Chapter Eight: Cellular Structure and Function
Lesson 8.2: Cell Structure

Cytoplasm: the portion of the cell outside the nucleus

- In eukaryotic cells, all cellular contents outside the nucleus
- In prokaryotic cells, all the cells' contents

Organelles: specialized structure that performs important cellular functions within a cell

- Specialized "little organs"

Nucleus: control center of the cell

- Acts like a main office in a large factory
- Nuclear pores which allow material to move in and out of the nucleus (like a door or window)
- Contains nearly all the cell's DNA and the coded instructions for making proteins and other molecules
    - Chromosomes (genetic information) are found here
    - Nucleolus – small dense region where ribosomes are made

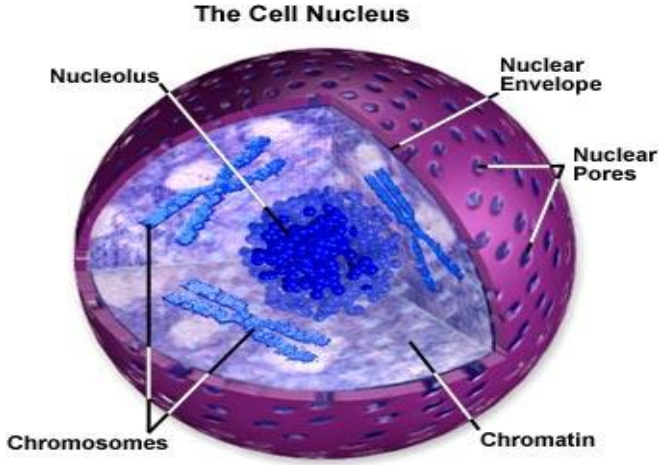


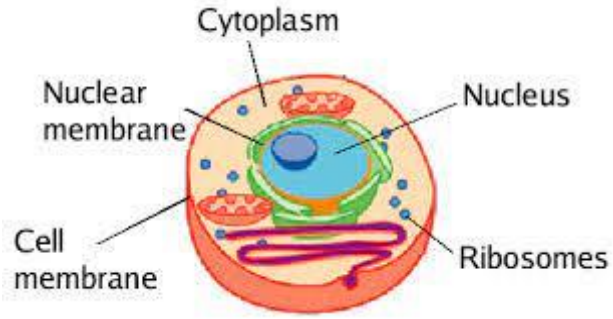
Figure 1

Much of the cell is devoted to the production and distribution of proteins.

- Proteins carry out so many of the essential functions of living things including the synthesis of lipids and carbohydrates

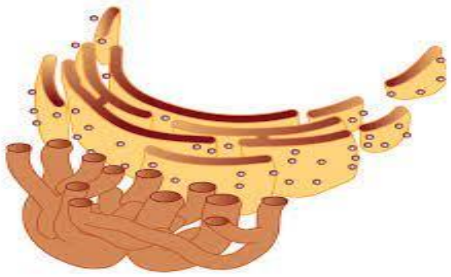
Ribosomes: cell organelle consisting of RNA and protein found throughout the cytoplasm in a cell

- Proteins are assembled on ribosomes
- Ribosomes make proteins by coded instructions from your DNA



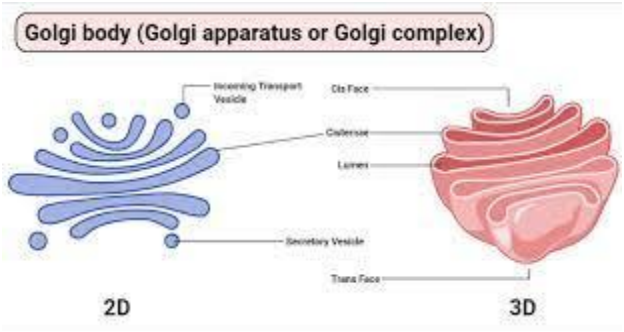
Endoplasmic reticulum (ER): internal membrane system found in eukaryotic cells

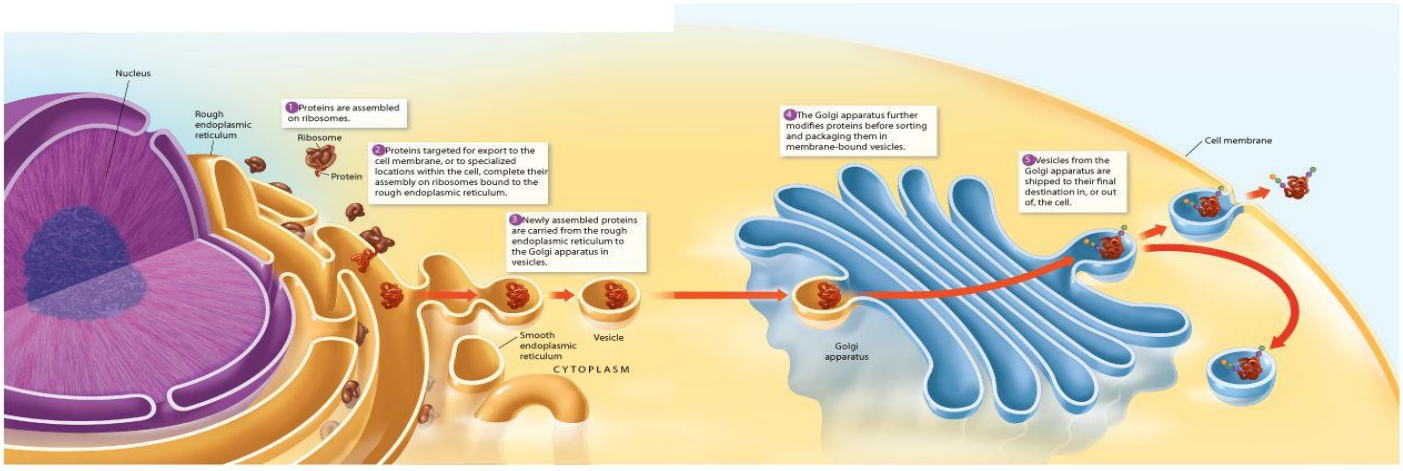
- Place where lipid components of the cell membrane are assembled
- Rough ER – this is where the synthesis of proteins are assembled
    - It is given the name because the Rough ER has ribosomes covering the surface.
    - Newly made proteins leave the ribosomes and enter the Rough ER where they can be chemically modified
- Smooth ER – the synthesis of lipids and detoxification of drugs
    - Important role in the synthesis of carbohydrates
    - Given the name because NO ribosomes are located on the surface



Golgi apparatus: organelle in cells that modifies, sorts, and packages proteins and other material from the endoplasmic reticulum for storage in the cell or release outside the cell

- Looks like a stack of flattened membranes
- Think of this as a customization shop where proteins get its final touches and are ready to leave the factory
    - The proteins leave the factory in a vesicle (think of it like a car)





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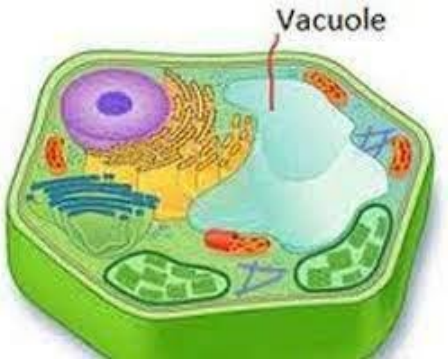
Vacuoles: cell organelle that stores materials such as water, salts, protein, and carbohydrates

- Large saclike, membrane-enclosed structures
- In plants – single large vacuole filled with fluid called a central vacuole

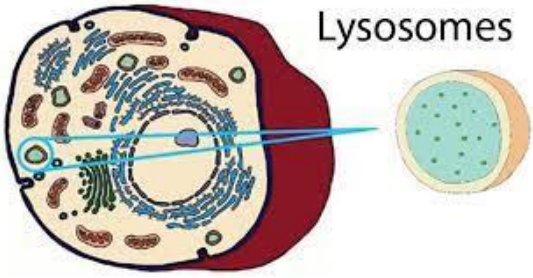


Vesicles: stores and moves materials between cell organelles as well as to and from the cell surface

- This is your vehicle that gets material to and from your destination

Lysosomes: cell organelle that breaks down lipids, carbohydrates, and proteins into small molecules that can be used by the rest of the cell

- This is the clean up crew of the cell
    - Perform the vital function of removing "junk" that might clutter the cell and break down organelles that are "dying"
- Found manly in animal cells but can be found in some plant cells
- Rare but serious human diseases are linked to lysosome failure
    - Tay-Sachs disease

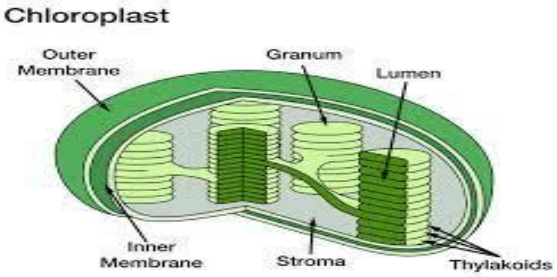


Cytoskeleton: network of protein filaments in a eukaryotic cell that gives the cell its shape and internal organization and is involved in movement

- Acts like a conveyor belt that moves materials from one part to the other
- Help with movement like the cell flagella (males) and cilia (lungs)

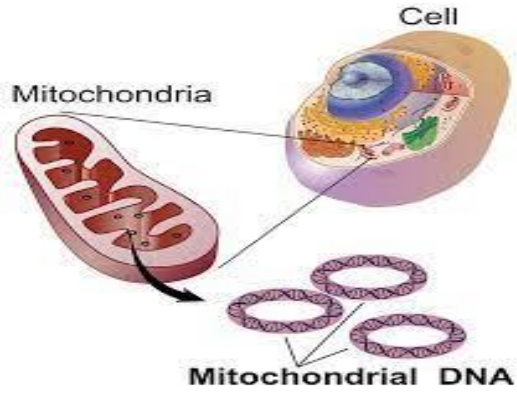
Chloroplasts: organelle found in cells of plants and some other organisms that captures the energy from sunlight and converts it into chemical energy

- Contains the green pigment chlorophyll
- Animal cells do NOT contain chloroplasts



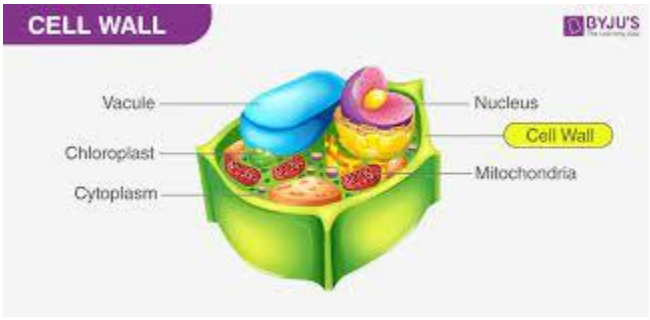
Mitochondria: cell organelle that converts the chemical energy stored in food into compounds that are more convenient for the cell to use

- Mitochondrion – singular
- Powerhouse of the cell
- Nearly all of our mitochondria originate from the egg cell (you get this from your mom!)



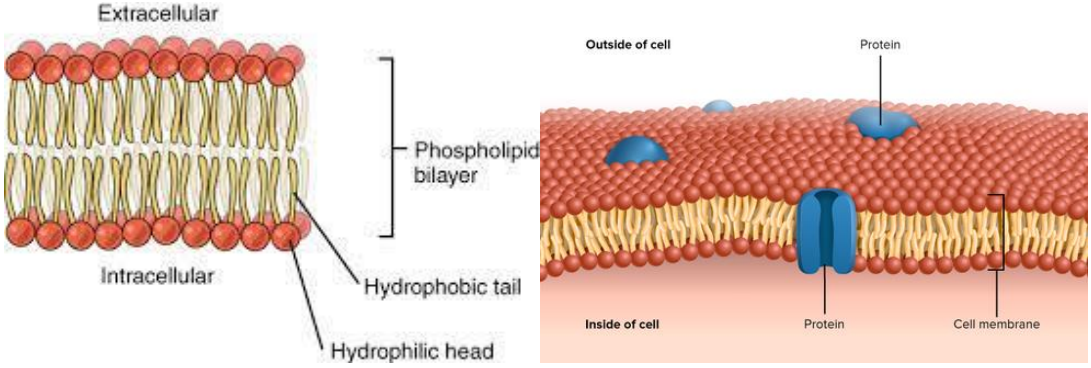
Cell wall: strong, supporting layer around the cell membrane in some cells

- Support, shape, and protect the cell
    - The wood of many trees in made of cell walls
- Plants and fungi



Lipid bilayer: flexible double-layered sheet that makes up the cell membrane and forms a barrier between the cell and its surroundings

- Hydrophobic tail – water hating
- Hydrophilic head – water loving



Selectively permeable: property of biological membranes that allows some substances to pass across it while others cannot

- Also called semipermeable membrane
- If a substance is able to cross, it is said to be permeable
- If a substance is not able to cross, it is said to be impermeable