

Phylum Porifera



Porifera:

- ✓ “Pore Bearers”
- ✓ Comes from the Latin Terms
 - Porus = Pore
 - Ferre = to Bear

Information:

- ✓ Asymmetrical- some are ball shaped and others are branched.
- ✓ Can be various colors: red, orange, yellow, purple or green.
- ✓ Range in size from ~ 1.5 cm to several meters.
- ✓ ~5000 species
- ✓ Most reside in shallow water, but some can survive depths of 8500 m.
- ✓ Sessile:
 - the glue-like substance that they attach themselves with is being genetically engineered for repairing human tissue.

Body Structures:

- ✓ 2 Cell layers thick.
- ✓ Has no true body cavity
- ✓ Osculum: The large opening at the top of the sponge where wastes and water are expelled.
- ✓ Pore Cell: Brings H₂O, food, Oxygen into the sponge, surrounds each pore.
- ✓ Collar Cells: Line the interior of the sponge, has a flagellum that draws water through the pores of that sponge, aka Choanocytes.

Body Structures:

- ✓ Amoebocytes (Archaeocytes): amoeba-shaped cells between the two layers of cells in a sponge's body, aids in reproduction, produces chemicals that make up the spicules.
- ✓ Spicules: hard support system of sponges, skeleton, made up of CaCO₃ or silica, small needle-like structures between the cell layers of a sponge.

Body Structures:

- ✓ Spongin: Internal skeleton of soft sponges, network of flexible organic protein fibers.
- ✓ Spongocoel: The large tubular central cavity that water flows through before leaving a sponge through the osculum.

Body Structures:

- ✓ Epithelial Cells: thin flat cells on the outside of a sponge, contract closing pores in response to touch or irritants.
- ✓ Pore: Small openings in the body of the sponge through which water and food are permitted to enter the body, called Ostia (Ostium= singular)
- ✓ Basal End: End of the organism that attaches the sponge to other objects.
- ✓ Free End: Osculum end of the sponge, opposite the basal end.

Digestion:

- ✓ Intracellular- occurs inside the cells
- ✓ Occurs in the food vacuoles of choanocytes (collar cells)
- ✓ Undigested material is removed through the osculum
- ✓ Archeocytes transport digested food throughout the sponge as necessary.

Reproduction:

- ✓ Can be sexual or asexual
- ✓ Sponges are hermaphroditic -produce eggs (ova) and sperm
 - produce ova and sperm at different times of the year.
- ✓ Eggs and sperm are produced by the amoebocytes .

Sexual reproduction:

- ✓ Sperm are released and carried by currents to other sponges.
- ✓ Fertilization can be internal or external
- ✓ Internal fertilization is the most common.
- ✓ Produces flagellated swimming larva.

Fertilization:

- ✓ External fertilization:
 - Eggs and sperm are both released into the water for fertilization.
- ✓ Internal fertilization:
 - Eggs remain inside the animal body.
 - Sperm are carried to the eggs
 - collar cells collect the sperm
 - sperm is transferred to the amoebocytes
 - amoebocytes transfer sperm to the eggs.

Asexual Reproduction:

- ✓ Fragments of the sponge break off from the parent animal and form a new sponge.
- ✓ External buds eventually break off and form a new sponge (or remain attached and form a colony.)
- ✓ In unfavorable conditions, sponges form gemmules (groups of archeocytes surrounded by a tough layer of spicules) that can survive freezing temps. and drought. These gemmules become a new sponge when conditions become favorable.
- ✓ Regeneration: Regenerate lost body parts through mitosis.

Respiration, Circulation, Excretion

- ✓ Rely on the movement of water.
- ✓ Oxygen in the water diffuses into the cells as it moves through the body.
- ✓ Wastes (ammonia, CO₂, etc.) diffuse into the water and are carried away.

Response:

- ✓ No central nervous system.
- ✓ Can not respond to changes in the environment.
 - Protect itself by producing toxins that make themselves unpalatable or poisonous to predators.
 - One of these is being tested to treat cancer (a Caribbean sponge)

4 Classes of Porifera:

- ✓ Class Calcarea:
- ✓ Class Hexactinellida:
- ✓ Class Demospongiae:
- ✓ Class Sclerospongiae:

4 Classes of Porifera:

- ✓ Class Calcarea:
 - Calcareous Sponges
 - Skeletons are made-up of CaCO₃ spicules.
 - small thin clusters.
 - ie: scypha (aka sycon or granita)

4 Classes of Porifera:

- ✓ Class Demospongiae:
 - Natural sponges
 - Skeletons made-up of spongin or siliceous material (or both)
 - ie: Spongia (common bath sponge)

4 Classes of Porifera:

- ✓ Class Hexactinellida:
 - Glass Sponges
 - Skeletons composed of silicic acid forming a fused network of siliceous material
 - ie: Euplectalla

4 Classes of Porifera:

✓ Class Sclerospongiae:

- Coralline Sponges
- Skeletons composed of silica, spongin, and CaCO_3
- Thin living layer and massive underlying skeleton of aragoite-silica and spongin.