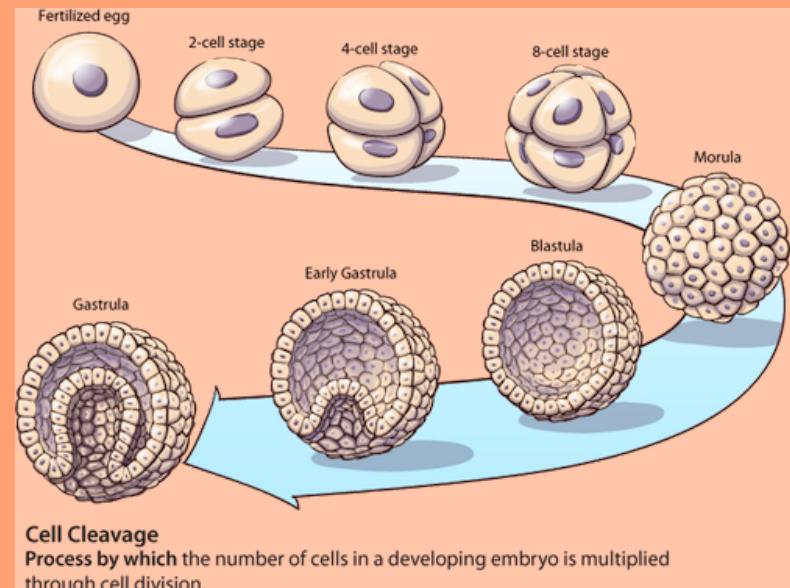


Kingdom Animalia



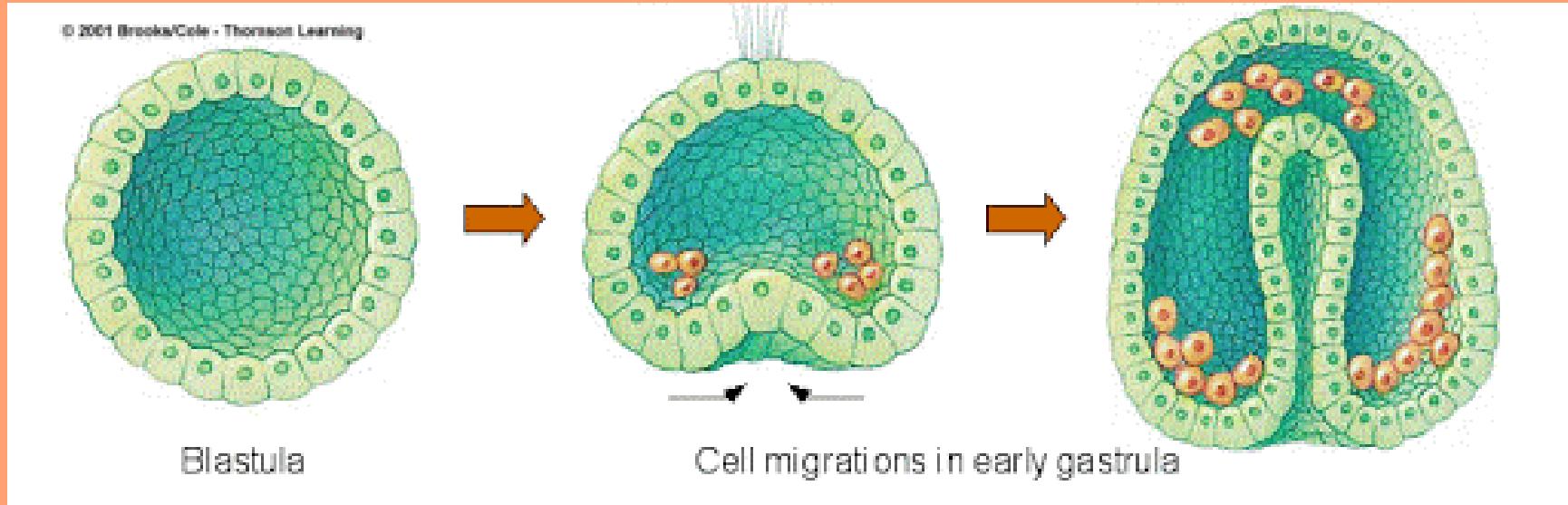
Characteristics of the Kingdom Animalia

- Animals are eukaryotic
- multicellular
- They are heterotrophic
- generally digesting food in an internal chamber
- lacking rigid cell walls
- Motile
- embryos pass through a blastula stage.

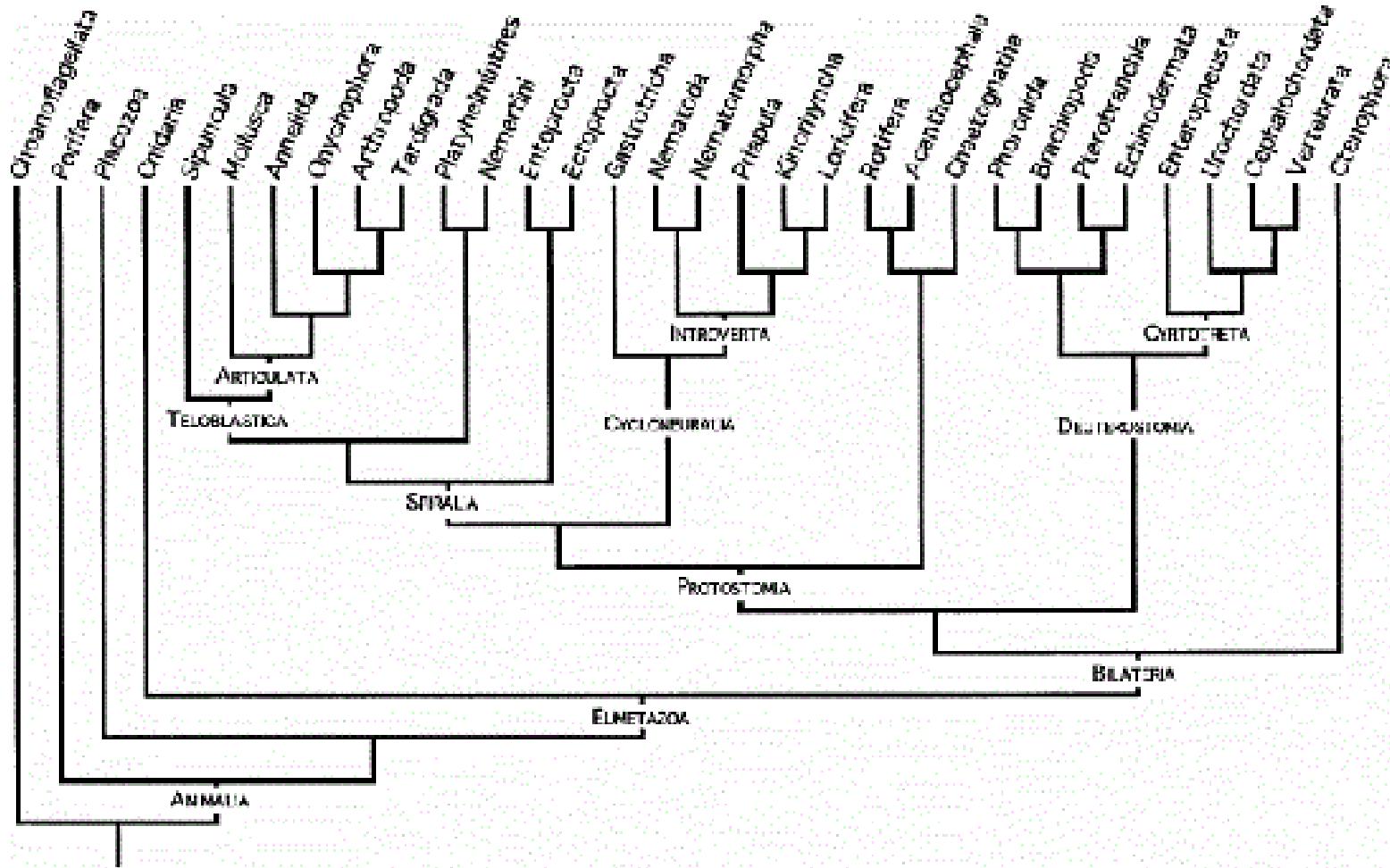


Embryonic development:

- Sphere of cells is a blastula
- During gastrulation, some cells move inward
- Produces a three-layer embryo



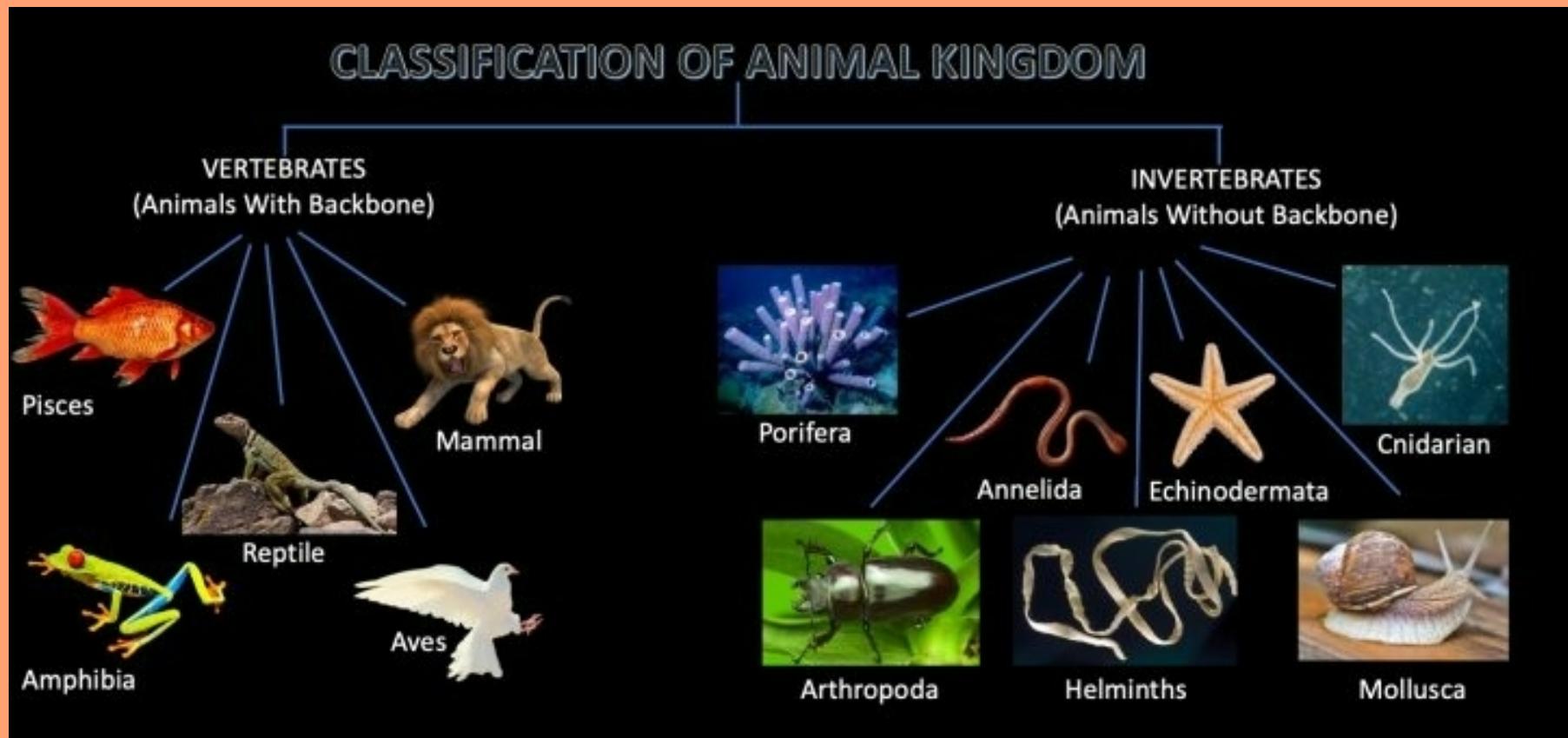
Animal Diversity



- Depending on the authority, the number of phyla described in Kingdom Animalia is between 32-35.
 - We will focus on the 9 most common phyla.

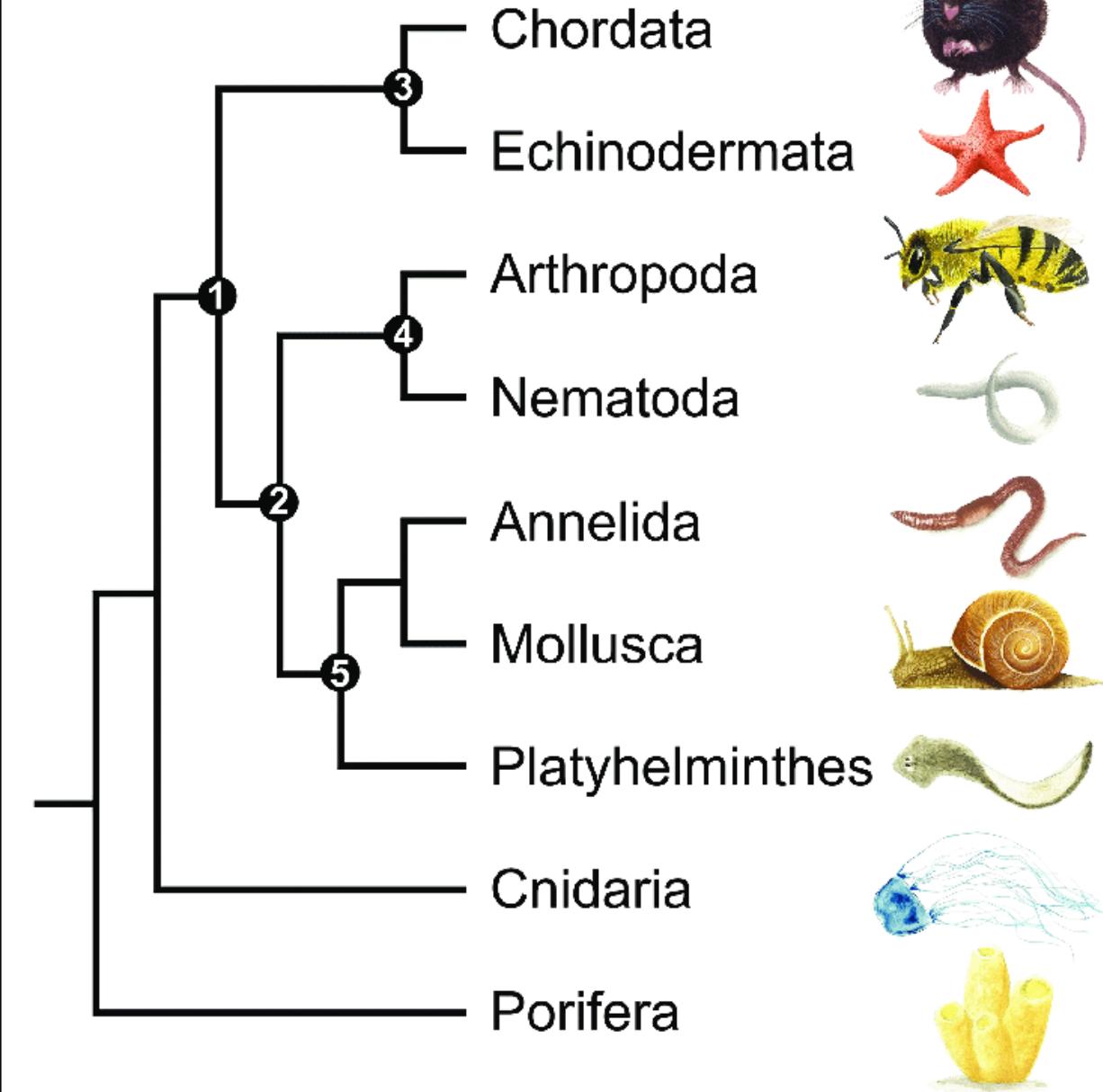
Animal Diversity

- Zoologists split Animals up between those that have a backbone (**vertebrate** animals) and those that do not (**invertebrate** animals).



Animal Diversity

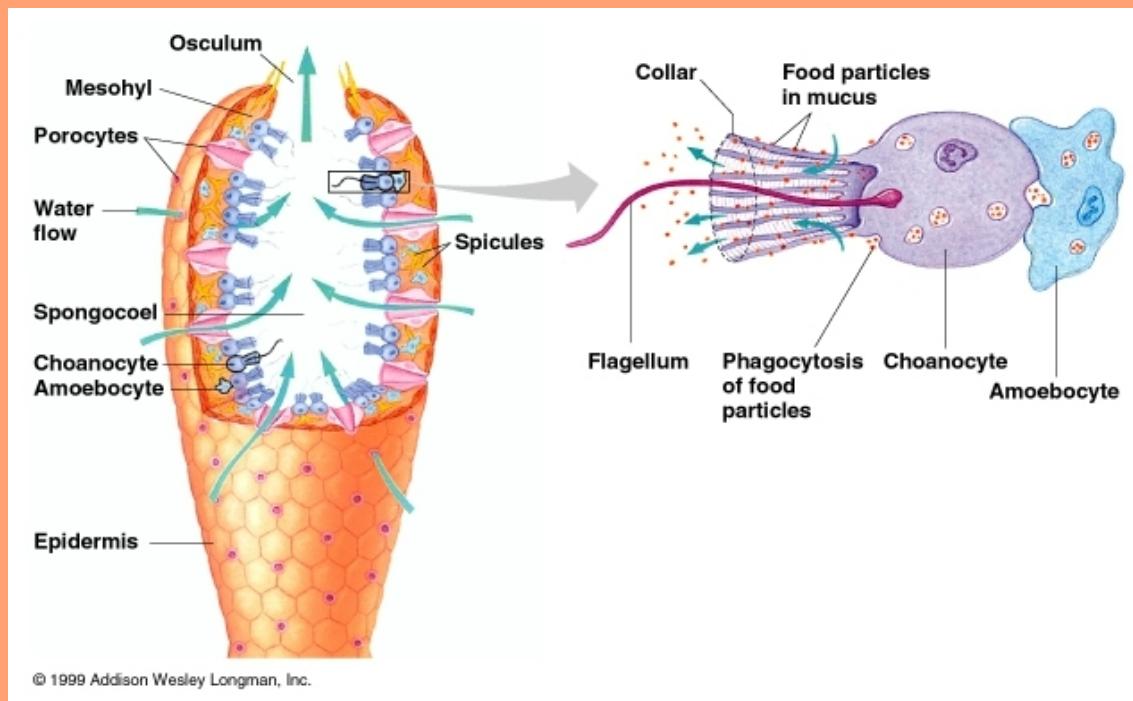
Nine of the more common animal phyla



Phylum Porifera

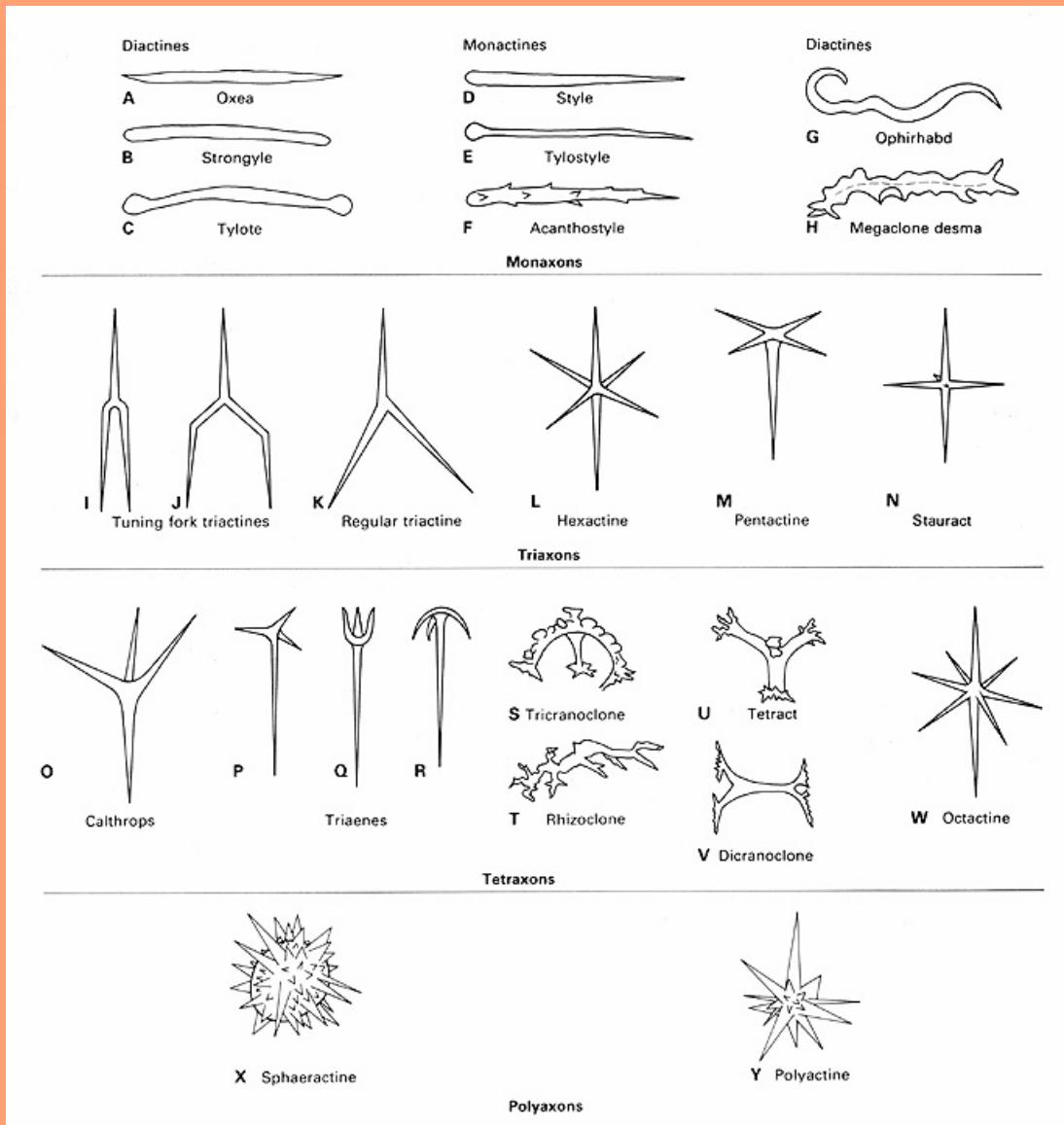
Etymology:- From the Latin porus for pore and Ferre to bear.

- No definite symmetry.
- Few tissues, no organs.
- No true body cavity.
- All are sessile, (live attached to something as an adult).
- Reproduce sexually or asexually
- Has no nervous system.
- Has a distinct larval stage which is planktonic.
- Lives in aquatic environments, mostly marine.
- All are filter feeders.
- Pull water in pores and out through an osculum.
- Use collar cells to create a current and capture food.
- Often have a skeleton of spicules made of glass, calcium or protein.



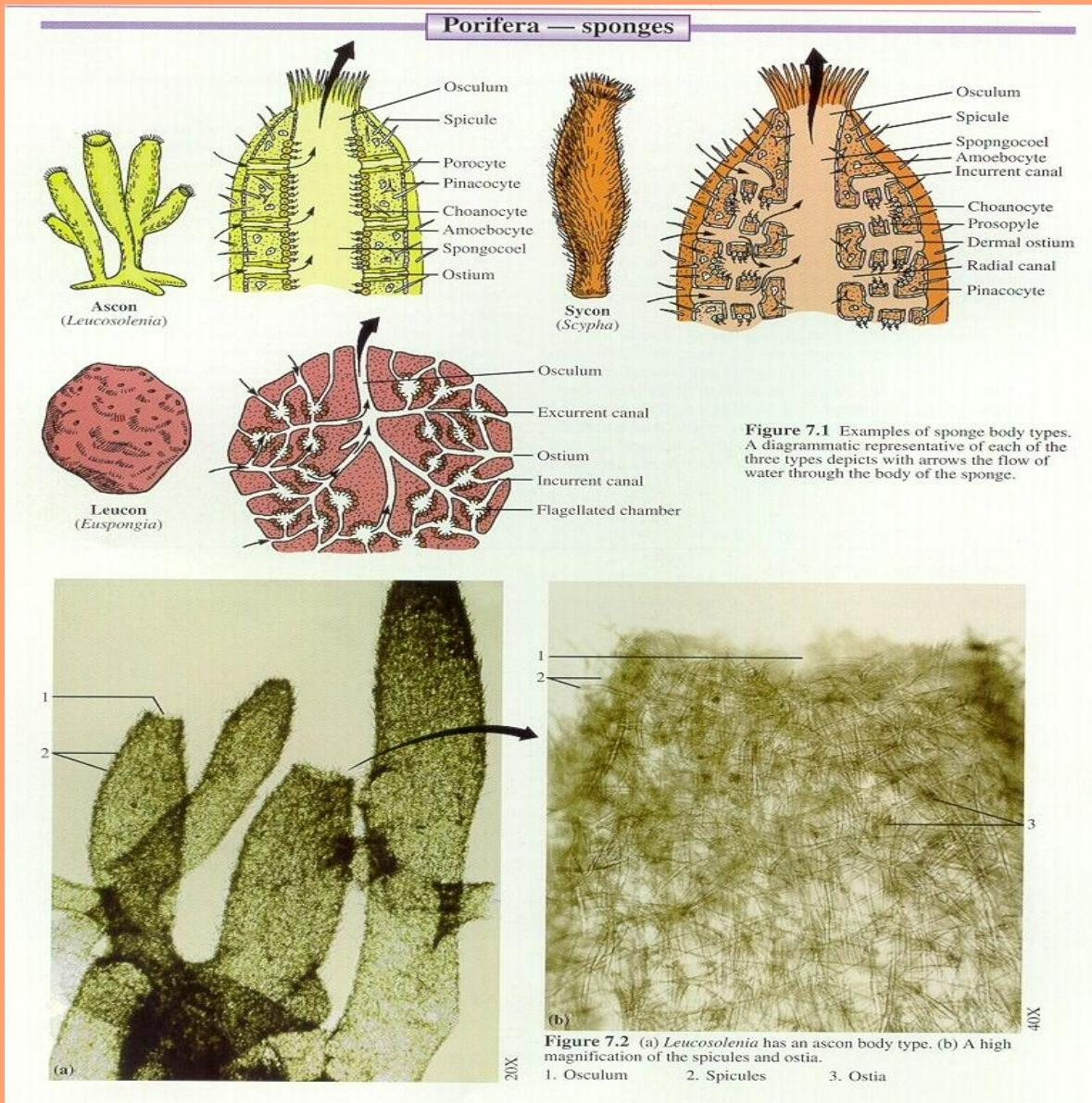
Phylum Porifera

Species can be identified by their spicule shapes



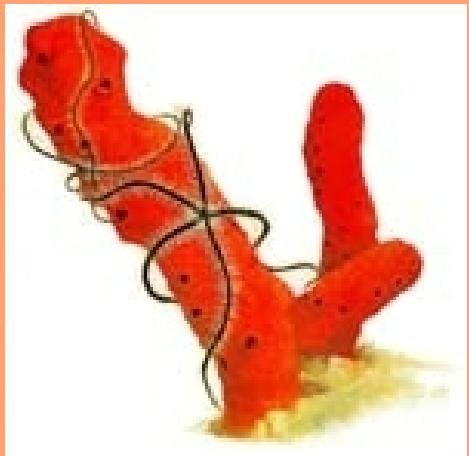
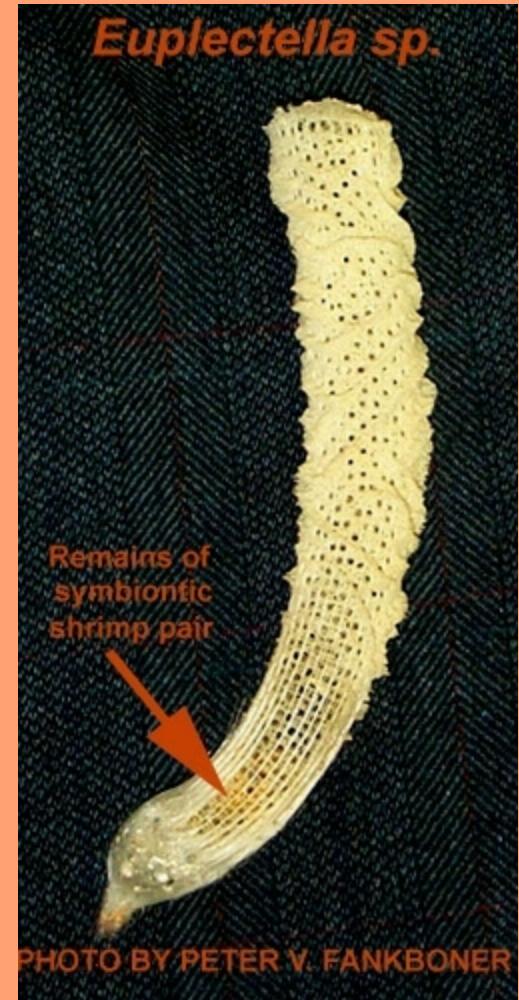
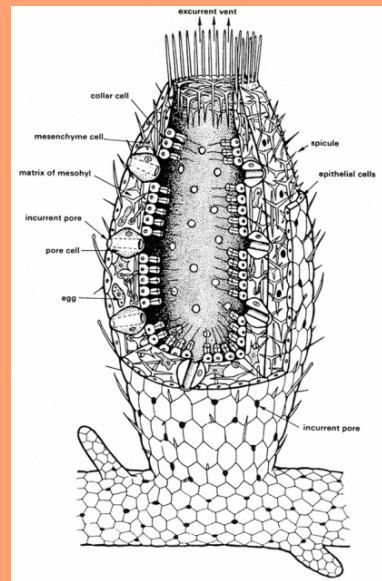
Phylum Porifera

The flow of water from pores to osculum vary from species to species

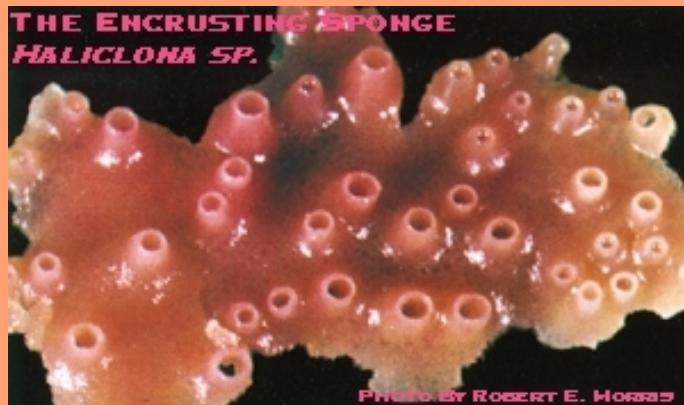


Phylum Porifera

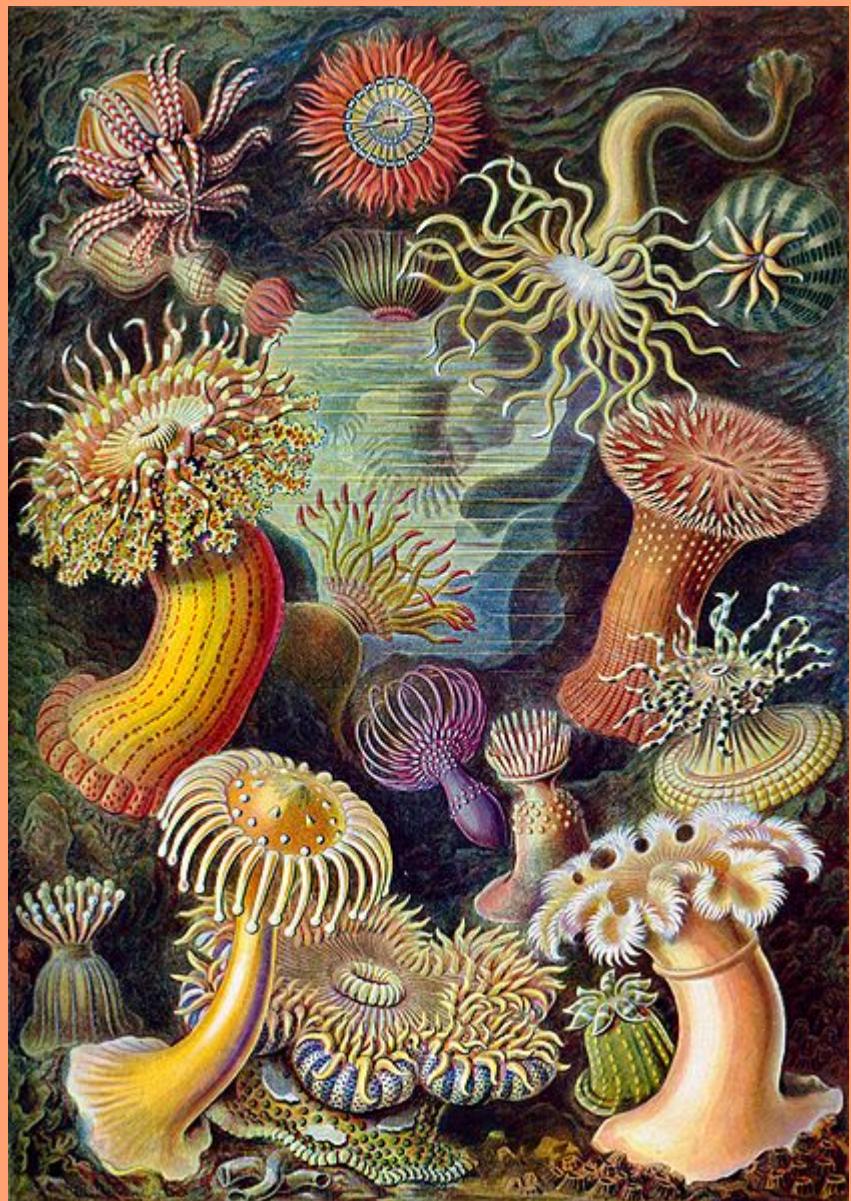
Species vary in shape and size



Sponge
reaggregation



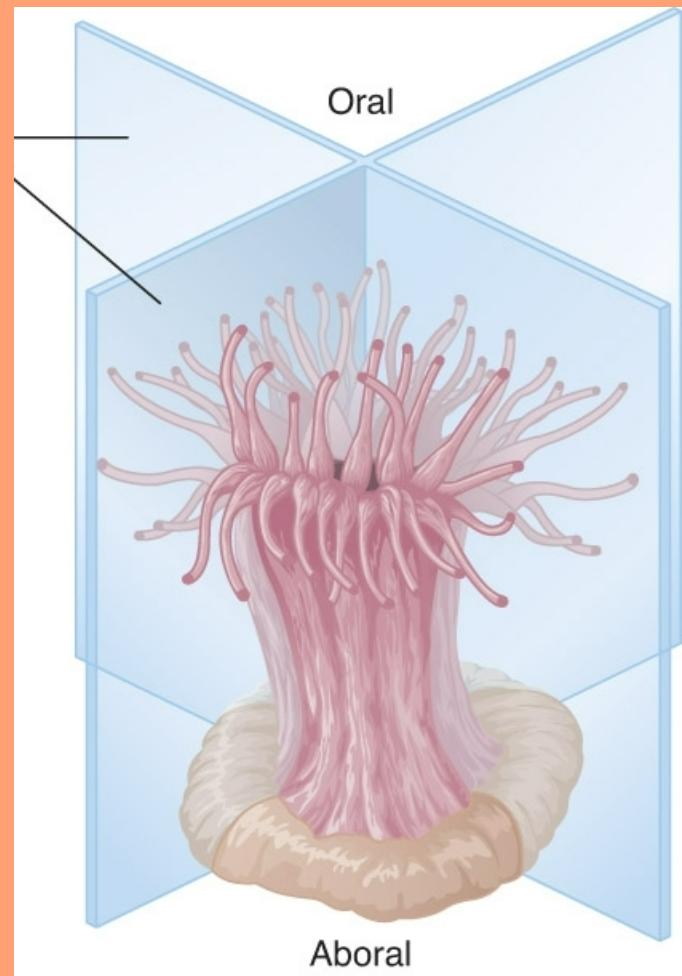
Phylum Cnidaria



Phylum Cnidaria

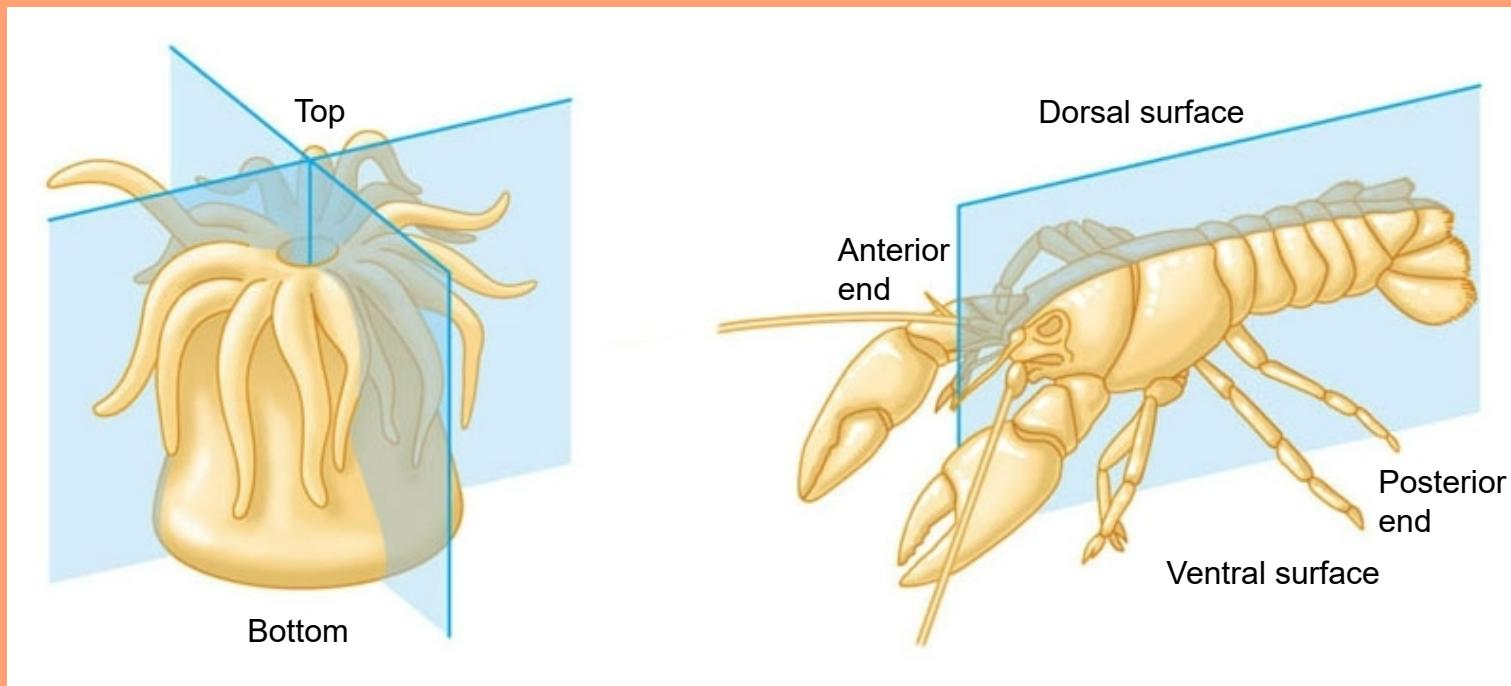
Etymology:- From the Greek knide for nettle.

- Radially Symmetrical.
- Few tissues, some organs.
- **Gastrovascular cavity** (a mouth leading to a digestive sac).
- Two different forms exist, **medusa** and **polyp**
- Reproduction is asexual or sexual.
- Has a simple net like nervous system.
- Has a distinct larval stage which is planktonic.
- Lives in aquatic environments, mostly marine.
- Mostly carnivorous otherwise filter feeders.
- May have a minimal skeleton of chiton or calcium carbonate.
- **Tentacles** surrounding the mouth with stinging cells (**cnidocytes**)



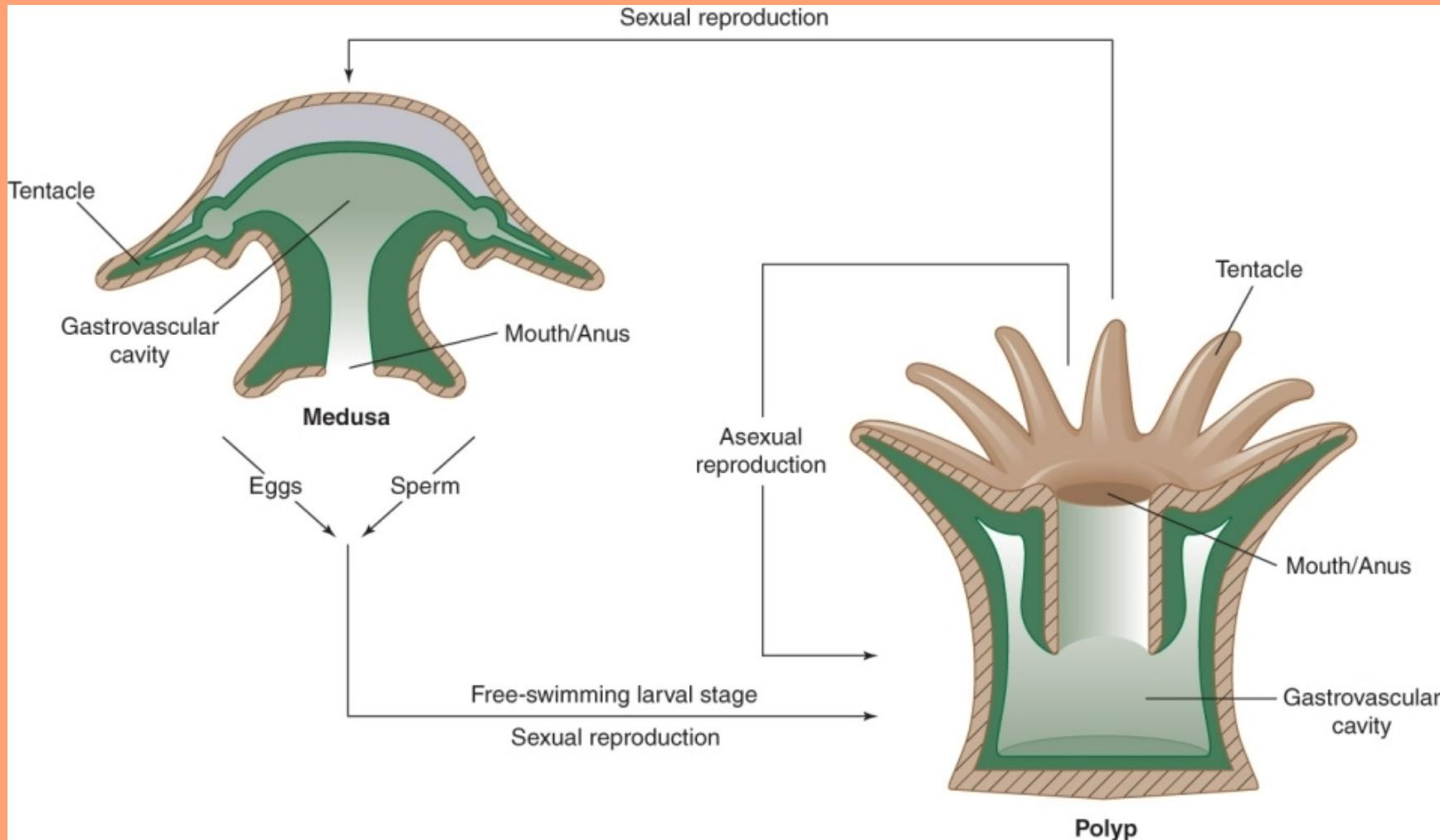
Symmetry of Animals

- Radial or Bilateral



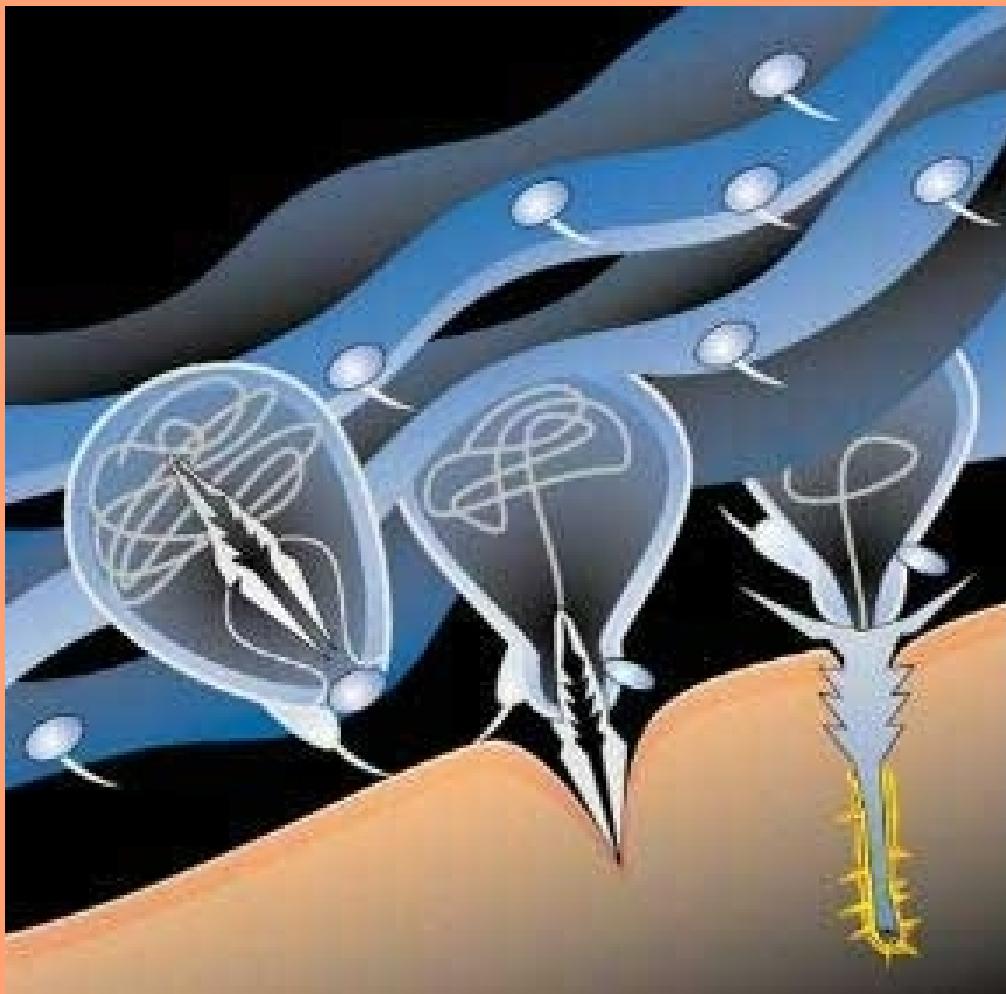
Phylum Cnidaria

Many species alternate between a medusa stage and a polyp stage



Phylum Cnidaria

- Stinging cells are called cnidocytes



Phylum Cnidaria

- Species Diversity



<http://www.youtube.com/watch?v=4hc16ejBkjM>
jellyfish

Phylum Cnidaria

- Species Diversity





Phylum Cnidaria

- Species Diversity



Phylum Platyhelminthes

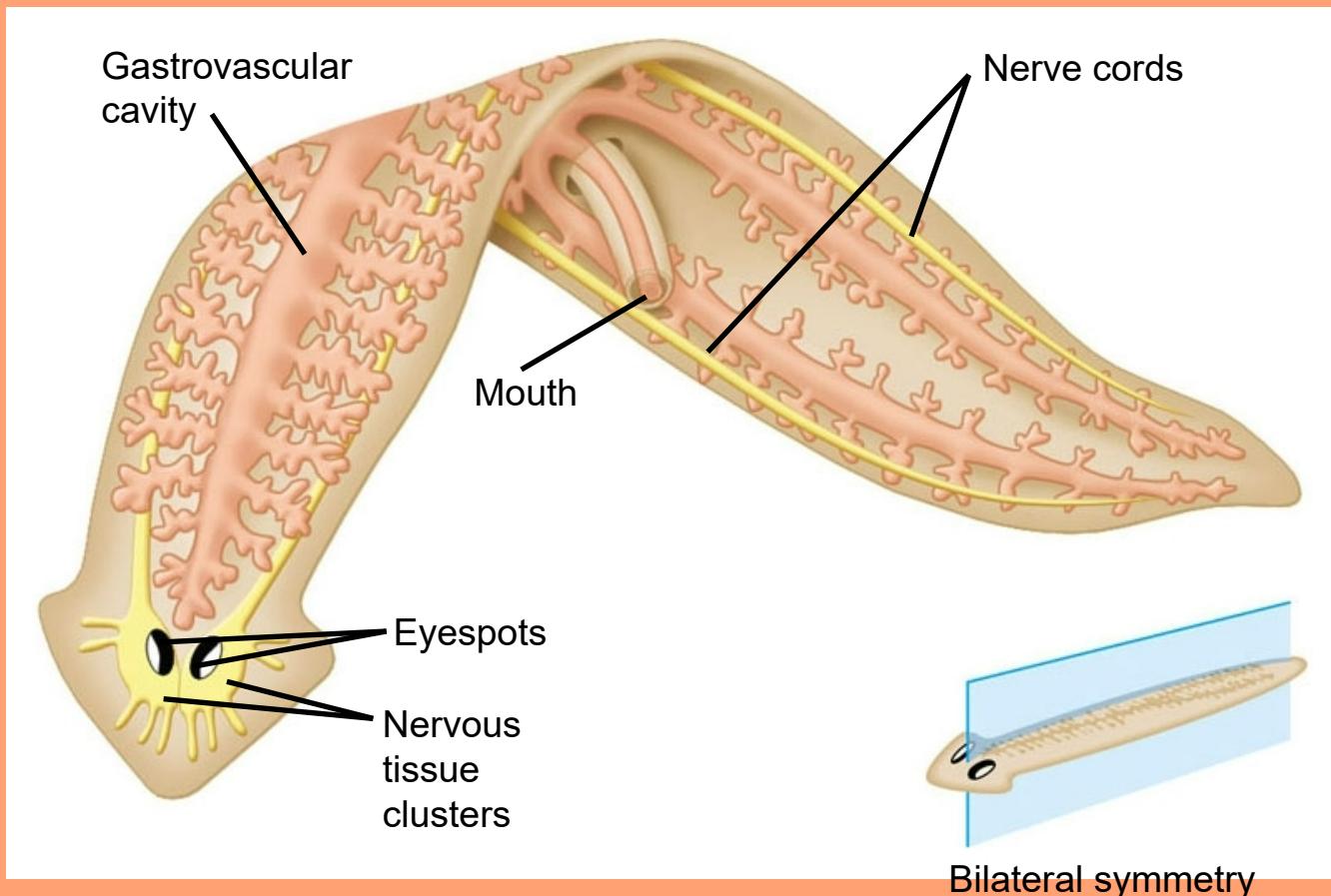
Etymology:- From the Greek *platy* for flat and *helminthes* for worms, hence Flat Worms.

- **Bilaterally symmetrical.**
- Body having 3 layers of tissues with organs
- Body contains no internal cavity.
- **Gastrovascular cavity**
- Has a nervous system of longitudinal fibres.
Sensory systems concentrated in the **head**
- Dorsoventrally flattened, ventral side covered with **cilia** for movement.
- Reproduction mostly sexual as hermaphrodites.
- Mostly they feed on animals and other smaller life forms.
- Some species occur in all major habitats, including many as parasites of other animals.



Phylum Platyhelminthes

- A planarian has a *gastrovascular cavity*
 - And a simple nervous system

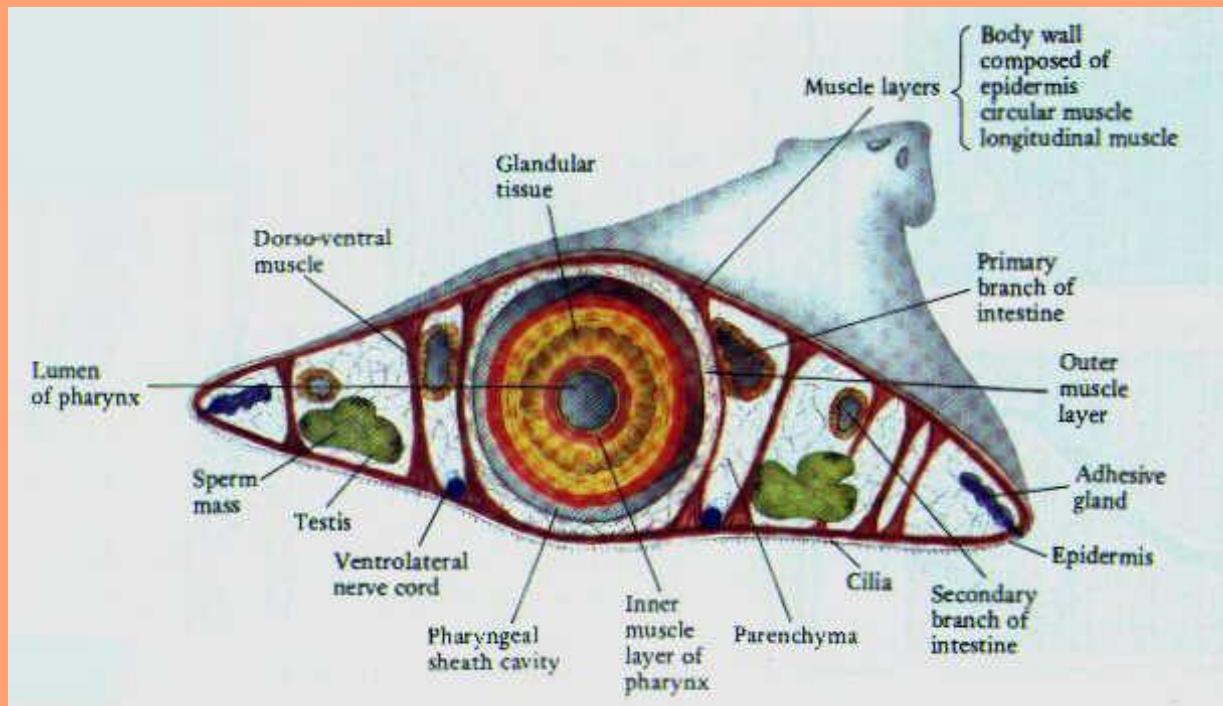


[Marine flatworm](#)

[Terrestrial Flatworm](#)

Phylum Platyhelminthes

Internal anatomy



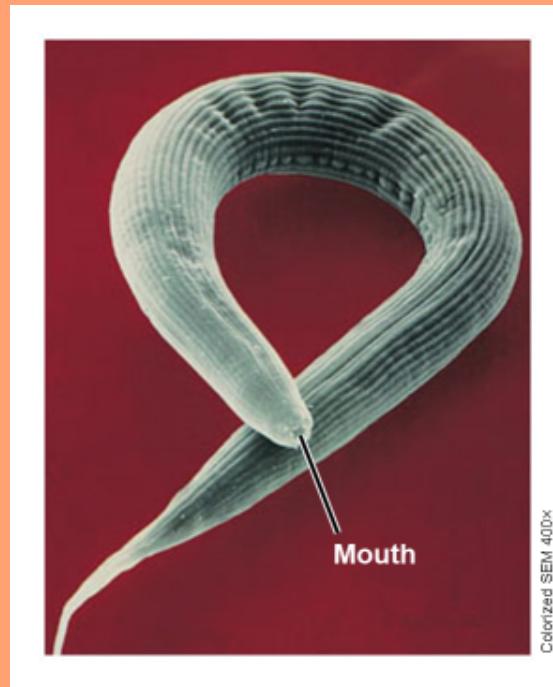
[Planaria](#)

platyhelminthes

Phylum Nematoda

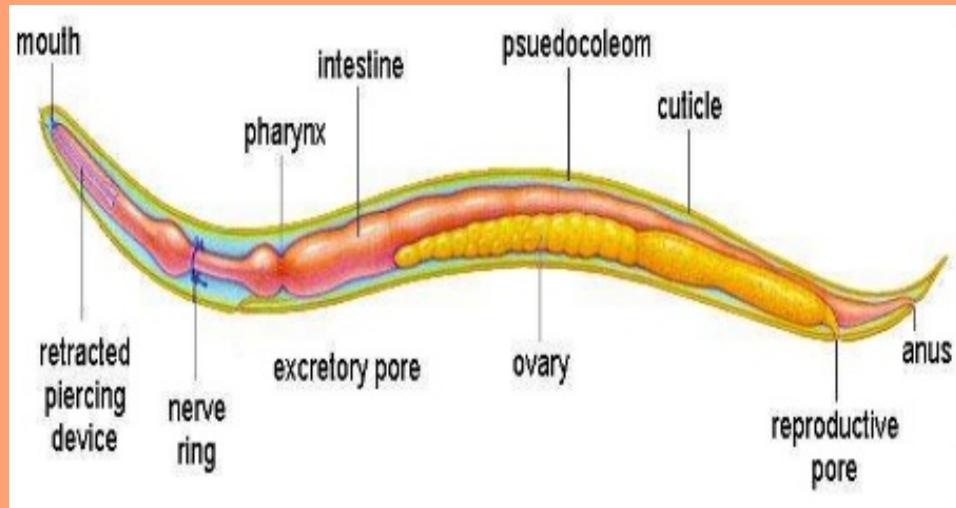
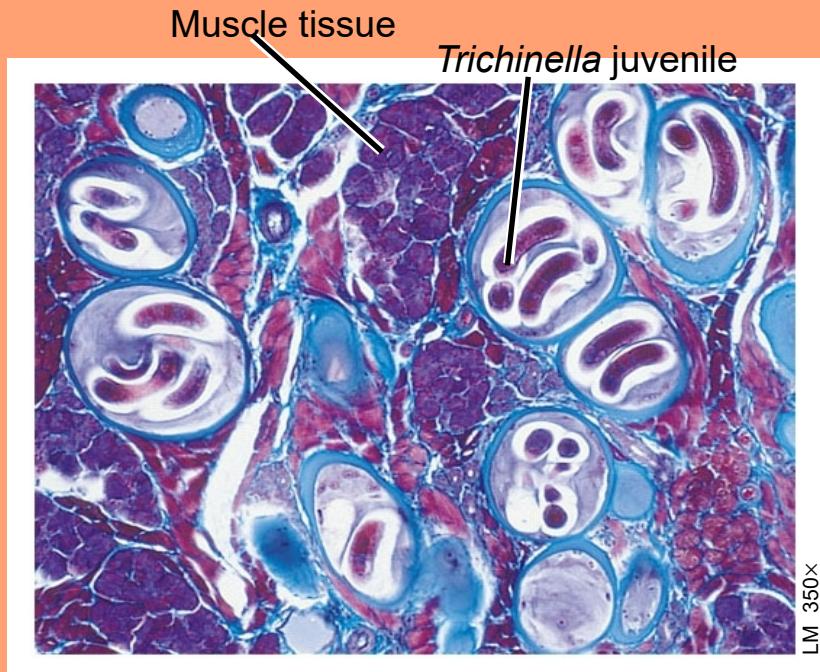
Etymology:- From the Greek Nema for Thread and Eidos for form.

- Bilaterally symmetrical
- Body has more than two cell layers, tissues and organs.
- Body cavity is a pseudocoel, body fluid under high pressure.
- Alimentary canal.
- Body covered in a complex cuticle.
- Has a nervous system
- Has no circulatory system
- Reproduction sexual.
- Feed on just about everything.
- Live just about everywhere, many species are endoparasites.

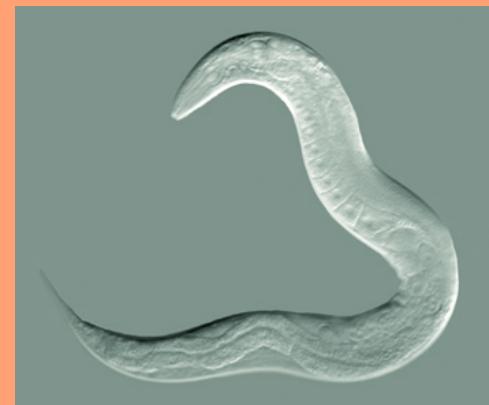


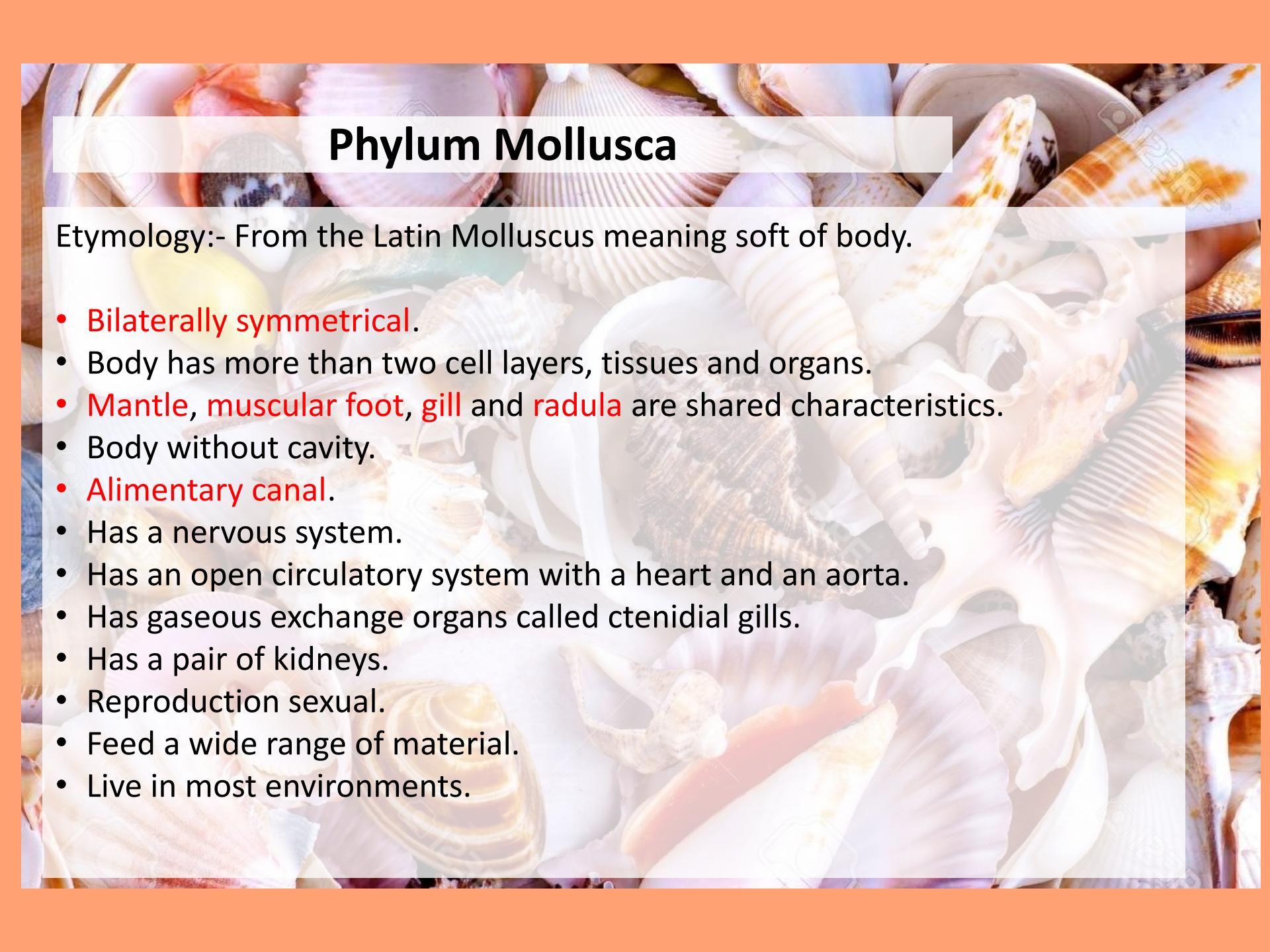
Phylum Nematoda

- Species Diversity



Nematode





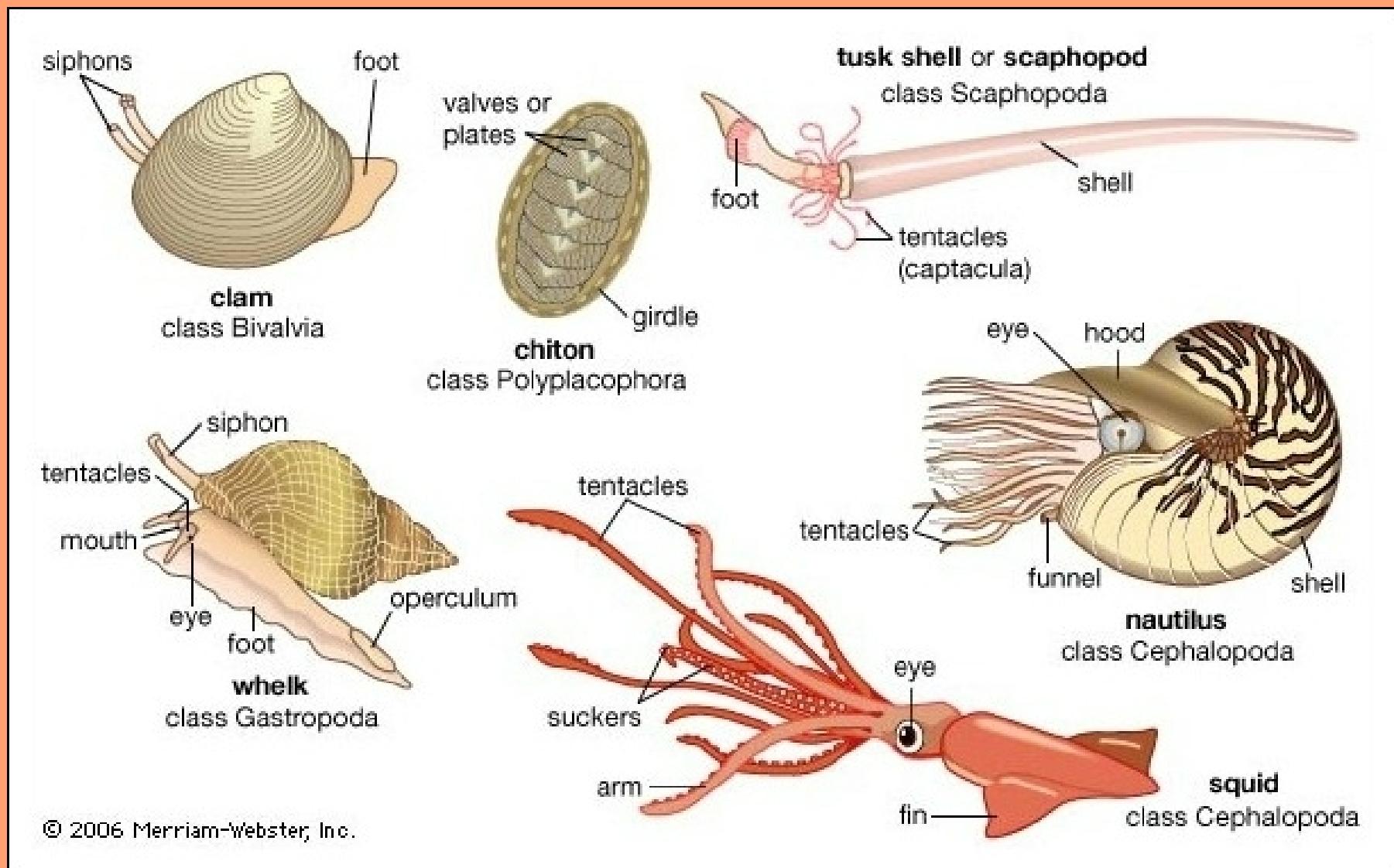
Phylum Mollusca

Etymology:- From the Latin **Molluscus** meaning soft of body.

- **Bilaterally symmetrical.**
- Body has more than two cell layers, tissues and organs.
- **Mantle, muscular foot, gill** and **radula** are shared characteristics.
- Body without cavity.
- **Alimentary canal.**
- Has a nervous system.
- Has an open circulatory system with a heart and an aorta.
- Has gaseous exchange organs called ctenidial gills.
- Has a pair of kidneys.
- Reproduction sexual.
- Feed a wide range of material.
- Live in most environments.

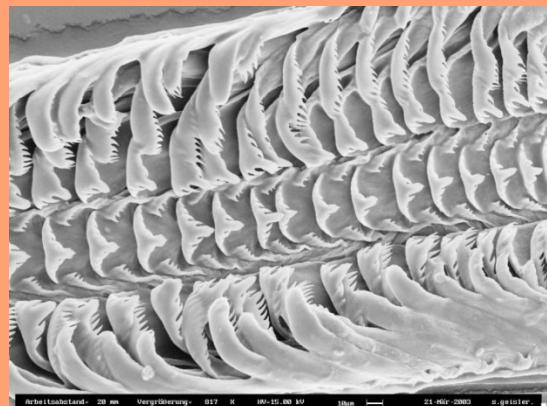
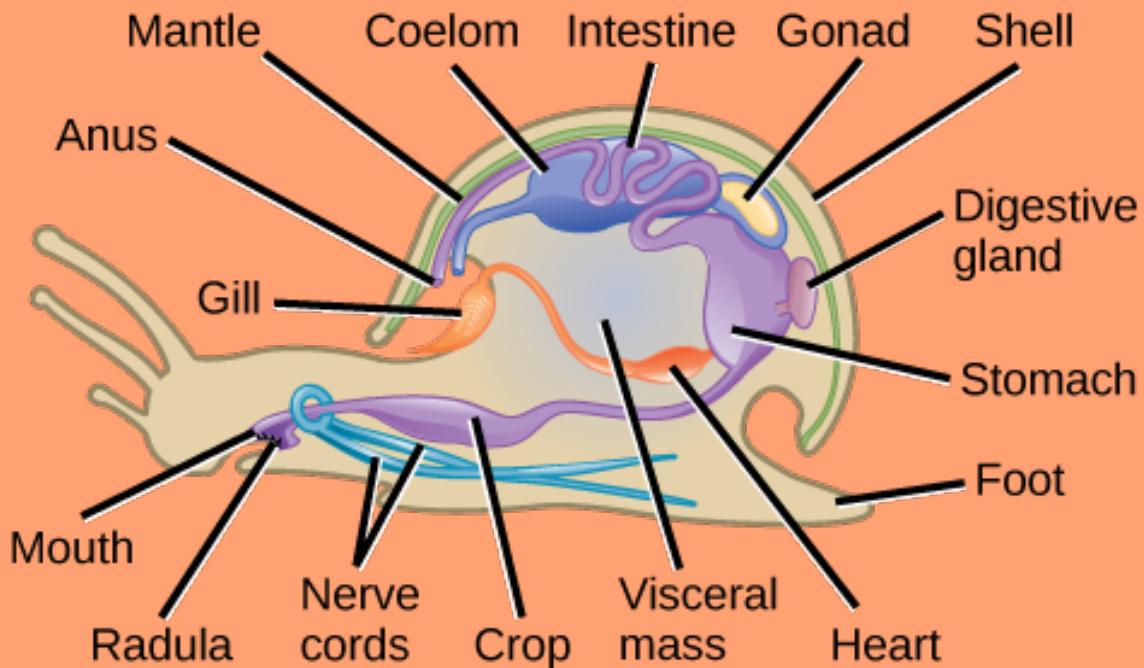
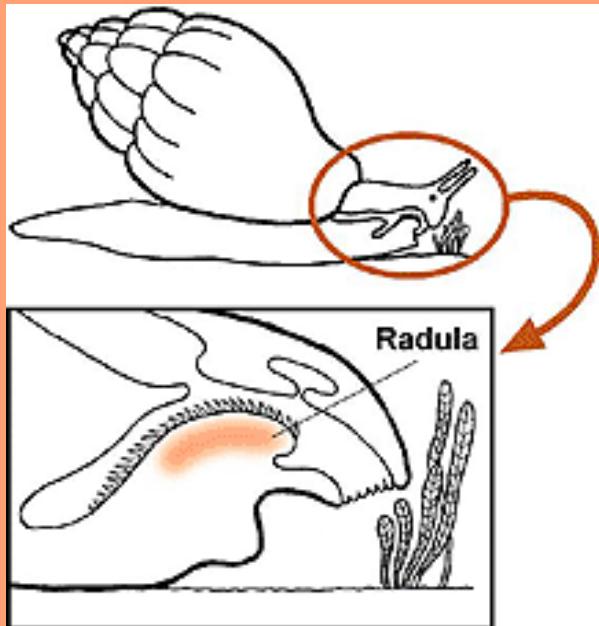
Phylum Mollusca

- Key characteristics: muscular foot, mantle, gill & radula

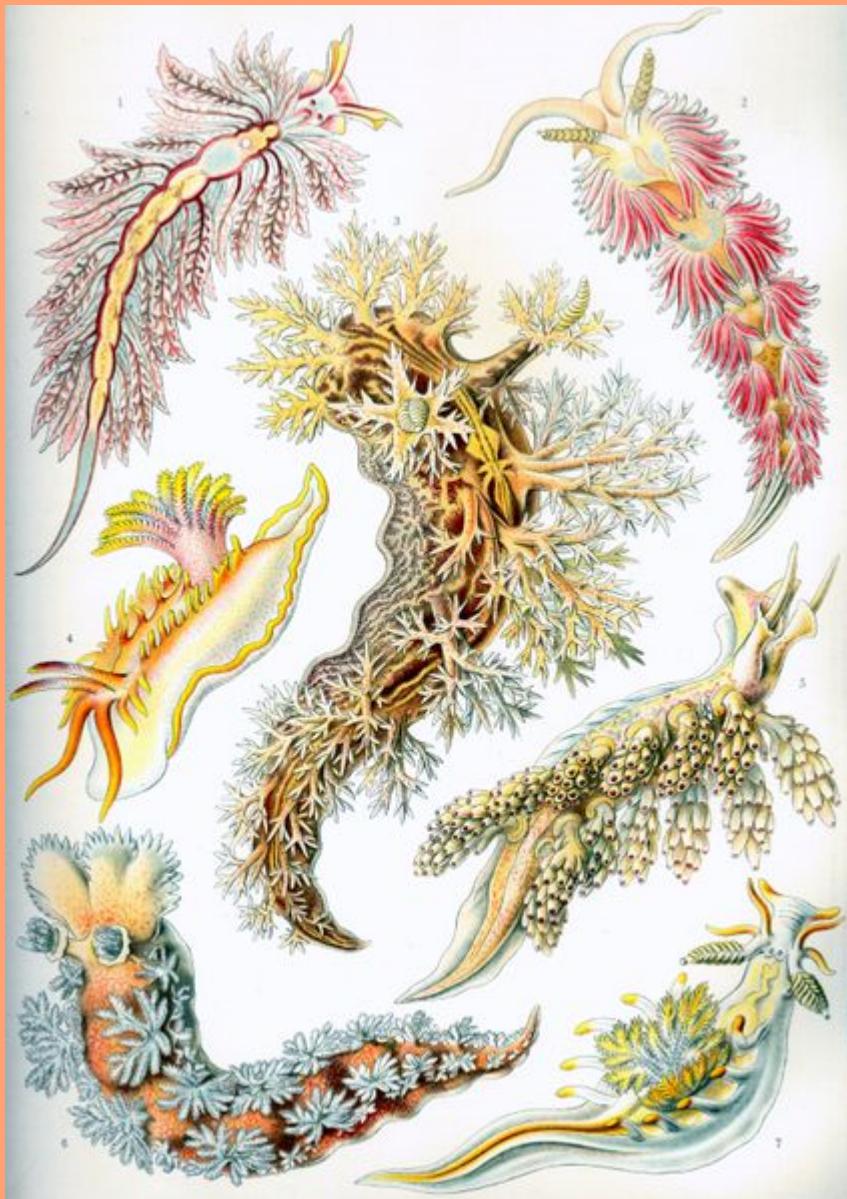


Phylum Mollusca

- radula



mollusca



Phylum Mollusca

Species Diversity



**Mollusca, Class Gastropoda
Nudibranchs**



[limpet underside](#)
[limpet feeding](#)



Mollusca, Class Gastropoda
Limpets and Snails

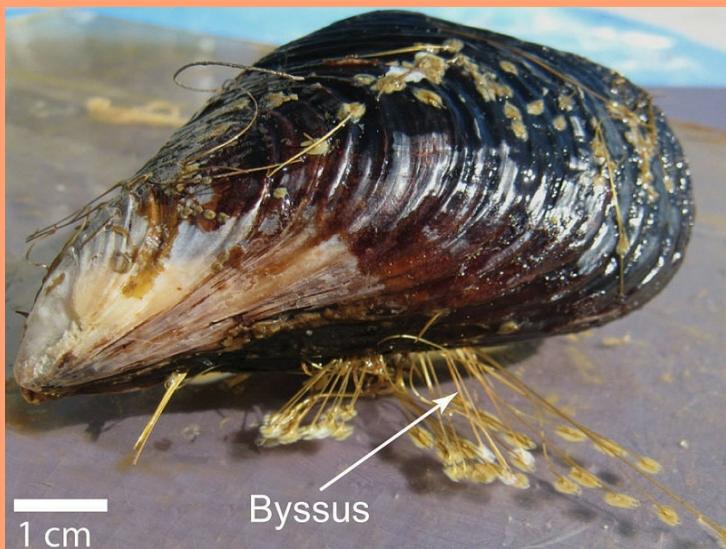
Phylum Mollusca

Species Diversity



Phylum Mollusca

Species Diversity



Mollusca, Class Bivalvia
clams, scallops and mussels



Phylum Mollusca

Species Diversity

Mollusca, Class Polyplacophora
Chitons

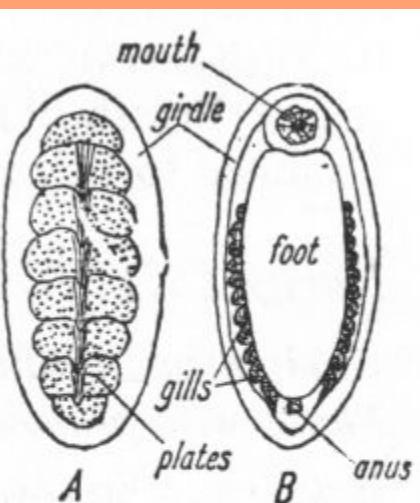
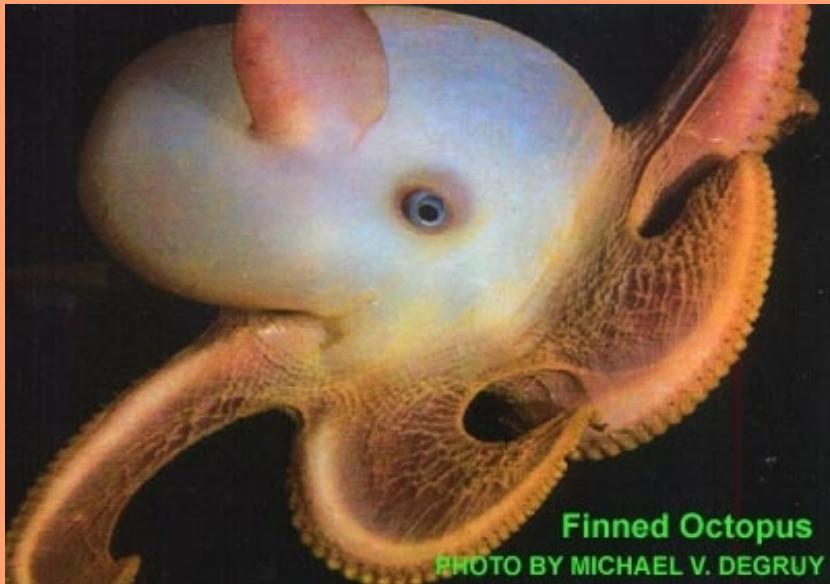


Fig. 81. Chiton ;
a. from above, b.
from below



Phylum Mollusca

Species Diversity



THE CHAMBERED NAUTILUS
NAUTILUS MACROMPHALUS



PHOTO BY DOUGLAS FULLER

Mollusca, Class Cephalopoda
Octopus, Nautilus, Cuttlefish and Squid

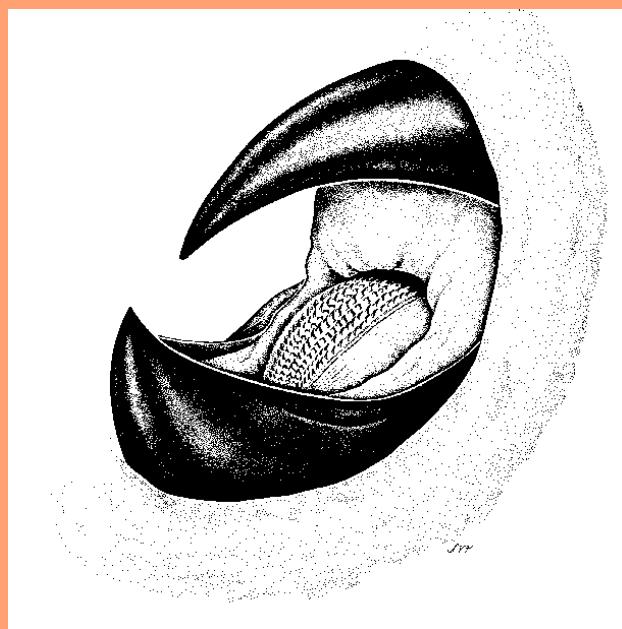
[Cuttlefish changing color](#)

[Mimic Octopus](#)



Phylum Mollusca

Species Diversity



Phylum Annelida

Eymology:- From the Latin *Annellus* a little ring.

- Bilaterally symmetrical.
- Body has more than two cell layers, tissues and organs.
- Body cavity is a true coelom, often divided by internal septa. Segmented with bristles (setae)
- Alimentary canal.
- Has a nervous system with an anterior nerve ring, ganglia and a ventral nerve chord.
- Has a true closed circulatory system.
- Has no true respiratory organs.
- Reproduction sexual.
- Feed on a wide range of material.
- Live in most environments.



Sabellid Polychaete



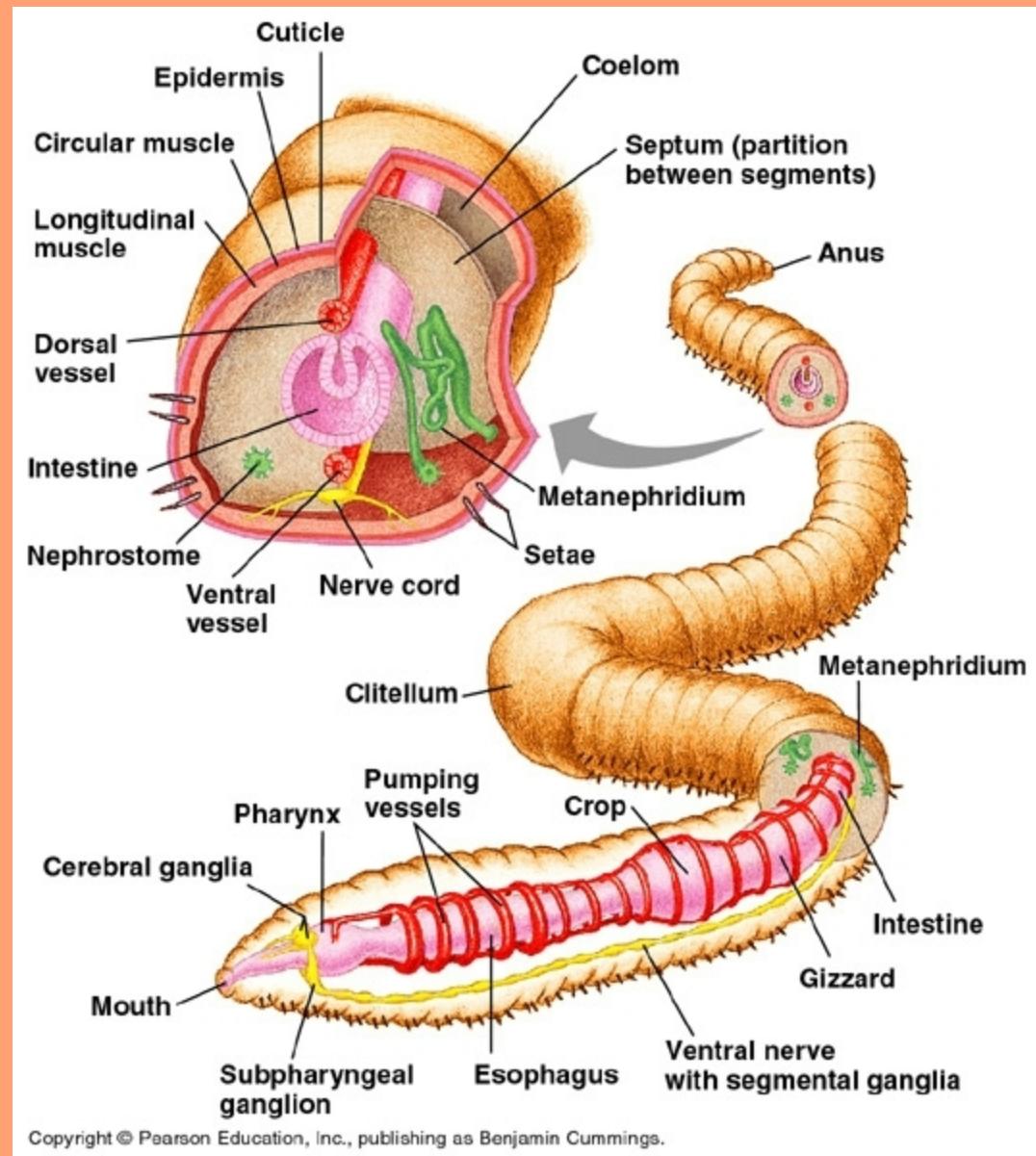
Scale Worm



Phylum Annelida

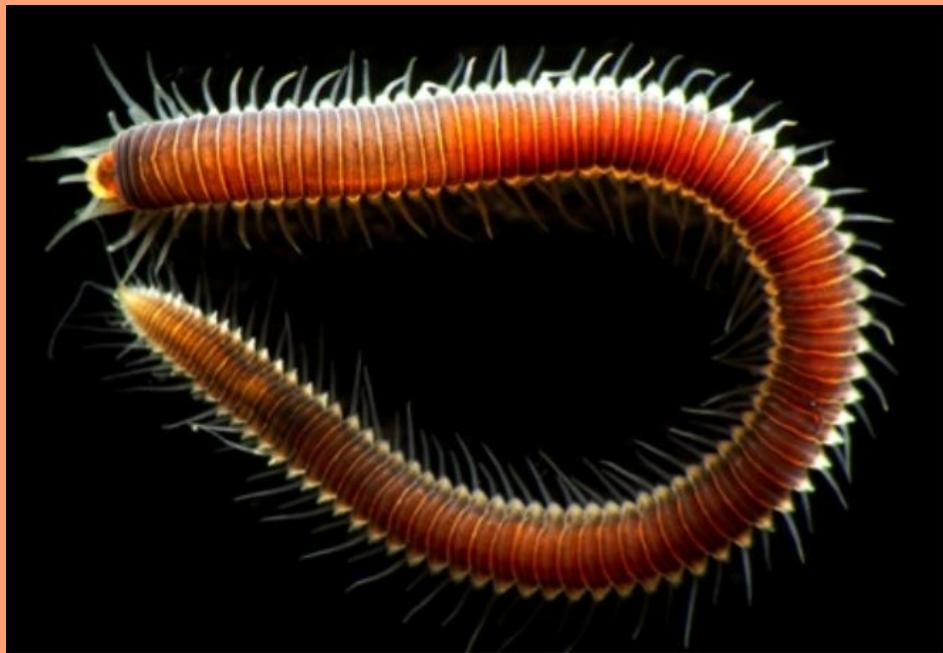
Earthworms

Eat their way through soil

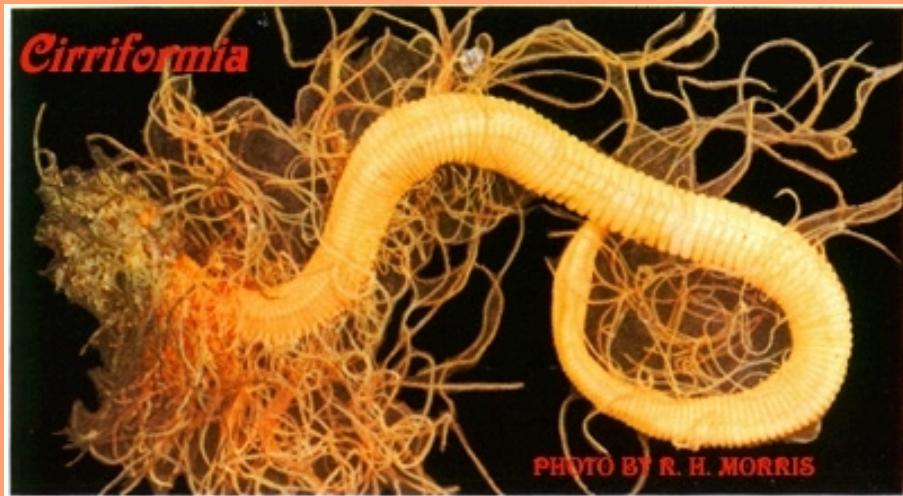


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Phylum Annelida

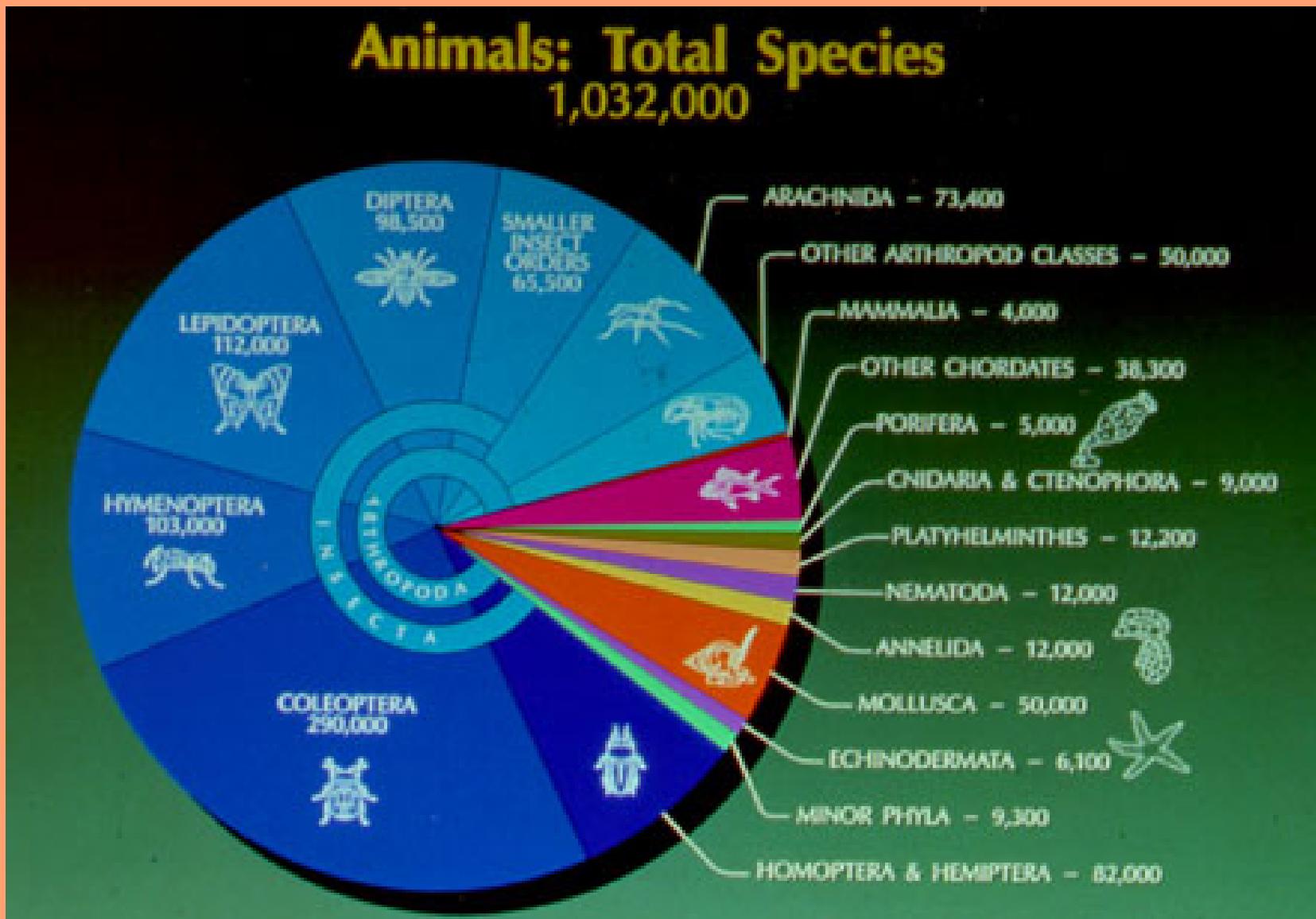


Species Diversity



[Christmas tree worms](#)
[Feather duster worm](#)

Distribution of species within the Kingdom Animalia



Phylum Arthropoda

Etymology:- From the Greek Arthon a joint and Pous for foot.

Bilaterally symmetrical.

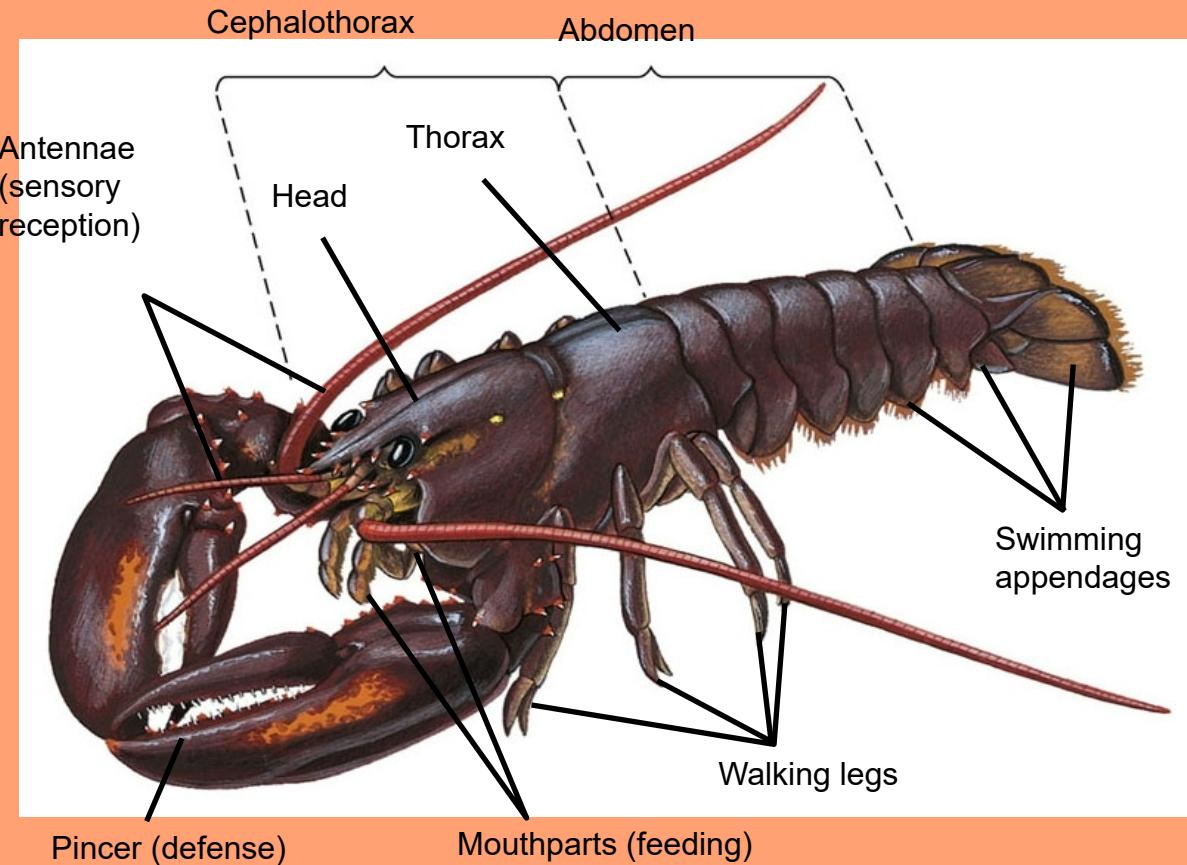
- Body has more than two cell layers, tissues and organs.
- Body cavity a true coelom.
- **Alimentary canal.**
- Body possesses 3 to 400+ pairs of **jointed legs.**
- Body possesses an **Exoskeleton** made of **chiton.**
- Body is divided in 2 or 3 sections.
- Nervous system includes a brain and ganglia.
- Possesses a respiratory system in the form of tracheae and spiracles.
- Possesses an open circulatory system with a simple heart.
- Reproduction sexual but can be parthenogenetic.
- Feed on everything.
- Live everywhere.



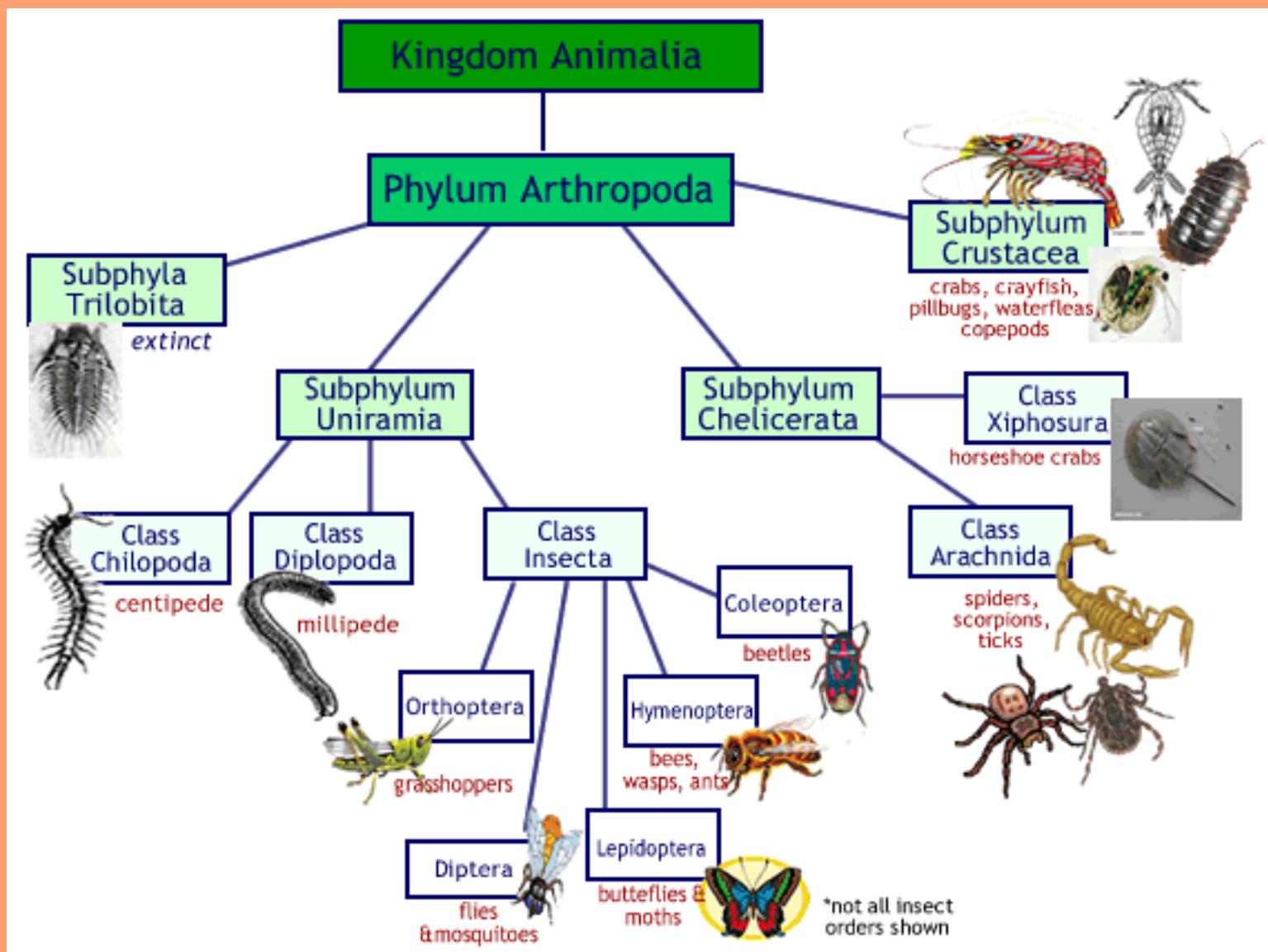


Phylum Arthropoda

segmented animals with jointed appendages and an exoskeleton

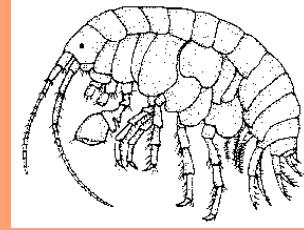
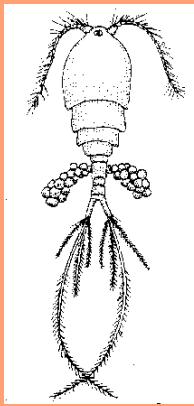


Phylum Arthropoda

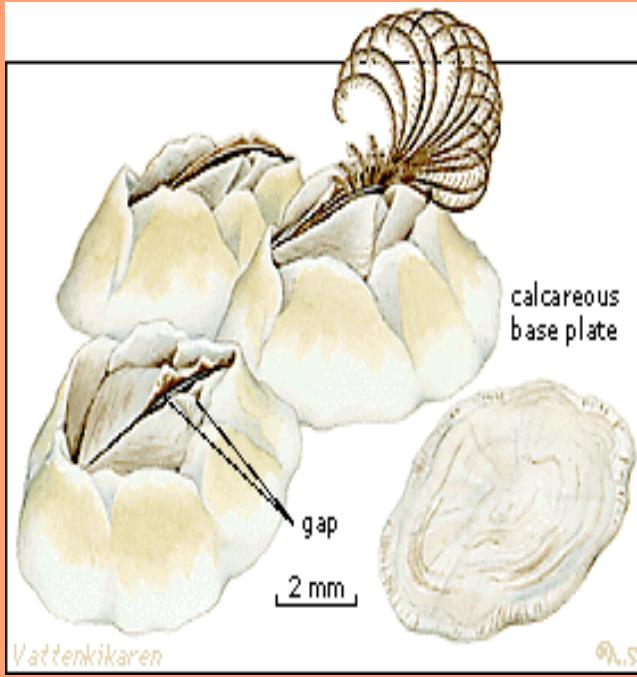


Phylum Arthropoda

Species Diversity

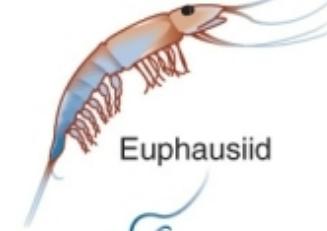
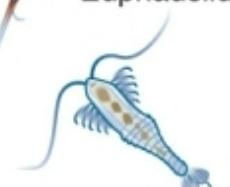


barnacles



Phylum Arthropoda

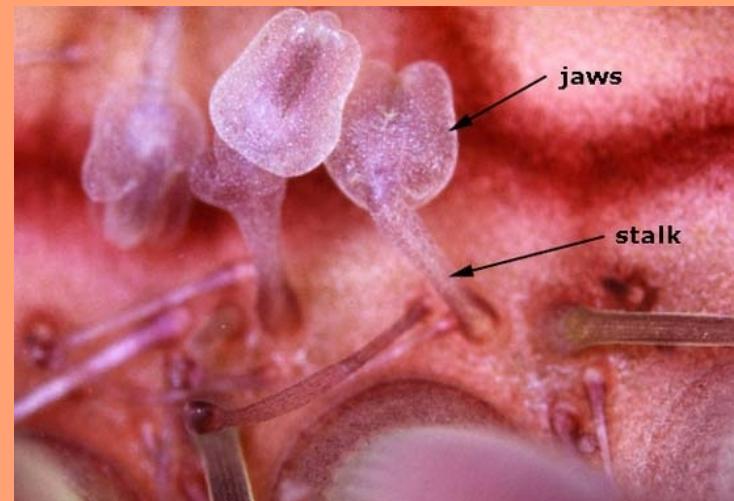
Developmental stages of
three groups of
planktonic crustaceans

| Nauplius | Protozoea | Zoea | Adult |
|---|---|---|--|
|  |  |  | |
| Present | Present | Present |  Mysid |
| Present | Present | Absent |  Euphausiid |
| Present | Absent | Absent |  Copepod |
| ← Copepodite stages → | | | |

Phylum Echinodermata

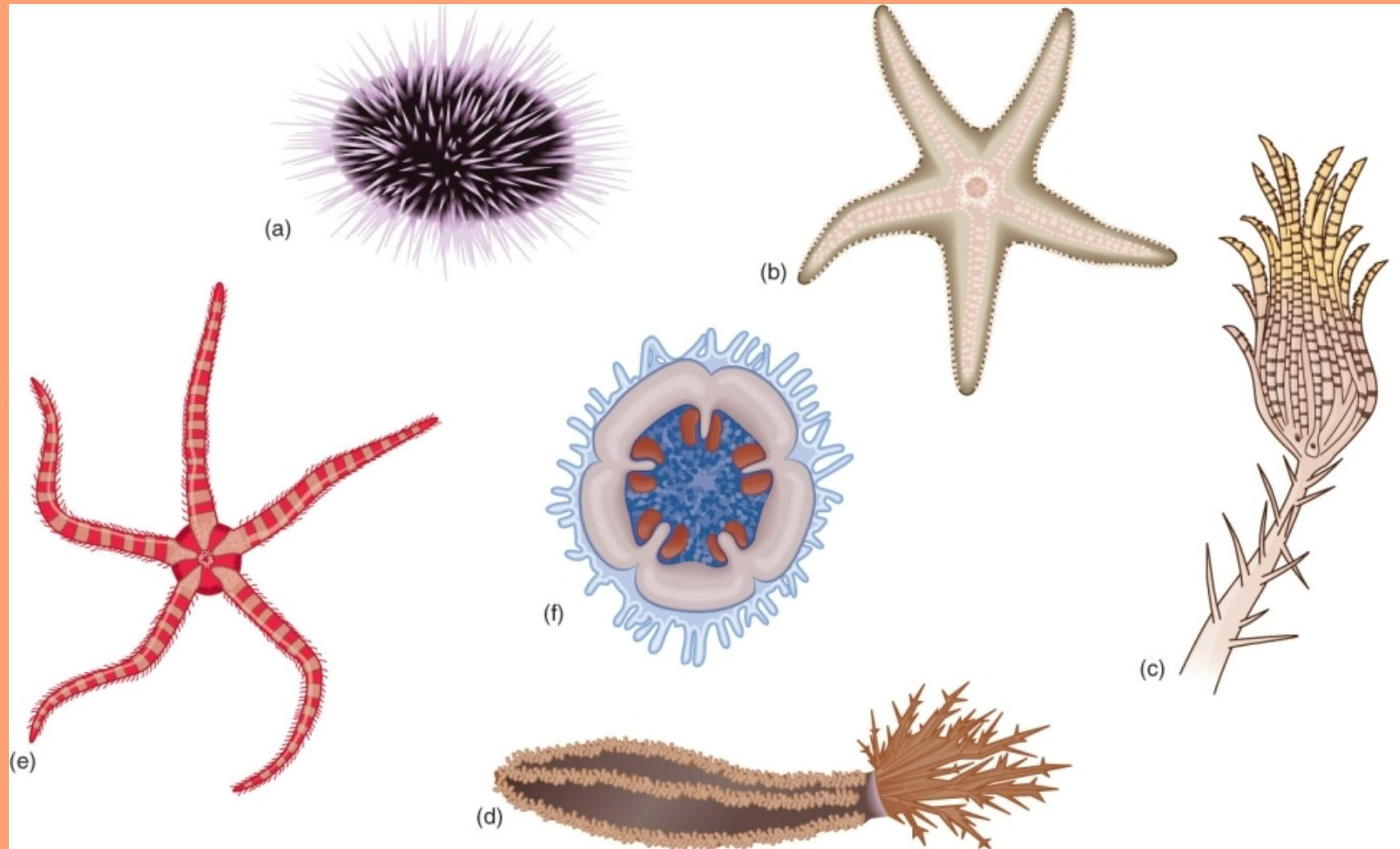
Etymology:- From the Greek Echinos for spiny and Derma for skin.

- Possess 5-rayed symmetry (**pentamously radial**).
- Body has more than two cell layers, tissues and organs.
- Body cavity a true coelom.
- **Alimentary canal**.
- Body shape highly variable, but with no head.
- Nervous system
- Has a poorly defined open circulatory system.
- Possesses a **water vascular system**, which hydraulically operates the **tube feet** or feeding tentacles.
- Normally possesses a subepidermal calcareous plates: **internal skeleton**.
- Reproduction sexual.
- All live marine environments.



Phylum Echinodermata

Representatives of the six living echinoderm classes



Phylum Echinodermata

Species Diversity:
starfish



Phylum Echinodermata

- Species Diversity: Brittle Stars with flexible arms

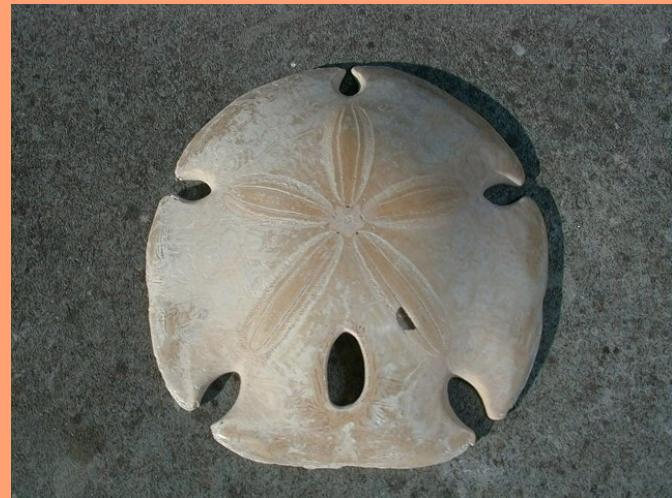


[Brittle star](#)



Phylum Echinodermata

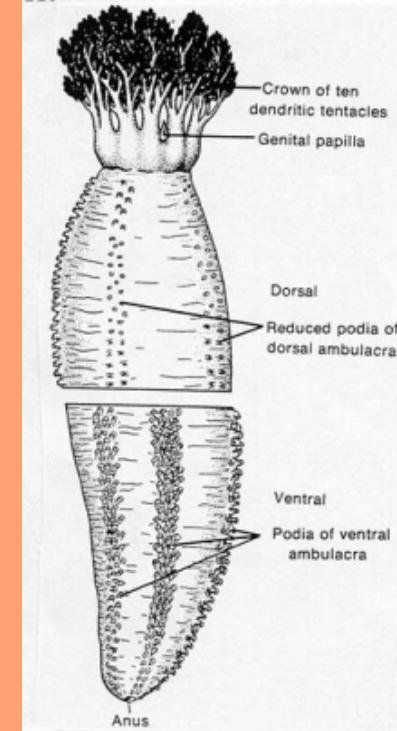
- Species Diversity: Sea Urchins and sand dollars



Phylum Echinodermata

Species Diversity: Sea Cucumbers

sea cucumber feeding



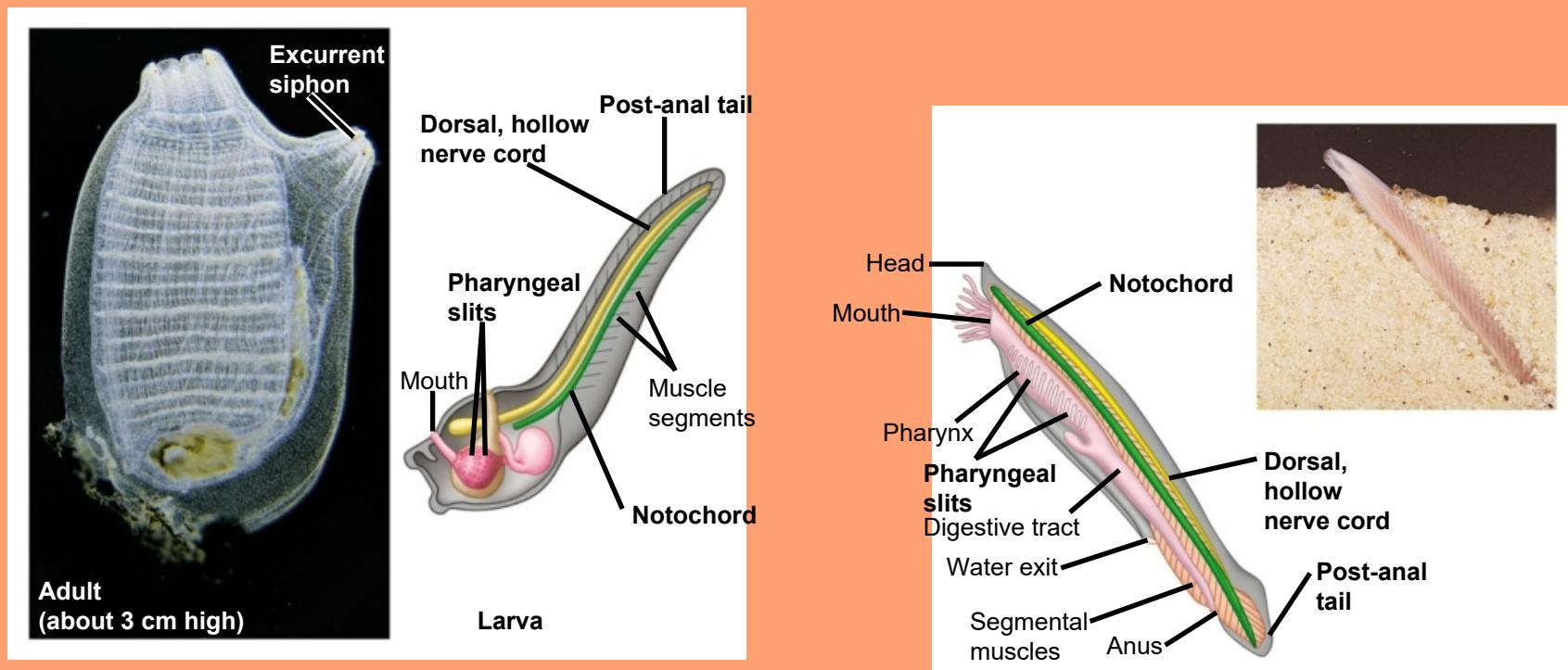
Phylum Chordata



Phylum Chordata

Our own phylum is distinguished by four features

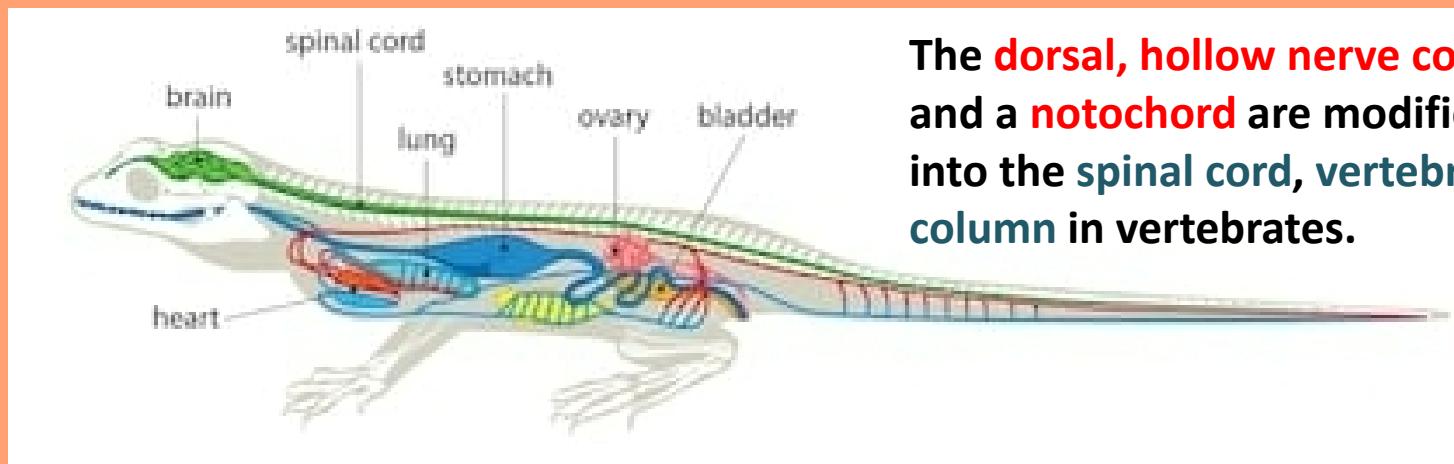
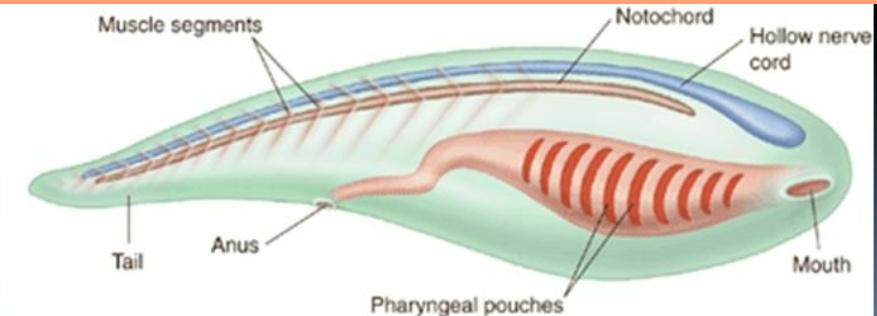
- A dorsal hollow nerve cord
- A stiff notochord
- Pharyngeal slits
- A muscular post-anal tail



Phylum Chordata

Etymology:- From the Latin chorda a chord.

- Bilaterally symmetrical.
- Body has more than two cell layers, tissues and organs.
- Body cavity a true coelom.
- Alimentary canal.
- Dorsal, hollow nerve cord and a notochord.
- Pharyngeal gill slits and a Post-anal tail.
- Has a partially open circulatory system.
- Reproduction sexual.



The **dorsal, hollow nerve cord** and a **notochord** are modified into the **spinal cord, vertebral column** in vertebrates.

Phylum Chordata

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