Biology

Animal kingdom

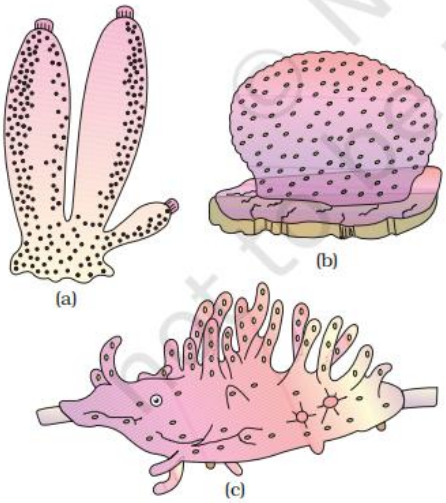


Figure Examples of Porifera : (a) Sycon (b) Euspongia (c) Spongilla

General Characteristics

- Commonly known as **sponges**.
- Mostly marine; a few are freshwater.
- Body is generally asymmetrical.
- They are primitive multicellular animals.
- Show cellular level of organisation.

Canal System

- Body has a water transport (canal) system.
- Water enters through **ostia** (minute pores).
- It passes into the **spongocoel** (central cavity).
- Water comes out through the **osculum**.
- Functions of the canal system:
  - Food collection
  - Respiration
  - Removal of wastes

Special Cells

- **Choanocytes (collar cells)** line the canals and spongocoel.
- They help in food capture and water movement.

Digestion

1. Digestion is **intracellular**.

Skeleton

- Skeleton is made of **spicules** or **spongin fibres**.
- It provides support and protection.

Reproduction

- They are **hermaphrodites** (same individual produces eggs and sperms).
- Asexual reproduction occurs by **fragmentation**.
- Sexual reproduction occurs by the formation of **gametes**.
- Fertilisation is **internal**.
- Development is **indirect** and includes a **larval stage**.

Examples

Sycon (Scypha), Spongilla (Freshwater sponge), Euspongia (Bath sponge).

❖ Phylum Cnidaria (Coelenterata)

Phylum – Cnidaria (Coelenterata)

General Characteristics

- Mostly aquatic and marine animals.
- They are sessile or free-swimming.
- Body shows radial symmetry.
- Tissue level of organisation is present.
- They are diploblastic animals.

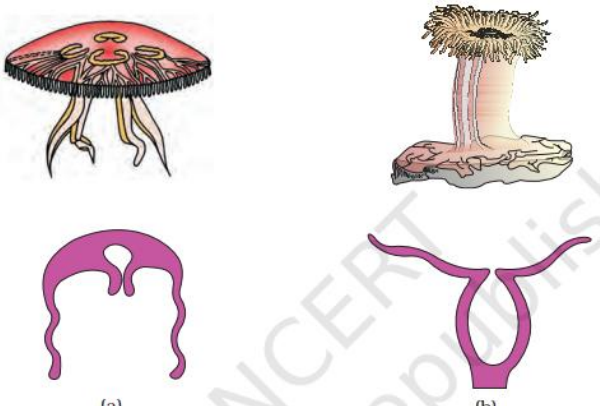


Figure Examples of Coelenterata indicating outline of their body form : (a) Aurelia (Medusa) (b) Adamsia (Polyp)

Cnidocytes (Cnidoblasts)

- The name *Cnidaria* is derived from cnidocytes (cnidoblasts).
- These cells contain nematocysts (stinging capsules).
- They are present on the tentacles and body.
- Functions:
  - Anchorage

Learning Hcrit NCERT

- Defence
- Capture of prey

Body Structure

- Body has a gastrovascular cavity.
- There is only one opening (mouth) on the hypostome.

Digestion

- Digestion is extracellular and intracellular.

Skeleton

- Corals have a calcium carbonate ($CaCO_3$) skeleton.

Body Forms

1. Polyp

- Sessile and cylindrical.
- Examples: **Hydra, Adamsia**

2. Medusa

- Free-swimming and umbrella-shaped.
- Examples: **Aurelia (Jellyfish)**

Metagenesis

- Seen in **Obelia**.
- Polyp produces Medusa by asexual reproduction.
- Medusa produces Polyp by sexual reproduction.

Examples

Physalia, Adamsia, Pennatula, Gorgonia, Meandrina, Aurelia, Hydra, Obelia.

❖ Phylum – Ctenophora (Comb Jellies)

General Characteristics

- Commonly known as **Sea walnuts** or **Comb jellies**.
- They are exclusively marine animals.
- Body shows radial symmetry.
- They are diploblastic.
- Show tissue level of organisation.

Body Structure

- Body has **eight rows of ciliated comb plates**.
- Comb plates help in locomotion.

Digestion

- Digestion is both **extracellular** and **intracellular**.

Special Feature

They show **bioluminescence** (ability to produce light).

Reproduction

- They are hermaphrodites (sexes are not separate).
- Reproduction is only by **sexual method**.
- Fertilisation is **external**.
- Development is **indirect**.

Examples Pleurobrachia, Ctenoplana.

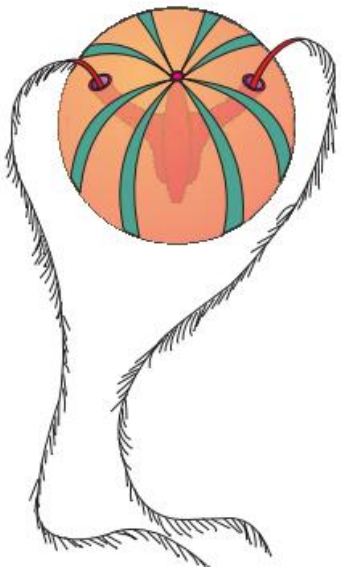


Figure 1 Example of Ctenophora (Pleurobrachia)

❖ Phylum – Platyhelminthes (Flatworms)

General Characteristics

- Body is dorsoventrally flattened.
- Commonly called **Flatworms**.
- Mostly endoparasites found in animals and humans.
- Body shows bilateral symmetry.
- They are triploblastic.
- They are acoelomate.
- Show organ level of organisation.

Special Features

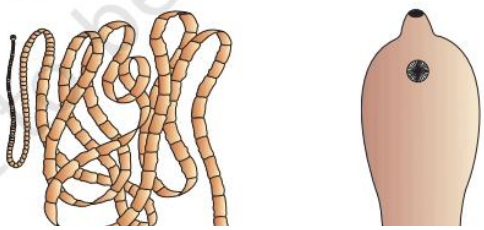


Figure Examples of Platyhelminthes : (a) Tape worm (b) Liver fluke

Learning Horizon

- Parasitic forms possess **hooks and suckers**.
- Some absorb nutrients directly through the body surface.
- **Flame cells** help in excretion and osmoregulation.

Reproduction

- They are hermaphrodites (sexes are not separate).
- Fertilisation is **internal**.
- Development occurs through **many larval stages**.

Special Character : Planaria has a high power of regeneration.

Examples

Taenia (Tapeworm), Fasciola (Liver fluke), Planaria.

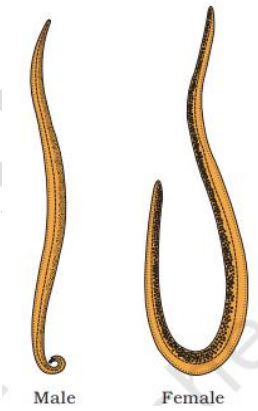
❖ Phylum – Aschelminthes (Roundworms)

General Characteristics

- Body is circular in cross-section.
- Commonly called **Roundworms**.
- They may be free-living or parasitic.
- Found in aquatic, terrestrial habitats, and inside plants and animals.
- Show organ-system level of organisation.
- They are bilaterally symmetrical.
- They are triploblastic.
- They are pseudocoelomate animals.

Body Structure

- Alimentary canal is complete.
- Muscular pharynx is well developed.
- Excretion takes place through an **excretory tube** and **excretory pore**.



Example of Aschelminthes: Roundworm

Reproduction

- Sexes are separate (**dioecious**).
- Females are usually longer than males.
- Fertilisation is **internal**.
- Development may be **direct** or **indirect**.

Examples

Ascaris (Roundworm), Wuchereria (Filaria worm), Ancylostoma (Hookworm).

❖ Phylum – Annelida (Segmented Worms)

General Characteristics

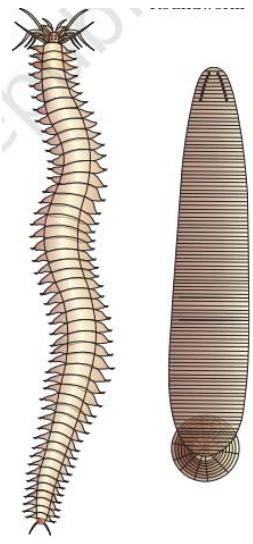
- They may be aquatic (marine and freshwater) or terrestrial.
- They are free-living or parasitic.
- Show organ-system level of organisation.
- Body shows bilateral symmetry.
- They are triploblastic.
- They are coelomate animals.
- Body is metamerically segmented.

Body Structure

- Body is divided into ring-like segments called **metameres**.
- Longitudinal and circular muscles help in locomotion.
- Aquatic forms like **Nereis** possess **parapodia** for swimming.

Organ Systems

- Closed circulatory system is present.
- **Nephridia** help in excretion and osmoregulation.
- Nervous system consists of paired ganglia and a double ventral nerve cord.



Examples of Annelida : (a) Nereis (b) Hirudinaria

Reproduction

- **Nereis** is dioecious (sexes separate).
- **Earthworm** and **Leech** are monoecious (hermaphrodites).
- Reproduction is sexual.

Examples: Nereis, Pheretima (Earthworm), Hirudinaria (Blood-sucking leech).

❖ Phylum – Echinodermata

General Characteristics

- Commonly called **spiny-skinned animals**.
- They are exclusively marine.
- Show organ-system level of organisation.
- Adults are **radially symmetrical**.
- Larvae are **bilaterally symmetrical**.
- They are triploblastic and coelomate animals.

Body Structure

- Endoskeleton is made of **calcareous ossicles**.
- Digestive system is complete.
- Mouth is present on the **ventral (lower)** side.
- Anus is present on the **dorsal (upper)** side.

Special Feature

- **Water vascular system** is present.
- It helps in:
    1. Locomotion
    2. Food capture and transport
    3. Respiration

Excretion

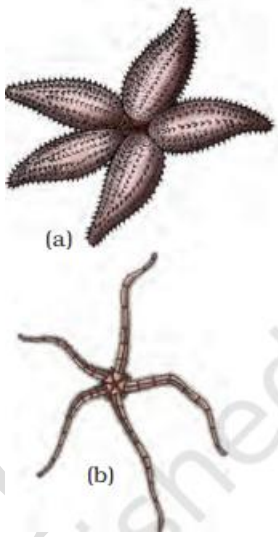
- Excretory system is absent.

Reproduction

- Sexes are separate (**dioecious**).
- Reproduction is sexual.
- Fertilisation is usually **external**.
- Development is **indirect** with a free-swimming larva.

Examples

Asterias (Starfish), Echinus (Sea urchin), Antedon (Sea lily), Cucumaria (Sea cucumber), Ophiura (Brittle star).



Examples of Echinodermata : (a) Asterias (b) Ophiura

❖ Phylum – Hemichordata

General Characteristics

- They are worm-like marine animals.
- Show organ-system level of organisation.
- They are bilaterally symmetrical.
- They are triploblastic.
- They are coelomate animals.
- They possess a **stomochord** in the collar region.

Body Structure

- Body is cylindrical.
- Body is divided into:
    - Proboscis
    - Collar
    - Trunk

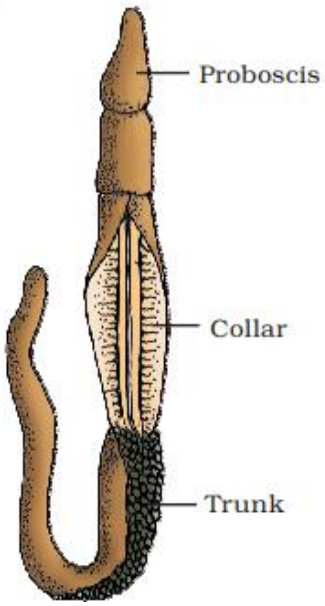
Organ Systems

- Circulatory system is **open type**.
- Respiration takes place through **gills**.
- Excretory organ is the **proboscis gland**.

Reproduction

- Sexes are separate (**dioecious**).
- Fertilisation is **external**.
- Development is **indirect**.

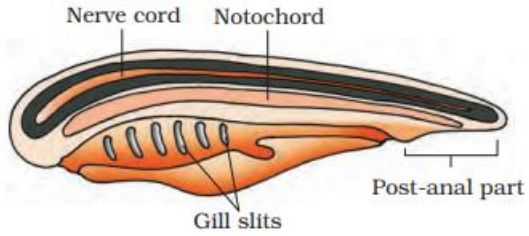
Examples : Balanoglossus, Saccoglossus.



Balanoglossus

Learning Hotspot

❖ Phylum – Chordata



Chordata characteristics

General Characteristics

- Notochord is present at least in the embryonic stage.
- Dorsal hollow nerve cord is present.
- Paired pharyngeal gill slits are present.
- Post-anal tail is present.
- Show organ-system level of organisation.
- They are bilaterally symmetrical.
- They are triploblastic.
- They are coelomate animals.
- Circulatory system is **closed type**.

Examples

Urochordata, Cephalochordata and Vertebrata (Fishes, Amphibians, Reptiles, Birds and Mammals).

Learning Horizon