Biology – planaria research

Science, Biology

Purpose: The purpose of doing this lab was to observe the regenerative patterns of planaria cells after a portion of their bodies was cut off. Background: 1. A blastema is a group of cells that forms at the site of a wound that eventually turns into the missing parts of a planaria. 2. Planaria fission occurs when a planaria is missing body parts. The organism attaches its tail-end to the ground and pulls itself forward using its head-end in order to tear itself into two parts. Then, each of these parts grows back the missing half, producing two new identical planaria. . A free-living flatworm ingests its food by opening its mouth, a cavity which allows food and water to pass. The food passes into the pharynx, a muscular tube near the mouth. The pharynx then pumps the food into the digestive cavity, called the gut. The cells in the gut digest the food, where nutrient absorption takes place. 4. Free-living worms eat tiny aquatic animals, as carnivores, or recently dead animals, as scavengers. 5. The digested compounds get to the other body tissues by diffusing out of the gut. 6. Planaria do not have a circulatory system.

Feature Article -Campbells Biology Review

This is because since they are so thin and flat, they are able to use diffusion to transport materials throughout their bodies. 7. Flame cells are special cells found in flatworms that remove excess water and metabolic wastes from the cells through the pores of an animal’s skin. 8. Flame cells are only necessary in aquatic worms because since aquatic worms live in water, their cells are constantly absorbing water. Flame cells help the worms maintain homeostasis by keeping the amount of water inside the cells balanced. 9. DIAGRAM. 10. The ganglia are a group of nerve cells found in free-living flatworms that controls the nervous system.

The ganglia are enclosed in the head of a flatworm. 11. The flatworm can detect external stimuli such as chemicals found in food and which direction water is flowing. 12. The function of the eye spot is so that the flatworm can detect changes in the amount of light in the environment. 13. One way free-living flatworms move is by using cilia on their skin to help them glide over the bottoms of streams and ponds and through the water. Another way flatworms move is by using muscle cells to twist and turn so they can move quickly. 14. The worm sexually reproduces by joining together with another planaria. They deliver sperm to each other and ay their eggs in clusters. The eggs hatch within several weeks. 15. These worms can perform a method of asexual reproduction called fusion. 16. Kingdom: Animalia. Phylum: Platyhelminthes. Class: Turbellarians. Materials: Petri dish, water, pipettes, hand lens, scalpel, planaria organisms Procedure: 1. Fill a petri dish with water using a pipette 2. Add one planaria to the water 3. After learning about the different cuts to make on a planaria in order to make it duplicate, using a scalpel, cut the planaria in one of the directions instructed (horizontally, vertically, or vertically half way down the body) 4.

Watch through hand lens as blastema forms 5. Cover the petri dish, place planaria away 6. Every day, look at your planaria using the hand lens and notice its growth rate and changes 7. Observe the regeneration process Qualitative Data: Day 1- Eye spots visible. Very thin and flat. Black and brown in color. Twists and curls around in water in order to move. Jagged sides. Approximately 12 millimeters in length. Day 2- After planaria was cut vertically halfway down the middle, small white blastema formed on the right

side of the cut and formed a new head. Eyespots visible. Blastema also formed on left side, but no head appeared.

Planaria was also cut horizontally, approximately 2 millimeters off of the tail end. Portion of the tail end that was cut off began to wiggle vigorously but no change occurred. Blastema began to form on one end. Day 3- Along the first cut, the two heads that grew branching out of the body grew back together, forming one thicker neck and one head. The second cut, on the tail end, had no visible change. Tail end grew back fully. Once again 12 millimeters long. Day 4- After the fourth day, the first cut returned to what the planaria looked like when it was first received. Nothing more happened to the head end of the organism.

The second cut on the tail end grew slightly larger, now at approximately 3 millimeters, but no other change occurred. Day 5- Epidermal cells are now visible on the smaller planaria portion. Began to twist and curl in order to move, similar to the movements of the full-grown planaria. Head began to develop a definite shape. Day 6- Color changed from a dark black to a lighter blackish-brown. Appears longer, but thinner. Approximately 5 millimeters long. Eyespots are now visible. Head is fully developed. Day 7- Color turned back into a darker shade of black. Now resembles shape of a full-grown planaria, only smaller.

Approximately 7 millimeters long. On the other, fully sized planaria, a tiny piece of the tail dropped off. Tail end is blunt and flat. Portion of tail that fell of is very small and thin. However, epidermal cells and eyespots are already visible. Planaria most likely dropped its tail due to hunger, and the inability

to supply enough energy to all of its cells. Quantitative Data: Conclusion: This experiment helped to teach a lot about regenerative cells. Watching the planaria produce new cells and grow day by day helped me to better understand the process of regeneratio