

1

1

Phylum Platyhelminthes

They exhibit bilateral symmetry, cephalization, bodies are dorsoventrally flattened.

Acoelomates with 3 germ layers

The mesoderm gives rise to muscles, various organs systems, and the **parenchyma**

Evolutionary Relationships among Flatworms

What all flatworms have in common, apart from their flatness, is that they lack an anus and they lack a coelom

Recent evidence suggests that the flatworms (acoels, flukes, tapeworms and turbellarians) are a heterogeneous collection of worms that should not be united under one name (Acoels have been recently removed from the Platyhelminthes into its own phylum – Acoelomorpha)

The genuinely primitive kind are the Acoela and Nemertodermatida (both member of the phylum Acoelomorpha)

The Acoela are named for their lack of coelom which, for them and the Nemertodermatida but not the Platyhelminthes proper, is a primitive lack

The main group of flatworms proper, the flukes, tapeworms, and turbellarians, are now thought to have lost their anus and their coelom secondarily

The Acoelomorpha

Almost all acoels live in marine habitats

In addition to lacking a coelom, they lack a gut

Some species supplement their diet by living in symbiotic association with photosynthetic protistans

Outer Body Covering

Often covered by a ciliated epidermis

Epidermal cells contain rod-shaped structures called **rhabdites**

The outer body covering of some platyhelminthes is a **tegument**

The tegument is essentially a **syncytial epithelium**

Organ Systems of the Platyhelminthes

1. Digestive System

2
2

2. Excretory System (osmoregulation)

It includes a network of water collecting tubules adjacent to a **flame cell** or a **protonephridia**

When cilia beat they move water into the tubules and out the body through pores called **nephridiopores**

3. Muscular System

4. Nervous System

The nervous system includes: anterior cerebral ganglia, longitudinal nerve cords, and some lateral nerves

Sensory organs common among the free-living planarians

5. Reproductive System

Most are capable of some form of asexual reproduction

Most flatworms are *hermaphroditic* - possess both testes and ovaries

However, they often pair with other individuals to exchange gametes

1. Class Turbellaria

Locomotion

Most move by means of cilia and mucous

But muscle contractions also permit turning, twisting and folding of the body

Nutrition

Turbellarians are carnivores and prey on other animals or eat dead animal remains.

Senses

Because they are predators they have well developed sensory structures including eyespots, mechanoreceptors, and chemoreceptors

Reproduction

3

3

Planarians are capable of asexual reproduction and exhibit a powerful means of regeneration

The common form of asexual reproduction is fission

They are hermaphrodites but usually exhibit cross-fertilization

In these groups, sperm transfer is by **hypodermic impregnation**

2. Class Trematoda

These are the flukes that live as parasites either on or in other organisms.

They possess 2 suckers:

1. An oral sucker which attaches to organs of the host
2. A ventral sucker which is used to attach the parasite to host tissues and organs

It does not lead to the digestive system

They often have complex life cycles that alternate between sexual and asexual stages.

1. A definitive host (primary host)
2. An intermediate host

Generic Life cycle

Eggs are passed out of the definitive host and hatch as ciliated larvae called **miracidia**

The miracidia penetrates a snail molluscan host and becomes a **sporocyst**

They undergo asexual reproduction producing larvae called **rediae**

Rediae often asexually produce more rediae, but will eventually give rise to larvae called **cercaria**

They leave the molluscan host and penetrate fish

They encyst in the fish tissues as the **metacercaria**

Consumption of infected fish results in the metacercaria excysting in the gut and moving to the bile duct

3. Class Cestoda

These are the tapeworms whose adults live in the intestines of vertebrate animals.

4

4

Body covered by a nonciliated tegument composed of glycoprotein

The head is called a **scolex**, and it is armed with suckers and hooks for attachment purposes.

Extending from the head is a series of sections called **proglottids**.

They are continually being produced from the neck region

A commonly cited example is the beef tapeworm, *Taeniarhynchus saginatus*

Humans become infected by eating under cooked meat

Eggs are shed in the feces

Infected person defecates in a pasture and the eggs are ingested by cattle

Eggs hatch giving rise to **oncosphere larvae** that bore into the intestinal wall and get into the circulatory system to be transported to muscle

Here the larvae develop into the **cysticercus** stage (**=the bladder worm**) with the inverted scolex

If uncooked beef is consumed the cysticercus is freed and the scolex everts, forming the adult