Animal Kingdom

Fundamental basis of classification

- **Levels of organisation** - It includes cellular level, tissue level, organ level and organ system level of organisation.
- **Symmetry** - Body of animals can be asymmetrical, radially symmetrical, and bilaterally symmetrical.
- **Organisation** - Animals are classified on the basis of diploblastic or triploblastic organisation.
- **Coelom** - Animals can be classified as acoelomate, pseudocoelomate, or coelomate.
- **Segmentation** - It involves the phenomenon of metamerism.
- **Presence or absence of notochord**

Phylum - Porifera

- Multicellular organisms with cellular level of organisation
- Water or canal system is present.
- Water enters through ostia and goes out through osculum.
- Skeleton is made of spongin fibres or spicules.
- Choanocytes (collar cells) line the spongocoel and the canal.
- Hermaphrodite
- Fertilization is internal and development is indirect (larval stage is present).

- Examples: *Sycon*, *Spongilla*, and *Euspongia*

Phylum - Coelenterata (Cnidaria)

- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- Digestion is intracellular and extracellular.
- Corals have calcium carbonate skeleton.
- Cnidarians exhibit two basic body forms – polyp and medusa.
- Metagenesis is the alternation of generation between polyp and medusa forms.
- Examples: *Hydra, Adamsia*, and *Pennatula*

Phylum - Ctenophora

- Multicellular organisms with tissue level of organisation
- They are diploblastic and radially symmetrical.
- They show the property of **bioluminescence**.
- Eight external rows of ciliated comb plates are present.
- Examples: *Ctenoplana* and *Pleurobrachia*

Phylum - Platyhelminthes

- Bilaterally symmetrical organisms with dorso-ventrally flattened body
- They are triploblastic and acoelomate with organ level of organisation
- They are usually parasitic on other animals.

- Fertilization is internal.
- Hermaphrodite
- Flame cells perform the function of osmoregulation and excretion.
- Examples: *Fasciola* (liver fluke) and *Taenia* (Tapeworm)

Phylum - Aschelminthes

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.
- They are pseudocoelomate.
- Sexes are separate.
- Fertilization is internal.
- Examples: *Ascaris* (round worm)*, Ancylostoma*, and *Wuchereria*

Phylum - Annelida

- Multicellular organisms with organ system level of organisation
- They are triploblastic and bilaterally symmetrical.
- They are coelomate.
- They are metamerically segmented.
- *Nereis* possesses parapodia, which help in swimming.
- They have nephridia as excretory and osmoregulatory organs.
- Earthworm and leech are monoecious and *Neries* is dioecious.
- Examples: *Pheretima* (earthworm), *Neries*, and *Hirudinaria*

Phylum - Arthropoda

- Largest phylum of kingdom Animalia
- They are triploblastic, bilaterally symmetrical, segmented, and coelomate animals.
- The body is covered by chitinous exoskeleton.
- They have jointed appendages.
- Circulatory system is open.
- Respiration through book lungs, gills, book gills, or tracheal system
- They have malpighian tubules as excretory organ.
- Mostly dioecious and oviparous
- Examples: *Anopheles, Aedes*, and *Locusta*
- *Limulus* (King crab) is a living fossil.

Phylum - Mollusca

- Second largest phylum of kingdom Animalia
- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- Possess organ system level of organisation
- Body possesses calcareous shell and is unsegmented having distinct head, muscular foot, and visceral hump.
- Usually dioecious and oviparous
- They have radula (a file-like rasping organ for feeding)**.**
- Examples: *Pila, Pinctada*, and *Octopus*

Phylum - Echinodermata

- They are triploblastic and coelomate animals with adult echinoderms having radial symmetry and larvae having bilateral symmetry.
- Endoskeleton is of calcareous ossicles.
- They have well-developed water vascular system, which is used for locomotion, capture, and transport of food and respiration.
- Examples: *Asterias* (Star fish*), Echinus* (Sea urchin), and *Antedon (*Sea lily)

Phylum - Hemichordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals.
- Body is composed of proboscis, collar and trunk.
- Respiration through gills; sexes – separate; fertilization – external; development – indirect
- Proboscis gland is excretory organ.
- Example: *Balanoglossus*

Phylum - Chordata

- They are triploblastic, bilaterally symmetrical, and coelomate animals with organ system level of organisation.
- These animals are characterized by the presence of a notochord.
- They have single, dorsal, and hollow nerve cord.
- Their pharynx is perforated by gill slits.
- The heart is located in ventral part.
- They have post anal tail.
- Phylum Chordata is divided into three sub-phyla:

- Urochordata - Notochord is present only in larval stages. Example: *Ascidia* and *Doliolum*
- Cephalochordata- Notochord is persistent throughout life. Example: *Branchiostoma*
- Vertebrata

Sub-phylum Vertebrata

- All vertebrates are chordates, but all chordates are not vertebrates.
- Notochord is replaced by vertebral column in adult.
- Sub-phylum vertebrata is divided into two divisions called **Agnatha (**which lacks jaws) and **Gnathostomata** (which bears jaw).
- The division **Agnatha** contains a single class called **Cyclostomata.**

  Class- Cyclostomata

  - They are ectoparasites on fishes.
  - Jaws are absent.
  - Example: *Petromyzon*
- The division **Gnathostomata** is divided into two super classes called **Pisces (**which bear fins) and class **tetrapoda** (that bear limbs).
- The super class Pisces contains two classes – **Chondrichthyes** and **Osteichthyes.**

  Class- Chondrichthyes

  - Skeleton is cartilaginous.
  - Operculum is absent.
  - Notochord is persistent.

- Air bladder is absent.
- Heart is two-chambered.
- Poikilothermous i.e., cold blooded animals
- Skin is covered by placoid scales.
- Fertilization is internal.
- Mostly viviparous
- Example: *Scoliodon*

Class- Osteichthyes

- Skeleton is bony.
- Operculum is present.
- Air bladder is present.
- Skin is covered by ctenoid/cycloid scales.
- Heart is two-chambered.
- Poikilothermous i.e., cold-blooded animals
- Fertilization is external.
- Mostly oviparous
- Example: *Hippocampus*, *Exocoetus*

- The super class tetrapoda contains four classes called **Amphibia, reptilia, aves**, and **mammals.**

  Class- Amphibia

  - Cold-blooded animals with two pairs of limbs

- Heart is three-chambered.
- Respiration is through gills, lungs, and skin.
- Fertilization is external; sexes are separate; oviparous
- Examples: Frog, toad, and salamander

Class- Reptilia

- Cold-blooded animals with two pairs of limbs
- They have dry and cornified skin.
- Mostly, heart is three-chambered, but it is four-chambered in crocodiles.
- Respiration is through lungs.
- Fertilization is internal; sexes are separate; oviparous
- Examples: Snake, lizard, and crocodile

Class- Aves

- Homoeothermic i.e., warm-blooded animals with forelimbs modified into wings
- Heart is four-chambered.
- Respiration is through lungs.
- Bones are hollow with pneumatic cavity.
- Fertilization is internal; sexes are separate; oviparous
- Examples: Crow, Pigeon, and Parrot

Class- Mammalia

- Warm-blooded animals having mammary glands
- Two unique features of mammals are the presence of mammary gland and hairs on skins.
- Heart is four-chambered.
- Respiration is through lungs.
- Fertilization is internal; sexes are separate; viviparous with some exceptions such as *Platypus*
- Examples: Rat, elephant, and kangaroo