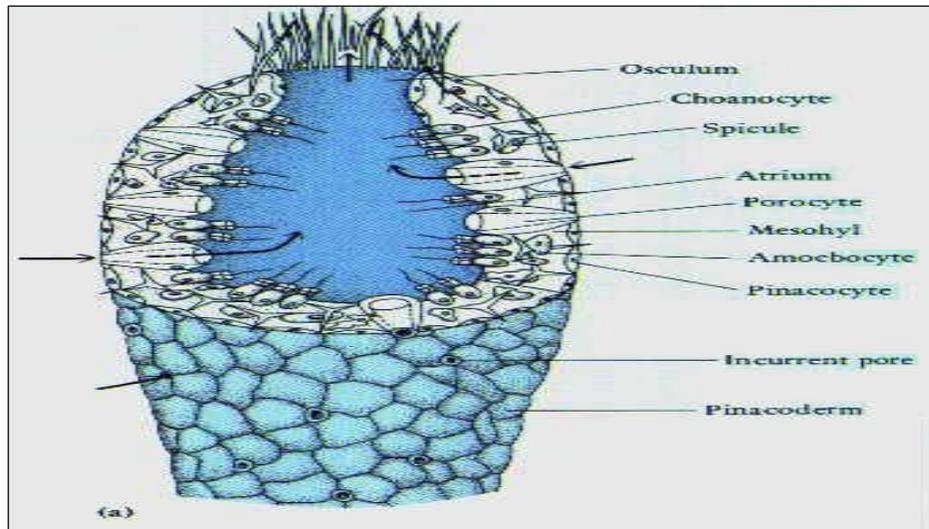


Phylum: Porifera (Sponges)

Sponges are animals of the phylum Porifera (meaning: pore bears), they are diverse group of sometimes common types with about 5000 species known across the world. Sponges are primarily marine but around 150 species live in freshwater.

General attributes:

1. Include a system of pores (also called Ostia) and canals through which water passes.
2. Sponges are either radially symmetrical or asymmetrical. They are supported by a skeleton made up of the protein collagen and spicules which may be calcareous or siliceous depending on the group of sponges examined.
3. They are multicellular organisms and have specialized cells that can transform into other types and which often migrate between the main cell layers and mesophyll in the process.
4. 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 O₂ and remove wastes.
5. All sponges are sessile aquatic animals.
6. Many species feed on bacteria and other food particles in the water some host photosynthesizing micro-organism a few species of sponges that live in food – poor environment have become carnivores (prey mainly on small Crustaceans).
7. Most species reproduce by sexual reproduction and other by asexual reproduction.



Classification

Phylum: Porifera

1. Class: Calcarea

Order: Homocoela *Leucosolenia*

Order: Heterocoela *Sycon*

2. Class: Hexiactinellida (Glass sponges)

3. Class: Demosponges

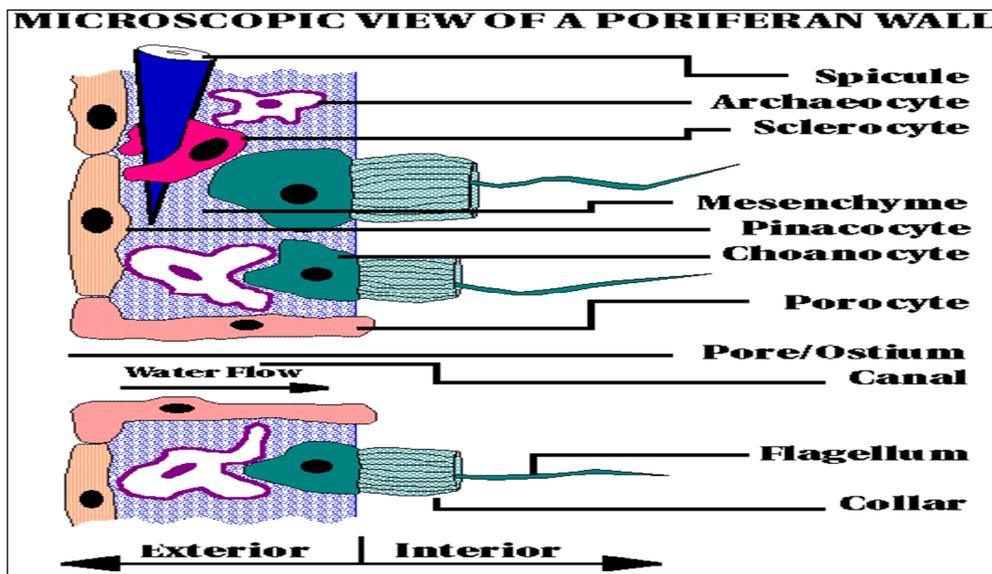
4. Class: Homoscleromorpha.

Cell types:

1. **Pinacocytes:** flattened cells, they line exterior of the sponges' body wall, they are thin leathery and tightly packed together. These cells are skin cells of sponges
2. **Porocytes:** Conical – shape extended through the jelly (mesenchyme layer) having their base in the covering layer while apex reaches the paragastric between the choanocytes each pierced from base to apex by tube which is one of the pores.
3. **Amoebocytes:** Cells change from type to another and found in mesohyl layer and different in size and structure divided into: Chromocytes – Thesocytes – Sclerocytes – Archaeocytes (are lobopodous amoebocytes each with a large

nucleus and sometimes containing cytoplasmic and they un difference cells and produce sex cells).

4. **Gland cells:** Put out long strands to the sponge surface and are secrete slime.
5. **Desmacytes (fiber cells):**
6. **Myocytes:** like muscle cells, so their movement is rather limited can contract in a similar fashion as muscle cells.
7. **Choanocytes:** Covered the inner surface of sponge cylindrical or conical collar surrounding one flagellum.
8. **Trophocytes (Grey cells) = (Immune system).**



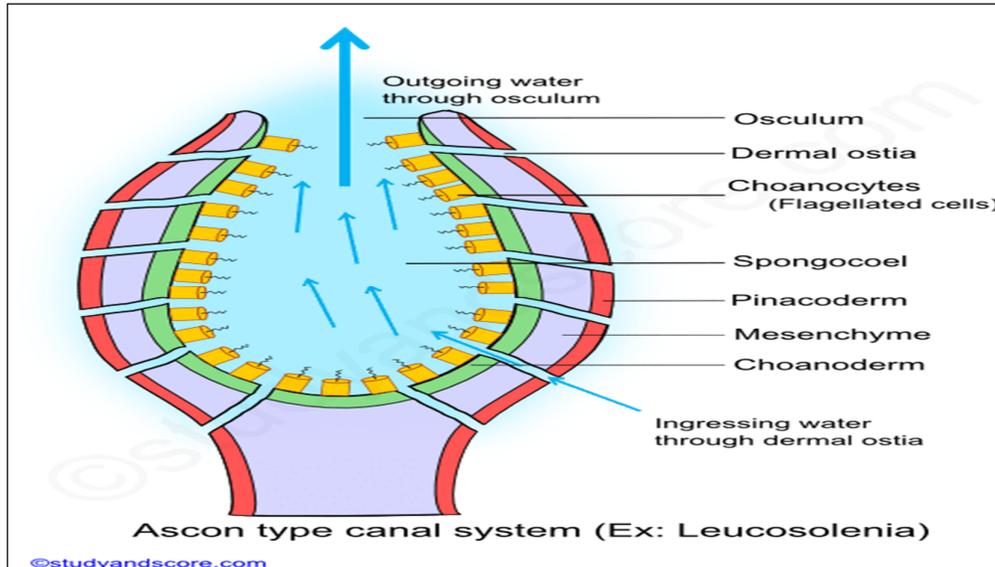
Sponge types:

Sponges have three different types of body plane:

1. **Asconoid sponges:** This is the simplest type of canal system and is found in *Leucosolenia* and other homocoela. Ostia are present on the surface of body and lead directly into the spongocoel, which is lined by flagellated choanocyte cells. Spongocoel opens to the outside through a narrow circular opening, the osculum located at the distal free end of the sponge body. Water enters through ostia into spongocoel and goes out of body through the osculum.

The course of water current is as follows:

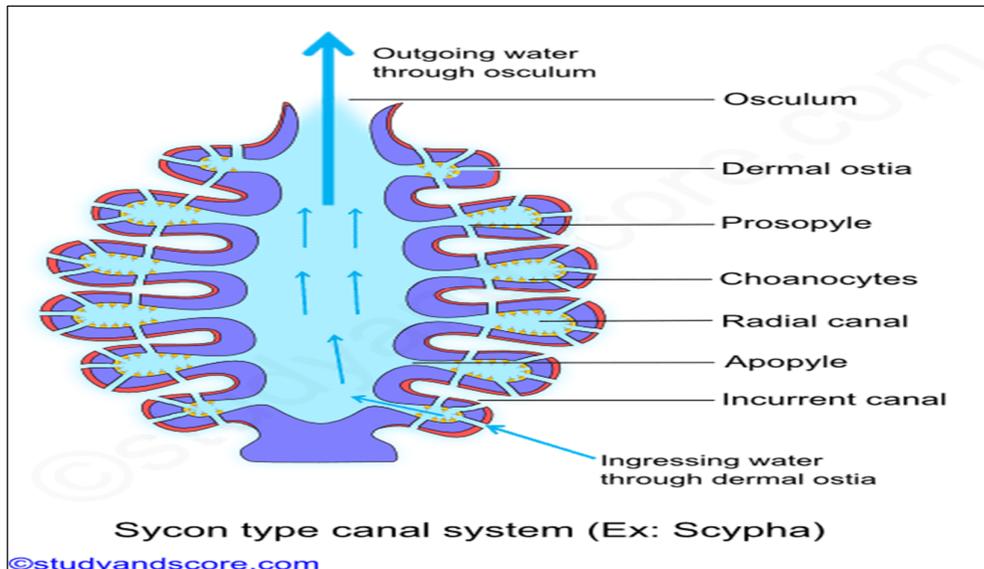
Ingressing water → Ostia → Spongocoel → Osculum → outside



2. **Syconoid sponges:** This type of canal system is a characteristic of syconoid sponges, e.g. Scypha and Grantia. Body wall is secondarily folded to form incurrent and radial canals, which open into the spongocoel by an opening called apopyle. Both types of canals are interconnected by minute pores called prosopyles. Incurrent pores or ostia are found on the outer surface of body and open into the incurrent canals, which lead into adjacent radial canals through minute openings called prosopyles. Radial canals are the flagellated chambers that open into central spongocoel by internal openings called apopyles. Spongocoel is a narrow, without flagellated cells but is lined by pinacocytes and opens to exterior through the osculum.

Course of water current in Syconoid type canal system

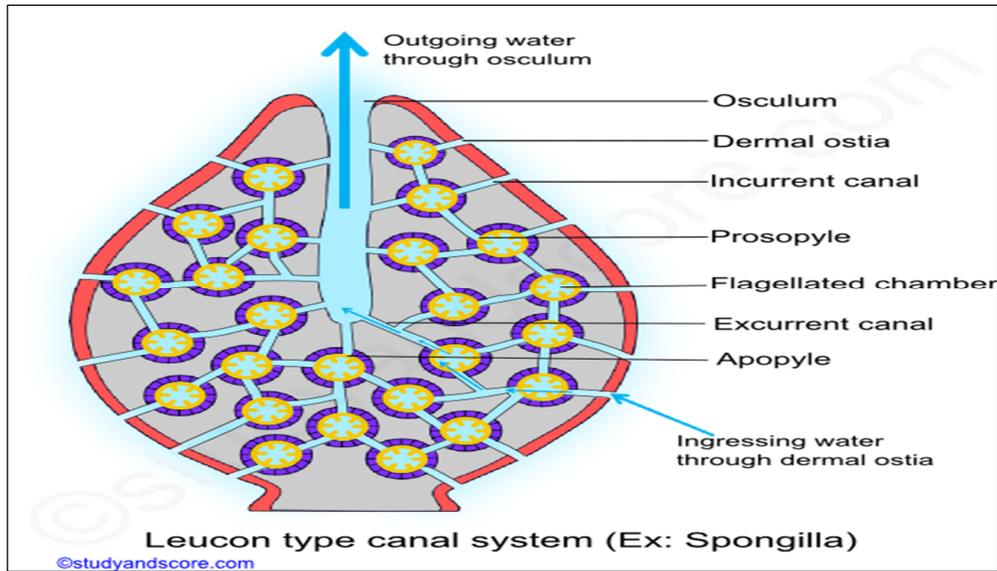
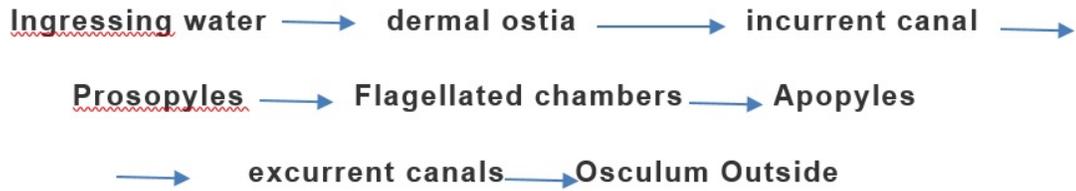
**Ingressing water → dermal ostia → incurrent canal → Prosopyles → Radial canals
→ Apopyles → Spongocoel → Osculum → Outside**



3. **Leuconoide type:** This type of sponges have canal system results due to further folding of body wall of the sycon type of canal system. This canal system is the characteristic of the leuconoid type of sponges like Spongilla. In this type the radial symmetry is lost due to the complexity of the canal system and this result in an irregular symmetry.

The flagellated chambers are small compared to that of the asconoid and syconoid type. These chambers are lined by choanocytes and are spherical in shape. All other spaces are lined by pinacocytes. The incurrent canals open into flagellated chambers through prosopyles. These flagellated chambers in turn communicate with the excurrent canals through apopyles. The excurrent canals develop as a result of shrinkage and division of spongocoel. The large and spacious spongocoel which is present in the asconoid and syconoid type of canal systems is absent here. Here the spongocoel is much reduced. This excurrent canal finally communicates with the outside through the osculum.

Course of water

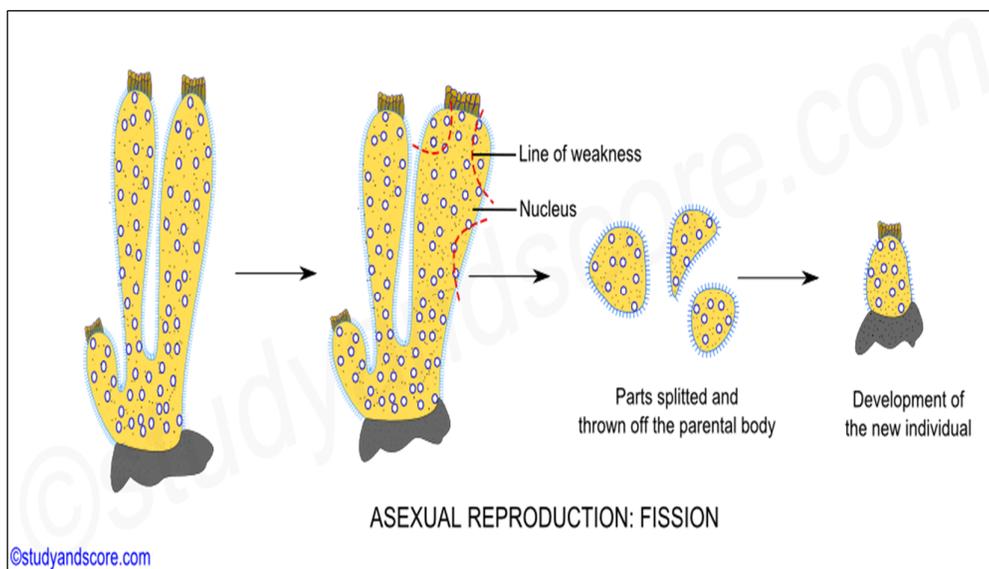
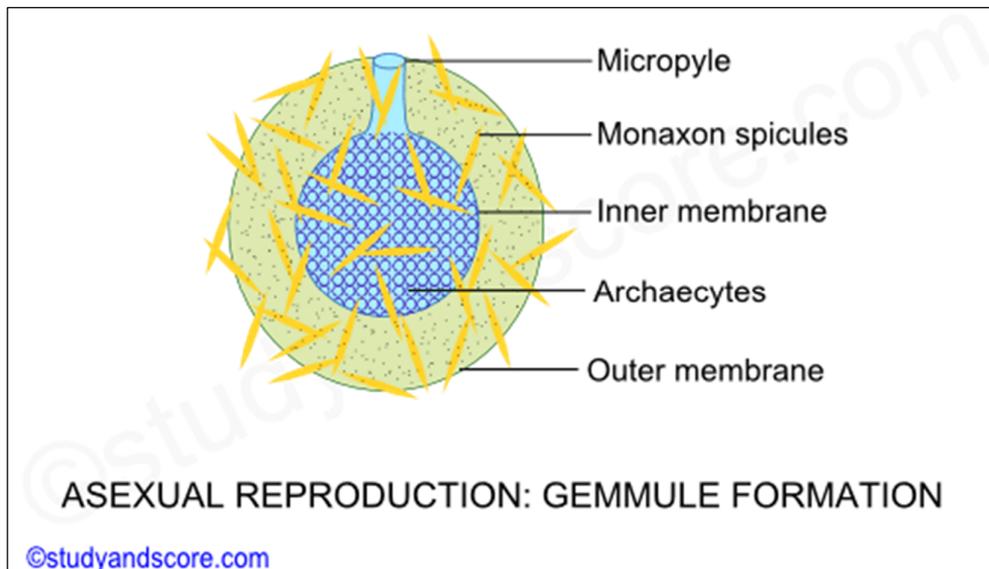


Reproduction

Asexual reproduction:

Occurs by Budding and Fragmentation. Budding may remain attached to the parent or separate from it, and each bud develops into new individual. Freshwater sponges as well as several marine species form resistant structures called gemmules that can withstand adverse conditions such as drying or cold and later develop into new individuals.

Gemmules: Are aggregates of sponges tissue and food covered by a hard coating containing spicules or sponging fibers.



Sexual reproduction:

Most sponges are hermaphrodite, same individual producing eggs and sperms, but in some species sexes are separate. The larva are flagellated and swim about freely for a short time, after setline and attaching to a suitable substrate. The larva develops into young sponges (Male gametes are released into water by sponges and taken into the pore system of its neighbors in the same way as food. Spermatozoa are captured by collar cells which then lose their collars and transform into specialized, Amoebocytes carry the spermatozoa to the eggs, some sponges are Monoecious Or Dioecious Eggs + Sperms (they spermatozoa) larva (development) into young sponges.

