

Notes: Planaria Regeneration Lab

Introduction

Planaria are flatworms (Platyhelminthes) that have a remarkable regenerative ability. When a planaria is cut into fragments, each piece will regenerate a complete animal. This amazing ability seems to be related to the relative abundance of stem cells. Neoblasts are found in planaria, which are totipotent stem-cells that are capable of generating essentially every cell type in the adult animal, including themselves.

Planaria Background Information

Planaria belongs to Kingdom Animalia, Phylum Platyhelminthes (flatworms), Class Turbellaria, Order Seritaria, and Family Planariidae.

- They are considered parasites because they are not parasitic and do not have to feed off of something else, like parasites do. (They are not parasitic like their cousins tapeworms and fluke worms.)
- Planaria can be found in freshwater streams, ponds and springs under rocks and debris.

Characteristics

- Planaria like the temperature around 22° to 28° C or 70-73° F.
- They have a triangular head, which has two eyespots or light-sensing areas, these are the pigmented areas that are sensitive to light.
- The eyespots are the black dots seen at the head and are the earlike projections at the base of the head that are sensitive to touch and the presence of certain chemicals. (chemotaxis)
- They exhibit symmetry, which means two sides the same. The right side is a mirror image of the left side.

Planaria Reproduction: How do planaria reproduce?

- Planaria are considered hermaphroditic because they possess both male and female sex glands. Even though they exhibit both male and female sex glands they cannot fertilize their own eggs; the eggs must be fertilized by the sperm of another planarian (copulation).
Another type of reproduction (fragmentation) is where the planaria constricts behind the pharynx and separates itself into two pieces (fission or fragmentation), then both pieces grow back their missing parts through a process called regeneration and one planarian becomes two planarians.

Do they have a circulatory or respiratory system?

- They do not have a circulatory system or respiratory system.
 - They go through cilia by oxygen entering and carbon dioxide leaving the body through cilia through the body wall.

How do they move?

- of planaria is accomplished by the planaria gliding along using its cilia, which are small hair-like projections.
 - The planarian can also be seen traveling small distances by using a rapid crawling motion.

How do they digest food?

- They have a pharynx, mouth, lateral and anterior intestine.
- The mouth is located in the middle of the underside of the body, which is covered with hair-like projections called lophophore. They feed on crustaceans, larvae and small worms in the streams.
- We feed them dry egg yolk, in the laboratory. To eat they extend a long tubular or stereo-microscope. Through this tube the planaria will secrete digestive juices onto its prey then sucks in the bits of partially digested food.

What is their nervous system like?

- The nervous system is quite simple in which it has a simple brain in which 2 nerve cords extend the length of the body. These nerve cords are called transverse nerves, which are similar to the rungs on a ladder that continue all the way down the body.
 - At the ends of the transverse nerves on both ends are nerve fibers.
- Regeneration of Planaria**
- are found in planaria, which are totipotent that are capable of generating essentially every cell type in the adult animal, including themselves.
 - could take up to 2 weeks depending on the temperature.

Name: _____



Planaria Regeneration Lab

Results Questions:

1. At the end of the lab, how many photoreceptors did you observe on each fragment?
 2. Did you observe extra pieces of planaria in your dishes? What could be the reason for those pieces?
 3. Use the words "transverse" and "longitudinal" to describe the difference between cuts A, B and C.
 4. What is the name of the stem cells in planaria that allow them to regenerate any body part?
 5. Why did you have to keep the planaria in the dark?
 6. We say that planaria are asexual and/or sexual organisms explain what that means.
 7. Explain what cell differentiation means and how it plays a role in planaria.
 8. Why do we study how stem cells work in planaria?

Conclusion: Write a conclusion using CER answering the question "What was the result of cutting the planaria and why?"