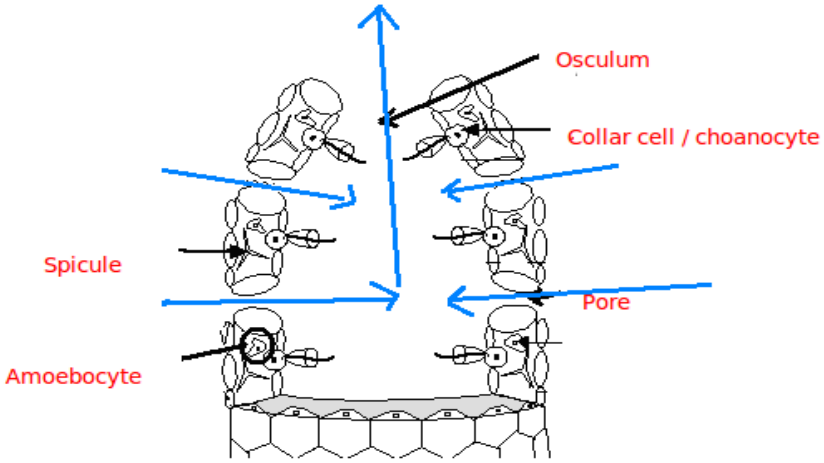
Biology 11 **Name:**_____

Phylum Porifera

Use your textbook and the page references to answer the questions below. ***Miller/Levine****: P561-563.* ***Nelson****: P304-306*

Structure & Function

1. Label the following diagram using the terms osculum, pore, spicule, amebocyte, and collar cell.



2. Describe the function of each of the following structures.

   a) osculum – The opening at the top of the sponge where water and any food not trapped by the collar cells / choanocytes exits the sponge

   b) pore – openings on the sides of the sponge where water and food enters the sponge

   c) spicule – glass like structures that give support and structure to the sponge

   d) amebocyte – secretes a chemical that breaks down shells on the ocean floor, helps digest food, secretes a chemical that makes the sponges taste bad

   e) collar cell / choanocyte – have flagellum to create the current to bring in food and water and the collar is sticky to trap food particles

3. Show the direction of water flow through the sponge by drawing arrows in the diagram above. In light blue

4. Explain the process of filter feeding in sponges. Be sure to mention the role of the: osculum, collar cells, food vacuoles, amebocytes, and water currents.

Food enters the sponge through the pores. The food particles get stuck to the collar cells / choanocytes where they are put into a food vacuole to be digested. Amoebocytes help digest the food too. Any food particles too big to be trapped will exit the sponge through the osculum

Reproduction

1. Explain asexual reproduction in sponges.

Budding – where an outgrowth occurs on the parent that will form a new individual; fragmentation – piece breaks off to form a new individual; and branching – where individuals radiate out from the parent

Sexual reproduction:

2. Most sponges are **hermaphroditic**. What does this mean?

The animal has both male and female sex organs

3. Sponges reproduce only one type of gamete at a time to ensure that they do not self-fertilize.
    a. After fertilization of the egg, what happens?

    A zygote is formed that develops into a larva that is capable of swimming to new habitats

    b. This process is called **metamorphosis**. What does this mean?

A complete and dramatic change as the baby develops into an adult. So the baby looks very different from the adult form

Ecological Roles

1. Explain ecological roles of sponges.

Food source, home / shelter for animals, symbiotic relationships with bacteria, recycle calcium from shells on ocean floor

2. Why are sponges generally safe from predation by other organisms?

Because they have a chemical that makes them taste bad and they have spicules that can be very sharp and unpleasant to eat.

3. What would happen to a sponge living in a limited supply of stagnant water?

Stagnant water has no new nutrients coming into it. Therefore, the sponge would filter out all of the food from the water and eventually starve to death

4. Colchicine is a chemical that stops the action of flagella. What would happen to sponges if colchicine was present in the water that they lived in?

If the flagella of the collar cells / choanocytes could not create a water current, no food could enter the sponge and the sponge would starve to death.

5. Why are sponges especially sensitive to water pollution?

    Because they live in water and filter water for food. When the pollution is brought into their bodies, it can accumulate and damage the cells of the sponge leading to a decline in health and possibly death