

26-2 Sponges



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What Is a Sponge?

Sponges are in the **phylum Porifera** which means “**pore-bearers**.” Pores are tiny openings all over the bodies of sponges.

Sponges are **sessile** (live their entire adult life attached to a single spot).

Why are sponges classified as animals?





Sponges are classified as animals because they are:

- **multicellular**
- **heterotrophic**
- **have no cell walls**
- **contain a few specialized cells**



How do sponges carry out essential functions?



Form and Function in Sponges

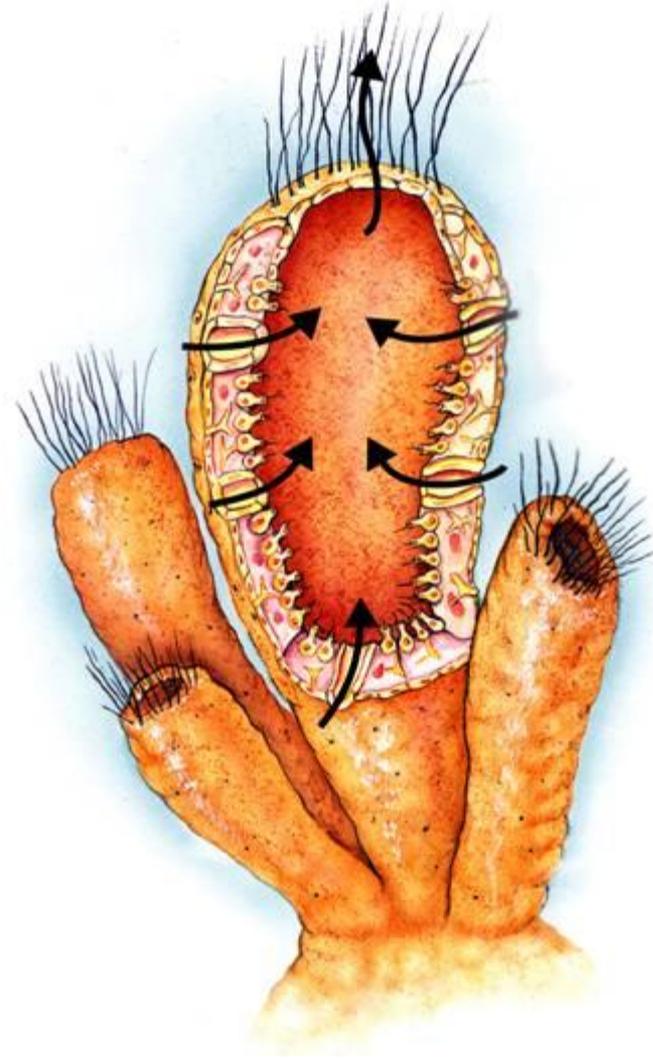
Sponges do not have a mouth or gut, and they have no tissues or organ systems.



The movement of water through the sponge provides a simple mechanism for feeding, respiration, circulation, and excretion.

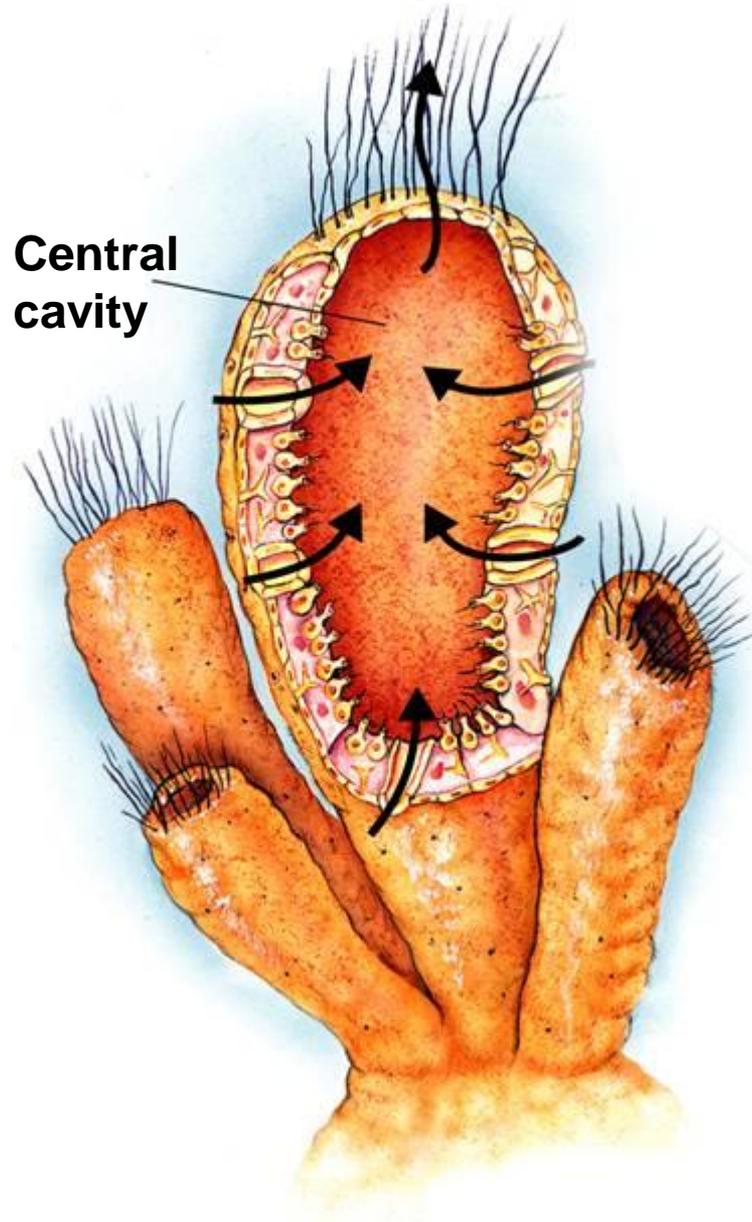
Body Plan

Sponges are **asymmetrical**; they have no front or back ends, no left or right sides.



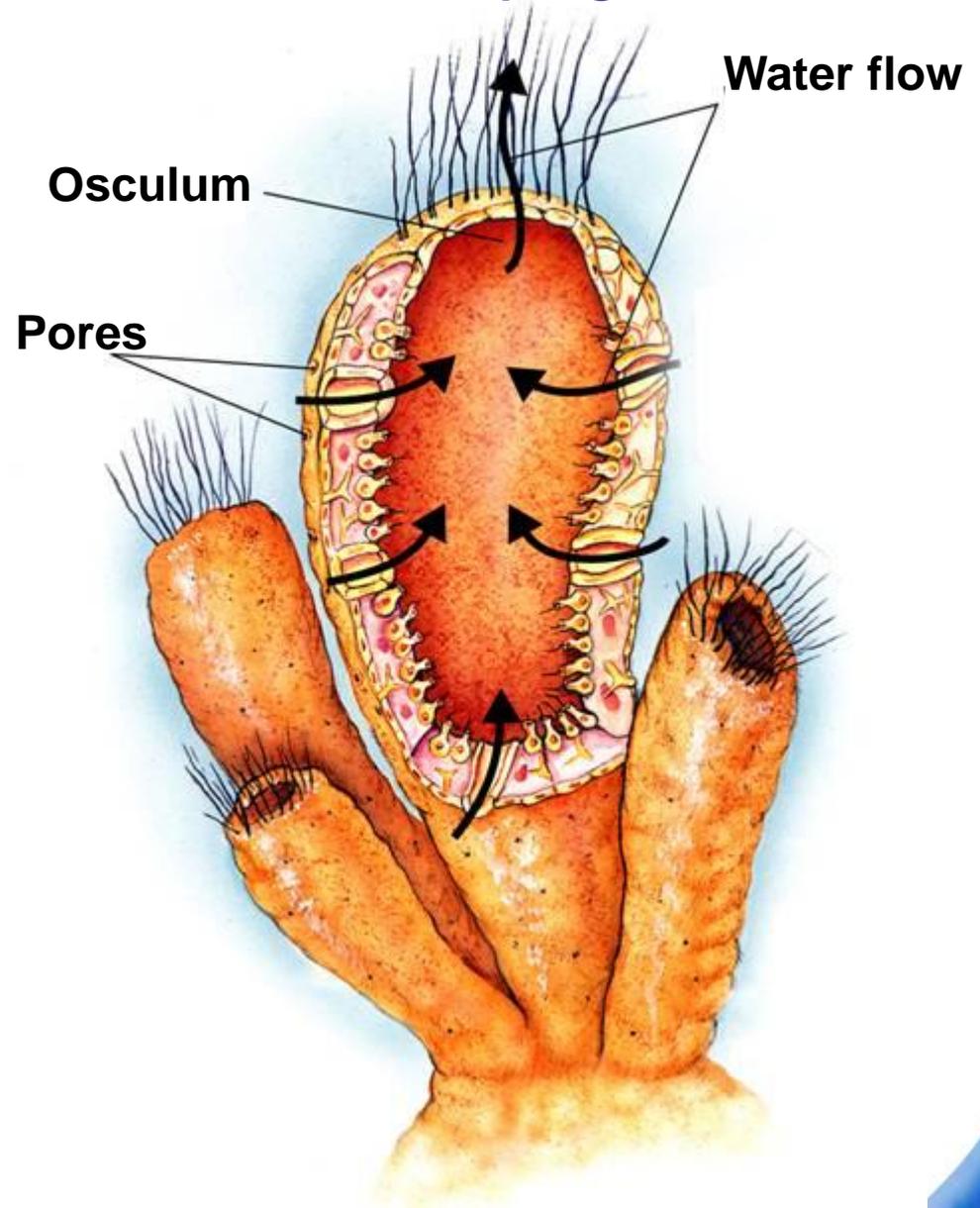
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The body of a sponge forms a wall around a **large central cavity** through which water is circulated continually.

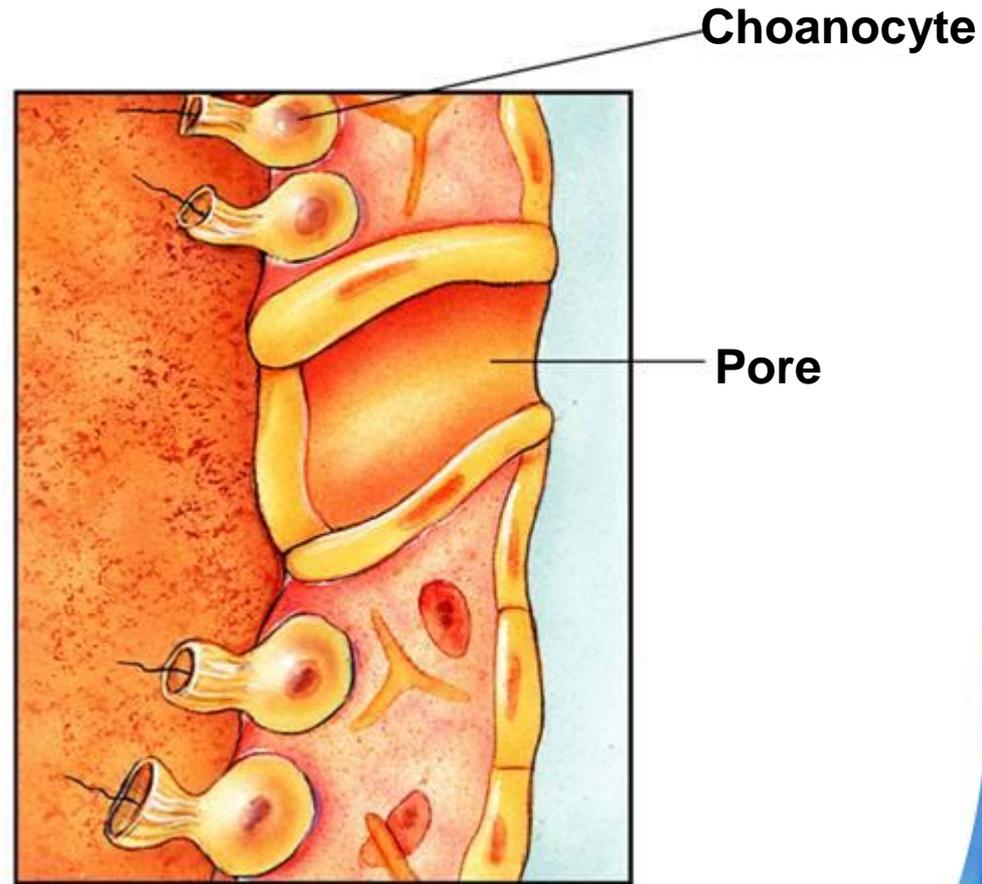


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Water enters through pores located in the body wall and leaves through the **osculum**, a large hole at the top of the sponge.

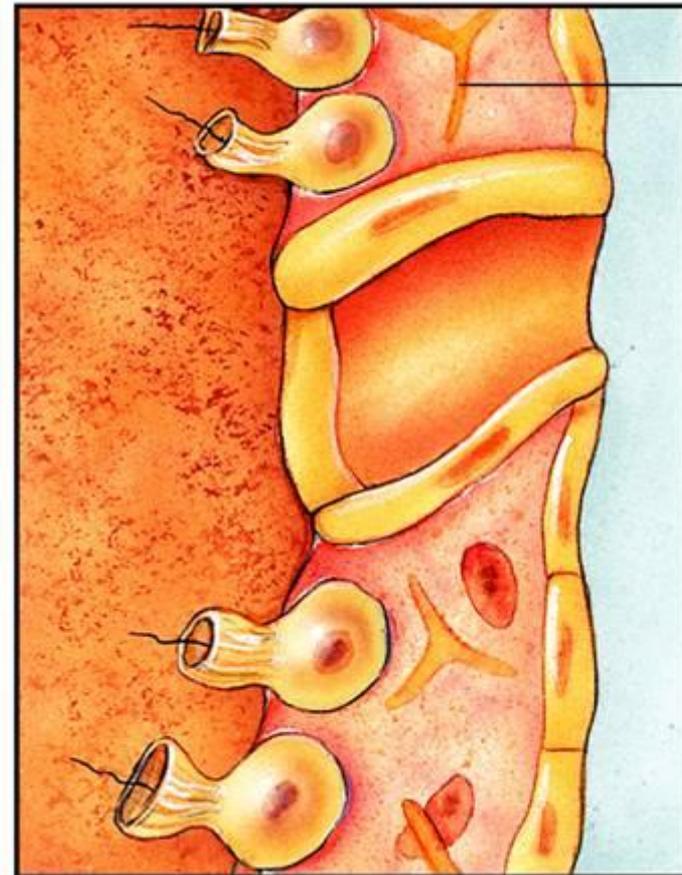


Choanocytes are specialized cells that use flagella to move a steady current of water through the sponge.



Sponges have a simple skeleton. In harder sponges, **the skeleton is made of spiny spicules.**

A **spicule** is a spike-shaped structure made of calcium carbonate or silica.

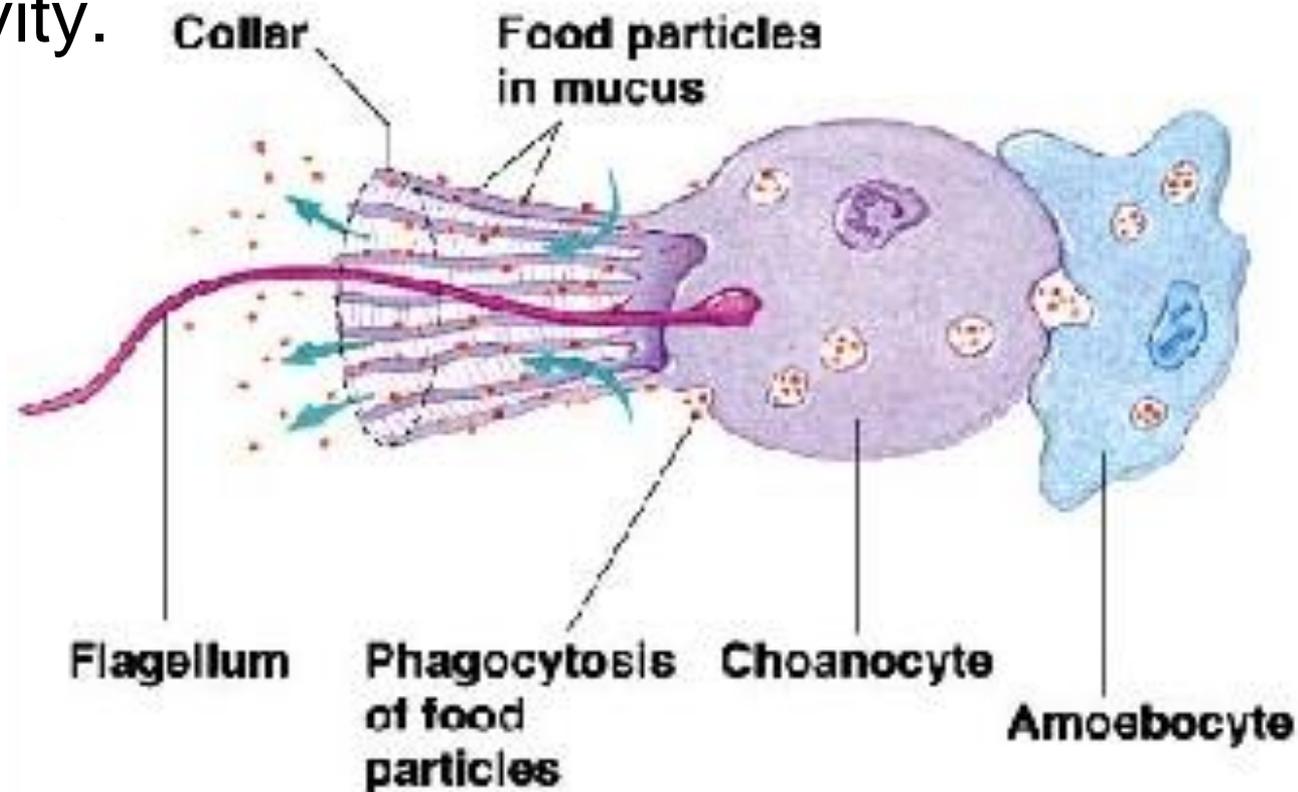


Spicule

Feeding

Sponges are filter feeders.

As water moves through the sponge, **food particles are trapped and engulfed by choanocytes** that line the body cavity.



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These particles are then digested or passed on to archaeocytes, who complete the digestive process and transport digested food throughout the sponge.



Respiration, Circulation, and Excretion

Sponges rely on movement of water through their bodies to carry out body functions.

Oxygen dissolved in the water diffuses into the surrounding cells.

Carbon dioxide and other wastes, such as ammonia, diffuse into the water and are carried away.

Response

Sponges **do not have nervous systems** that would allow them to respond to changes in their environment.

However, many sponges **protect themselves by producing toxins** that make them unpalatable or poisonous to potential predators.

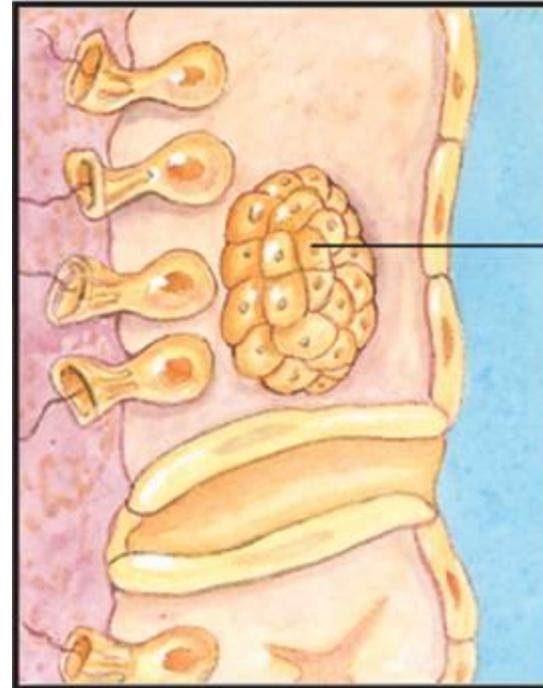
Reproduction

Sponges **can reproduce sexually or asexually.**

In most sponge species, a single sponge forms both eggs and sperm by meiosis.

The eggs are fertilized inside the sponge's body, in a process called **internal fertilization.**

After fertilization, the zygote develops into a **larva**. A **larva** is an immature stage of an organism that looks different from the adult form.



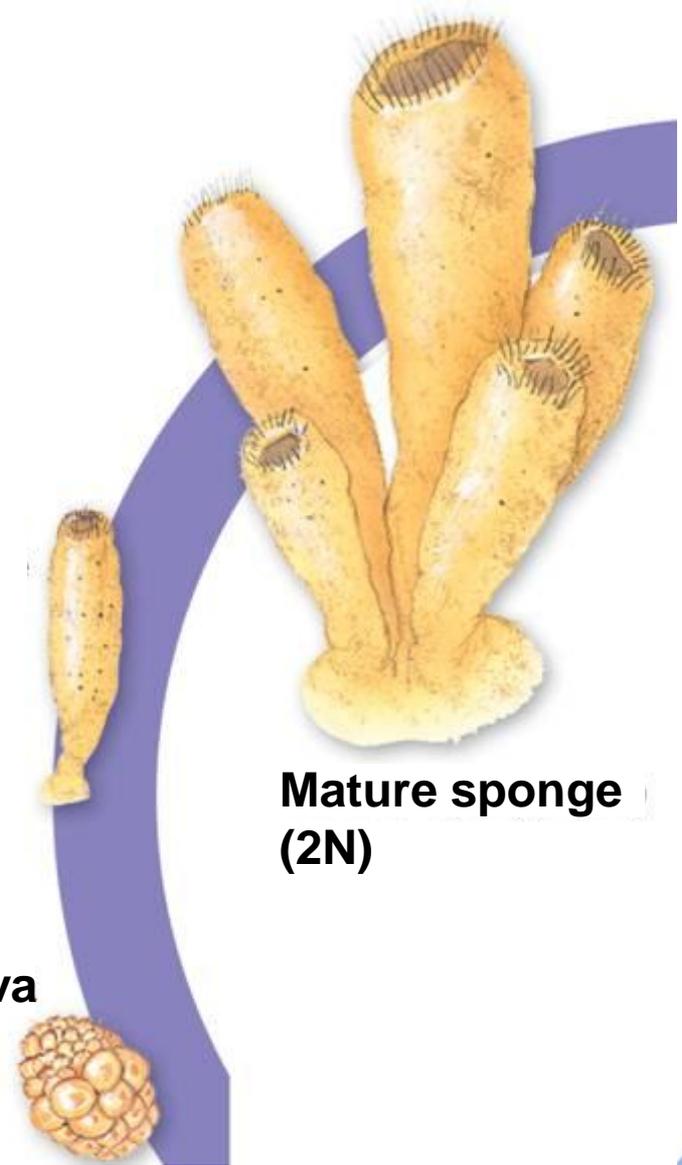
Larva (2N)

The **larvae of sponges are motile**. Water currents carry the larva until it attaches to a surface and grows into a new sponge.

New sponge

Mature sponge (2N)

Swimming larva



Sponges can reproduce asexually by budding or by producing gemmules.

In budding, part of a sponge breaks off of the parent sponge, settles to the sea floor, and grows into a new sponge.



26-2 Section QUIZ

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Section QUIZ

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1 In sponges, a spike-shaped structure made of chalklike calcium carbonate or glasslike silica is a(an)

a. spicule.

b. archaeocyte.

c. choanocyte.

d. epidermal cell.

2 An immature stage of an organism that looks different from the adult form is a(an)

a. gemmule.

b. larva.

c. archaeocyte.

d. choanocyte.

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3 Specialized cells that use flagella to move water through the sponge are

- a. gemmules.
- b. pores.
- c. spicules.
- d. choanocytes.

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- 4 Sponges are
- a. detritivores.
 - b. carnivores.
 - c. filter feeders.
 - d. herbivores.

- 5 Sponges can reproduce
- a. sexually only.
 - b. asexually only.
 - c. both sexually and asexually.
 - d. by metamorphosis.