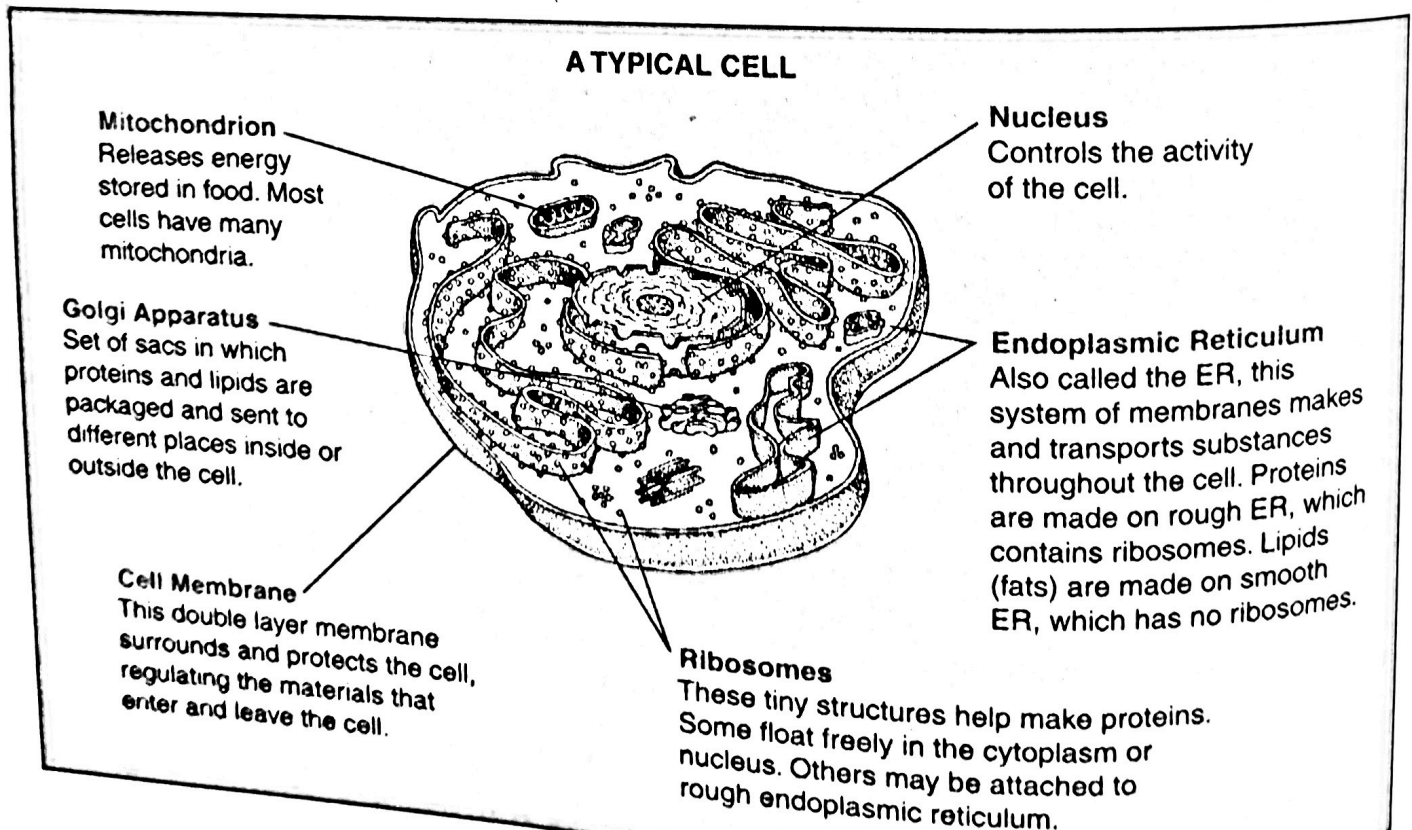


# GED CONTENT Cell Structures and Functions

All organisms are made up of microscopic units called cells. Some organisms consist only of a single cell. Other organisms are made up of many cells. All cells, whether they form a single-celled organism or a multicellular organism, carry out life processes. For example, all cells take in food. They all break down food to get energy, and they all give off waste products. Most cells grow and reproduce. All cells eventually die.

Most cells have the structures shown in the diagram. The nucleus is one of the most complex cell structures. The nucleus is the control center of the cell. The **nuclear membrane** protects the nucleus and controls what goes into and out of it. The nucleus contains **chromatin**—the cell's genetic material. When the cell divides, the chromatin forms **chromosomes**, which pass on the hereditary information for the cell. The nucleus also contains nucleoli, which produce **protein-making** structures called **ribosomes**.

Outside the nucleus is a soup-like fluid called **cytoplasm**. The cytoplasm contains a number of cell structures called **organelles**. The organelles work together to help the cell break down food for energy, growth, and reproduction. The cytoplasm and organelles are surrounded by a **cell membrane**, which controls what goes into and out of the cell. Use the diagram to learn about each of the different organelles, the nucleus, and the cell membrane.



Directions: Choose the one best answer to each question.

Questions 1 through 6 refer to the information and diagram on page 36.

1. What is the main idea of the first paragraph?

- (1) All organisms are made up of many cells that eventually die.
- (2) All organisms are made up of cells, which carry out the basic life processes.
- (3) All cells are tiny and can be seen only with a microscope.
- (4) All cells take in food for energy and give off wastes.
- (5) Although most cells grow and reproduce, they all eventually die.

2. What is the main idea of the second paragraph?

- (1) Cells have many different kinds of structures in the cytoplasm.
- (2) The cells of multicellular organisms have a nucleus.
- (3) The nucleus is surrounded by the nuclear membrane.
- (4) The nucleus is often located near the center of the cell.
- (5) The nucleus is one of the cell's most complex structures.

3. Which detail best supports the main idea of the second paragraph?

- (1) The cytoplasm is outside the nucleus.
- (2) The organelles are outside the nucleus.
- (3) Most cells include the structures described in the diagram.
- (4) The nucleus is the control center of the cell.
- (5) There are ribosomes in both the nucleus and the cytoplasm.

4. What is the main purpose of the diagram?

- (1) to show and describe the nucleus
- (2) to show and describe various cell structures
- (3) to describe the functions of ribosomes
- (4) to show the difference between cytoplasm and the nucleus
- (5) to explain how materials pass through the cell membrane

5. According to the diagram, how do different organelles work together to carry out cell processes related to proteins?

- (1) Ribosomes make proteins, the endoplasmic reticulum transports them, and the Golgi apparatus sends them where they are needed.
- (2) Ribosomes make proteins, the Golgi apparatus transports them, and the mitochondria send them where they are needed.
- (3) The mitochondria release energy and the smooth endoplasmic reticulum sends proteins throughout the cell.
- (4) The mitochondria release energy and the Golgi apparatus makes lipids and proteins.
- (5) The mitochondria release energy, the endoplasmic reticulum makes proteins, and the Golgi apparatus makes lipids.

6. What is the main idea of the passage and diagram together?

- (1) Organisms are made of cells that have specialized structures to carry out life processes.
- (2) Some organisms consist of just one cell, and others consist of many different types of cells.
- (3) The life processes of cells include taking in food for energy, growing, and reproducing.
- (4) Cells are microscopic units with many types of structures having different functions.
- (5) The cytoplasm contains organelles needed to carry out the cell's functions.

**Answers start on page 266.**

## SCIENCE TOPIC

## PLANTS AND ANIMALS

We share the Earth with millions of other living things, from the smallest bacteria to the huge blue whale. Many of these creatures affect our lives directly. All of them have some of the same needs as human beings: to find food, to escape enemies, and to reproduce. When we learn about other living things, we also learn something about ourselves.

## CELLS:

## Life Comes in Small Packages

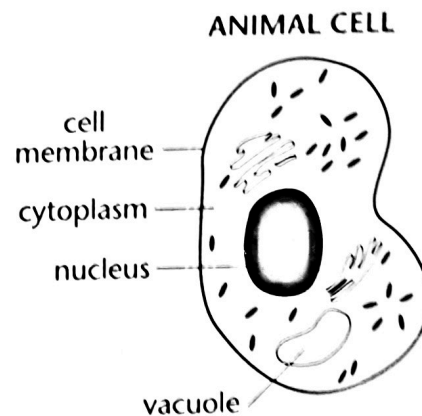
Did you know that you are made up of millions of tiny units called *cells*? You are! In fact, every living thing is made up of cells. Cells are so small that you can see them only through a microscope; there are thousands of cells in just your little finger. Some cells, like the ones in you, are part of larger, many-celled beings. Other cells live on their own as one-celled creatures.

There are lots of different types of cells. A nerve cell in your brain is very different from a muscle cell in your arm and even more different from a cell in the trunk of an oak tree. Still, there are some things that are alike in all cells.

## Animal Cells

Look at the diagram of an animal cell to see the major cell parts. Every cell has a *nucleus*, which is a dark spot, usually near the center of the cell. The nucleus is like the "brain" of the cell. It controls most of what happens inside the cell. The *chromosomes* inside the nucleus carry the directions (similar to blueprints) for making new cells.

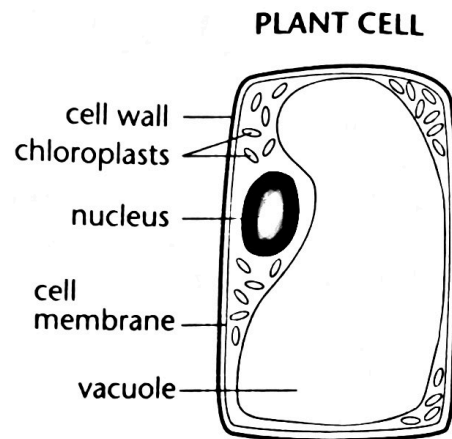
The *cell membrane* is a thin wrapping around the outside that holds the cell together. It keeps out many things that could harm the cell, while letting in things the cell needs, like oxygen and food. The inside of the cell is filled with *cytoplasm*, a clear, jellylike liquid. The space you see in the cytoplasm is called a *vacuole*. Vacuoles store water and food for the cell.



## Plant Cells

Now look at the diagram of a plant cell. It is mostly the same as an animal cell, but there are some differences. In plant cells, a large vacuole often takes up much of the space inside the cell. All plant cells have a **cell wall** around the outside of the membrane. This wall is made of a stiff material called **cellulose**.

In most plant cells there are also small oval objects called **chloroplasts**. These chloroplasts contain a green chemical called **chlorophyll**. Chlorophyll is the chemical that helps green plants make their own food. No animal cells have cell walls or chloroplasts, and no animal can make its own food.



### EXERCISE 5: CELLS

*Directions:* Match the word with its definition.

- |                        |   |
|------------------------|---|
| _____ 1. Cell membrane | a. Contain chlorophyll                  |
| _____ 2. Cell wall     | b. Jellylike liquid inside cells        |
| _____ 3. Cellulose     | c. Carry "blueprints" for new cells     |
| _____ 4. Chloroplasts  | d. Directs most cell activities         |
| _____ 5. Chlorophyll   | e. Stores food and water for the cell   |
| _____ 6. Chromosomes   | f. Holds animal cells together          |
| _____ 7. Cytoplasm     | g. Stiff material in cell walls         |
| _____ 8. Nucleus       | h. Chemical that helps plants make food |
| _____ 9. Vacuole       | i. Stiff structure around plant cells   |

*Directions:* Circle the number of the best answer.

10. What is the main topic of this passage?
- (1) what is inside an animal cell
  - (2) what a cell wall is made of
  - (3) which is the most important part of a cell
  - (4) what cells are and what is inside them
  - (5) how a cell makes new cells