Cell Structure & Function

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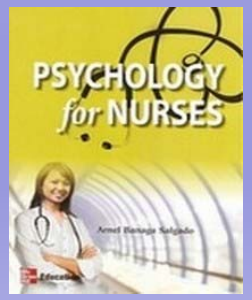
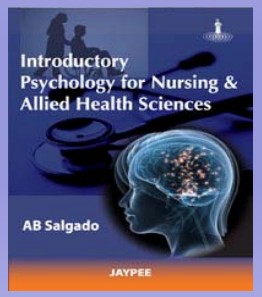
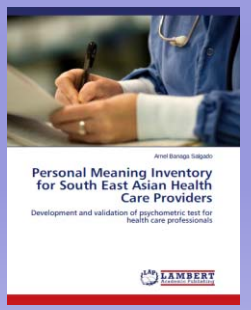
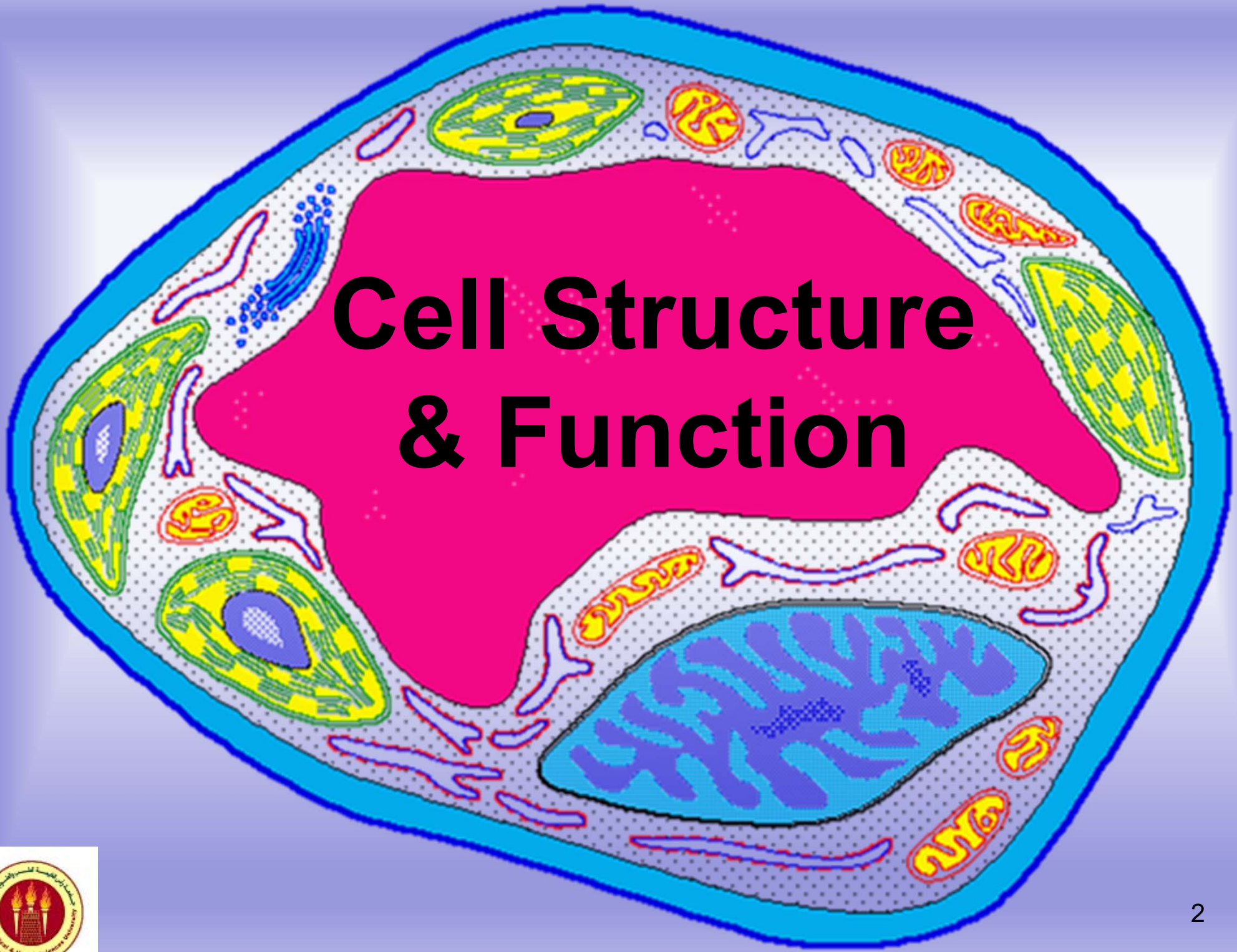


McGraw-Hill






Cell Structure
& Function

Learning Objectives

By the end of this course or lesson on biomolecules, you should be able to:

Describe the fundamental concepts of cell biology and biochemistry, including cell structure, function, and the chemical basis of life.

Explain the major biomolecules, such as proteins, nucleic acids, lipids, and carbohydrates, and their roles in cellular processes.

Identify and compare the structures and functions of prokaryotic and eukaryotic cells.

Cell Theory

- All living things are made up of cells.
- Cells are the smallest working units of all living things.
- All cells come from preexisting cells through cell division.

Definition of Cell

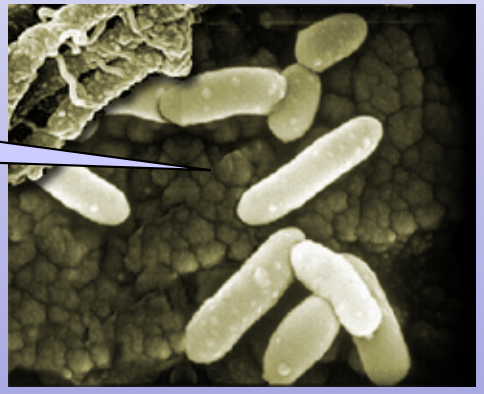
A cell is the smallest unit that is capable of performing life functions.

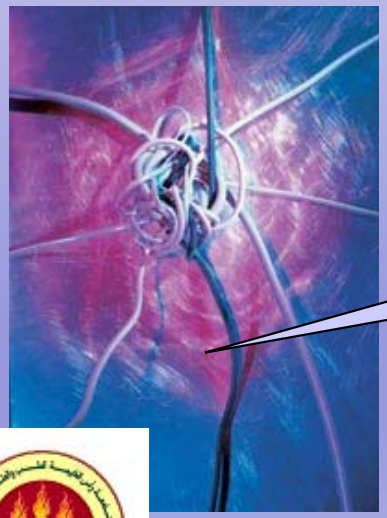
Examples of Cells

Amoeba Proteus

Plant Stem

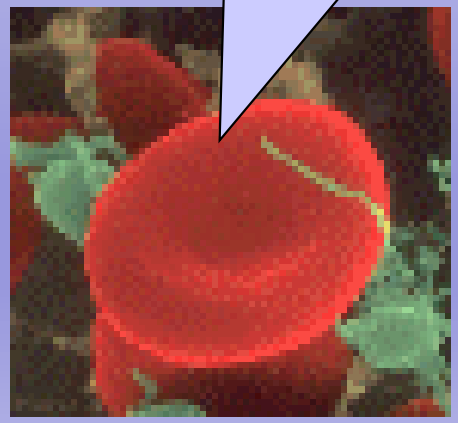
Bacteria





Nerve Cell

Red Blood Cell

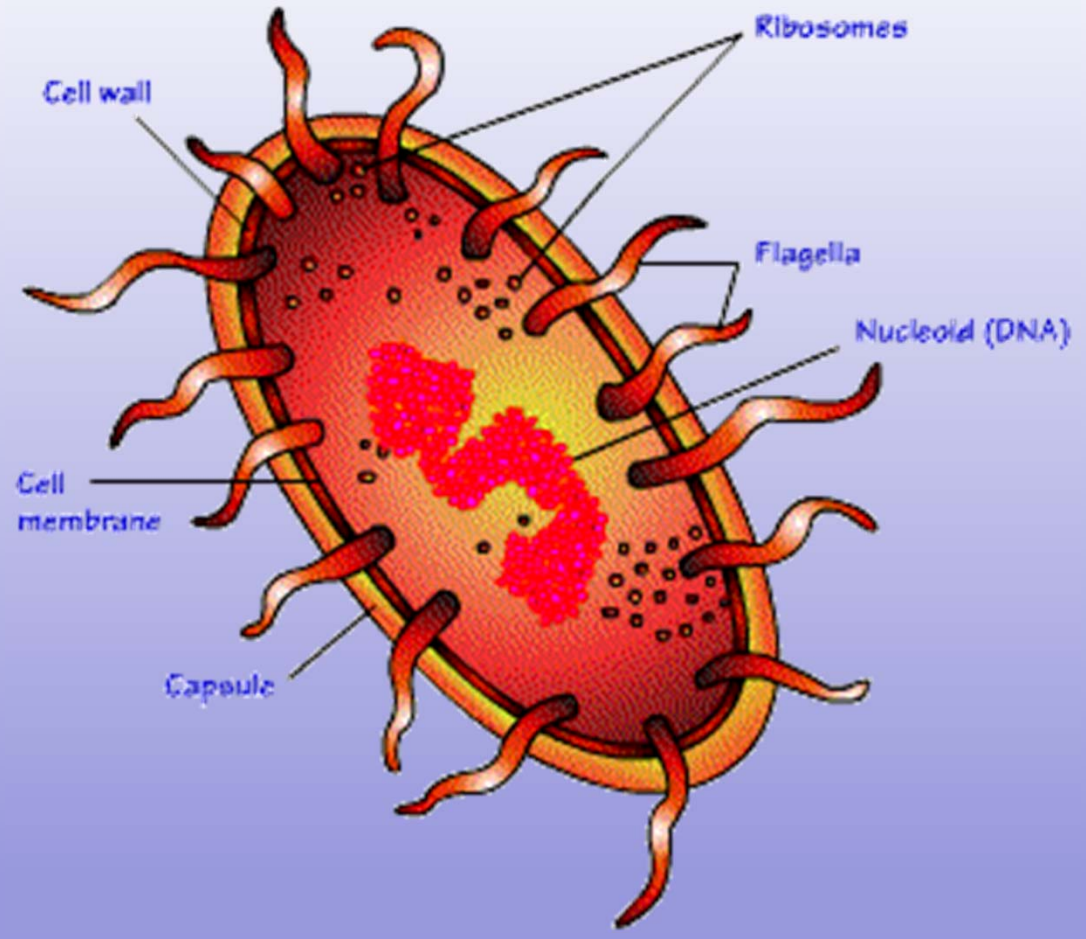


Two Types of Cells

- Prokaryotic
- Eukaryotic

Prokaryotic

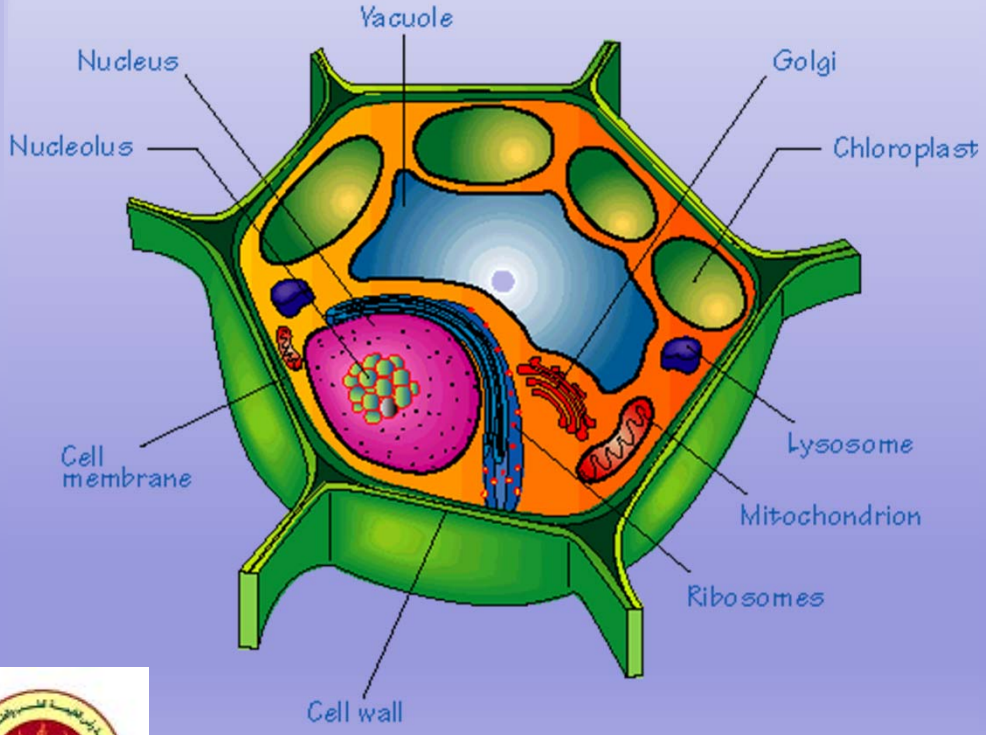
- Do not have structures surrounded by membranes
- Few internal structures
- One-celled organisms, Bacteria



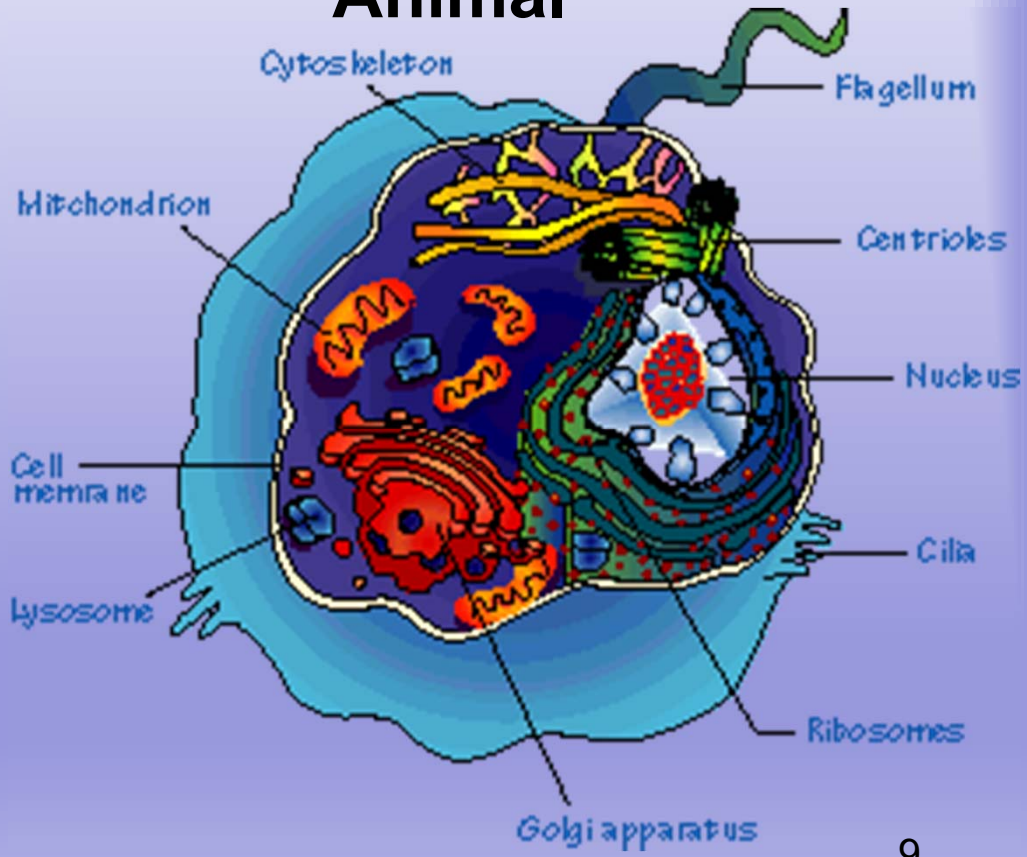
Eukaryotic

- Contain *organelles* surrounded by membranes
- Most living organisms

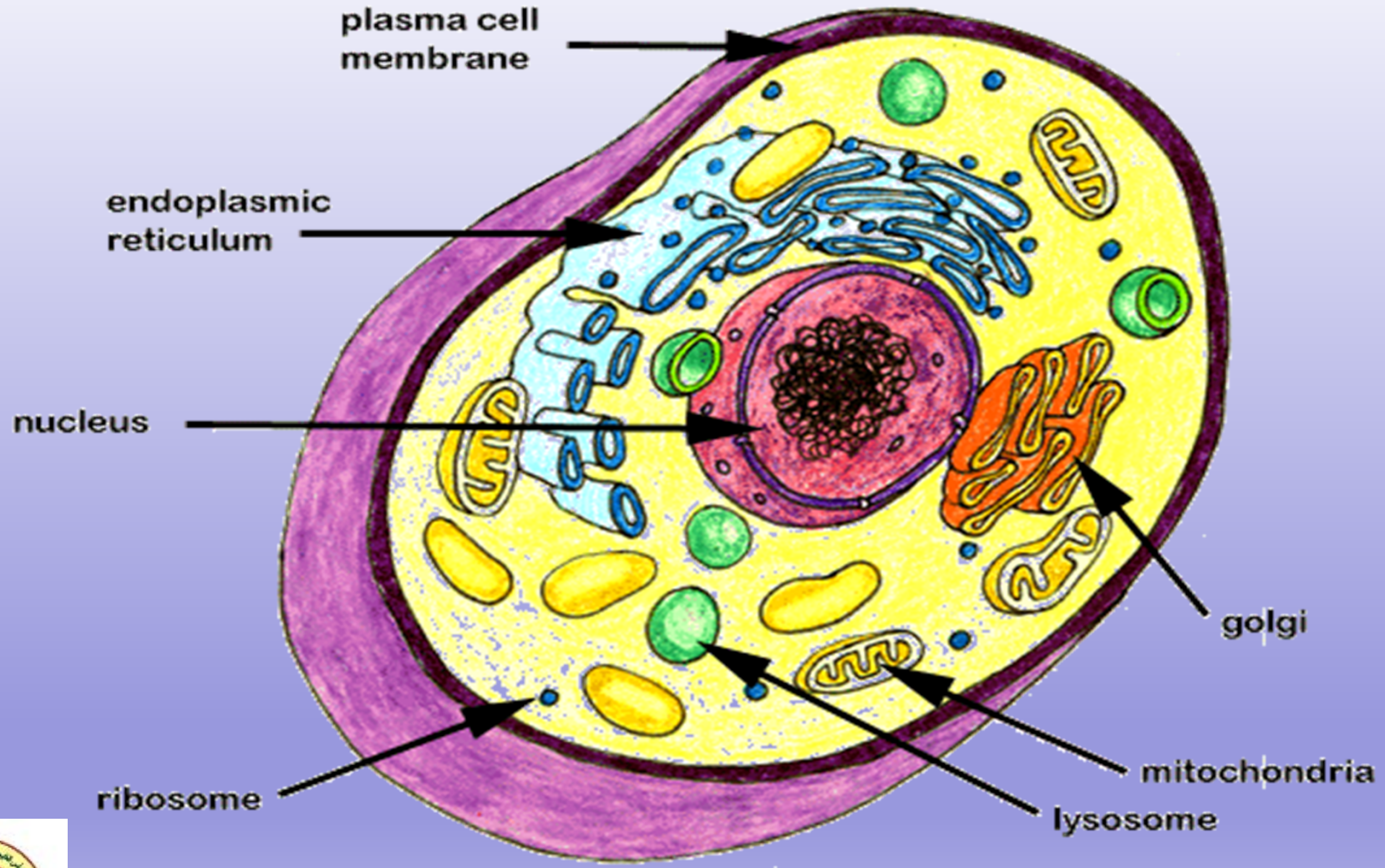
Plant



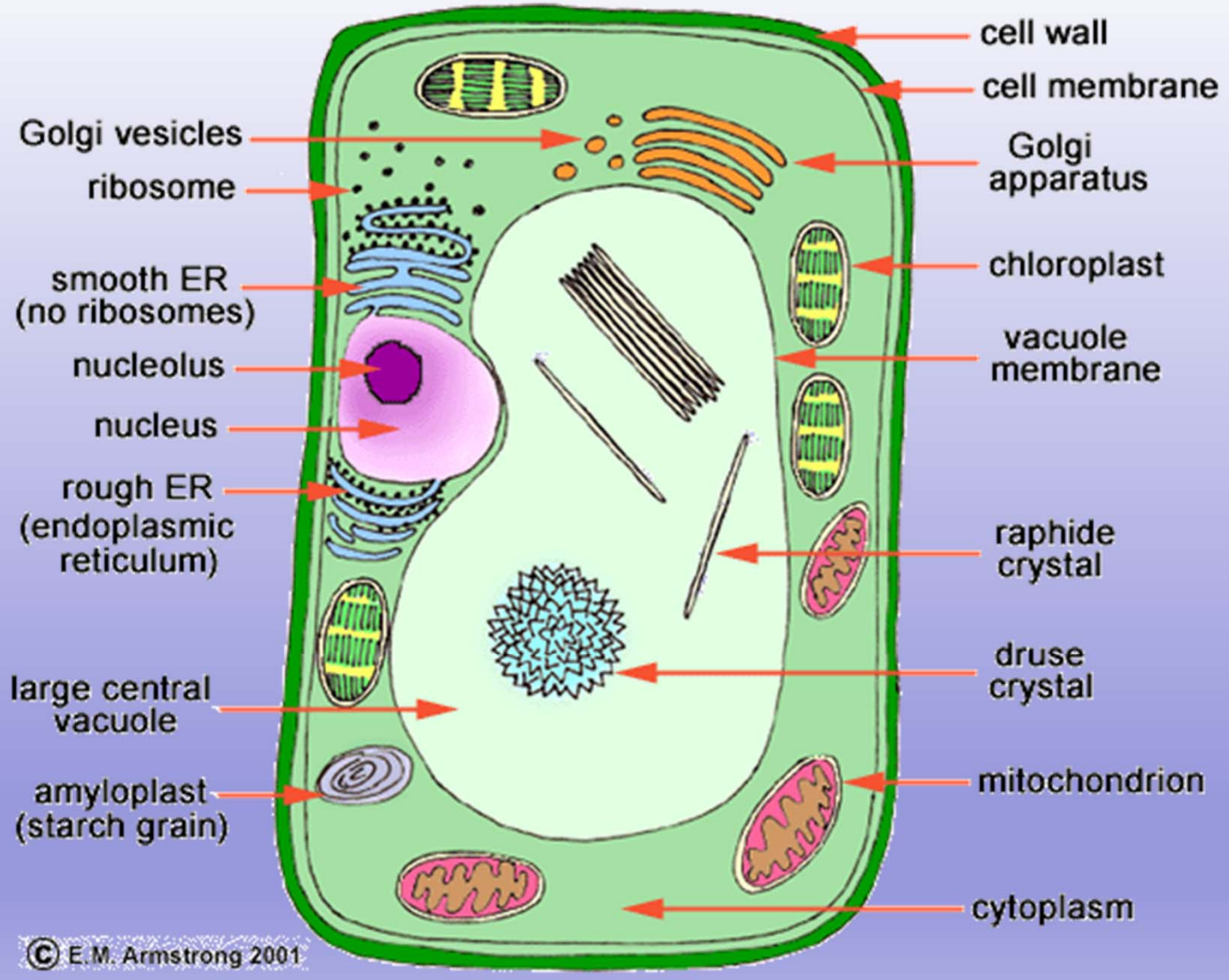
Animal



“Typical” Animal Cell



“Typical” Plant Cell

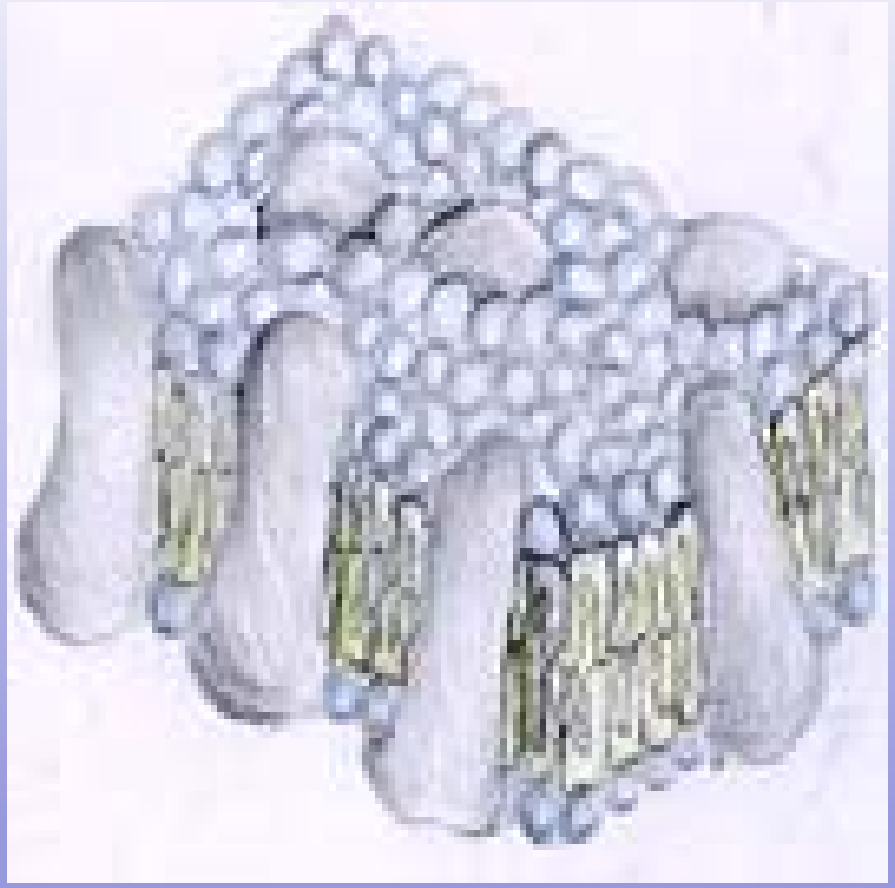


Cell Parts

Organelles

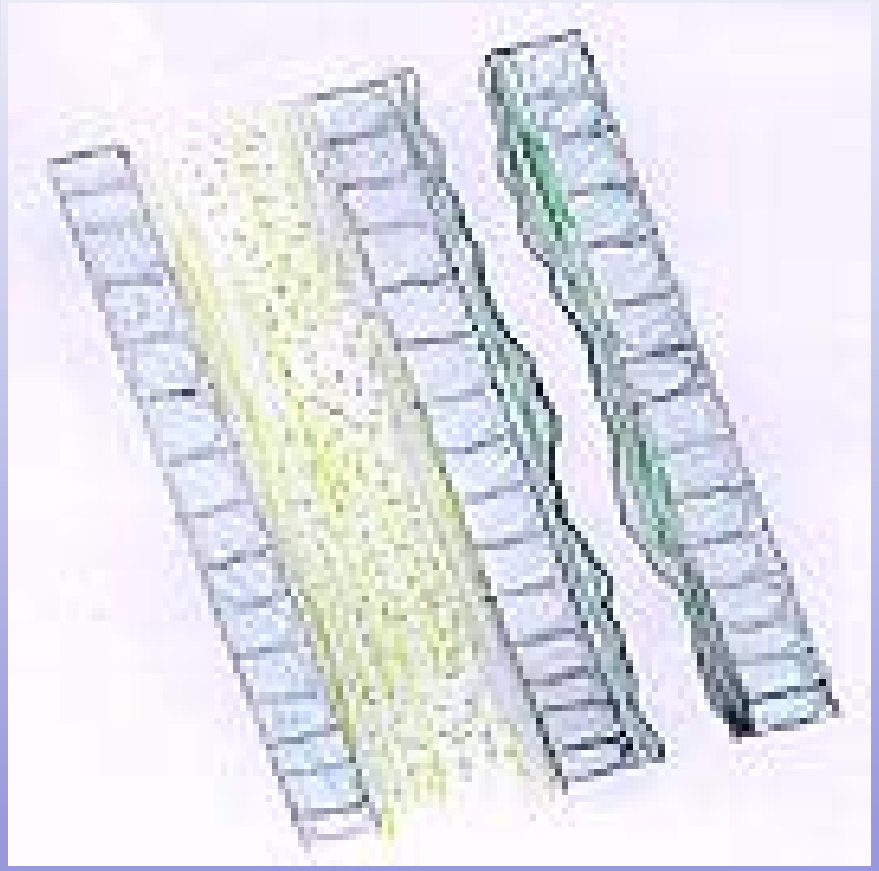
Surrounding the Cell

Cell Membrane



- Outer membrane of cell that controls movement in and out of the cell
- Double layer

Cell Wall



- Most commonly found in plant cells & bacteria
- Supports & protects cells

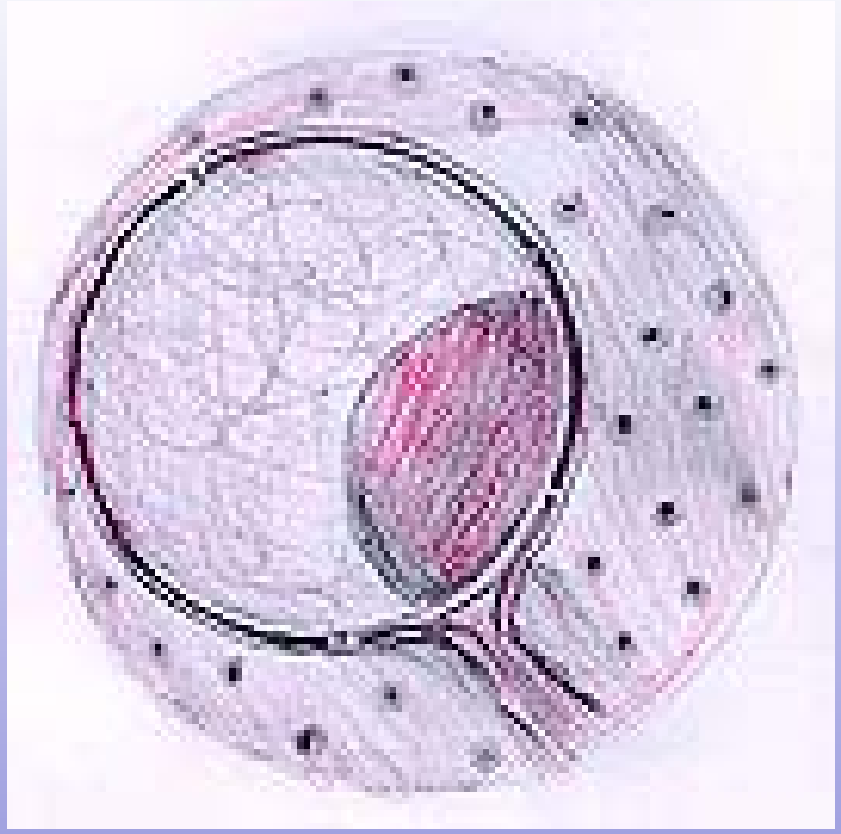
Inside the Cell

Nucleus

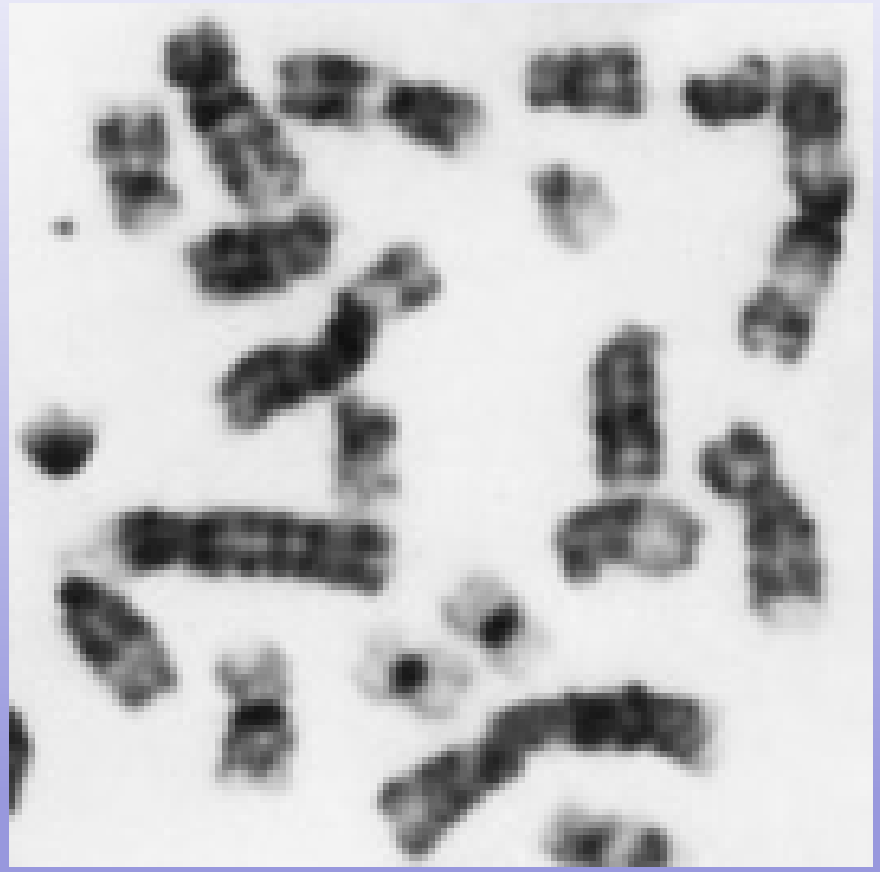
- Directs cell activities
- Separated from cytoplasm by nuclear membrane
- Contains genetic material - DNA

Nuclear Membrane

- Surrounds nucleus
- Made of two layers
- Openings allow material to enter and leave nucleus



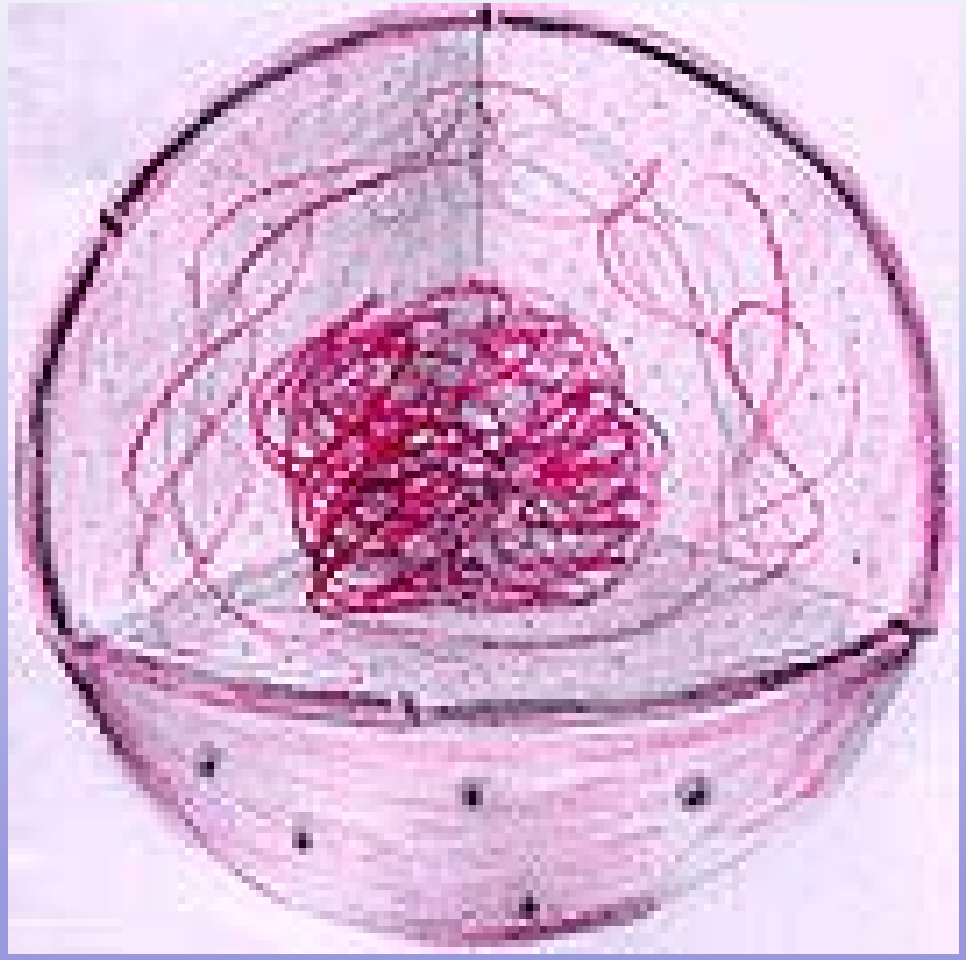
Chromosomes



- In nucleus
- Made of DNA
- Contain instructions for traits & characteristics

Nucleolus

- Inside nucleus
- Contains RNA to build proteins



Cytoplasm

- Gel-like mixture
- Surrounded by cell membrane
- Contains hereditary material

Endoplasmic Reticulum

- Moves materials around in cell
- Smooth type: lacks ribosomes
- Rough type (pictured): ribosomes embedded in surface

Ribosomes

- Each cell contains thousands
- Make proteins
- Found on ribosomes & floating throughout the cell

Mitochondria

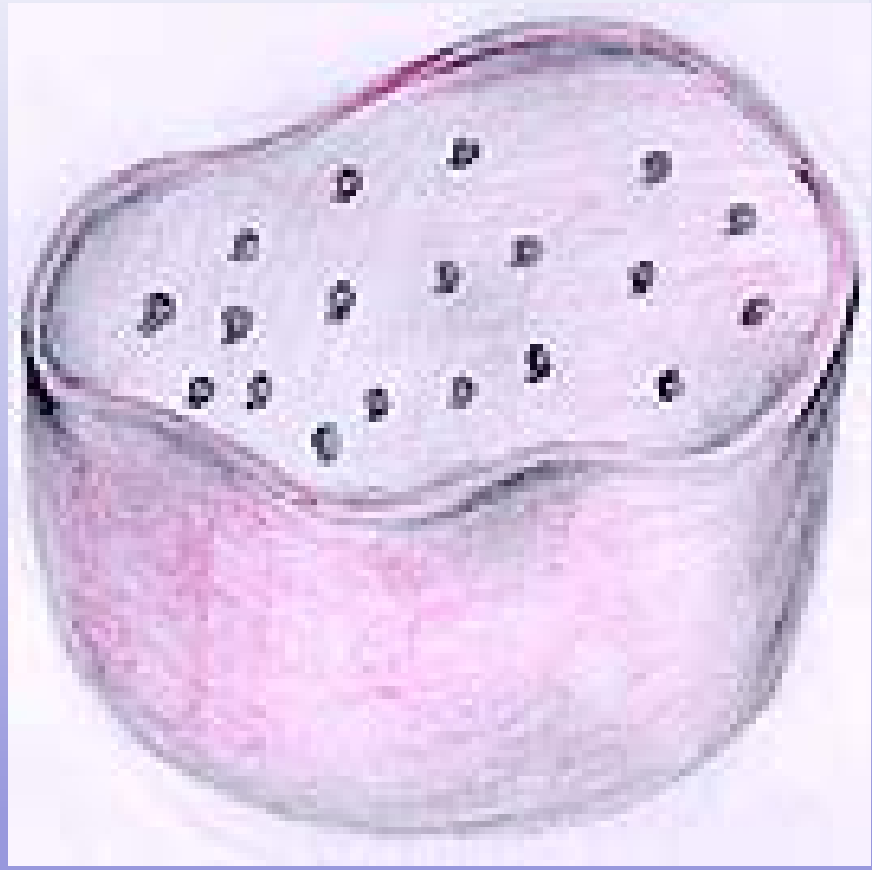
- Produces energy through chemical reactions – breaking down fats & carbohydrates
- Controls level of water and other materials in cell
- Recycles and decomposes proteins, fats, and carbohydrates

Golgi Bodies

- Protein 'packaging plant'
- Move materials within the cell
- Move materials out of the cell

Lysosome

- Digestive 'plant' for proteins, fats, and carbohydrates
- Transports undigested material to cell membrane for removal
- Cell breaks down if lysosome explodes



Vacuoles

- Membrane-bound sacs for storage, digestion, and waste removal
- Contains water solution
- Help plants maintain shape

Chloroplast

- Usually found in plant cells
- Contains green chlorophyll
- Where photosynthesis takes place