Worms - Platyhelminthes, Nematoda, Annelida

- numerous animal phyla are worms of one kind or another. We are only looking at three phyla of "worms".

- also, we are NOT going in taxonomic order in what follows. Usually, many more groups are covered before getting to the Annelids or Nematodes (your book turns everything upside down here).

Phylum Platyhelminthes - Flat worms (12,000 species) **[Fig. 33.10, p. 675]**

- Bilateral symmetry.

    - this is often a result of moving in one direction, thus having a "head" end.

- flattened dorso-ventrally (thin from front to back).

    - anatomical terms - learn them (see the start of the pig dissection in the lab manual for more terms).

- have mesoderm, and are generally much more complicated than cnidarians, but still fairly primitive for animals (all higher animals have three layers).

- gut (if present) only has a single opening.

- acoelomate (no body cavity)

- have distinct organs and organ systems (e.g., digestive, nervous, reproductive, etc. [but NO circulatory system!])

Classes you need to know **[TABLE 33.2, p. 674]**

Turbellaria - Planarians and similar. **[similar to Fig. 33.9, p. 675]**

- mostly marine and free living. Carnivorous.

- have a simple excretory system to remove nitrogenous wastes (flame cells, more later in the semester).

- finely divided gastrovascular cavity (brings food to all parts, and allows for better digestion).

- move by using several different muscle groups (working against a hydrostatic skeleton), or by using cilia (hence "turbellaria).

- simple brain, eye-spots. Even show some learning ability.

- reproduce asexually through regeneration, or sexually (hermaphroditic).

Monogenea - flukes, mostly ectoparasites of fish.

Trematoda - flukes **[Fig., not in book]**:

- are parasitic; live in organs and tissues of their host.

- many cause important diseases of humans.

- some general characteristics:

    - two suckers
    - have at least two hosts (will explain this shortly).
    - adults reproduce sexually and have a high reproductive potential - why?
    - juveniles can reproduce asexually

- Example: schistosomiasis (or sometimes, billharzia)[OVERHEAD, fig. 33.11, p. 675]

    - fertilized eggs exit host through feces.

    - eggs develop into ciliated larvae, which then infect snails.

    - Once inside the snail, they reproduce asexually and develop into larval flukes, which are then released.

    - these larval flukes bore through skin of humans

    - move to veins that bring blood from small intestine to liver and feed off of host

    - reproduce sexually, producing many eggs. These are released into feces (or in some species, urine).

    - Schistosomiasis is very debilitating [body pains, dysentery, anemia, lack of energy; has also been linked to increased rates of some cancers], and is a major medical problem in many parts of Africa and South America [Don't go swimming or wading in stagnant fresh water areas].

    - An estimated 207 million people are infected!

    - An example: Aswan dam - disease incidence jumped from 5% to 75%. This is progress??

- Can be cured, though as usual, cure is easier to get in wealthy countries.

Cestoda - tape worms.

- also parasitic in many different groups.

- head (or scolex) anchors worm to intestine.

- following scolex are proglottids, which are "segments" that are mostly sacs of reproductive tissues. As these develop, eggs form inside them. Toward "end" of worm, proglottids are mature and burst open to release eggs into feces.

- no digestive system (why?).

- cause nutritional deficiencies since a lot of food feeds the worm instead of the person

- diet?

Phylum Nematoda - round worms (90,000 described species, though probably many more exist) **[Fig. 33.25, p. 683]**

- round, mostly circular in cross section

- pseudocoelom: a body cavity not located within mesoderm, though it functions much the same.

- do not have cilia, but have a thick cuticle. Together with pseudocoelom (which provides a hydrostatic skeleton) provides a skeleton for the worm.

- complete digestive tract - mouth -> anus.

- only have longitudinal muscles. Therefore move by "thrashing" or "whipping" around (bend from one side to the other).

- no circulatory system.

- probably the most numerous group of animals in terms of numbers of individuals (90,000+ found in one rotten apple).

- many important pests and parasites in this group. Some examples:

- Filarial worms - one species can clog lymphatic vessels, leading to "elephantiasis". Spread by mosquitos. Was on the decrease, but recently increasing again.

- Trichinella [go over life cycle]:

  - raw undercooked meat eaten (often pork, in this country, though claims are made that this has gotten much better)

  - larvae break out of cyst, mature to adults in gut

  - adults mate, females embed in walls of intestine

  - larvae released into blood or lymph

  - larvae migrate to skeletal muscles and encyst.

  - problem - feeding pork to pork!

- Ascaris, hookworm, Guinea worm, etc.

- Finally, pinworm - affects 60% of kids in the United States! Fortunately not a serious parasite.

- But many (most!) species are free living (e.g., vinegar eels used in lab)

Phylum Annelida - segmented worms (about 12,000 species)

- an old theory says they gave rise to the arthropods. More recent information seems to contradict this, though.

- earthworms and leeches probably best known examples.

Major characteristics **[Fig. 33.22, p.681]**

- true coelom, though partitioned by septa (segmented)
(septa are incomplete in polychaetes).

- digestive tract, blood vessels, nerve cords run the length of the animal

- "heart" (actually pumping blood vessels) and blood vessels present (earthworms respire through skin) - closed system.

- metanephridia (a primitive kidney)

- brainlike ganglia

- hermaphroditic, but cross fertilize (clitellum is reproductive organ).

- muscles - circular, longitudinal, others.

- hydrostatic skeleton **[Fig. 50.33, p. 1113]**

Three major classes (see table 33.4, p. 680):

Polychaetes **[Fig. 33.23, p. 682]**:

- parapodia - "pair" of lobes (paddles) with setae (stiff hair like projections used for traction) that help worm move. These parapodia are also vascularized (i.e., supplied with lots of blood vessels) for respiration.

- no permanent gonads.

- feed in many different ways (will discuss some of this later in the semester). Mostly marine.

Oligochaeta - earthworms:

- live in soil and fresh water

- only have a few setae per segment, and no parapodia.

- clitellum is used for mating (line up and transfer sperm across clitellum).

- feed on soil nutrients and decaying vegetation. Important in keeping soil aerated. See note in text book about Darwin (1 acre => 50,000 worms).

Hirudinea - leeches **[Fig. 33.24, p. 682]**:

- setae lost
- have clitellum
- have suckers front and back (for locomotion)
- raptorial or parasitic (have anti-coagulant in saliva)
- not very segmented internally - lots of connective tissues instead.

- some are again being used in medicine to help alleviate tissue swelling (anti-coagulants).

Other worms **[Fig, not in book]**:

There are many, many phyla of worms. You don't need to know the specifics here, just that they exist.