

CELLS

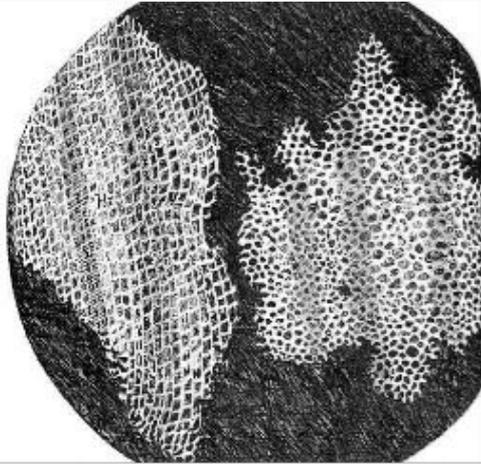
Objectives

- List the components of the cell theory
- Compare prokaryote and eukaryote cells
- Label a plant and an animal cell
- Know the functions of cell organelles



Early Contributions

- Robert Hooke - First person to see cells (1665)
- Anton van Leeuwenhoek - cells in pond water, which he called "animalcules" (1673)





Leeuwenhoek's "animalcules."

Where do you think Leeuwenhoek's animals came from? Where do you think scientists at that time thought they came from?



The Cell Theory

1. Every living thing is made of one or more cells.
2. The cell is the basic unit of structure and function.
3. All cells come from other cells.



Think



Pair



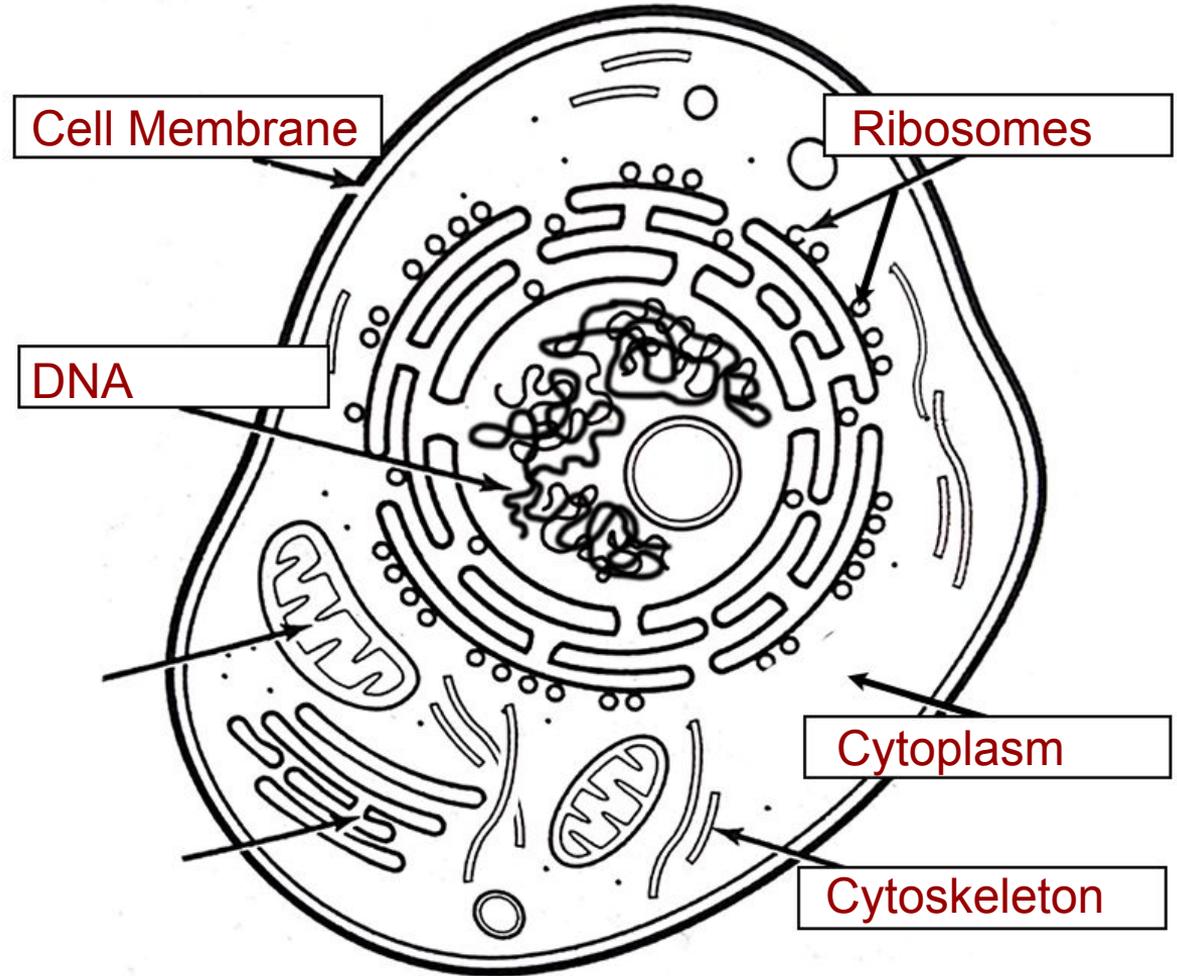
Share

*Why is the Cell Theory called a **Theory** and not a fact?

Cell Features

ALL cell have these parts

- **Ribosomes** – make protein
- **Cytoplasm** – fluid
- **DNA** – genetic material
- **Cytoskeleton** – framework
- **Cell Membrane** – boundary



Comprehension Checkpoint

Answer true or false

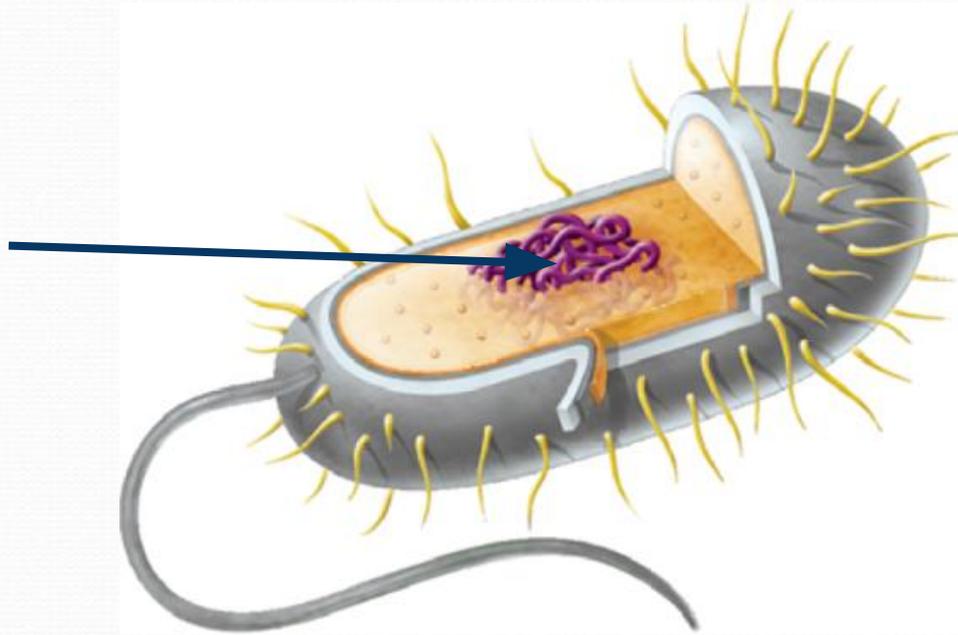
1. Robert Hooke was the first person to see cells.
2. Bacteria cells have a cell membrane.
3. Plant cells have cytoplasm.
4. Cells taken from fungi do not have DNA.
5. Cells can only come from pre-existing cells.
6. The framework of the cell is called the cytoplasm.
7. The outer boundary of the cell is the cell membrane.

Prokaryote Cells

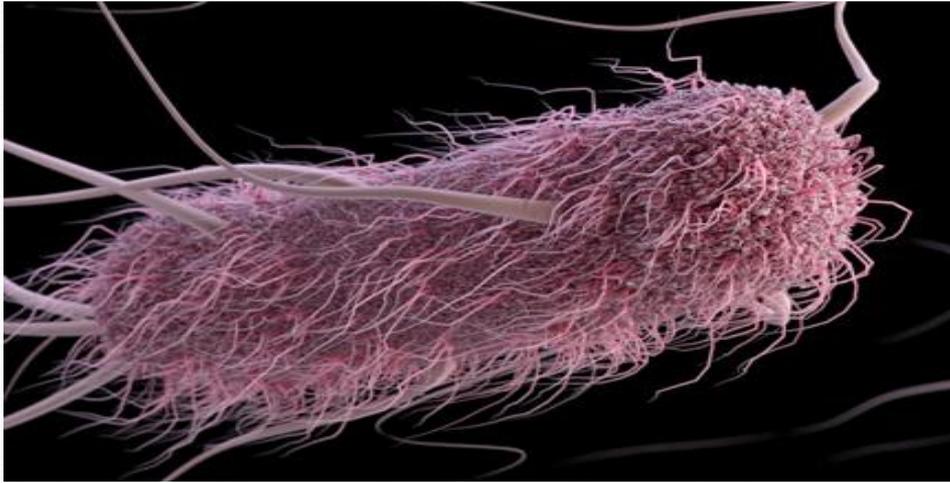
First cells | Simple cells | Bacteria

These cells do NOT have a nucleus

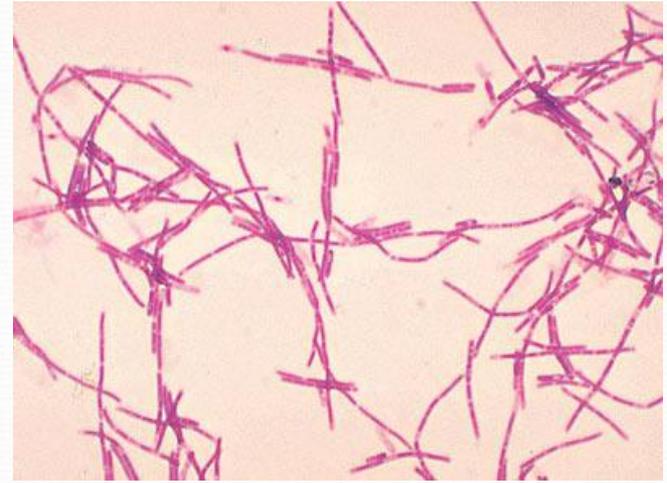
DNA floats
within the
cytoplasm



Bacteria Images

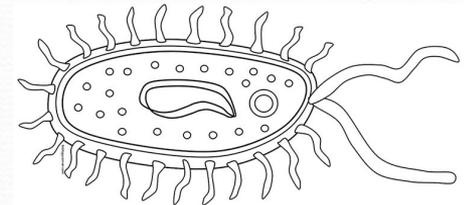


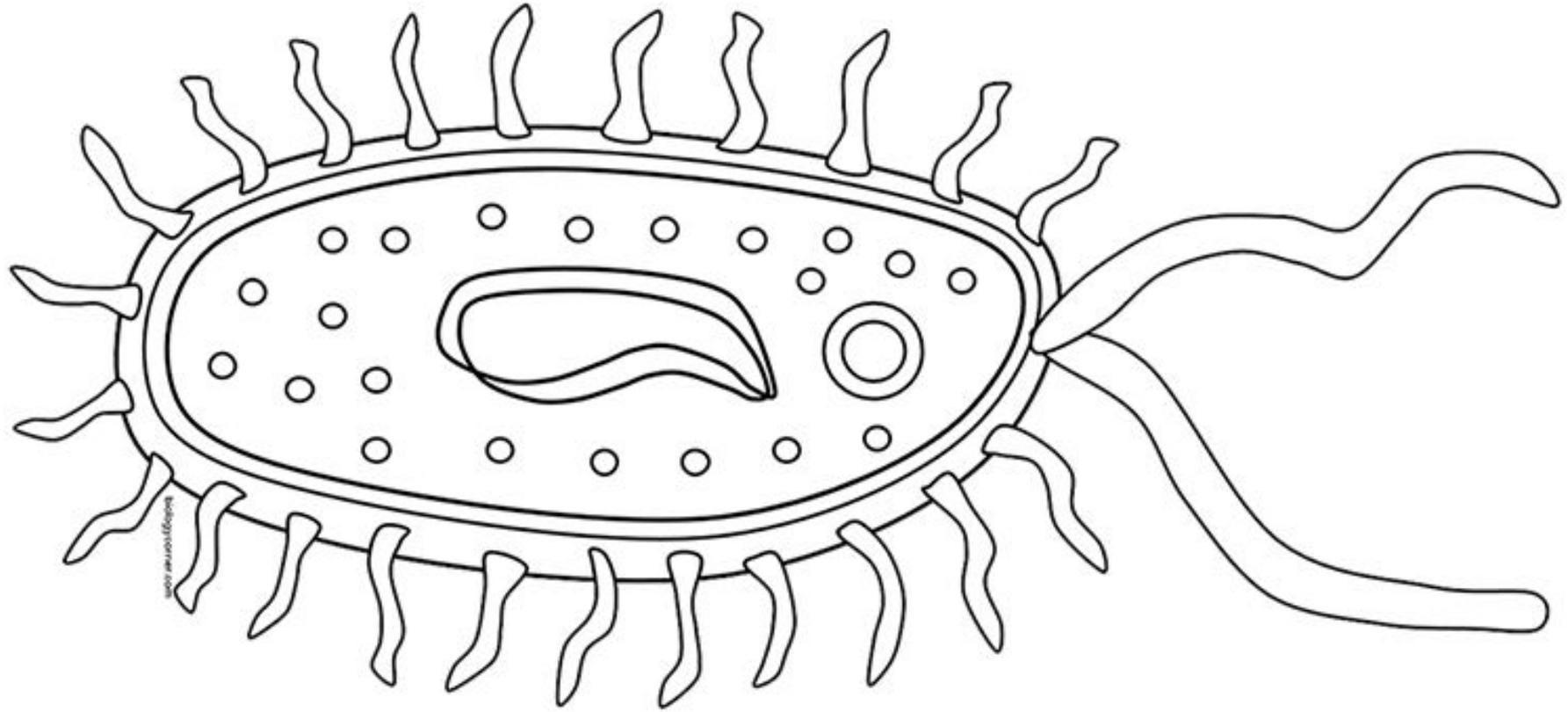
E. coli - lives in the gut



Bacteria that causes Anthrax

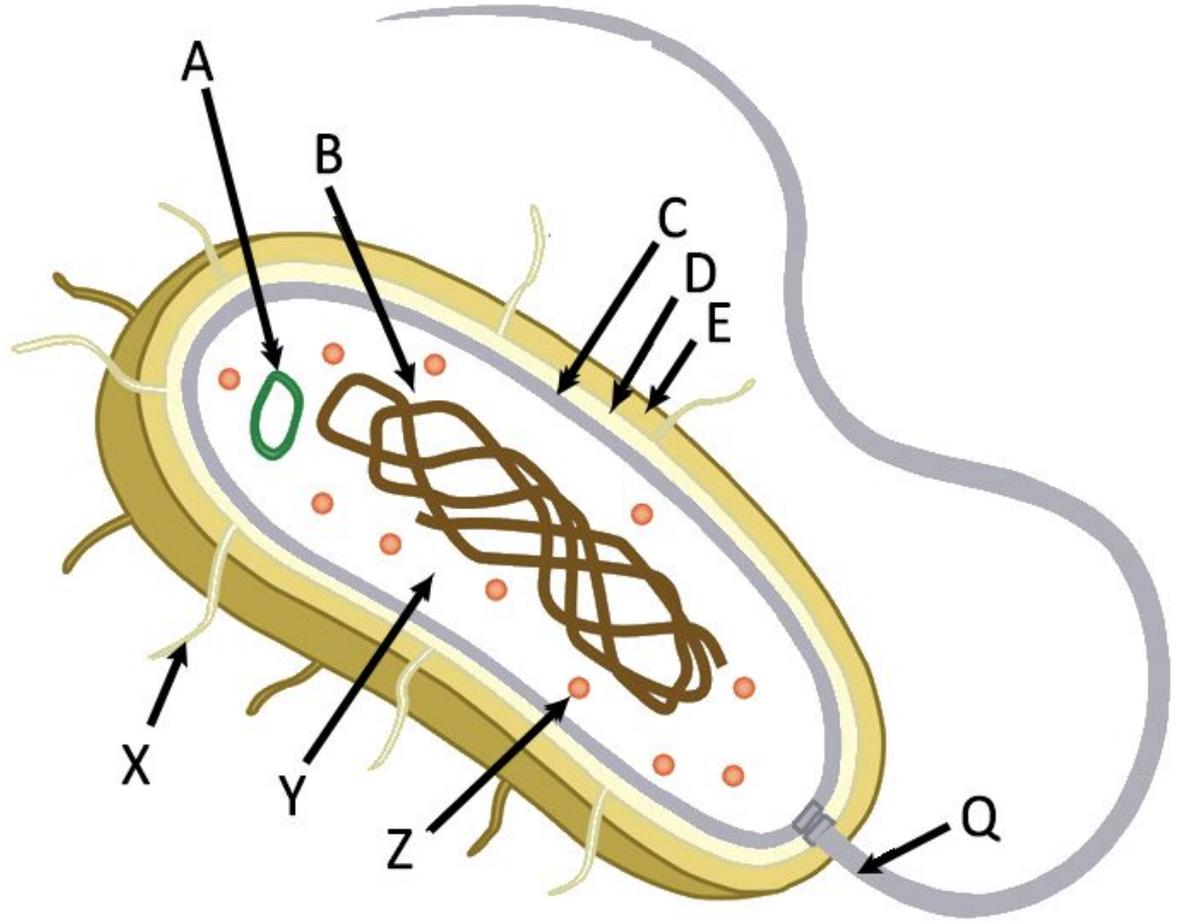
[Assignment: Color a typical bacteria cell.](#)





Reinforcement (Matching)

1. Flagellum
2. DNA (nucleoid region)
3. Ribosome
4. Pilus
5. Cell Wall
6. Cell Membrane
7. Cell Capsule (E)
8. Cytoplasm
9. Plasmid

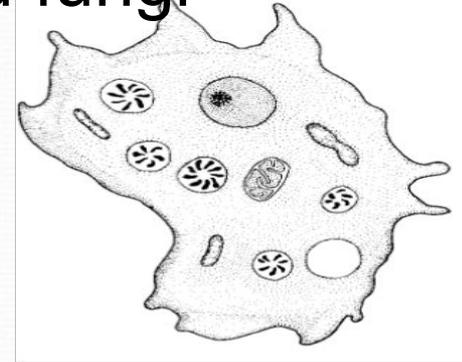


Eukaryotic Cells

Cells found in plants, animals, protists, and fungi

The cell is composed of 4 main parts:

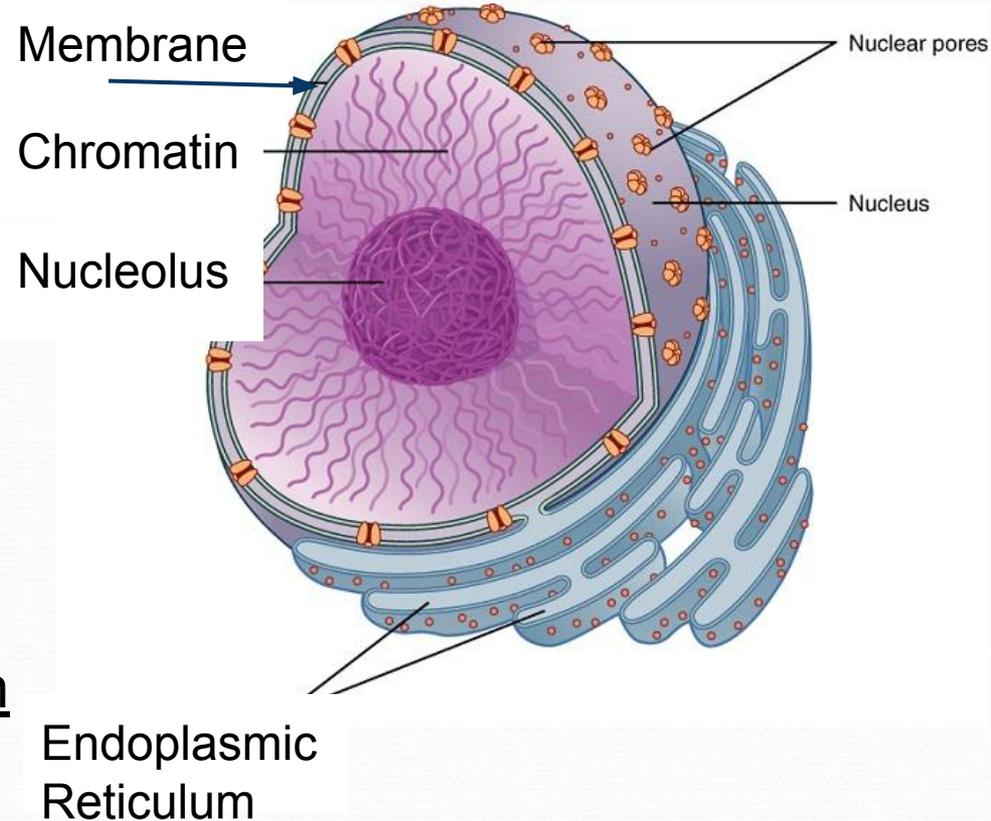
1. **Cell membrane**
2. **Cytoplasm**
3. **Nucleus** – “control center” of cell
4. **Organelles** – small structures that carry out specific functions (“little organs”)



Nucleus

*Contains the instructions for building a cell and controlling its functions.

- Nuclear Membrane (outer boundary)
- Nucleoplasm (liquid inside)
- Nucleolus (makes ribosomes)
- DNA or Chromatin (information storage)



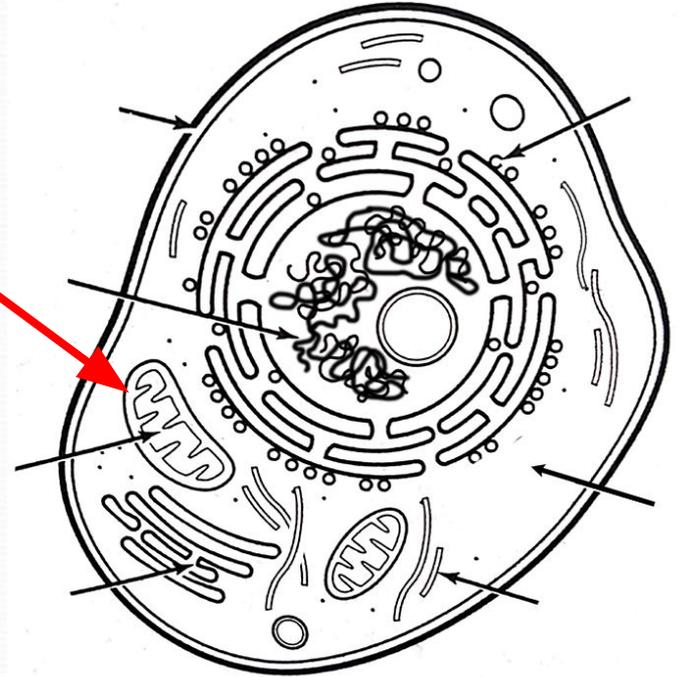
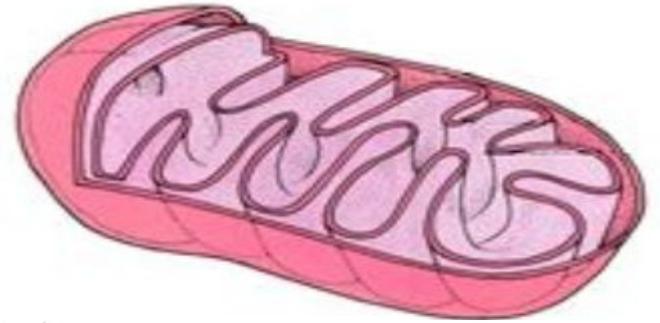
True or False

1. All cells have a nucleus.
2. All cells have a cell membrane.
3. The nucleus contains the cell's DNA.
4. Chromatin is made of DNA.
5. The nucleolus makes the cell's DNA.

Cell Structures

1. **Mitochondria** – cell's energy center
- uses oxygen and glucose in a process called cellular respiration.

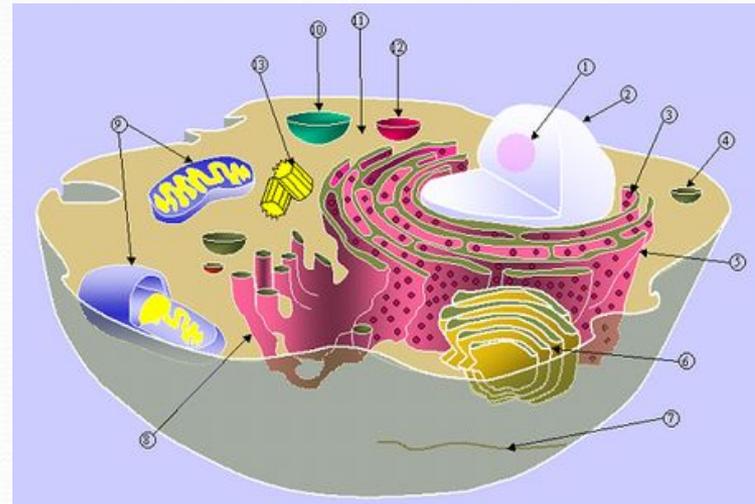
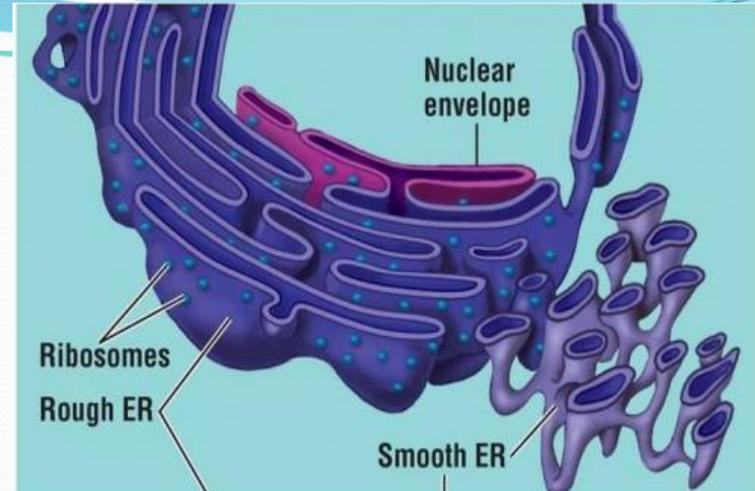
The mitochondria is sometimes called the “powerhouse” of the cell



2. Endoplasmic Reticulum – Transport, "intracellular highway"

-**Rough ER** contains ribosomes;

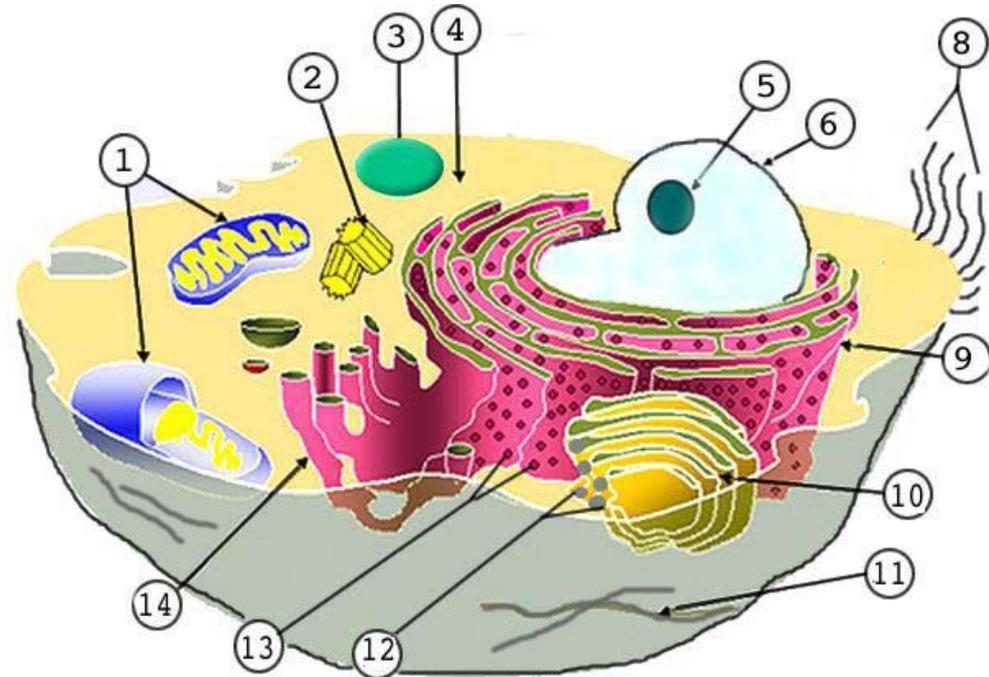
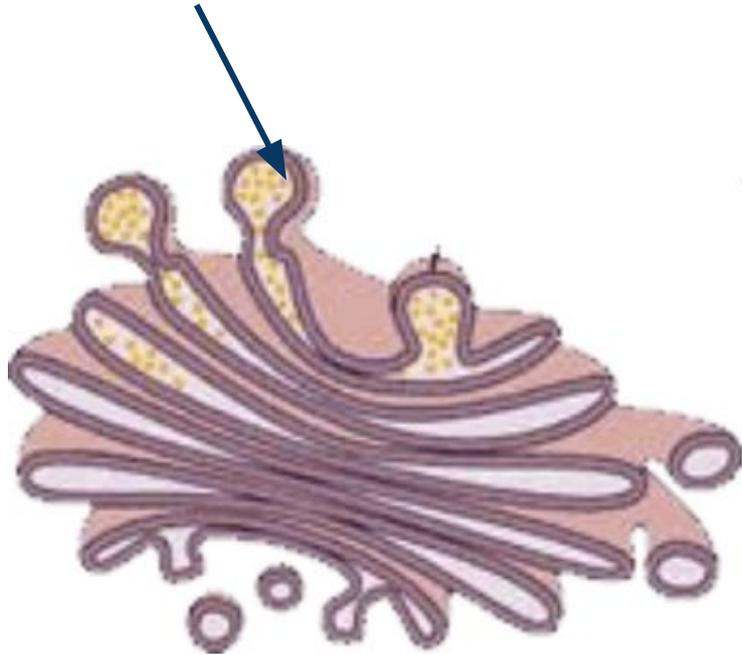
-**Smooth ER** = no ribosomes



3. **Golgi Apparatus** – packages and exports proteins.

It is like a factory or a post office.

A vesicle is the package that can be sent out of the cell.



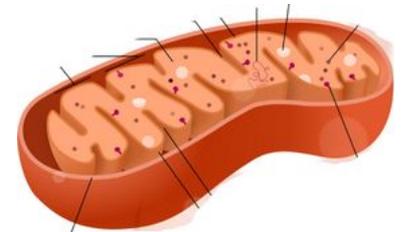
Protein Production

The cell is like a factory. Its product is protein.

1. DNA has instructions to build protein
2. Instructions are sent to ribosomes
3. The ribosomes build protein and sends it through ER
4. The proteins go to golgi body where they are packaged for export



What structure powers the cell factory?



4. **Lysosome** – Contains digestive enzymes which breaks things down, also called the "suicide sac"

Babies born with Tay-Sachs have defective lysosomes.

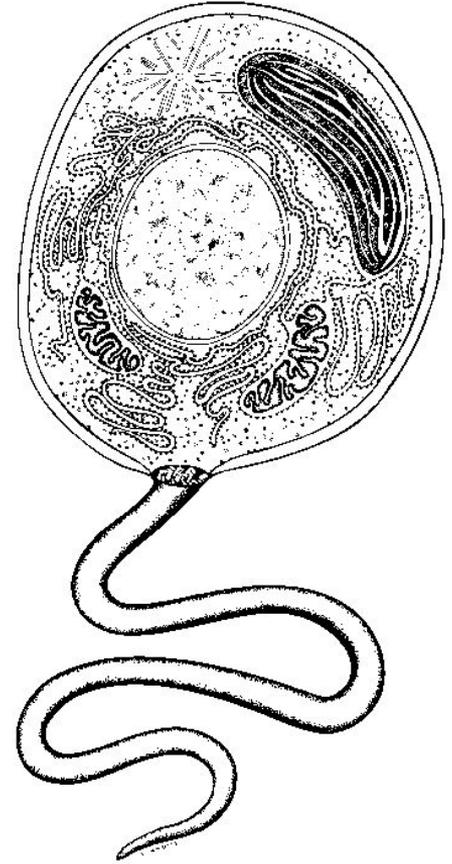
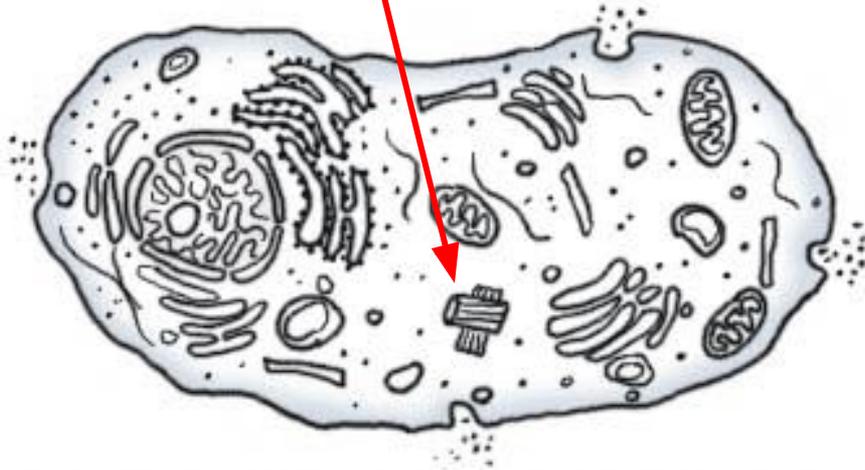
Because they cannot break down waste products, these substances build up in the cells and cause brain damage.

Babies with Tay-Sachs die in early childhood.



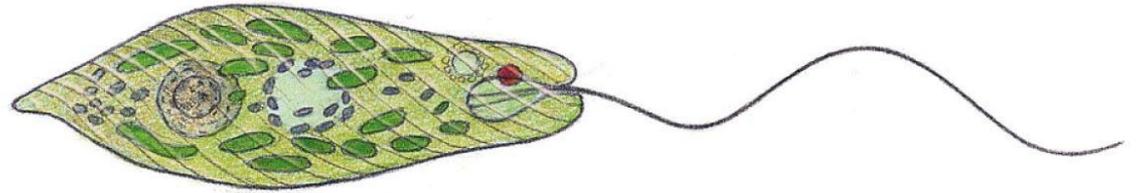
5. Cytoskeleton –

- Helps cell maintain shape
- Involved in movement
- Microtubules provide a framework
- Includes centrioles for cell division



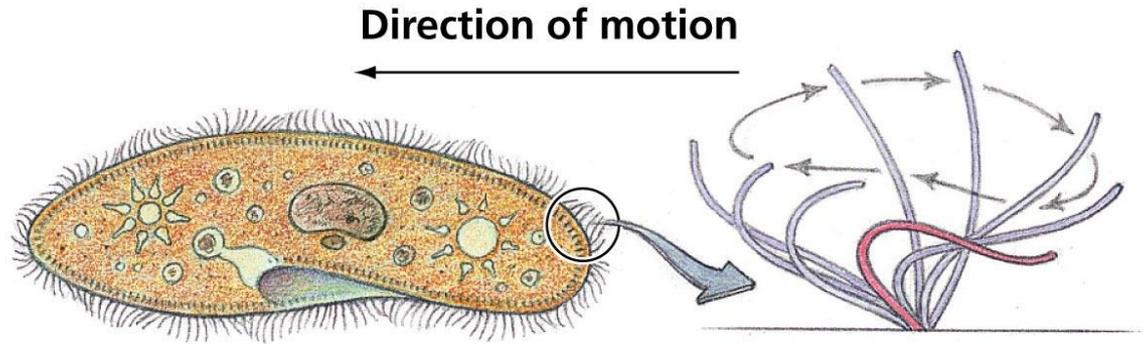
Structures that Function in Movement

Flagella - tail-like structures, cells may be one of two



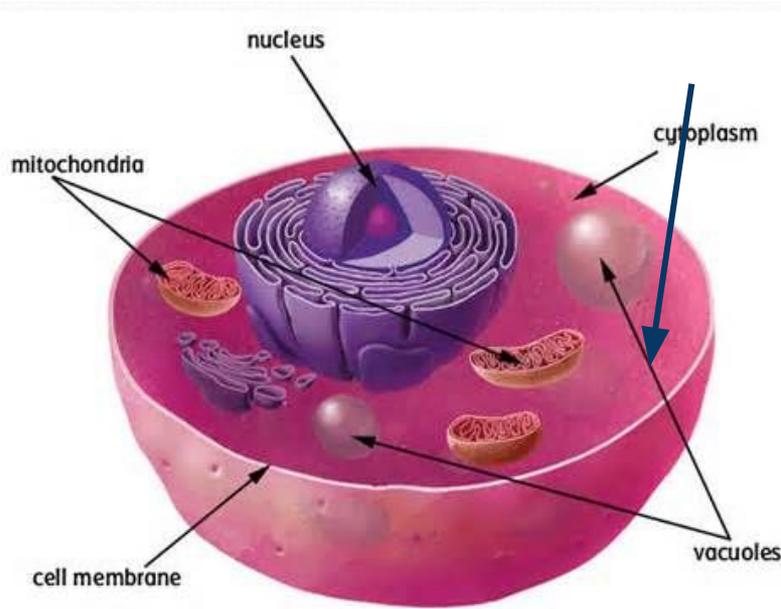
(a) Flagella

Cilia - shorter, hair-like structures, cell have many

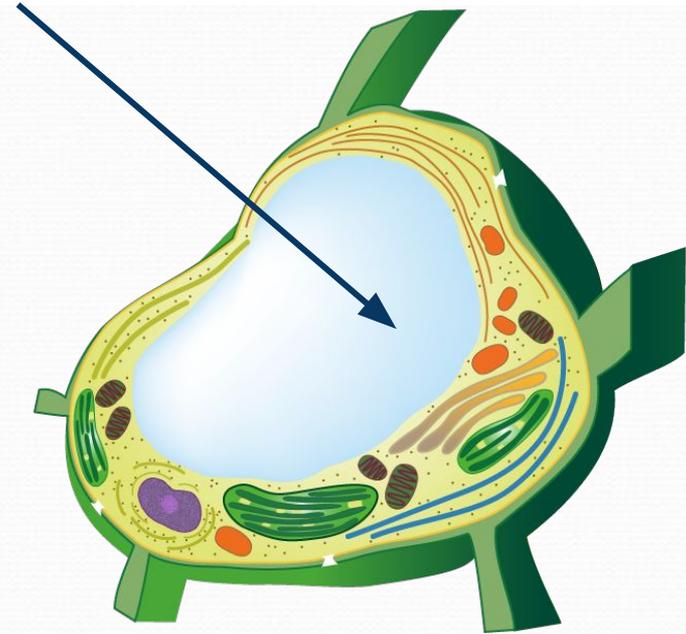


(b) Cilia

6. **Vacuole** – storage area for water and other substances, plant cells usually have a large central vacuole

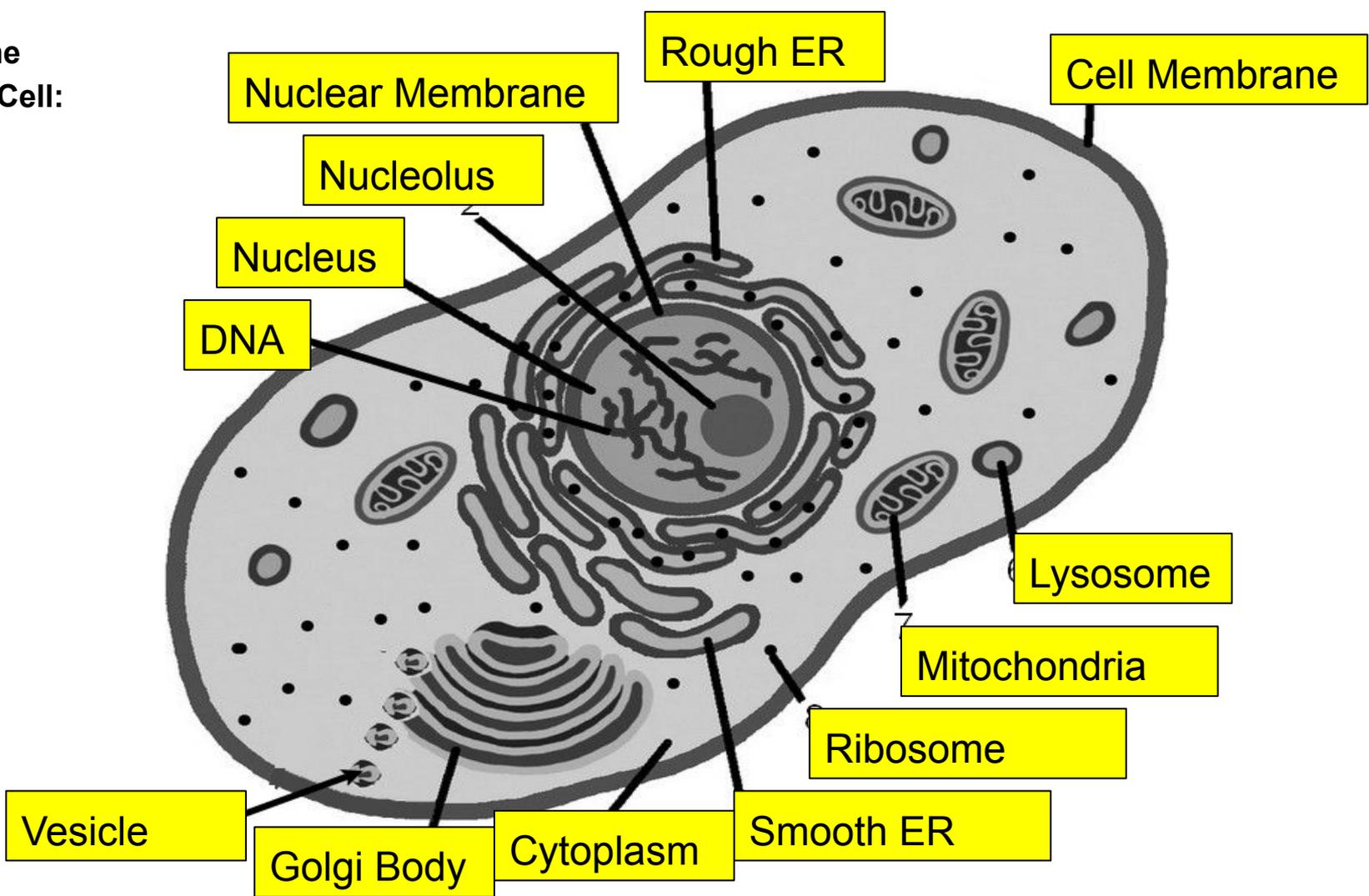


Animal Cell



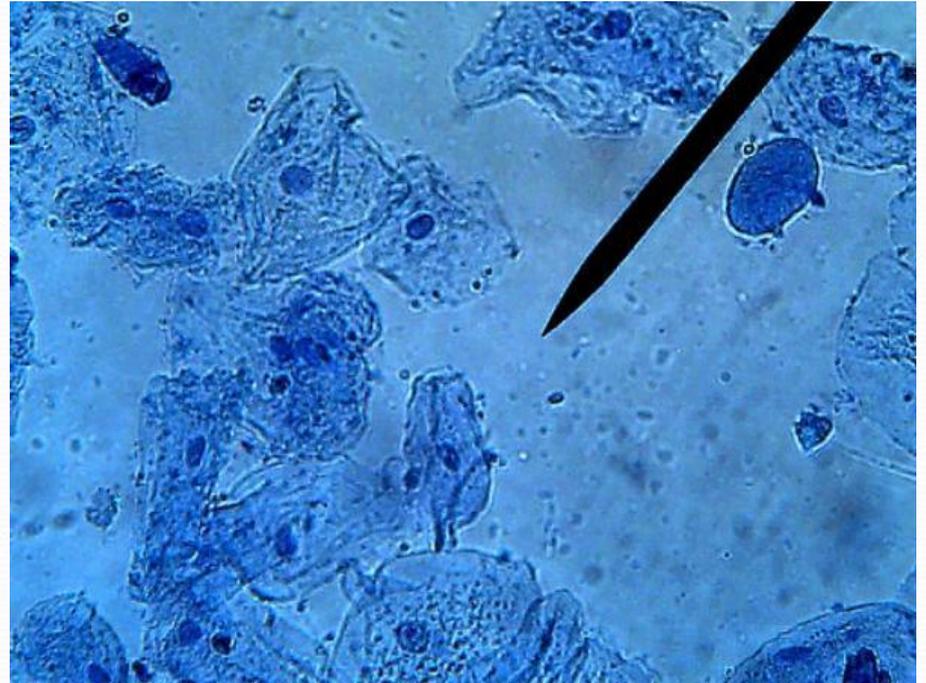
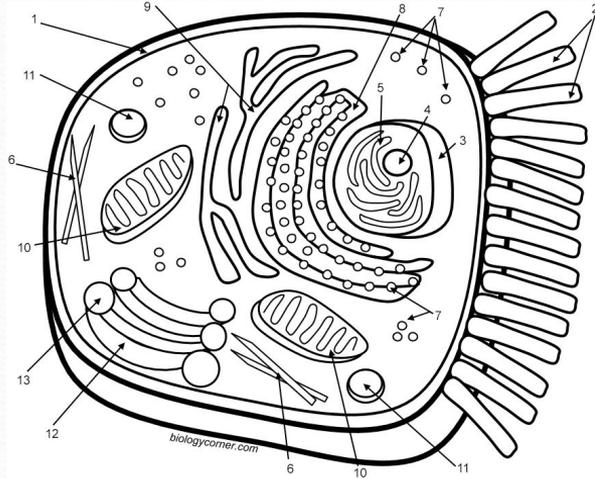
Plant Cell

Label the
Animal Cell:

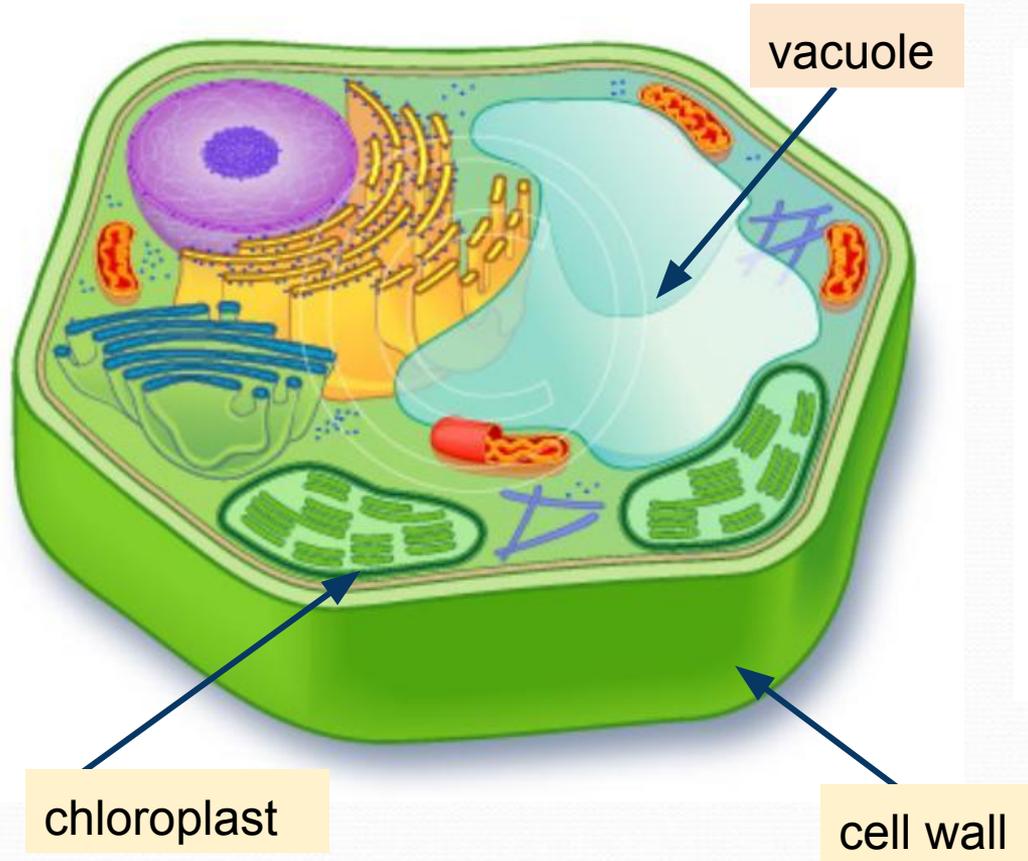


Cheek Cells Seen Through Microscope

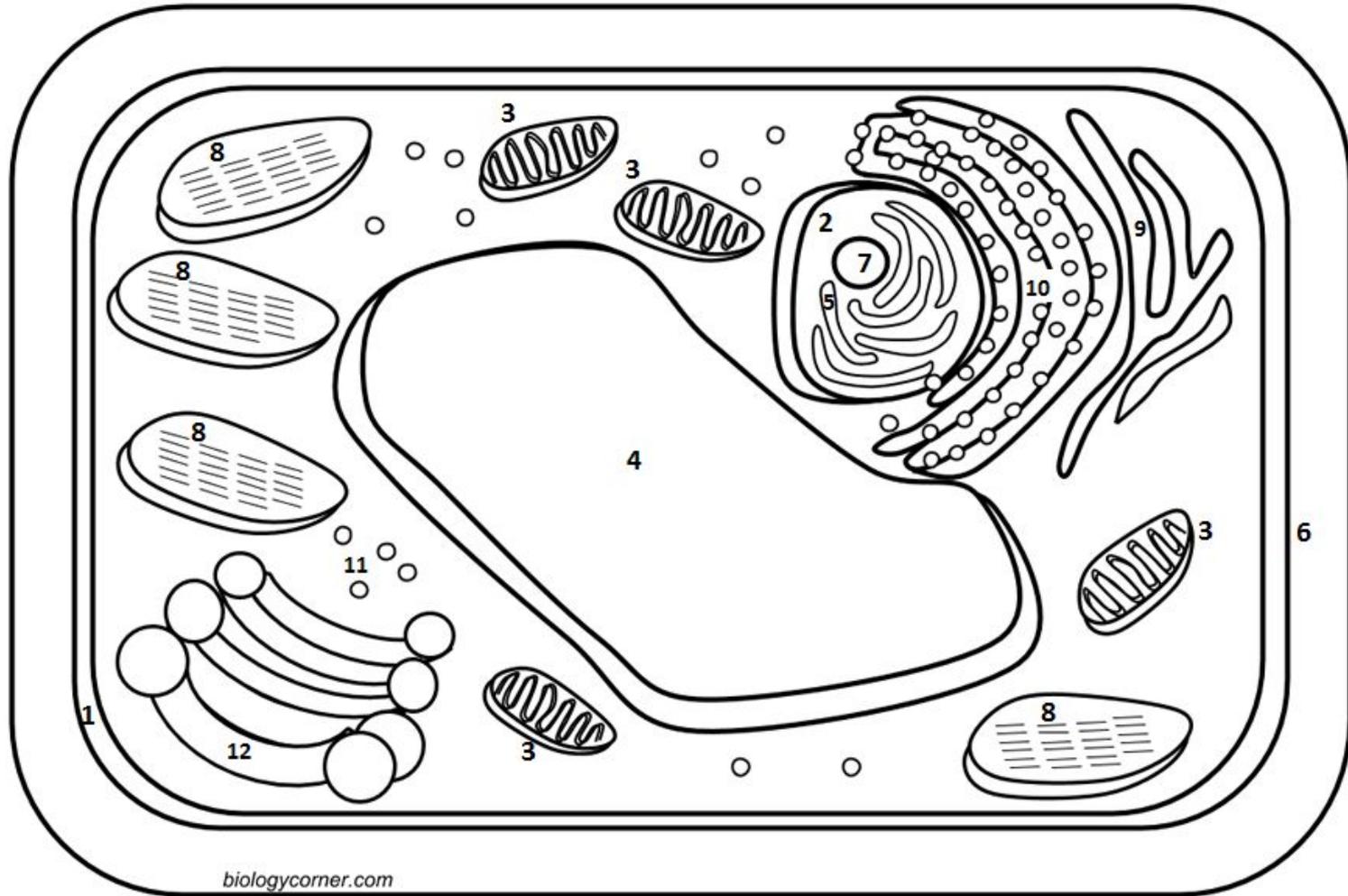
[Assignment: Color the Animal Cell](#)



How are Plant Cells different from Animal Cells?



1. A large central vacuole stores water.
2. Chloroplasts are used to capture sunlight to create food (photosynthesis)
3. A cell wall surrounds the cell (outside the membrane)
4. Square-shaped

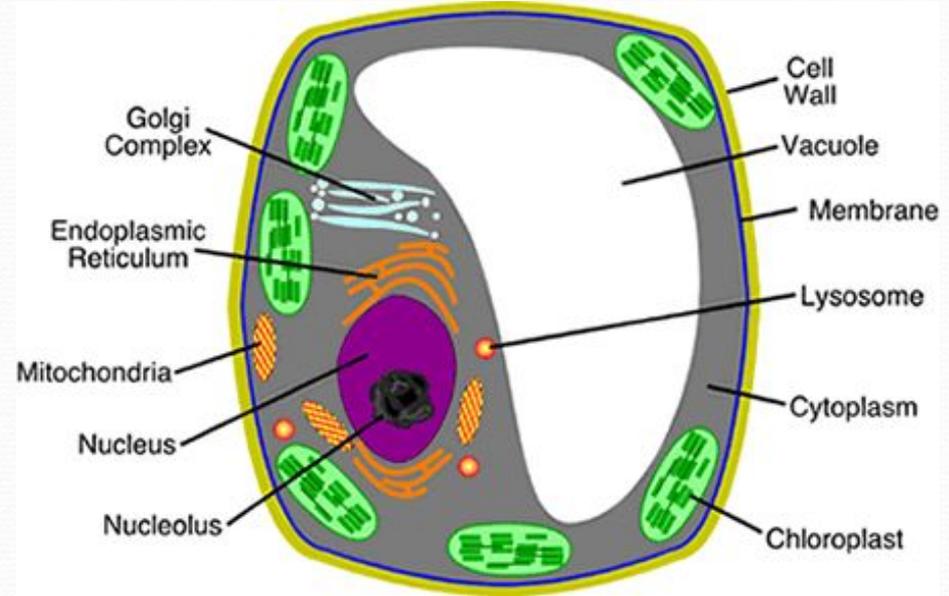
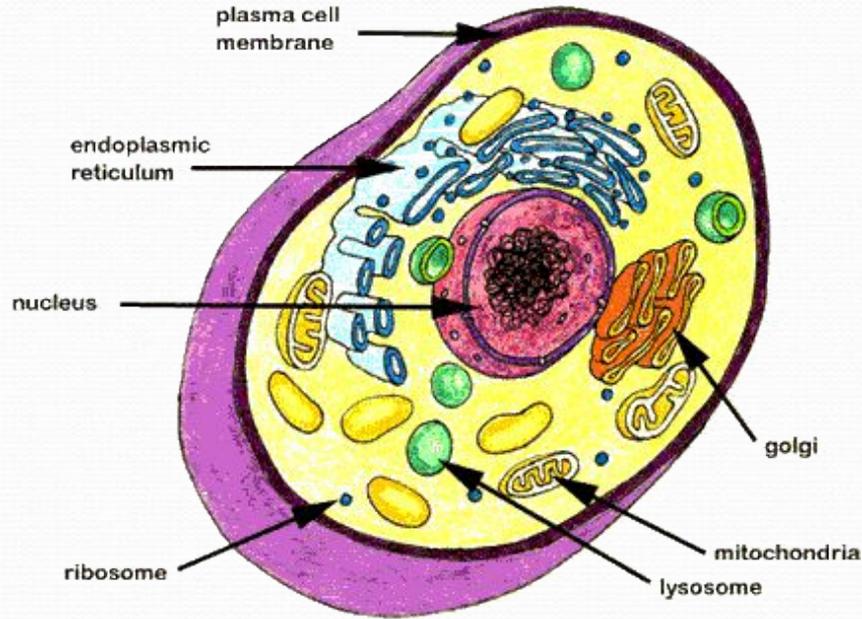


Elodea Cells Viewed With a Microscope

Elodea densa



Animal Cell vs Plant Cell

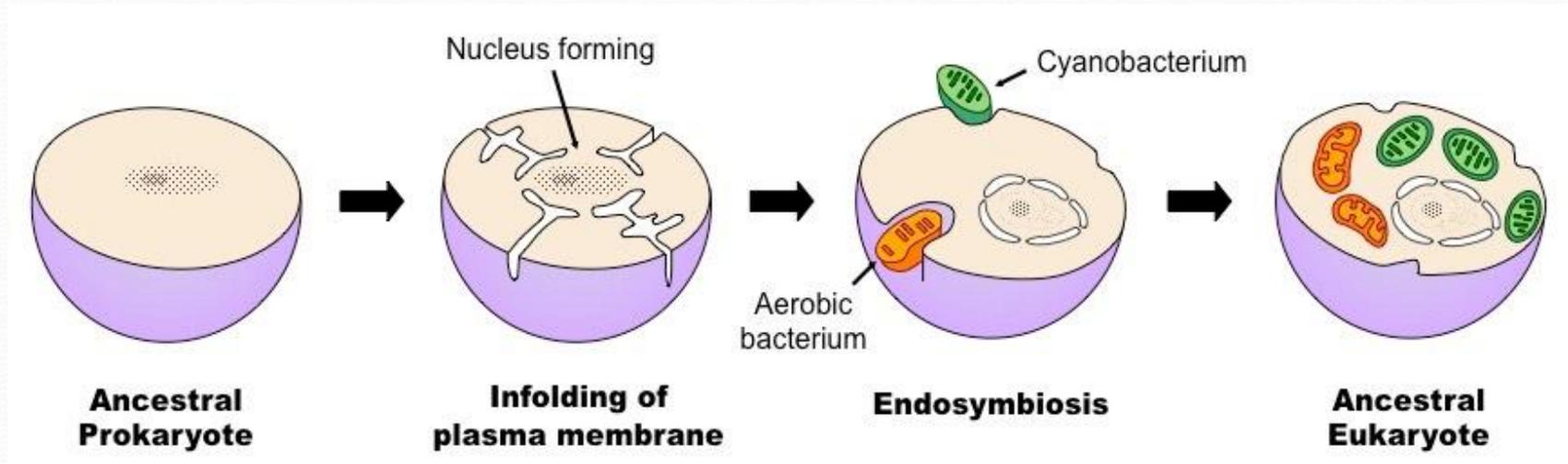


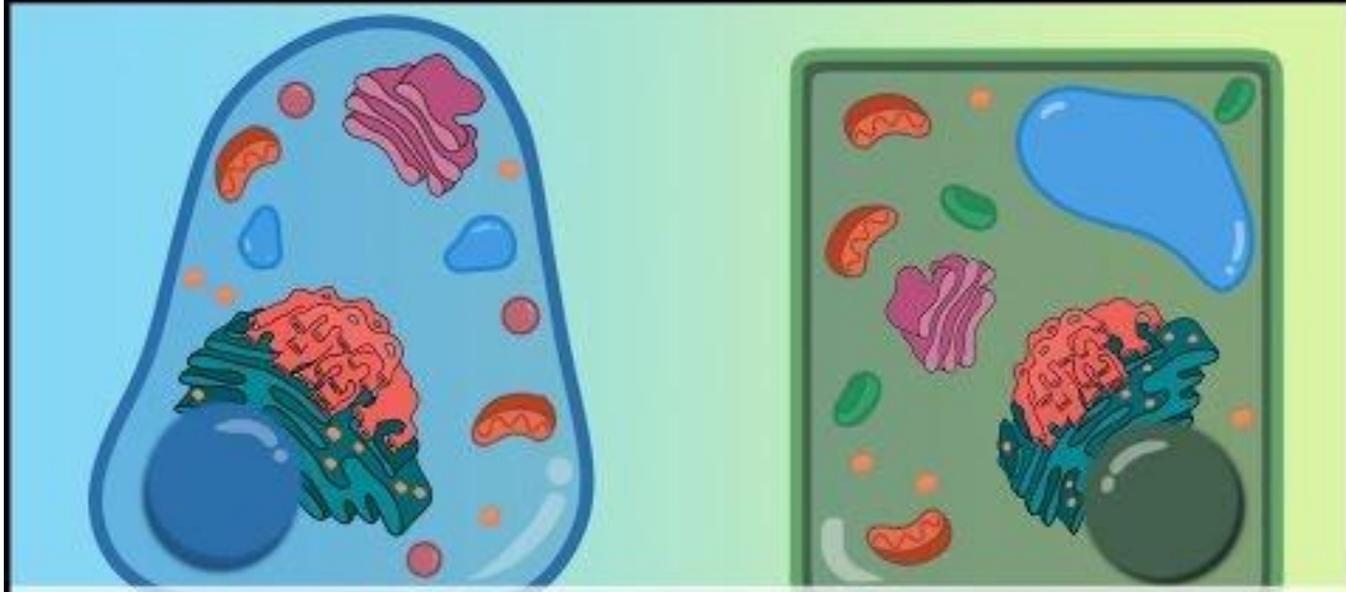
With a partner, create a VENN diagram showing comparing plant and animal cells.

Organelles With DNA

Mitochondria and chloroplasts have their own DNA (separate from the nucleus)

This supports the **ENDOSYMBIOSIS THEORY**





Introduction to Cells

with the Amoeba Sisters