Helminths

General Features

The helminthic parasites are **multicellular** (metazoa) **bilaterally symmetrical** animals having **3** germ layers (**triploblastic metazoa**) and belong to the kingdom Metazoa. Helminths, which occur as a parasite in humans belong to2 phyla:

- Phylum Platyhelminthes (flatworms) – It includes 2classes:
    - Class – Cestoda (tapeworms)
    - Class – Trematoda (flukes or digenean's)
- Phylum Nemathelminthes

Nematode

Cestode

Trematode

Phylum Platyhelminthes

The platyhelminths are **tape-like**, dorsoventrally flattened worms.

1- They either lack an alimentary canal (as in cestodes) or their alimentary canal is incomplete, lacking an anus (as in trematodes).

2- The body cavity is absent, viscera are suspended in a gelatinous matrix.

- They are mostly **hermaphrodites** (**monoecious**).
- Phylum Platyhelminthes includes 2 classes:
- ・ Class – Cestoda ・ Class – Trematoda.

	Cestodes	Trematodes	Nematodes
Shape	Tape-like, segmented	Leaf-like unsegmented	Elongated, cylindrical, unsegmented
Head end	Suckers present; some have attached hooks	Suckers are present but no hooks	Hooks and sucker absent. Well-developed buccal capsule with teeth or cutting plates seen in some species
Alimentary canal	Absent	Present but incomplete, no anus	Complete with anus
Body cavity	Absent, but inside is filled with spongy undifferentiated mesenchymatous cells, in the midst of which lie the viscera	Same as cestodes	Present and known as **pseudocele**. Viscera remains suspended in the pseudocele
Sex	Not separate: hermaphrodite (monecious)	Not separate: hermaphrodite except *Schistsoma*	Separate (diecious)
Life cycle	Requires 2 host except *Hymenolepis* (1 host) and *Diphyllobothrum* (3 host)	Requires 3 host except schistosomes (2 host)	Requires 1 host except filarial worms (2 host) and *Dracunculus* (2 host)

Important Features of Helminths

Adult Worms

Helminths have an outer protective covering, the cuticle or **integument**, which may be tough and armed with spines or hooks. The cuticle of live helminths is resistant to intestinal digestion.

- The mouth may be provided with teeth or cutting plates. Many helminths possess suckers or hooks for attachment to host tissues.
- They do not possess organs of locomotion, but in some species, the suckers assist in movement.

- Locomotion is generally by muscular contraction and relaxation.
- Many helminths have a primitive nervous system.
- The excretory system is better developed.
- The greatest development is seen in the reproductive system.

- Helminths may be **monoecious** (with functioning male and female sex organs in the same individual) or **diecious** (the two sexes, male and female, separate). In the hermaphroditic helminths, both male and female reproductive systems are present in the same worm, and self-fertilization, as well as cross-fertilization, take place. (e.g. *Taenia solium*).
- In the **diecious** species, males and females are separate, the male being smaller than the female. (e.g. *Ascaris lumbricoides*) Rarely, the female is **parthenogenic**, being able to produce fertile eggs or larvae without mating with males (e.g. *Strongyloides*).

Eggs

The **eggs** or **larvae** are produced in enormous numbers as many as 200,000 or more per female per day. Various helminths have distinct morphology of eggs, which can be used to differentiate the helminths (discussed in the respective chapters).

Larval Forms

There are various larval forms of helminths found in man and other hosts. These forms are as follows:

Cestodes: The various larval forms are cysticercus, coenurus, coracidium, cystecercoid, procercoid, hydatid cyst, and plerocercoid forms.

Trematodes: The various larval forms are miracidium, cercaria, redia, metacercaria, and sporocyst.

Nematodes: The various larval forms are microfllaria, fllariform larvae, and rhabditiform larvae.