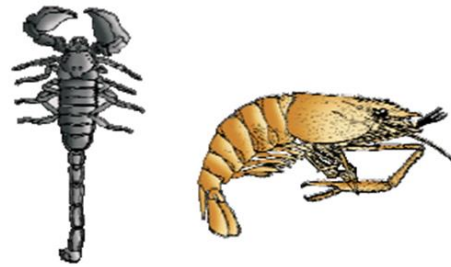
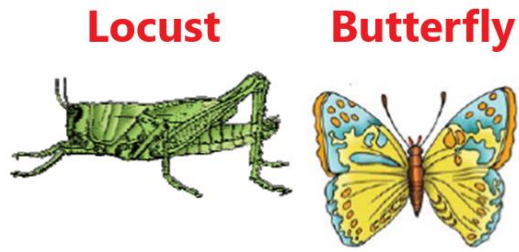


FEATURES OF ANIMAL KINGDOM



Scorpion **Prawn**

BASIS OF CLASSIFICATION

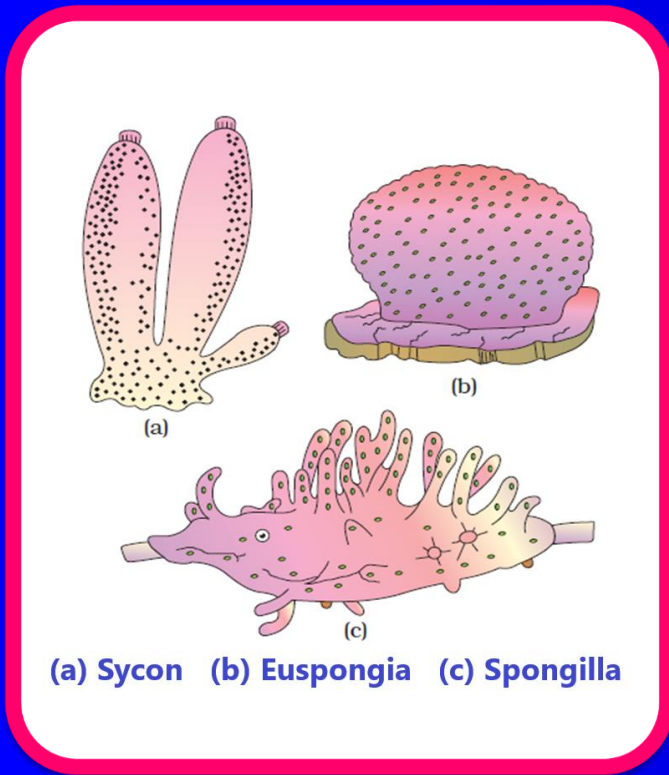


Animal Kingdom

Basis of Classification

The features used as the basis of classification of animals are;

- The arrangement of cells
- Body symmetry
- Nature of coelom
- Patterns of
- digestive System
- Circulatory System
- Reproductive System



Levels of Organisation

Cellular Level :

Cells are arranged as loose cell aggregates, e.g., sponges.

Tissue level :

A group of cells performing similar function are arranged into tissues, e.g., Coelenterates.

Organ level :

A group of different tissues are arranged into organs, each tissue is specialised for a particular function. e.g., platyhelminthes.

Organ System Level :

A group of different organs are arranged into organ systems e.g., Annelids, Arthropods, Molluscs, Echinoderms and Chordates.



Open and Closed Circulatory Systems

Open circulatory system:

The circulatory system in which the blood flows freely through the body cavity and there are no vessels to conduct the blood is called open circulatory system.

This system is mainly found in invertebrates.

Closed circulatory system:

The circulatory system in which the blood flows through blood vessels is called closed circulatory system.

This system is found in vertebrates and a few invertebrates like earthworms.



Symmetry

Animals can be classified on the basis of their symmetry.

The types of symmetry are

Asymmetry

Bilateral Symmetry

Radial Symmetry



Asymmetry

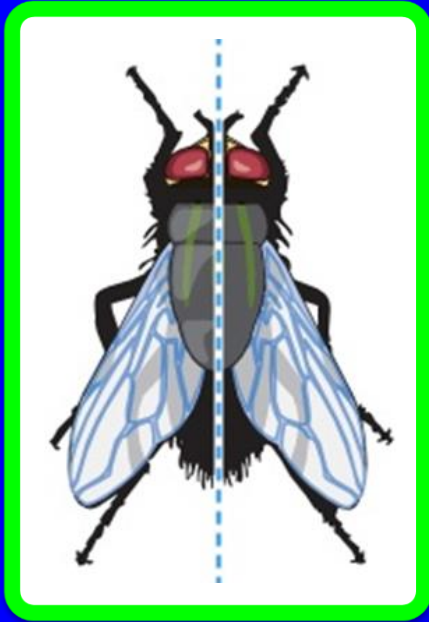


A line passing through the centre of the body does not divide the organism into two equal halves in any plane is asymmetry.

Sponges are mostly **asymmetrical**.

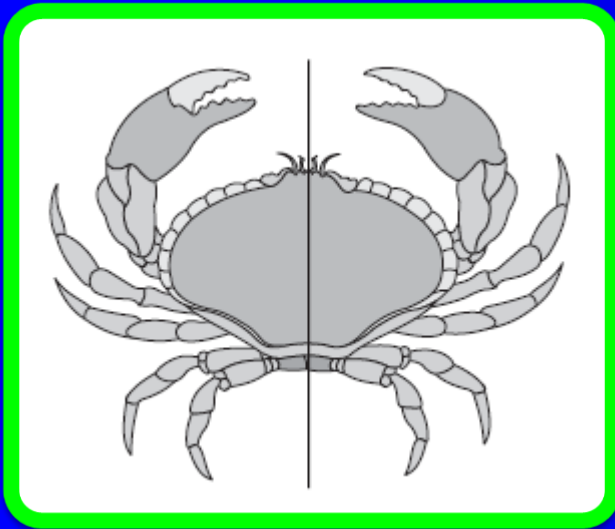


Bilateral Symmetry

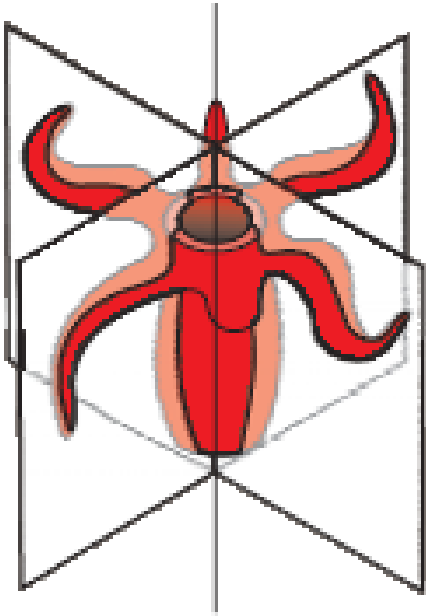


A line passing through the centre of the body divides the organism into two identical halves **only in one plane** is called **bilateral symmetry** .

Eg., Annelids, Arthropods, etc.,

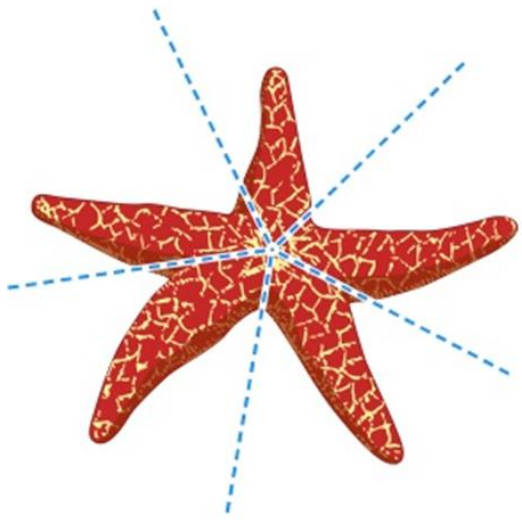


Radial Symmetry



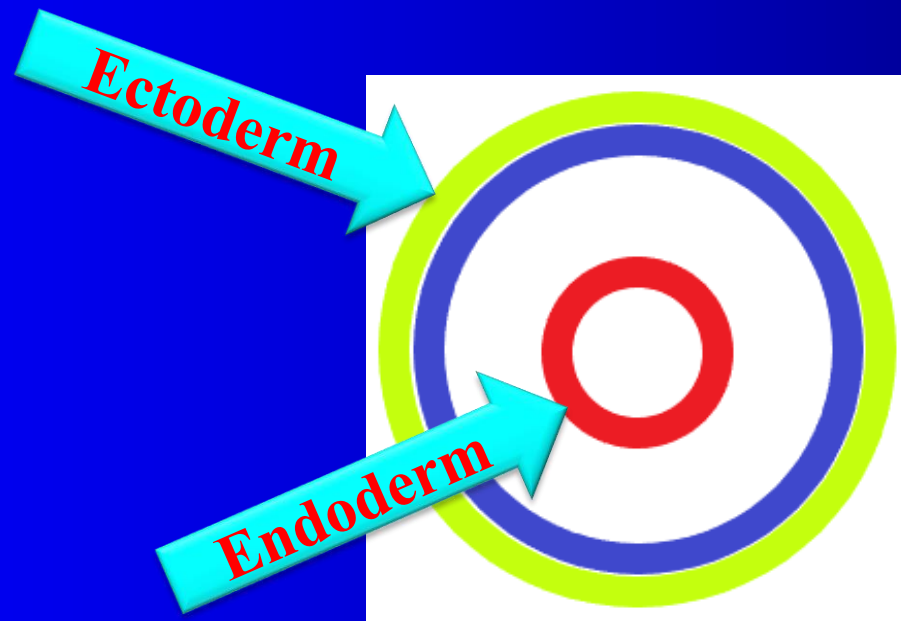
A line passing through the centre of the body divides the organism into two identical halves, in **any plane** is called **radial symmetry**.

Eg., Echinoderms



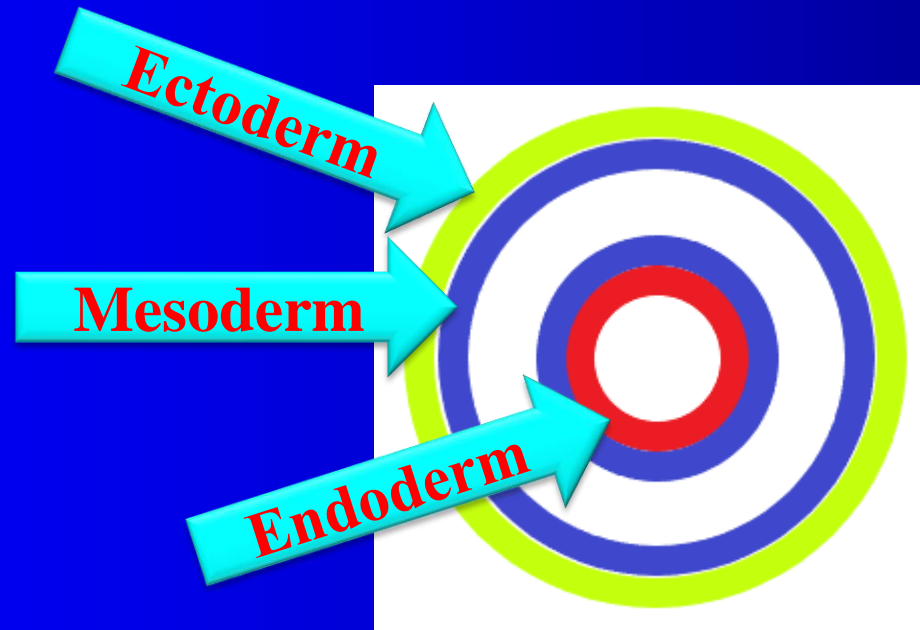
Diploblastic Animals

The animals whose body develops from two embryonic layers, external **ectoderm** and internal **endoderm**, are called **diploblastic** animals.
e.g., coelenterates.



Triploblastic Animals

The animals whose body develops from three embryonic layers, external **ectoderm**, internal **endoderm** and middle **mesoderm** are called **triploblastic** animals, e.g., coelenterates. Eg., platyhelminthes to chordates



Coelom - Body Cavity

Presence or absence of a cavity between the body wall and the gut wall is very important in classification.

The type of body in which there is no body cavity is called acoelom.
Eg, Some worms.

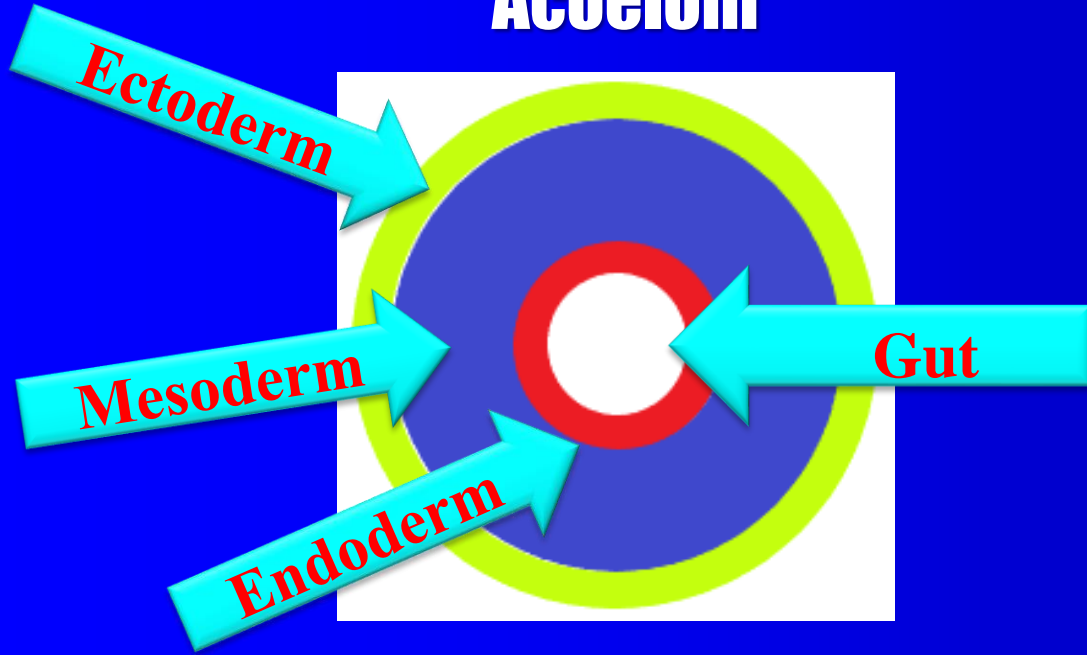
The type of body in which there is mesoderm around the outer body wall but not around the gut is called pseudocoelom.

The type of body in which there is mesoderm around the outer body wall and around the gut is called true coelom or Eucoelom.

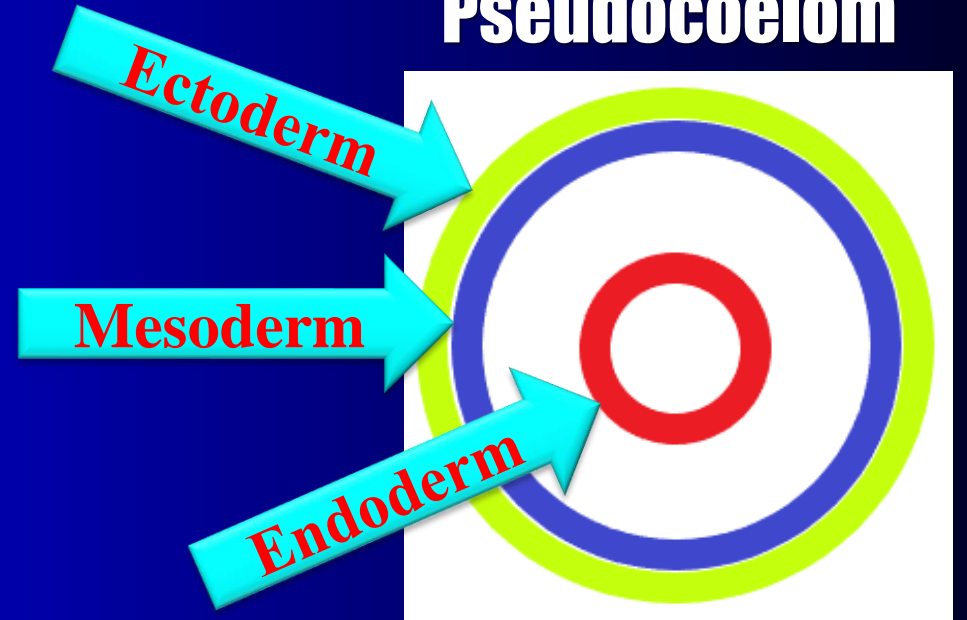
Animals possessing coelom are called **coelomates**, e.g., annelids, molluscs, arthropods, echinoderms, hemichordates and chordates.



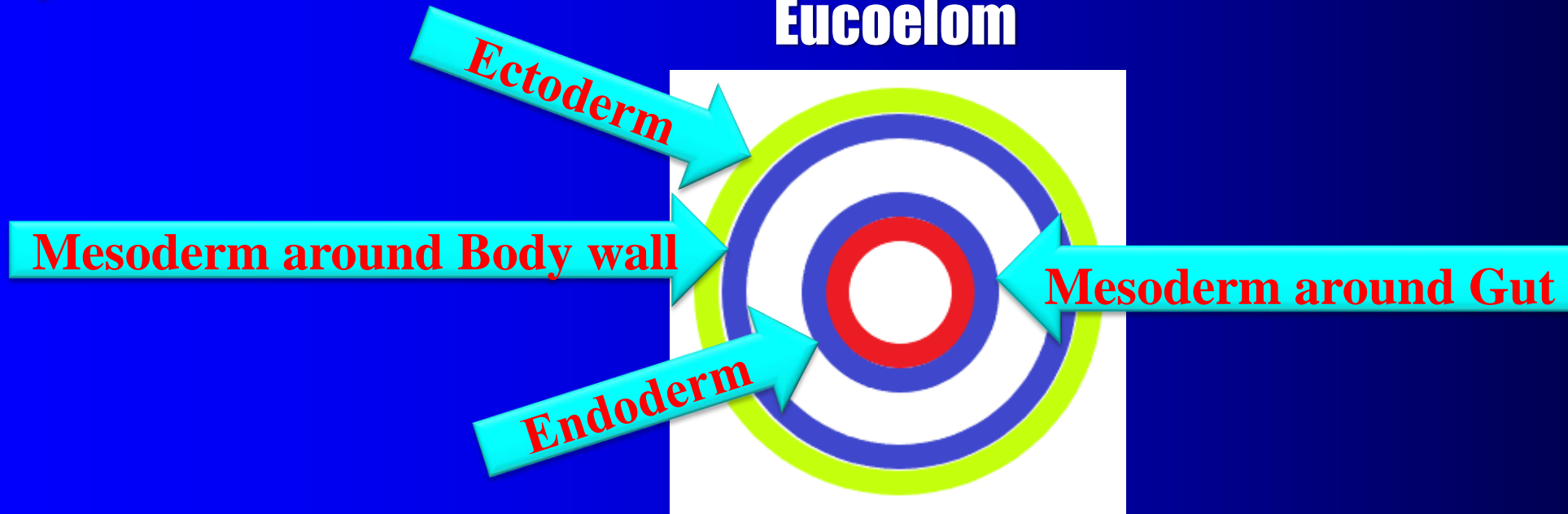
Acoelom



Pseudocoelom



Eucoelom



Acoelom



The type of body in which there is no body cavity is called acoelom.
Eg, Some worms.

Pseudocoelom



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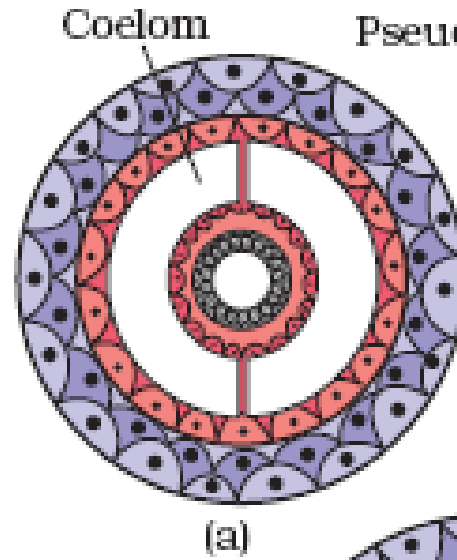
Eucoelom



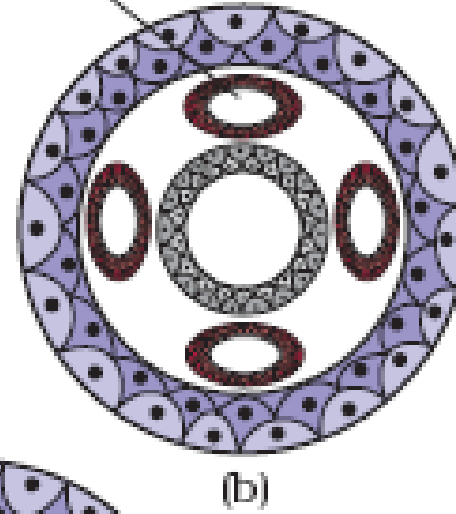
The type of body in which there is mesoderm around the outer body wall and around the gut is called true coelom or Eucoelom.



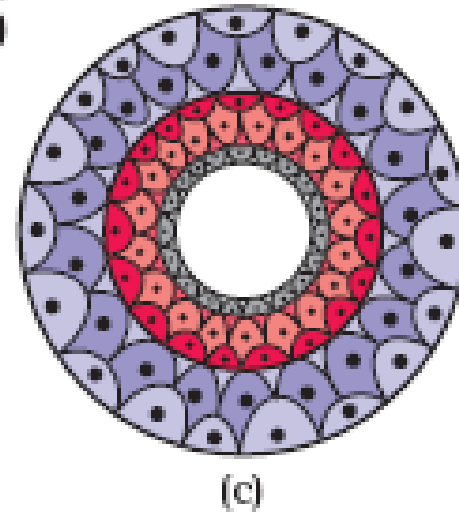
Eucoelom



Pseudocoelom



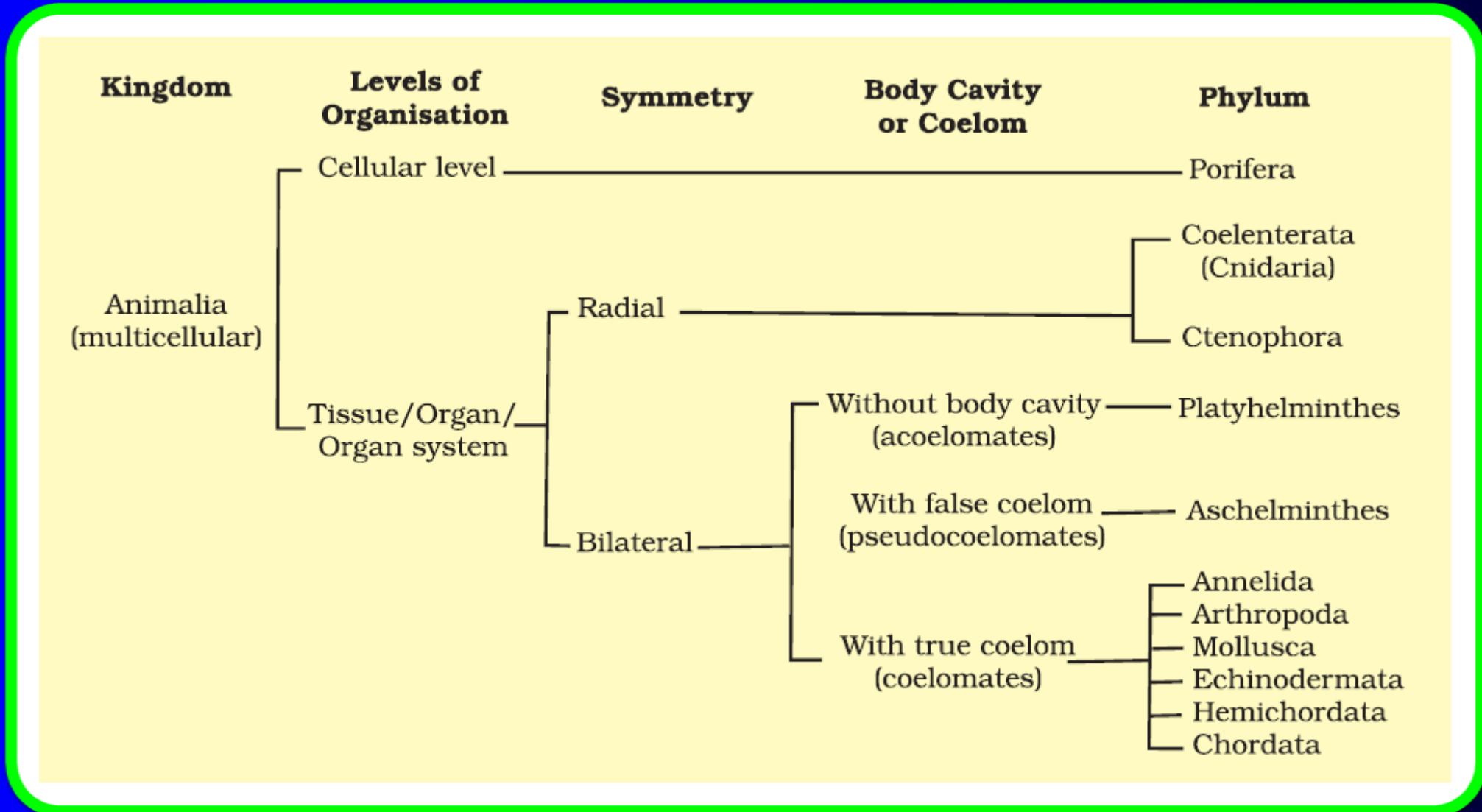
Pseudocoelom



Acoelom



Broad classification of Kingdom Animalia based on common fundamental features



Segmentation

In some animals, the body is externally and internally divided into segments with a serial repetition of at least some organs.

Earthworm shows this pattern called metameric segmentation and the phenomenon is known as **metamerism**.

Notochord

Notochord is a flexible skeletal rod-like structure formed on the dorsal side during embryonic development in some animals. It is similar to the vertebral column.

Animals which possess notochord are called chordates and those animals which do not possess notochord are called non-chordates, e.g., porifera to echinoderms.



Phylum : Porifera

Phylum : Porifera

Greek: Pori = Pore, Pherin = Bearing

Members of Porifera are pore bearing animals, commonly known as sponges.

Habitat:

They are **marine** and mostly asymmetrical animals.

Organisation:

These are primitive multicellular animals and have **cellular level** organisation.

Germ Layers and Coelom:

They are **diploblastic** animals with two germ layers and **acoelomates**.

Symmetry:

They are **radially symmetrical** animals.



Canal System:

They have a water canal system. Water enters through **minute pores (ostia)** in the body wall into a **central cavity, spongocoel**, from where it goes out through the **large pore - osculum**.

Choanocytes or collar cells line the spongocoel and the canals.

This pathway of water transport helps in obtaining food, respiratory exchange and removal of waste.

Digestion: It is intracellular.



Endoskeleton:

The body is supported by a skeleton made up of calcareous spicules (needles made up of CaCO_3) or spongin fibres.

Cell Types: The types of cells found in sponges are

Pinacocytes form the protective layer of the body.

Choanocytes maintain the water current in the body.

Amoebocytes store reserve food.



Reproduction:

They are hermaphrodites. i.e., ova and sperms are produced by the same individual.

Sponges reproduce asexually by fragmentation and sexually by formation of gametes.

Fertilisation is internal and development is indirect having a larval stage which is morphologically distinct from the adult.

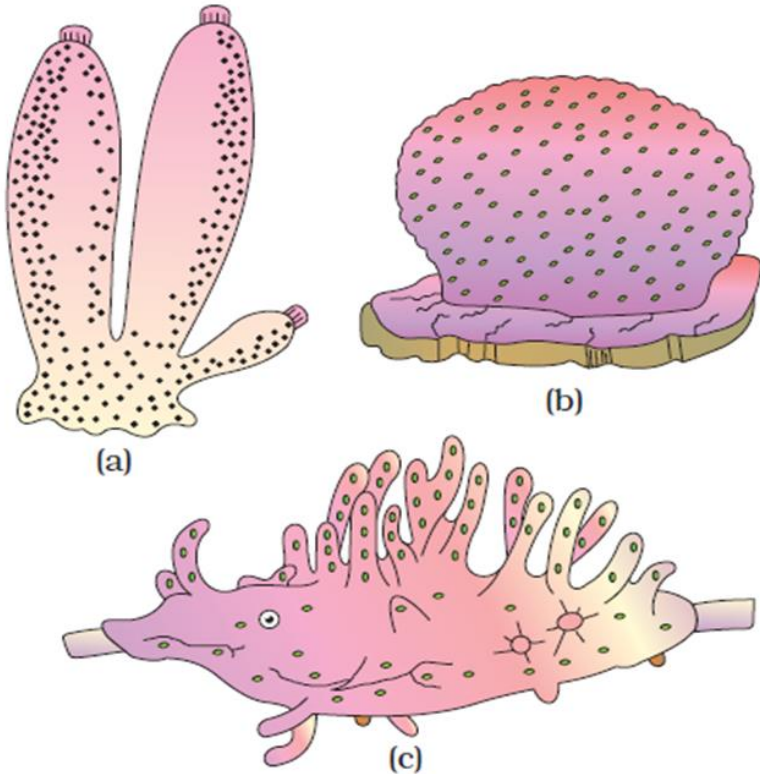


Members of Porifera

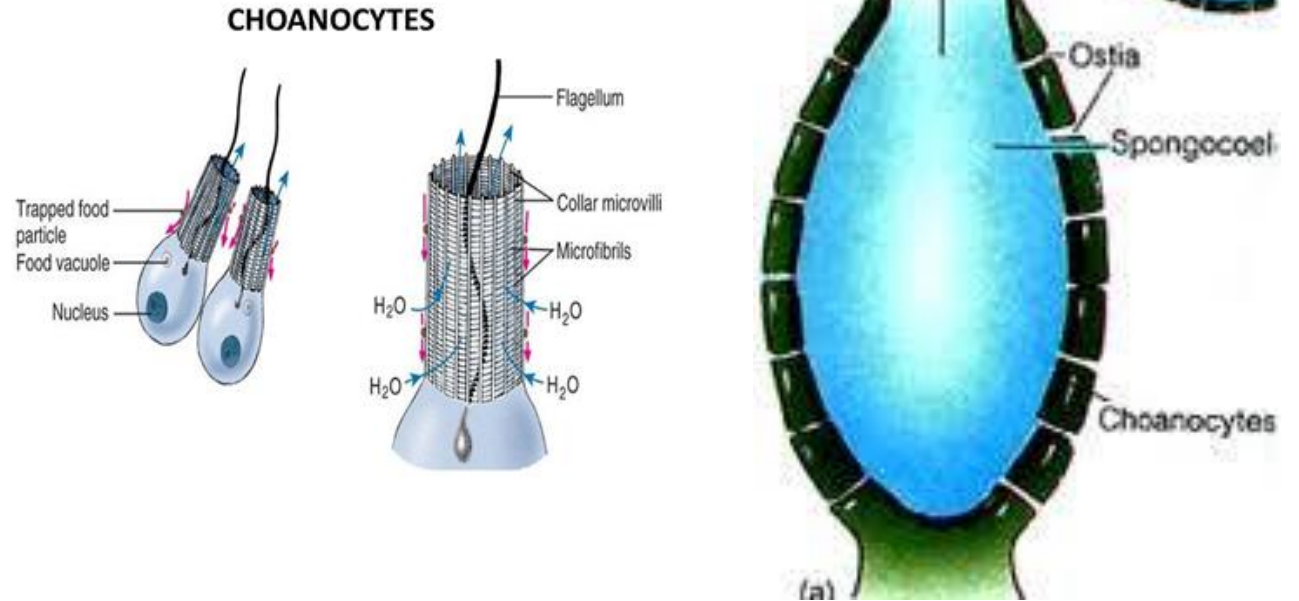
Scientific Name	Common Name
<i>Sycon</i>	Scypha
<i>Spongilla</i>	Fresh water sponge
<i>Euspongia</i>	Bath sponge



Phylum: Porifera



(a) Sycon (b) Euspongia (c) Spongilla





**Phylum
Coelenterata**

Phylum : Coelenterata (Cnidaria)

Greek: Coel = Cavity, Knide = Stinging cells

They have a central cavity called coelenteron. They have stinging cells. So they are also known as Cnidarians.

Habitat: All are **marine** except Hydra. They are sessile or free-living.

Organisation: Cnidarians exhibit **tissue level of organisation**.

Germ Layers and Coelom:

They are **diploblastic** animals with two germ layers and **acoelomates**.

Symmetry: They are mostly **radially symmetrical** but Sea Anemone is bilaterally symmetrical.



Body Structure:

Cnidoblasts are used for anchorage, defense and for the capture of prey.

They have a central gastro-vascular cavity with a single opening **hypostome**.

Some of the cnidarians like **corals** have a skeleton composed of calcium carbonate.



Life cycle of Cnidarians:

Cnidarians exhibit two basic body forms called polyp and medusa.

The polyp is a sessile and cylindrical form like Hydra and Adamsia.

The medusa is umbrella-shaped and free-swimming like *Aurelia* or jelly fish.

Those cnidarians which exist in both the forms exhibit alternation of generation (Metagenesis),

i.e., polyps produce medusae asexually and medusae produce the polyps sexually (e.g., *Obelia*).



Members of Coelenterata (Cnidaria)

Scientific Name	Common Name
<i>Physalia</i>	Portuguese man-of-war
<i>Adamsia</i>	Sea anemone
<i>Pennatula</i>	Sea-pen
<i>Gorgonia</i>	Sea fan
<i>Meandrina</i>	Brain coral



Phylum : Coelenterata (Cnidaria)



**Adamsia
Polyp**



**Aurelia
Medusa**



Cnidoblast



Phylum : Coelenterata (Cnidaria)




Physalia
Portuguese man-of-war



Adamsia
Sea Anemone





**Phylum
Ctenophora**

Phylum : Ctenophora

Cteno = Comb, Ctenophore = Comb bearer

Ctenophores are commonly known as **comb jellies or sea walnuts**.

They are transparent and gelatinous organisms.

Habitat: Ctenophores are exclusively **marine** organisms.

Organisation: They have **tissue level** organisation.

Germ Layers and Coelom: They are **diploblastic** animals with two germ layers and **acoelomates**.

Symmetry: They are **radially symmetrical** animals.



The body bears eight external rows of ciliated **comb plates**, which help in locomotion.

Digestion is both extracellular and intracellular.

Bioluminescence, the property of living organisms to emit light is well-marked in ctenophores.

Reproduction:

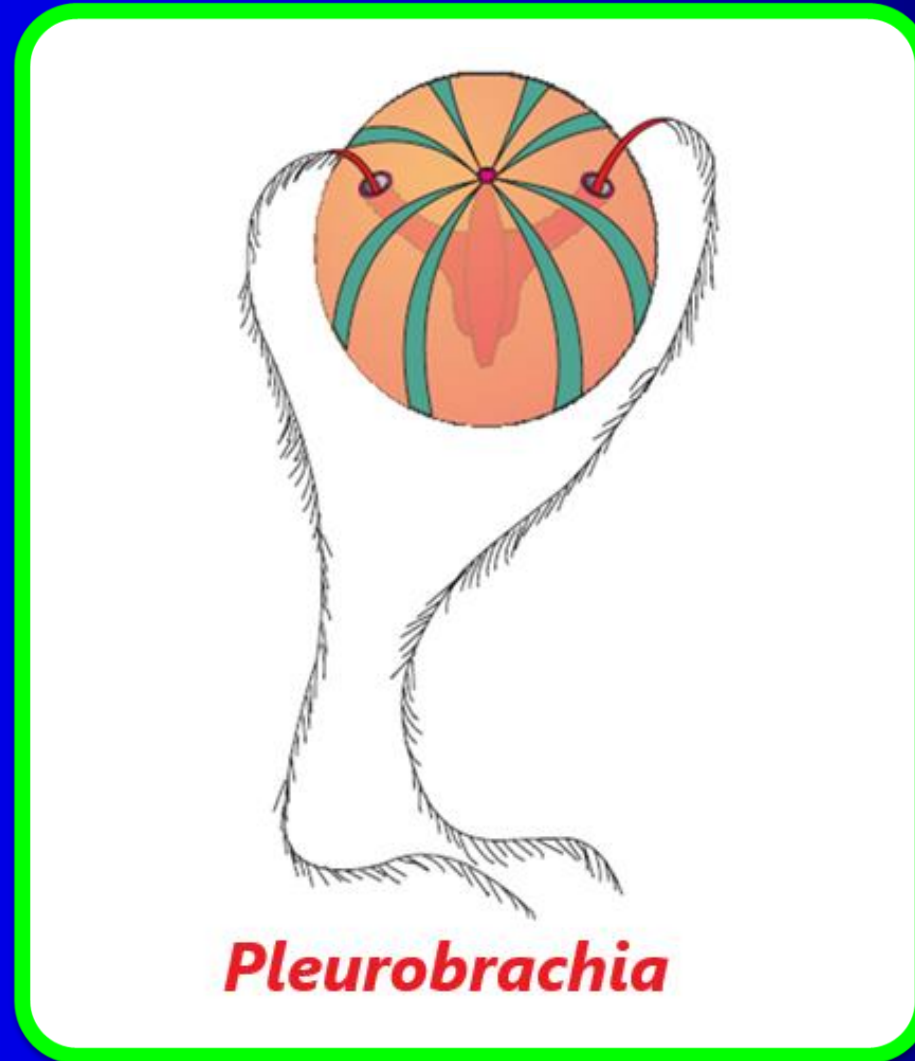
They are hermaphrodites. Only sexual reproduction takes place.


Fertilisation is external.

Examples: *Pleurobrachia* and *Ctenoplana*.



Phylum : Ctenophora





**Phylum
Platyhelminthes**

Phylum : Platyhelminthes

Greek: Platys = Flat, Helmins = Worms (Flatworms)

They have dorso-ventrally flattened body, hence they are called **flatworms**.

Habitat:

These are mostly endoparasites found in animals including human beings. Some are free living like planaria (Living in fresh water).

Organisation:

They are the first animals to have **organ level** organisation.

Germ layers & Coelom:

They are **triploblastic** animals with three germ layers and **acoelomates**.



Symmetry:

They are **bilaterally** symmetrical.

Adaptations:

Hooks and suckers are present in the parasitic forms. Some of them absorb nutrients from the host directly through their body surface.

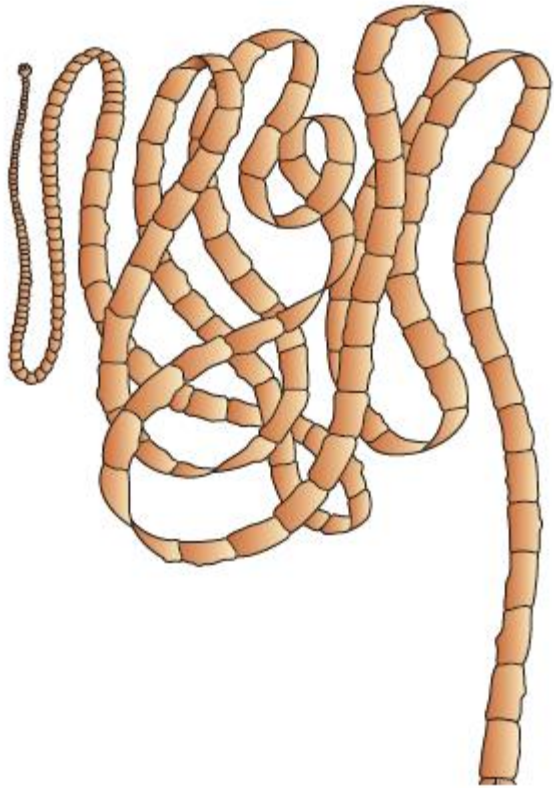
Excretion:

Specialised cells called flame cells help in osmoregulation and excretion.

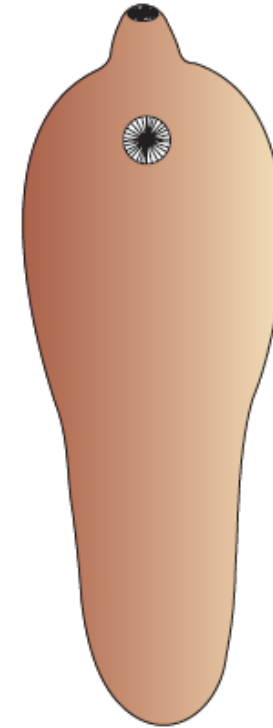
Reproduction: They are hermaphrodites. Fertilization is internal. Some members like *Planaria* possess high capacity of regeneration.



Examples: *Taenia* (Tapeworm), *Fasciola* (Liver fluke)




Tapeworm



Liver Fluke





**Phylum
Aschelminthes**

Phylum : Aschelminthes

Greek : Ascus = Bladder, Helmins = Worms (Roundworms)

The body of the aschelminthes is circular in cross section, hence they are known as **roundworms**.

Habitat:

They may be free-living, aquatic and terrestrial or parasitic in plants and animals.

Organisation:

Roundworms have **organ system level** of body organisation.

Germ Layers and Coelom:

They are **triploblastic** animals with three germ layers and **pseudocoelomates**.

Symmetry: They are **bilaterally** symmetrical.



Alimentary canal is complete with a well developed **muscular pharynx**.

An excretory tube removes body wastes from the body cavity through the excretory pore.

Reproduction:

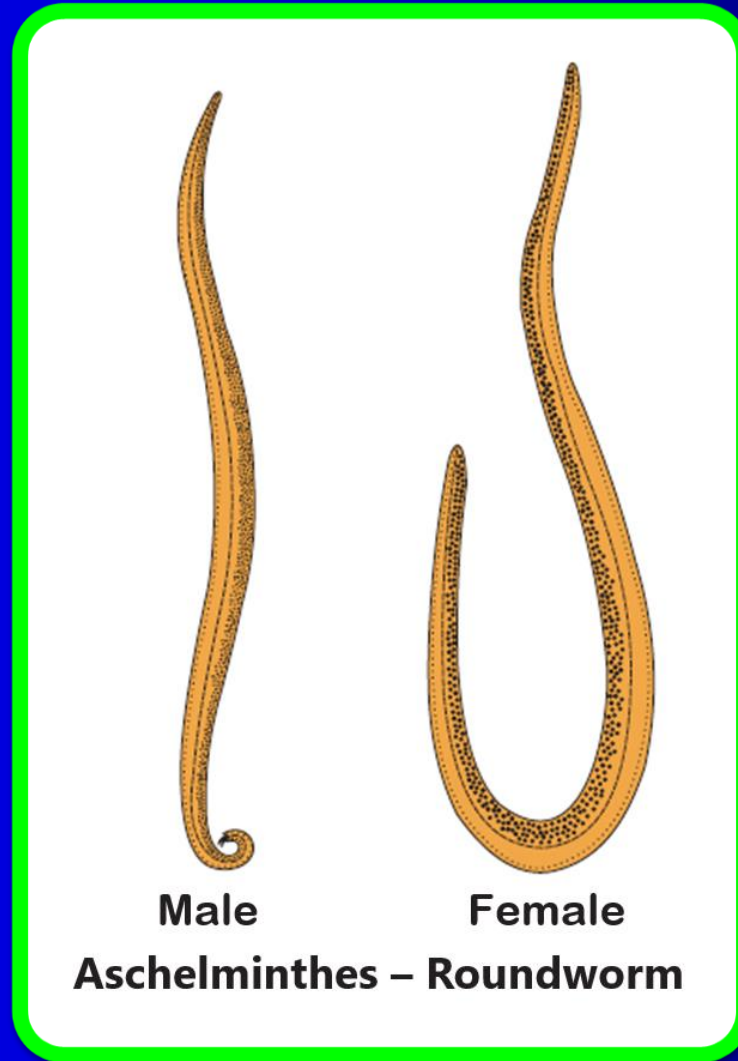
They are **dioecious** (Sexes are separate). i.e., males and females are distinct. Females are longer than males.

Fertilisation is internal and development may be direct (the young ones resemble the adult) or indirect (Life cycle has different stages)

Examples : *Ascaris* (Round Worm), *Wuchereria* (Filarial worm), *Ancylostoma* (Hookworm).



Phylum : Aschelminthes





**Phylum
Annelida**

Phylum : Annelida

Latin : Annulus = Ring, Eidos = Form (Segmented worms)

Habitat:

They may be aquatic (marine and fresh water) or terrestrial; free-living, and sometimes parasitic.

Organisation: They exhibit **organ-system level** of organisation.

Germ Layers and Coelom:

They are **triploblastic** animals with three germ layers and are **coelomates**.

Symmetry: They are **bilaterally** symmetrical.



Body Structure:

Their body surface is distinctly marked out into **segments** or **metameres**, hence the phylum is named Annelida.

Circulatory System:

They are the first group of animals to have closed circulatory system. The blood colour is red due to the presence of haemoglobin.

Nervous System:

It consists of paired ganglia (sing. ganglion) connected by lateral nerves to a double ventral nerve cord.



Excretion:

It occurs by segmentally arranged coiled organs called **Nephridia**.

Locomotion:

Locomotory organs are **setae**.

Aquatic annelids like *Nereis* possess lateral appendages called **parapodia**, which help in swimming.

Reproduction:

Sexual reproduction occurs. Earthworms and leeches are monoecious but *Nereis*, an aquatic worm, is dioecious.

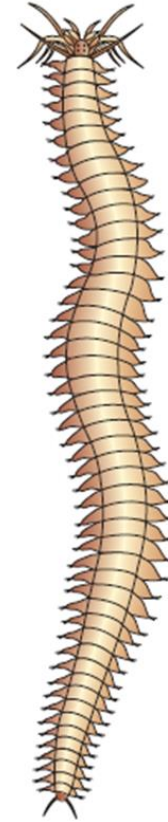
Examples : *Nereis* (Sandworm) *Pheretima* (Earthworm) and *Hirudinaria* (Blood sucking leech).



Phylum : Annelida



Pheretima posthuma
Earthworm




Nereis



Hirudinaria





**Phylum
Arthropoda**

Phylum : Arthropoda

Greek : Arthros = Joint, Podos = Feet (Jointed Feet)

This is the **largest phylum** of kingdom Animalia which includes insects. Over two-thirds of all species on earth are arthropods.

Habitat:

They are mostly terrestrial . Some are aquatic.

Organisation:

They have **organ system level** of organisation.

Germ Layers and Coelom:

They are **triploblastic** animals and **coelomates**.

Symmetry:

They are **bilaterally** symmetrical.



Body Structure:

The body of arthropods is segmented and covered by chitinous exoskeleton.

The body consists of **head, thorax** and **abdomen**.

They have **jointed appendages**.

Respiratory system:

Respiratory organs are gills, book gills, book lungs or tracheal system.

Circulatory system:

It has open circulatory system. Blood is colourless without haemoglobin and called haemolymph.

Excretion:

Excretion takes place through **malpighian tubules**.



Locust



Butterfly



Scorpion



Prawn

Sense Organs:

Sensory organs like antennae and eyes are present.
Statocysts or balance organs are present.

Reproduction:

They are mostly dioecious and oviparous.
Fertilisation is internal.
Development may be direct or indirect.



Scientific Name	Common Name
Economically Important Insects	
<i>Apis</i>	Honey bee
<i>Bombyx</i>	Silkworm
<i>Laccifer</i>	Lac insect
Vectors	
<i>Anopheles</i>	
Culex	Mosquitoes
Aedes	
Gregarious pest	
<i>Locusta</i>	Locust
<i>Limulus</i>	King crab





**Phylum
Mollusca**

Phylum : Mollusca

Latin : Mollis = Soft (Soft bodied Animals)

This is the **Second Largest Phylum** in the animal kingdom.

Habitat: Molluscs are terrestrial or aquatic (marine or fresh water) organisms.

Organisation :

They have **organ system level** organisation.

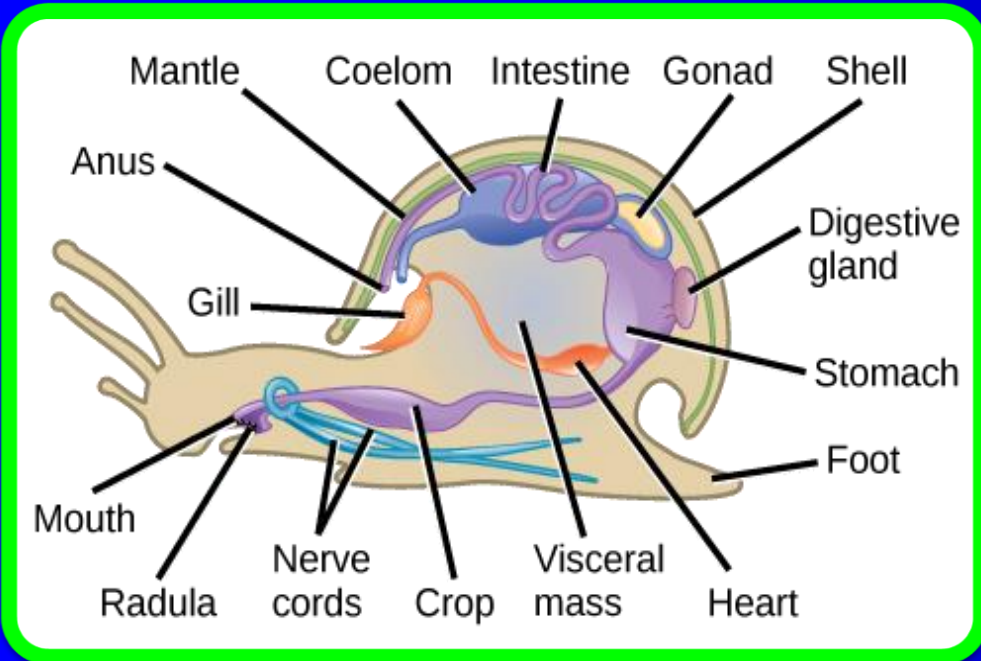
Germ Layers and Coelom:

They are **triploblastic** animals with three germ layers and are **coelomates**.

Symmetry:

They are **bilaterally** symmetrical.





Body Structure:

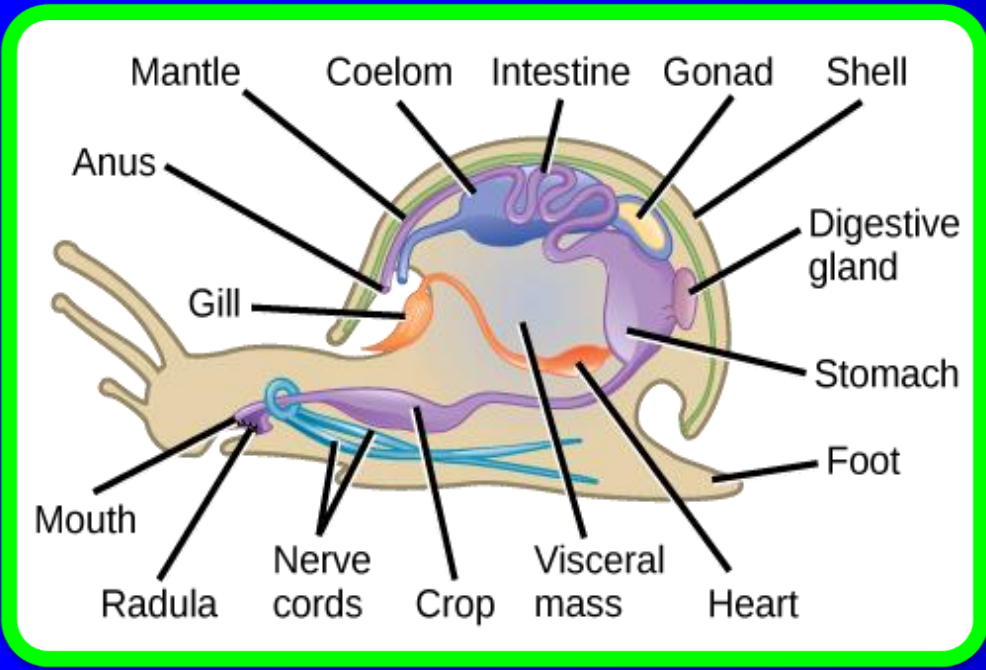
The body is covered by a calcareous shell and is unsegmented with distinct **head**, **muscular foot** and **visceral hump**.

A soft and spongy layer of skin forms a mantle over the visceral hump.

The anterior head region has sensory tentacles.

The **mouth** contains a file-like rasping organ for feeding, called **radula**.





Circulatory System:

It is open type. Blood colour is blue due to the presence of copper containing Haemocyanin.

Respiration:

The space between the hump and the mantle is called the **mantle cavity** in which **feather like gills** are present. They have **respiratory** and **excretory** functions.



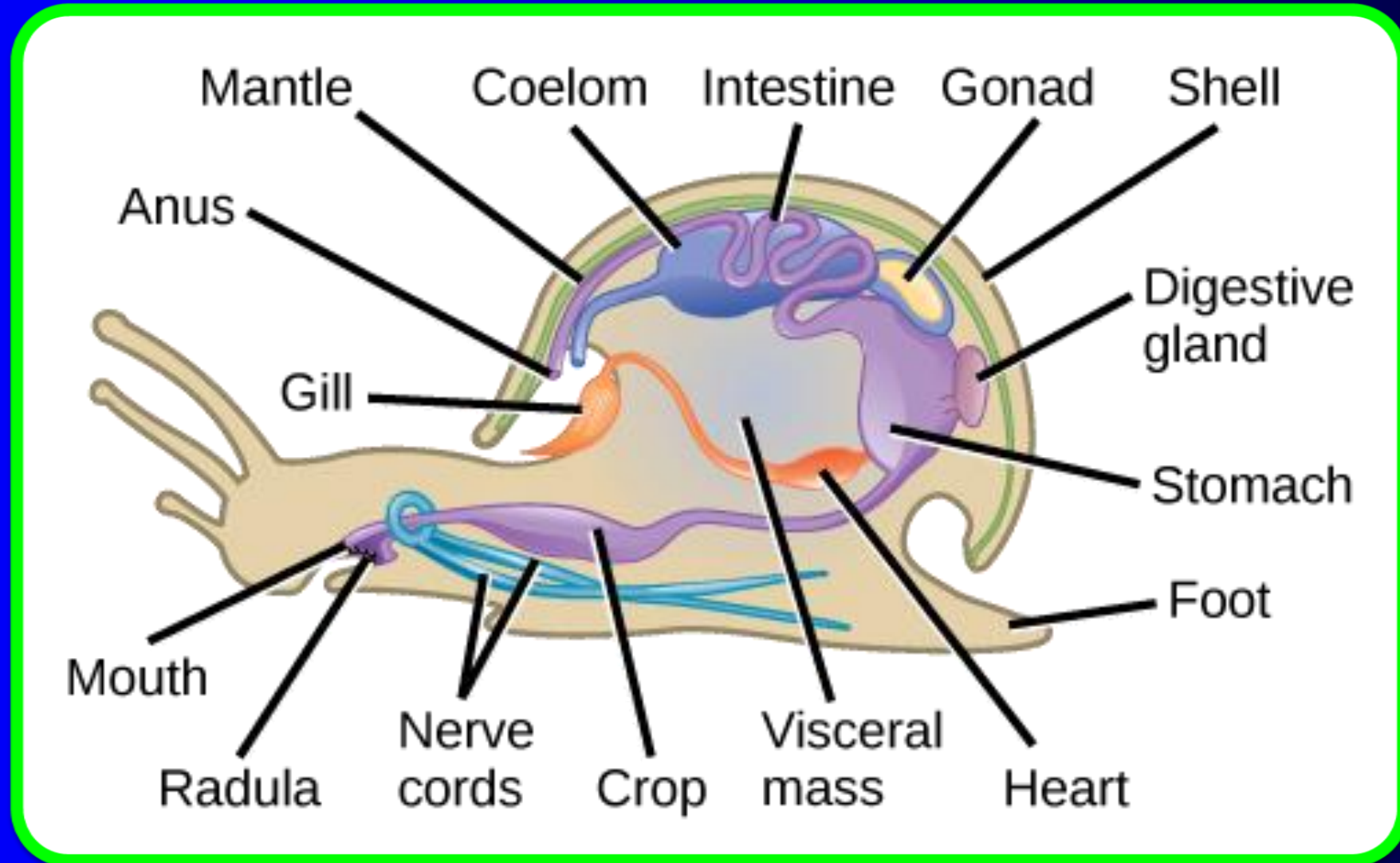
Reproduction:

They are dioecious and oviparous with indirect development.

Scientific Name	Common Name
<i>Pila</i>	Apple snail
<i>Pinctada</i>	Pearl oyster
<i>Sepia</i>	Cuttlefish
<i>Loligo</i>	Squid
<i>Octopus</i>	Devil fish
<i>Aplysia</i>	Seahare
<i>Dentalium</i>	Tusk shell
<i>Chaetopleura</i>	Chiton



Snail



Phylum : Mollusca



Snail

Pila speciosa



Octopus vulgaris





**Phylum
Echinodermata**

Phylum : Echinodermata

Greek : Echinus = Spines, Derma = Skin (Spiny Skinned Organisms)

These animals have an endoskeleton of calcareous ossicles or spiny skin, hence they are named Echinodermata (Spiny skinned Organisms).

Habitat:

All are marine animals.

Organisation:

They have **organ-system level** of organisation.

Germ Layers and Coelom:

They are **triploblastic** and **coelomate animals**.

Symmetry:

The adult echinoderms are **radially symmetrical** but larvae are **bilaterally symmetrical**.



Digestive system:

It is complete with mouth on the lower side and anus on the upper side.

Water Vascular System:

The most distinct feature of echinoderms is the presence of **water vascular system** which helps in **locomotion, capture** and **transport** of food and **respiration**.

Excretory system is absent.

Reproduction:

They are dioecious (Sexes are separate). Sexual reproduction occurs. Fertilisation is external. Development is indirect with free-living larva.



Phylum : Echinodermata

Scientific Name	Common Name
Asterias	Star fish
Echinus	Sea urchin
Antedon	Sea lily
Cucumaria	Sea cucumber
Ophiura	Brittle star



Phylum : Echinodermata



B. John Ebenezer





**Phylum
Hemichordata**

Phylum : Hemichordata

Greek : Hemi = Half, Chordata = Notochord

This phylum consists of a small group of **worm-like** animals

Habitat: They are marine animals.

Organisation:

They have **organ-system level** of organisation.

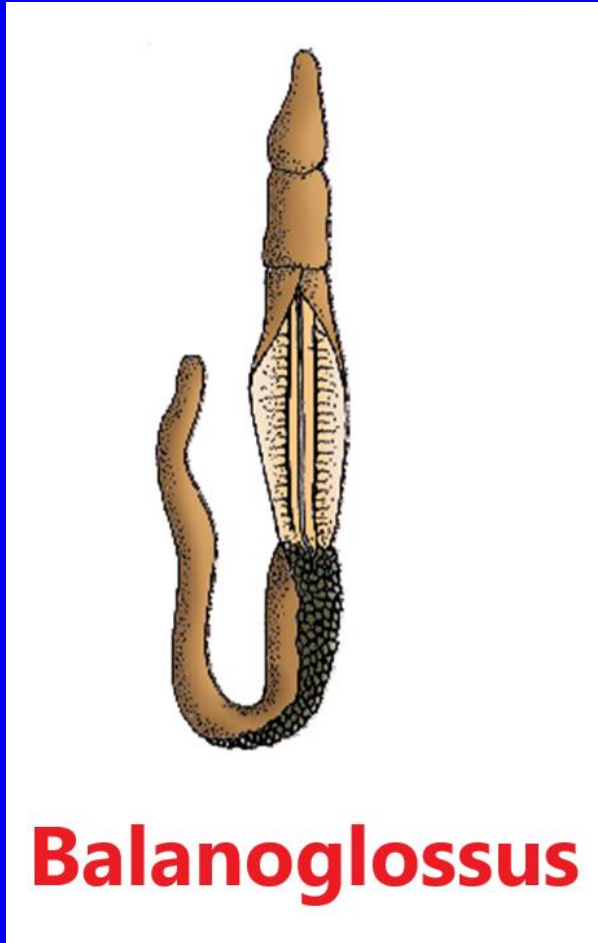
Germ layers and Coelom:

They are **triploblastic** and **coelomate** animals.

Symmetry:

They are bilaterally symmetrical animals.





Body Structure:

The body is cylindrical and is composed of an anterior **proboscis**, a **collar** and a long **trunk**.

Circulatory System: They have open circulatory system

Respiration takes place through gills.

Excretion: Excretory organ is proboscis gland.

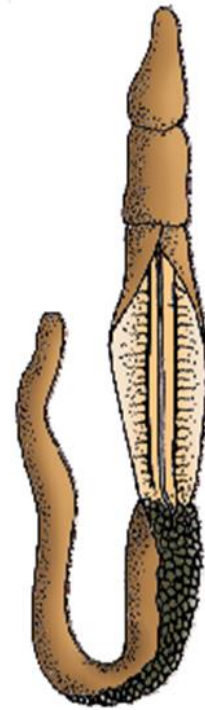
Reproduction:

They are dioecious. Fertilisation is external. Development is indirect.

Examples: *Balanoglossus* and *Saccoglossus*.



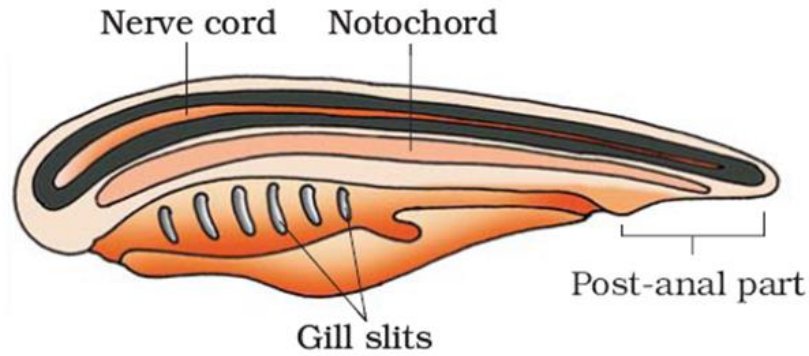
Phylum : Hemichordata



Balanoglossus



FEATURES OF ANIMAL KINGDOM



PHYLUM : CHORDATA



**Phylum
Chordata**

Phylum : Chordata

Animals belonging to phylum Chordata are characterised by the presence of a **notochord**, a dorsal hollow nerve cord and **paired pharyngeal gill slits**.

Organisation:

They have organ-system level of organisation.

Germ Layers and Coelom:

They are triploblastic and coelomate animals.

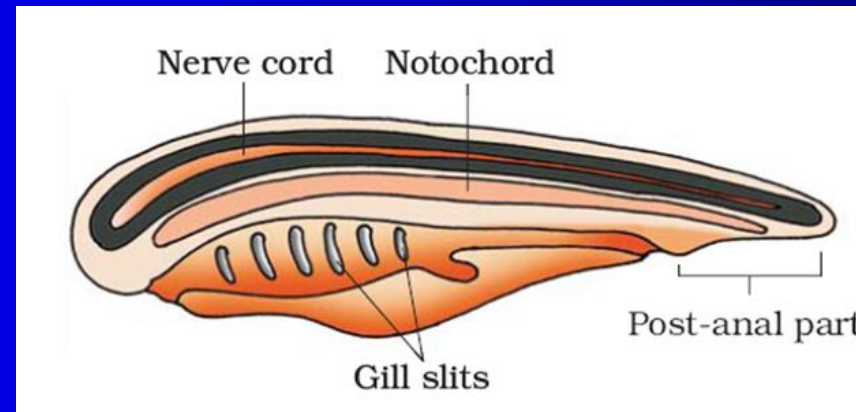
Symmetry:

These are bilaterally symmetrical,

They possess a post anal tail and a closed circulatory system.



Phylum : Chordata



Phylum Chordata is divided into three subphyla:

- 1. Urochordata or Tunicata,**
- 2. Cephalochordata and**
- 3. Vertebrata.**



Subphyla Urochordata and Cephalochordata are known as **protochordates** and are marine.

In Urochordata, **notochord is present only in larval tail.**

In Cephalochordata, notochord runs from **head to tail region and is persistent throughout their life.**



Examples:

Urochordata – Ascidicia, Salpa, Doliolum.

Cephalochordata - Branchiostoma (Amphioxus or Lancelet).



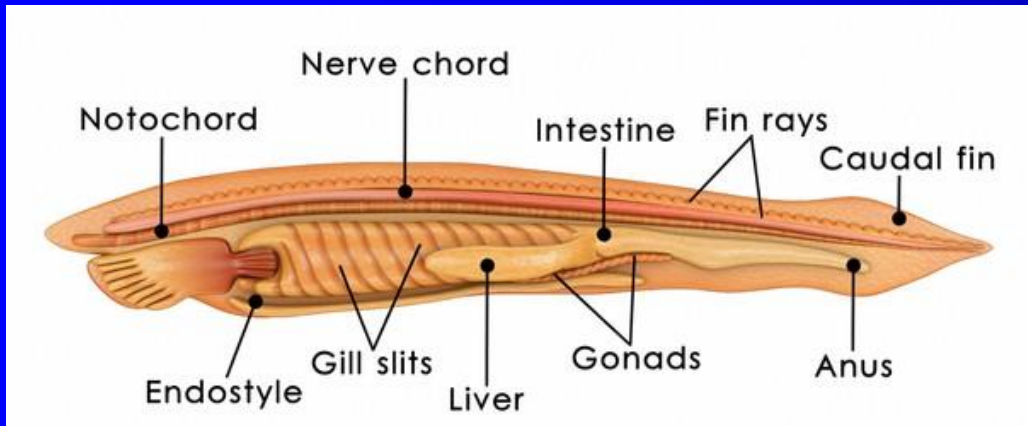
Ascidicia



Salpa



Doliolum



Branchiostoma (Amphioxus or Lancelet).



The members of subphylum Vertebrata possess notochord during the embryonic period.

The notochord is replaced by a cartilaginous or bony **vertebral column** in the adult.

Thus all vertebrates are chordates but all chordates are not vertebrates.

Besides the basic chordate characters, vertebrates have a ventral muscular heart with two, three or four chambers.

Kidneys for excretion and osmoregulation and paired appendages which may be fins or limbs.





**Class
Cyclostomata**

Class : Cyclostomata

All living members of the class Cyclostomata are ectoparasites on some fishes.

They have an elongated body bearing **6-15 pairs of gill slits** for respiration.

Cyclostomes have a sucking and circular mouth without jaws.

Their body is devoid of scales and paired fins.

Cranium and vertebral column are **cartilaginous**.

They have closed circulatory system.



Cyclostomes are marine but migrate for spawning (Releasing eggs and sperm) to fresh water.

After spawning, within a few days, they die.

Their larvae, after metamorphosis, return to the ocean.

Examples: Petromyzon (Lamprey) and Myxine (Hagfish).





Class
Chondrichthyes

Class : Chondrichthyes



Operculum

They are marine animals with **streamlined body** and have **cartilaginous endoskeleton**.

Mouth is located ventrally. **Notochord is persistent throughout life.**

Gill slits are separate and without **operculum** (gill cover).

The skin is tough, containing minute **placoid scales**.

Teeth are modified placoid scales which are backwardly directed.

Their jaws are very powerful. These animals are predators.

Due to the absence of air bladder, they have to swim constantly to avoid sinking.



Placoid scales





Torpedo



Trygon

Heart is two-chambered (one auricle and one ventricle).

Some of them have **electric organs** (e.g., Torpedo)

Some possess **poison sting** (e.g., Trygon).

They are cold-blooded (**poikilothermous**) animals, i.e., they lack the capacity to regulate their body temperature.

Sexes are separate. In males pelvic fins bear claspers.

They have internal fertilisation and many of them are viviparous.



Clasper



Examples: Scoliodon. (Dog fish), Pristis (Saw fish), Carcharodon (Great white shark), Trygon (Sting ray).



Scoliodon (Dog fish)



Carcharodon (Great white shark)



Pristis (Saw fish)

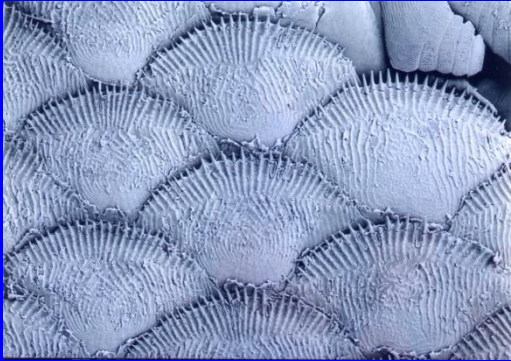


Trygon (String Ray)

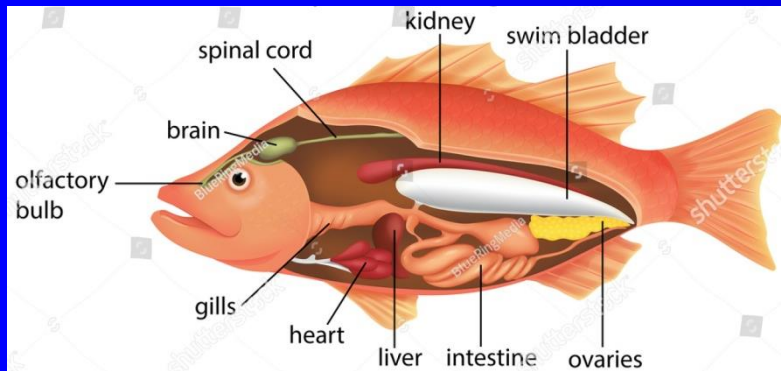




**Class
Osteichthyes**



Cycloid/ctenoid scales



Air bladder

Habitat:

It includes both marine and fresh water fishes with bony endoskeleton.

Their body is streamlined. Mouth is mostly terminal.

They have four pairs of gills which are covered by an **operculum** (gill cover) on each side.

Skin is covered with cycloid/ctenoid scales.

Air bladder is present which regulates buoyancy.

Heart is two- chambered (one auricle and one ventricle).



They are cold-blooded animals.

Reproduction:

Sexes are separate. Fertilisation is external.

They are mostly oviparous and development is direct.

Examples:

Marine Exocoetus (Flying fish)

Hippocampus (Sea horse)

Freshwater Labeo (Rohu)

Catla (Katla)

Clarias (Magur)

Aquarium Betta (Fighting fish)

Pterophyllum (Angel fish)





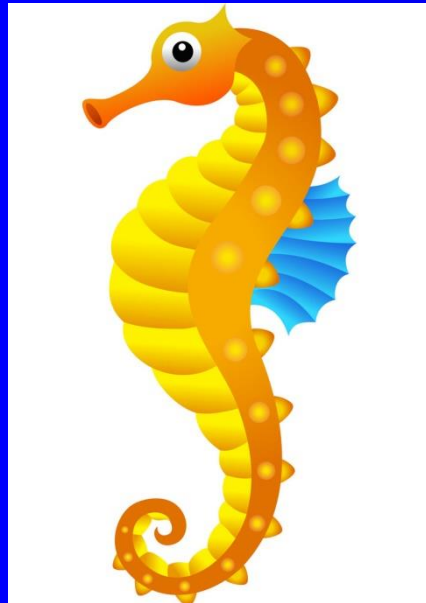
Marine Exocoetus (Flying fish)



Freshwater Labeo (Rohu)



Clarias (Magur)



Hippocampus (Sea horse)



Catla (Katla)



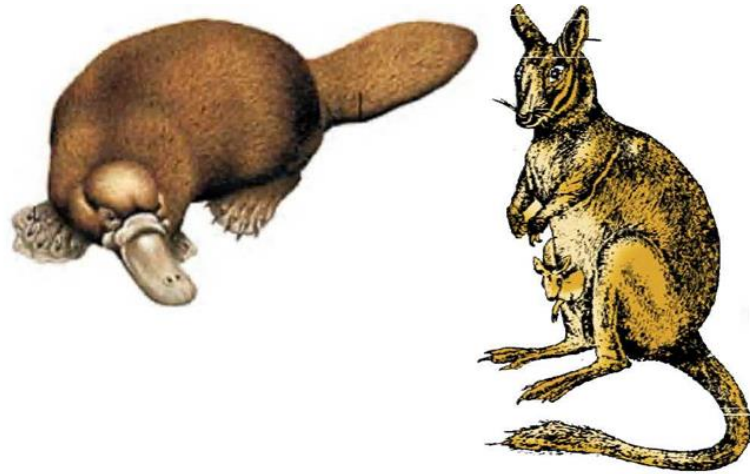
Pterophyllum (Angel fish)



Aquarium Betta (Fighting fish)



FEATURES OF ANIMAL KINGDOM



AMPHIBIA, REPTILIA, AVES, MAMMALIA



**Class
Amphibia**

Class : Amphibia

Greek : Amphi = Both, Bios = Life

Habitat:

Amphibians can live in both aquatic as well as terrestrial habitats.

Most of them have two pairs of limbs.

Body is divisible into **head** and **trunk**. Tail may be present in some.

Skin:

The skin is moist (without scales). The eyes have eyelids.

A **tympanum** represents the ear.



Alimentary canal, urinary and reproductive tracts open into a common chamber called **cloaca** which opens to the exterior.

Respiration is by gills, lungs and through skin. The heart is three-chambered (two auricles and one ventricle).

These are cold-blooded animals.

Reproduction:

They are diecious. Fertilisation is external. They are oviparous and development is indirect.

Examples: Bufo (Toad), Rana (Frog), Hyla (Tree frog), Salamandra (Salamander), Ichthyophis (Limbless amphibia).





Bufo (Toad)



Rana (Frog)



Hyla (Tree frog)



Salamandra (Salamander)



Ichthyophis (Limbless amphibia)





**Class
Reptilia**

Class : Reptilia

Latin : Reptare = To creep = Creeping Vertebrates

Habitat:

They are mostly terrestrial, creeping animals.

Their body is covered by dry and cornified skin, epidermal **scales** or **scutes**.

They do not have external ear openings. Tympanum represents ear.

Limbs, when present, are two pairs.

Heart is usually three-chambered, but four-chambered in crocodiles.



Reptiles are poikilotherms.

Snakes and lizards shed their scales as skin cast.

Reproduction:

Sexes are separate. Fertilisation is internal. They are oviparous and development is direct.



Examples:

Chelone (Turtle),

Testudo (Tortoise),

Chameleon (Tree lizard),

Calotes (Garden lizard),

Crocodilus (Crocodile),

Alligator (Alligator).

Hemidactylus (Wall lizard),

Poisonous snakes Naja (Cobra),

Bangarus (Krait),

Vipera (Viper).



Class : Aves

Greek : Avis = Birds

The characteristic features of Aves are the presence of **feathers** and most of them can fly except flightless birds (e.g., Ostrich).

They possess beak.

The forelimbs are modified into wings.

The hind limbs have scales and are modified for walking, swimming or clasping the tree branches.

Skin is dry without glands except the oil gland at the base of the tail.



Endoskeleton is fully ossified (bony) and the long bones are hollow with **air cavities** (pneumatic).

The digestive system of birds has additional chambers, the crop and gizzard.

Heart is completely four- chambered.

They are warm-blooded (**homoiothermous**) animals, i.e., they are able to maintain a constant body temperature.

Respiration occurs through lungs.

Air sacs connected to lungs supplement respiration.

Reproduction:

Sexes are separate. Fertilisation is internal. They are oviparous and development is direct.



Examples:

Corvus (Crow)

Columba (Pigeon)

Psittacula (Parrot)

Struthio (Ostrich)

Pavo (Peacock)

Aptenodytes (Penguin)

Neophron (Vulture)



Class

Mammalia

Class : Mammalia

Habitat:

They are found in a variety of habitats polar ice caps, deserts, mountains, forests, grasslands and dark caves.

Some of them have adapted to fly or live in water.

The most unique mammalian characteristic is the presence of milk producing glands (**mammary glands**) by which the young ones are nourished.

They have two pairs of limbs, adapted for walking, running, climbing, burrowing, swimming or flying.



The skin of mammals is unique in possessing **hair**.

External ears or **pinnae** are present.

Different types of teeth are present in the jaw.

Heart is four- chambered.

They are homoiothermous.

Respiration occurs through lungs.

Reproduction:

Sexes are separate. Fertilisation is internal. They are mostly viviparous and development is direct.



Examples:

Oviparous- Ornithorhynchus (Platypus)

Viviparous - Macropus (Kangaroo)

Pteropus (Flying fox)

Camelus (Camel)

Macaca (Monkey)

Rattus (Rat)

Canis (Dog)

Felis (Cat)

Elephas (Elephant)

Equus (Horse)

Delphinus (Common dolphin)

Balaenoptera (Blue whale)

Panthera tigris (Tiger)

Panthera leo (Lion)



God Bless You!