SKELETON SYSTEM

Reduced bone number compared to other vertebrates

Changes are observed in fore and hind legs depending on the way of life in mammals.

Fast moving mammals, legs are long and thin

Slow moving mammals (Elephant), legs are very thick.

MUSCULAR SYSTEM AN MOVEMENT-LOCOMATION

Metameric array in the abdominal muscles is not very clear

The muscles in the head, neck and extremities are thinner and more developed.

Face muscles in mammals are well developed and give some facial expression to any event

DIGESTIVE SYSTEM

- Lips present around the mouth.
- Lips are mobile in mammals except Monotremata and Cetacea

Tooth consist of two parts:

1.Enamel develop from epidermis

2.Dentin ve pulp develop from dermis

- Four types of theeth present in mammals: **Incisors, canine, premolars and molars**
- The canine teeth are well developed in carnivorous mammals. These are big and pointed.
- These teeth are used to catch, kill, break up and defend against enemies
- The incisor teeth are useful in capturing and cutting food and are well developed in herbivorous mammals.
- The upper canine teeth are quite elongated in *Odobenus rosmarus* (Pinnipedia family)
- The upper canine teeth of the Vampire bats are long and sharp.

Some mammals teeth have **heterodont type** (all the types of tooth present)

Some of the mammals teeth have **Homodont Type (similar) (**Dolphins)

Diphyodont: The type of dentition characterised by two sets of teeth. First set is of temporary and second is of permanent.

The digestive system and stomach shape of the mammals varies depending on the type of food.
The stomach is in the form of a bag in the omnivorous or carnivorous mammals

CIRCULATORY SYSTEM

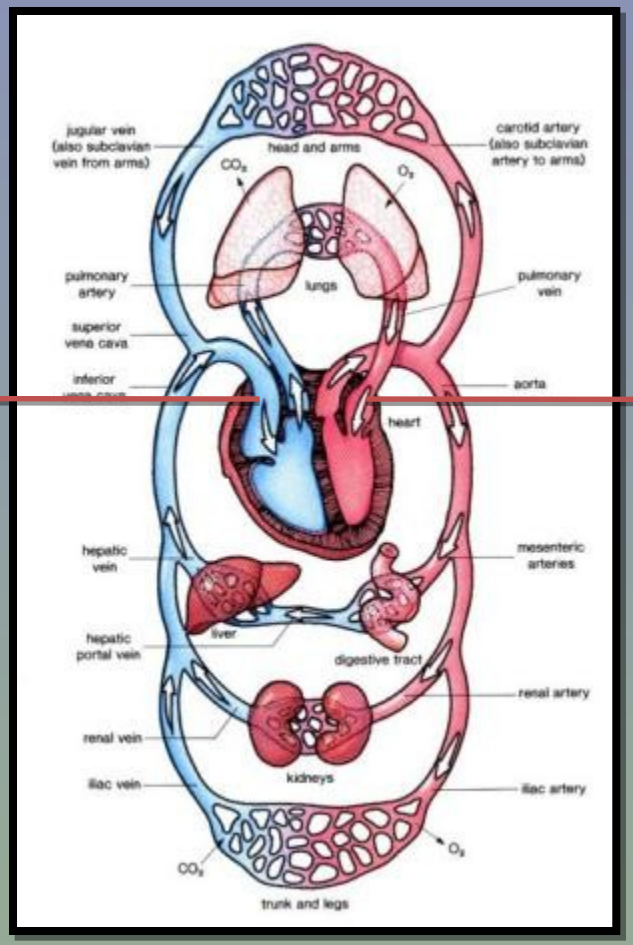
Heart with 4 chambers.
Homoethermic-Endothermic
Nonnucleated and biconcave red blood cells

Clean blood (Right(

Dirty blood (Left)

Tricuspit

Bicuspid



RESPIRATORY SYSTEM

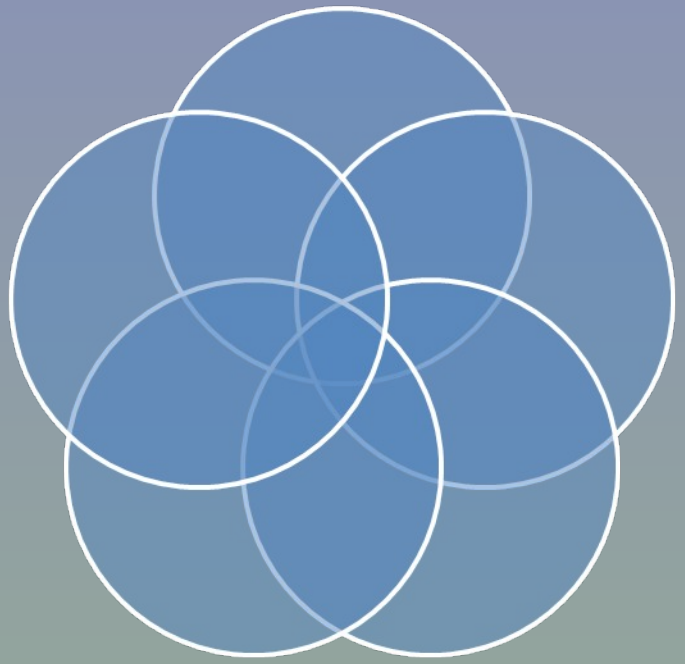
- Respiration rate is quite high in the insectivorous mammals
- Significant changes have occurred in the respiratory systems of some aquatic mammals. In many of these animals, valves created to close the outer nostrils. Lungs are long in Sirenia (Sea Cows)

Why Mammals Make Sound?

To Fright the enemies

Communication

Gathering (Forming a Flock)



Attracting opposite sex

Migratory mammals

EXCRETORY SYSTEM

- Metanephric kidneys
- Ureters that usually open into a bladder
- Main nitrogenous waste is **urea**

NERVOUS SYSTEM

- Brain is well developed especially cerebral cortex
- Cerebrum and Cerebellum are quite big.
- 12 pairs of cranial nerves.
- **Olfactory sense highly developed; middle ear with three bones**

REPRODUCTIVE SYSTEM

Separate sexes

Internal fertilization

- Copulary organ a penisare present in males.

Testis are present usually in **Scrotum** sac.

- **Monotremes** are egg-laying (oviparous) mammals.
- **Monotremes have got cloaca**
- The duck-billed platypus has one breeding season each year
- Usually two ovulated eggs are fertilized in the oviduct.
- Embryos developed in the uterus for 10-12 days
- A thin leathery shell is secreted around the embryos before the eggs are laid.
- Echidnas incubate their eggs in an abdominal pouch.
- After hatching, young feed on milk produced by the mother's mammary glands.
- Monotremes have no nipples, young lap milk secreted onto the belly of the mother

- **Marsupials** are pouched, viviparous mammals.
- They have a transient type of placenta called **Choriovitelline (yolk sac) placenta.**
- At first, an embryo encapsulated by shell membranes and floats free for several days in the uterine fluid.
- After hatching embryos, of most marsupials do not implant
- Gestation (the intrauterine period of development) is short
- Birth to tiny young (in this period they are still embryos).
- Followed by a prolonged interval of lactation and parental care

- Most of them breed in spring and winter.
- Although many male mammals are fertile at any time, female mammals fertility is restricted to a specific time during a periodical cycle (estrous cycle).
- Females copulate with males only a relatively brief period in this cycle, called **heat** or **estrus**
- Animals that have only one estrus during their breeding season are called **monestrous (dogs, foxes, bats, etc.)**
- Animals that have a recurrence of estrus during breeding season are called **polystreous (Mice, Squirrel)**
- **Pregnancy period in mammals is generally proportional to size**
- **The number of young produced in a birth is inversely proportional to the size of the body.**