

Cell Wall

As you travel through the plant cell, first, you must slip through the cell wall. The [cell wall](#) is a rigid layer of nonliving material that surrounds the cells of plants and some other organisms. The cells of animals, in contrast, do not have cell walls. **A plant's cell wall helps to protect and support the cell.** The cell wall is made mostly of a strong material called cellulose. Although the cell wall is tough, many materials, including water and oxygen, can pass through easily.

Cell Membrane

After you sail through the cell wall, the next barrier you must cross is the [cell membrane](#). All cells have cell membranes. In cells with cell walls, the cell membrane is located just inside the cell wall. In other cells, the cell membrane forms the outside boundary that separates the cell from its environment.

The cell membrane controls what substances come into and out of a cell. Everything the cell needs, from food to oxygen, enters the cell through the cell membrane. Fortunately, your ship can slip through, too. Harmful waste products leave the cell through the cell membrane. For a cell to survive, the cell membrane must allow these materials to pass in and out. In addition, the cell membrane prevents harmful materials from entering the cell. In a sense, the cell membrane is like a window screen. The screen allows air to enter and leave a room, but it keeps insects out.

Nucleus

As you sail inside the cell, a large, oval structure comes into view. This structure, called the [nucleus](#) (NOO klee us), acts as the “brain” of the cell. **You can think of the nucleus as the cell's control center, directing all of the cell's activities.**

Nuclear Membrane

Notice the nucleus is surrounded by a membrane called the nuclear membrane. Just as a mailing envelope protects the letter inside it, the nuclear membrane protects the nucleus. Materials pass in and out of the nucleus through pores in the nuclear envelope. So aim for that pore just ahead and carefully glide into the nucleus.

Cytoplasm

As you leave the nucleus, you find yourself in the [cytoplasm](#), the region between the cell membrane and the nucleus. Your ship floats in a clear, thick, gel-like fluid. The fluid in the cytoplasm is constantly moving, so your ship does not need to propel itself. Many cell organelles are found in the cytoplasm.

Mitochondria

Suddenly, rod-shaped structures loom ahead. These organelles are [mitochondria](#) (my tuh KAHN dree uh) (singular *mitochondrion*). **Mitochondria are known as the “powerhouses” of the cell because they convert energy in food molecules to energy the cell can use to carry out its functions.**

Chloroplasts

Have you noticed the many large green structures floating in the cytoplasm? Only the cells of plants and some other organisms have these green organelles called [chloroplasts](#). **Chloroplasts capture energy from sunlight and use it to produce food for the cell.** Chloroplasts make leaves green.

Vacuoles

Steer past the chloroplasts and head for that large, water-filled sac, called a [vacuole](#) (VAK yoo ohl), floating in the cytoplasm. **Vacuoles are the storage areas of cells.** Most plant cells have one large vacuole. Some animal cells do not have vacuoles; others do. Vacuoles store food and other materials needed by the cell. Vacuoles can also store waste products.

