

CLASSIFICATION OF PLATYHELMINTHES

General Characteristics:

Phylum Platyhelminthes is characterized by the following characters-

1. Multicellular body shows organ grade organization.
2. Platyhelminthes are bilaterally symmetrical and dorso-ventrally flattened.
3. They are triploblastic worms, i.e., their body is derived from three embryonic germ layers namely ectoderm, mesoderm and endoderm.
4. Body shape varies from moderately elongated flattened shape to long flat ribbons and leaf like.
5. Most parasitic flatworms are white and colourless; some of them derive colour from the ingested food. The free-living forms are brown, grey, black or brilliantly coloured.
6. Animals have soft bodies and are unsegmented.
7. Anterior end of body is differentiated into the so called head.
8. Exoskeleton and endoskeleton are absent and hard parts of body such as spines, thorns, hooks, teeth, etc., are formed of scleroproteins.
9. Body is covered with syncytial or single layered, partly ciliated epidermis (e.g. Turbellaria) In parasitic forms (trematodes and cestodes) epidermis is absent and the body is covered with cuticle.
10. Great variety of adhesive secretions, organs of attachment and adhesion (e.g., hooks and suckers) are present. Body surface of flatworms bears two kinds of glands:

Cyanophilous glands (e.g., frontal glands) which secrete slime and **Eosinophilous glands** (e.g., glanduloepidermal adhesive organs) which secrete adhesive substances.

11. The mouth is typically the only opening to the digestive tract when the latter is present. The round or slit-like mouth appears at the site of blastopore (called protostomia). It may occur anywhere on the midventral surface.
12. A true body cavity or coelom is absent; so they are called acoelomates. Space between the organs is filled with a loose mesodermal tissue called parenchyma or mesenchyma.
13. Parenchyma helps in internal transport of materials from cell to cell distribution. Parenchymal tissue fluid is typically circulated as muscular movements squeeze and distort the parenchyma.
14. Digestive system is totally absent in Acoela (Acoela, or the acoels, is an order of small and simple invertebrates in the subphylum Acoelomorpha of phylum Xenacoelomorpha, a deep branching bilaterian group of animals, which resemble flatworms. Historically they were treated as an order of turbellarian flatworms) and tapeworms but in other flat worms it consists of mouth, pharynx and blind and highly branched intestine. It is incomplete due to absence of anus.
15. No special organ for respiratory exchange or transport occurs. Respiration is aerobic in turbellarians but anaerobic in parasitic flatworms.

In turbellarians, the aerobic respiration releases energy mainly by a cyanide-sensitive system, i.e., after dehydrogenation, hydrogen is transferred by a cytochrome-oxidase system to the final acceptor oxygen. A small cyanide-resistant fraction is probably maintained by iron-free oxidases. Anaerobic respiration or parasitic flatworms involves glycogen degradation and formation of carbon dioxide and various organic acids. Different species release different combinations of acids, which indicate diversity among the array of respiratory enzymes.

16. Platyhelminthes are ammonotelic, releasing their nitrogenous waste in the form of ammonia.
17. Excretory system consists of single or paired protonephridia with flame cells or solenocytes. Protonephridia are absent in *Acoela*.

A flame cell is a hollow cell that has a tuft of vibratile cilia.

The protonephridium has traditionally been thought of as a primitive precursor to more complex structures of excretion seen in higher invertebrates (Wilson and Webster, 1974).

Recent work indicates, however, that rather than being primitive, protonephridia are a unique solution to the filtration of extracellular fluid in a body that has no coelom or blood-vascular system (Ruppert and Smith, 1985).

In this case, the solenocytes must actively transport selective materials out of the body fluids into the protonephridial weir (river dam).