BIO 597Z – Mammalogy

- 4,629 species
- **Phylum Chordata**
  "back-boned animals"

**Four Distinct Features**
1) notocord = rod extending the length of the body; structural support
2) dorsal, hollow nerve cord located above notocord
3) pharynx, with gill slits
4) tail

Mammal Characteristics

- **Subphylum Vertebrata**
  Vertebrates = true back-bone
  - Vertebral column or backbone, generally replaces notocord
  - Brain enclosed in cranial cavity (e.g., skull)
  - Endoskeleton
Mammal Characteristics

- Class Mammalia
  - Subclass Prototheria (monotremes)
  - Subclass Theria
    - Infraclass Metatheria (marsupials)
    - Infraclass Eutheria (placentals)

Mammal Characteristics

- Class Mammalia
  Distinguishing Features
  1) Hair
  2) Mammary glands (= milk for young)
  3) Endothermic
  4) Most bear live young*
  5) Behavioral advancements over other classes, due to increased brain size/intelligence
Mammal Characteristics

*Exception to the Rule:
1) monotremes: e.g., duck-billed platypus = egg laying mammal
2) marsupials: e.g., opossums, koala = bear live young which are immature; young develop in specialized pouch

Mammals in Michigan

9 Orders of Mammals in MI
- Didelphimorphia
- Insectivora
- Chiroptera
- Primates
- Carnivora
- Perissodactyla
- Artiodactyla
- Lagomorpha
- Rodentia
MAMMALIAN DIVERSITY: AN ORDERLY OVERVIEW

A. Monotremes (Order Montremata)
   e.g., echidnas & duck-billed platypus

<table>
<thead>
<tr>
<th>Wooly opossum</th>
<th>Virginia opossum</th>
<th>Mouse opossum</th>
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B. Marsupials
   1. South American Marsupials
      a. Order Didelphimorphia
MAMMALIAN DIVERSITY: AN ORDERLY OVERVIEW

B. Marsupials
   2. Australian Marsupials
      a. Order Dasyuromorphia

   b. Order Peramelemorphia
MAMMALIAN DIVERSITY: AN ORDERLY OVERVIEW

B. Marsupials
   2. Australian Marsupials
      c. Order Diprotodontia…

C. Placental Mammals
   –Order Xenarthra (= Edentata)
      (anteaters, sloths, armadillos)
C. Placental Mammals

- Order Insectivora
  (shrews, moles, tenrecs)

- Order Dermoptera
  (colugos)
C. Placental Mammals
   –Order Chiroptera
      (bats)

C. Placental Mammals
   –Order Primates
      (lemurs, monkeys, apes, humans)
C. Placental Mammals

–Order Carnivora

(dogs, cats, weasels, bears, hyenas, mongooses, civets, pinnipeds)

–Order Cetacea

(whales, dolphins)

• toothed whales (odontocetes)
C. Placental Mammals

– Order Cetacea
  (whales, dolphins)

• baleen whales (mysticetes)

C. Placental Mammals

– Order Proboscidea
  (elephants)
C. Placental Mammals
   –Order Perissodactyla
   Odd-toed ungulates
   (horses, rhinos, tapirs)

D. Placental Mammals
   –Order Artiodactyla
   Even-toed ungulates
   (pigs, peccaries, hippos, camels, giraffes, deer, antelope, sheep, goats, cattle)
C. Placental Mammals
   –Order Lagomorpha
      (rabbits, hares, pikas)

C. Placental Mammals
   –Order Rodentia
      (squirrels, gophers, kangaroo rats, voles, porcupines, capybara)
Mammal Characteristics – Soft Anatomy: **Hair/Fur/Pelage**

- key distinguishing feature
- Originally tactile bristles
- **Dreiartgruppen**: hair in threes; primitive pattern

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**Hair** = body covering for:
1) insulation; helps maintain body temperature in hot & cold climates
2) coloration
   a) broadly camouflaged
   b) **countershading** (dorsal dark, ventral light) - destroys depth perception
Mammal Characteristics – Soft Anatomy: **Hair/Fur/Pelage**

2) Coloration

- c) disruptive coloration - "blobbed pattern"
- d) warning coloration - classic black & white
- Pelage consists of stiff guard hairs and downy underfur

**Vibrissae**

- "whiskers" -- tactile purpose
- Majority of mammals (excluding humans) molt hair annually or bi-annually

- **Hair Follicle**: living cells in skin from which hair grows
- **Hair**: nonliving; consists of dead epidermal cells; strengthened by keratin (a structural protein)
Mammal Characteristics – Soft Anatomy: **Hair/Fur/Pelage**

**Structure of Hair**

1) **Medulla**: inner layer of cells; location of pigment granules
2) **Cortex**: middle layer of cells; location of pigment granules
3) **Cuticular scales**: outer layer of cells, scale-like; used for identifying hair samples from various mammal species
Mammal Characteristics –
Soft Anatomy: Special Skin Glands

**Mammary glands** - milk production for young; key distinguishing feature
- Consists of alveoli for milk secretion
- Alveoli: small sacs of epithelial tissue
- Alveoli connect to milk ducts which open into nipples (except in Monotremes)
# Mammal Characteristics –
## Soft Anatomy: Special Skin Glands

### Endocrine Control:

- Mammary gland development linked to estrogen
- Milk production stimulated by secretions of prolactin & somatotropin (growth hormone) from the anterior lobe of the pituitary (link to placenta)
- Nursing provides the stimulus to the pituitary to continue prolactin production & lactation

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### Endocrine Control:

- Nursing also stimulates the release of oxytocin, thus allowing "milk letdown" (squeezing of milk into milk ducts)
- Lactation and nursing forces a close relationship between mother & young; closely linked to parental investment