

PHYLUM: CHORDATA

SUBPHYLUM: VERTEBRATE (CRANIATA)

SUPERCLASIS: GNATHASTOMATA (JAWED FISHES)

CLASS: AMPHIBIA

ORDER: GYMNPHIONA (APODA)

ORDER: URODELA (CAUDATA)

ORDER: ANURA (SALIENTIA)

MORPHOLOGY

Apoda

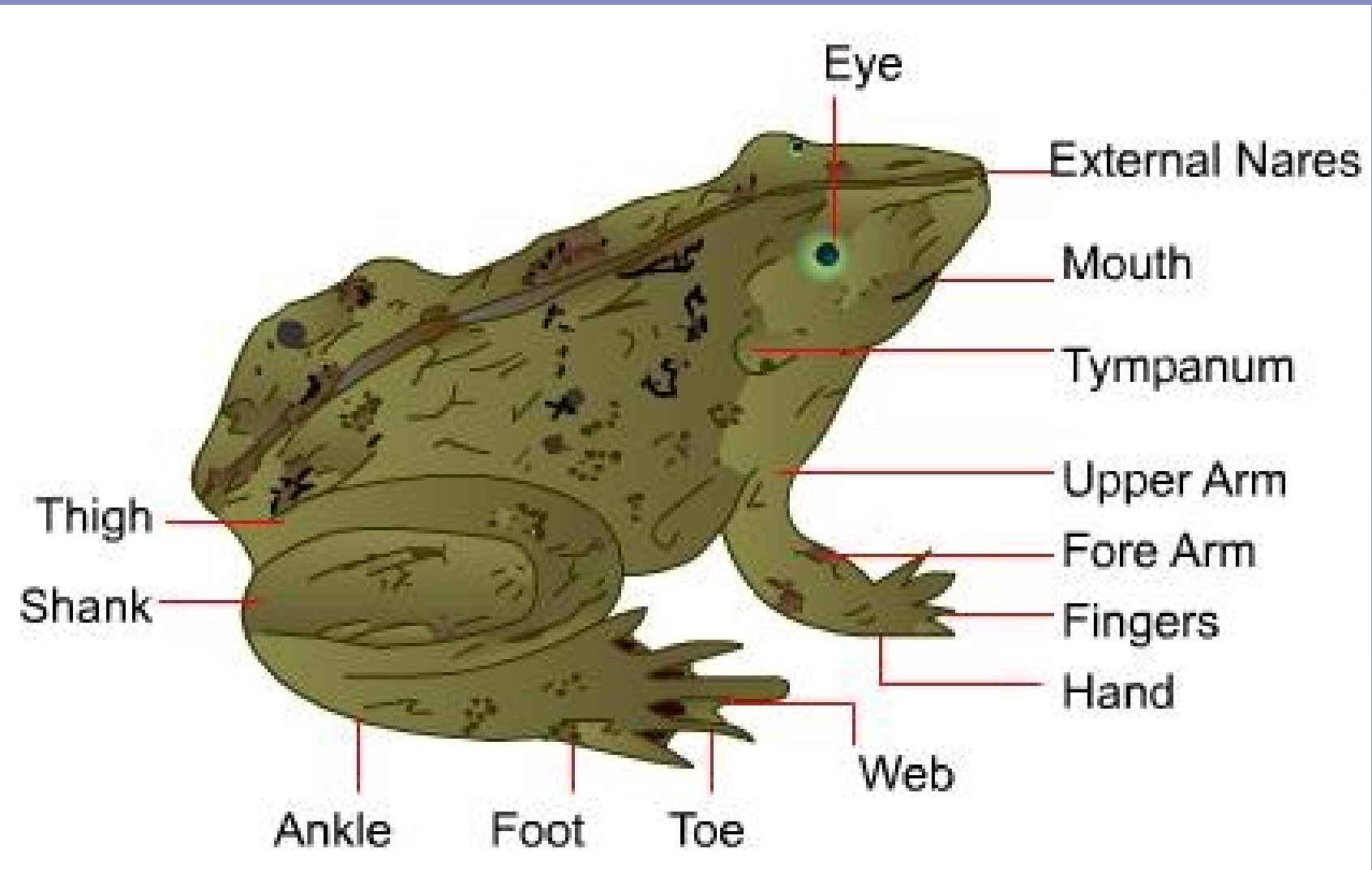
- The body structure look like the earthworm and the members become dull.
- They show a ring structure and have small flakes under the skin.

Urodela

- The body is long and round, there is **no specific head and neck part.**
- **A long tail** is available.

ANURA

- The head and body are joined; **no specific neck area or tail** was formed.
- The front members are short and the back members are long.
- During the breeding season, the first finger turned to the pillow-shape structure in males.
- **They have got third eyelids** that are transparent from the upper and lower eyelids **(Protection)**
- Timpanal membrane are located behind the eyes.
- Some of them have got small tubercles at the front and back members **(used for nesting and digging soil).**
- Small disc-shaped tubercles are present on all fingers of leaf frogs (Hylidae)



Apoda



Urodela (Caudata)

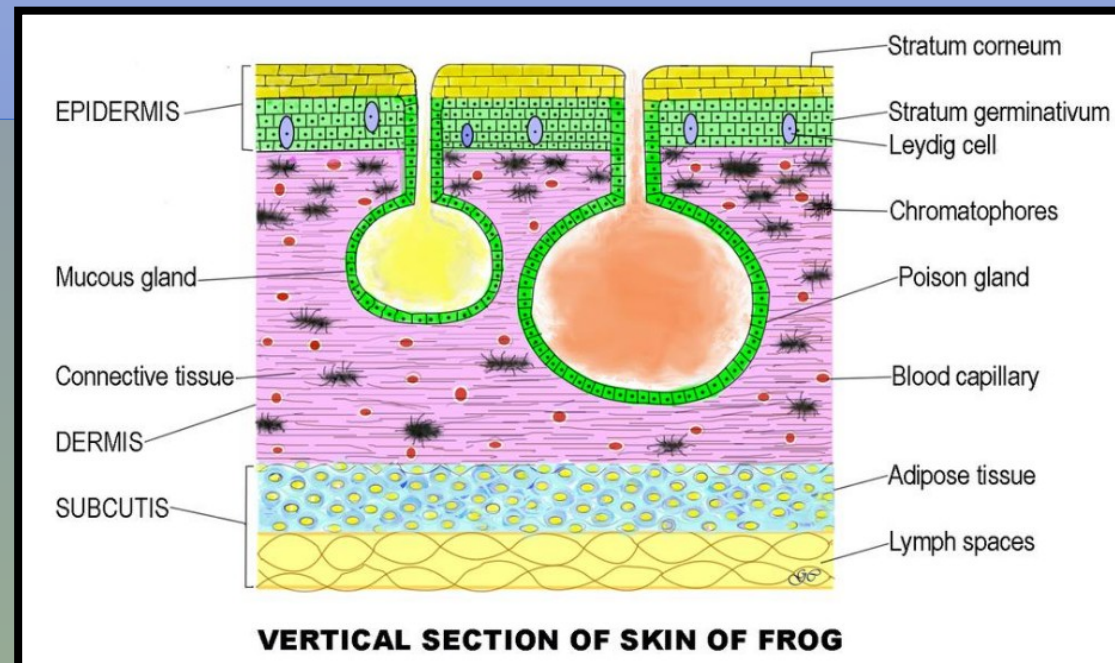


Anura

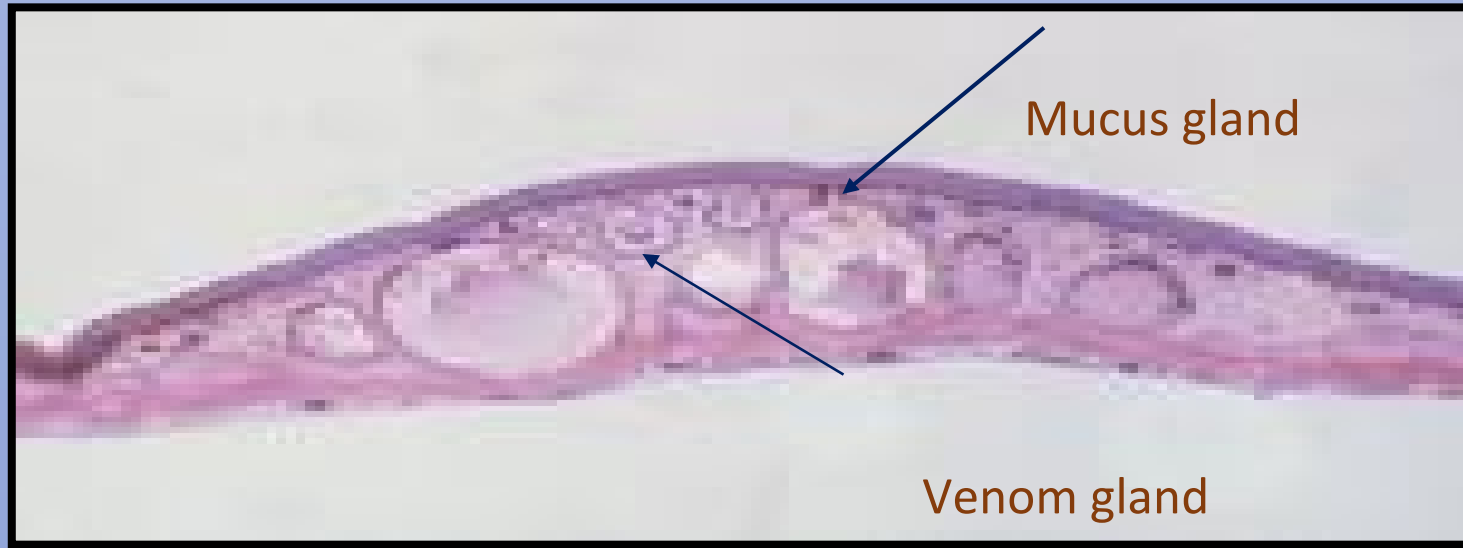


SKIN

- Since they spend a part of their lives on land, they consist of **two layers: epidermis and dermis**. Their skin is naked and always moist.
- The epidermis consists of the **stratum germinativum (lower part)** and the **stratum corneum (upper part)**.
- **Stratum corneum** is under the control of the **pituitary and thyroid glands** and has a **protective role**. Sometimes some of the dead cells occur in the accumulation of **keratinised structures (horny teeth, skin on the reliefs)**.



- The dermis is made of connective tissue. Mucus, venom glands, color cells, nerve and blood vessels are located in this layer.



- Skin must be **moist** for the **skin respiration** .
- **Mucus secretion**; prevents water from entering the body, plays a role in **regulating body temperature**.

- The dermis is made of connective tissue. Mucus, venom glands, color cells, nerve and blood vessels are located in this layer.



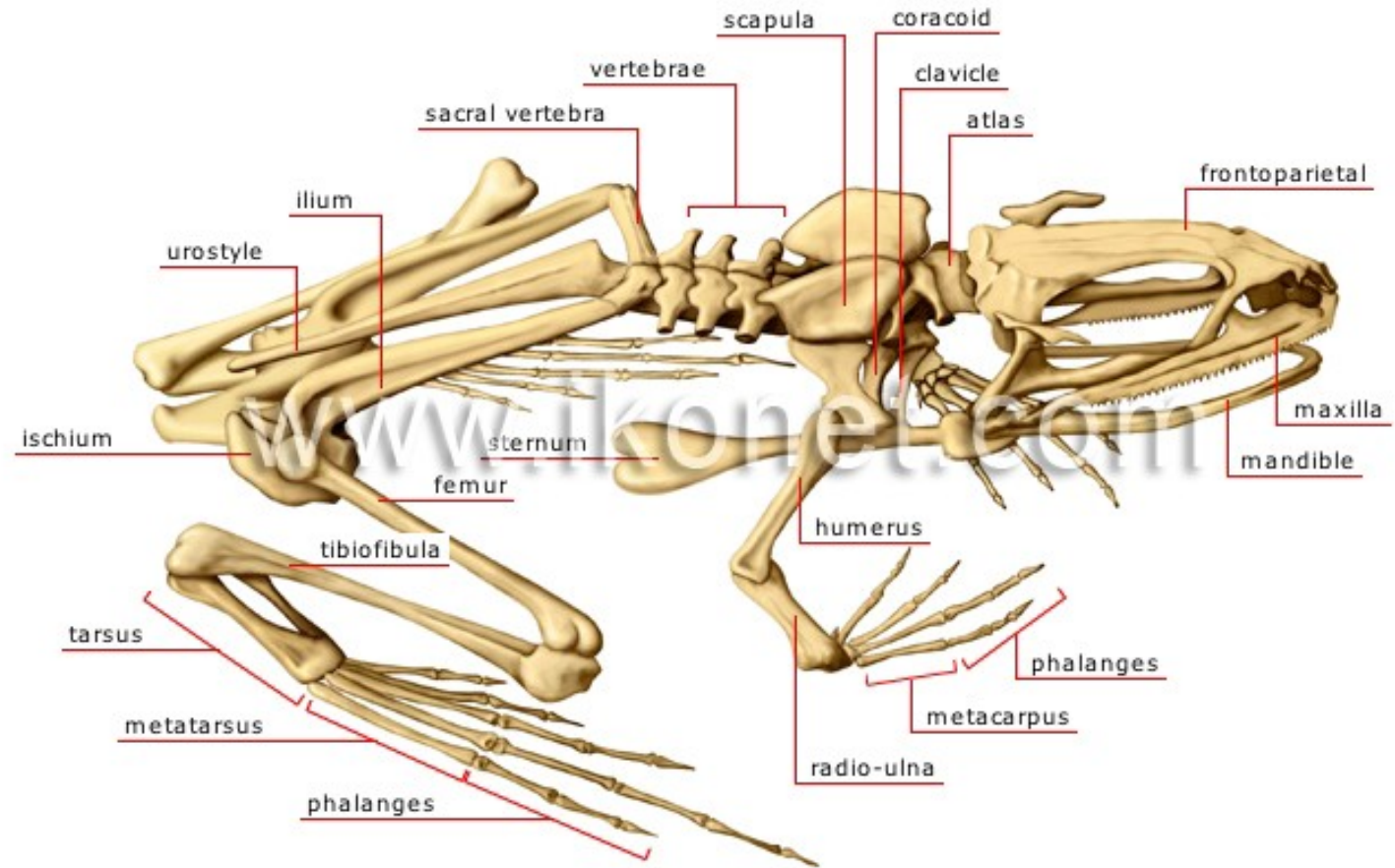
Venom gland

- Skin must be **moist** for the **skin respiration** .
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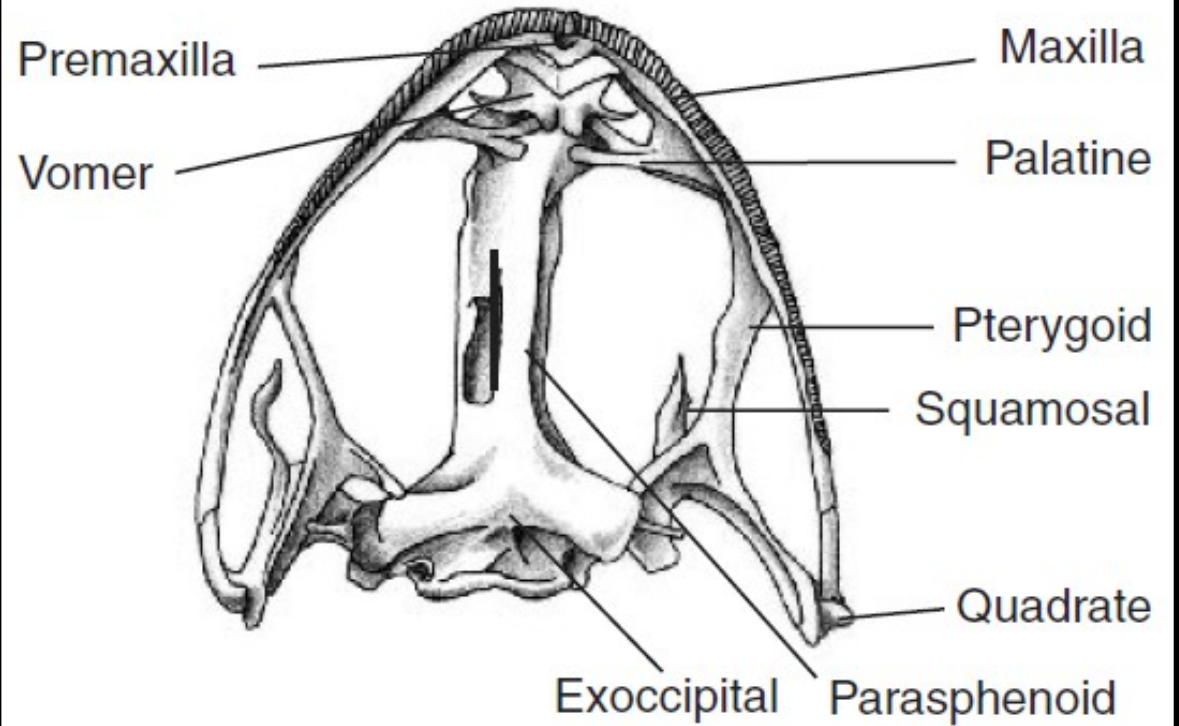
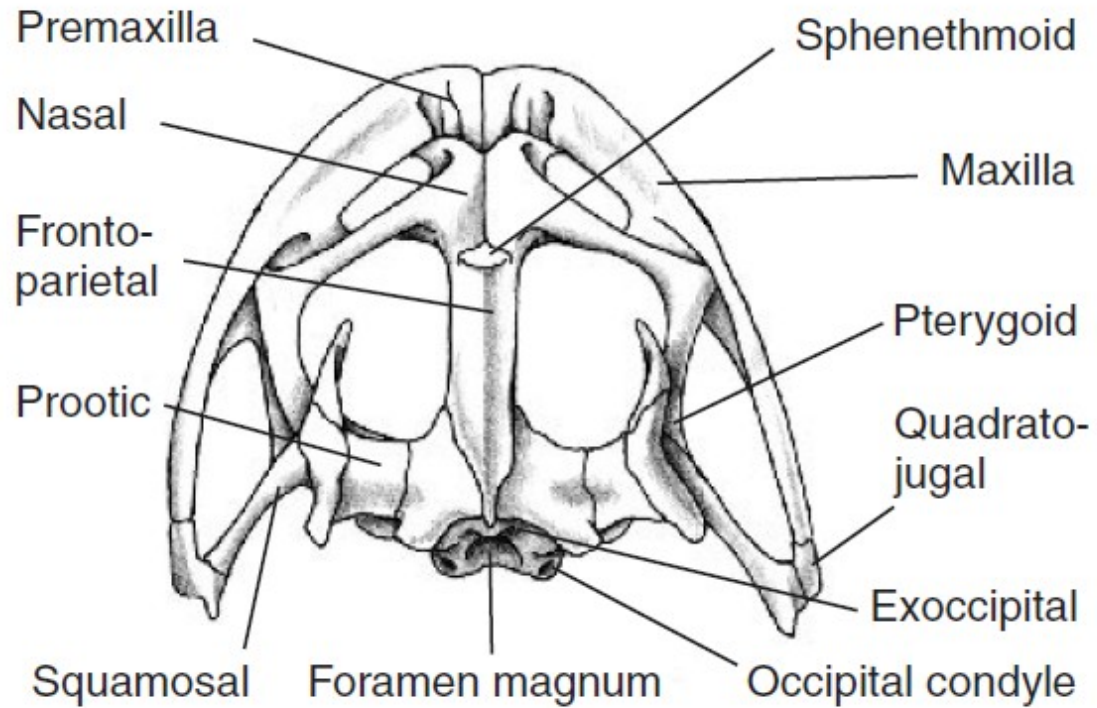
SKELETON

- It serves to keep the soft parts of the body upright, to protect the organs, to connect the muscles that provide movement.
- In the larval stage, the skeleton is composed of the cartilage whereas it is the bone structure in the adult period.

- 1. Axial skeleton:** It consists of the head, spine, breastbone and ribs.
 - 2. Appendicular skeleton:** It consists of a chest strap, anterior legs, a hip strap, and hind legs.
- The first vertebra that connects the spine to the skull is called **ATLAS**.
 - While in tailed amphibians have 100, non-members have 200 cartilage spin; **the frogs have up to 10 ossified vertebrae**.
 - **The sternum is the first time seen in Amphibia.**
 - The ends of **the ribs are not connected to the breastbone.**
 - The frogs have clavícula, coracoid, scapula and suprascapula bones from the midline of the chest strap.



SKULL



VARIATIONS OF PUPILLA



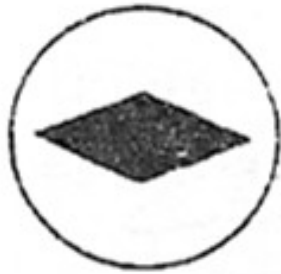
Rana



Pelobates



Bombina



Bufo



Alytes

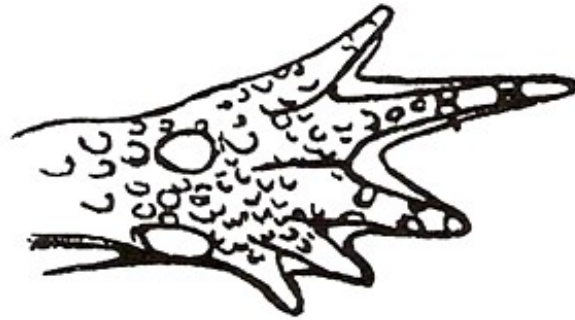


Bombina

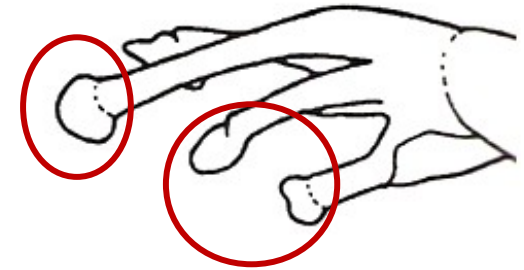
Foot Structure of Frogs



Rana

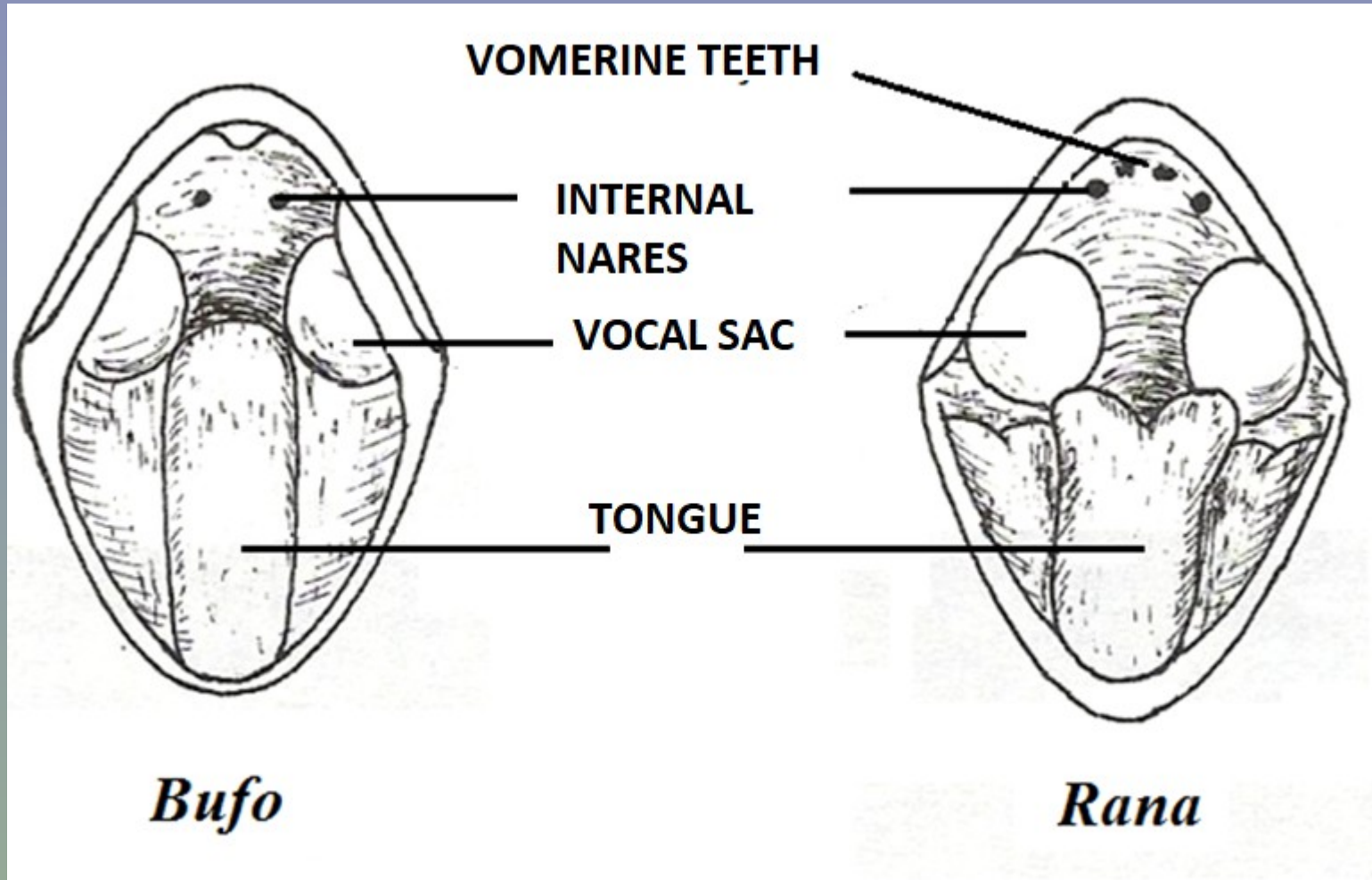


Bufo



Hyla

Mouth Structure of Frogs



Changes in the Larval During Metamorphosis

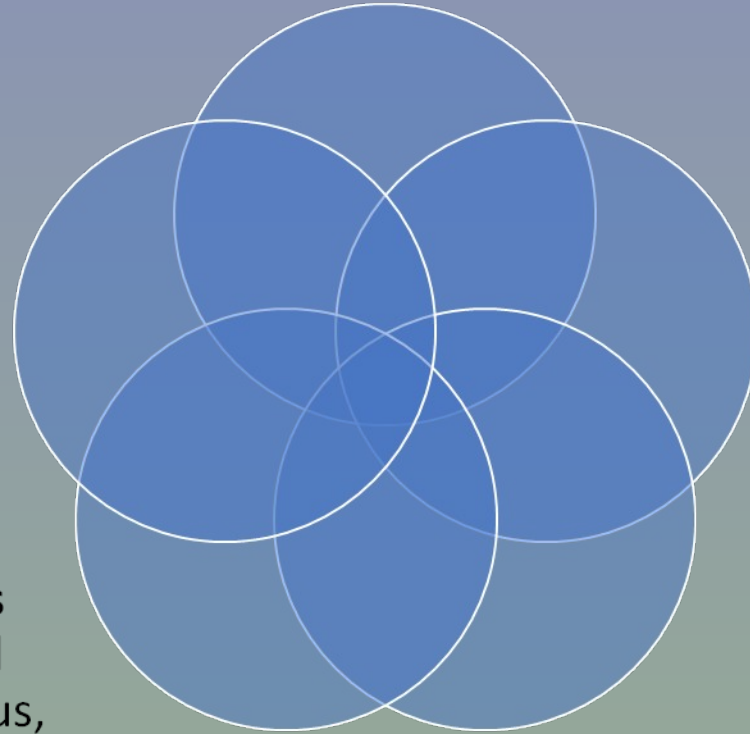
The mouth expands and the keratin jaws are replaced by real jaws.

Dorsal and tail fins are absorbed.

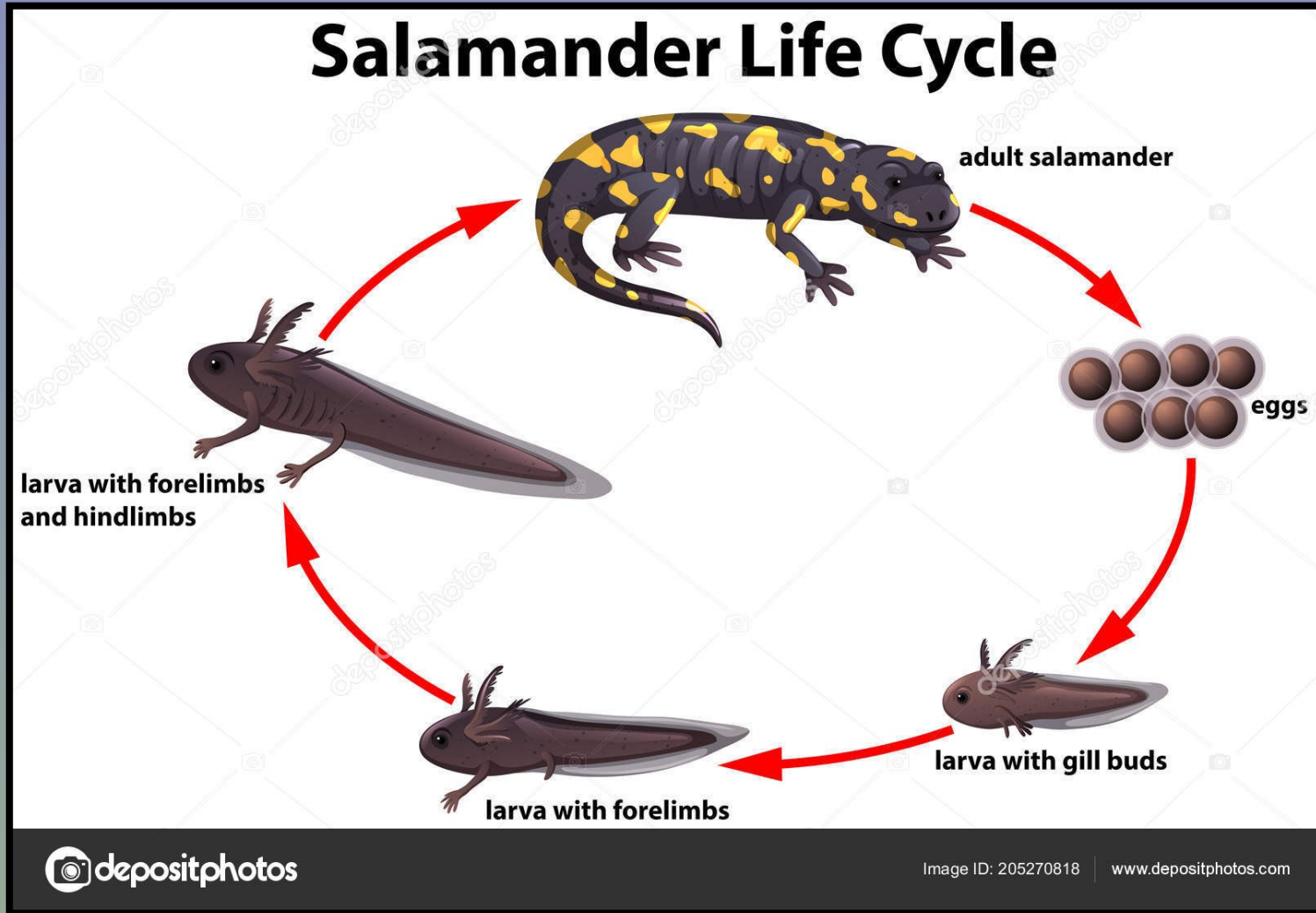
Gills disappear, gill slits close and lungs occur.

Small intestine is shortened (larval stage of herbivorous, carnivore in adult stage).

Front legs start appearing.



METAMORPHOSIS OF SALAMANDER





Class: Amphibia

Order: Anura

Family: Ranidae

Species: *Rana* sp.



Class: Amphibia

Order: Anura

Family: Bufonidae

Species: *Bufo bufo*



Class: Amphibia

Order: Anura

Family: Bufonidae

Species: *Bufo viridis*



Classis: Amphibia

Ordo: Anura

Familia: Pelobatidae

Species: *Pelobates syriacus*

"Guida dei Rettili e degli Anfibi d'Europa"
E.N.Arnold J.A.Burton - ed. Franco Muzzio



Classis: Amphibia

Ordo: Anura

Familia: Ranidae

Species: *Rana dalmatina*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Salamandra salamandra*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Lyciasalamandra luschani*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Mertensiella caucasica*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Neurergus crocatus*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Neurergus strauchii*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Ommatotriton ophryticus*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Triturus karelini*



Class: Amphibia

Order: Urodela

Family: Salamandridae

Species: *Lissotriton vulgaris*