MONOTREMES, MARSUPIALS, XENARTHRA, PHOLIDOTA

Know the taxonomic and anatomical terms in **bold** type. For laboratory, be able to identify the key characteristics present in the available specimens.

**Infraclasse MONOTREMATA**

*Characters visible on laboratory specimens*

1. precoracoids, coracoids, and interclavicle present in shoulder girdle
2. **epipubic bones** [present in both sexes]
3. **cervical ribs** are present
4. males bear **horny spurs** on ankles (Fig. 5-8)
5. lack teeth as adults (**edentulous**)

![Shoulder girdles: A = therapsid; B = monotreme; C = marsupial or placental](image)

A. Family **Ornithorhynchidae**--duck-billed platypus

*Characters visible on laboratory specimens*

1. adults without teeth, horny plates are present [young with teeth]
2. widely flared rostrum
   - Compare the pectoral girdle of the platypus with the pectoral girdle of the opossum.
   - Compare the skeleton with the picture of *Thrinaxodon*, a cynodont **therapsid**. How are they similar?
   - Is the specimen in the laboratory a male or a female? How do you know?
   - Note the horny pads that have replaced the teeth.

![Skeleton of a duck-billed platypus, Ornithorhynchus anatinus](image)

*Thrinxaxodon*

B. Family **Tachyglossidae**--echidnas (Figs. 5-2, 5-7)
Infraclass **METATHERIA** (Marsupialia)

**Characters**
1. cheek teeth primitively consist of 3 premolars and 4 molars
2. only dp3 is replaced
3. large palatal vacuities are typically present [fig 6-3 left]
4. inflected angular process
5. marsupium in most females
6. epipubic bones in both sexes

Order **DIDELPHIMORPHIA**
Family **Didelphidae**: American (Neotropical, Nearctic) opossums

**Characters**
1. didelphids tend to be unspecialized.
2. **Dental formula**: 5/4, 1/1, 3/3, 4/4
3. Prehensile tail
4. Opposable big toe (hallux)
A. Examine the skulls and skeleton. What features are characteristic or marsupials?
B. Compare the male and female Virginia opossums (*Didelphis virginiana*).
C. Compare the skulls and dentition of *Didelphis* with that of *Caluromys*. 

---

![Diagram](image-url)
Order DASYUROMORPHIA
Family Dasyuridae: Australian marsupial “mice” and “cats”, Tasmanian devil
Characters
1. dasyurids are the least specialized Australian marsupials
2. polyprotodont (lower i1 not greatly enlarged) and toes unspecialized
3. Dental formula: 4/3, 1/1, 2-3/2-3, 4/4

Compare and contrast the cast of the Sarcophilus (Tasmanian devil) skull with that of a placental carnivoran such as Taxidea or a small hyaenid and note how similar it is in form. What features show that it is marsupial? Which teeth are the shearing teeth in Sarcophilus; in Taxidea?

Order DIPROTODONTIA
A. Australian
B. Characters
1. diprotodont (i1 greatly enlarged and procumbent)
2. reduction or loss of I4 and lower canine
3. molar hypocone present
C. Compare the incisors and canines in diprotodont and polyprotodont marsupials.

Family Vombatidae: wombats [fig 6-9D, 6-19]

Characters
1. The dental formula is 1/1, 0/0, 1/1, 4/4 = 24.
2. Cheek teeth are bilophodont (Fig. 6-10D) and unrooted.
3. the coronoid process of dentary reduced
4. short rostrum.
5. Labelled skull from Animal Diversity Web

Compare the wombat skull with the placental beaver skull. Note the similar tooth structure: 1) All teeth open-rooted and evergrowing (hypsodont). 2) Incisors with enamel restricted to front and side of teeth
Family **Phascolarctidae** koalas [Fig. 6-20]  
*Characters*  
1. dental formula: 3/1, 1/0, 1/1, 4/4 = 30.  
2. Cheek teeth are rooted and selenodont.  
3. Very-short rostrum. [Fig. 6-21]  
4. **Labelled skull** from Animal Diversity Web  
5.  

---  

Family **Phalangeridae** large possums (phalangers) and cuscuses  
*Characters*  
1. bunodont molars, with semilophodont cusps.  
2. lower incisor somewhat procumbent  
3. Last upper premolar enlarged  
4. Masseteric fossa shallow  

---  

Family **Macropodidae** kangaroos and wallabies  
*Characters*  
1. Hindlimbs much larger than forelimbs  
2. Dental formula is 3/1-2, 0-1/0, 0-2/0-2, 3-4/3-4 = 30-34  
3. Lower incisor very procumbent [Fig. 6-9C]  
4. Enamel restricted to the lateral surface of the lower incisors.  
5. Molars are hypsodont and bilophodont.  
7. Masseteric canal present but not always obvious  

---  

Compare and contrast the kangaroo (*Macropus*) skull with that of a North American ecomorph, the white-tailed deer (*Odocoileus virginianus*). What features do they have in common? How do they differ?
Order **XENARTHRA** (formerly Edentata)--anteaters, sloths and armadillos. Recent studies have divided the xenarhans into two related orders. The Cingulata (armadillos) have a dermal bones in their skin, producing a "shell." The Pilosa (sloths and anteaters) are covered with hair.

**Characters**

A. *Xenarthrous intervertebral articulations* on lumbar vertebrae add rigidity.
B. Incorporation of caudal vertebrae into sacrum [fig 10-3A]
C. Incisors and canines absent. Cheek teeth, if present, single-rooted and without enamel, or absent.

**On the armadillo vertebrae, locate the centrum, prezygapotheses, postzygapotheses, and xenarthrous articulations,**

![Armadio sacrum](image)

**FAMILIES**

1. **Family Myrmecophagidae** -- anteaters (figs. 10-13, -14)
   A. Neotropical
   B. feed on ants and termites (myrmecophagy)
   C. *long tapered skull*
   D. no teeth

2. **Family Dasypodidae** -- armadillos
   A. Neotropical and Nearctic
   B. body covered with bony dermal scutes [fig 10-11]
   C. homodont dentition [fig 10-1dC]
   D. Generalized feeders, primarily insects
   E. Limbs modified for digging. [fig 10-8]
   F. *What skeletal features of the limbs maximize force out?*

3. **Family Bradypodidae** -- three-toed sloth
   A. Neotropical
   B. 3 toes on front and hind limb [fig 10-15]
   C. 8 or 9 cervical vertebrae give neck greater flexibility
   D. *All teeth approximately equal in size and shape* [fig 10-12B]
   E. Arboral folivores

4. **Family Megalonychidae** -- two-toed sloth
   A. *Choloepus* is more closely related to the extinct, giant ground sloth *Megalonyx.*
   B. Neotropical
   C. two toes on the front foot, three on the hind
   D. *caniform anterior premolar*
   E. 5 to 8 cervical vertebrae
   F. Arboral folivores

Xenarhans lack incisors and canines. **What is the tooth on the Choloepus skull that looks like a canine?**

**Order PHOLIDOTA**--pangolins or scaly anteaters. [fig 10-17]

1. **Family Manidae**
   *Characters*
   A. Afrotropic and Indo-Malaysian
   B. Epidermal scutes
   C. *Robust, conical skull*

Ant- and termite-eating mammals share a number of specializations. Compare the skulls of the anteaters and pangolin. **What adaptations for myrmecophagy** can you observe in these skulls? **What character of the skull indicates they belong to different orders?**