General characteristics and outline classification of chordates

Animal kingdom is basically divided into two sub kingdoms:

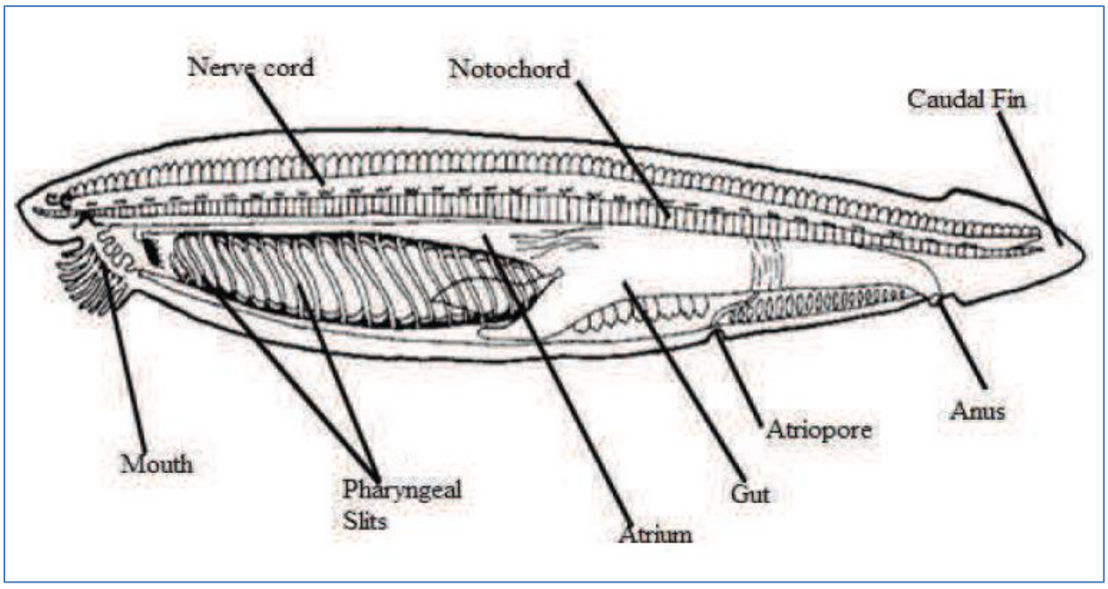
a) **Non-chordata-** including animals without notochord.

b) **Chordata-** This comprising animals having **notochord** or **chorda dorsalis**. While the Chordata has a **notochord** at some stage during the life, it is not known to exist in the Non-chordata.

The Chordata is the animal phylum with which everyone is most intimately familiar, since it includes humans and other vertebrates. However, not all chordates are vertebrates. All chordates have the following features at some stage in their life (in the case of humans and many other vertebrates, these features may only be present in the embryos).

1. **Pharyngeal slits:** a series of openings that connect the inside of the throat to the outside of the "neck". These are often, but not always, used as gills.

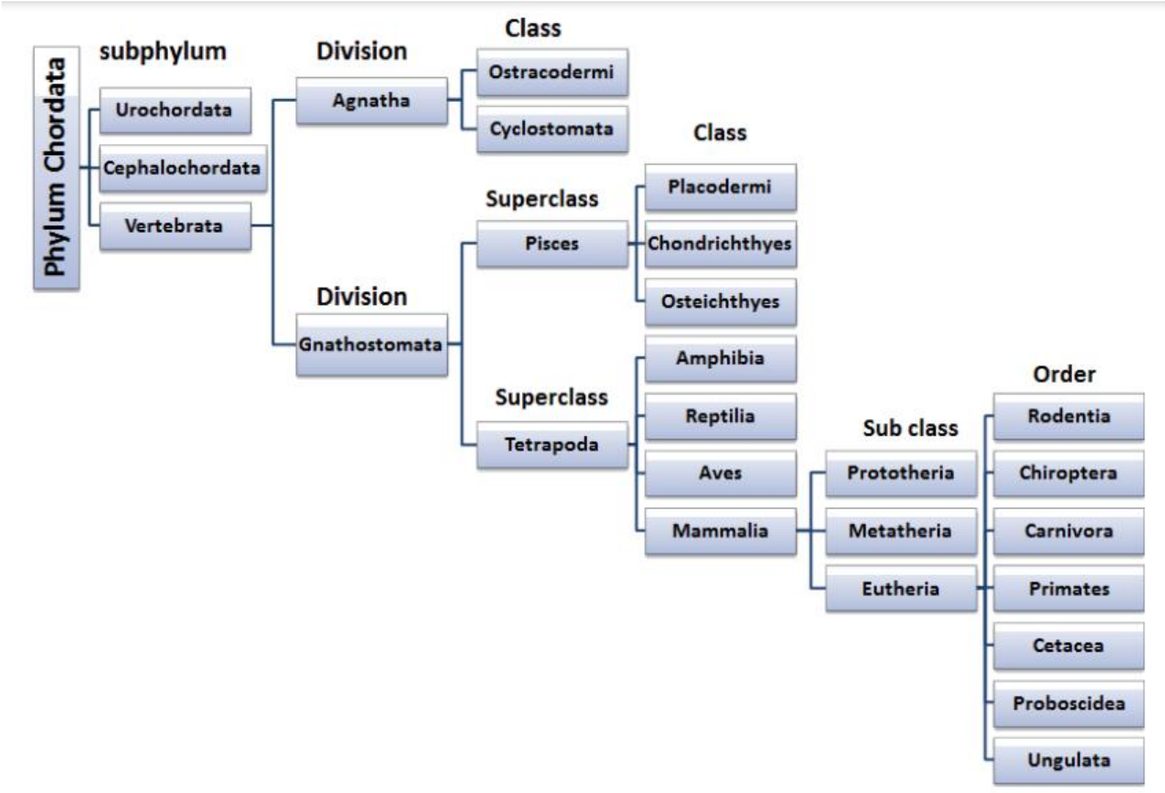
2. **Dorsal tubular nerve cord:** A bundle of nerve fibres which runs down the "back". It connects the brain with the lateral muscles and other organs.
3. **Notochord:** cartilaginous rod running underneath, and supporting, the nerve cord.
4. **Post-anal tail:** Extensions of the body post the anal opening.



GENERAL CHARACTERSTICS OF CHORDATES

- Aquatic, aerial or terrestrial all free living with no fully parasitic forms.
- Bilaterally symmetrical and metamerically segmented.
- Exoskeleton often present well developed in most vertebrates.
- Body wall triploblastic with 3 germinal layers: ectoderm, mesoderm and endoderm.
- Coelomate animals with a true coelom, enterocoelic or schizocoelic in origin.
- A skeletal rod, the notochord, present at some stage in life cycle.
- Digestive system complete with digestive glands.
- Blood vascular system closed. Heart ventral with dorsal and ventral blood vessels.
- Hepatic portal system well developed.
- Excretory system comprising proto- or meso- or meta-nephric kidneys.

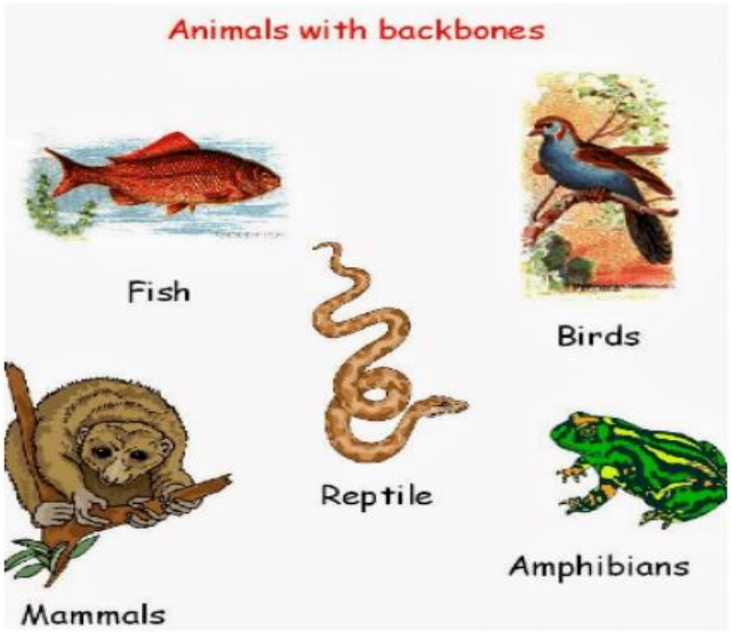
CLASSIFICATION OF CHORDATES



Phylum Chordata has three subphyla: Urochordata, Cephalochordata and Vertebrata.

1. **Subphylum Urochordata:** Marine, mostly sessile, filter-feeders. Notochord occurs only in the tail of the larva and disappears in the adult. The gill slits are numerous, persist in the adult and open into an ectoderm-lined cavity, the atrium, instead of to the exterior. The tail does not persist throughout life, Example: *Herdmania*, *Doliolum*, and *Ciona.*
2. **Subphylum Cephalochordata:** Notochord extends to the tip of the snout and persists throughout life. The nerve cord persists throughout life but no brain is formed. The gill slits are numerous and persist in the adult. The body wall consists of myotomes. Tail persists throughout life Example: *Amphioxus.*
3. **Subphylum Vertebrate:** Notochord replaced by vertebral column (back bone). Body is with well-developed head, neck, trunk and paired fins or

limbs. Dorsal tubular nerve cord present which is divided into brain and spinal cord.



The chordates are of various body forms but they all have notochord, dorsal tubular nerve cord, pharyngeal slits and a post anal tail at some stage of life .Various theories have been proposed to explain the origin and evolution of chordates but none of them is completely satisfactory, However, it is believed that they evolve sometimes before Cambrians. The most advanced forms of chordates are mammals.