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 H₂O 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 H₂O need to be removed

4. Circulation and Respiration
   • Gastrovascular cavity serves to distribute nutrients and diffused O₂ / CO₂
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 H₂O

   **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 CO₂ / O₂ 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.