

- **Olfaction** – form of chemosensation mediated by receptor cells to respond to the presence of chemicals w/ specific traits
  - --Receptor cells responsible for the sense of smell are located in the **Olfactory Epithelium**
    - All vertebrates but lampreys have a pair of olfactory organs that house the Olfactory Epithelium (lamprey singular)
  - -In Fishes – water (containing chemicals) enters through the InCuRrent nostril – passes over the Olfactory Epithelium – Exits through the Excurent nostril
    - ----In fishes – olfact organs not connected to mouth or throat(independent)
  
- Nasal ways dif in tetrapods – Have noses that open to world through a single pair of external nostrils
  - Open to throat through a pair of Internal Nostrils called **CHONAE** (choana sing.)

#### I. Tetrapod Olfaction

-Olfactory receptors associated w/ mouth & throat – pass air over olfactory epithelium every breath

-receptors can be very sensitive

-----amongst extant mammals have most sensitive

---due partly to presence of thin scrolls of bones called **TURBINATES**

-Turbinates highly developed in mammals – significantly increase the surface area available for olfactory epithelium

#### II. Vomeronasal Organ/ Jacobsons organ

- a. In anterior roof of mouth
- b. Well developed in snakes & in some mammals
  - i. Flehman Behavior in ungulates ( where the head is lifted high & the upper lip is curled) – likely a way of inhaling pheromones into the vomeronasal organ

### 3 MAJOR TETRAPOD LINEAGES

- Batrachomorpha
  - Stem Tetrapods
  - Lissamphibia
  - Temnospondyls
- Lepospondyli
- Reptilomorpha
  - Amniotes
    - Synapsids
      - Anthracosaurs
      - Mammals

- Mammal Like reptiles
- Parareptiles
  - Turtles
  - Stem Parareptiles
- Eureptiles
  - Stem Eureptiles
- Diapsids
  - Lepidosaurs
  - Turtles?
  - Archosaurs

Tetrapod origins in **LATE DEVONIAN PD** (360 mya) @ same time began transition from water to land (based on fossil record)

### **Lepospondyli**

1. Diverse tetrapods – semi-aqua & terrestrial forms
2. Many body forms some similar to extant - suggest similar ecologies & life histories
3. Relation to other tetrapods unclear
  - a. 5 GROUPS OF LEPOSPONDYLI \*\*\*\*
    - i. **NECTRIDIA**
    - ii. Microsauria
    - iii. Aistopoda
    - iv. Adelogyrinidae
    - v. Lysorophia

#### **Nectridian Lepospondyls**

1. bad devel. Limbs – prob aquatic
2. **\*DiploCAULuS** – well known lepos. From NA
3. up to 1 m in length
4. **\*\* boomerang** shaped head

### **The Batrachomorpha**

-Aq, semi aq & terr. Forms

--**MID CARBONIFEROUS PERIOD** 340 mya

**\*Reduced # of digits on the forelimbs ---- 4 vs. 5** as in other crown group tets

#### **Two Groups**

1. **Temnospondyli**
  - a. Extinct
  - b. Paraphyletic – some gave rise to amphibians now
  - c. Large (>2 m) – prob look & act like crocodiles
2. **Lissamphibia**
  - a. some extant – Anurans, Salamanders, Caecilians

### **The Reptilomorpha**

## **1) Third major lineage of tetrapoda**

**a) Origins in *Early carboniferous***

**b) Majority of extant tetra's**

Sensory systems – water vs air

-lateral line system good water bad air b/c water is denser than air

-Electroreception – better in water b/c it conducts electricity

-Air better for vision & hearing

-Chemical senses (Olfactory) work better in air than water

How did the Choanae evolve?

- Posterior nostril migrated from its external to internal position over evolutionary time
- Critics – This would involve migrating across a field of teeth in the upper jaw & is unlikely – no fossil intermediates found for support of hypothesis