Chapter 8-3: Phylum Platyhelminthes

There are approximately 20,000 species in the phylum Platyhelminthes. Platyhelminthes are flatworms that inhabit marine and freshwater environments and include free-living forms as well as parasitic flukes and tapeworms. They range in size from the nearly microscopic species to tapeworms that are over twenty meters in length.

One of the most familiar flatworms is the planarian of the genus *Dugesia*. This animal is used extensively in introductory biology laboratories and will be a major topic of this plate.

As you look over the plate, notice that we present information on three types of flatworms, including the planarian. A mixture of light and dark colors is recommended; you should use darker colors for the anatomical features. Light colors should be used on the larger specimens and the background areas. Begin your work by focusing on the anatomy of the flatworm, a representative of the planarian *Dugesia*.

The planarian is a free-living flatworm that moves along rock surfaces by gliding or rhythmic muscle waves, or over a slime track secreted by its adhesive glands. The animal has a **gastrovascular cavity (A)** that is similar to that of the cnidarian discussed in the previous plate. There is only one opening to the gastrovascular cavity at the **pharynx (B)**, but there are several dead-end sacs along the branches of the cavity. This animal consumes small worms, protozoa, and insects.

The nervous system of the flatworm is organized into two **nerve cords (C)** that can be seen running along the sides of the animal. The nerve cords meet at two primitive brains called **ganglia (D)**, which are masses of nerve cells. The animal also has two **eyespots (E)** that detect light.

We will continue our study of flatworm anatomy by focusing on its symmetry and germ layers. Continue your reading below as you focus on the remaining whole section and cross section of *Dugesia*.

The excretory system of the flatworm consists of a number of canals and tubules that come together to form a series of **protonephridia (F)**. This system is shown in the whole section and should be colored in a dark color; as you can see, the **left side (G)** is a mirror image of the **right side (H)**. This type of symmetry is called bilateral symmetry.

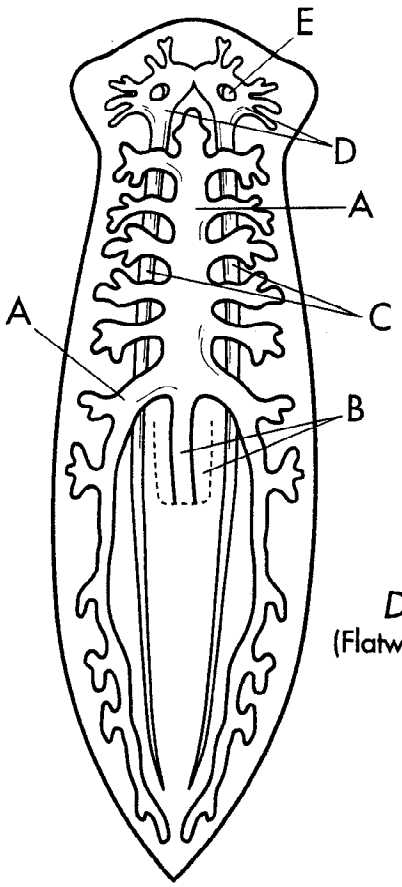
An important evolutionary feature of the cnidarians is their three germ layers, seen here in cross section. They exist in the embryonic stage and are the layers from which all organs are formed. Surrounding the gastrovascular cavity (A) are the **endoderm (I)**, **the mesoderm (J)**, and the **ectoderm (K)**. As you may recall, cnidarians possess only two germ layers. Flatworms also show the rudimentary beginnings of a head region.

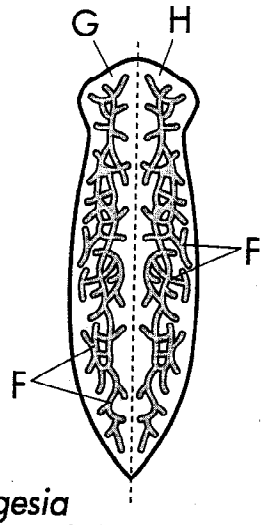
We will now turn our attention to another type of flatworm called the fluke. As a representative fluke, we examine *Schistosoma mansoni*. This flatworm is a parasite. Focus your attention on the section called fluke life cycle, and begin reading below.

Notice the similarity of the **fluke (L)** to *Dugesia* described previously; it possesses many of the same organs. The fluke's life cycle begins when workers in irrigated fields are infected with human feces contaminated with the larvae of flukes. They can enter the body of the worker and travel to the liver of the **human (M)**, where they deposit eggs. These pass out of the human intestine and hatch to become miracidium, the larval form that infects the intermediate host, the **snail (N)**. In the snail, the miracidium develops into the cercaria, which is the larval form that infects the final host—the human. This type of life cycle depends upon a primary host (human) and an intermediary host (snail).

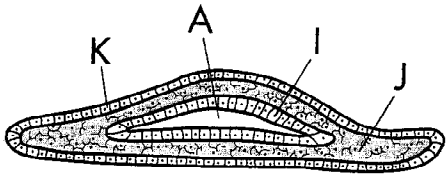
We close the plate with a brief examination of a third flatworm, the tapeworm. Like flukes, they are parasites. Continue your reading below and focus on the diagram of the tapeworm in the plate.

Tapeworms have long, flat bodies and little internal detail. They lack digestive cavities and attach to the inner walls of their host animals, absorbing food through their skin. The attachment organ of the tapeworm is called the **scolex (O)**. It has several suckers, and in some cases it also has hooks. Behind the scolex is a short neck, and then a series of repetitive segments called **proglottids (P)**. At the end of the body, the gravid proglottids produce eggs, which provide the next generation of tapeworms.





Dugesia
(Flatworm – whole)

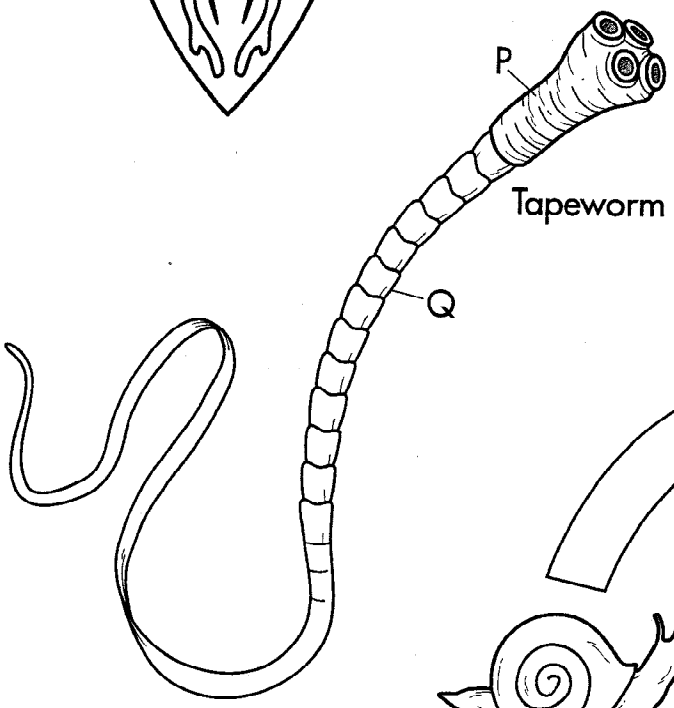


Cross-section

Phylum Platyhelminthes

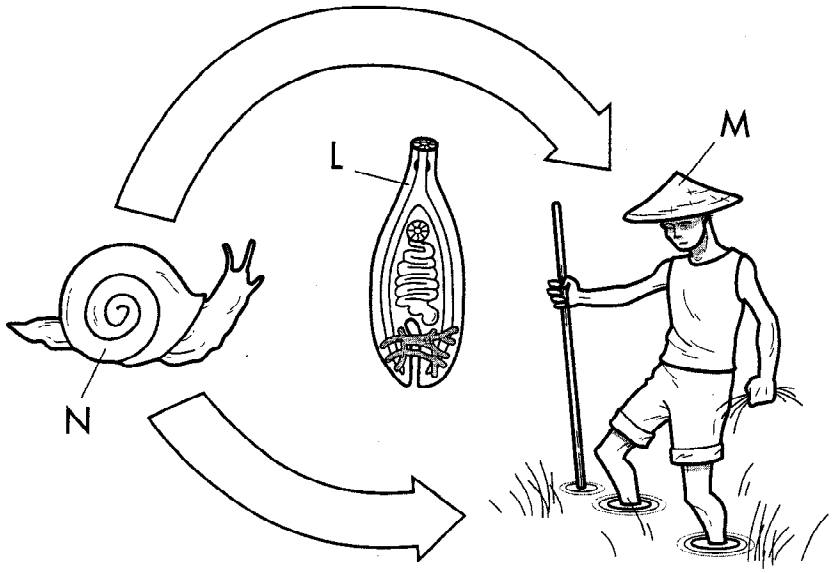
Flatworm Anatomy

- ○ Gastrovascular Cavity .....A
- ○ Pharynx .....B
- ○ Nerve Cords C
- ○ Ganglia .....D
- ○ Eyespot .....E
- ○ Protonephridia ....F
- ○ Left Side .....G
- ○ Right Side .....H
- ○ Endoderm I
- ○ Mesoderm .....J
- ○ Ectoderm .....K



Tapeworm

Fluke Life Cycle



Flatworm Life Cycle

- ○ Liver Fluke L
- ○ Human .....M
- ○ Snail .....N

Tapeworm

- ○ Scolex .....O
- ○ Proglottids .....P