ADVANCED FEATURES OF VERTEBRATES OVER PROTOCHORDATA

Subphylum **vertebrata** includes chordates with head or skull, brain and vertebral column. Some advanced features of vertebrates over protochordates are as follows:

- Mostly notochord is replaced by vertebral column, or in some cases notochord is persistent with vertebral column.
- Cranium and vertebral column, both are present.
- Atrium is absent.
- Endostyle is totally absent in the adult stages of vertebrates, (only found in the ammocoetes larval stage of Petromyzon).
- Presence of neural crest cells in the development of nervous system.
- Pharyngeal slits or clefts persist in some vertebrates.
- Chambered heart. RBC is present in the blood.
- Sexes' are separate (dioecious) except in some fishes.
- During fertilization, the sperm unites with the ovum in the pathway of animal pole.
- **Examples:** Agnathan to mammals.

Protochordates are primitive chordates without head and vertebral column. Some primitive features of protochordates are as follows:

- Notochord persists throughout life.
- No cranium or vertebral column.
- Atrium, the space in between pharynx and body wall, is present.
- Endostyle is present except hemichordates. It is the precursor of thyroid gland of higher vertebrates.
- Absence of neural crest cells in the development of nervous system.
- Pharyngeal slits or clefts are present throughout life.

- Hearts chamber less. No blood corpuscles in the blood.
- Sexes mostly separate (dioecious), or monoecious in most urochordates.
- During fertilization, the sperm unites with the ovum in the pathway of vegetal pole.
- **Examples:** Hemichordates, urochordates and cephalochordates.