Chapter 4 Phylum Platyhelminthes

Platyhelminthes, or flatworms, is a group of organisms, including one class of mostly free-living individuals (Class Turbellaria) and three classes of exclusively parasitic individuals (Class Monogenea, Class Trematoda and Class Cestoda). They are **acoelomate** (have no coelom) and **triploblastic** (three germ layers), and have **bilateral symmetry**.

General structure and function

In the turbellarians, the epidermis forms a protective mucous sheath around the body. In Monogenea, Trematoda and Cestoda the worms have a syncytial integument. Muscles are well-developed and parenchymal cells fill the space between the muscles and visceral organs.

The digestive system is incomplete, and consists of mouth, pharynx and intestine. Undigested food is egested through the pharynx. Turbellarians and trematodes have a highly branched digestive system, which is lacking in cestodes. The cestode host's predigested food directly passes through the integument.

The excretory system of almost all flatworms is composed of two lateral canals with branches bearing **flame cells** (protonephridia). They open to the outside through nephrediopore. Metabolic wastes are largely removed by diffusion through the body wall.

The nervous system consists of a pair of anterior ganglia with two longitudinal nerve cords. The turbellarians and some flukes develop sense organs called **ocelli**, or light-sensitive eyespots. In flatworms, tactile cells and chemoreceptive cells are located all over the body and they are abundant in the auricles (Fig. 1) of planarians.

Most flatworms are monoecious and have cross fertilization. The reproductive system has gonads, ducts and accessory organs. However, many turbellarians can reproduce by fission, and flukes reproduce asexually in their snail hosts.

Ecological relationships and economic importance in the region

The flatworms consist of free-living and parasitic forms. Relatively few turbellarians, such as planarians, live in freshwater habitats. All members of the classes Monogenea, Trematoda and Cestoda are parasitic. Most of the Monogenea are ectoparasites on fishes, but all the trematodes and cestodes are endoparasites in both invertebrates and vertebrates.

Classification

Class Turbellaria

Members of turbellarians usually are free-living forms. The body is covered with a ciliated epidermis containing secretory cells and rhabdites, example: *Dugesia* (planaria) (Fig. 1).

Class Monogenea

The body is covered with a syncytial integument. They are parasitic mostly on the skin or gills of fishes.

Class Trematoda

The body is covered with a syncytial integument. They are leaf-like or cylindrical in shape. They usually have oral and ventral suckers, but no hooks. Foods move from the mouth through the esophagus and into a branched intestine. They are monoecious, with a complex life cycle having invertebrate intermediate hosts and vertebrate final hosts, examples: the liver fluke (*Opisthocis viverini*) and the human blood fluke (*Schistosoma mansoni*).

Class Cestoda

Cestodes, or tapeworms, have a syncytial integument, and are tape-like in shape. The body consists of scolex, neck and proglottids. They are intestinal parasites in vertebrate digestive tracts, examples: pork tapeworm (*Taenia solium*) and fish tapeworm (*Diphyllobothrium latum*).

The most well-known free-living flatworm in freshwater is the planarian (family Planariidae, order Tricladida). Planarians are mainly carnivorous feeding largely on small invertebrates. They use their anterior end to wrap up prey and then they extend the proboscis to suck up the food. They usually glide around on rocks and debris in both flowing and standing water habitats.

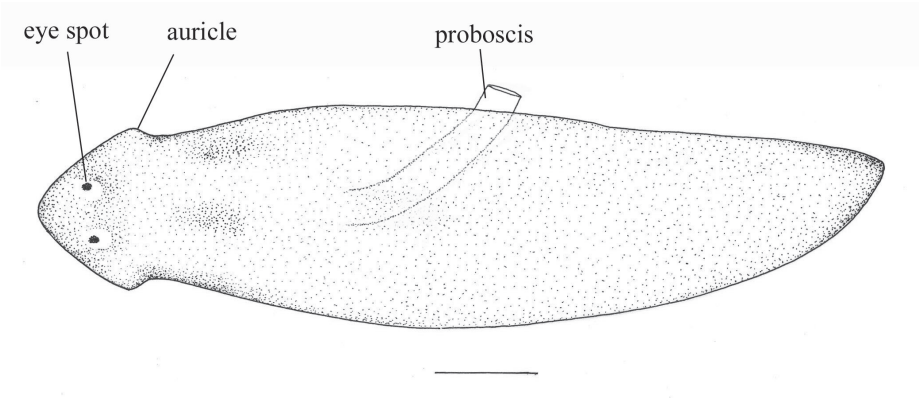

Fig. 1 Structure of planarian.
Scale = 1 mm.