



ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION

STUDY MATERIAL -4

Class: IX

Sub: LIFE SCIENCE

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Topic - CLASSIFICATION OF PHYLUM CHORDATA

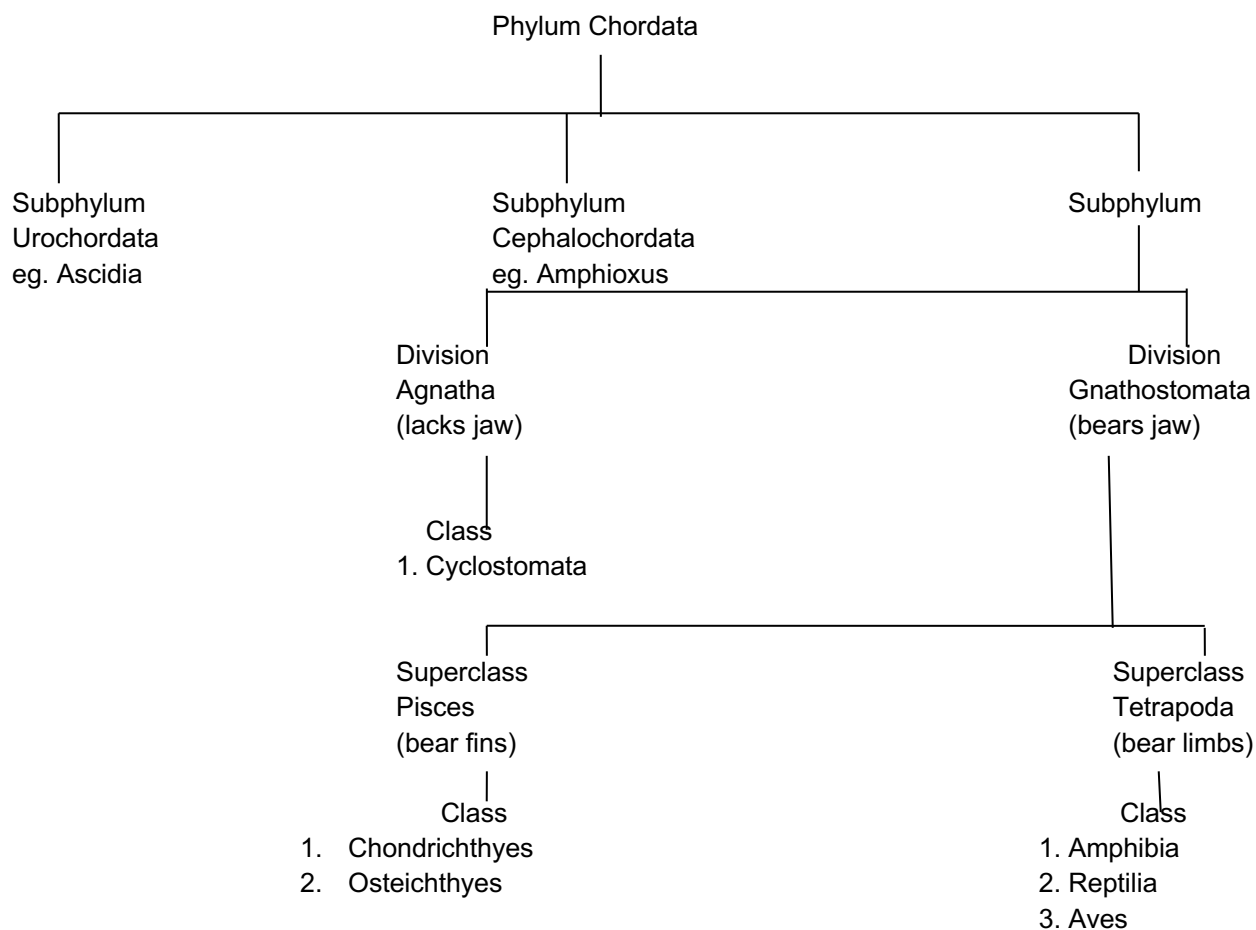
CLASSIFICATION OF PHYLUM CHORDATA

PHYLUM : CHORDATA

SALIENT FEATURES

- Presence of notochord at any stage of life.
- Presence of dorsal hollow tubular nerve cord filled with CSF (Cerebro Spinal Fluid).
- Presence of pharyngeal gill slits.

Example : All vertebrates including human beings



All vertebrates are chordates but all chordates are not vertebrates.

Protochordata = Sub phylum Urochordata + Sub phylum Cephalochordata

SUB PHYLUM UROCHORDATA

SALIENT FEATURES

- Two openings on the body surface – **mouth** and **atriopore**.
- **Notochord** is present only in larval tail.
- Larva undergoes **retrogressive metamorphosis** to form adult
Example: ***Ascidia sp.*** And ***Salpa sp.***

SUB PHYLUM CEPHALOCHORDATA (ACRANIATA)

SALIENT FEATURES

- Notochord extends from head to tail region and is persistent throughout life.
- Fish like marine animals.
- 'V' shaped myotome muscles are present.
Example : ***Amphioxus sp.***, ***Asymmetron sp.***

- ❖ **Traditional system of classification considered Phylum Chordata to be divided into four sub –phylum namely:**
 - **Hemichordata**
 - **Urochordata**
 - **Cephalochordata**
 - **Vertebrata**

Of which first three groups are considered as PROTOCHORDATES OR INVERTEBRATE CHORDATES.

However, Modern Biologists place Hemichordates into a separate non-chordate phylum i.e PHYLUM HEMICHORDATA

PHYLUM HEMICHORDATA :

SALIENT FEATURES

- Small group of marine animals
- Presence of gill slits
- A structure regarded as notochord in the anterior region only.
- Solid nerve cord only.
Example: ***Balanoglossus sp.***, ***Saccoglossus sp.***

SUBPHYLUM VERTEBRATA (CRANIATA)

SALIENT FEATURES

- Presence of endoskeleton made of bones and cartilages.
- Presence of cranium or brain box that accommodates brain.
- Presence of dorsal vertebral column formed of vertebrae.
Example : Shark, Rohu, Frog, Lizard, Birds, Guinea pig etc.

Vertebrata is divided into two divisions. They are:

A) **DIVISION AGNATHA : (A = WITHOUT ; GNATHOS = JAW) (JAWLESS ANIMAL)**
SALIENT FEATURES

- Mouth is circular (Cyclostomata : Cyclos = circular ; stoma = mouth)
- Absence of jaws surrounding mouth.
- No paired fins and fins are without fin rays.
Example : Lamprey (*Petromyzon marinus*)
Hag fish (*Myxine glutinosa*)

B) **DIVISION GNATHOSTOMATA : (GNATHOS = JAWS ; STOMA = MOUTH)**
ANIMAL WITH JAW

Gnathostomata consists of superclass pisces

SALIENT FEATURES

- Mouth is guarded by upper and lower jaw.
- Skeleton mostly made of bones.
- Respiration by gills or lungs.
Example : Fish, Amphibia, Reptilia, Aves, Mammalia

Gnathostomata consists of two classes :-

(i) **Class 1. CHONDRICTHYES (Gr. CHONDROS = CARTILAGE ; ICTHYES = FISH)**
(Fishes having cartilaginous skeleton)

SALIENT FEATURES

- Endoskeleton completely cartilaginous : bone absent.
- Gill slits are without operculum ; mouth ventrally placed.
- Marine animals where body is covered with placoid scales ; no air bladder.
Example : Dog fish / shark (*Scoliodon sp.*)
Sting ray (*Trygon sp.*)

(ii) **Class 2. OSTEICHTHYES (GR. OSTEON = BONE ; ICTHYES = FISH)**

(Bony Fish)

SALIENT FEATURES

- Skin is covered with cycloid / ctenoid scales.
- Gills are covered by operculum ; presence of air bladder to maintain hydrostatic balance.
- Two chambered venous heart that always contains deoxygenated blood.

Example : Rohu Fish (*Labeo rohita*)

Katla Fish (*Catla Catla*)

Super class Tetrapoda is is divided into the following classes :-

CLASS 1 : AMPHIBIA (GR. AMPHI = BOTH ; BIOS = LIFE)

(Animal that can live both on land and in water)

SALIENT FEATURES

- Skin is moist, glandular and naked.
- Heart three chambered - two auricles and one ventricle.
- For sexual reproduction and larval life, water is needed.

Example : Frog (*Rana tigrina*)

Salamander (*Ambystoma sp*)

CLASS 2 : REPTILIA (L. REPERE = TO CREEP)

(Vertebrates with creeping or crawling habit)

SALIENT FEATURES

- Presence of two pairs of pentadactyle limb with claw that help in crawling locomotion.
- Dry skin covered with cornified epidermal scales.
- Heart is three and half chambered (four chambered in crocodile).

Example : Garden Lizard (*Calotes versicolor*)

Cobra (*Naja naja*)

CLASS 3 : AVES (L. AVIS = BIRD)

(Common flying vertebrates)

SALIENT FEATURES

- Body covered with feathers and forelimb modified into wings for flight.
- Bones are hollow, pneumatic, lighter in weight.
- Presence of horny, hard beak without teeth.

Example : Pigeon (*Columba livia*)

Peacock (*Pavo cristatus*)

CLASS 4 : MAMMALIA (L. MAMMALIS = BREAST)

(The highest evolved group of animal kingdom)

SALIENT FEATURES

- Presence of a pair of mammary gland which is enlarged in female. This gland is modified sweat gland.
- This body is covered with hair; pair of external ear or pinna present.
- Heart completely four chambered ; matured RBC non nucleated; diaphragm separates thorax and abdomen.

Example : Tiger (*Panthera tigris*)

Man (*Homo sapiens sapiens*)

The animals who lay eggs are called **oviparous** (e.g. Fish, Amphibia, Reptilia, Aves) and those who give birth to young ones directly are called **viviparous** (e.g. Mammalia).

Question. “All vertebrates are chordates but all chordates are not vertebrates”- justify the statement ?

In all vertebrates, chordate features are present in early embryonic life. Thus, there is notochord which is gradually replaced by vertebral column in course of development. They have pharyngeal gill slits which may be persistent or replaced by lungs – so all vertebrates are basically chordates.

But all chordates are not vertebrates – for example, in urochordata and cephalochordata, notochord is persistent throughout life and is never replaced by vertebral column. Hence urochordates and cephalochordates are chordates but not vertebrates.

Shaista Ahmed