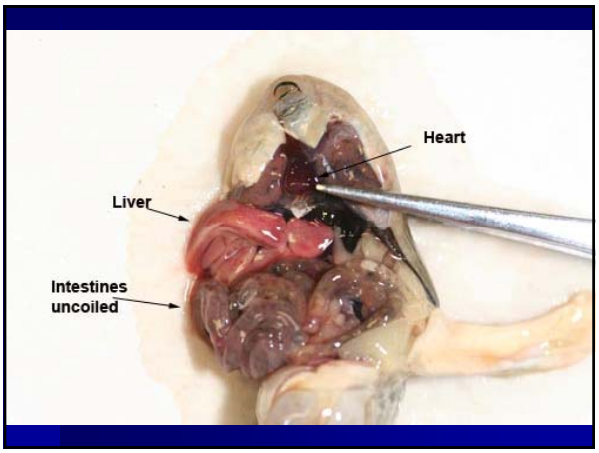
Alveolate

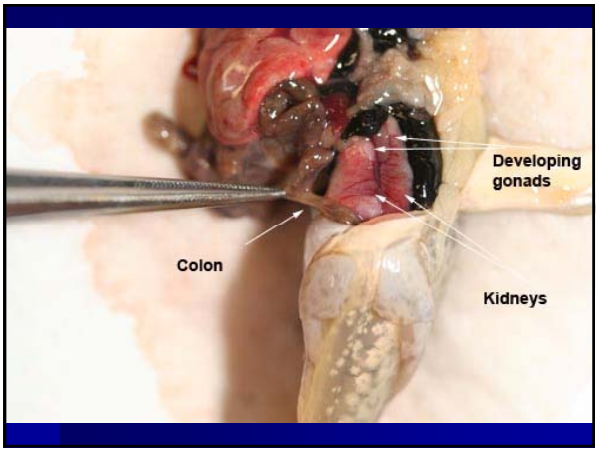


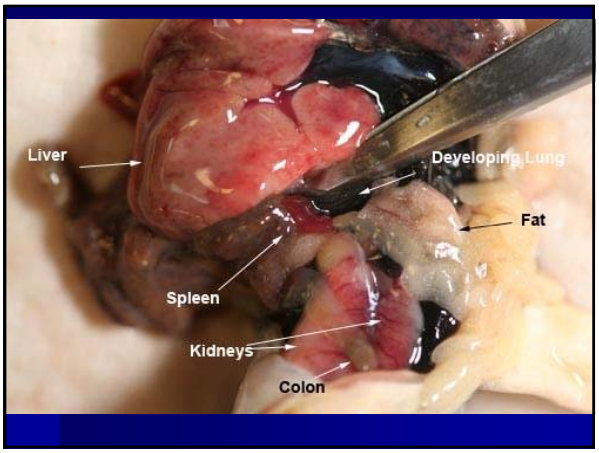
Courtesy Dr. Kevin Keel, UGA SCWDS

Questions?

LAB TIME: Organ Review


Heart
Liver
Intestines
uncoiled


Developing
gonads
Colon
Kidneys


Liver
Developing Lung
Fat
Spleen
Kidneys
Colon