Amphibian Anatomy and Physiology

Who is Daniel Malagon?
- Undergraduate Senior
- Took this class two years ago
- Undergraduate Researcher in Gray Lab

What is Anatomy and Physiology?
- Anatomy
- Physiology
What is Anatomy and Physiology?

**Anatomy**
- The individual components (organs, skeleton, etc.) of an organism that work together to keep it alive.

**Physiology**
- How these individual components work together to keep an organism alive.

This lecture is what I imagine the average herpetologist remembers from his/her Amphibians Class.

Consequences of an Ectothermic Lifestyle

- Metabolism
- Shedding rate
- Locomotion
- Growth rate
- Feeding voracity
- Larval development
- Calling rate/frequency

Consequences of a Water-Dependent Lifestyle
Survival of amphibians is limited by water and temperature.

Amphibian Locomotion and Body Plans

Lateral Undulation

"Jumping"

Amphibian Locomotion and Body Plans
Anuran Anatomy

• Powerful Hind Limbs
• Urostyle
• Powerful Leg Tendons
• Reduced Skull
• Front Legs & Pectoral Girdle
• Shortened vertebral column

Common Modifications to General Body Plan

• Gliding
• Swimming
• Burrowing
• Hopping
• Specialized toe tips
Common Modifications to General Body Plan

- Specialized toe tips
- Area of oxygen exchange for respiration
- Eyecup
- Paedomorphosis
- Eft stage in newts
What is a Caecilian?

- Limbless
- Fossorial
- Understudied clade
- Wedge-shaped skulls
- 212 known species
- Tropical

Caecilian Anatomy

Caecilian Anatomy
Layers of the Skin and Function

Caecilian Tentacle

**Types of Glands**

- **Mucous**
  - Secret mucus that keep amphibian skin moist
  - More numerous
  - More widely distributed on body

- **Granular**
  - Secret various substances that serve as defensive chemicals
  - Maintain mucosome ideal for host
Tadpole Anatomy and Physiology

Gosner Stages (1960)

Metamorphosis

Strategies of Respiration

Lungs

Skin

Gills

Specialized Tissues
Unique examples of Amphibian A & P

Gastric Brooding Frog
Wood Frog "Anti-Freeze" Blood

[Video Link]

Poison Arrow Frogs

Tetrodotoxin Production in Newts
Waxy Monkey Frog

- [https://www.youtube.com/watch?v=5dIuToICgaU](https://www.youtube.com/watch?v=5dIuToICgaU)
- Unique 3rd type of gland that excretes lipid-rich mucus to help reduce evaporative water loss