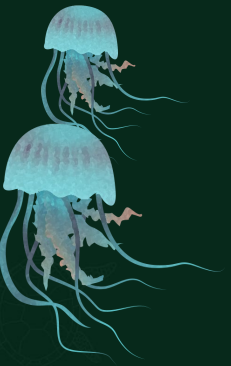
PHYLUM ECHINODERMATA & MOLLUSCA

ANIMAL KINGDOM - L5

MISSION MBBS 11th | ZOOLOGY

PUSHPENDU SIR

FREE FOR 14 DAYS!



12TH CLASS | TUESDAY, THURSDAY
11TH CLASS | MONDAY, WEDNESDAY, FRIDAY

3 PM | 4 PM | 5 PM | 6 PM

MISSION MBBS

VIVEK SIR

CHEMISTRY | 3:00 PM

ANUSHRI MA'AM

PHYSICS | 4:00 PM

SACHIN SIR

ZOOLOGY | 5:00 PM

PANKHURI MA'AM

BOTANY | 5:00, 6:00 PM

PUSHPENDU SIR

ZOOLOGY | 6:00 PM

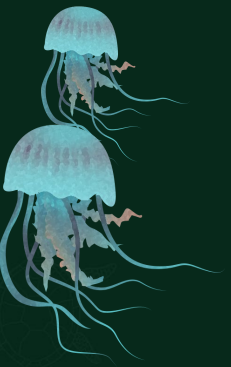
Recall: Phylum Annelida

Unique feature is **metameric segmentation**

Recall: Phylum Arthropoda

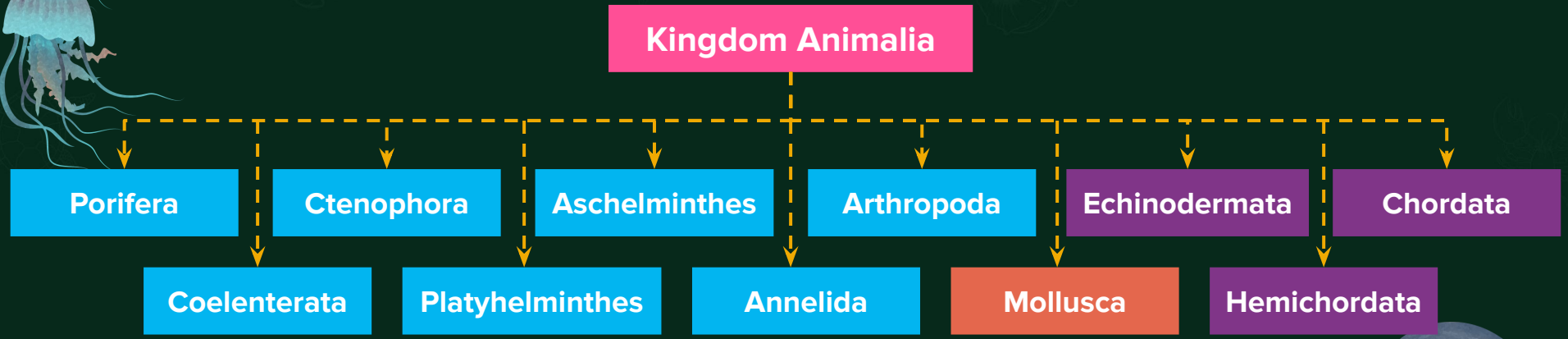
Unique feature is the presence of **jointed appendages**

Recall! Animal Kingdom

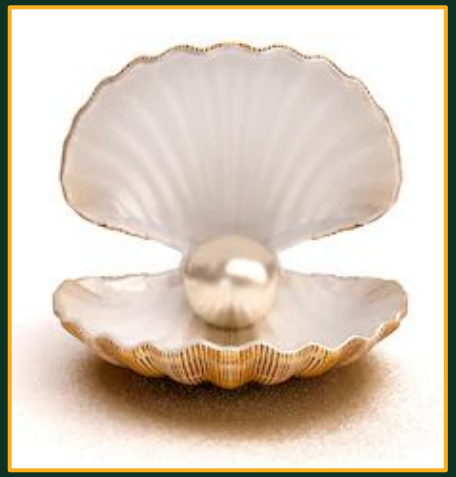


- **Animal Kingdom**
  - **Non-Chordates**
    - **Cellular Level**
    - **Tissue Level**
    - **Organ and Organ System Level**
      - No Body Cavity → **Acoelomate**
      - Body Cavity Present → **Coelomate**
        - **Phylum Annelida**
        - **Phylum Arthropoda**
        - **Phylum Mollusca**
        - **Phylum Echinodermata**
  - **Chordates**

Kingdom Animalia




Can you think of a gem
that comes from a
living creature ?



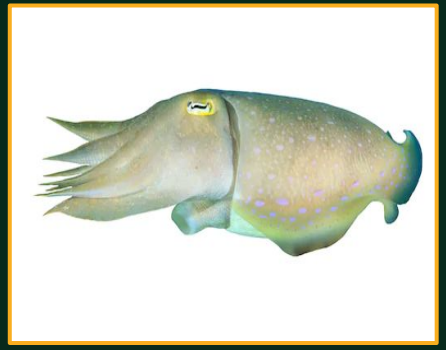
Pinctada
Pearl Oyster

Have You Tasted Yummy Shellfish!

All of These Belong to Phylum Mollusca

Phylum Mollusca

Pila
Apple Snail



Sepia
Cuttlefish

Loligo
Squid

Octopus

Have you seen these beautiful shells?

Have you seen these beautiful shells?

Characteristic feature of Phylum Mollusca - Calcareous shells!

Phylum Mollusca

- **Second** largest phylum

Pila
Apple Snail

Phylum Mollusca

- **Second** largest phylum
- Term ‘Mollusca’ derived from Latin term ‘**mollis**’ which means ‘**soft**’

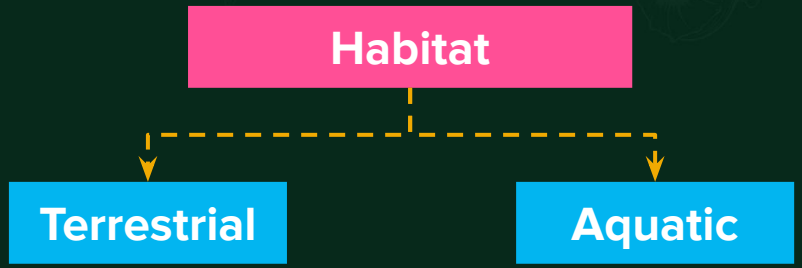
Pila
Apple Snail

Phylum Mollusca

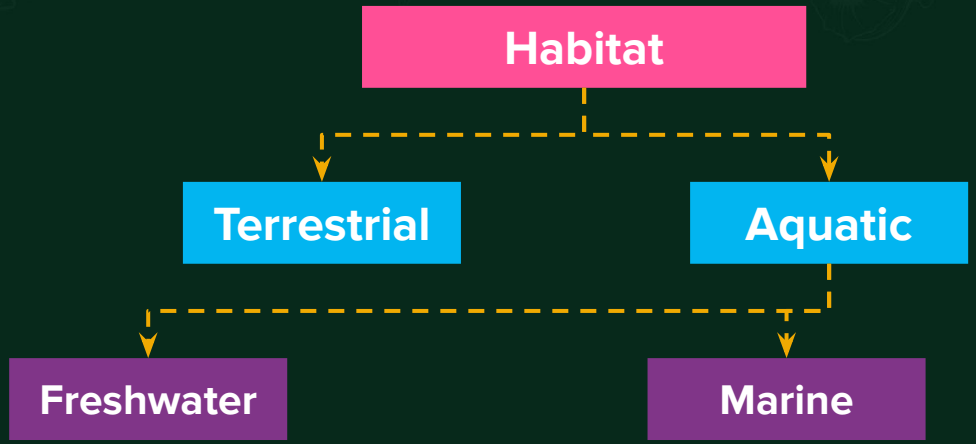
- **Second** largest phylum
- Term ‘Mollusca’ derived from Latin term ‘**mollis**’ which means ‘**soft**’
- Includes all **soft bodied** animals

Pila
Apple Snail

Phylum Mollusca



Phylum Mollusca



Phylum Mollusca

Habitat

- **Terrestrial**
- **Aquatic**
  - **Freshwater**
  - **Marine**

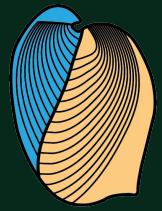
Mussel

Octopus

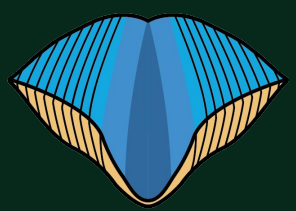
Phylum Mollusca

Characteristic Features

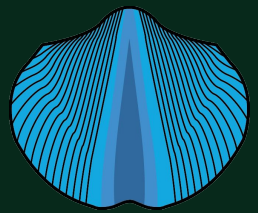
- Exhibit **bilateral** symmetry



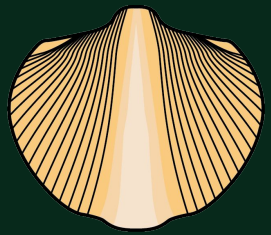
Side View



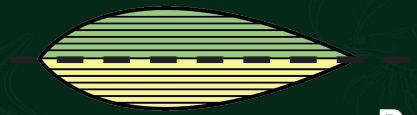
Front View



Top View



Bottom View



Phylum Mollusca

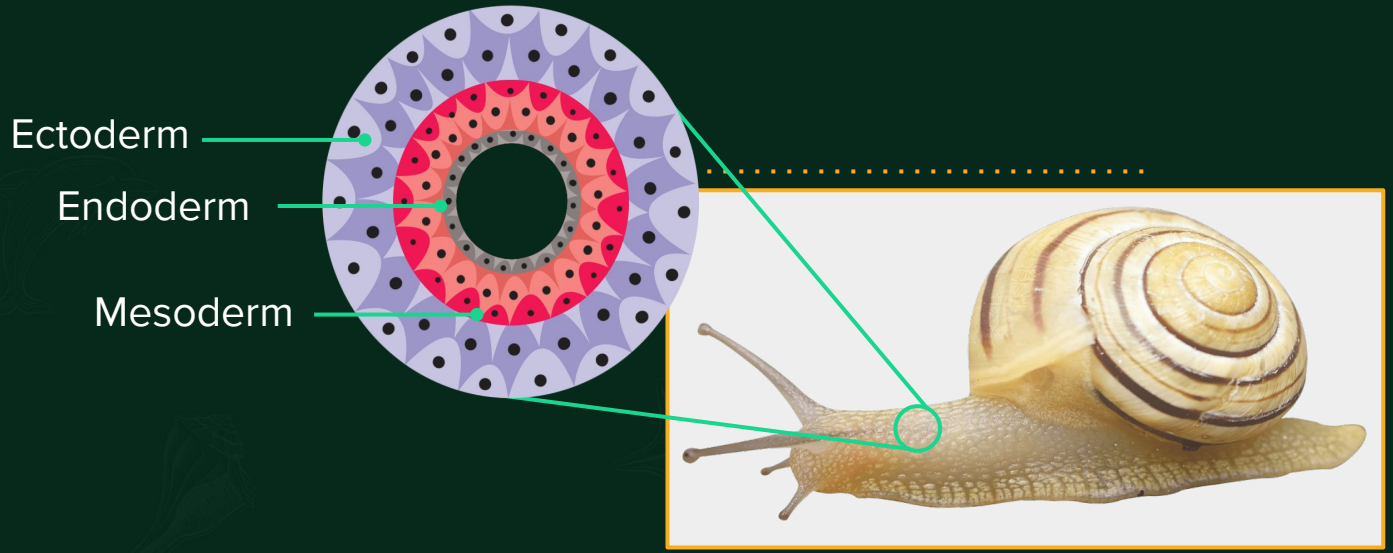
Characteristic Features

- Exhibit **bilateral** symmetry

Phylum Mollusca

Characteristic Features

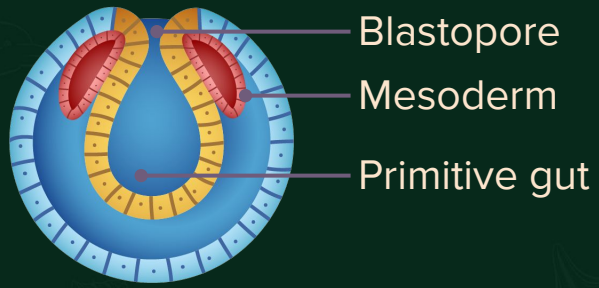
- Exhibit **bilateral** symmetry
- **Triploblastic**: Possess all three germ layers



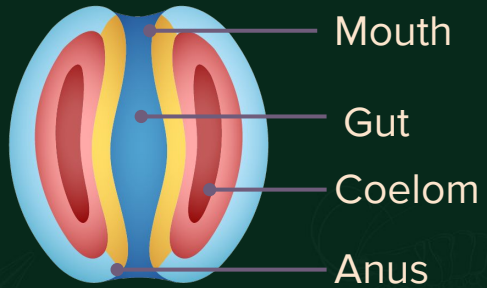
Phylum Mollusca

Characteristic Features

- Exhibit **bilateral** symmetry
- **Triploblastic:** Possess all three germ layers
- **Schizocoelomate**: Possess a true coelom (body cavity lined by mesoderm)



Schizocoelom

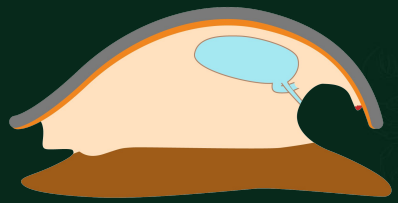


Cross-sectional View

Phylum Mollusca

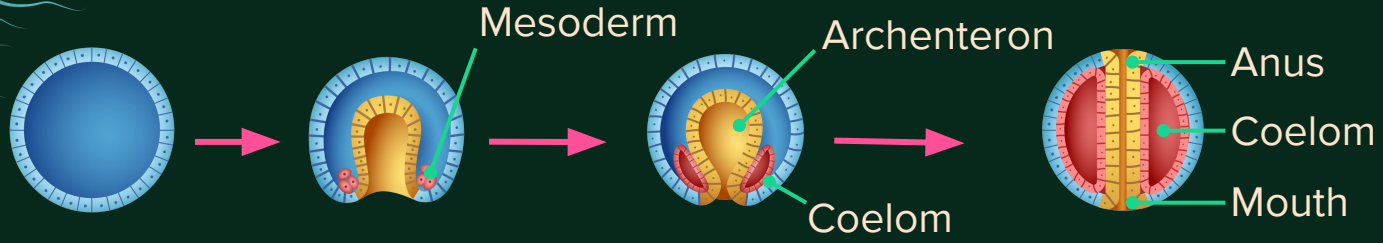
Characteristic Features

- Exhibit **Bilateral** Symmetry
- **Triploblastic**: Possess all three germ layers
- **Schizocoelomate**: Possess a true coelom (body cavity lined by mesoderm)
- **Protostomes**: Mouth develops first from the blastopore



Phylum Mollusca

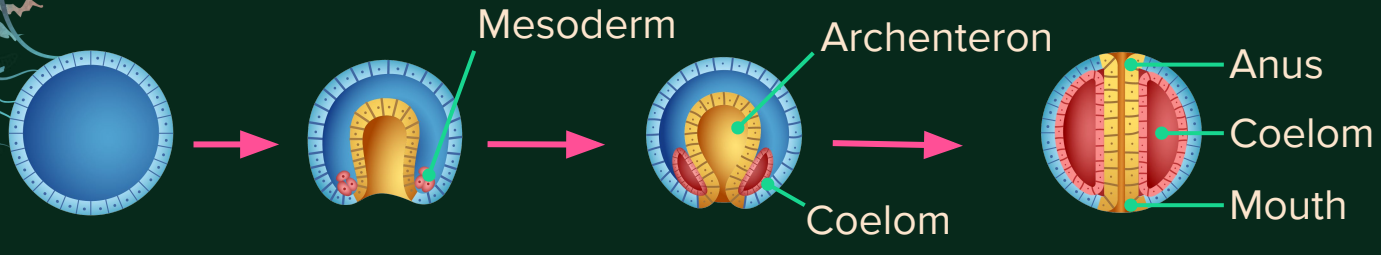
Protostomes: Mouth develops first from the blastopore



Blastula → **Blastopore** → **Mesoderm splits** → **Mouth forms from blastopore**

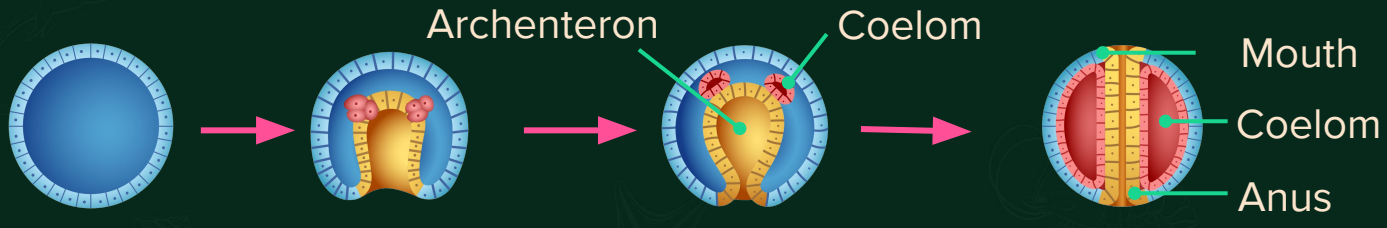
Phylum Mollusca

Protostomes: Mouth develops first from the blastopore



Blastula | **Blastopore** | **Mesoderm splits** | **Mouth forms from blastopore**

Deuterostomes: Anus develops first from the blastopore



Blastula | **Blastopore** | **Archenteron outpockets to form coelom** | **Anus form from blastopore**

Phylum Mollusca

Main Body

- is unsegmented

Phylum Mollusca

Main Body

- is unsegmented
- is soft

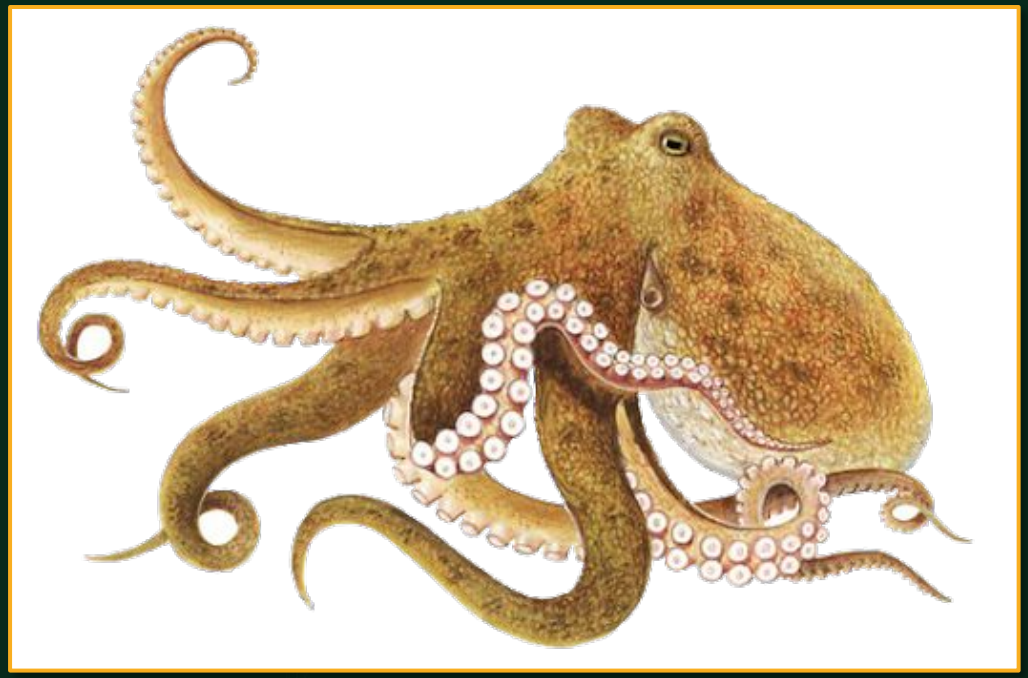
Phylum Mollusca

Main Body

- is unsegmented
- is soft
- has a protective cover made of calcareous shell

Exception

Octopus does not have a shell to protect the body

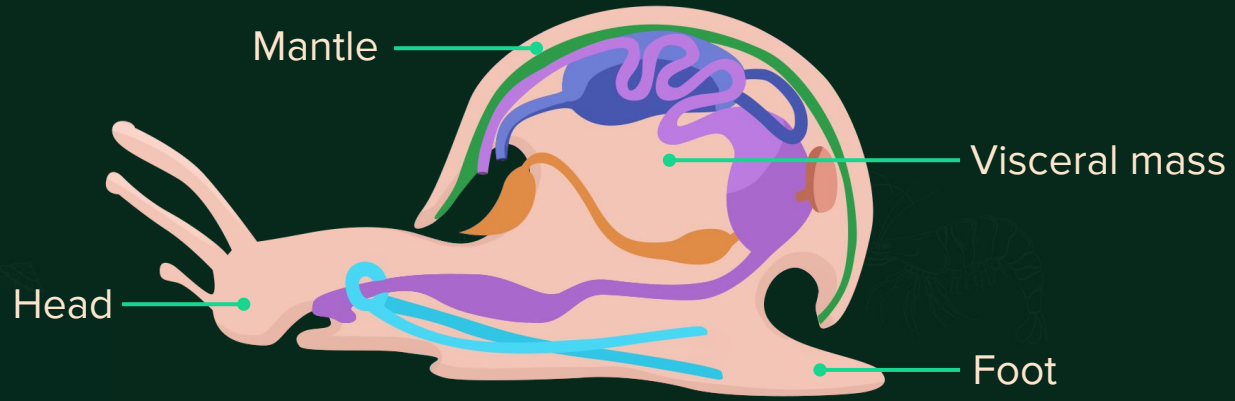


Let's take a closer look!

Phylum Mollusca

Body Plan

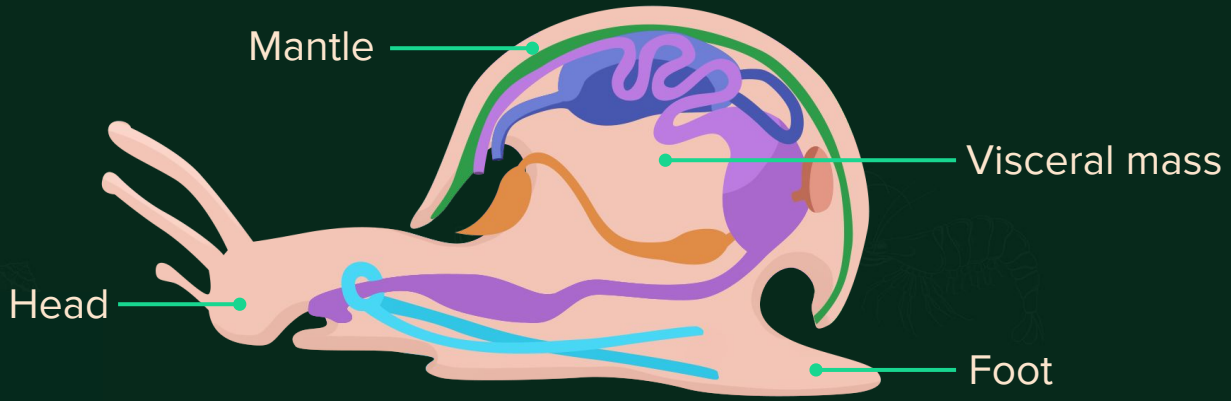
- **Distinct body:** Head, muscular foot and visceral hump (visceral mass)



Phylum Mollusca

Body Plan

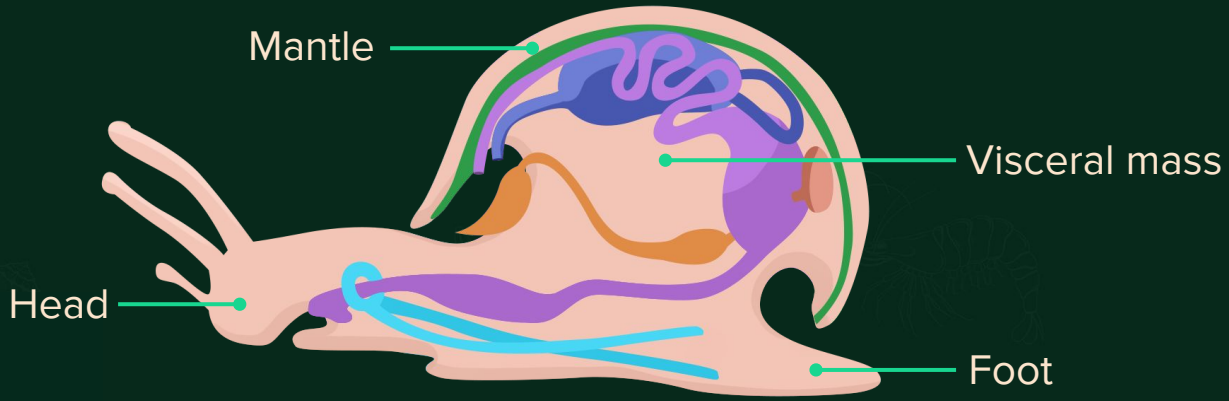
- **Distinct body:** Head, muscular foot and visceral hump (visceral mass)
- **Mantle:** Spongy layer covering the visceral mass



Phylum Mollusca

Body Plan

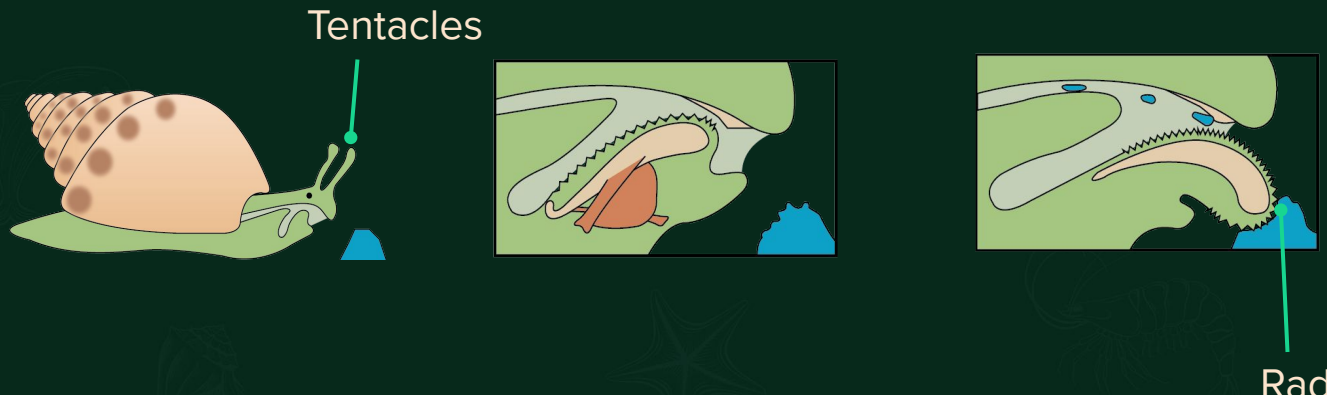
- **Distinct body:** Head, muscular foot and visceral hump (visceral mass)
- **Mantle:** Spongy layer covering the visceral mass
- **Mantle cavity** is the space between hump and mantle



Phylum Mollusca

Head region consists of

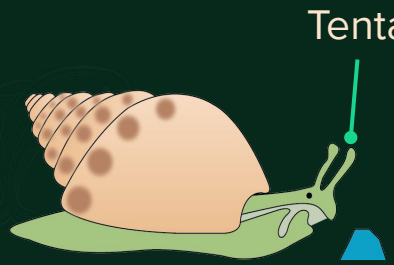
- **Tentacles** for feeding and sensory perception

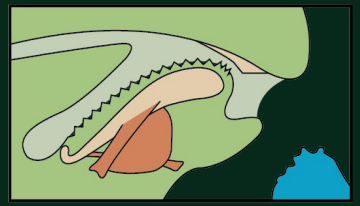


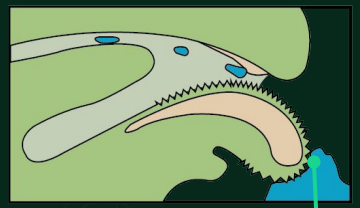
Phylum Mollusca

Head region consists of

- **Tentacles** for feeding and sensory perception
- **Radula** - rasping organ in mouth for feeding







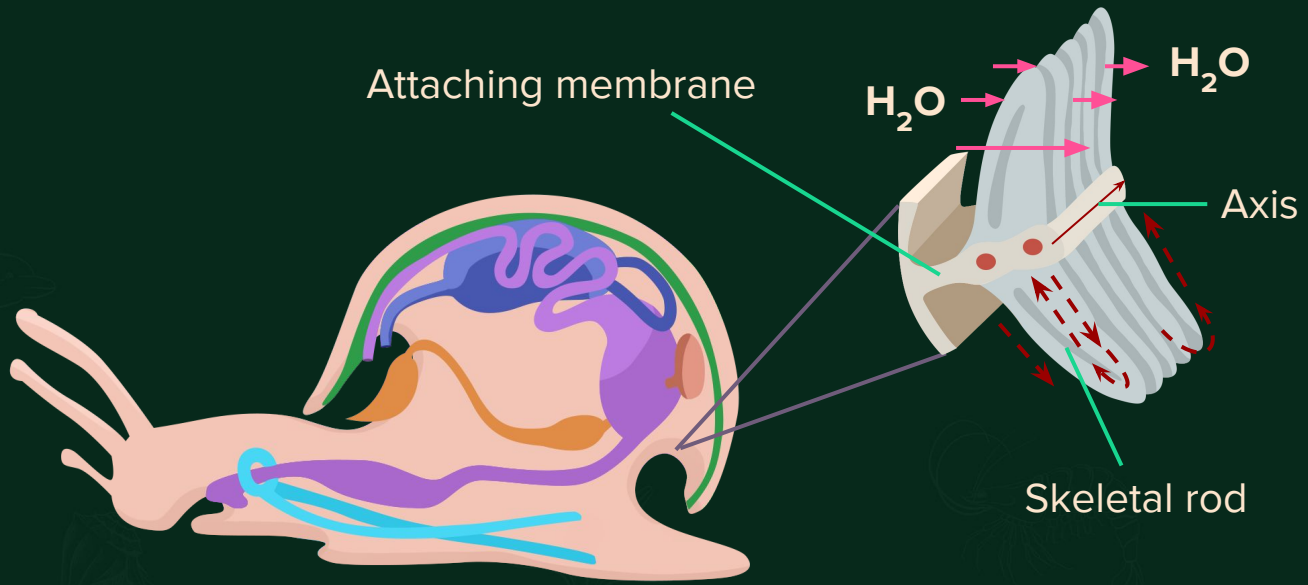
Phylum Mollusca

Head region consists of

- **Tentacles** for feeding and sensory perception
- **Radula** - rasping organ in mouth for feeding

Phylum Mollusca

Gaseous Exchange : Feather-like gills inside the mantle cavity for gaseous exchange and excretory functions



Phylum Mollusca

Reproduction

- Usually **dioecious**

Phylum Mollusca

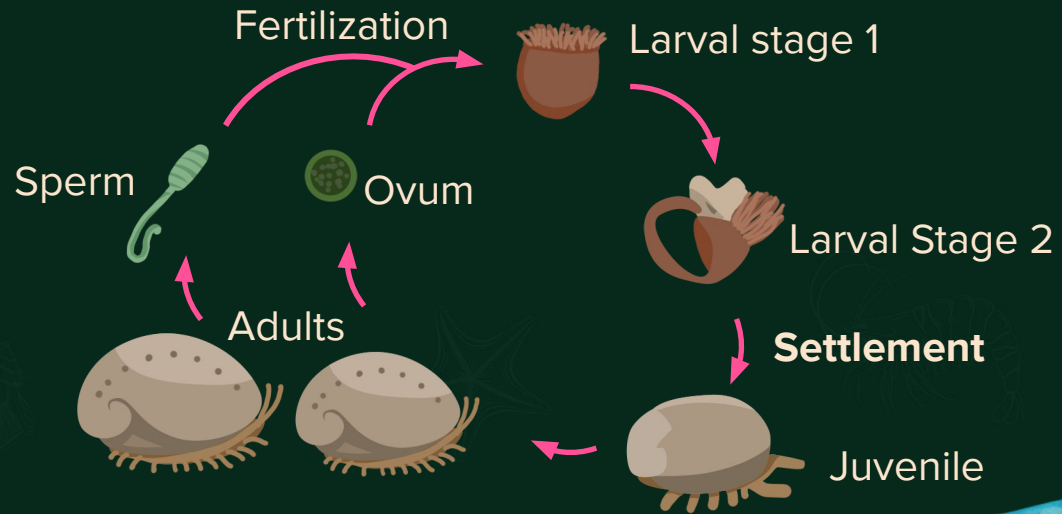
Reproduction

- Usually **dioecious**
- **Oviparous**: Lay eggs

Phylum Mollusca

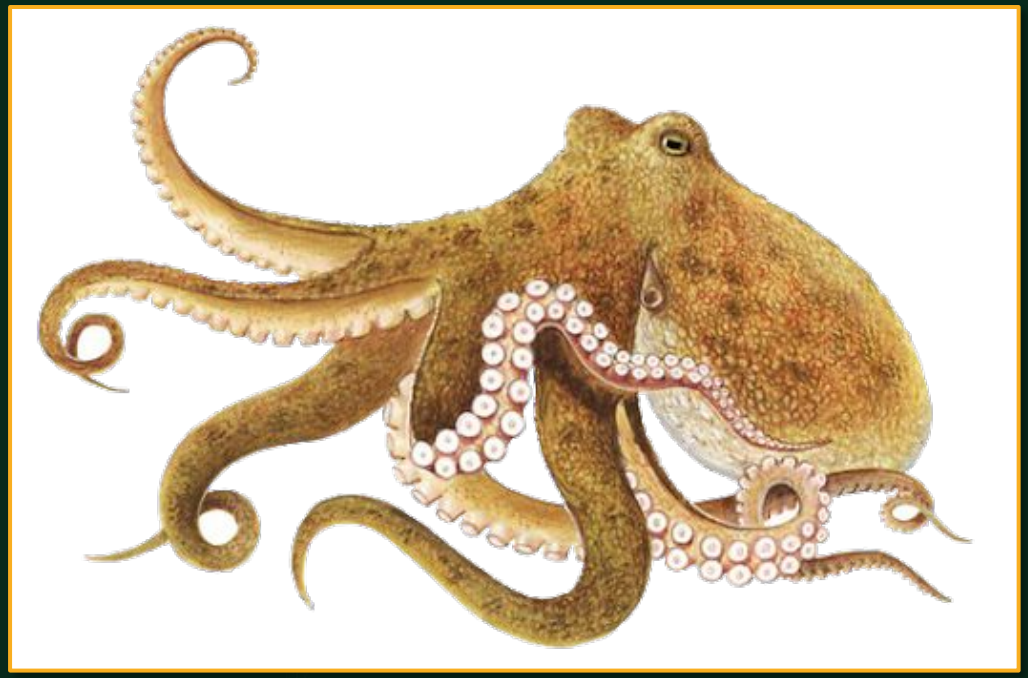
Reproduction

- Usually **dioecious**
- **Oviparous**: Lay eggs
- Development: **Indirect**



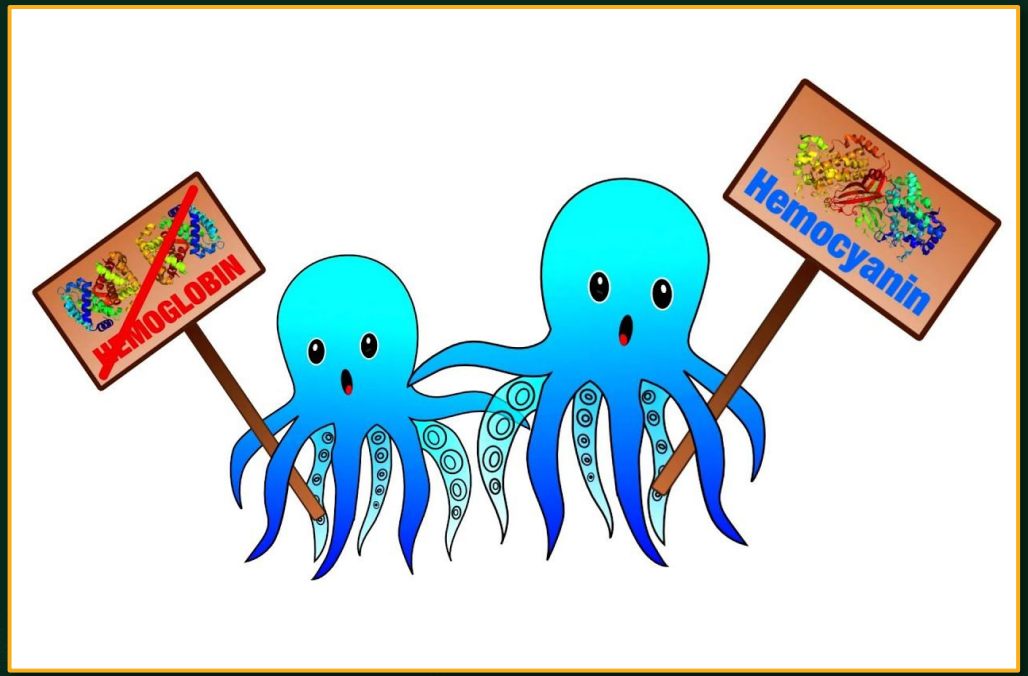
Did You Know?

Octopus has three hearts



Did You Know?

Octopus has blue blood which contain **haemocyanin** instead of **haemoglobin**



Kingdom Animalia

- Kingdom Animalia
  - Porifera
  - Ctenophora
  - Aschelminthes
  - Arthropoda
  - Echinodermata
  - Chordata
    - Coelenterata
    - Platyhelminthes
    - Annelida
    - Mollusca
    - Hemichordata

Puzzle Time: Who Am I ?

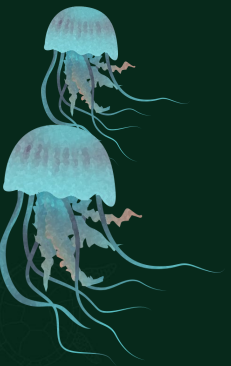
Cut my arms and I will grow it back!

No Brains!

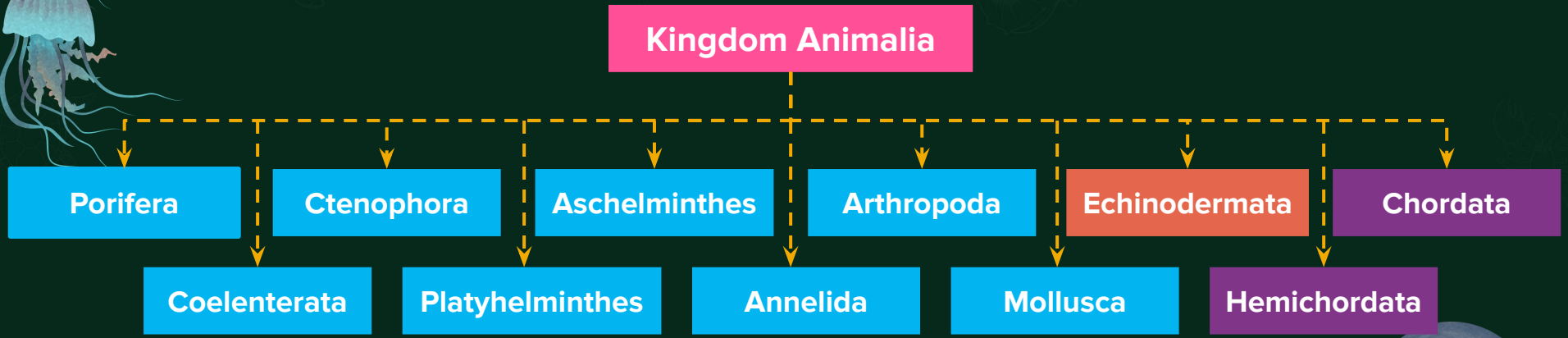
No Blood!

Put me in normal water and I will burst out before your eyes!

I can send my tummy out, fill it with food and take it back!!



Kingdom Animalia



Phylum Echinodermata

Asterias
Starfish

Ophiura
Brittle star

Antedon
Sea Lily

Phylum Echinodermata

Echinus
Sea Urchin

Cucumaria
Sea cucumber

Phylum Echinodermata

ECHINOS

Porcupine

DERMA

Skin

Phylum Echinodermata

Habit

- Exclusively **marine**
- Unique phyla with **stenohaline** members

Antedon
Sea lily

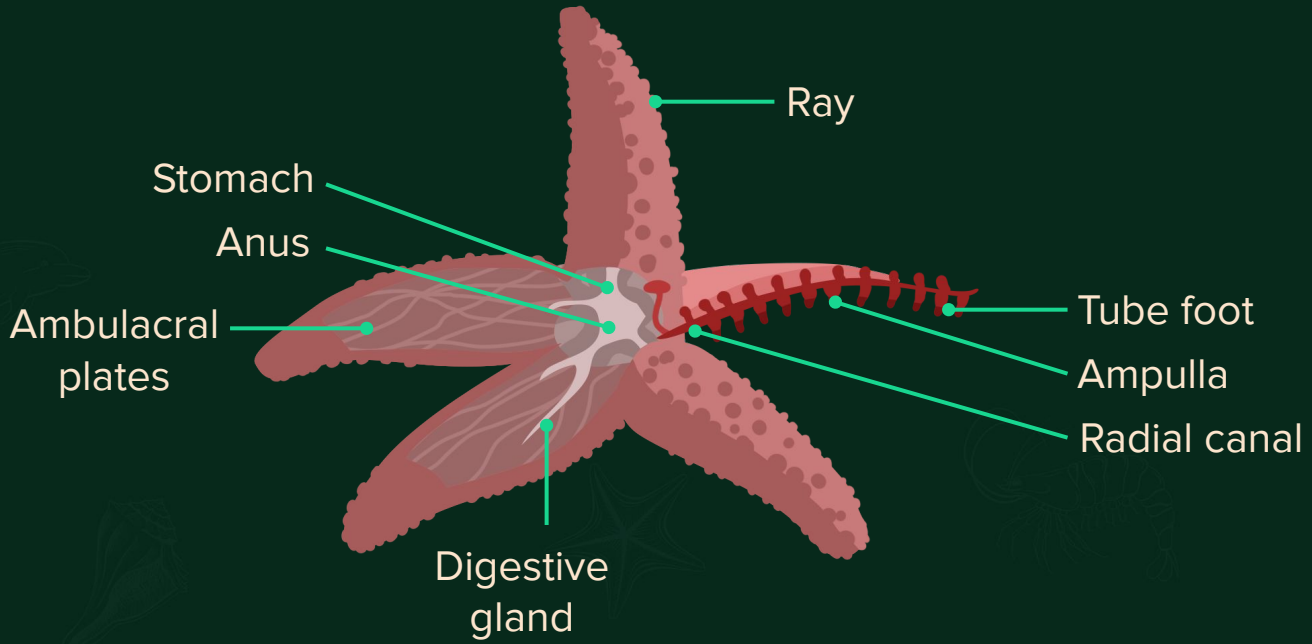
Did You Know?

Putting a sea cucumber in fresh water causes it to explode

Phylum Echinodermata

Body Organisation

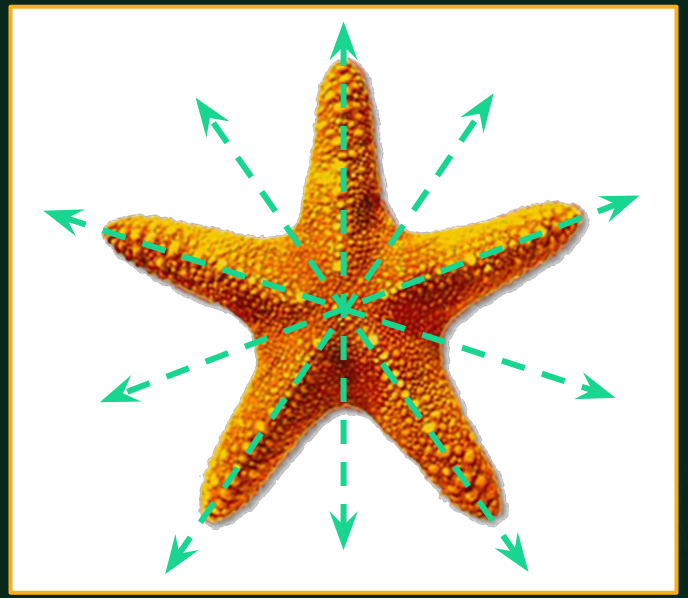
- Organ system level



Phylum Echinodermata

Symmetry

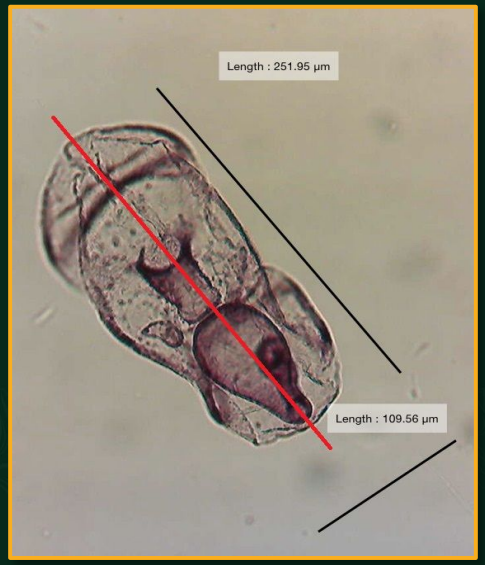
- Adults: **Radial** symmetry



Phylum Echinodermata

Symmetry

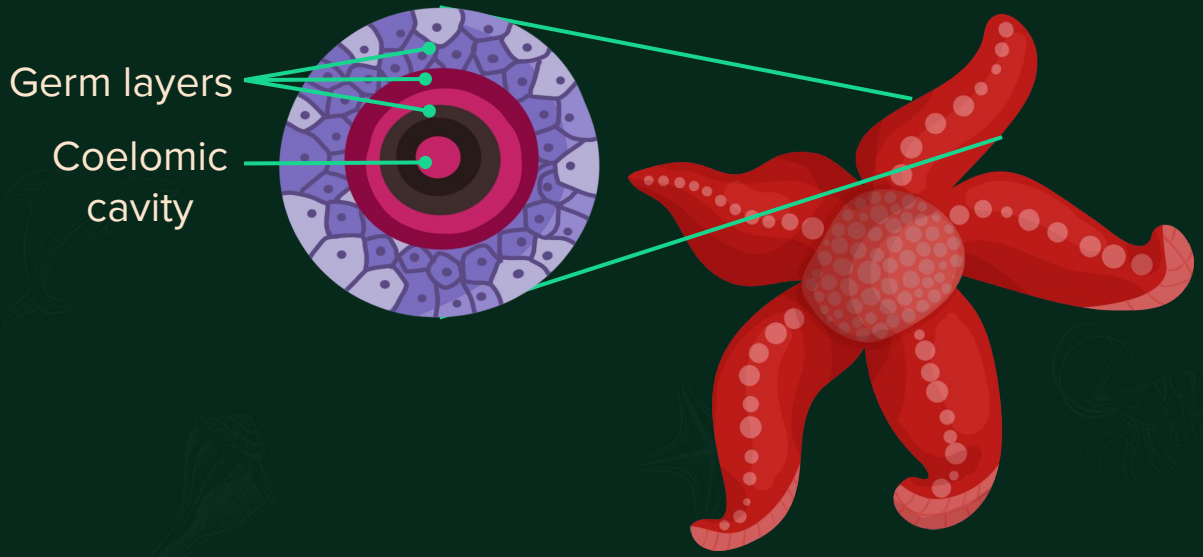
- Adults: **Radial** symmetry
- Larvae: **Bilaterally** symmetrical



Phylum Echinodermata

Germ Layers

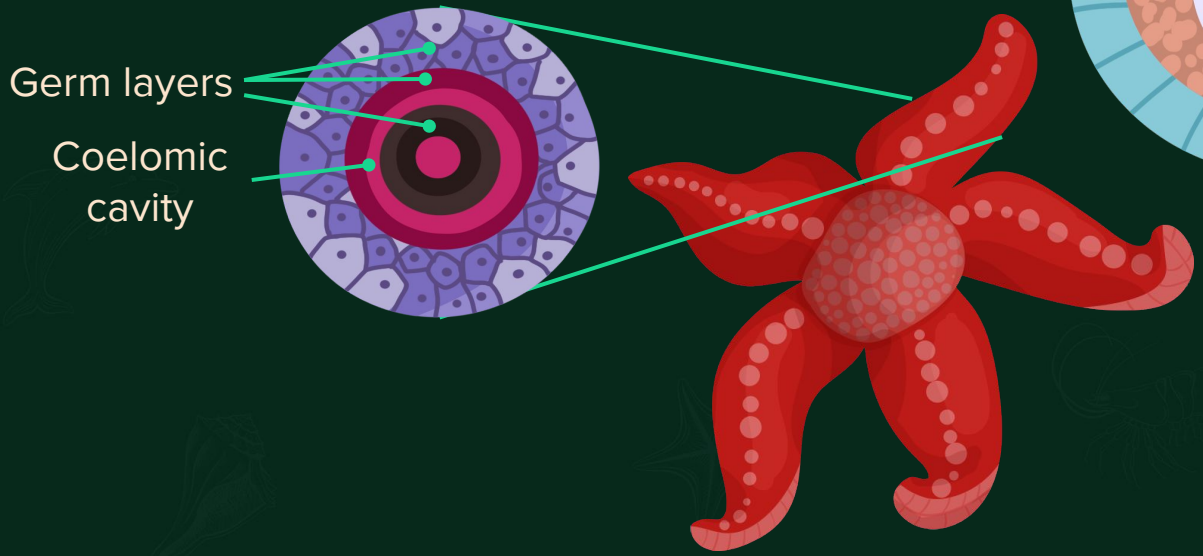
- Triploblastic

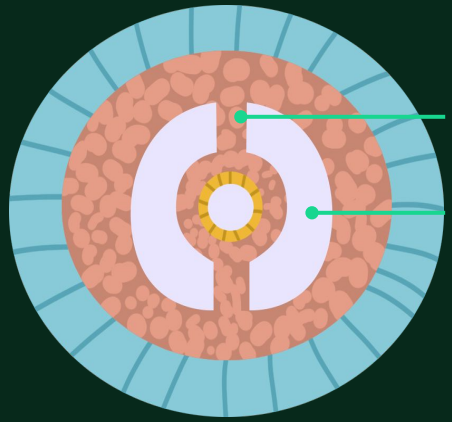


Phylum Echinodermata

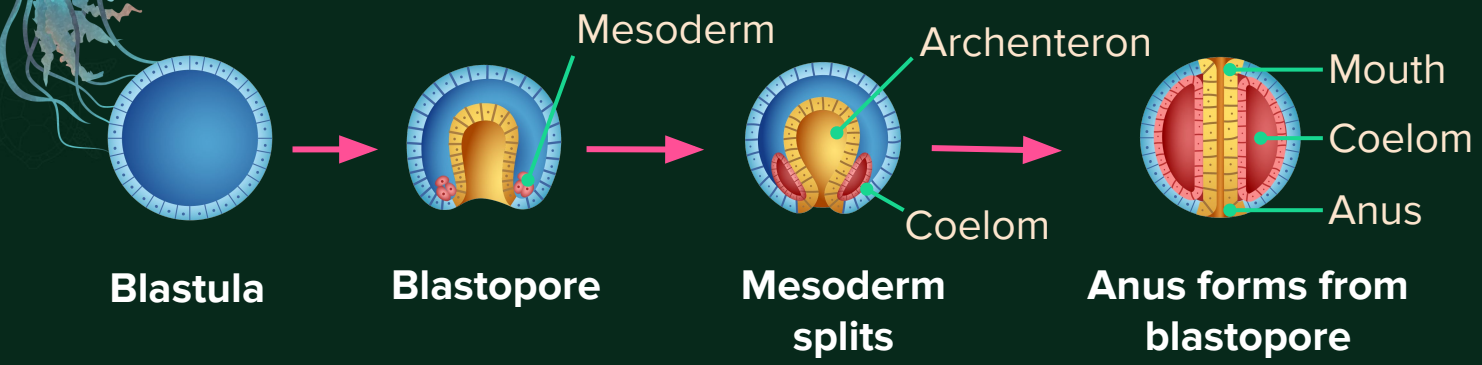
Germ Layers

- Triploblastic
- Coelomate





Phylum Echinodermata



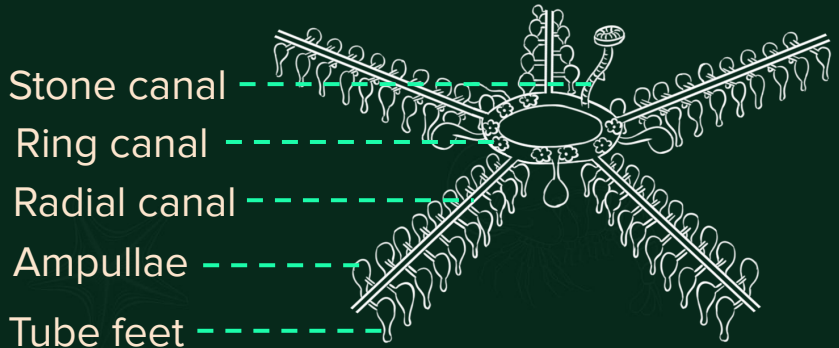
Blastula → **Blastopore** → **Mesoderm splits** → **Anus forms from blastopore**

Echinoderms are deuterostomes

Phylum Echinodermata

Circulation: Water Vascular System

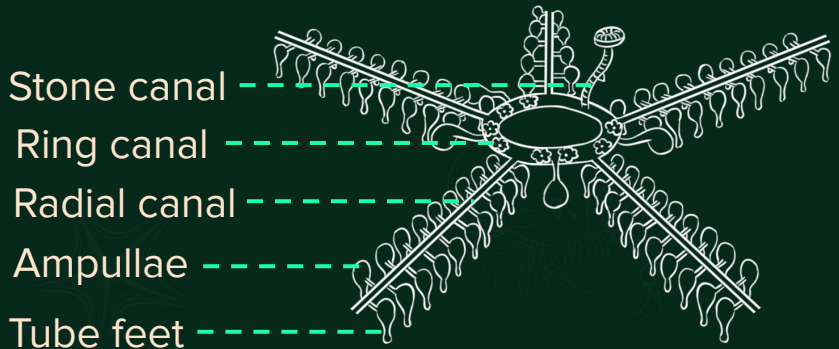
- Unique Echinoderm Feature



Phylum Echinodermata

Circulation: Water Vascular System

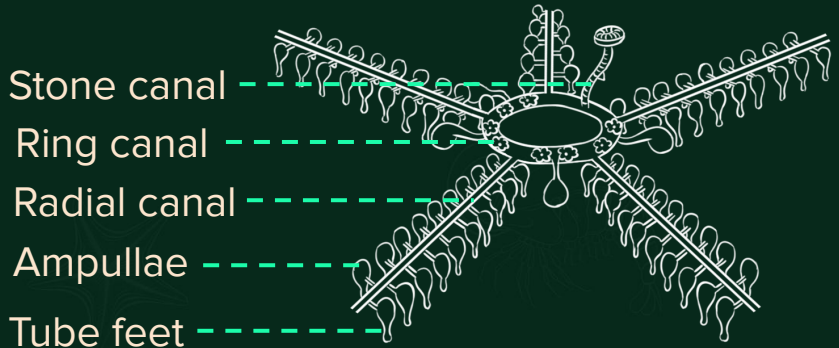
- Unique Echinoderm Feature
- Function:
  - Locomotion



Phylum Echinodermata

Circulation: Water Vascular System

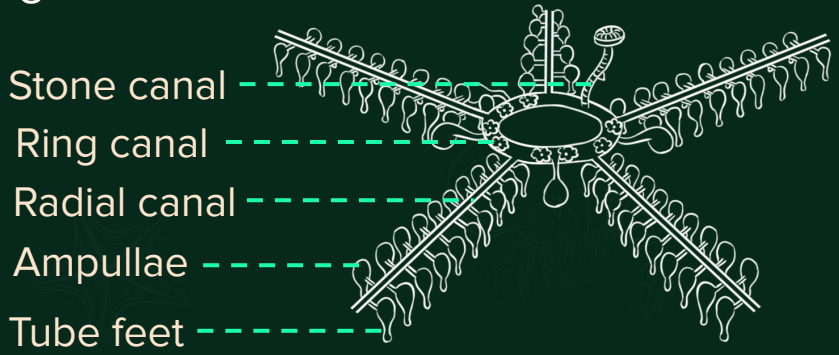
- Unique Echinoderm Feature
- Function:
  - Locomotion
  - Food transport



Phylum Echinodermata

Circulation: Water Vascular System

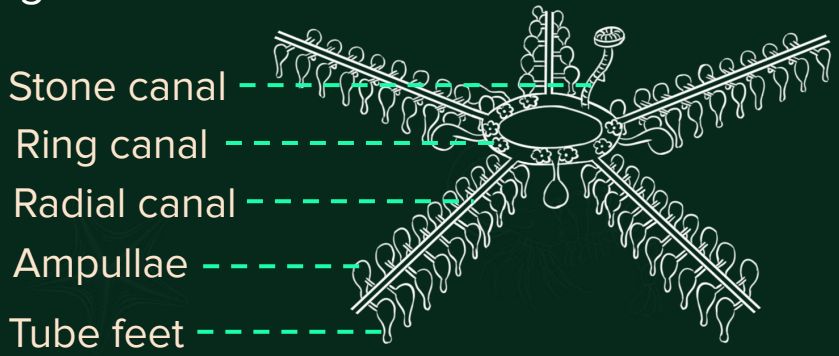
- Unique Echinoderm Feature
- Function:
  - Locomotion
  - Food transport
  - Food capturing

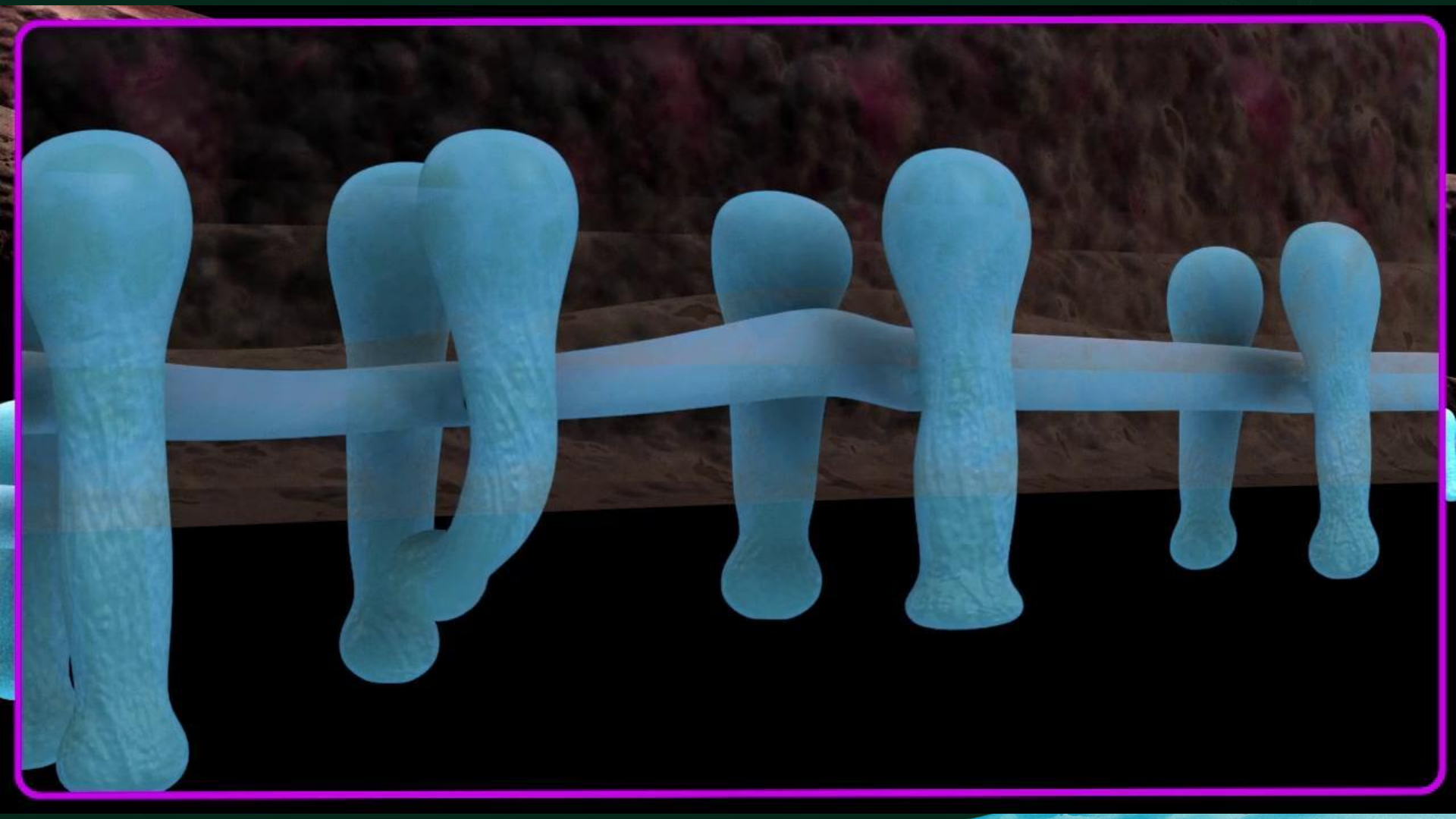


Phylum Echinodermata

Circulation: Water Vascular System

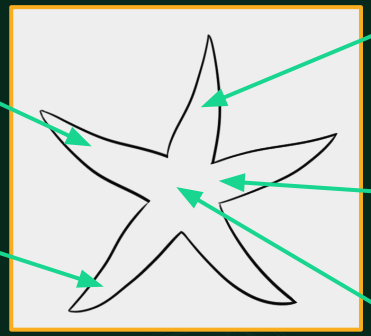
- Unique Echinoderm Feature
- Function:
  - Locomotion
  - Food transport
  - Food capturing
  - Respiration





Phylum Echinodermata

- Digestive system is **complete**
  - Mouth: Lower side (Ventral)
  - Anus: Upper side (Dorsal)



Sharp, bony spine and grasping pincers covering the body

Eyespot at tip of each arm

Tiny, hollow, finger-like gills on the body

Arm or ray covered with tough skin

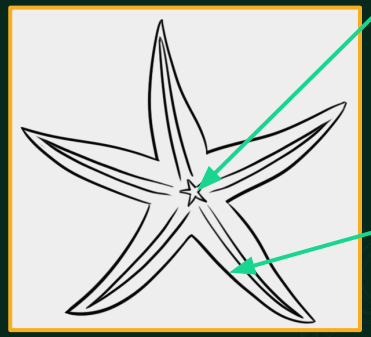
The body, a flat disk at the center

Top Side

Phylum Echinodermata

- Digestive system is complete
  - Mouth: Lower side (Ventral)
  - Anus: Upper side (Dorsal)

Suckers at tip of tube feet



Mouth with a stomach that is pushed out to get food

Ambulacral groove with 2-4 rows of tube feet

Bottom Side


No Excretory System !

Phylum Echinodermata

Reproduction

- Sexual reproduction

Phylum Echinodermata

Reproduction

- Sexual reproduction
- Separate sexes present

Phylum Echinodermata

Reproduction

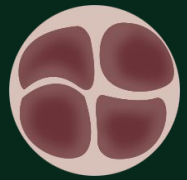
- Sexual reproduction
- Separate sexes
- **External fertilisation**: Both gametes are released into water

Phylum Echinodermata

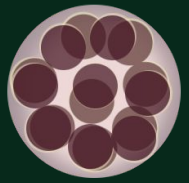
Indirect Development

- Larval stage involved
- Larvae are free swimming


Zygote


4 - cells


8 - cells


Morula


Free Swimming Larvae

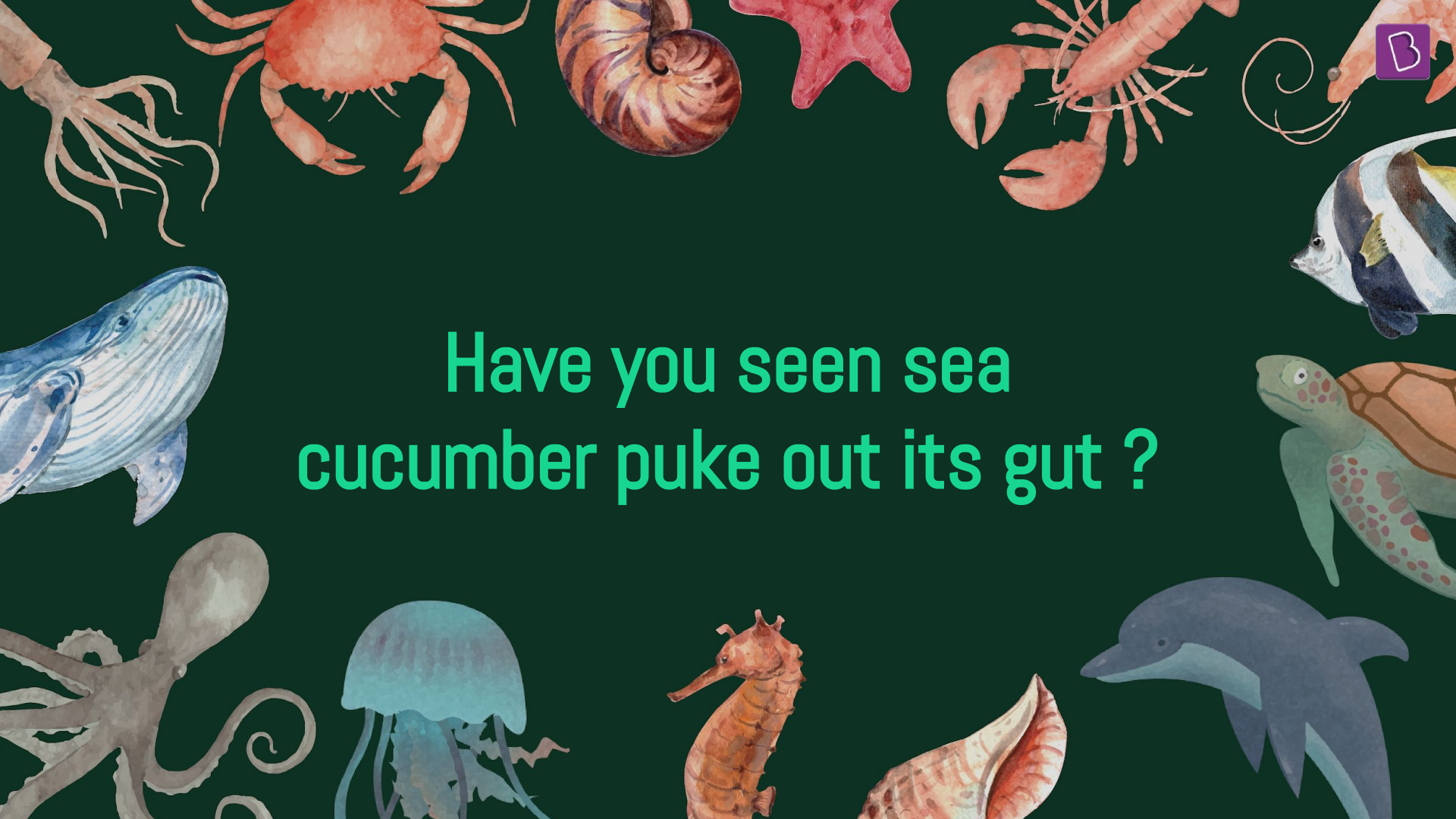

Blastula


Gastrula


Ciliated gastrula


Larva

Developmental Stages of Starfish (Echinoderm)


Have you seen sea
cucumber puke out its gut ?

Phylum Echinodermata

Kingdom Animalia

- Kingdom Animalia
  - Porifera
  - Ctenophora
  - Aschelminthes
  - Arthropoda
  - Echinodermata
  - Chordata
    - Coelenterata
    - Platyhelminthes
    - Annelida
    - Mollusca
    - Hemichordata


KEEP
LEARNING