

Tetrapods

Vertebrates

Class Mammalia (Mammals)

Mammal evolution:

- Therapsid lineage gave rise to all modern mammals
- Upright limbs positioned under body
- Evolution of hair and diphyodont tooth replacement
- Survived 'Age of Reptiles' in small numbers then radiated greatly

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General features:

- About 4600 species
- Considerable morphological diversity
- Specific defining traits:
 1. Presence of hair and mammary glands
 2. Endothermy (share this trait with birds)
 3. Placenta for embryo nutrition
 4. Tooth specialization
 5. Highly advanced brain and sense organs


Vertebrates

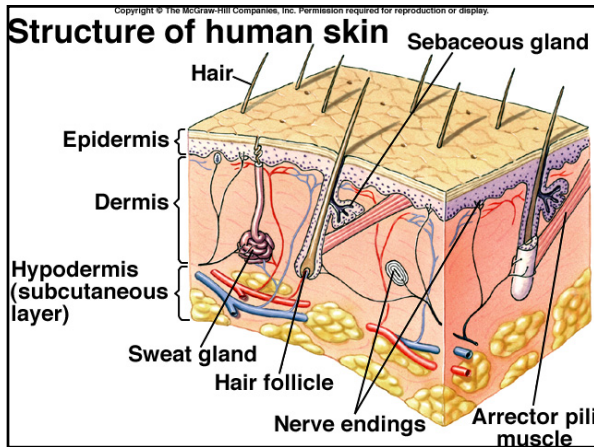
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Class Mammalia (Mammals)

Important adaptations:

1. Skin modifications
 - > Hair unique to mammals
 - > Sweat and scent glands for cooling and communication
 - > Mammary glands also unique to mammals





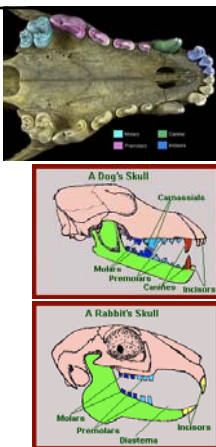
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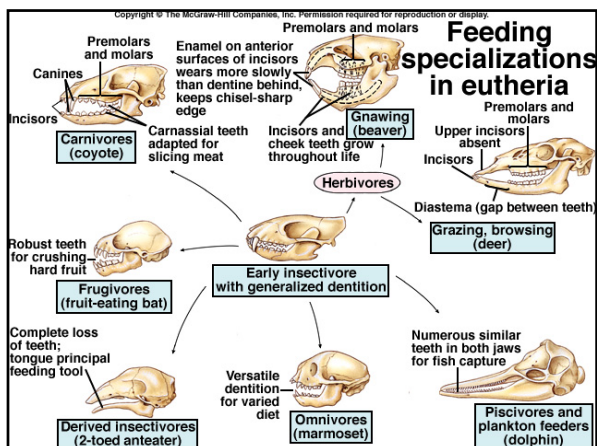
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Class Mammalia (Mammals)

Important adaptations:

2. Feeding specializations
 - > Tooth morphology linked closely with diet
 - > Heterodont teeth allow for regional specialization
 - > Insectivores, herbivores, carnivores, and omnivores
 - > Digestive tracts accommodate different food types





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Important adaptations:

3. Mammal reproduction
 - > Mating seasons usually well-defined
 - > 3 reproductive strategies define major mammal groups:
 1. Monotremes (egg-layers)
 2. Marsupials (develop in pouch)
 3. Placental (nutrition from placenta)
 - > Most mammals are placental
 - > All rear young on milk

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Important adaptations:

4. Respiration and limb modification
 - > Very high metabolic rate
 - > 4-chambered heart like birds
 - > Muscular diaphragm for ventilating large lungs
 - > Secondary palate separates respiratory and digestive tracts
 - > Limb modification for specific functions

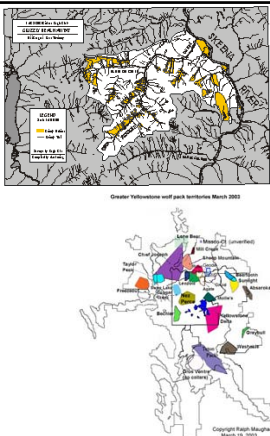
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Important adaptations:

5. Migration vs. Territoriality

- Very few mammals make routine migrations
- Many mammals defend territories marked by scent glands
- Defense is intra- and interspecific
- Mammal home ranges are larger foraging areas




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Class Mammalia (Mammals)

Evolution of humans

- Darwin's theories based only on anatomical similarities
- Fossil, biochemical, and chromosomal evidence for common descent with apes
- Humans and apes are primates derived from an arboreal ancestor
 - Evolutionary importance of grasping fingers
- Apes appear 25MY ago and adopted terrestrial lifestyle
- First Hominids appear 8MY ago



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Class Mammalia (Mammals)

Evolution of humans

- Poor fossil record of early Hominids
- Appearance of Australopithecus about 4.5 MY ago
- Genus Homo appears about 2 MY ago
- Three potential species
 - Homo habilis (2 MY ago)
 - Homo erectus (1.5 MY ago)
 - Homo sapiens (0.3 MY ago)
- First Homo sapiens were Neanderthals

