

# Bell Ringer



Do you know what kind  
of cell this is?

What do you already know about cells?

What types of cells have you heard of?

# WHAT CELL IS IT?

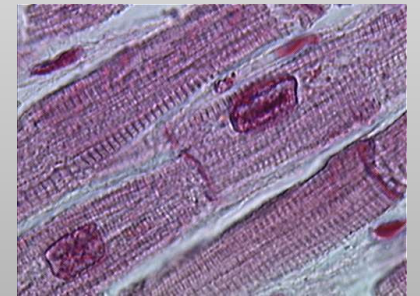
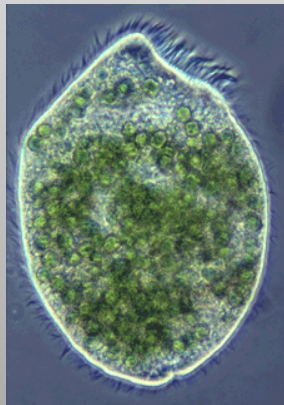
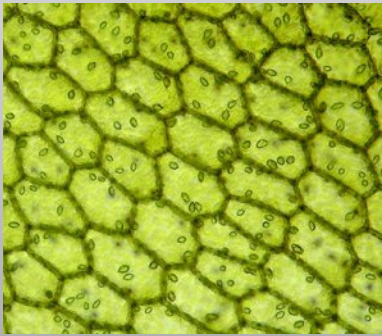
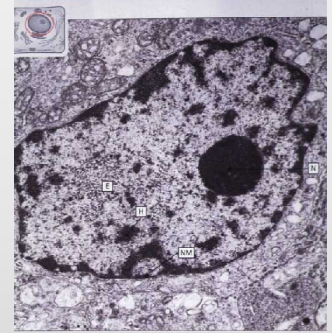
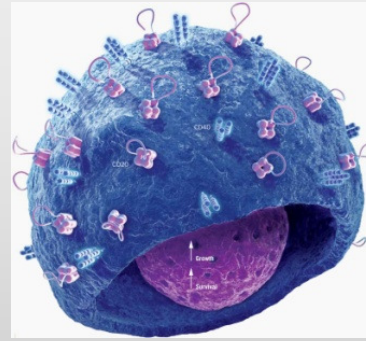
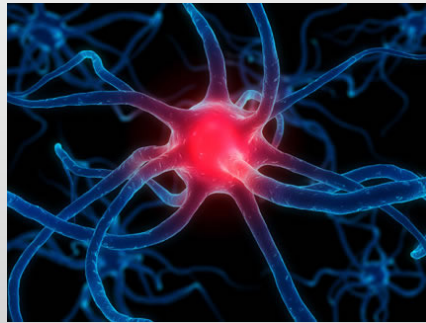
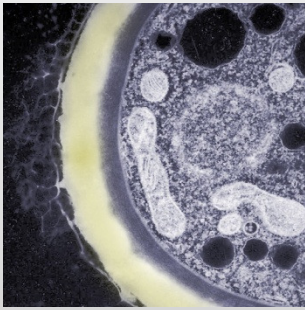
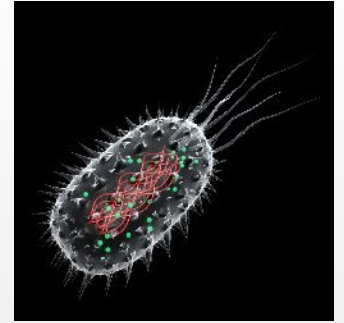
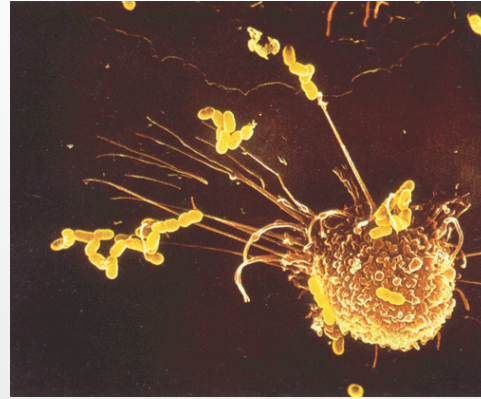
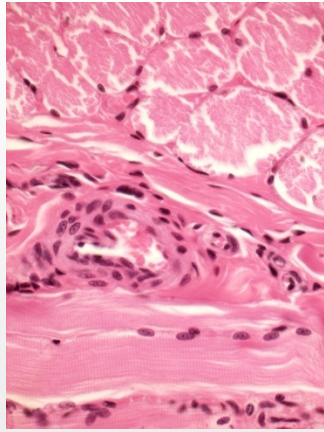
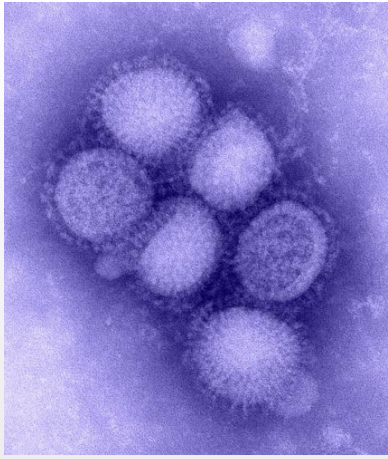
In your groups, look at the picture of a cell you have been given.

Can you identify any structures you see?



Brainstorm a list of at least 5 questions that you think will be answered as we study cells.

Any guesses about what kind of cell you think you are looking at?



# CELL FUN FACTS!

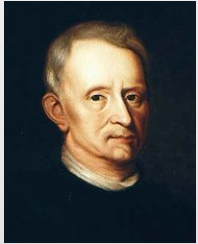
- The average human being is composed of around 100 Trillion individual cells!!!
- It would take as many as 50 cells to cover the area of a dot on the letter “i”

**WOW!!!**

**Cell:** the smallest unit of life that can perform all life processes.

## *A History of the Cell*

*Robert Hooke*- Used the first microscope (magnifying glass) to look at dead cork cells from bark of oak trees. He was not looking at living cells when he gave them the name “CELL”. It was 150 years later before the term cell took on its current meaning.



*Anton Van Leeuwenhoek*-Develops first simple microscope that we recognize today. Observes tiny living things in pond water. He called them “animalcules”. Discovers Protozoa and looked blood cells.



*Robert Brown*- observes that many cells have a dark structure near the center of the cell which we now call the nucleus.



*Matthias Schleiden*- studied botany as a hobby. Concluded that plants are made up of cells. Cofounder of Cell Theory

Theodor Schwann-concludes that animals are made up of cells. Cofounder of Cell Theory. Other major contributions include his discovery of Schwann Cells, and digestive enzyme pepsin.



Rudolph Virchow- proposes that cells come from other cells. This completes the cell theory. Considered the “Father of Pathology” and the founder of “social medicine”.



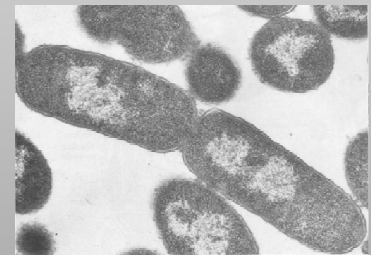
Janet Plowe- discovers that the cell membrane is a physical structure of the cell, not an interface of 2 liquids.

Lynn Margulis-proposes a theory that certain organelles were once free living cells themselves.



# THE CELL THEORY

- ALL LIVING THINGS ARE COMPOSED OF CELLS
- CELLS ARE THE BASIC UNITS OF STRUCTURE AND FUNCTION IN LIVING THINGS
- NEW CELLS ARE PRODUCED FROM EXISTING CELLS



# Modern Cell Theory

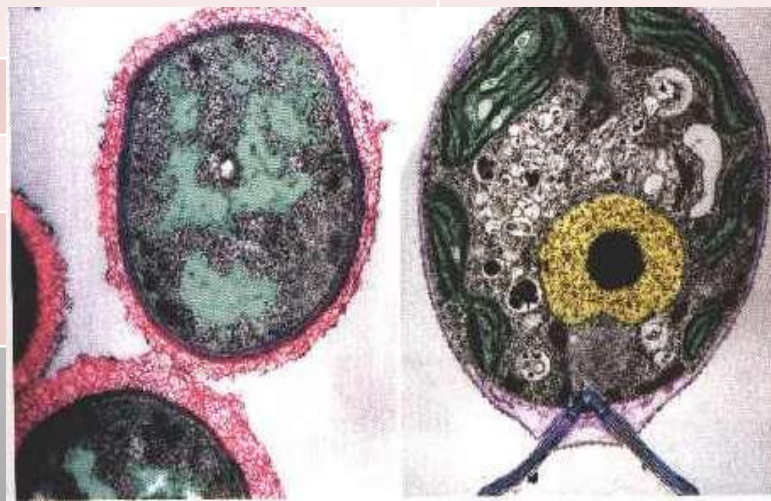


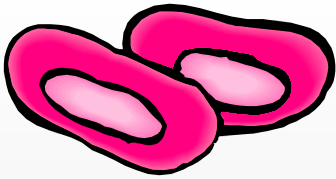
- **Modern Cell Theory contains 4 statements, in addition to the original Cell Theory:**
- The cell contains hereditary information(DNA) which is passed on from cell to cell during cell division.
- All cells are basically the same in chemical composition and metabolic activities.
- All basic chemical & physiological functions are carried out inside the cells.(movement, digestion,etc)
- Cell activity depends on the activities of sub-cellular structures within the cell(organelles, nucleus, plasma membrane)



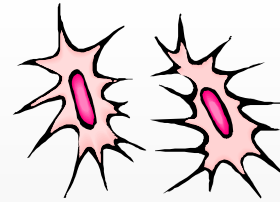
# Scientists divide cells into 2 categories:

| Prokaryotic   | Eukaryotic   |
|---|--|
| <ul style="list-style-type: none"><li>•No nucleus, only genetic material</li><li>•Have a cell membrane and cytoplasm but no other organelles</li><li>• very simple organisms but can carry out all life processes</li></ul> <p>Examples: Bacteria</p> | <ul style="list-style-type: none"><li>•Nucleus surrounded by a membrane</li><li>•Have a cell membrane, cytoplasm and organelles</li><li>•Can be unicellular or multicellular</li></ul> <p>Examples: Plants, Animals, Fungi, and Protists</p> |





Red Blood Cell

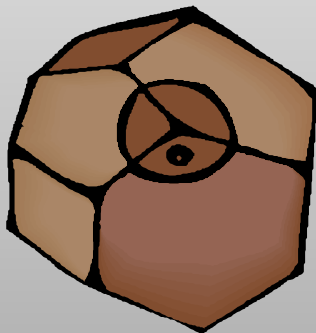


Bone Cell

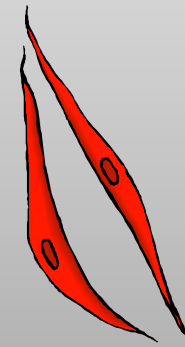


Cartilage cells

**It is amazing to think that the cells that make up our bodies are just as alive as we are. Humans are just an intricately designed community of cells, which must work together to survive.**



Liver Cell



Muscle cell



Connective tissue cell

# BELL RINGER



**Compare and Contrast Prokaryotic and Eukaryotic Cells.**

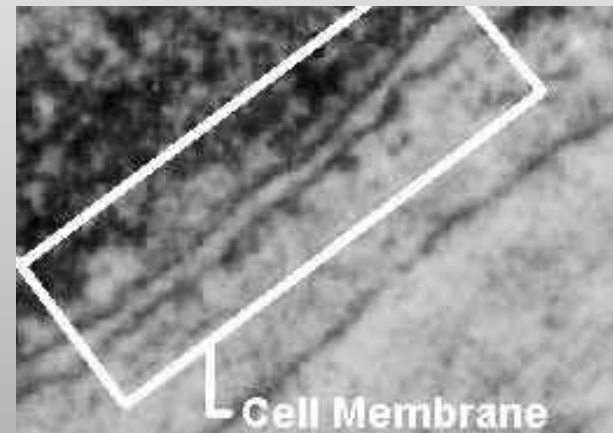
# CELL STRUCTURES

Organelles- structures inside the cell that perform the functions necessary for the cell to survive.

## Cell Membrane:

- Found in all cells
- Controls what enters and leaves the cell, selectively permeable
- Protects and supports the cell
- Barrier between cell and its environment
- Helps to maintain Homeostasis

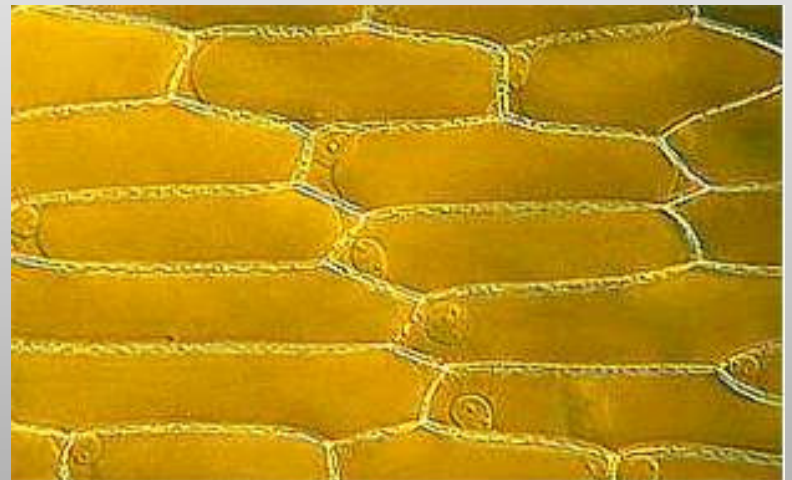
\*\*acts like a fence around a yard\*\*



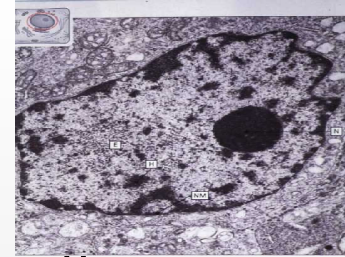
## Cell Wall

- Found only in plant cells
- Surrounds the cell membrane
- Main job is to protect and support cell (rigid and strong)
- Made of cellulose
- Allows H<sub>2</sub>O, O<sub>2</sub>, and CO<sub>2</sub> to diffuse in and out of cell

\*\* it is a second “fence”  
around the cell membrane\*\*



# NUCLEUS



- Found in eukaryotic cells
- An organelle inside the cell that directs all cell activity
- It holds DNA- the coded instructions for making proteins and other important molecules
- Surrounded by a membrane called the *nuclear envelope*

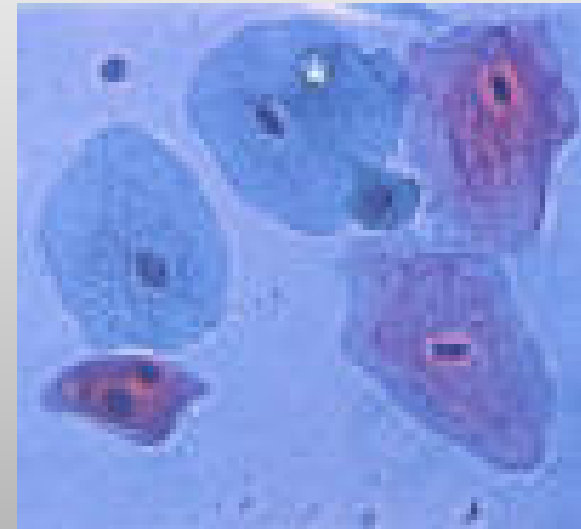
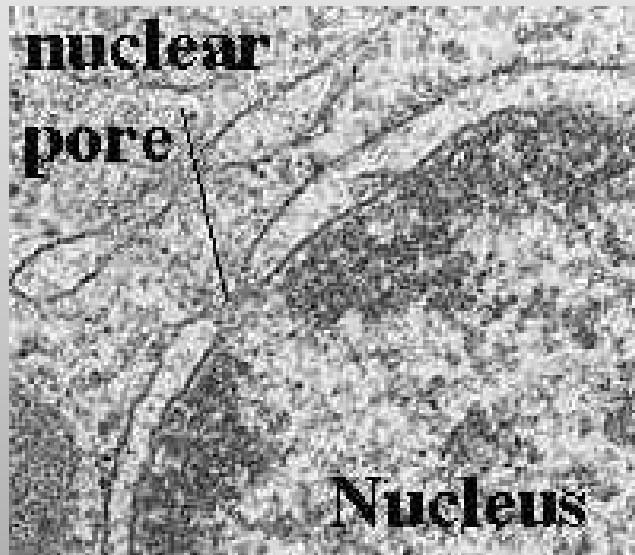
Inside the nucleus is a granular material called *chromatin*.

This chromatin has the DNA and other proteins inside.

When cell division happens, the chromatin condenses into *chromosomes*. Chromosomes are threadlike structures that contain the genetic information that is passed from one generation of cells to the next.      \*\* “brain” of the cell\*\*

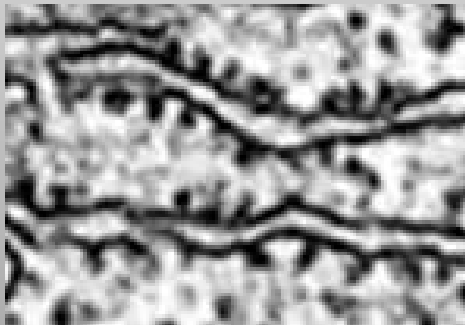
# Nucleolus

- Found in all eukaryotic cells
- Located in cell's nucleus (dark, dense region)
- Where assembly of *ribosomes* begins
- Disappears during cell division

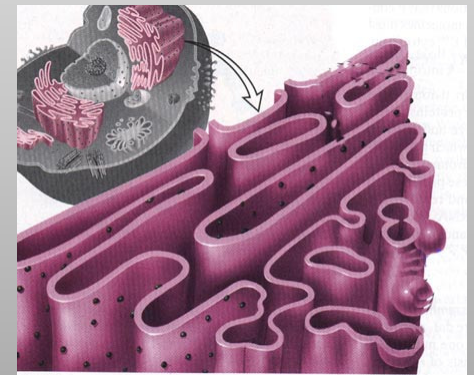


# ENDOPLASMIC RETICULUM (ER)

- All eukaryotic cells
- Network of tubes or membranes that moves material (proteins and lipids) in a cell
- Rough ER—protein synthesis (rough has *ribosomes*)
- Smooth ER—lipids are made
- Also responsible for moving proteins and other materials to the *Golgi Apparatus*.
- Connects to *nuclear envelope* and *cell membrane*.
- **RIBOSOMES**—small particles of RNA and protein spread throughout the cytoplasm. Proteins are made on the ribosomes. Prokaryotic cells contain ribosomes.



\*\* “Factory” of the Cell\*\*



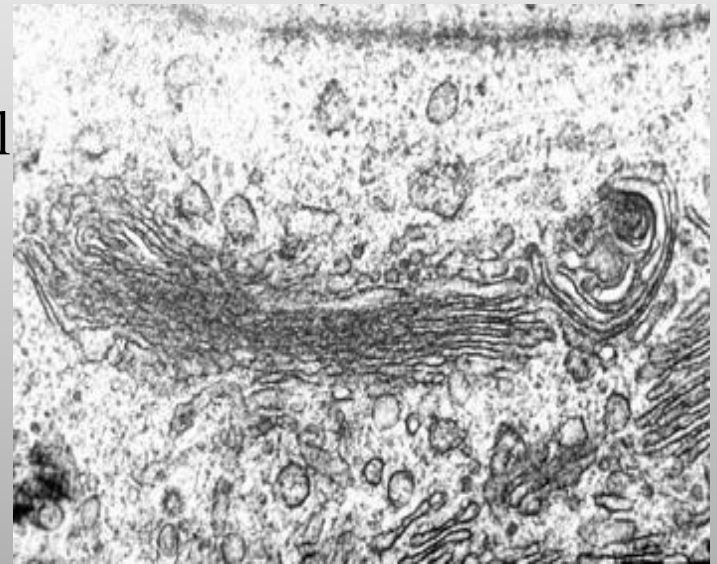


# GOLGI APPARATUS



- Found in all eukaryotic cells
- Closely grouped membranes that change, sort, and package proteins and other materials from the ER for storage in the cell or secretion outside the cell.
- Appear like flat, disk-shaped sacs

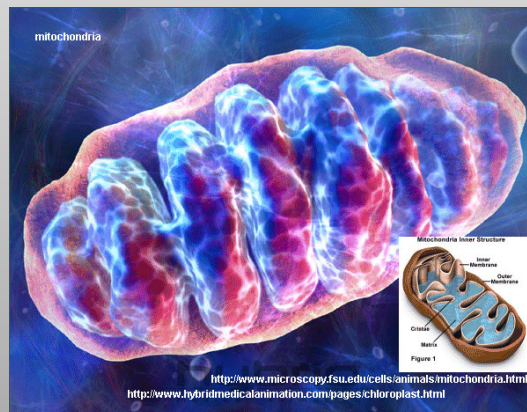
\*\* “PACKAGING PLANT” of the cell



# MITOCHONDRIA



- Found in eukaryotic cells
- Converts the chemical energy stored in food into compounds that are more convenient for the cell to use.
- Produce and Release Energy in the form of ATP
- Outer membrane is smooth, Inner membrane is folded into *cristae*.
- Site of aerobic cellular respiration



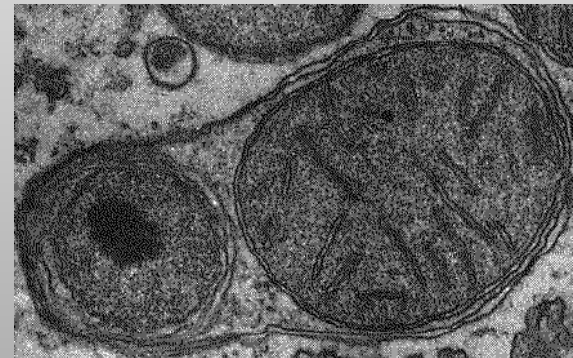
\*\* “POWERHOUSE” of the cell\*\*

# LYSOSOMES



- Found only in animal cells
- Filled with enzymes that help break down lipids, carbohydrates, and proteins into smaller molecules that can be used by the rest of the cell.
- Also break down organelles that have outlived their usefulness. (they “eat” worn out parts)
- Remove “garbage” that could clutter up cell and interfere with cell function.

\*\* “suicide” bag of the cell

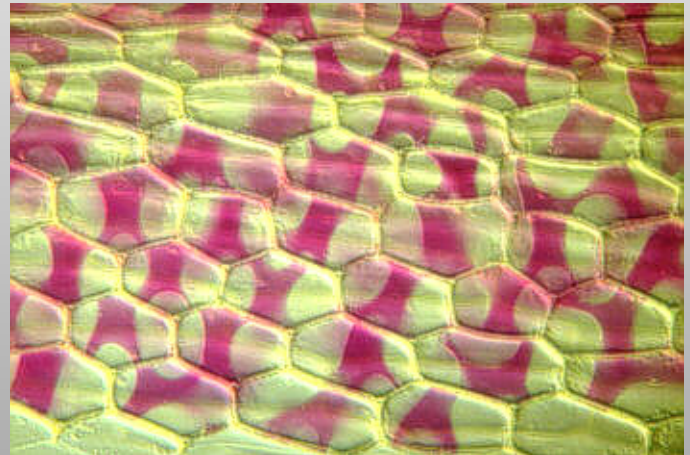


# VACUOLE

- Found mostly in plant cells (animal cells can have small ones)
- Saclike structures that are used to store food, water, and metabolic waste materials
- Can also move material in and out of the cell
- Largest organelle in plant cells
- Store large amounts of food or sugars in plants
- Smaller versions of these are called

*Vesicles.*

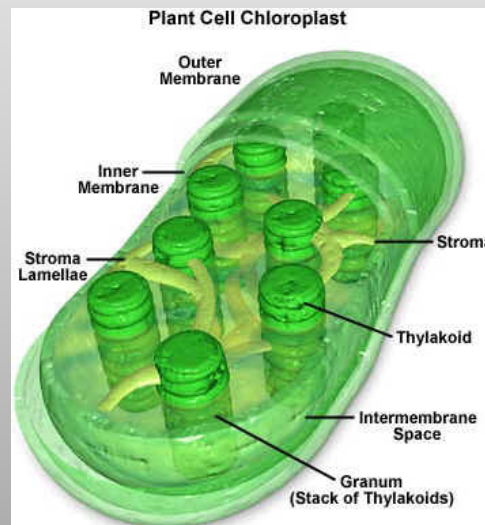
\*\* “storage facility” of the cell\*\*



# CHLOROPLASTS



- Found only in Plant cells
- Capture energy in sunlight and convert it into chemical energy (photosynthesis)
- Produces chlorophyll (the chemical of photosynthesis) to power the plant cell
- Has a gel like inner substance called stroma



# CYTOPLASM

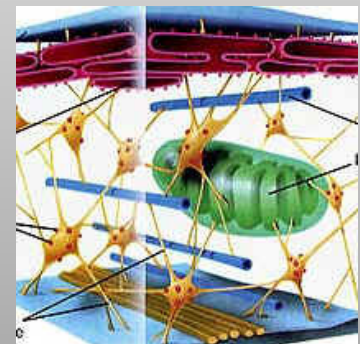
- Found in all cells
- Gel-like material inside of the cell membrane of a cell
- Keeps organelles in place
- Contains the *cytoskeleton* fiber

**\*\*cell soup\*\***



# CYTOSKELETON

- Found in all eukaryotic cells
- Network of protein filaments that helps the cell maintain its shape.
- Also involved in movement of the cell



# FLAGELLUM AND CILIA

- Flagellum are found in bacteria cells and protozoa.

Made of microtubules (filaments)

Long and few in number

Aid in movement



- Cilia are found in animal cells

Made of microtubules

Short and numerous

Aid in movement

