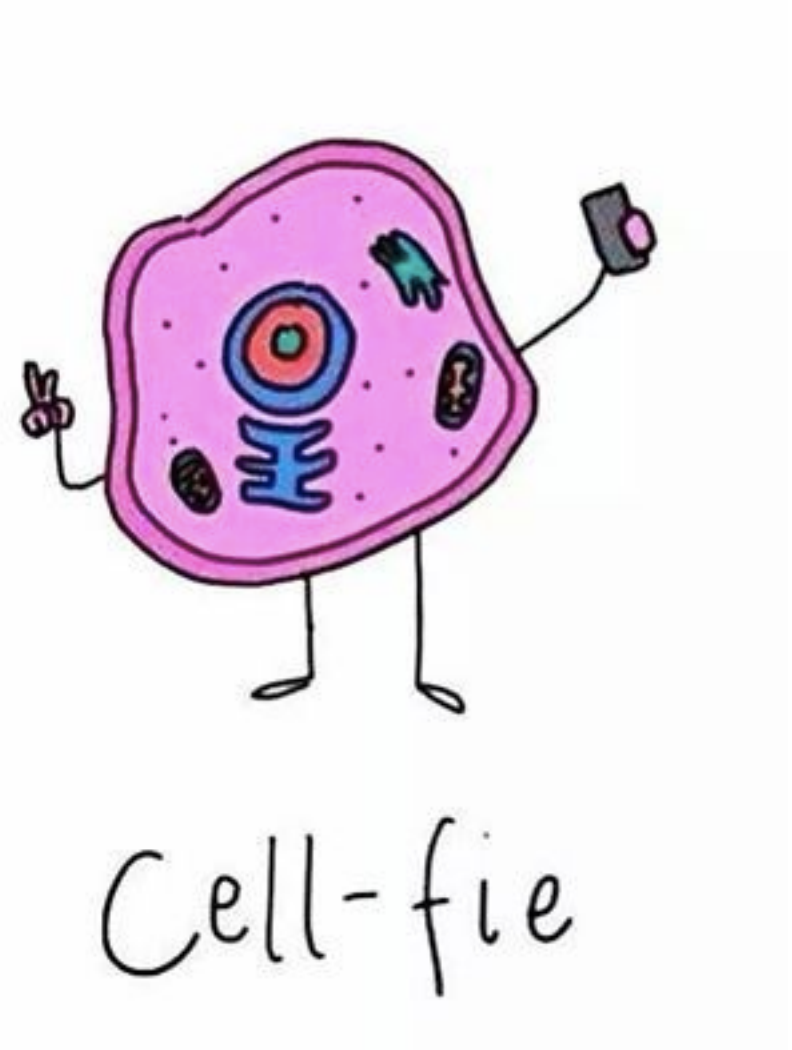
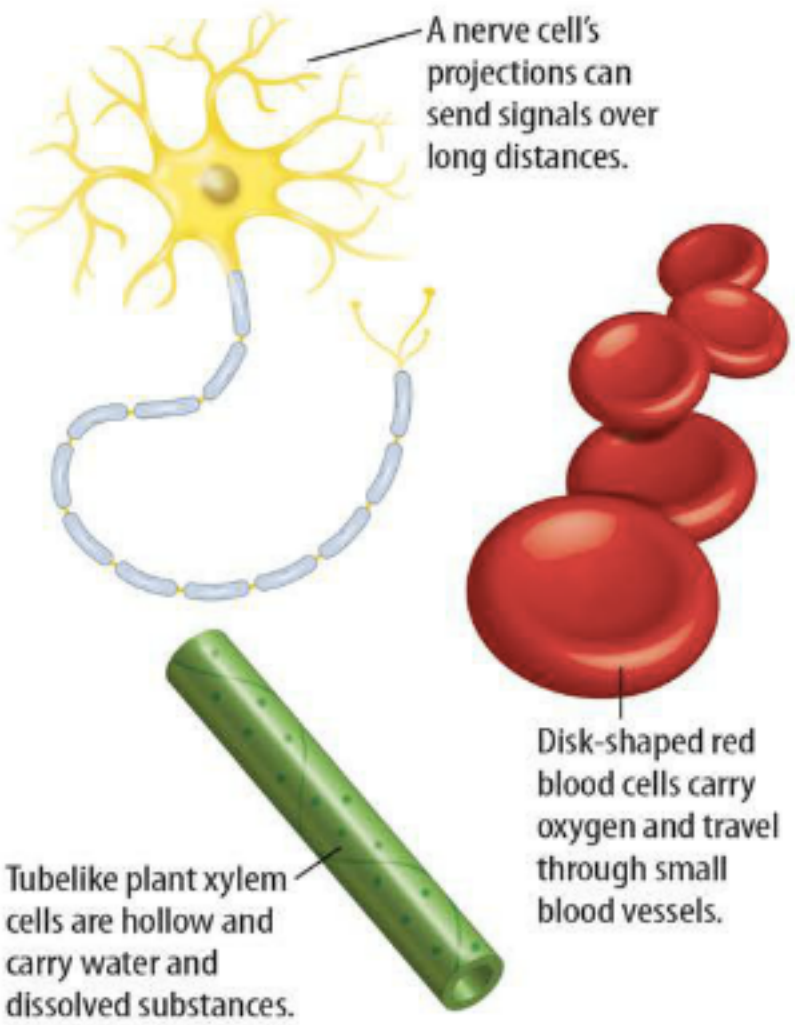
The Cell



Cell Shape and Movement

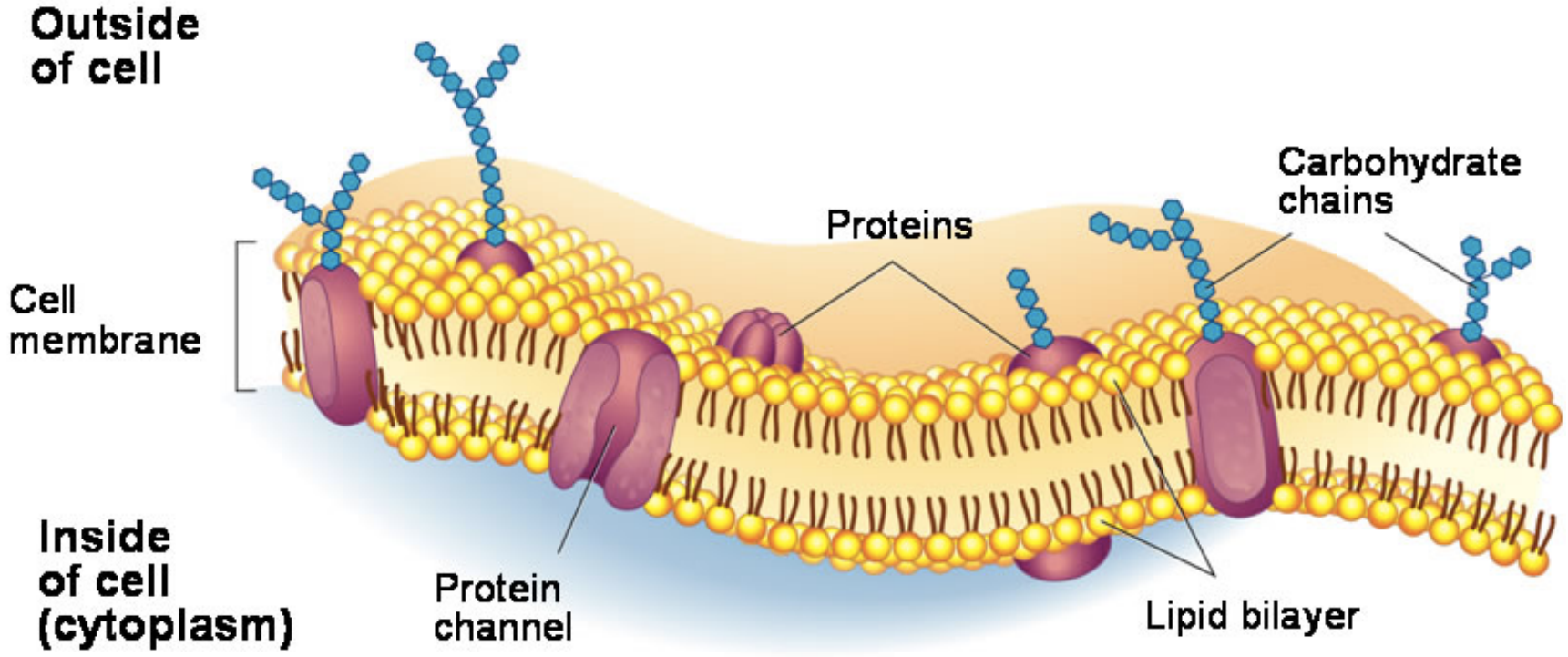
- Cells come in many shapes an
  - Red blood cells
  - Nerve cell
  - Plant cell

- Each cell structure (shape) is unique to the cell's function



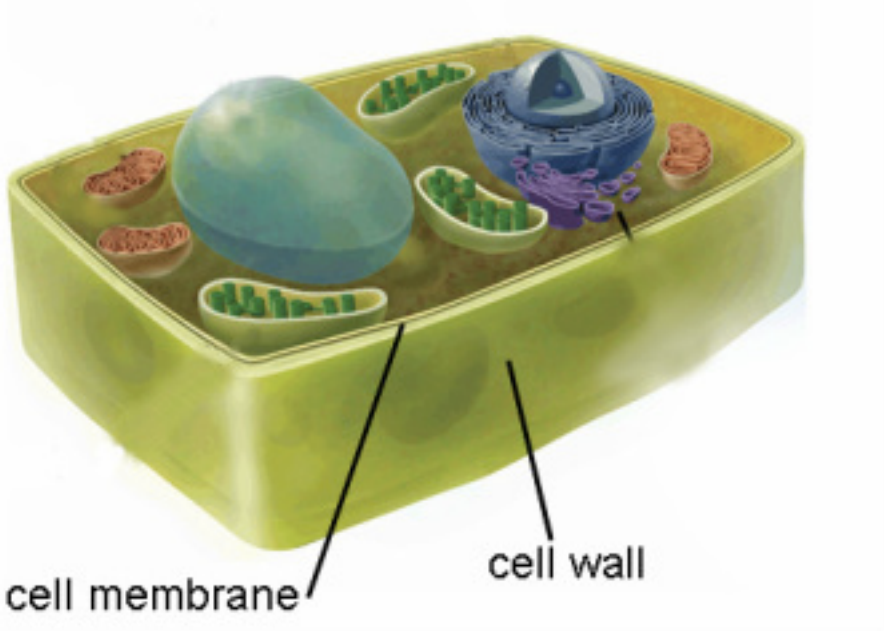
Cell Membrane
membrane, plasma membrane

- Every cell is surrounded by a protective, flexible covering that protects the inside of a cell from the outside environment
- Made of two macromolecules: lipids (phospholipid) & proteins

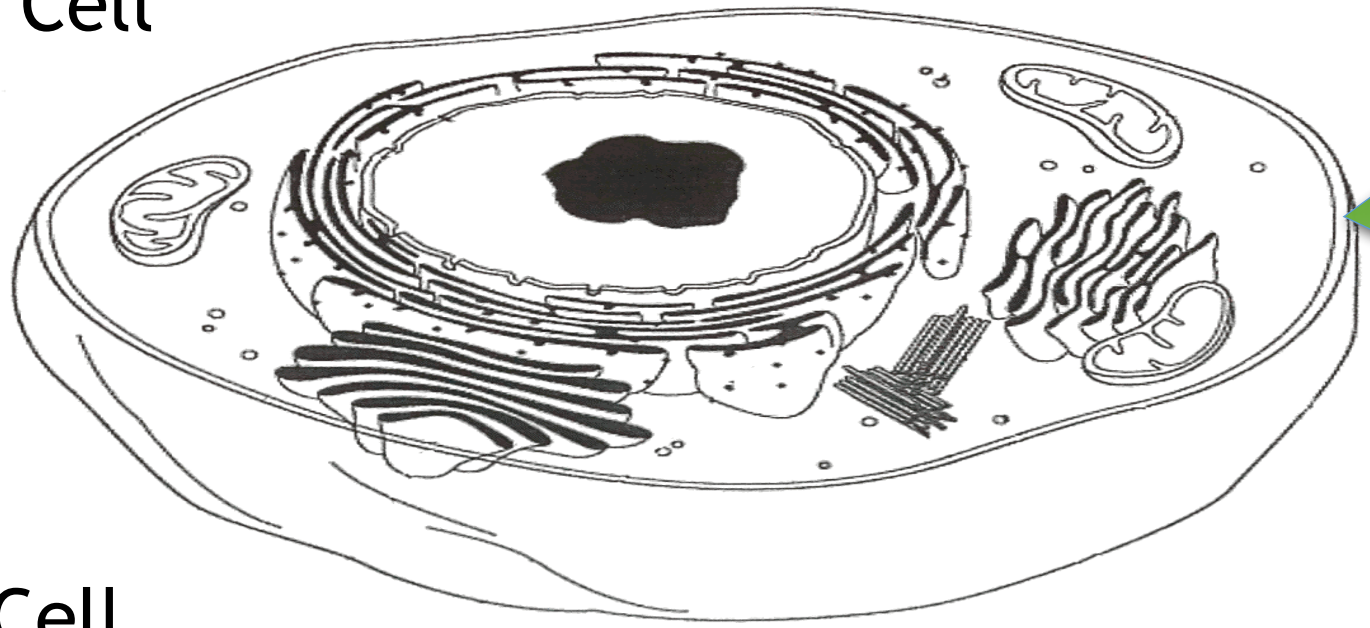


Cell Wall

- Some cells in addition to having a cell membrane have a cell wall, stiff structure OUTSIDE the cell membrane
  - Plant cells, fungal cells, bacteria, and some protists
- Protects the cell from viruses and and other harmful organisms
- Can help maintain the cell's shape and give it structural support

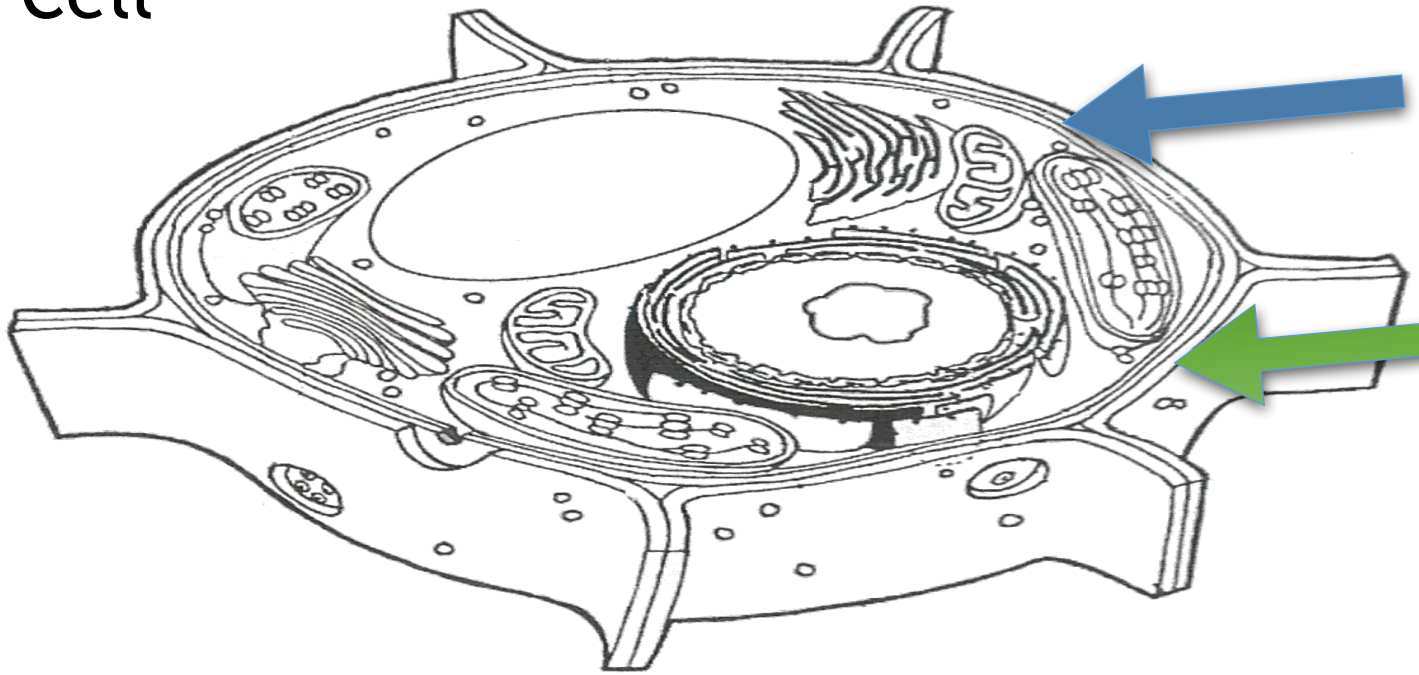


Animal Cell



Cell Membrane

Plant Cell



Cell Membrane

Cell Wall

Cell Appendages
a projecting part of an invertebrate or other living organism

- Are often used for movement:
  - Flagella: long, tail-like; whips back and forth to move a cell
  - Cilia: short, hair-like; can move a cell or molecules away from a cell

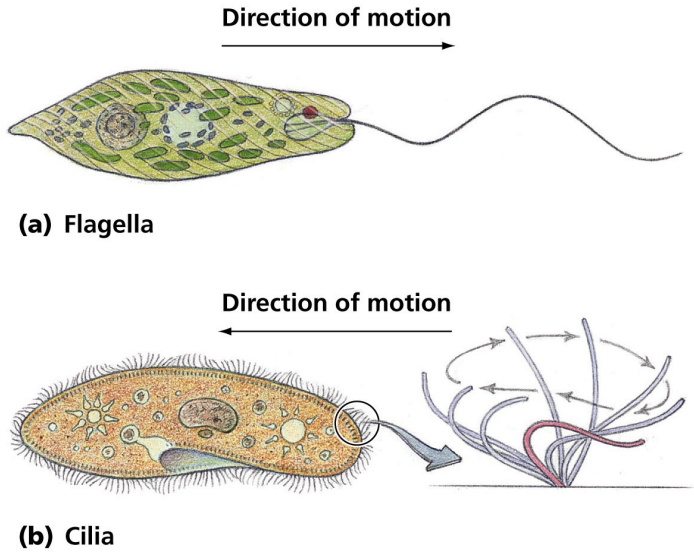
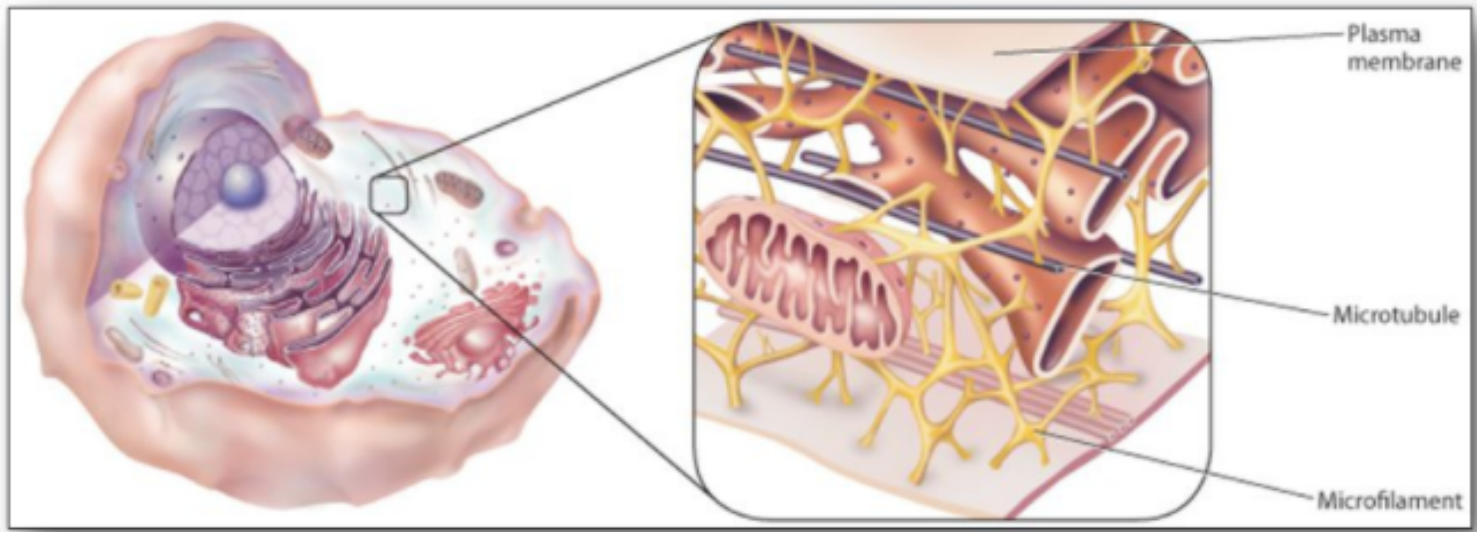


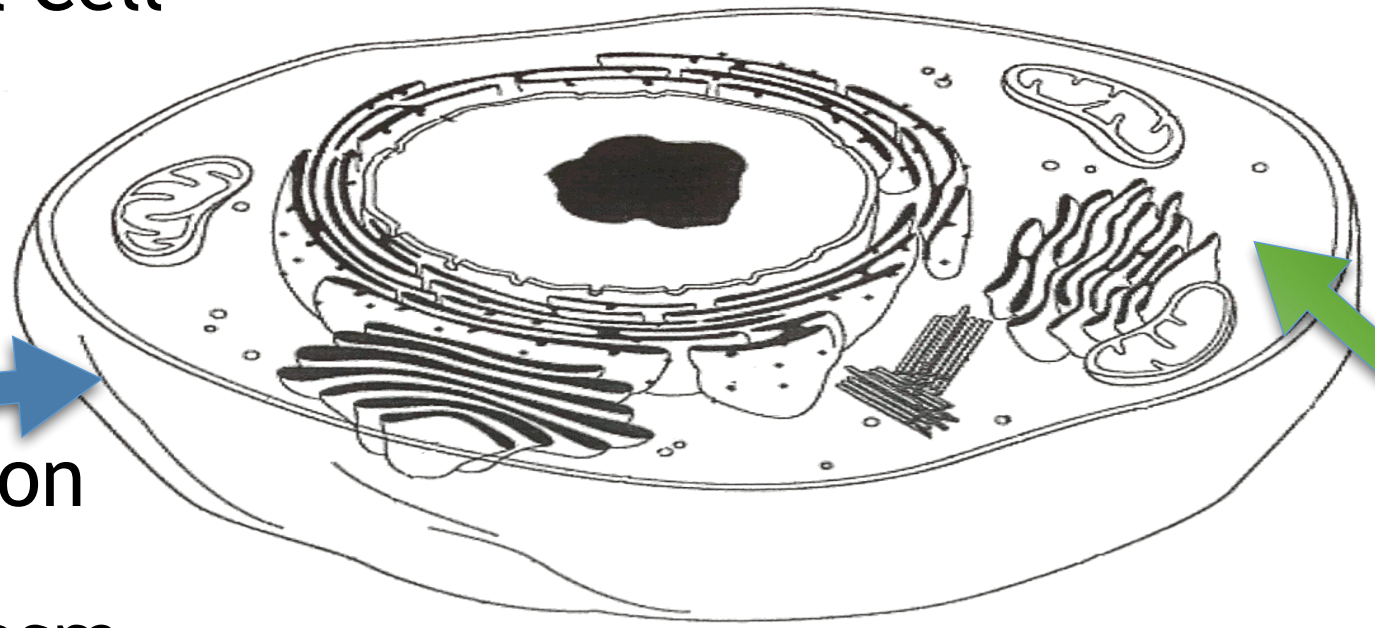
Figure 7 Lung cells have cilia that help move fluids and foreign materials.

Cytoplasm and cytoskeleton

- Fluid inside of a cell that contains water, salts, and other molecules: **cytoplasm**
- Cytoplasm also contains **cytoskeleton**: network on threadlike proteins joined together
  - Gives cell its shape and helps it move (cilia and flagella made of same proteins as cytoskeleton)



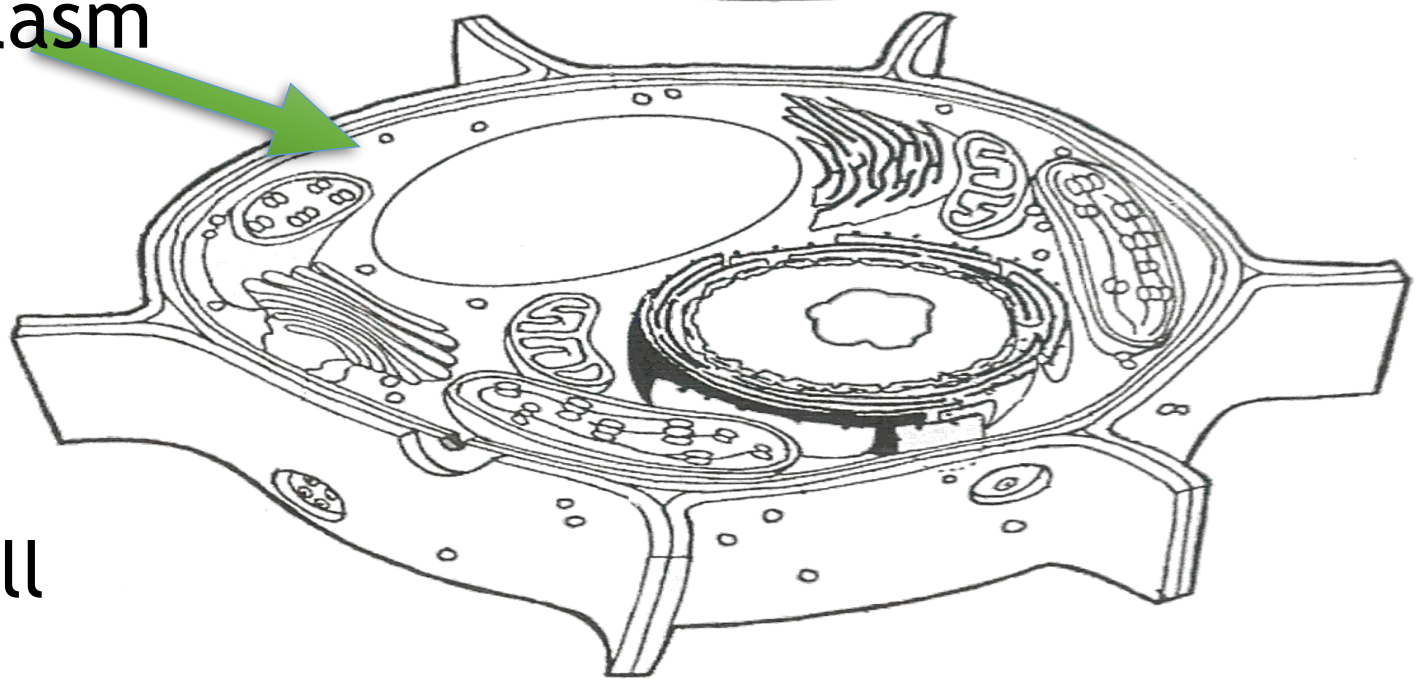
Animal Cell



Cytoskeleton

Cytoplasm

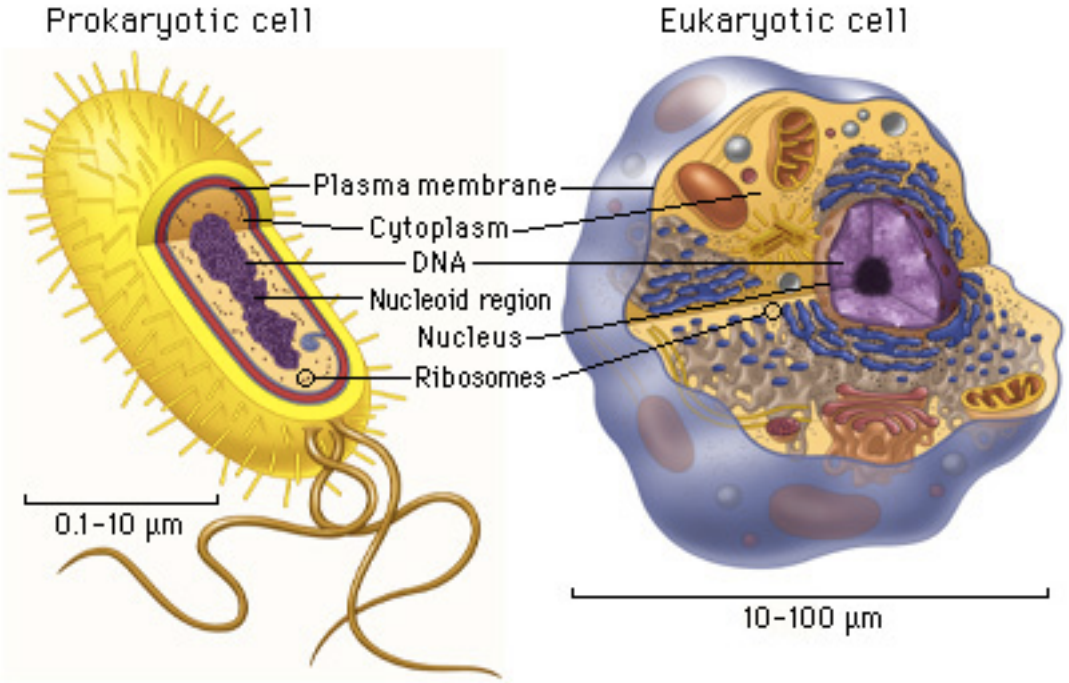
Cytoplasm



Plant Cell

Cell Types

- Prokaryotic
  - Most are unicellular organisms
  - Very simplistic
  - Do not have genetic material surrounded by a membrane
- Eukaryotic
  - Plants, animals, fungi, protists
  - Contain organelles (specialized structures)
  - Are bigger than prokaryotic cells
  - Have genetic material surrounded by a membrane



Cell organelles

- Many small structures located inside the cell
  - “little organs”
- These tiny structures perform certain functions that keep the cell (and the organism) alive

Nucleus

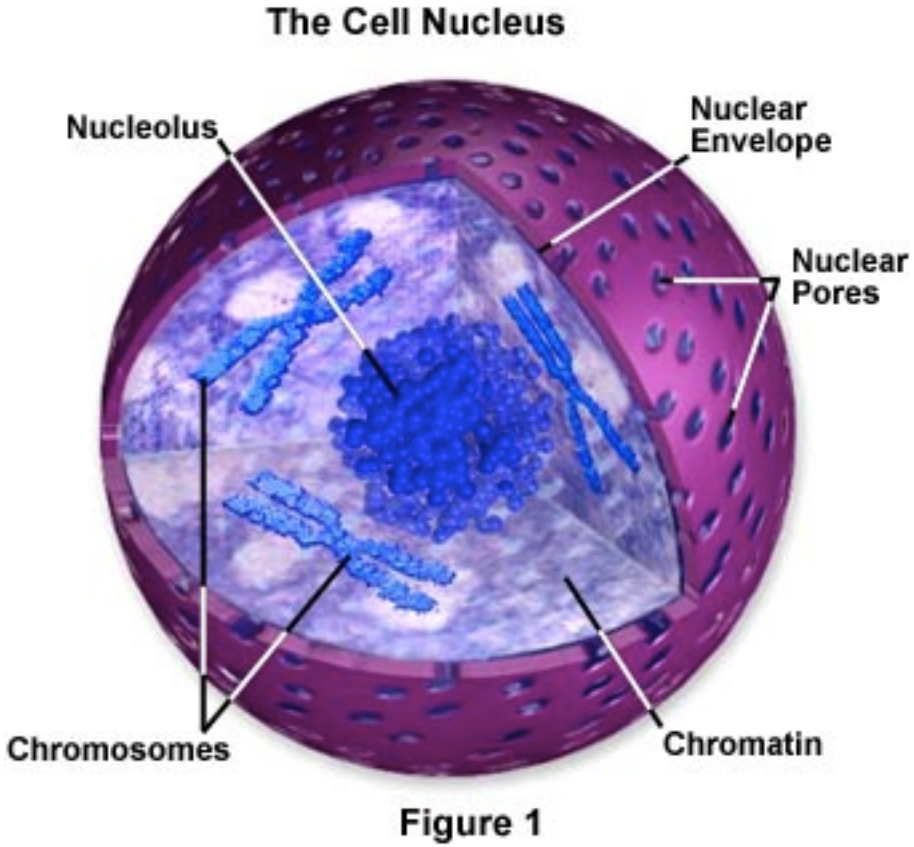
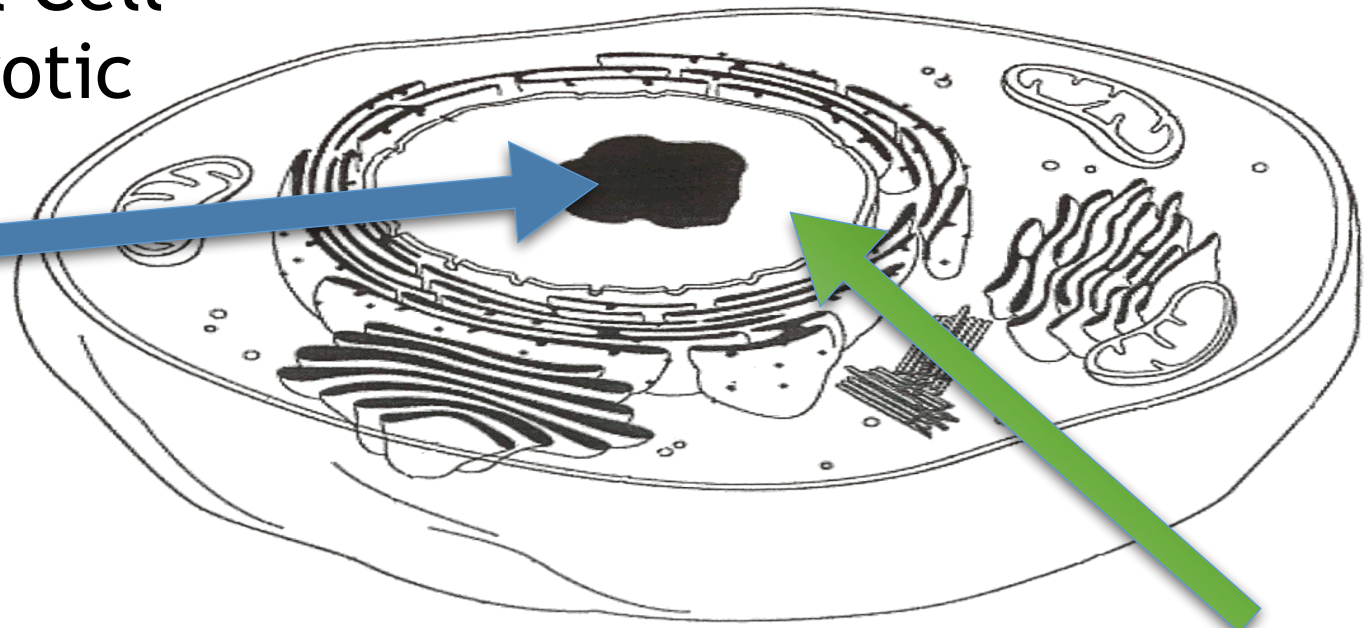


Figure 1

- Largest organelle inside a eukaryotic cell
- Directs all cell activities, contains genetic information stored in DNA
- DNA is organized into chromosomes
- Contains proteins and a nucleolus
- Surrounding the nucleus is a **nuclear envelope** (made of a lipid membrane), which contains pores and allows molecules to leave the nucleus

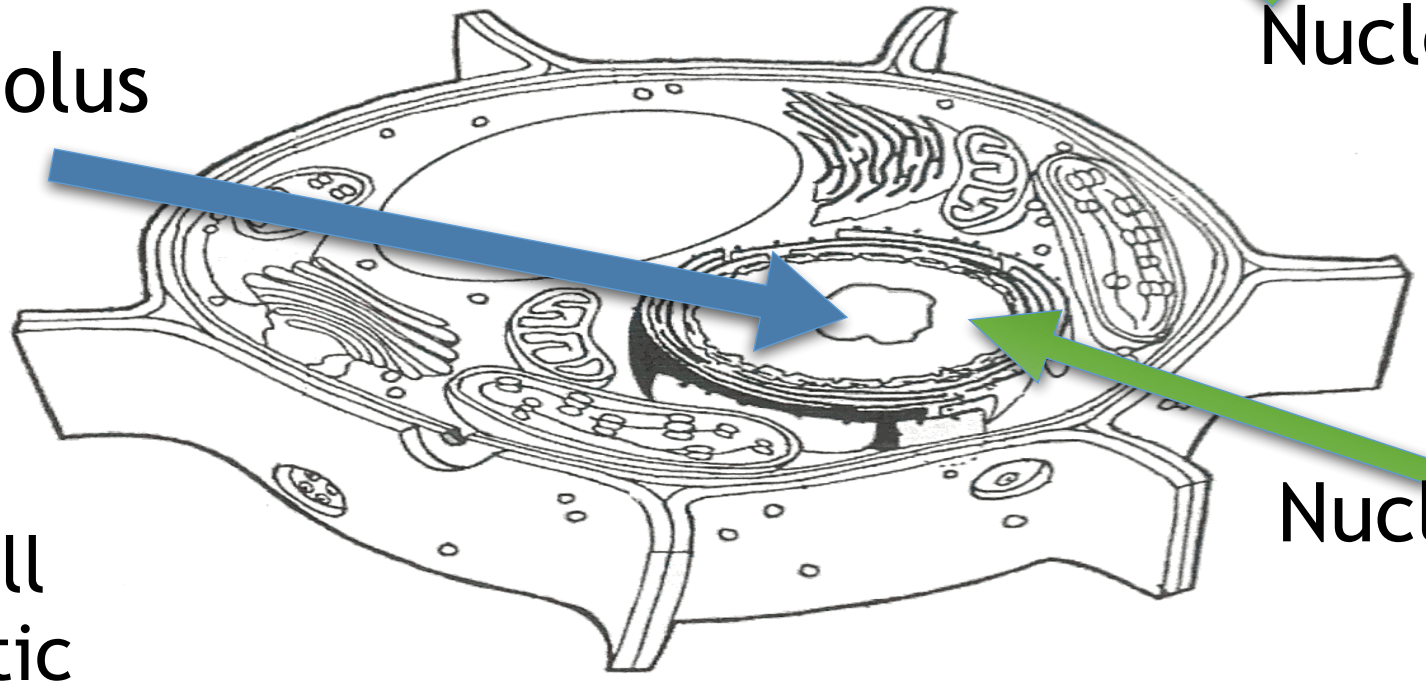
Animal Cell
Eukaryotic



Nucleolus

Nucleus

Nucleolus

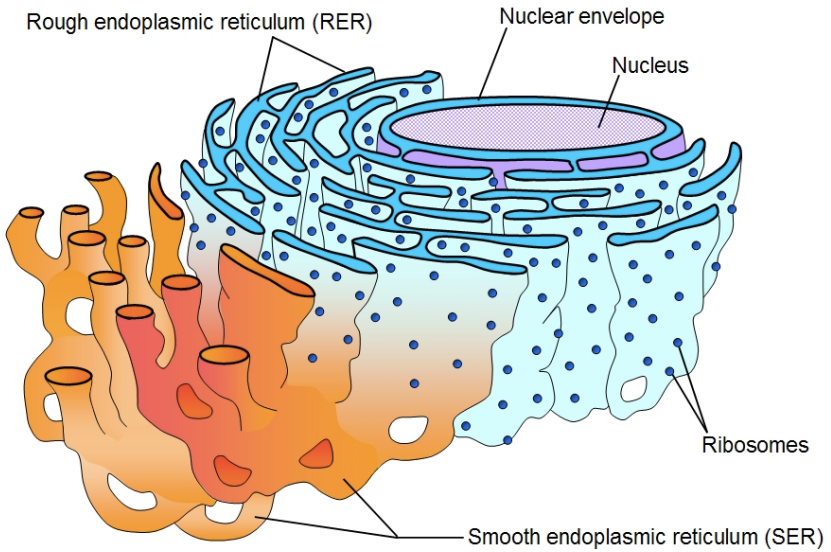


Nucleus

Plant Cell
Eukaryotic

Manufacturing molecules

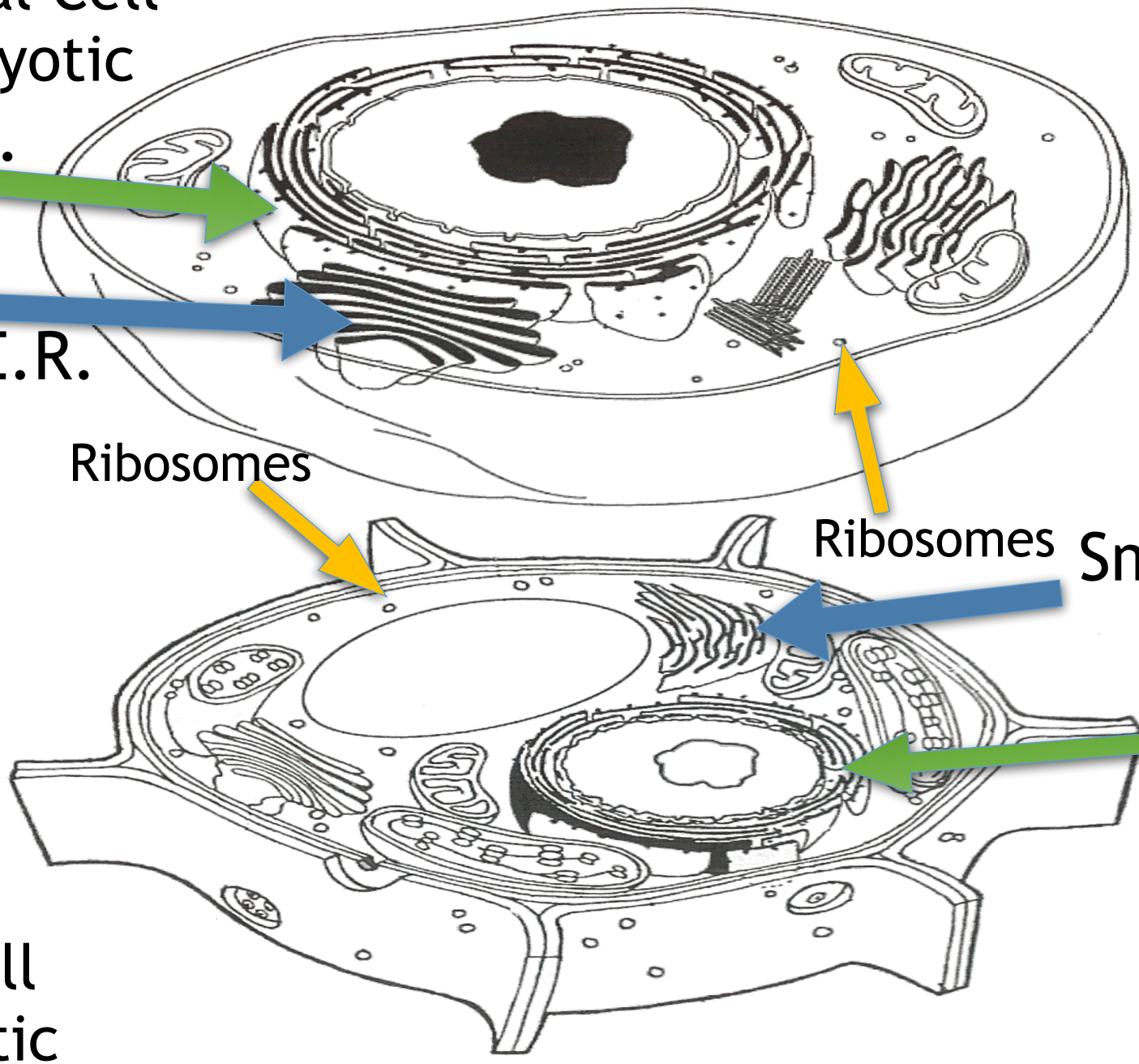
- Proteins perform various functions in the body, and are produced on **ribosomes** in the cell
- **Ribosomes** can be found in the **cytoplasm** or **ER (endoplasmic reticulum)**
- **ER** spreads from the nucleus throughout the cytoplasm
  - **Rough ER: contains ribosomes,** site of **protein** production
  - **Smooth ER**: does **not** contain ribosomes, site of **lipid** production



Animal Cell
Eukaryotic

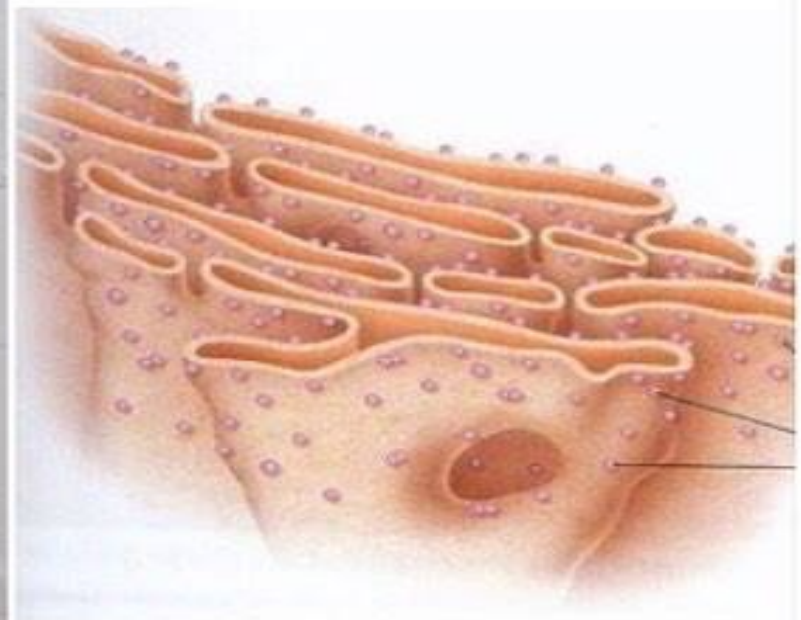
Rough E.R.

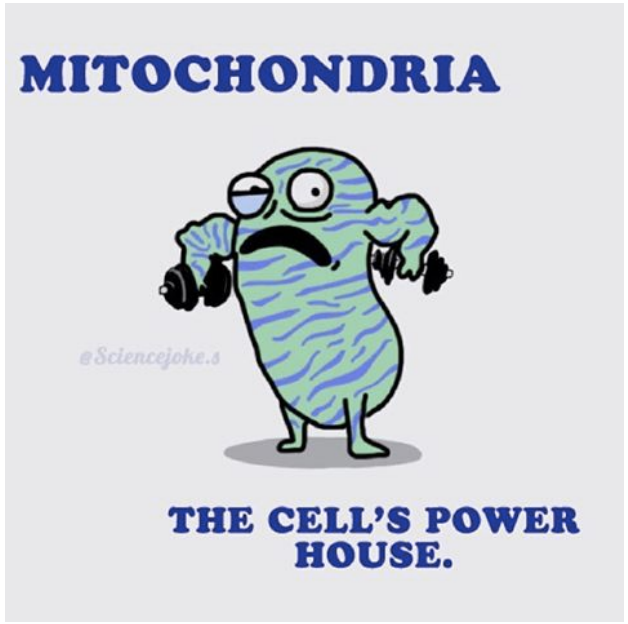
Smooth E.R.



Plant Cell
Eukaryotic

Beyonce look like the rough endoplasmic reticulum with ribosomes attached to it

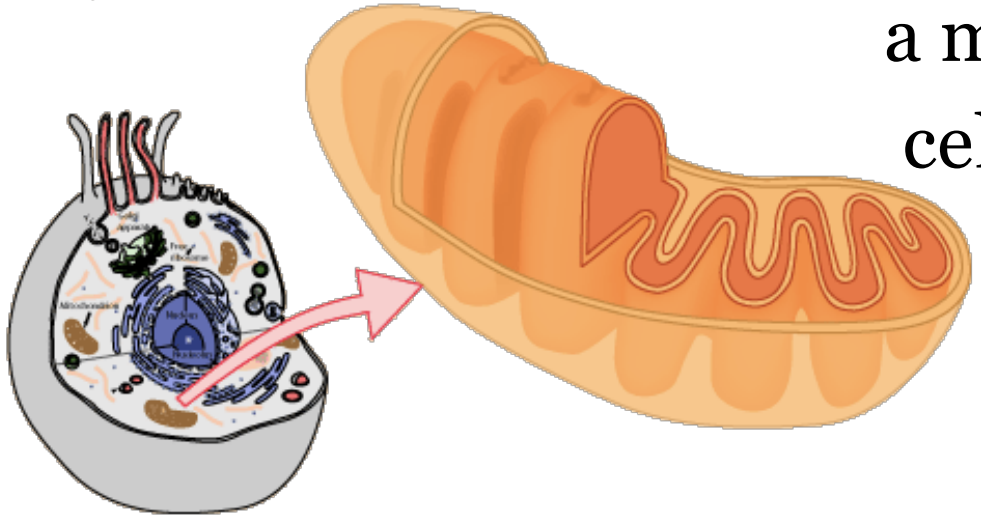




Processing energy

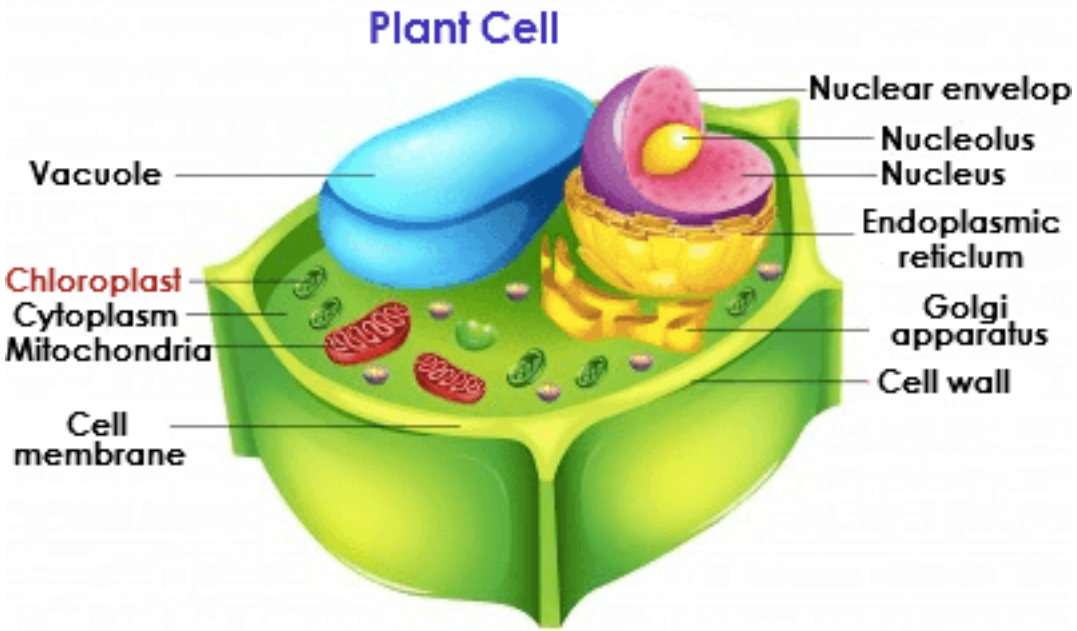
- All living things require energy to survive
- This energy is produced in specialized structures called **mitochondria**
  - Human heart: 1,000 of mitochondria inside, leg muscle cells, liver
- Energy is released during chemical reactions and energy is stored (and then converted) in a molecules called ATP and used for cell growth, cell division, cell transport

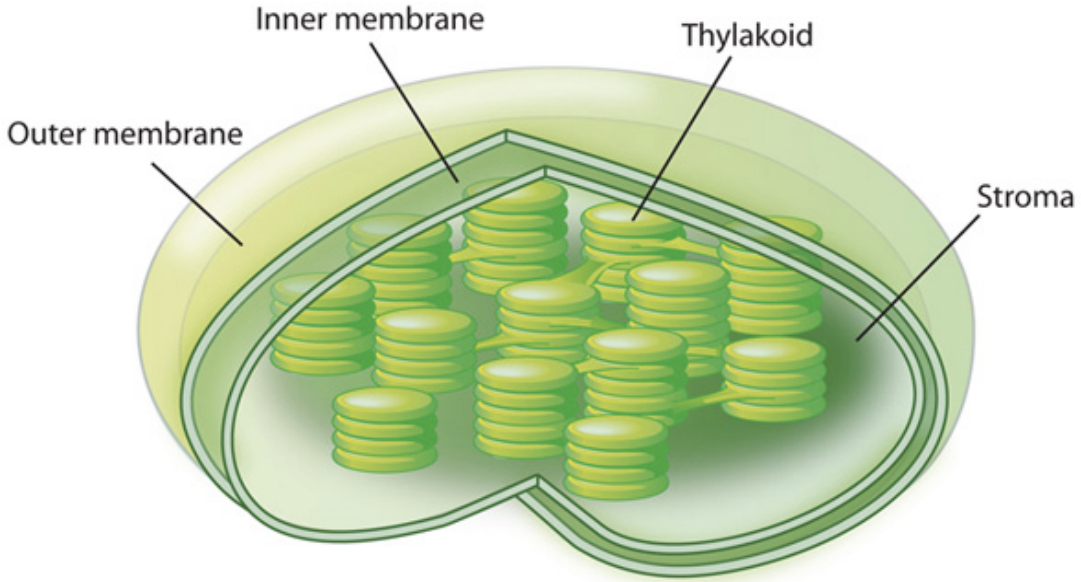
The cell's energy factories, the mitochondria manufacture ATP to fuel all of life's activities.



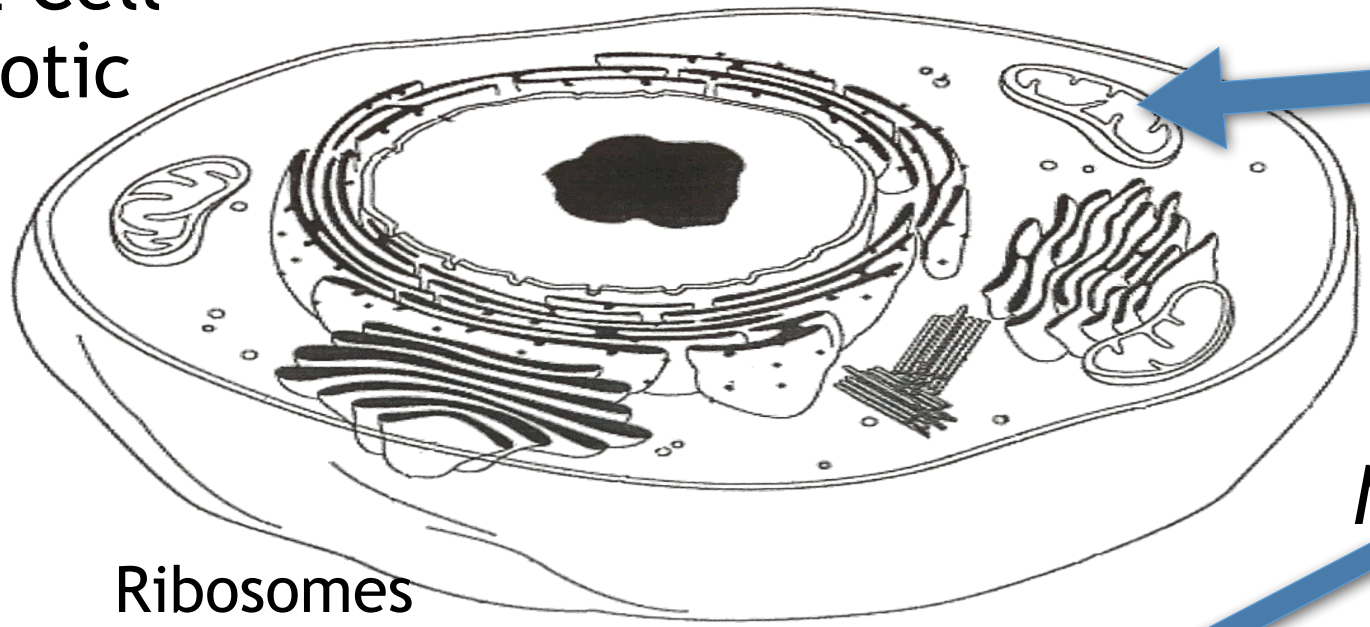
Chloroplast

- Plant cells, some protists, algae
- Organelles that use light energy, water, and carbon dioxide to produce glucose (food) for the cell during photosynthesis
- The sugar can then be stored and used as a fuel when needed





Animal Cell
Eukaryotic

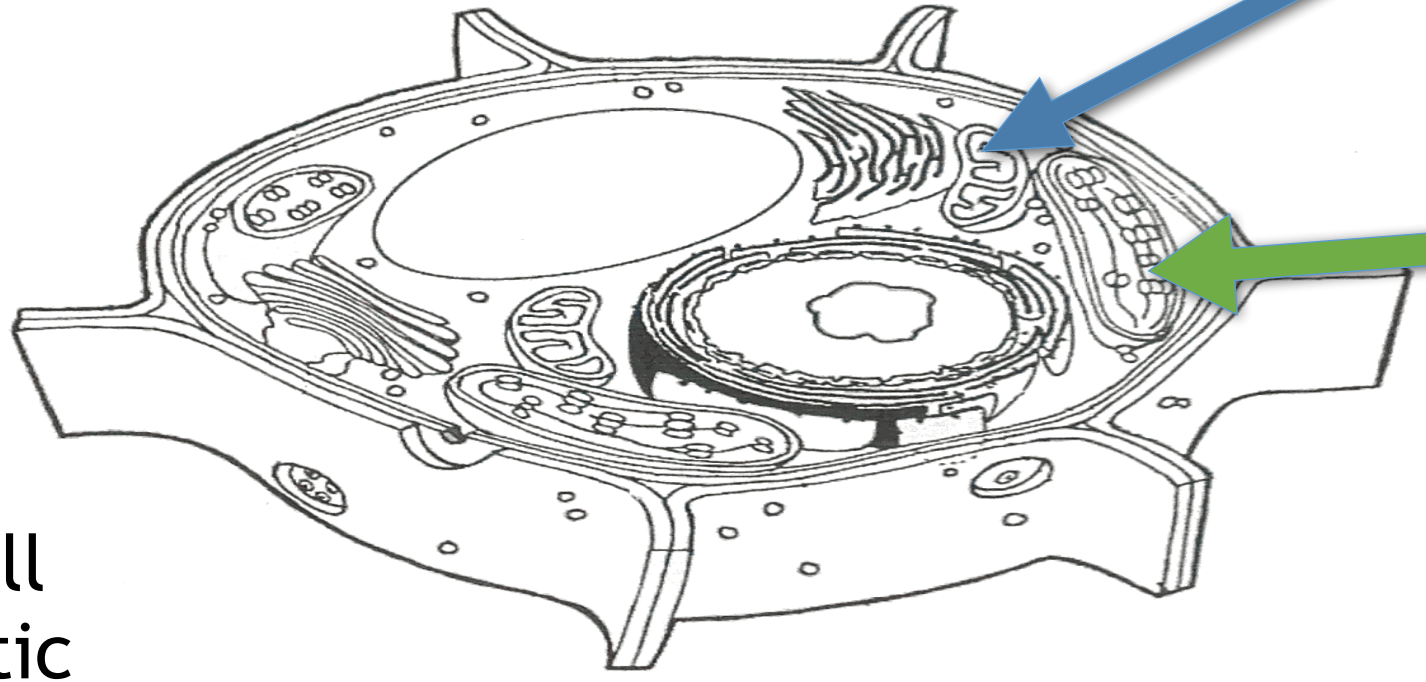


Mitochondria

Ribosomes

Mitochondria

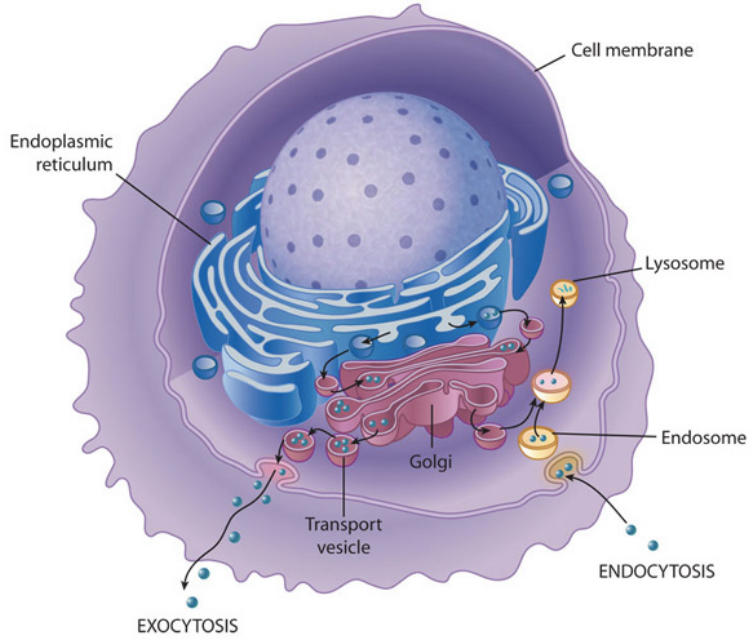
Chloroplast



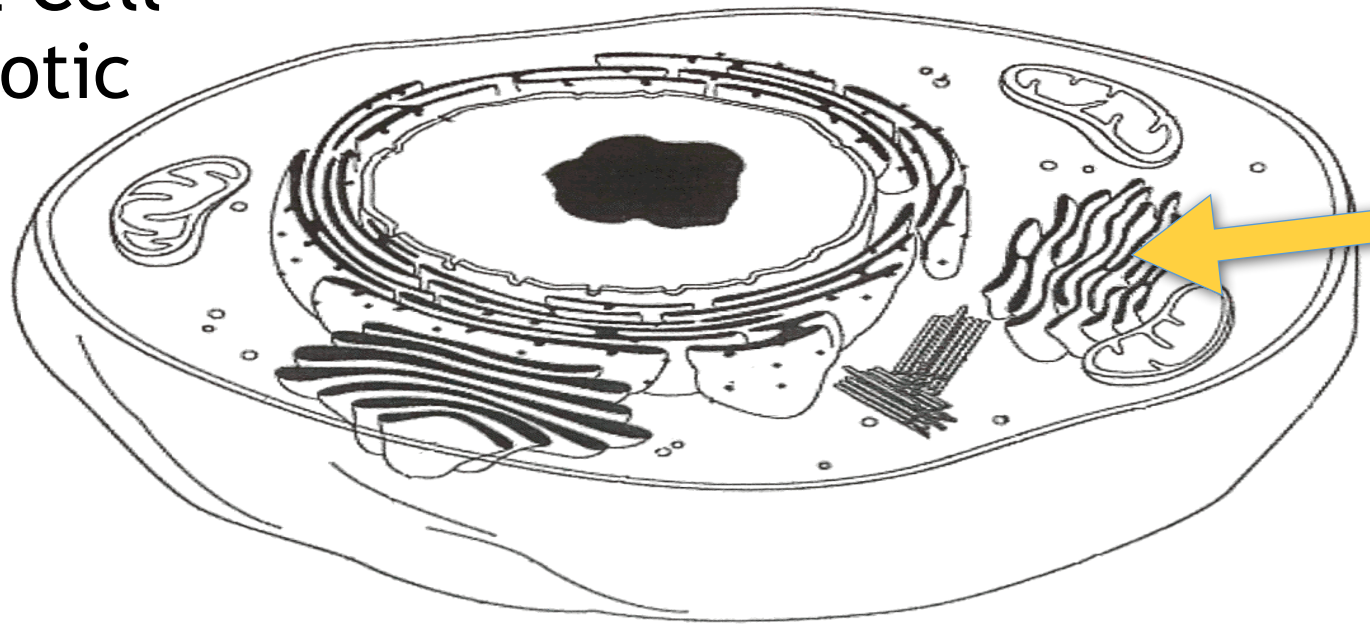
Plant Cell
Eukaryotic

Processing, transporting, and storing materials

- **Golgi apparatus** prepares proteins for their specific jobs, packages them into **vesicles**, and then transports them
- Vesicles may contain **lysosomes**, which aid in digestion and breaking down and recycling material within a cell
- **Vacuoles** store water, waste material, and food
  - Plant cell: water vacuole



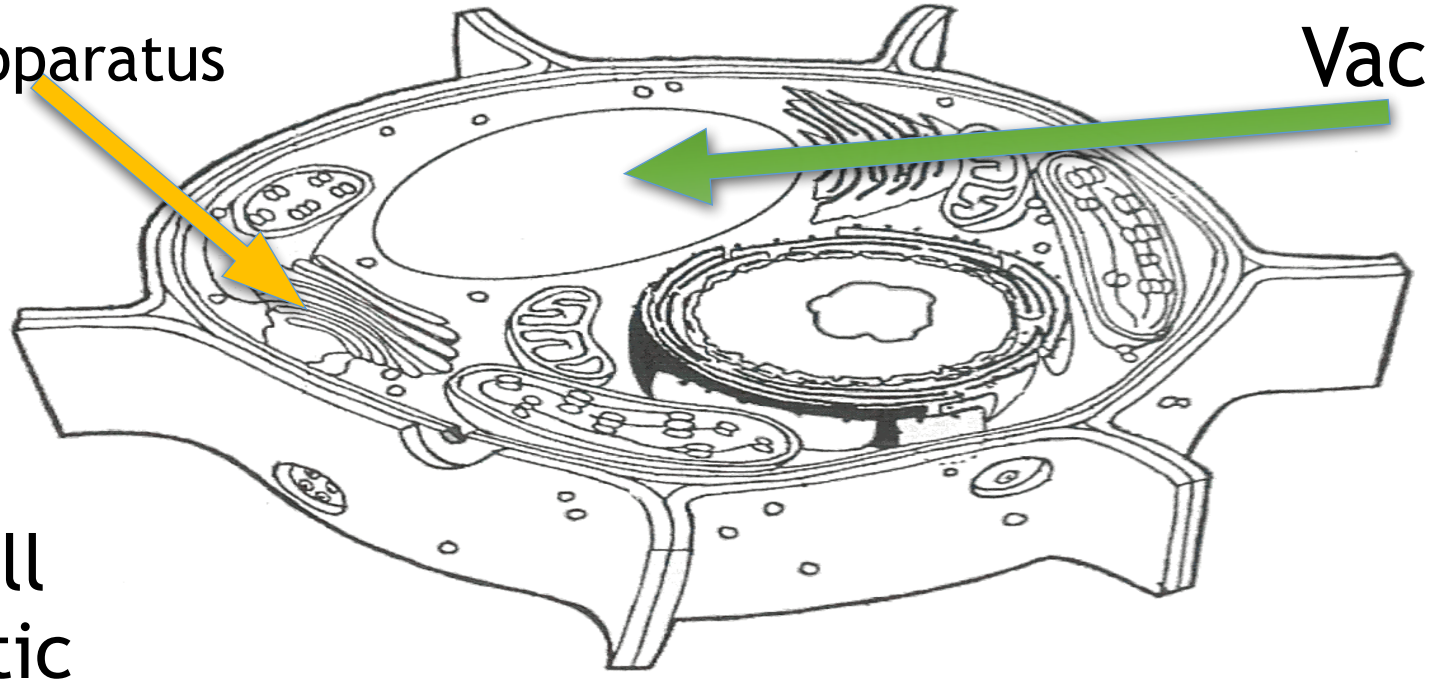
Animal Cell
Eukaryotic



Golgi Apparatus

Golgi Apparatus

Vacuole



Plant Cell
Eukaryotic

EXOCYTOSIS