CHARACTERISTICS & CLASSIFICATION OF CHORDATES

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Comparative Anatomy of Chordate - 403

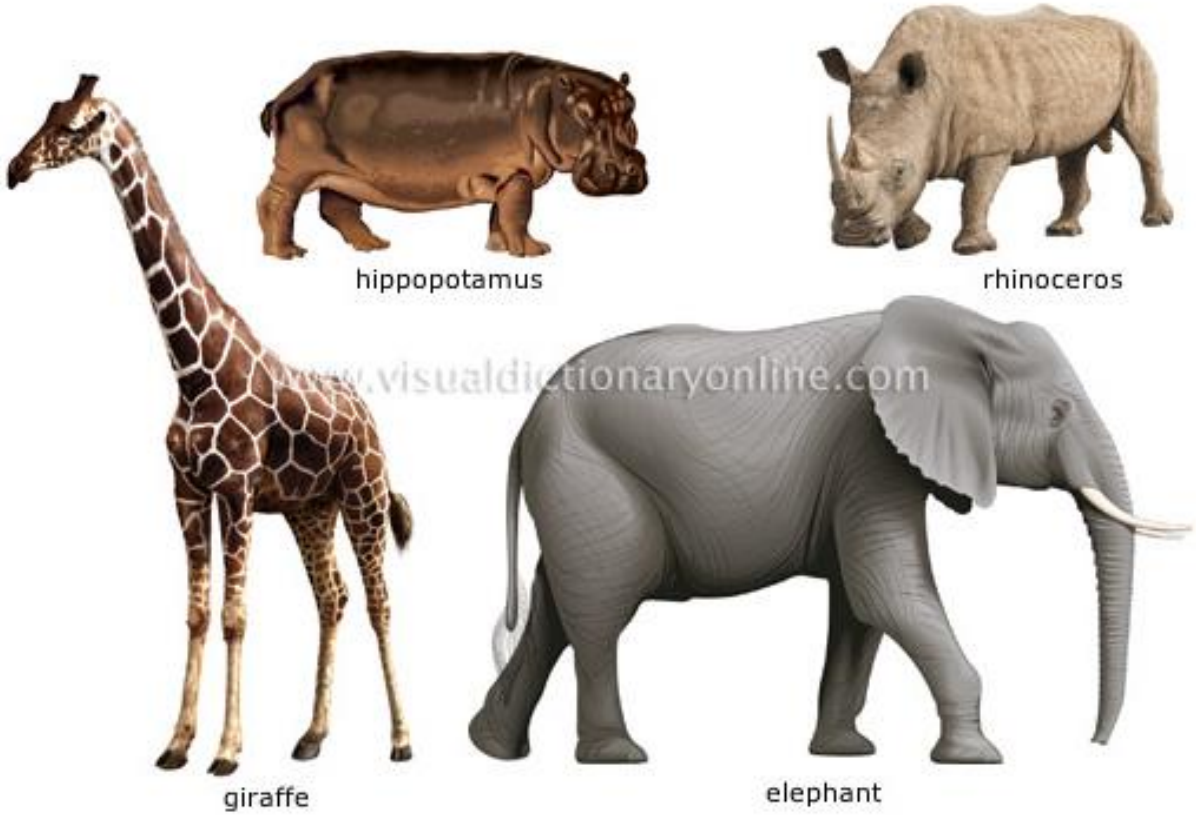
Semester 1

Week 2

Date 9/10/2023

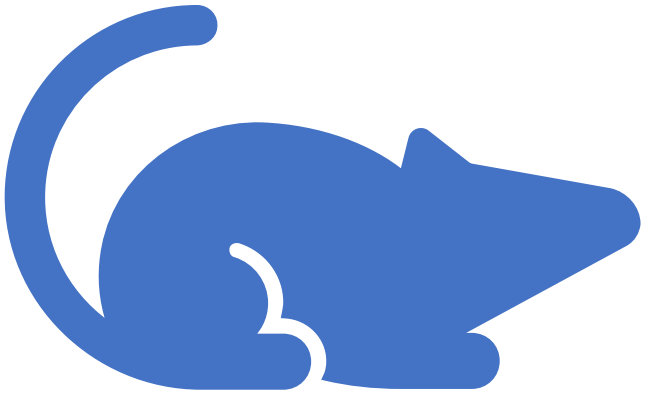
Outline

- **What is Chordates?**
- **Importance of Chordates**
- **Chordate basic characteristic & Other features**
- **Classification of Chordates**
- **Chordate phyla & classes**
- **Chordates Feature summary**
- **Comparative Characteristics Of Chordate Classes**
- **Embryonic development of chordates**



Objectives

- Understand The basic 4 characteristics of chordate
- Understand the classification of chordate
- Understand the general characteristics of chordate classes
- Know the main embryonic membranes of organisms.
- Identify chordate with its groups & subgroups.



What is chordate?

Animal kingdom is divided into several major groups are called phyla, about 30 phyla/ the last and the most advanced and higher one is the phylum chordata

- **Chordata = Gr, (Chord= rod, ata= bearing)**
- Chordata a phylum include animals bear a rod like structure called **notochord**
- Notochord= Gr, (Noton= back, chord= cord (rod)

- All other animal which lack notochord through all their life history are called Nonchordates or Invertebrates

Chordate

Animal possess notochord at least in sometimes or stage of their life history or may be persist

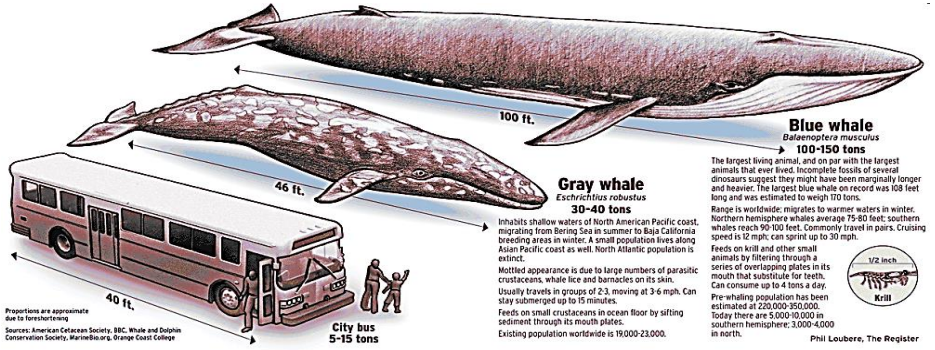
Importance of Chordate

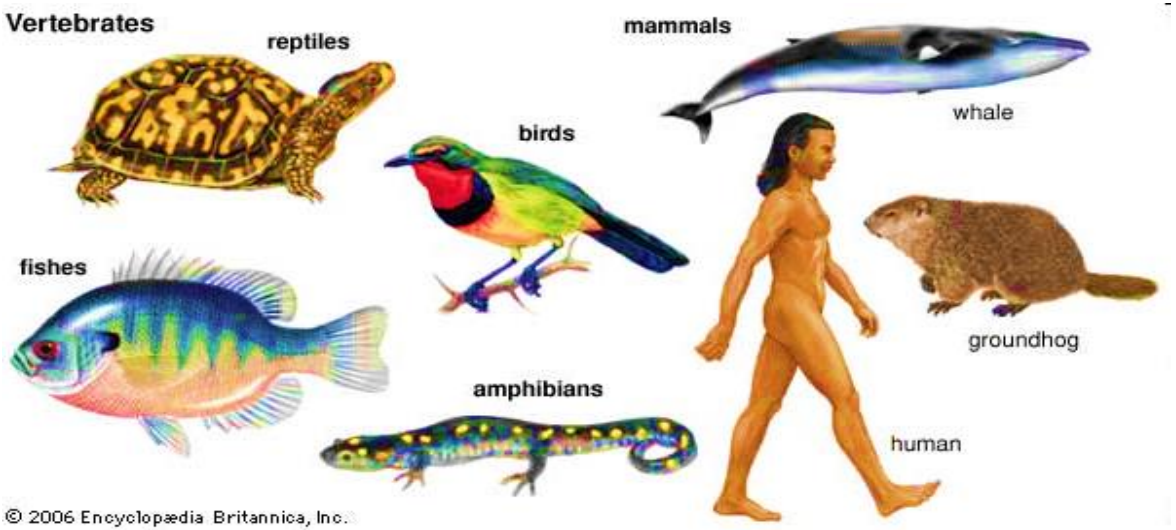
Vertebrate Chordate which its notochord change to vertebral column (backbone)

Phylum Chordata is important phylum because

- Most advancing phylum including man
- Diverse animals ranging from few CM to 35m

  Ex; blue whale, weight 120 ton
- Lives in different habitat : aquatic, Aerial, terrestrial
- Members of this phylum most possess four basic characteristic through some stage of life





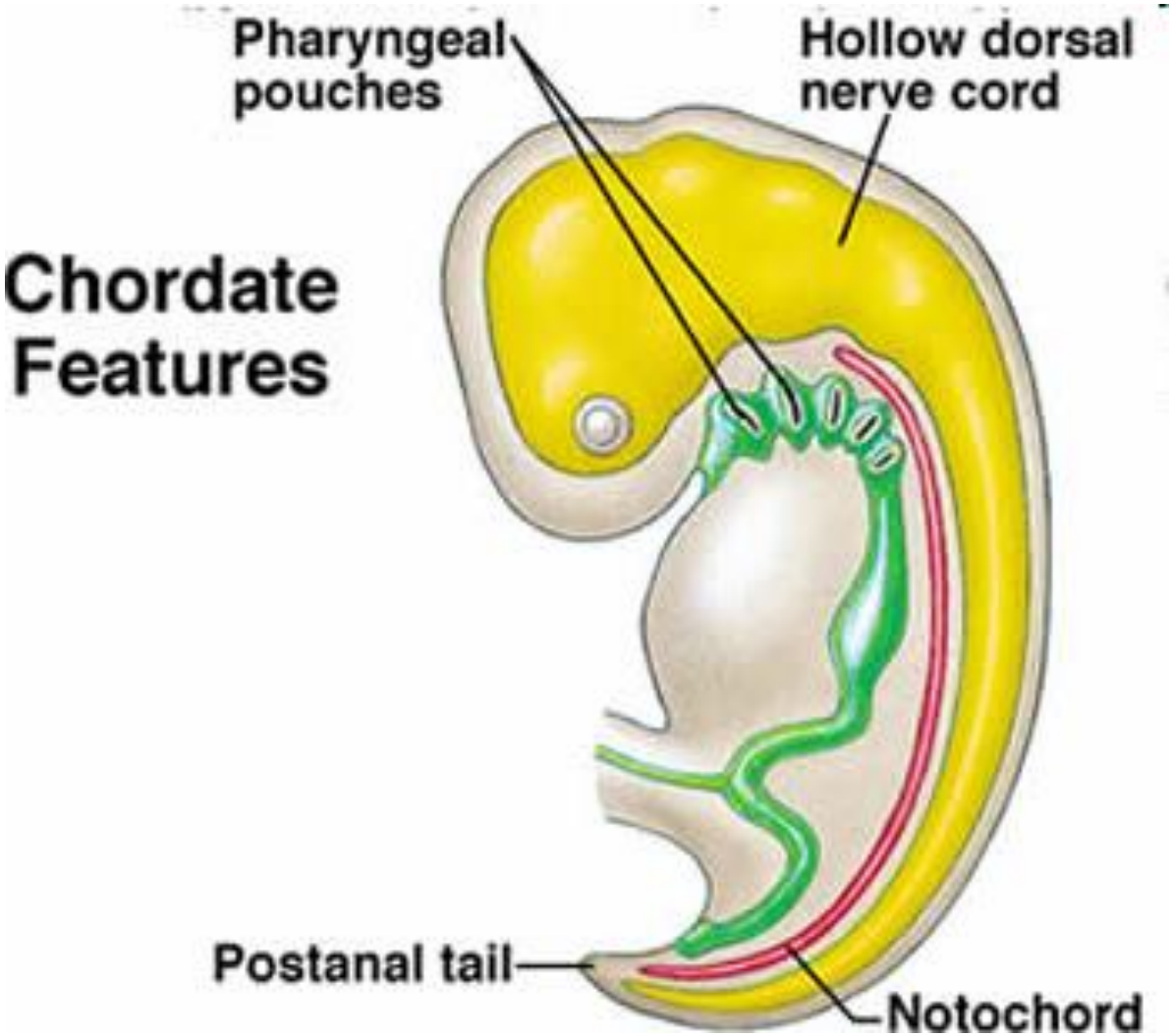
Chordate basic characteristic

1- Notochord:-
Vertebrate replaced by vertebral column, in other cases may be persist or lost

2- Nerve Cord:-
Dorsal single tubularcord beneath the notochord

3-Gill pouch:-
Out pocket of the Pharyngeal region, lost in the Most chordates and become functional gill in fish and amphibian larvae

4- Tail:-
Beyond the anus so called Post-anal region



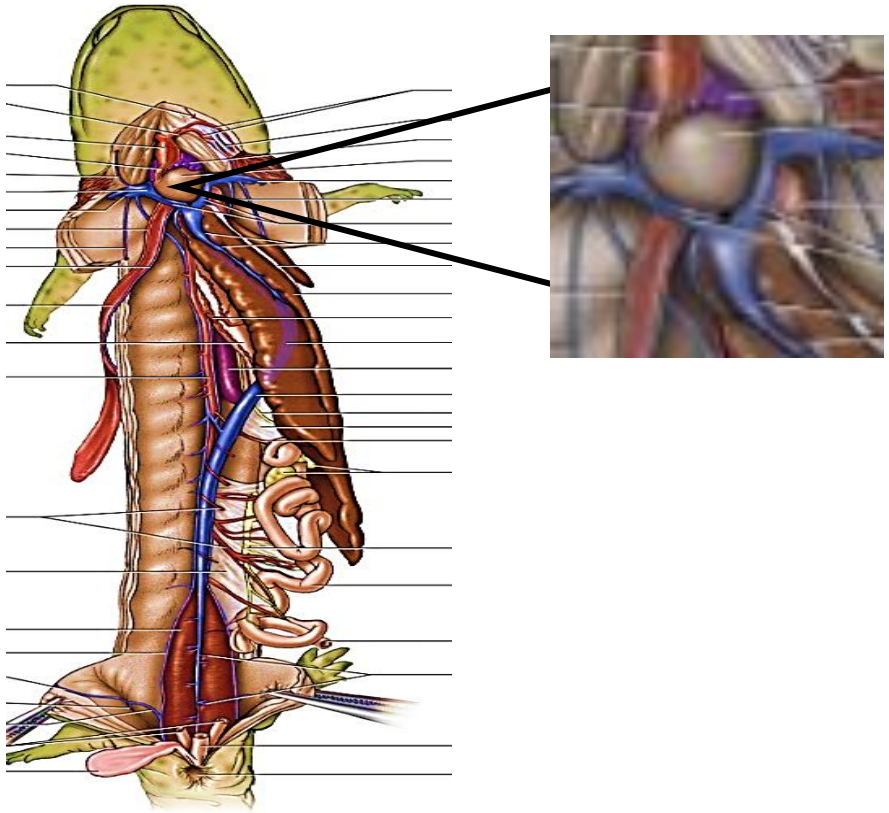
Other Features

Chordates have other features common to member of some other phyla

- Bilateral symmetry, Metamerism, Cephalization.
- True coelom ventral heart, closed circulation

Bilateral symmetry

Metamerism is the segmentation of body



Classification of chordates

Gr (classify = arrange or, nomes=laws)

Due to the presence of diverse type of chordates so its helpful to ordered them into groups or categories according to certain rules or character. This process is called taxonomy

Rules :-

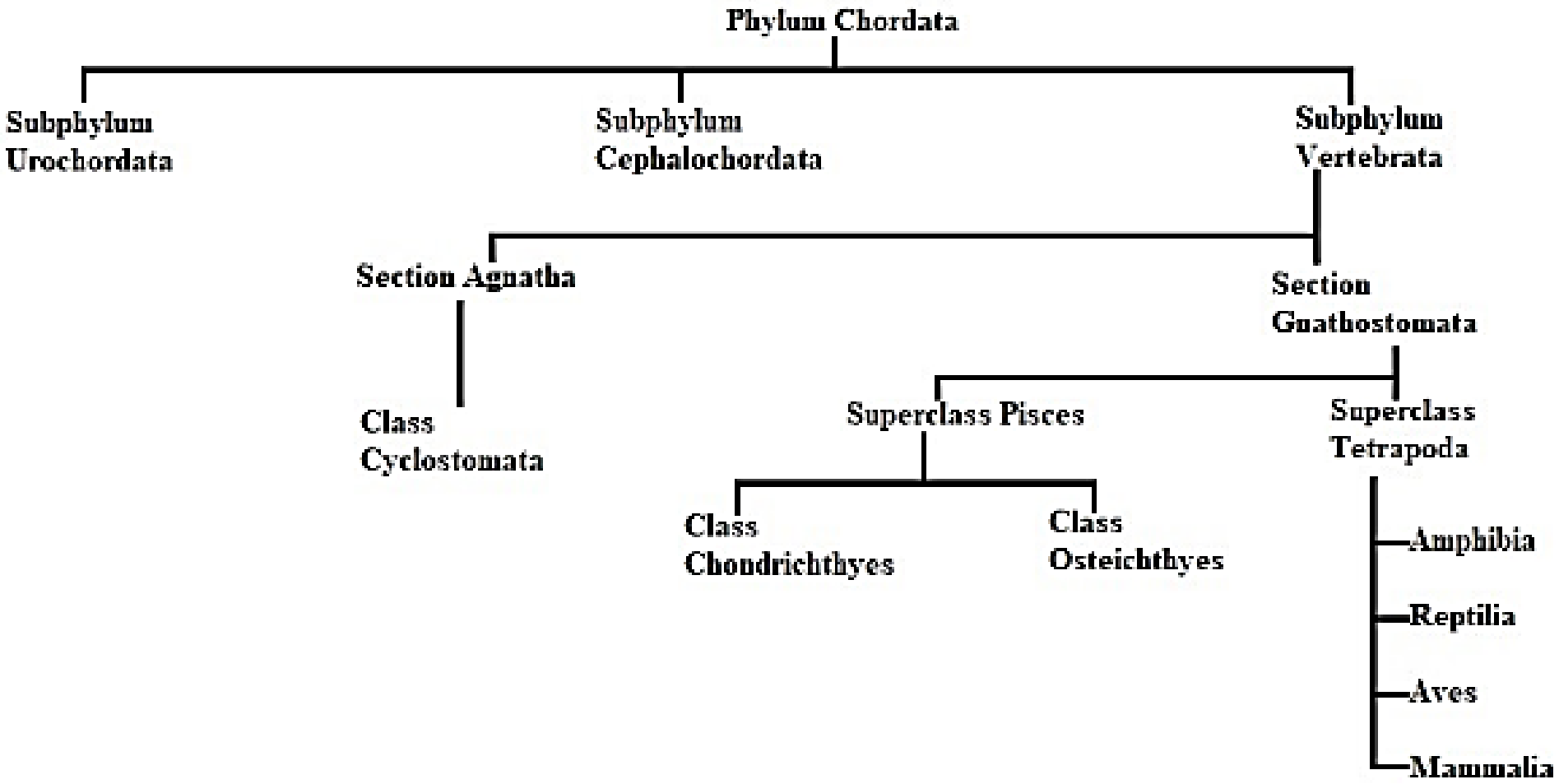
1- Morphological similarity (phylogenetic classification)

2- Evolutionary relationship

Categories

Kingdom, subkingdom, phylum, subphylum, super class, class, sub class, order, sub order , family, sub family genus and species)

Classification of chordates

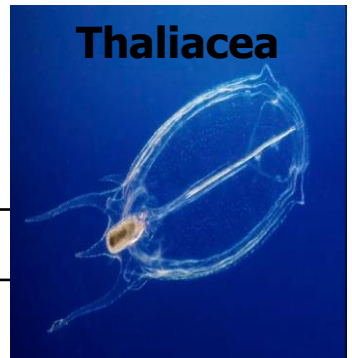


Subdivision of Chordate

Protochordate Acrania

1- without endoskeleton and brain so there is no cephalization and cranium so called protochordate or Acraniata.
2- no appendages of exoskeleton.
3- notochord persisted or degenerate.
4- sexes separate or united hermaphrodite
5- development indirect with free swimming larva
6- marine small sized chordates
7- include previously 3 subphyla (hemichordata, Cephalochordata and Urochordata) but the first one removed


Adult ascidian
(C. intestinalis)



Higher chordate (Craniata)= vertebrata

1- with endoskeleton, cephalization and with brain so there is cranium so called higher chordate or craniata.

2-present of appendages of exoskeleton

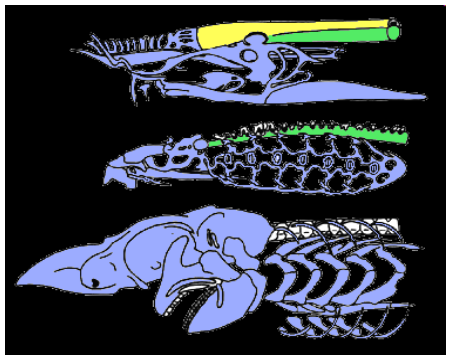
3- mostly notochord repalced by vertebral column (backbone)

4-sexes separated

5- development direct or indirect

6- inhabited to different environment mostly large sized

7- include subphylum vertebrata. More than (90% of chordate)



Super classes of Chordate

Super class (Agnatha)

1-without jaws (jawless vertebrate)

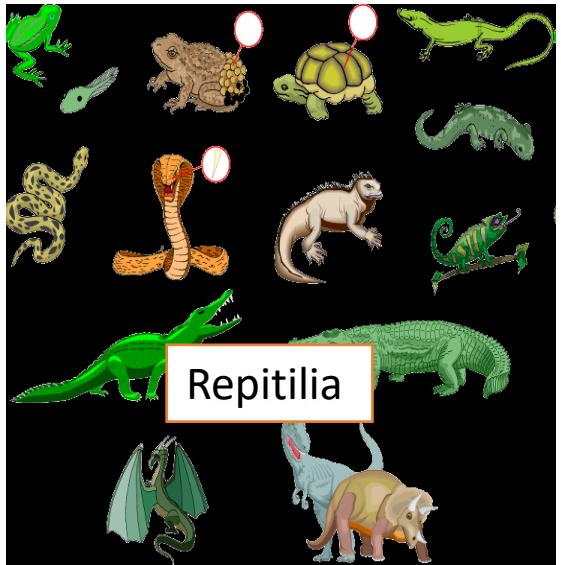
2- mouth without horney teeth (not true teeth)

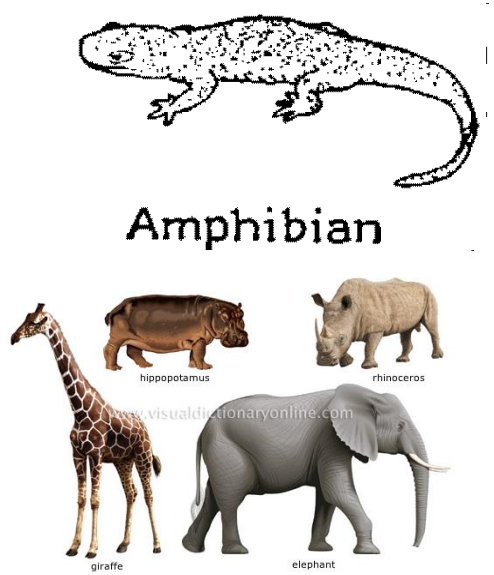
3- without paired appendages

4- classes (Ostrocodermi, myxini, Cephalosidomorphi

Super class (Gnathostomata)
1-Jawed-mouth vertebrate
2- Mouth mostly with true teeth
3- With paired appendages (pair fine in fishes and 2 pair of limbs in other classes amphibia, repitilia, birds and mammalia

classes, chondrichtyes, osteichthyes (amphibia, reptilia, aves, and mammalia)

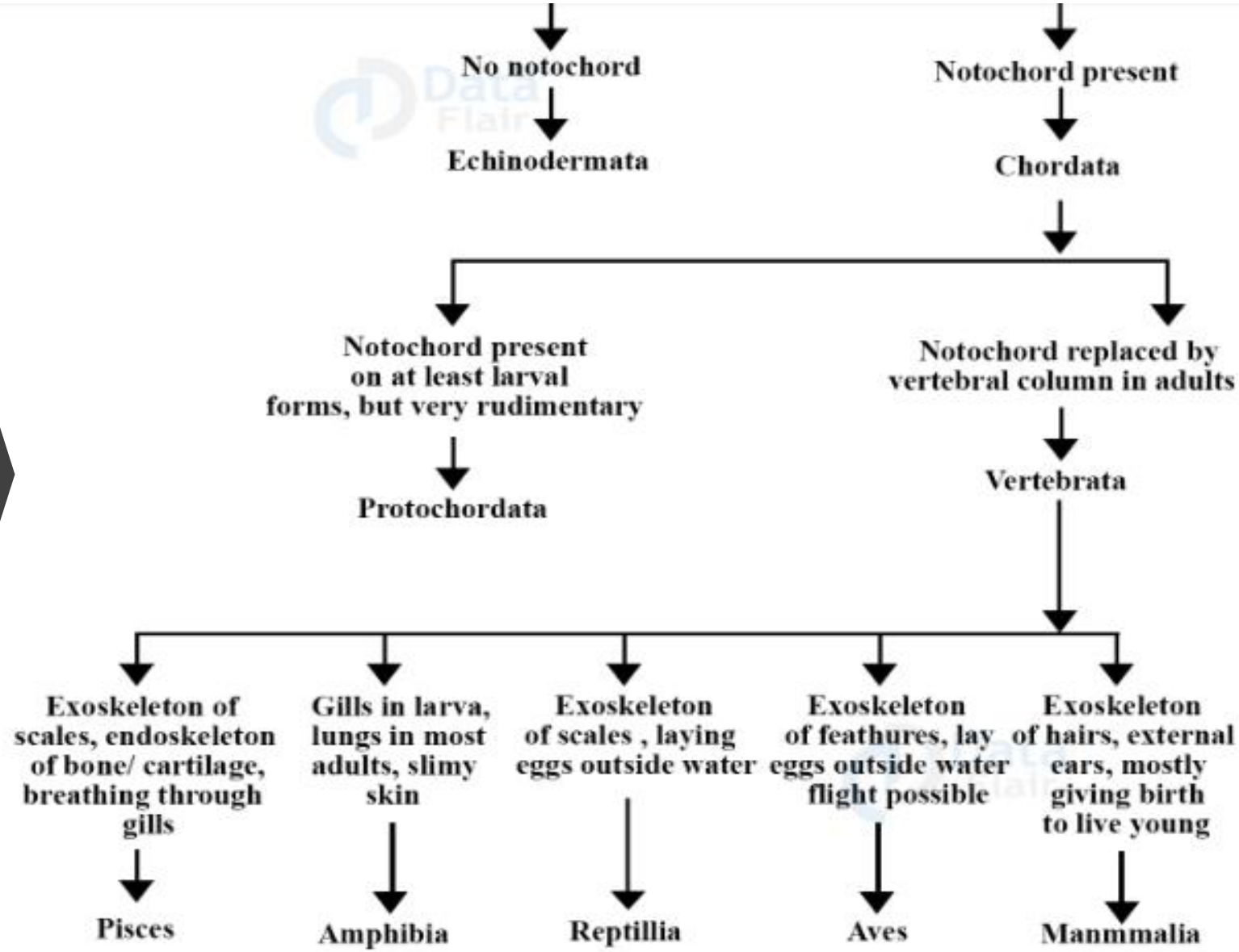




Comparative Characteristics Of Chordate Classes

Subclasses	Heart	Reproduction	Fertilization	Development	Respiration	Blood
Cyclostomata	Two Chambers	Oviparous	External	Indirect	Gills	–
Pisces	Two Chambers	Oviparous	Internal/ External	Direct	Gills	Cold Blooded
Amphibia	Three Chambers	Oviparous	Internal	Indirect	Lungs/Gills	Cold Blooded
Reptilia	Three Chambers	Oviparous	Internal	Direct	Scales	Cold Blooded
Aves	Four Chambers	Oviparous	Internal	Direct	Lungs	Warm-Blooded
Mammalia	Four Chambers	Viviparous	Internal	Direct	Lungs	Warm-Blooded

Chordates Feature summary



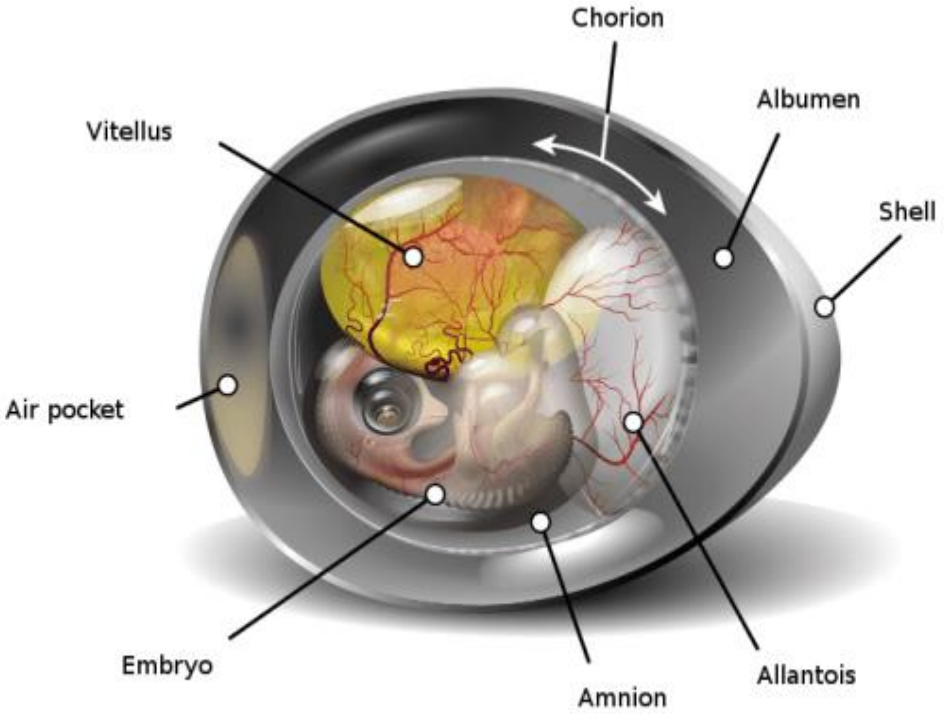
Embryonic development of chordates

Urochordata,
Cepphalochordata,
Myxini ‘’hagfish’’,
Cephalospidomorphi — Anamniotes
Chondrichthyes
Osteichthyes
Amphibia
Reptilia
Aves — yolk sac, amnion, chorion and allantoises
Mammalia

- Out of these 10 classes the 1st 7classes are anamniotes where their embryo lack the three extra embryonic membranes (amnion, chorion and allantoises) only possess yolk sac.
- Their eggs without shell and shell membrane so they are obligated to lay their egg in the water to prevent dehydration

- The last 3 class (Reptilia, Aves and mammalia) their membrane during embryonic development with 4 extra embryonic membrane (yolk sac, amnion, chorion and allantoises)
- In addition, the egg protected with shell membrane and may be also covered with shell. So, these two factors enable these animals to reproduce on land

Eggs of amniotes is called cleidoic egg (closed egg)



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- **For further reading please see:**
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