PHYLUM PLATYHELMINTHES

1. General Information
   - Meaning 'flatworms'
   - Examples: Planaria, Flukes, Tapeworms

2. Characteristics
   - 3 cell layers – ectoderm, mesoderm, and endoderm
   - This becomes an organ level of development eg reproductive, muscular, and excretory organs
   - Exhibit cephalization (concentration of sensory and nervous tissue at the anterior end)
   - Mesoderm layer will develop reproductive, muscular, and excretory organs
   - These organisms have anterior / posterior ends as well as ventral / dorsal surfaces

3. Classification
   a) Class Turbellaria – 'free-living' flatworms eg Planaria
   b) Class Trematoda – parasitic eg Sheep Liver Fluke, Chinese Liver Fluke
   c) Class Cestoda – parasitic eg Tapeworms

Class Turbellaria

1. Habitat
   - Most are marine but some are found in fresh water
   - Some are terrestrial

2. Ingestion, Digestion, and Elimination in Planaria
   - Diet: small animals, dead and decaying materials
   - Mouth on ventral surface allows muscular pharynx to be extended
   - Pharynx inserts into prey, secretes enzymes that partially break down food, and these pieces are sucked up by the pharynx into the mouth
   - Digestion occurs in the many branches of the gastrovascular cavity (a great # of branches increases surface area so nutrients can be absorbed)
   - Undigested food is eliminated out the pharynx and mouth

3. Excretion
   - The excretory 'system' is composed of flame cells, excretory tubules and excretory pores.
   - The cilia of flame cells beat and remove excess H_2O and nitrogenous wastes from tissue cells to the excretory tubules and out the excretory pores
   - The development of the system is necessary because of the greater # of cells and the density. More nitrogenous wastes and excess H_2O need to be removed

4. Circulation and Respiration
   - Gastrovascular cavity serves to distribute nutrients and diffused O_2 / CO_2

5. Nervous System
   - See handout and also p454
   - Exhibits cephalization, contains knots of nerve tissue at the anterior end
   - Ganglia attaches to a pair of ventral nerve cords
   - The anterior end contains eye spots that are sensitive to light and pointed lobes that are sensitive to touch.

6. Muscular System
   - 2 layers of muscle tissue below the ectoderm layer
   - The longitudinal and circular layers of muscle tissue allow the planaria to contract, twist, turn, and are stimulated by the nervous system to allow movement

7. Reproduction
   a) Asexual: binary fission
      - They regenerate any missing parts
   b) Sexual: hermaphrodites trade sperm with each other
      - Fertilization is internal → zygote is released into H_2O

CLASS TREMATODA

* Parasitic flukes eg. sheep liver flukes, blood flukes
* leaf-shaped, they are dorsally/ventrally, flattened
* thick cuticle to prevent digestion by the host
* have 1 or more suckers to hold onto the host

DIGESTION
* muscular pharynx sucks up blood from tissue and takes it through the mouth into the 2 sided GVC. The GVC has many ranches to increase the surface area for digestion and absorption of nutrients

CIRCULATION
* GVC also circulates nutrients and CO_2 / O_2 gases for respiration

ADDITIONAL CHARACTERISTICS
* nervous / muscular systems are greatly reduced or absent
* they produce 1000's of eggs since very few survive
* they are hermaphrodites with a complex life cycle involving more than one host.

CLASS CESTODA

* parasitic tapeworms
* live in humans, dogs, cats, cows, elk, moose, bears….
* They are long & dorsally/ventrally flattened
* Have a tough integument to prevent being digested by host
* Have a scolex (head) surrounded by suckers/hooks to attach to the host
* Excretory, nervous, muscular systems are reduced or absent

* Digestive system is absent as they are bathed in nutrients and nutrients enter by diffusion
* Reproductive organs are found in proglottids (segments)
* They are hermaphrodites and can produce 1000's of eggs each

PARASITIC ADAPTATIONS OF TAPEWORMS AND FLUKES

* have suckers & hooks so that they can attach to the host
* have a tough tegument to prevent being digested by the host (tapeworm) or they have a cuticle (flukes)
* absent or reduced digestive, circulatory, and muscular systems as they are parasites living inside a host
* produce 10's to 1000's of eggs to ensure survival
* have a complex lifecycle which involves several hosts and different environmental conditions which makes prevention difficult.