Chapter - 3

Vertebrates

Phylum: Chordata

- Those animals having back-bone are kept in this phylum.
- Phylum chordata is characterized by the presence of their distinguishing characters which are not found in other animals like non chordata.
- Three fundamental characteristics of chordata are
  1. The Notochord
  2. Branchial or gill cleft
  3. Dorsal tubular nerve cord.

1. Presence of Notochord

The notochord is also called corda dossalis which lies along the dorsal midline extending from head to tail.

- All chordates possess a notochord at least in the embryonic Stage.

  Due to this feature, they are named as **chordata**.
- It is more or less completely replaced by cartilaginous or bony vertebral columns in higher chordates like **craniata**.

2. The branchial or gill cleft.

- Branchial clefts are situated as a perforation from pharynx to the exterior on each side. In aquatic forms these clefts consist of gills.

3. Dorsal tubular nerve cord.

- It lies above the notochord on the dorsal surface. The dorsal tubular nervous system develops from a strip of ectodermal cell lying in the median line on the dorsal side of the body.

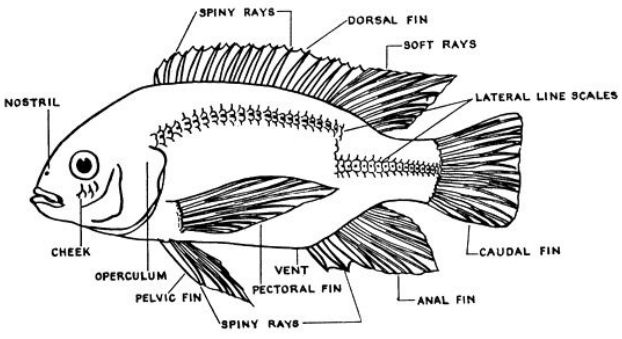
General feature of vertebrates

- They possess vertebral column or backbone so they are called vertebrates.
- Triploblastic and bilaterally symmetrical
- Sexes are separate.
- Respiration takes place by gills, skins or lungs.
- Presence of RBCS.
- Brain is enclosed in the skeletal case so it is also called **craniata**.

Phylum chordata is further divided into 5 classes

1. Pisces (Gr. pisces-Fish)

- They are **aquatic, cold-blooded vertebrates.**
- They possess the usual adaptation of gills for respiration, which are lined by **pharyngeal gill-slit.**
- Paired fins as well as median fins for locomotion.
- Body is streamlined or boat shaped.
- Heart is two chambered, one auricle and one ventricle.
- Fertilization is external eg. Fishes, **Torpedo** (electric-ray) **Hippocampus** (sea-horse)
- Cord liver oil is obtained from shark (Rice in vit. A and vit. D).
- Presence of lateral line sense organ as Rheoreceptor.
- Fishes migrate for the purpose of breeding, and searching for food.
- **Anadromous migration -** It is the migration of fishes **from sea water to fresh water** i.e high salinity to law salinity eg. salmon
- **Catadromous migration** - It is the migration of fish from freshwater to seawater. eg. **Anguilla (eel).**



Class: 2 Amphibia

- They are the first vertebrate to live (adapt) on land.
- They can live both in water and on land i.e dual mode of life.
- They have three chambered (two auricle and one ventricles)
- They are Cold blooded or Poikilothermic animals.

- Fertilization is mostly external and they are **oviponus** (producing young ones by eggs)
- They have two pairs of limbs-tetrapods. The forelimbs are smaller than hind limbs.
- They show **hibernation** (winter sleep) and Aestivation (summer sleep).
- Development is by **metamorphosis.** They include **tadpole larva**.
- Bony endoskeleton is present. Notochord is replaced by vertebral with two occipital condyles.
- Brain Consists of **10 pair of cranial nerve**,eg. Rana Tigrina (Frog), salamander, Toad.

Class: 3 Reptilia

(Latin Reptilia-creeping)

- They are cold blooded, terrestrial or aquatic animals.
- They have dry, horny, scaly skin, The scales check out loss of water and are best adapted for land habit.
- They have two pairs of **pantadactyle limbs.**
- There is the presence of an **exoskeleton of horny epidermal scales.**
- Brain of reptile consist of **12 pairs of cranial nerves.**
- Reptiles are **poikilothermic, Fertilization is internal**
- Reptiles take place by lungs.
- Heart is incompletely or completely divided into four chambers.
    - eg. **Turtle, wall-lizard, cobra, crocodile.**

Class 4 Aves

Class Aves include all types of birds.

- Streamlined body, covered with feathers. Streamlined body reduces resistance during flight.
- Presence of air-filled Pneumatic bone.
- Body is divisible into the head, neck, trunk and tail.
- They consist of two pairs of pentadactyl limbs. Forelimbs are modified into wings.
- 4 chambered hearts, brain is large and consists of 12 pairs of cranial nerves.
- Sense of vision is well developed and eyes are provided with pectin for sharp vision.
- Birds are **homoiotheremic**(self-regulation of body temperature).
- Disappearance of the right ovary & right oviducts reduces body weight. But the left sided ovary is functional.
- Air sacs are present.
- **Preen gland** is found in birds.
- Eg. Different types of birds columba libia (pigeon). Lophophorus impejanus (Daphne)

Class 5 Mammalia

Mammalia are highly developed with a much advanced brain.

- Body is usually covered with hairs.
- **Mammary glands** are well developed in females.
- They are **viviparous** i.e give birth to young ones.

- They possess two pairs of **pentadactyl limbs**.
- 4 chambered heart and a pair of lungs as the respiratory organ.
- Well-developed brain with **12 pairs of cranial** and **31 pairs of spinal nerves**.
- Fertilization -internal and all mammals are **viviparous** (giving birth to young ones) except prototheria
- All sense organs are well developed and Ear consists of the outer pina. eg. Man, Monkey, Tiger, Rabbit
- Man belongs to order to **primates**
- Whales, dolphins etc. belong to order **cetacea.**
- Rodents are also called **gnawing animals.**