

Flatworms/ Rotifers

- 1) **Clade** (clades are a group of related phylum) Platyzoa
 - a) **Platyzoa** consist of 6 phyla, however most of these phyla are represented by a very small number of species and are debated on where they fall taxonomically.
 - b) These organisms represent the beginning of bilateral symmetry
 - i) For organisms like sponges and Cnidarians it is to their advantage to be radial symmetrical because they can collect food from any angle
 - ii) However now organisms show a distinct head and tail end and better movement to go after food items
- 2) Phylum **Platyhelminthes**
 - a) This is the group of flat worms.
 - b) It consist of four classes
 - c) All but one class are parasitic in nature
 - d) Feeding
 - i) Platyhelminthes have an incomplete gut.
 - ii) Most have a mouth, pharynx, and intestine
 - (1) The advancement of having a small intestine increases surface area and thus increases the amount of nutrients absorbed.
 - iii) Many of the non-parasitic species have a **pharynx** (connection between mouth and intestines) that has the ability to extend out of the mouth in order to gather resources.
 - iv) Parasitic forms have to have some specialized feeding apparatus to extract nutrients from their host without causing too much harm.
 - e) Sense organs
 - i) Here is also an evolutionary advancement in nerve cells
 - (1) The simplest forms are similar to Cnidarians, however, others have in addition one or more longitudinal nerve cords creating a “ladder” style pattern.
 - (2) Towards the superior end there is a cluster of nerves that serves as a rudimentary brain
 - ii) **Tactile cells** (cells that detect pressure) and **chemoreceptors** (cells that stimulate in response to a chemical) are abundant all over the body. These cells help orient an organism to an ideal environment (food resource, safe habitat, etc..)
 - iii) **Ocelli** are prevalent, these are light sensitive cells that is a very primitive eye
 - iv) **Rheoreceptors** are specialized cells for sensing water current
 - v) **Statocysts** are specialized cells for determining equilibrium
 - f) Reproduction
 - i) Some flat worms can reproduce through **fission** by splitting themselves in half or snipping parts of itself off and it regenerates the missing parts.
 - ii) However, most reproduce by **cross fertilization**
 - (1) Even though flat worms are **hermaphroditic** they reproduce sexually with internal fertilization.

- iii) The life history of each group can be very complex, often requiring multiple species to complete their development
 - (1) A parasitic species of flat worms (Chinese liver fluke; *Clonorchis sinensis*), has to be ingested by a snail where it develops in the intestine of a snail. Once mature they “emerge” from a snail and penetrate a secondary host like a fish where they develop into juvenile flukes until ingested by a human where they migrate to the liver to reproduce and start all over again.
 - (a) This particular fluke can cause bile passageways to become blocked leading to malnutrition and if left long enough untreated death. (so make sure you cook your fish well!!!)
- g) Respiration
 - i) This group has to get its oxygen requirement either by absorbing it from the outside world in free swimming forms but in parasitic forms they usually have to steal it from their hosts blood.
- h) Classes of Platyhelminthes
 - i) **Turbellaria**
 - (1) These are free swimming
 - (2) Includes the flat worms you observed in lab
 - (3) They have a complex digestive tract with an extendable pharynx
 - ii) **Trematoda**
 - (1) All parasites of vertebrates
 - (2) Almost all are flukes
 - (3) These contain complex penetration glands that produce enzymes to help infest hosts
 - (4) Sense organs are poorly developed
 - (5) Some of the most serious parasites of humans found in this class
 - iii) **Monogenea**
 - (1) Mostly parasites of non-human vertebrates (fish, frogs, turtles) and typically causes no harm to its natural host, however it can infect humans as a non-natural host and be serious.
 - iv) **Cestoda**
 - (1) Tapeworms
 - (2) Poses **scolex** to hold on to host
 - (3) Can grow to 82 feet in a humans
 - (4) If the infection make it into blood stream it can infect the brain and be very deadly
- 3) Phylum **Rotifera**
 - a) A cosmopolitan group of about 2000 species (probably a lot more but its hard to identify these guys)
 - b) They get their name (rotifer: L. *rota* means wheel) from the ciliated crown called a **corona**.
 - c) They are all very small and are named based on cool names that describe their locomotion like Floaters and Creepers
 - d) The ciliated corona creates a current of water into its mouth where it filters out plankton or other organic particles.

- e) They have a complete one way gut with a mouth and anus
- f) Locomotion is provided by a foot like structure
- g) Rotifers come in male and female forms so reproduction is sexual.
- h) Nervous system is advanced with sensory eyespots and various other sensory organs to detect changes in its environment.
 - i) There is also a bi-lobed "brain" in rotifers which is very advanced.

4) Other phylum

- a) Most other phylum are rare and in some cases only represented by one species found living between sand grains in Greenland (so not all that common...)
- b) **Spiny head worms** are another cool parasite phylum that have a **proboscis** (needle like straw) that they use to attach themselves to the intestines of a host and steal nutrients.
 - i) They usually don't parasitize humans but it is possible