

Phylum: porifera

Sponges are animals of the Phylum porifera (meaning pore bears). Sponges are a diverse group with about 5000 species known across the world. sponges are primarily marine, but around 150 species live in fresh water.

General characteristic:

1. Sponges have a system of pores and canals, allowing water to circulate through them
2. Sponges are asymmetrical.
3. Many sponges have internal skeletons of spongin (a modified type of collagen protein) and/or spicules (silica or calcium carbonate).
4. Sponges are multicellular, Diploblasts animals.
5. Sponges consisting of jelly-like mesohyl sandwiched between two thin layers of cells.
6. Sponges have unspecialized cells that can transform into other types and that often migrate between the main cell layers and the mesohyl.
7. Sponges do not have nervous, digestive or circulatory systems, Instead, most rely on maintaining a constant water flow through their bodies to obtain food and oxygen and to remove wastes.
8. All sponges are sessile aquatic animals.
9. While most of the approximately 5,000–10,000 known species feed on bacteria and other food particles in the water, some host photosynthesizing microorganisms as endosymbionts and these microorganisms often produce more food and oxygen than they consume. A few species of sponge that live in food-poor environments have become carnivores that prey mainly on small crustaceans.
10. Most species use sexual reproduction, releasing sperm cells into the water to fertilize ova . A few species reproduce by budding.

Classification of phylum porifera :

1. Class: Calacea

This class have two orders

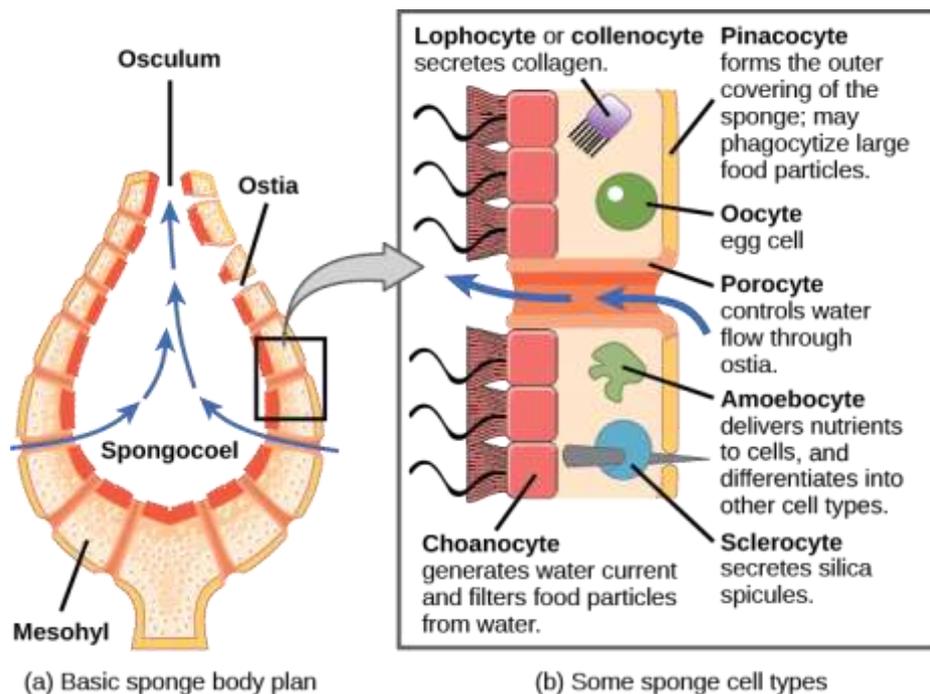
- I. Order: Homocoela*leucosolenia*
- II. Order: Heterocoela.....*Sycon*

2. Class: Hexactinellida (glass sponges)
3. Class: Demospongia
4. Class: Homoscleromorpha

Type of cells in sponges

1. **Pinacocytes** are flat cells form a single-layered external skin of sponges, they are thin, leathery and tightly packed together
2. **Porocyte** are unique, elongated, tubular cells ,extended through the jelly having their base in the covering layer while apex reaches the paragastric between the choanocyte , that act as valves to regulate the flow of water into the spongocoel, from surrounding aquatic habitat. The pore through which water flows in is called ostium (singular). ostia (plural).
3. **Amoebocytes** (or archaeocytes), they move throughout the mesohyl in an amoeba-like fashion. These cells are changed from type to another Amoebocytes have a variety of functions: delivering nutrients from choanocytes to other cells within the sponge, giving rise to eggs for sexual reproduction (which remain in the mesohyl), delivering phagocytized sperm from choanocytes to eggs, and differentiating into more-specific cell types. Such as: collencytes, sclerocytes, spongocytes.
4. **Gland cells**

5. **Myocytes** ("muscle cells") conduct signals and cause parts of the animal to contract.
6. **Choanocytes** ("collar cells") The inner surface is covered with choanocytes, these cells with cylindrical or conical collars (microvilli) surrounding one flagellum per choanocyte.
7. **Grey cells** act as sponges' equivalent of an immune system.



Types of sponges

1. **Asconoid**: sponges have the simplest type of organization. Perforated by pores. Small and tube shaped, water enters the sponge through dermal pores and flows into the spongocoel. Which Choanocyte (collar cell) are present. There is a single opening to the outside called osculum.
2. **Syconoid** : sponges tend to be larger than asconoid, have a tubular body with a single osculum, the body wall is thicker and the pores that penetrate it are longer forming system of canals these canals are lined by collar cells, the flagella of the cells move water from the outside into the spongocoel and out the osculum.

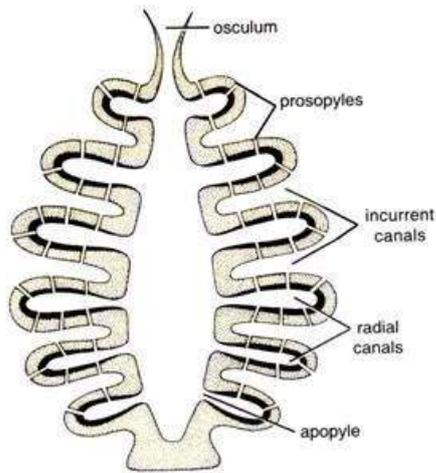
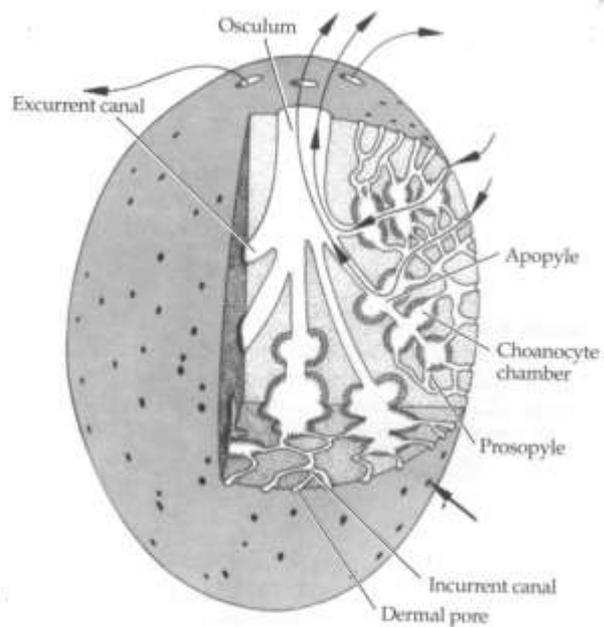
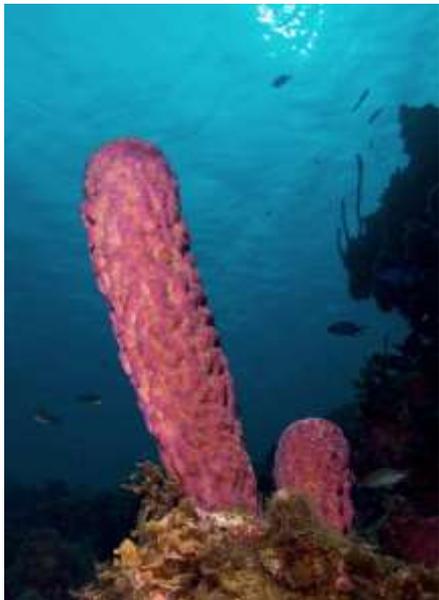
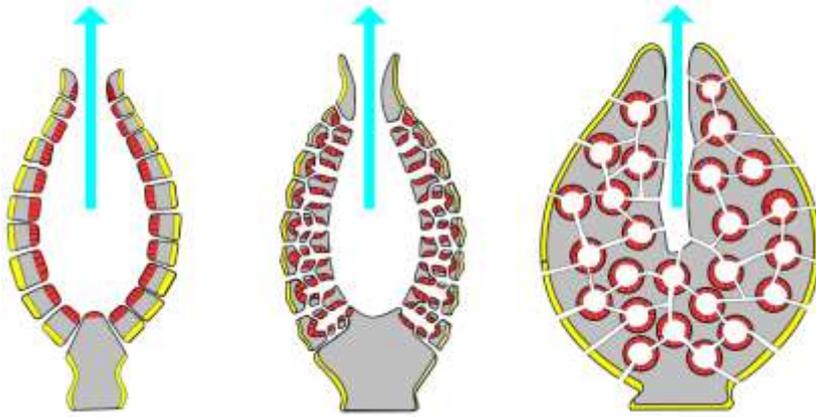


Fig. 28.2. Syconoid type of canal system. (Early stage without cortex).

3. **Leuconoid** : the largest, most complex. A leuconoid sponge has a thick body wall, are made up of masses of tissues penetrated by numerous canals , these canals lead to numerous chambers that are lined with choanocytes. Water flows through canals into these chambers , and water exits through an osculum.





Reproduction in sponges:

1. **Asexual reproduction:** Sponges have three asexual methods of reproduction: **Fragmentation, Budding;** The bud thus formed grows outward to produce a small individual, which either remains attached with the parent individual or gets detached and attached to a nearby rock to grow into colony. Fresh water sponge as well as several marine species, form resistant structure called **Gemmules;** are specialised bodies which survive during unfavourable conditions such as drying or cold and germinate to produce new sponges.

Gemmules are aggregates of sponges' tissues and food material covered by thick hard coating containing spicules or sponge fibers.

2. **Sexual reproduction:** most sponges are hermaphrodite, same individual produce sperms and ova. But in some species sexes are separated Although most sponges are hermaphrodite but cross-fertilization is the rule because eggs and sperms are produced at different times. Oocytes are produced inside the body and remain inside mesoglea waiting for fertilization. sperms leave the body of sponge through osculum, then from water enter the body of another sponge through canal system and reach choanocytes which transport the sperm body without tail to the mature ova that wait in the mesogloea. The sperm nucleus then fuses with the nucleus of ovum, (fertilization), then formation of a larval stage (gastrula) which swims and settles on a rock with and grows to form little sponge
- Monoecious
 - Dioecious