V. Looking Inside Cells

organelles: tiny structures that carry out specific functions within a cell

A. Entering the Cell: Substances need to pass through the Cell Wall and the cell membrane

1. **Cell wall:** a rigid layer of non-living material that surrounds the cells of plants and some other organisms
   a. The cells of animals do not have cell walls
   b. A plant's cell wall helps to protect & support the cell
   c. The cell wall is made of a strong material called cellulose
2. **Cell membrane:** the outside cell boundary that controls which substances can enter or leave the cell
   a. All cells have cell membranes
   b. In cells with cell walls, the cell membrane is located just inside the cell wall ; in cells without a cell wall, the cell membrane forms the outside boundary that separates the cell from its environment
   c. The cell membrane controls what substances come into & out of a cell
      1) For a cell to survive, the cell membrane must allow materials to pass in & out
      2) A cell membrane is like a window screen that allows air in & out of the room but keeps insects out

B. The Nucleus: You can think of the nucleus as the cell's control center, directing all of the cell's activities

1. **Nuclear envelope:** protects the nucleus
   a. Materials pass in & out of the nucleus through pores in the nuclear envelope
2. **Chromatin:** thin strands that contain genetic material; the instructions for cell functions
3. **Nucleolus:** structure in the nucleus where ribosomes are made.

C. Organelles in the Cytoplasm

The cytoplasm is the region between the cell memb. & nucleus ; the fluid in the cytoplasm is constantly moving

1. **Mitochondria:** rod-shaped cell structures that convert energy in food molecules to energy the cell can use to carry out its functions
   a. Mitochondria are known as the "power houses" of the cell because they convert energy in food molecules to energy the cell can use to carry out its functions
2. **Endoplasmic Reticulum:** a cell structure that forms passageways in which proteins & other materials are carried through the cell
3. **Ribosomes:** small grain-like structures in the cytoplasm of a cell where proteins are made ; proteins are transported to the golgi bodies

4. **Golgi Bodies:** Structures in a cell that receive proteins & newly formed materials from the E.R., packages them, & distributes them to other parts of the cell.

5. **Chloroplasts:** structures in the cells of plants that capture energy from sunlight and use it to produce food.
   a. Chloroplasts make leaves green

6. **Vacuoles:** sacs inside cells that act as a storage area
   a. Plant cells have 1 large vacuole
   b. Some animal cells have no vac.; others do have several

7. **Lysosomes:** small, round cell structures that contain chemicals that break down larger food particles; they also break down old cell parts & release the substances so they can be used again

D. Specialized Cells

1. In a multi-celled organism, the cells are often quite different from each other & are specialized to perform specific functions
   EX: Nerve cells are specialized to transmit info. from one part of the body to another
   Red blood cells carry oxygen throughout the body

2. In multi-celled organisms, cells are organized into tissues, organs, & organ systems
   a. A **tissue** is a group of similar cells that work together to perform a specific function
      EX: The brain is made of nervous tissue; which consists of nerve cells
   b. An **organ** is made of different kinds of tissues that function together
      EX: The brain consists of nervous tissue and other kinds of tissue that support & protect it
   c. An **organ system** is a group of organs that work together to perform a major function