



The Wildlife Center  
OF VIRGINIA

## Amphibian Rehabilitation



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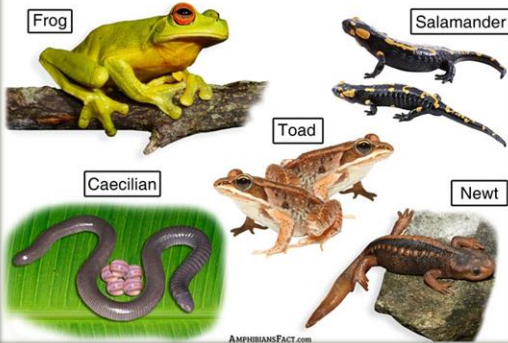
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## Types of Amphibians



Frog Salamander  
Toad  
Caecilian Newt

AMPHIBIANSFACT.com

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## Taxonomy and Diversity



Metamorphosis

- Over 4000 species worldwide
- "Amphibia" has Greek roots. Amphi = both, bios = life. Refers to the dual life stages: aquatic and terrestrial

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## Taxonomy and Diversity

### 3 Orders

- 1) Anura (Salientia) – frogs and toads
- 2) Caudata (Urodela) – salamanders, newts, sirens
- 3) Gymnophiona (Apoda) - caecilians




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## Metabolism

- Larger amphibians require proportionately fewer calories
- Are proportional to temperature and activity level
- MR will increase 1.5 – 2 times with illness or surgical recovery
- MR can increase 9 times with strenuous activity.



education.nsw.gov.au/Curriculum/5/5c\_frog.html




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## Metabolism

Formulae for determination of caloric needs or resting amphibians at 25°C <sup>a</sup>	
Order	Caloric requirement per 24 hours in kcal
Anuran	$0.02(BM)^{0.84}$
Salamander	$0.01(BM)^{0.8}$
Caecilian	$0.01(BM)^{1.06}$

Adapted from Tables 7.1-7.4 in Wright KM and Whitaker BR, 2001

<sup>a</sup> Value must be increased by at least 50% for ill or injured animals




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### Thermoregulatory Homeostasis

- Poikilotherms (ectotherms): rely on environmental heat and adaptive behaviour to maintain preferred optimal temperature zone (POTZ)
- POTZ depends on species, age, and season and is influenced by metabolism



[www.faoi.org.au/rosebery/gallery.html](http://www.faoi.org.au/rosebery/gallery.html)

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### Basic Amphibian Anatomy

FROG



Long legs, webbed toes – made for jumping!

Permeable skin

TOAD



Shorter, stumpy legs – made for more walking

Parotid glands



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### Amphibian Skin

- Don't forget that amphibians have permeable skin.
- Be careful of what they are exposed to.
- This includes their substrate, water, your hands, medications – anything they can touch.



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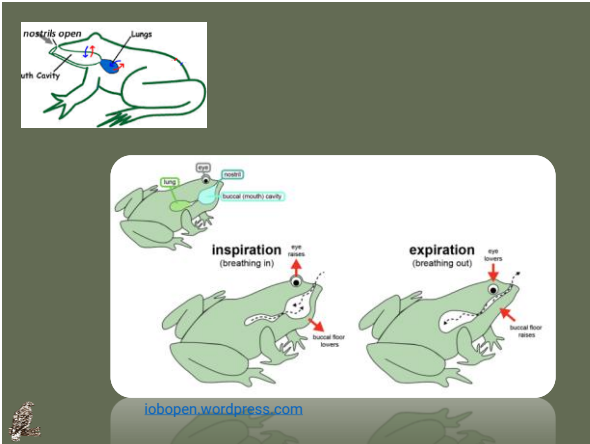
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## Husbandry - Vivarium

- Temperature
  - Tropical amphibians: background temperature = 70°F – 85°F
  - Temperate amphibians: background temperature = 65°F – 72°F. Seasonal drops of 10°F – 15°F may be required for optimal health and breeding
  - A basking spot of at least 15°F above background temperature should always be provided except during hibernation
- Humidity
  - Relative humidity should be between 75% - 95% in the vivarium.
  - Thermal and humidity gradients should be maintained to provide a variety of microenvironments.

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### “Commonly” Seen Species

- American Toad
  - Found in a wide range of habitats
  - Successful insectivore
- Gray Treefrog
  - Arboreal
  - Feeds on larval insects




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### Housing

- Can house in critter carrier or small aquarium
  - Cover 3 sides with newspaper on the outside
- Substrate must be NON-BLEACHED napkins or paper towels
- Enclosure must be moist at all times
  - Use distilled water, or tap is OK if pH balanced. Can also used 50/50 distilled/tap.
- Place to hide
- Shallow water dish
- \*\*No artificial plants




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### Diet

- Research natural history!
- Live crickets or mealworms. Use allometric food calculator to determine amount necessary.
- Feed EOD




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## Reptile Release Criteria

- Incredibly specific home ranges
  - Gathering rescue location information is a MUST
- Seasonal considerations
  - Spring vs. fall admissions
  - Acclimation period
- Legal constrictions
  - In VA, herps have to be released by Oct. 1 or be overwintered
  - Overwintered herps cannot be released until May 15




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## Exam Room

- Keep exam room between 70°F – 75°F and humidity around 70%. Amphibians prefer cooler temperatures than reptiles.
- Keep moist unbleached paper towel on exam table and a bottle of distilled water to wet the patient occasionally to prevent dehydration.
- Always wear slightly wetted powderless vinyl or plastic gloves when handling amphibians.
- Always have the door closed, the room tidy, and all drains and vents screened to prevent the patient from escaping.




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## Physical Exam and Restraint

- Proceed in a stepwise manner
- Perform a distance exam before handling looking at posture, responsiveness, general attitude, respiratory movements (gular and pulmonary), hydration of the skin, lesions, and debris on skin.



[www.wikipedia.com](http://www.wikipedia.com)




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### Physical Exam and Restraint

- The bulk of frogs need to be supported when held. Grasp large frogs around body just behind forelimbs. Grasp small frogs with either thumb and forefinger around body or hold the hind legs in your fist.
- Some frogs will vocalize when being held (either an “anti-predator call” or “get off me, I’m not interested”).
- Eye protection should be worn with several species. The neotropical Giant Toad (*Bufo marinus*) can squirt a noxious chemical from its parotid glands several feet when handled.



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tropicals.berkeley.edu/\_/img/hCG.html



tropicals.berkeley.edu/\_/img/hCG.html



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### Physical Exam and Restraint

- Salamanders should be grasped just behind the head and in front of the forelimbs AND just in front of the hind limbs.
- Salamanders may drop their tail during PE (autotomy).
- With small specimens, it may be best to examine them in a clear plastic container so the ventrum can be visualized.
- Aquatic salamanders should only be removed from the water for diagnostic purposes and then only for a short period of time.
- Large salamanders can bite. These bites hurt and tend to bleed a lot.




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### Physical Exam and Restraint

- Body Condition
  - Obtain weight, body symmetry, body condition (compare to normals of that species).
  - Look for musculoskeletal deformities, ulcerations, erythema, granulomas, increased or decreased pigmentation on the skin, skin texture, body swelling, etc.



[www.fdrproject.org/~enviro/bactfungi.htm](http://www.fdrproject.org/~enviro/bactfungi.htm)




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### Physical Exam and Restraint

- Oral Cavity
  - *Small amphibians*: use a small piece of waterproof paper to open the mouth.
  - *Large amphibians*: a thin piece of plastic (credit card or small soft rubber spatula)
  - Opening the mouth from the front or corner of the mouth may be easier
  - The jaw is extremely thin so care should be taken not to exert too much pressure.
  - Mucous membranes should be pale pink (unless pigment is normal for the species)
  - A thin layer of skin separates the oral cavity from the eye – look for retrobulbar injury.




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### Therapeutics – Drug Administration

- Oral
  - Preferred route for most adult amphibians
  - Safe, rapid, reliable
  - Open the mouth the same way as you would perform an oral exam.
  - For tiny patients, microliter pipettes can be used to administer small doses (use a fresh tip for each patient).




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### Therapeutics - Drug Administration

- Topical :
  - Small amounts of drug can be applied directly to the skin or the animal can be immersed in a medicated bath.
  - Select drugs that are non-irritating (avoid benzyl alcohol carriers ex. injectable enrofloxacin)
  - If irritation is seen (behavioural irritation or excessive mucous production), rinse animal in chlorine-free room-temperature water.
  - Use water-soluble medications and avoid overdosing by administering drugs locally with tuberculin syringes or rolling drug on with a cotton-tipped applicator.

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### Therapeutics - Drug Administration

- **Topical :**
  - Baths are good for dosing multiple animals; ensure the temperature and pH are appropriate for the species (pH between 7.2 – 7.4 is suitable for most amphibians).
  - Medications can be added to tank water or preferably, a separate hospital tank can be established



www.reptilesmagazine.com

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### Therapeutics - Drug administration

- **Injectable:**
  - With the aid of a good handler, drugs may be given SQ, IM, IV, IC (intracoelomically), or in to the lymphatic system.
  - SQ injections are difficult as frogs lack a subcutaneous space. Only small amounts of medications or fluids can be given in this way.
  - IM injections are usually given in the forelimbs to avoid the renal-portal system. Although it now appears that the renal-portal system has no detrimental affect for drug administration in reptiles, use cautiously in amphibians until more research is conducted.

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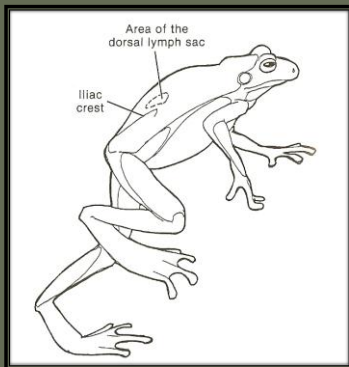
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### Diseases: Nutritional

- Nutritional Secondary Hyperparathyroidism
- Hypovitaminosis A
- Obesity
- Gastric Overload or Impaction



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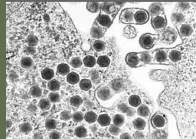
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### Viral Diseases

- Herpesvirus
- Iridoviruses



<http://www.scienceimage.com.au>



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### Bacterial Diseases

- Bacterial dermatosepticemia
- *Chlamydophila psittaci*
- *Mycobacterium* spp.



[www.fdrproject.org/\\_/environbactfungi.htm](http://www.fdrproject.org/_/environbactfungi.htm)

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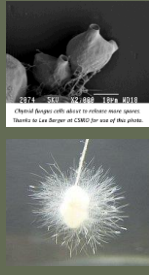
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### Fungal and Algal Diseases

- Chytridiomycosis (*Batrachochytrium dendrobatidis*)
- Saprolegniasis
- Chromomycosis




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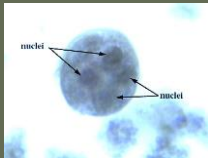
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### Protozoal Diseases - Amoebiasis

- Amoebiasis
- Ciliated Protozoa
- Trypanosomes



www.umantoba.ca/~dick/z346/images/ent3.jpg



webrt.calhoun.edu/~entamoeba\_trophozoite.jpg

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### Parasitic Diseases

- Nematodes:
  - *Rhabdias* spp – lung worm
  - *Strongyloides* sp. – GI parasite
- Trematodes and Cestodes
- Metazoan Parasites
  - Microsporidia
  - Myxosporean infection
  - Acanthocephalans
  - Leeches
  - Copepods
  - Trombiculid mites
  - Toad flies




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### Toxicities

- Ammonia
- Salt
- Heavy Metal
- Chlorine
- Pesticide
- Second-hand smoke!



[reptilenews.blogspot.com/2006\\_11\\_01\\_archive.html](http://reptilenews.blogspot.com/2006_11_01_archive.html)



[www.combatrackersteam.org](http://www.combatrackersteam.org)



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