7 Study Guide

Big ideas Cellular Basis of Life, Homeostasis

Cells are the basic units of life. Their structures are specifically adapted to their function and the overall goal of maintaining homeostasis. In multicellular organisms, cells may become specialized to carry out a particular function.

7.1 Life Is Cellular

- The cell theory states that (1) all living things are made up of cells, (2) cells are the basic units of structure and function in living things, and (3) new cells are produced from existing cells.
- Most microscopes use lenses to magnify the image of an object by focusing light or electrons.
- Prokaryotic cells do not separate their genetic material within a nucleus. In eukaryotic cells, the nucleus separates the genetic material from the rest of the cell.

cell (191)
cell theory (191)
cell membrane (193)
nucleus (193)
eukaryote (193)
prokaryote (193)

7.2 Cell Structure

- The nucleus contains nearly all the cell's DNA and, with it, the coded instructions for making proteins and other important molecules.
- Vacuoles store materials like water, salts, proteins, and carbohydrates. Lysosomes break down large molecules into smaller ones that can be used by the cell. They are also involved in breaking down organelles that have outlived their usefulness. The cytoskeleton helps the cell maintain its shape and is also involved in movement.
- Proteins are assembled on ribosomes.
- Proteins made on the rough ER include those that will be released from the cell as well as many membrane proteins and proteins destined for specialized locations within the cell. The Golgi apparatus then modifies, sorts, and packages proteins and other materials for storage in the cell or release outside the cell.
- Chloroplasts capture the energy from sunlight and convert it into food that contains chemical energy in a process called photosynthesis. Mitochondria convert the chemical energy stored in food into compounds that are more convenient for the cell to use.
- The cell membrane regulates what enters and leaves the cell and also protects and supports the cell.

cytoplasm (196)
organelle (196)
vacuole (198)
lysosome (198)
cytoskeleton (199)
centriole (199)
ribosome (200)
endoplasmic reticulum (200)
Golgi apparatus (201)
chloroplast (202)
mitochondrion (202)
cell wall (203)
lipid bilayer (204)
selectively permeable (205)

7.3 Cell Transport

- Passive transport (including diffusion and osmosis) is the movement of materials across the cell membrane without cellular energy.
- The movement of materials against a concentration difference is known as active transport. Active transport requires energy.

diffusion (208)
facilitated diffusion (209)
aquaporin (210)
osmosis (210)
isotonic (210)
hypertonic (210)
hypotonic (210)
osmotic pressure (211)

7.4 Homeostasis and Cells

- To maintain homeostasis, unicellular organisms grow, respond to the environment, transform energy, and reproduce.
- The cells of multicellular organisms become specialized for particular tasks and communicate with one another to maintain homeostasis.

homeostasis (214)
tissue (216)
organ (216)
organ system (216)
receptor (217)

Think Visually Use the terms *diffusion, facilitated diffusion, osmosis, active transport, endocytosis, phagocytosis, pinocytosis,* and *exocytosis* to create a concept map about the ways substances can move into and out of cells.