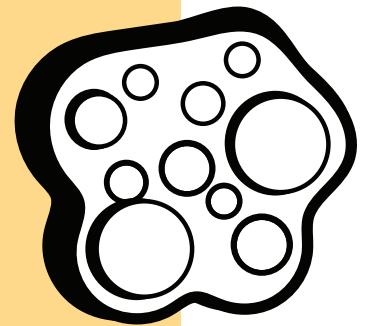


SPOTLIGHT ON THE SPONGE

MEET YOUR ANCESTOR: THE LUMPY SPONGE

Our first multicellular ancestor was a sponge. Sponges appeared about 640 million years ago. These ancient sea sponges were the first animals, and every animal alive today is descended from this first family.

Today, science recognizes approximately 5,000 different species of sponges. The majority live in salt water and about 150 to 200 species have adapted to freshwater.

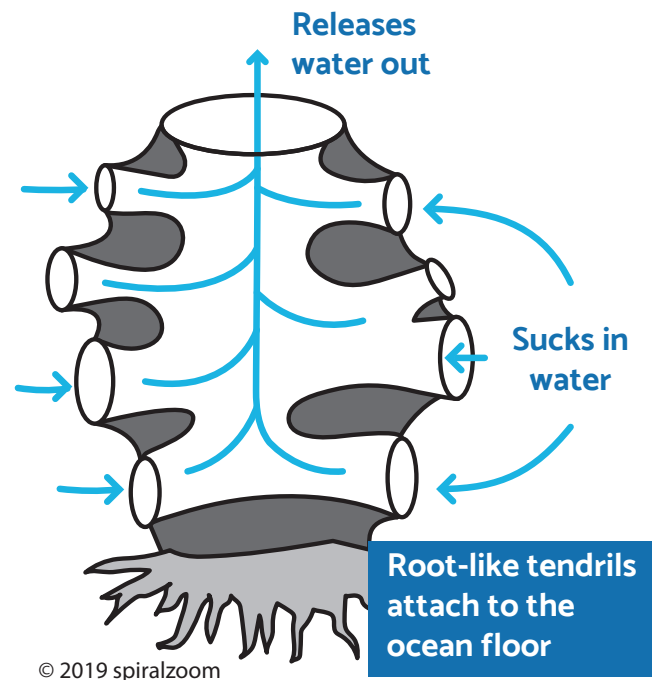


HABITAT

Scientists think that the first sponges lived in calm, shallow water and most likely fed on algae and bacteria.

BODY STRUCTURE

Sponges are anchored to the ocean floor, so they can't chase food. The food has to come to them. The sponge eats by sucking water in through small holes that are distributed across its body. As the water filters through, the sponge absorbs the nutrients, including algae and bacteria. It then releases the water through the central chimney. Sponges filter the oceans and help clear debris out of the water.



A sponge is a lumpy structure that is organized around a central “chimney” or body cavity.

EVOLUTION

THE TRANSITION FROM SINGLE-CELLED EUKARYOTES TO MULTICELLULAR ORGANISMS

For the first two billion years of our history, the only game in town was single celled organisms. What changed and brought about the evolution of multicellular animals? Scientists are still putting together the pieces of the puzzle. One thing we do know is that the evolution of collagen, a stretchy, elastic protein, played an important role in the evolution of larger, more complex animal bodies. Sponges were the first animals with collagen.

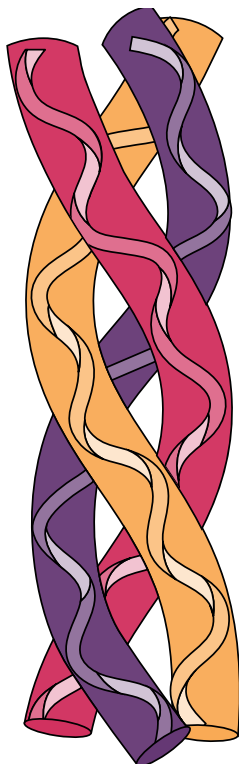
COLLAGEN: NATURE'S GLUE

All multicellular animals – including sponges and people – are held together by collagen. You might have heard about how collagen is an important part of your skin. Collagen not only holds your skin together, it is also found throughout your body. The connective tissue that holds your muscles, organs and other body parts together is made of collagen.

Collagen: Connective Tissue

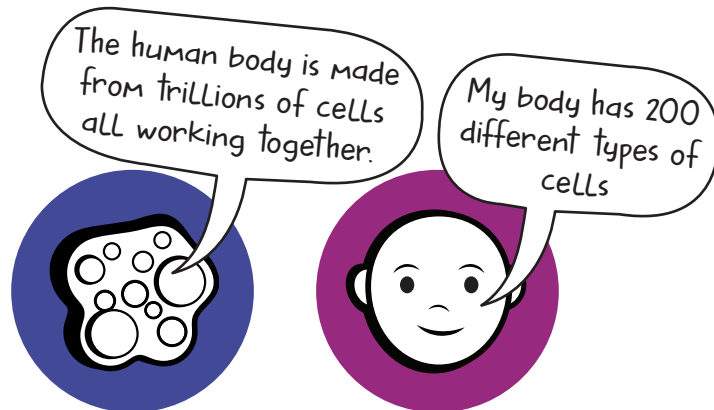
The Collagen protein is a triple helix. It looks a lot like the DNA molecule with is also a protein in the shape of a double helix. Collagen is similar to twisted rope. Smaller fibers are twisted together in order to make a stronger, larger structure.

What's the difference between a protein and a cell?
Read more on page 51.



CELLS: SPECIALIZATION

The sponge's body contains four types of differentiated cells – or cells that each perform a specialized function. The more differentiated cells in a creature, the more complex it is. Scientists estimate that the human body is made from about 200 different types of cells that perform special functions.



SKIN IN THE GAME

Another thing that might surprise you about the sponge is that it has a layer of skin! The sponge has epidermal cells. Research shows that all animals have epidermal cells. We inherited these cells from our ancestors the sponge. The outer layer of our bodies might look different, but at the cellular level we have a lot in common.



Insects are animals.
Bugs have epidermal cells too!

Skin Cells Are Like a Barrier Wall

Epidermal cells provide a protective covering that separates the inner body from the outer world. Skin cells are held together by a matrix of collagen.