

# ANIMAL KINGDOM -L6

ZOOLOGY

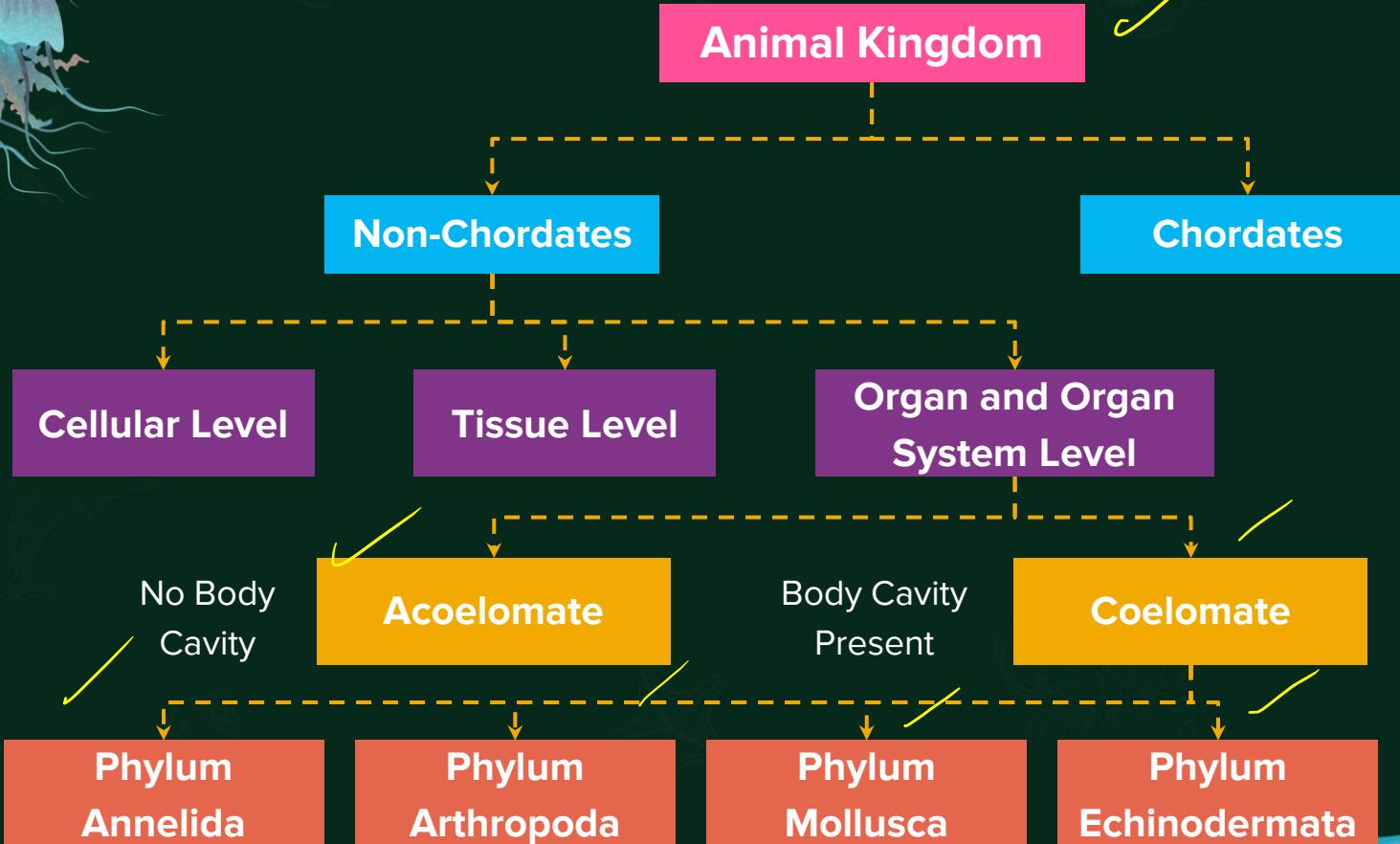


**PUSHPENDU SIR**



# Animal Kingdom

# Animal Kingdom



# Recall: Phylum Annelida

Unique feature is **metameric segmentation**



# Recall: Phylum Arthropoda

Unique feature is the presence of **jointed appendages**



## Kingdom Animalia

Porifera

Ctenophora

Aschelminthes

Arthropoda

Echinodermata

Chordata

Coelenterata

Platyhelminthes

Annelida

Mollusca

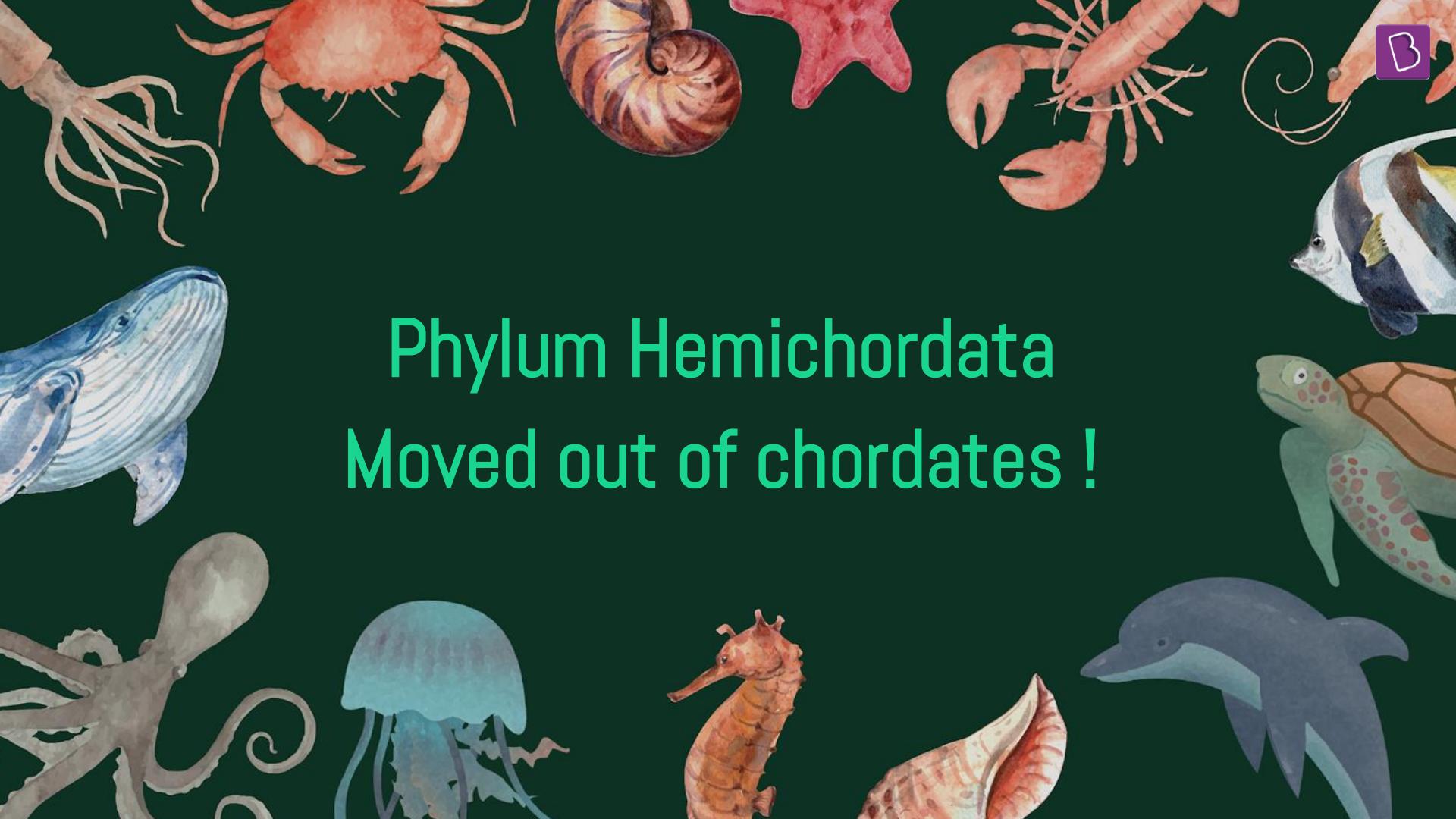
Hemichordata

3:4



# ECHINODERMS

Not the last phyla of  
non-chordates anymore !



B

# Phylum Hemichordata

## Moved out of chordates !

## Kingdom Animalia

Porifera

Ctenophora

Aschelminthes

Arthropoda

Echinodermata

Chordata

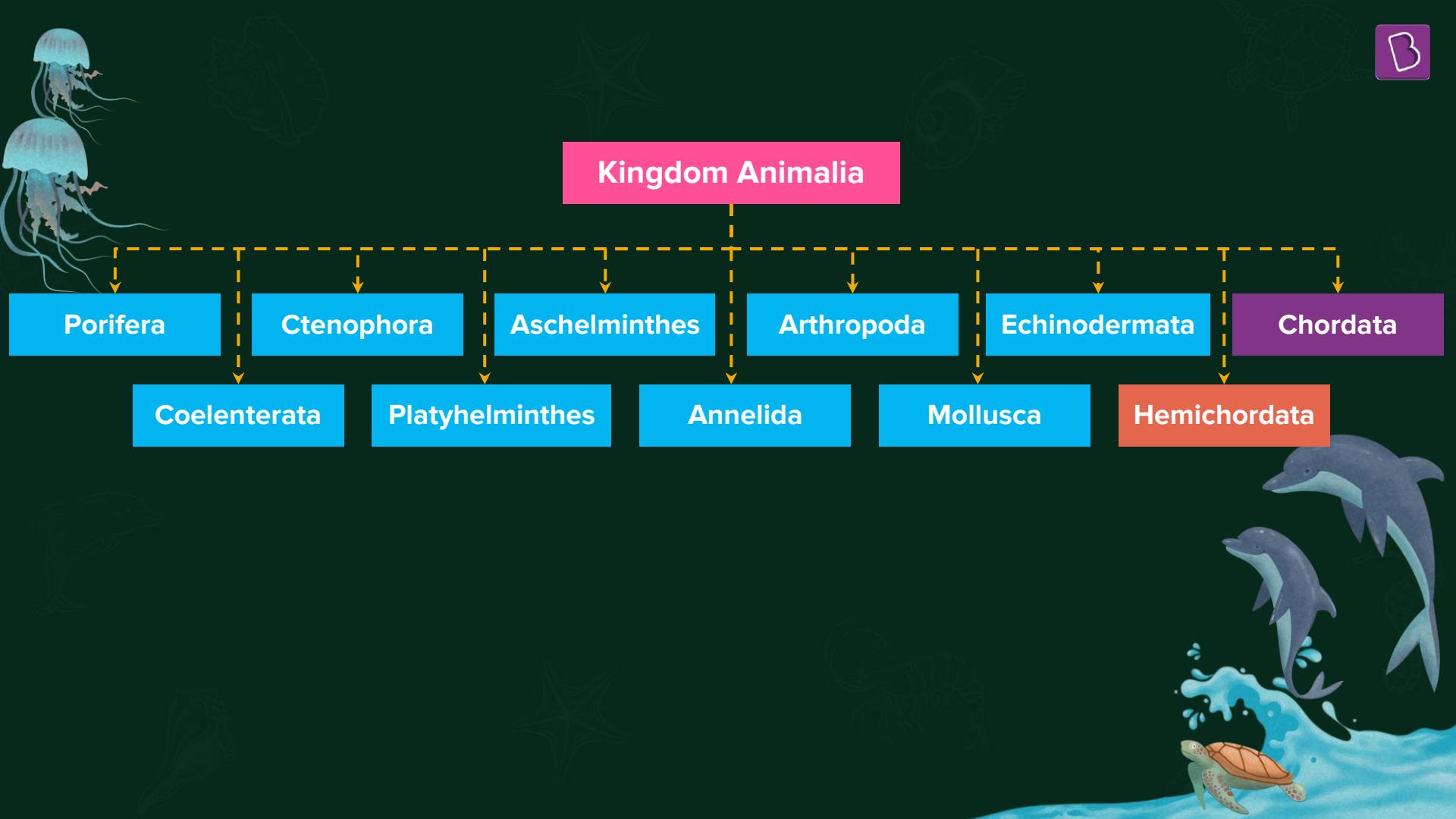
Coelenterata

Platyhelminthes

Annelida

Mollusca

Hemichordata



# Phylum Hemichordata

Hemichordate means 'half chordate'

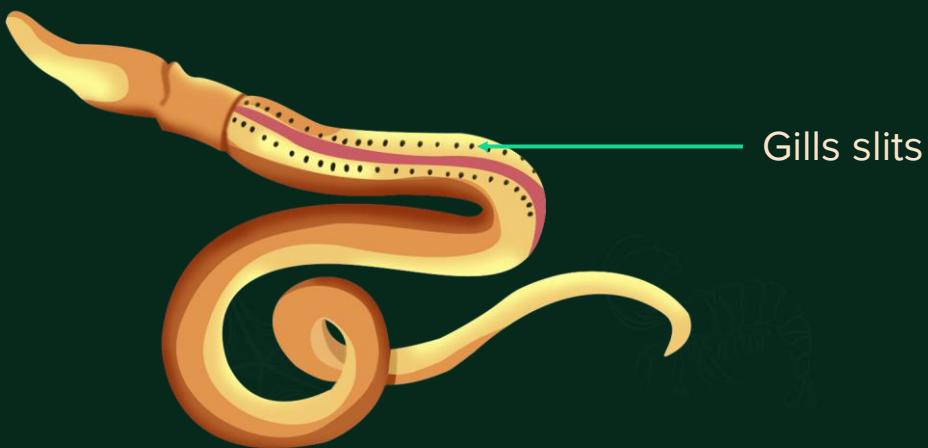
- They have stomochord which resembles a notochord



# Phylum Hemichordata

**Hemichordate means 'half chordate'**

- They have **stomochord** which resembles a notochord
- Presence of **pharyngeal** **gill slits**



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- All other features similar to the non-chordates



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- They have **stomochord** which resembles a notochord
- Presence of **pharyngeal gill slits**
- All other features similar to the non-chordates
- A very small phyla of **headless worms**



**Balanoglossus**



**Saccoglossus**

# Phylum Hemichordata

**Hemichordate means 'half chordate'**

- They have **stomochord** which resembles a notochord
- Presence of **pharyngeal gill slits**
- All other features similar to the non-chordates
- A very small phyla of **headless** worms
- Exclusively **marine** ✓



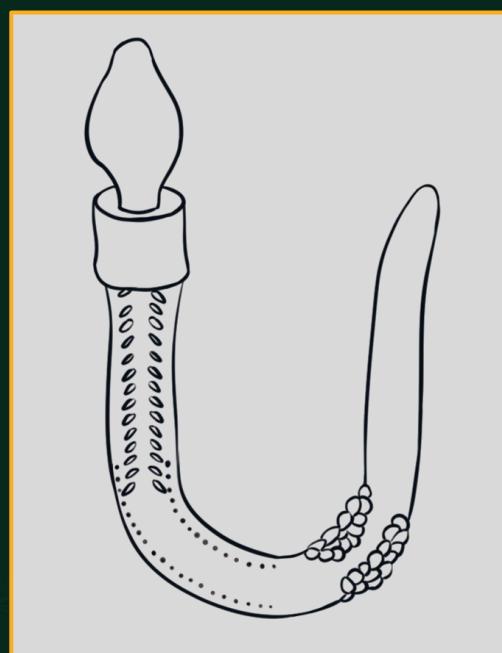
**Balanoglossus**



**Saccoglossus**

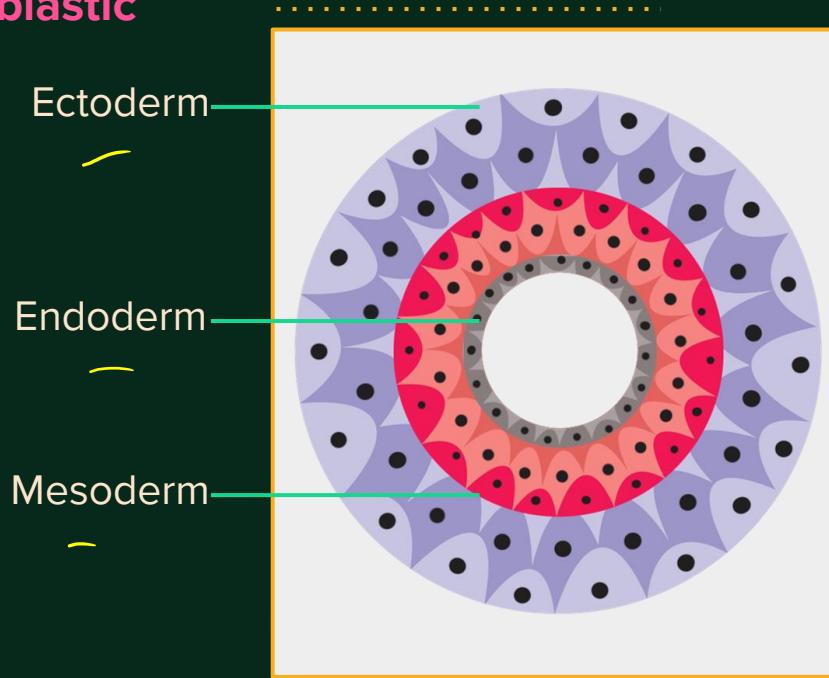
# Phylum Hemichordata

- Symmetry: **Bilateral**



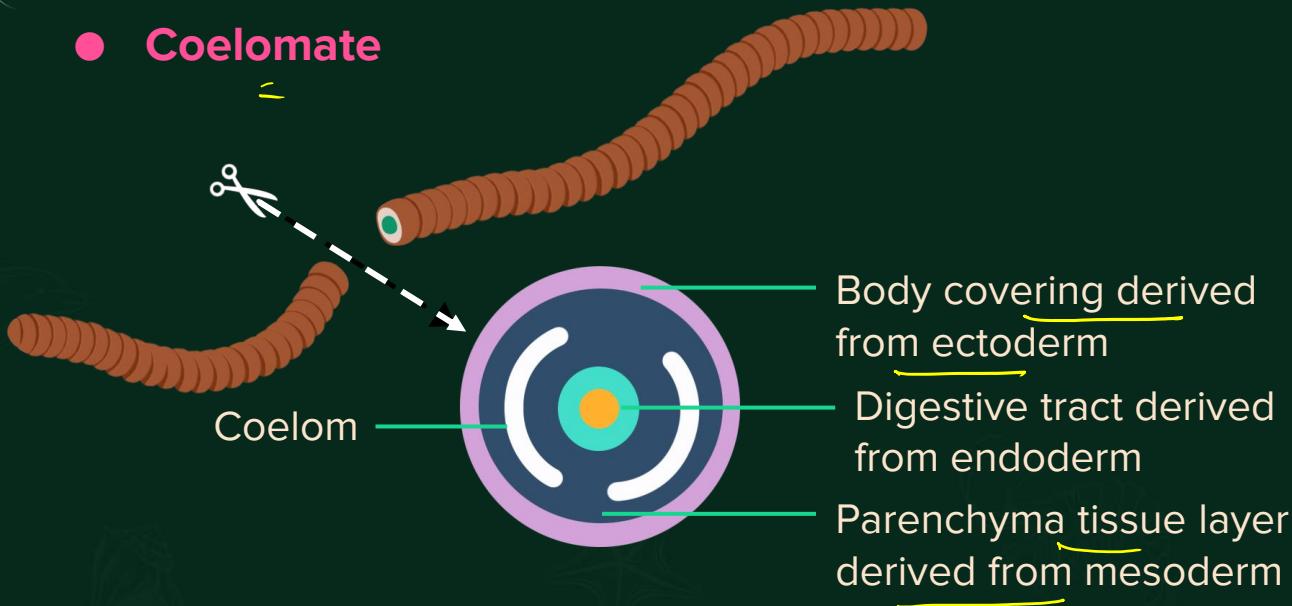
# Phylum Hemichordata

- Symmetry: **Bilateral**
- **Triploblastic**



# Phylum Hemichordata

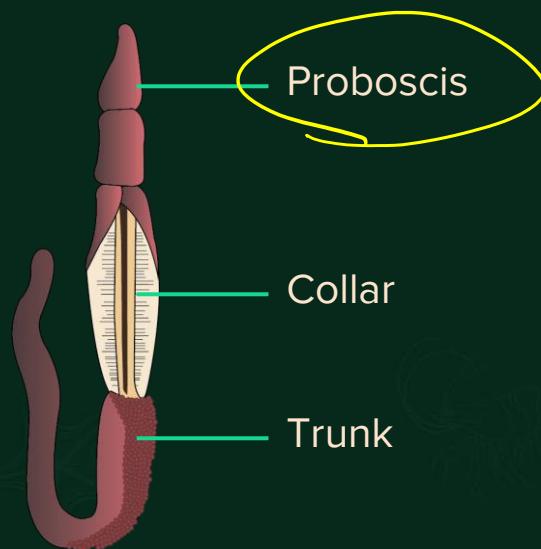
- **Symmetry:** Bilateral
- **Triploblastic**
- **Coelomate**



# Phylum Hemichordata

## Body Organisation

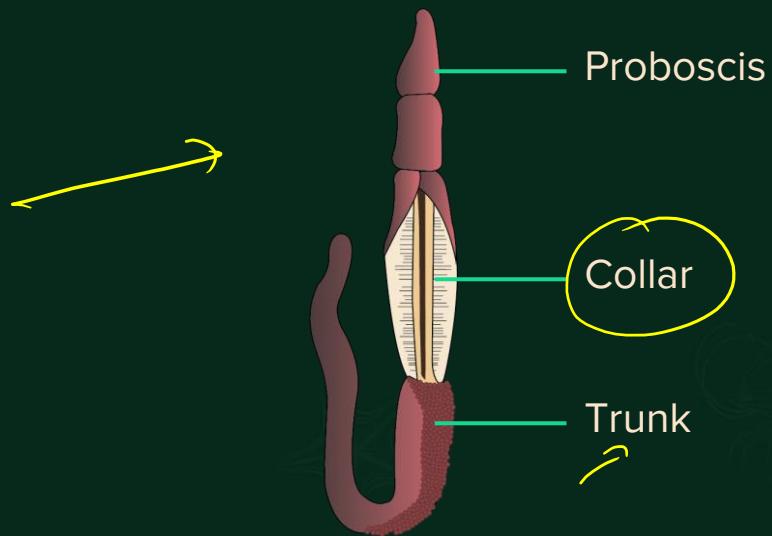
- **Organ system** level of organisation



# Phylum Hemichordata

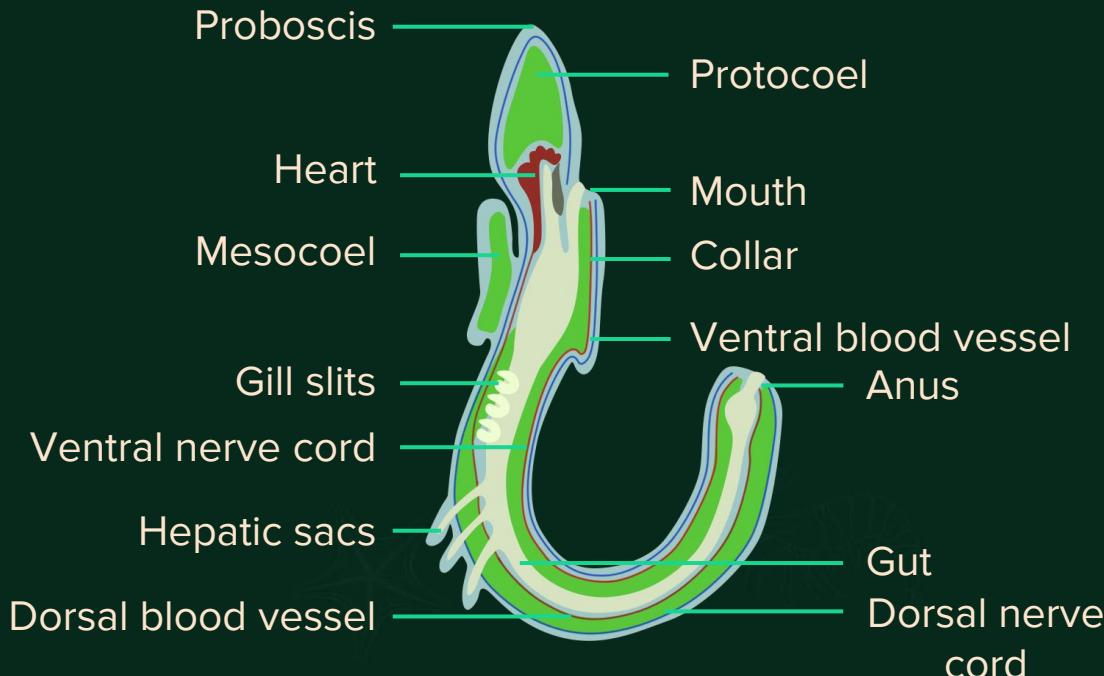
## Body Organisation

- **Organ system** level of organisation
- Cylindrical body with Proboscis, collar and long trunk



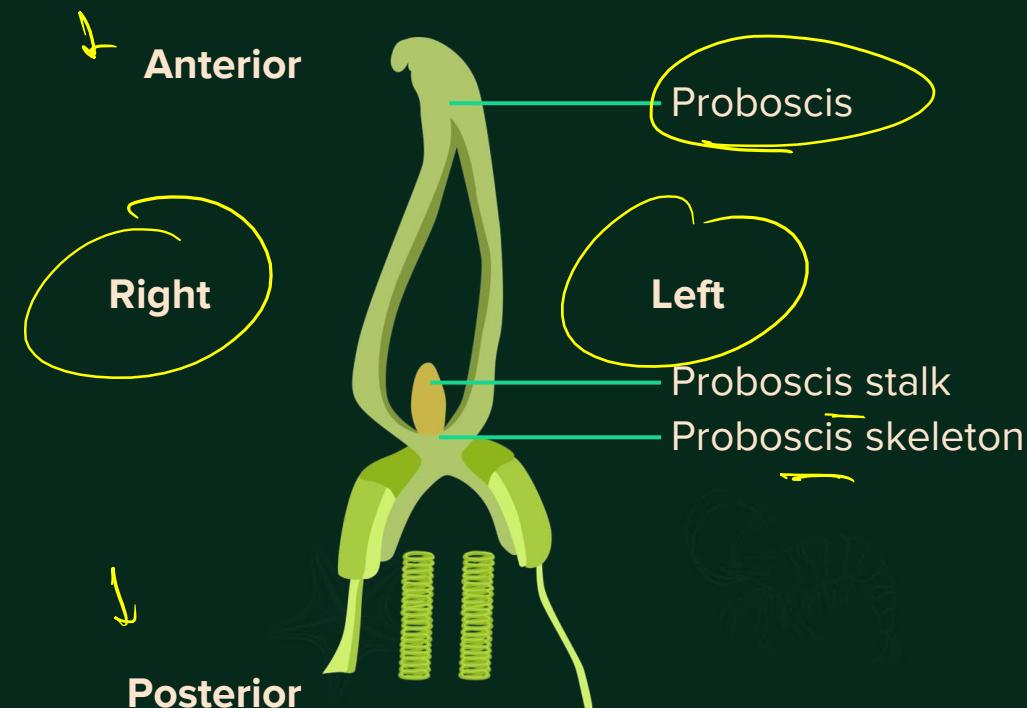
# Phylum Hemichordata

Open circulatory system



# Phylum Hemichordata

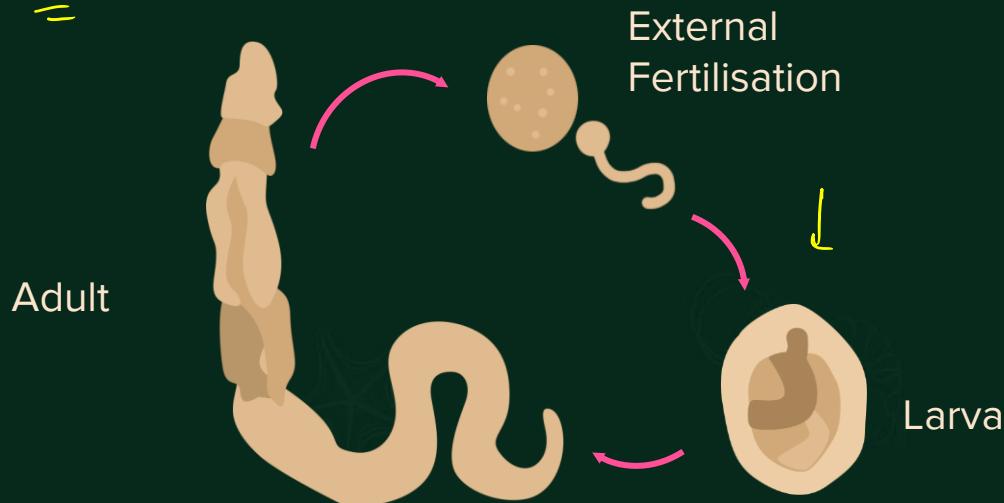
## Excretory organ: Proboscis gland



# Phylum Hemichordata

## Reproduction

- ✓ Separate sexes
- External fertilisation
- Indirect development



# Questio n Time !!

B





Proboscis gland is an excretory organ in:

a) *Dentalium*

c) *Echinus*

b) *Cucumaria*

 d) *Saccoglossus*



Proboscis gland is an excretory organ in:

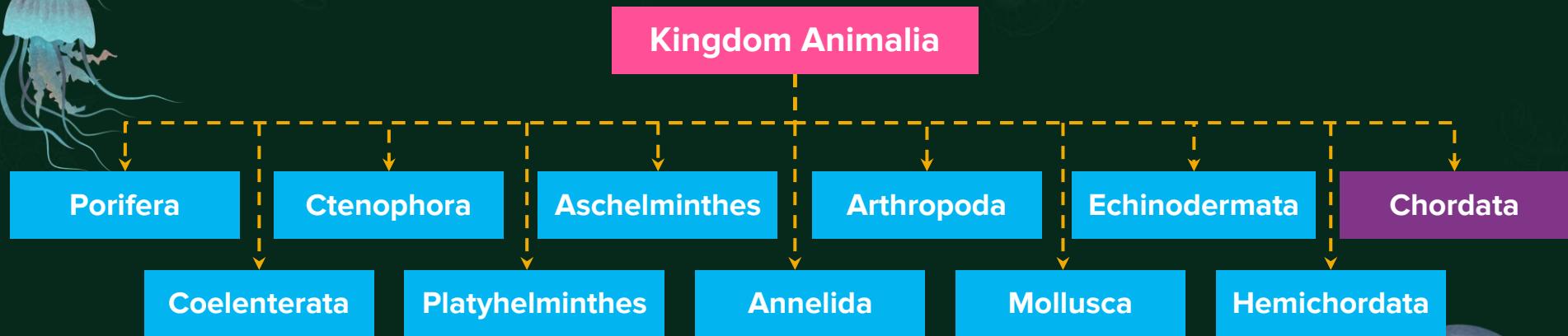
a) *Dentalium*

c) *Echinus*

b) *Cucumaria*

d) *Saccoglossus*

# Kingdom Animalia



We have learnt about all  
non-chordate animals  
Let us quickly compare and  
summarise !

Phylum	Level of organisation	Symmetry	Coelom	Segmentation	Digestive system	Circulatory system	Respiratory system	Distinctive features
<b>Porifera</b>	Cellular	Many	Absent	Absent	Absent	Absent	Absent	Body with pores and canal in walls
<b>Coelenterata (Cnidaria)</b>	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Cnidoblasts present
<b>Ctenophora</b>	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Comb plates for locomotion.

<b>Platyhelminthes</b>	Organ level	Bilateral	Absent	Absent	Incomplete	Absent	Absent	Flat body, Suckers.
<b>Aschelminthes</b>	Organ system	Bilateral	Pseudo-coelomate	Absent	Complete	Absent	Absent	Often worm shaped, Elongated.
<b>Annelida</b>	Organ system	Bilateral	Coelomate	Present	Complete	Present	Present	Body segmenta- tion like rings.

<b>Arthropoda</b>	Organ system	Bilateral	Coelomate	Present	Complete	Present	Present	Exoskeleton of cuticle, Jointed appendage.
<b>Mollusca</b>	Organ system	Bilateral	Coelomate	Absent	Complete	Present	Present	External skeleton shell usually present.

<b>Echinodermata</b>	Organ system	Radial/ Bilateral	Coelomate	Absent	Complete	Present	Present	Water vascular system, Radial symmetry.
<b>Hemichordata</b>	Organ system	Bilateral	Coelomate	Absent	Complete	Present	Present	Worm-like with proboscis, Collar and trunk.



Recall:

## Kingdom Animalia

Porifera

Ctenophora

Aschelminthes

Arthropoda

Echinodermata

Chordata

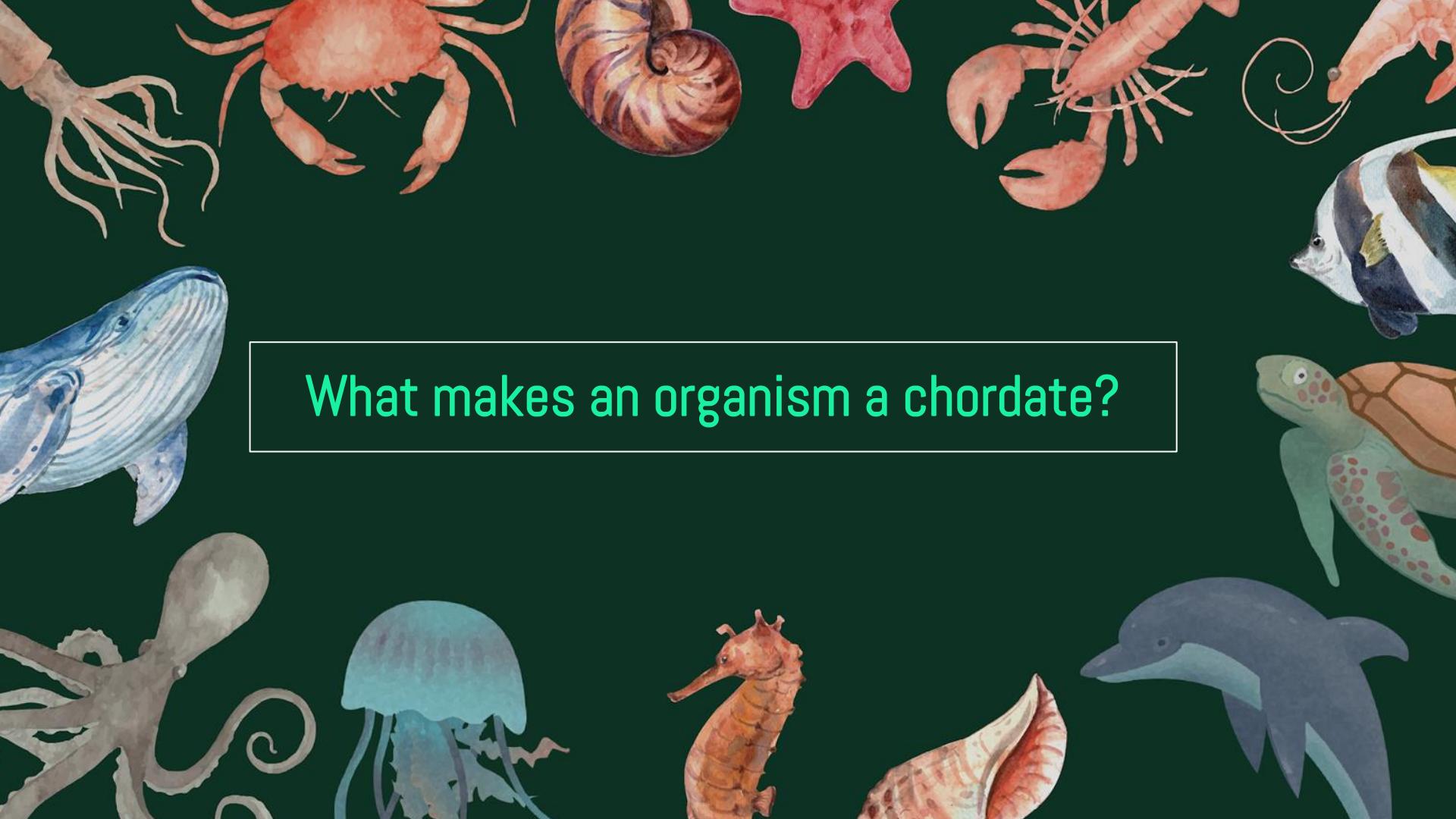
Coelenterata

Platyhelminthes

Annelida

Mollusca

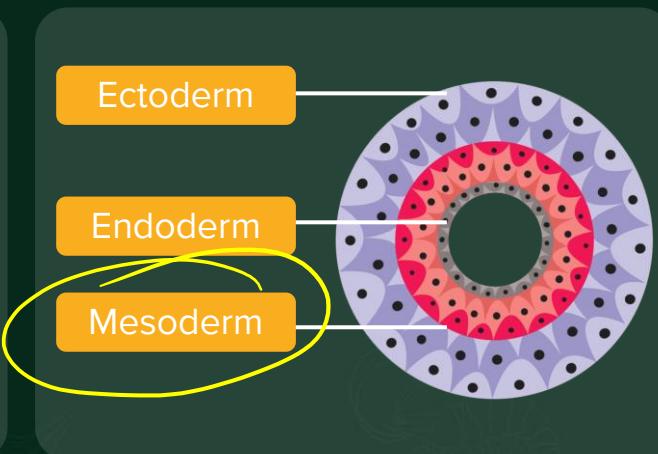
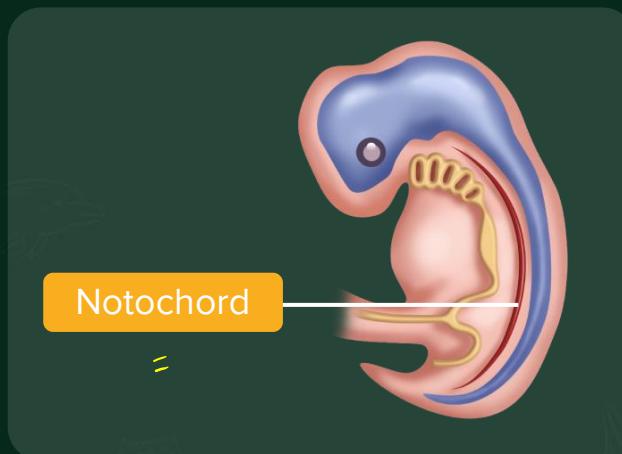
Hemichordata



What makes an organism a chordate?

# Notochord

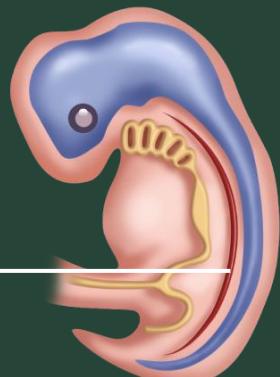
- It is derived from the **mesoderm**



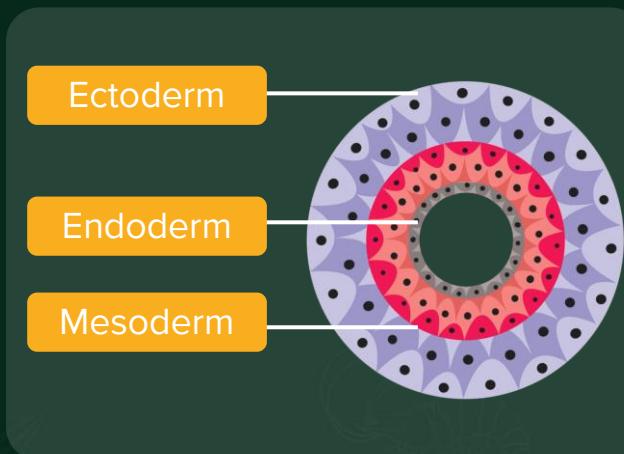
Dorsal side of embryo

# Notochord

- It is derived from the **mesoderm**
- Rod-like structure on the **posterior side** of the embryo



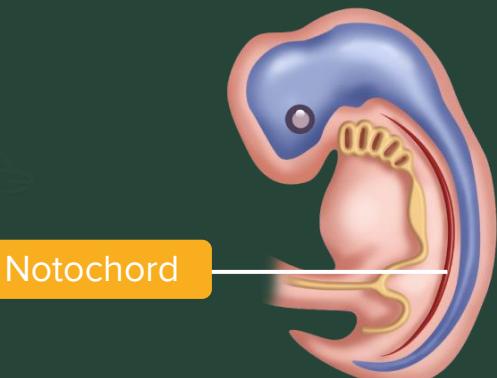
Notochord



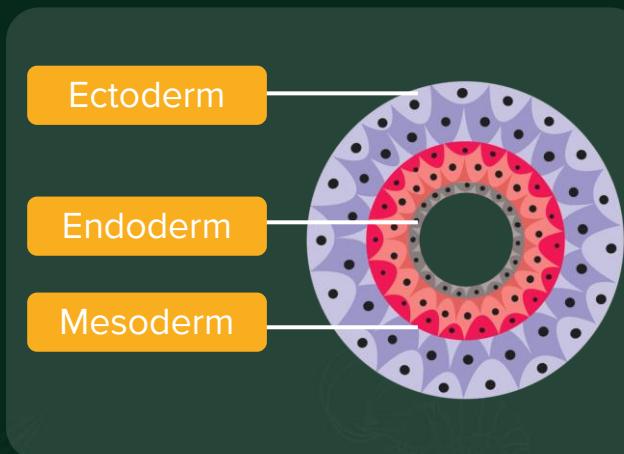
Dorsal side of embryo

## Notochord

- It is derived from the **mesoderm**
- Rod-like structure on the **posterior side** of the embryo
- Present during **embryonic** development



Dorsal side of embryo

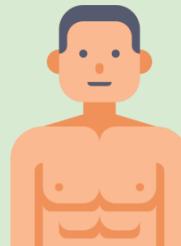


# Notochord

Based on the **presence** or **absence** of notochord, animals are classified into **Chordates** and **Non-chordates**

Animals with notochord

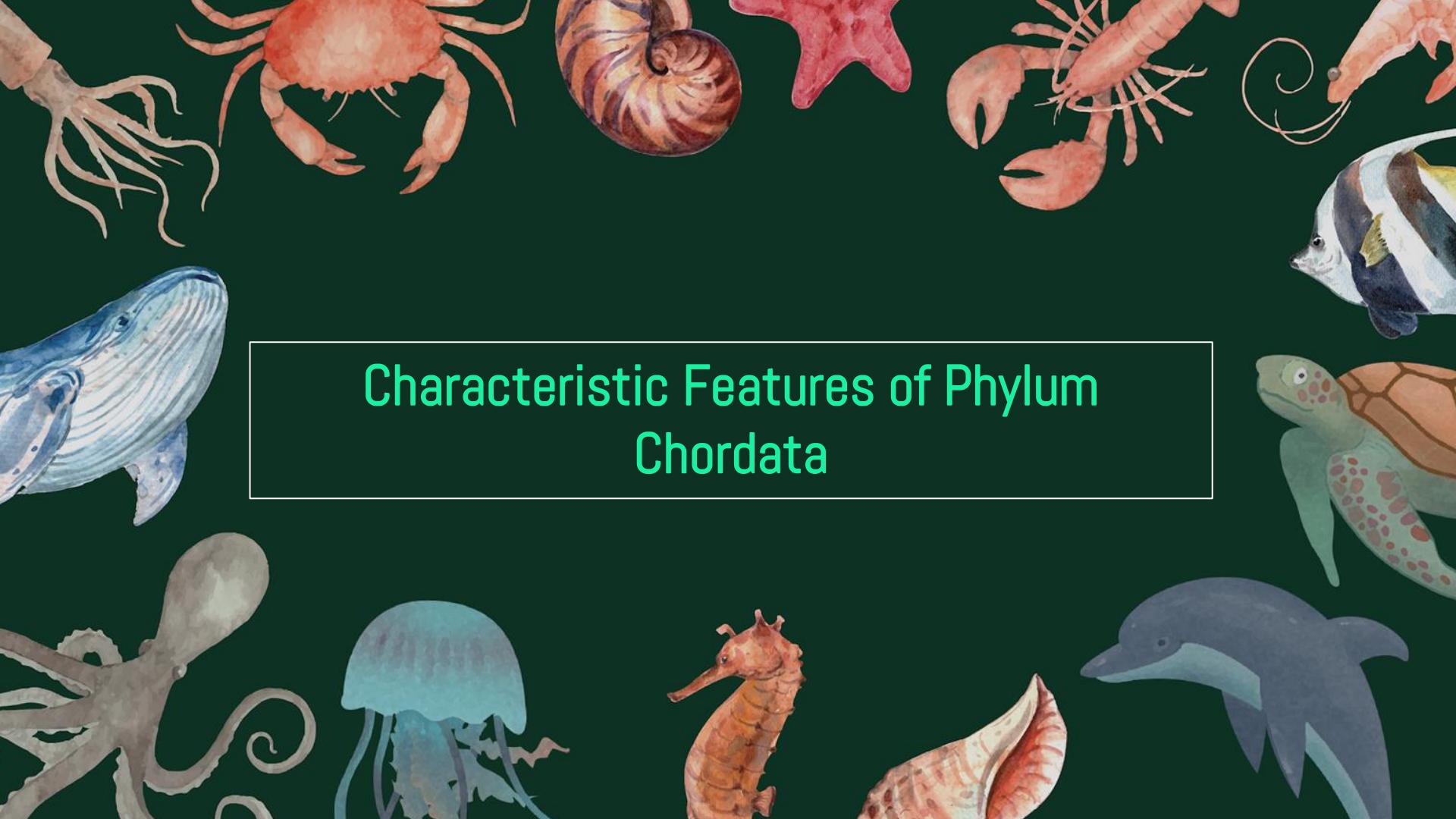
Chordates



Animals without notochord

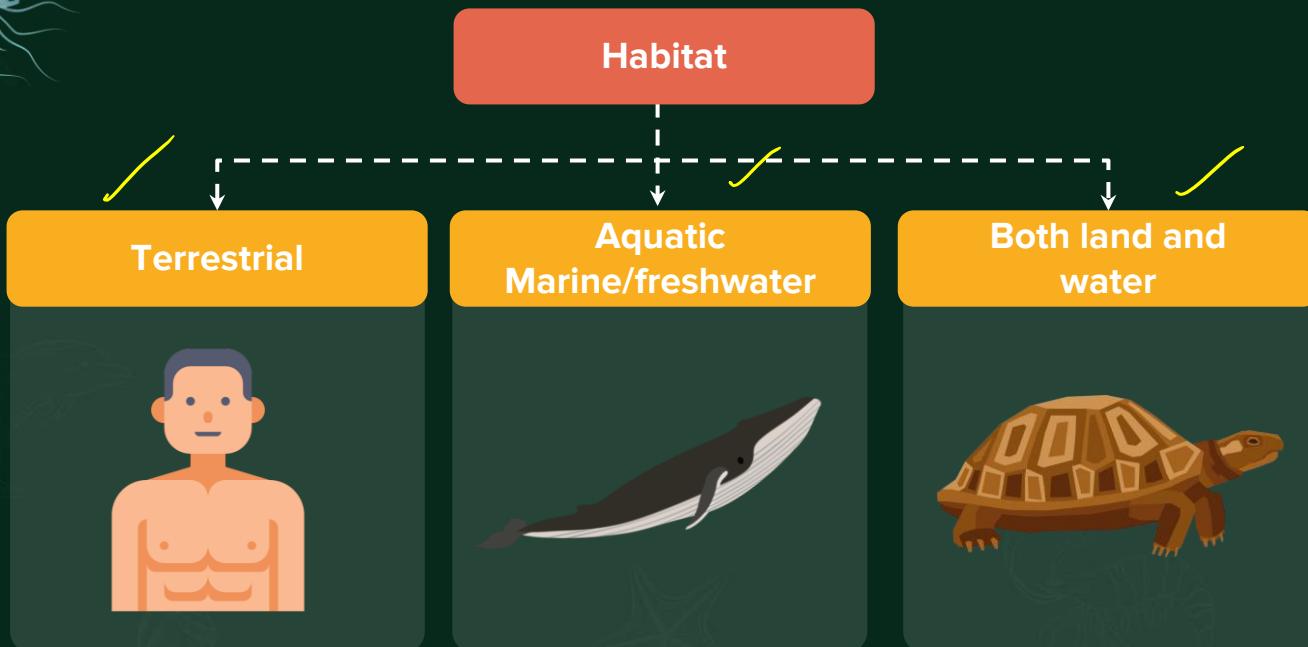
Non-chordates





## Characteristic Features of Phylum Chordata

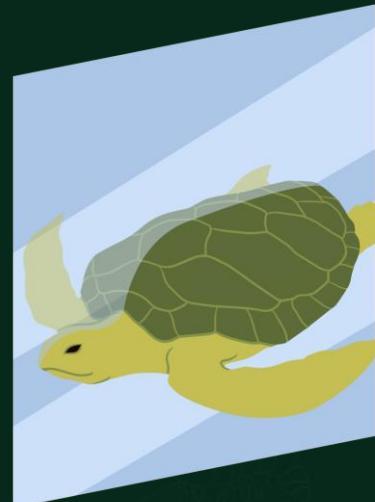
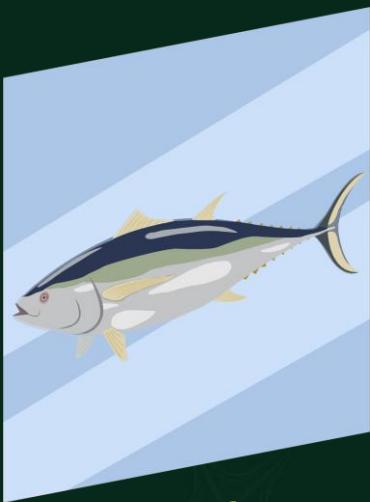
# Phylum Chordata



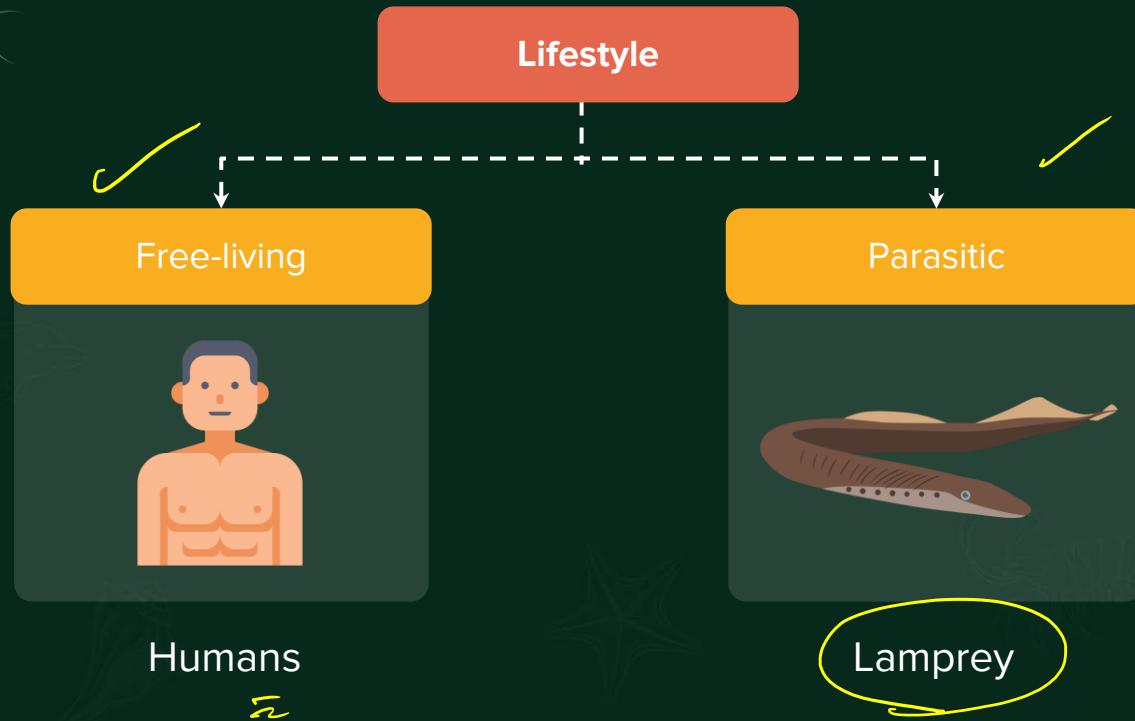
# Phylum Chordata

## Characteristic Features

- Bilaterally symmetrical



# Phylum Chordata

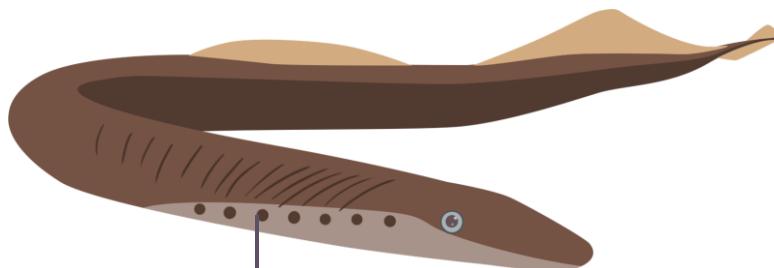


# How do Chordates Breathe?

# Phylum Chordata

## Characteristic Features

- They have **gill slits**



Gill slits



# Phylum Chordata

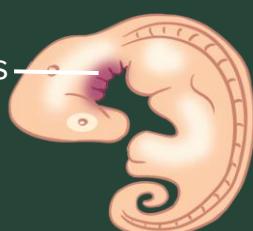
## Characteristic Features

- Presence of pharyngeal **gill slits**

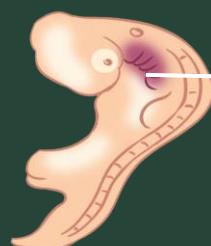
Embryos



Fish



Reptile



Bird



Mammal

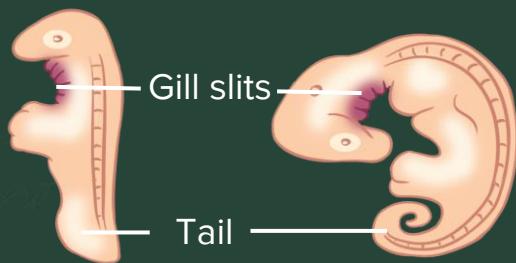


# Phylum Chordata

## Characteristic Features

- Presence of **post anal tail**

## Embryos



Fish



Bird

Reptile

Mammal



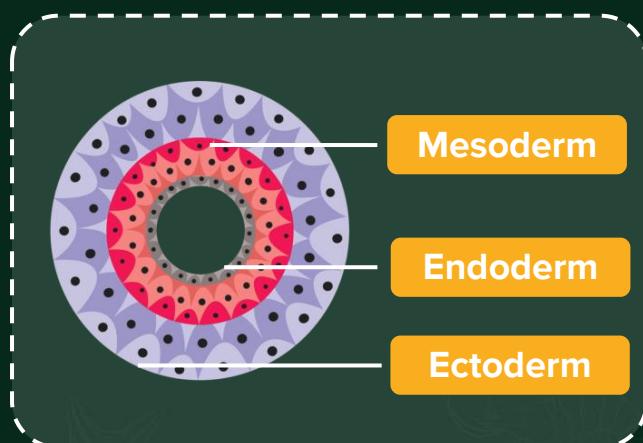
# Phylum Chordata

## Characteristic Features

- They exhibit **triploblastic organisation**

### Three germinal layers

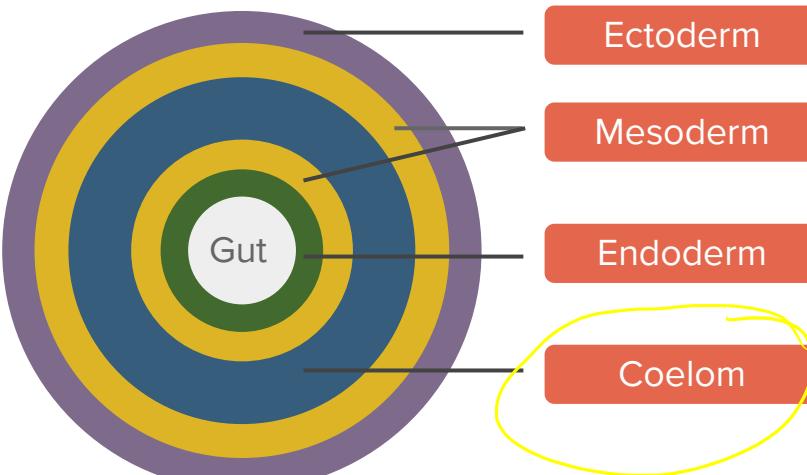
- 1 External ectoderm
- 2 Middle mesoderm
- 3 Internal endoderm



# Phylum Chordata

## Characteristic Features

- **Coelomate** - They have a **cavity between the alimentary canal and body wall**



1

2

3

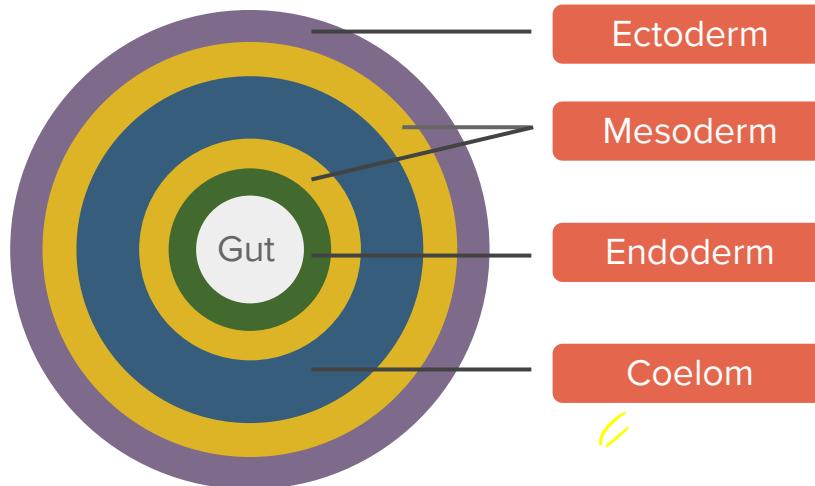
4



# Phylum Chordata

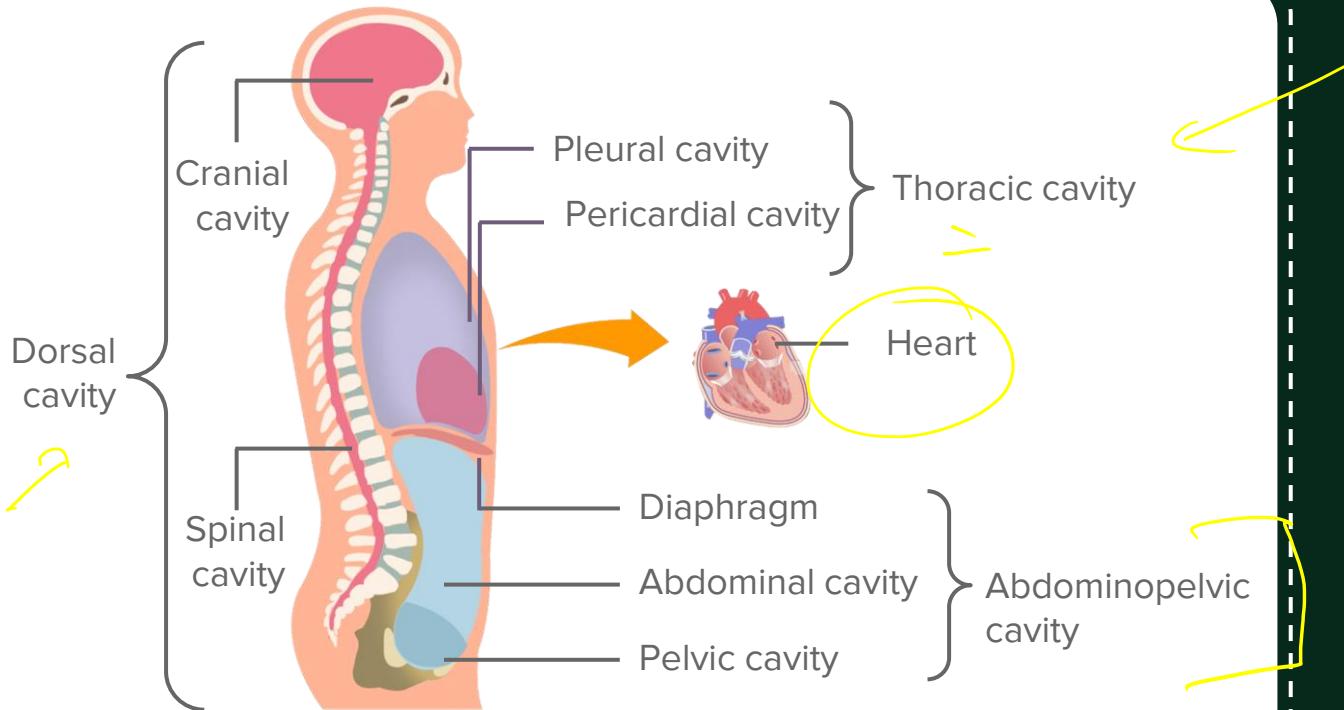
## Characteristic Features

- **Coelomate** - They have a **cavity between the alimentary canal and body wall**
- It is **lined by the mesoderm** on all sides



# Phylum Chordata

B



# Phylum Chordata

## Characteristic Features

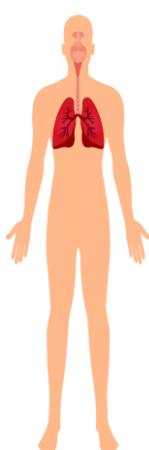
- **Organ-system** level of organisation



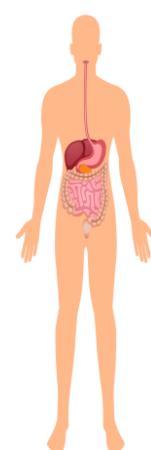
Skeletal System



Muscular System



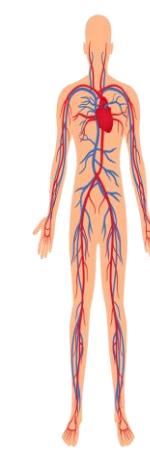
Respiratory System



Digestive System



Nervous System



Circulatory System

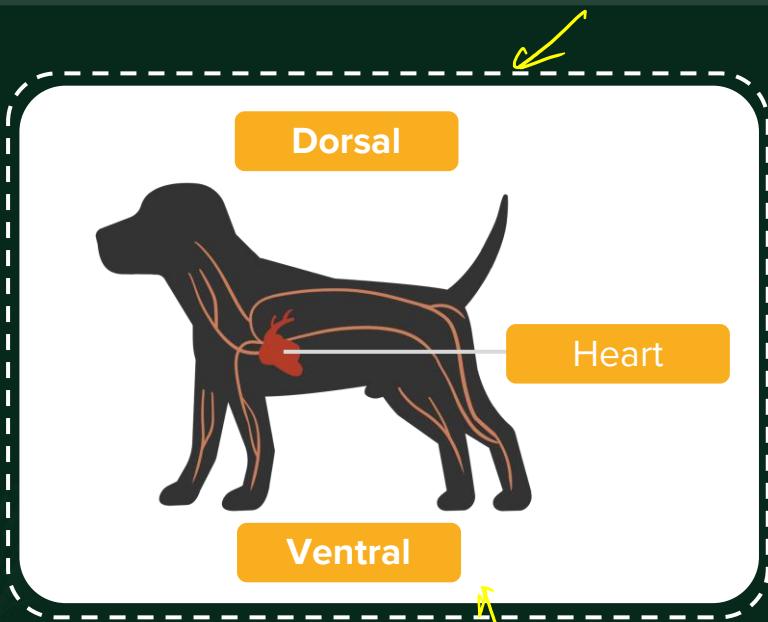


# Phylum Chordata

B

## Characteristic Features

- **Organ-system** level of organisation
- Heart is **ventral**

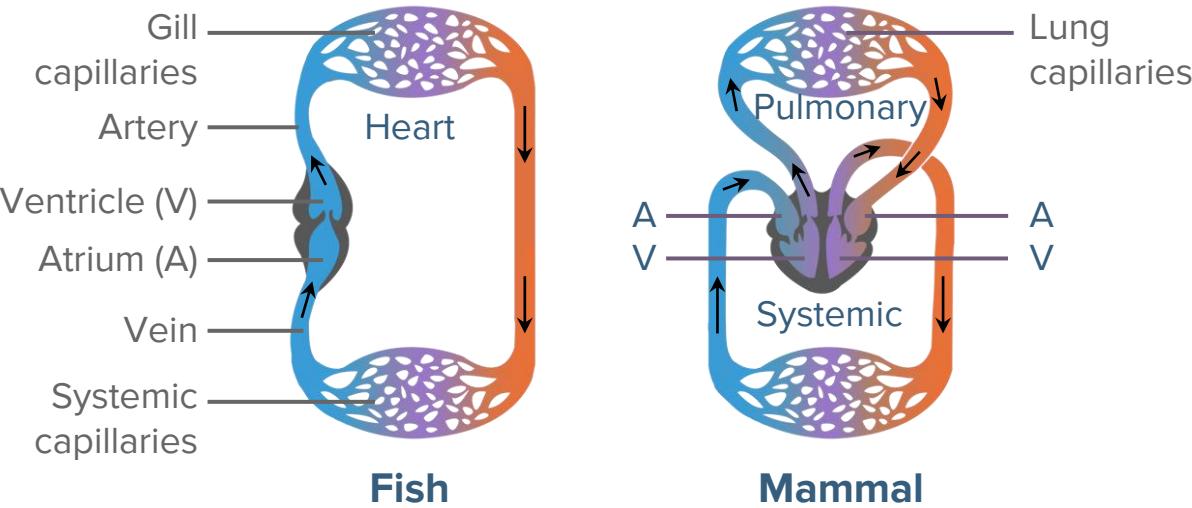


# Phylum Chordata

## Characteristic Features

- **Closed circulatory** system

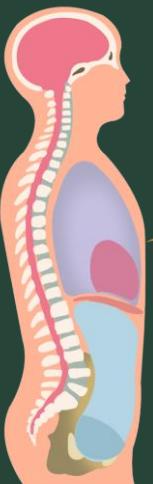
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# Phylum Chordata

## Characteristic Features

- **Organ-system** level of organisation
- Heart is **ventral**



Anterior  
& Ventral

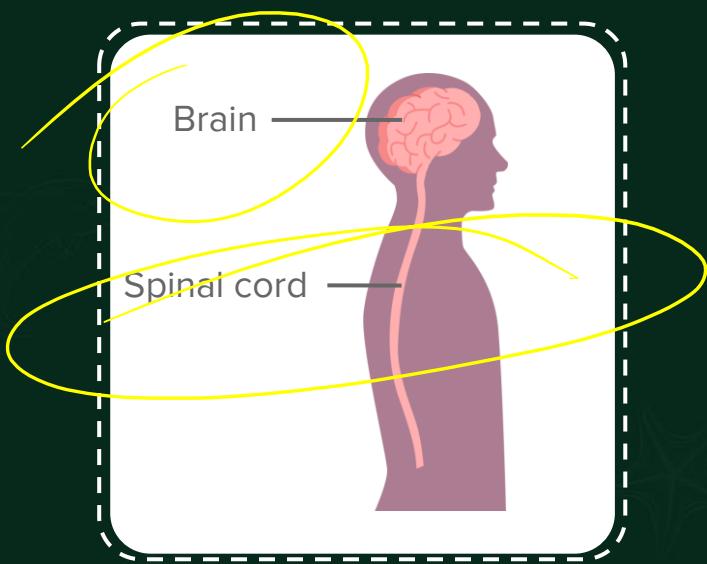
Posterior  
& Dorsal



# Phylum Chordata

## Characteristic Features

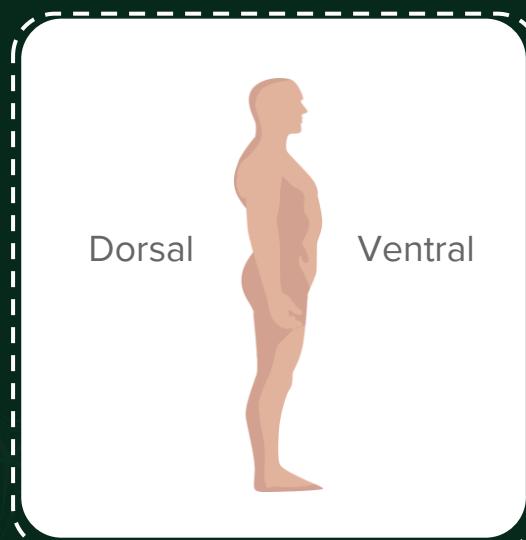
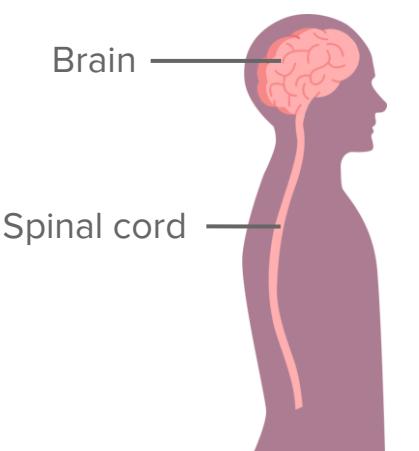
- **Central nervous system** consists of the **brain** and the **spinal cord**



# Phylum Chordata

## Characteristic Features

- **Central nervous system** consists of the **brain** and the **spinal cord**
- Central nervous system is **dorsal**, **hollow** and **single**



## Characters of Phylum Chordata that distinguishes it from Non-Chordates

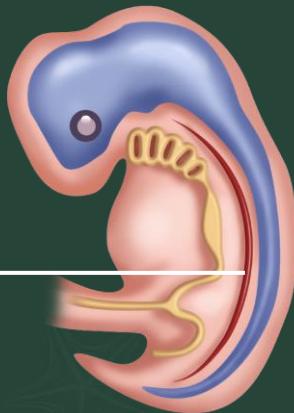
# Phylum Chordata

## Fundamental characters of Phylum Chordata

- Presence of **notochord**



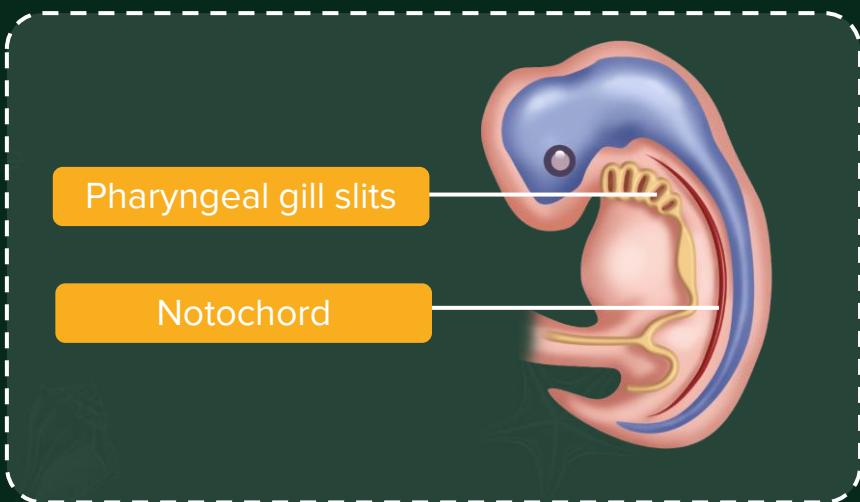
Notochord



# Phylum Chordata

## Fundamental characters of Phylum Chordata

- Presence of notochord
- Presence of paired pharyngeal **gill slits**



# Phylum Chordata

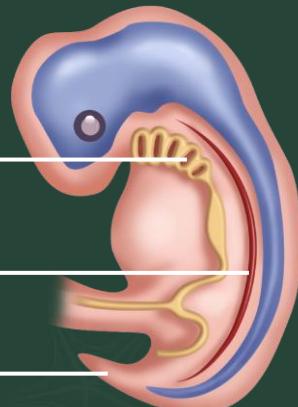
## Fundamental characters of Phylum Chordata

- Presence of notochord
- Presence of paired pharyngeal **gill slits**
- Presence of a **post-anal tail**

Pharyngeal gill slits

Notochord

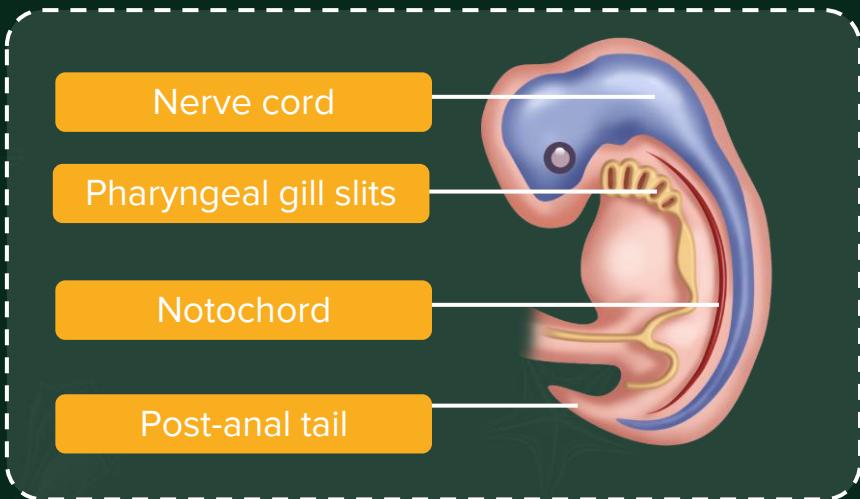
Post-anal tail



# Phylum Chordata

## Fundamental characters of Phylum Chordata

- Presence of notochord
- Presence of paired pharyngeal **gill slits**
- Presence of a **post-anal tail**
- Presence of **dorsal hollow nerve cord**



# Comparison of Chordates and Non-Chordates

## Chordates

## Non - Chordates

Notochord present

Notochord absent

# Comparison of Chordates and Non-Chordates

Chordates	Non - Chordates
Notochord present	Notochord absent
Central nervous system dorsal, hollow and single	Central nervous system ventral, solid and double

# Comparison of Chordates and Non-Chordates

Chordates	Non - Chordates
Notochord present	Notochord absent
Central nervous system dorsal, hollow and single	Central nervous system ventral, solid and double
Pharynx perforated by gill slits	Gill slits are absent

# Comparison of Chordates and Non-Chordates

Chordates	Non - Chordates
Notochord present	Notochord absent
Central nervous system dorsal, hollow and single	Central nervous system ventral, solid and double
Pharynx perforated by gill slits	Gill slits are absent
Heart is ventral	Heart is dorsal (if present)



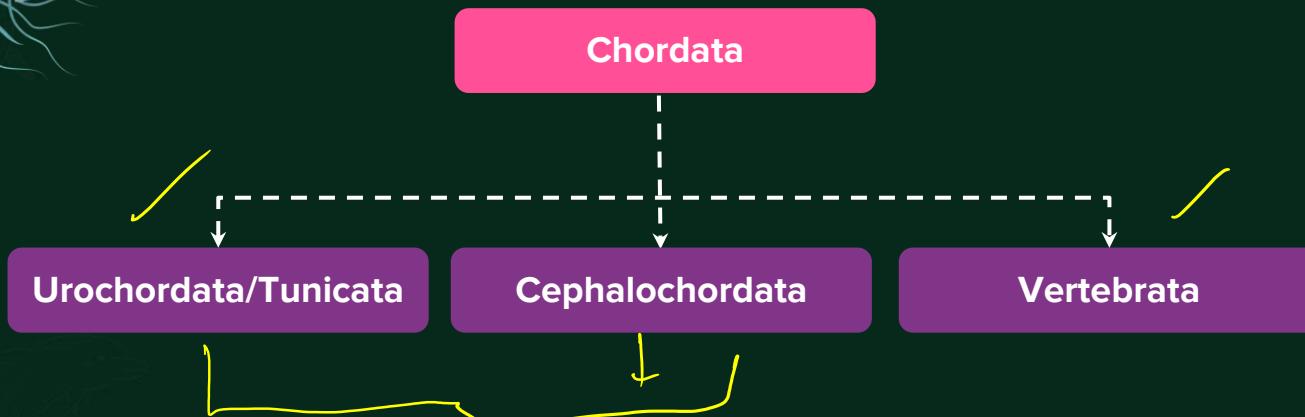
# Comparison of Chordates and Non-Chordates

Chordates	Non - Chordates
Notochord present	Notochord absent
Central nervous system dorsal, hollow and single	Central nervous system ventral, solid and double
Pharynx perforated by gill slits	Gill slits are absent
Heart is ventral	Heart is dorsal (if present)
Post-anal tail present	Post-anal tail absent



# Classification of Chordates

# Classification of Chordates





KEEP  
LEARNING