Plant Cell Structures

Plant cells contain the same features as animal cells, but they also have some special structures not found in animal cells. (As you look at a plant cell, it may appear that the cell doesn’t have a cell membrane. The cell membrane is just hard to see.)

5. Materials Storage: The Vacuole

Just as in animal cells, the vacuole is filled with nutrients. However, the vacule takes up a much larger part of the cytoplasm of a plant cell.

6. Protection: The Cell Wall

The cell wall protects and supports the plant cell. Gases, water, and some minerals can pass through small pores (openings) in the cell wall.

7. Food Production: Chloroplasts

Chloroplasts contain many molecules of a green chemical called chlorophyll. Chlorophyll allows plant cells to make their own food, using light from the sun. Animal cells cannot do this.

1. Control: The Nucleus

The nucleus is the control centre. It directs all of the cell’s activities.

2. Control: Chromosomes

Chromosomes are found inside the nucleus. Chromosomes contain genetic information, which holds “construction plans” for all of the pieces of the cell.

3. Materials: The Cell Membrane

The cell membrane acts like a gatekeeper, controlling the movement of materials like nutrients and waste into and out of the cell.

4. Materials: The Cytoplasm

Most of the cell is cytoplasm, a watery fluid. The cytoplasm allows materials to be transported quickly between structures in the cell. The cytoplasm also stores wastes until they can be disposed of.

5. Materials Storage: The Vacuole

Each vacuole is filled with fluid. A vacuole is used to store water and nutrients, such as sugar and minerals.

Animal Cell Structures

Most animal cells have these structures.

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Parts of a Cell Seen with an Electron Microscope

The cytoplasm, the working area of every cell, contains special structures called organelles. Many of these tiny structures can be seen only with a transmission electron microscope. The organelles described below are found in both plant and animal cells, although Figure 1 shows an animal cell.

1. Energy: Mitochondria
Mitochondria (singular is mitochondrion) provide the cells with energy. In a process called respiration, mitochondria release energy by combining sugar molecules with oxygen to form carbon dioxide and water. This energy is used in almost every function of the cell.

2. Protein Manufacturing: Ribosomes
Proteins are put together on ribosomes using information from the nucleus and molecules from the cytoplasm. Proteins are large molecules that are needed for cell growth, for repair, and for reproduction.

3. Material Transport: Endoplasmic Reticulum
A series of folded membranes, called endoplasmic reticulum, carry materials through the cytoplasm. "Rough" endoplasmic reticulum has many ribosomes attached to it.

4. Protein Storage: The Golgi Apparatus
Proteins are stored inside the Golgi apparatus. This organelle also puts proteins into packages, called vesicles. Vesicles carry the protein molecules to the surface of the cell, where they are released to the outside. The proteins in the vesicles vary, depending on their function.

5. Recycling: Lysosomes
Lysosomes patrol the cytoplasm, cleaning up. They contain special proteins that are used to break down large molecules into many smaller molecules. The smaller molecules can be reused as building blocks for other large molecules. In humans and other animals, lysosomes are also used to kill and digest invading organisms.

Understanding Concepts
1. What are organelles?
2. Make a concept map showing cell structures and their functions. Include the structures that are visible with a light microscope and an electron microscope.
3. Predict what would happen to a cell if its mitochondria stopped working.

Making Connections
4. Cells lining the stomach release enzymes that aid digestion. Digestive enzymes are protein molecules. Explain why many Golgi apparatuses are found in stomach cells.

Design Challenge
You have learned about the organelles inside a cell. When you build a specialized cell, should your design include some of these organelles? Explain.