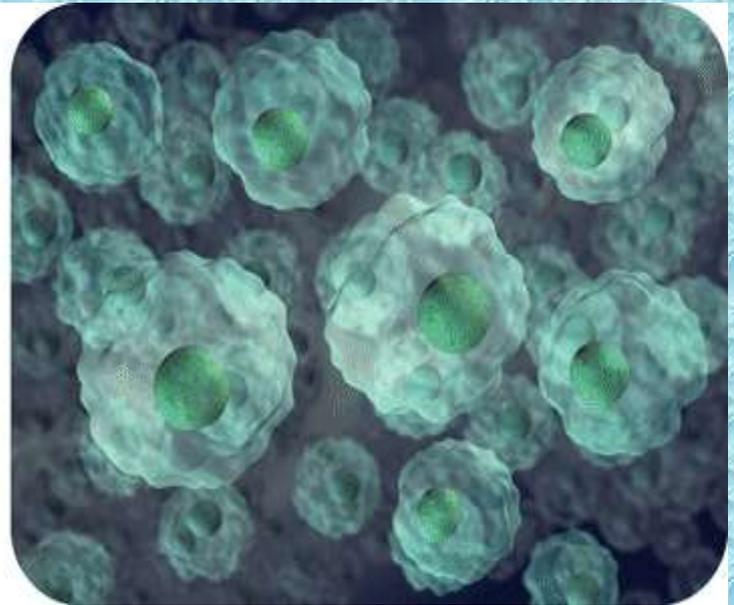


Prokaryote & Eukaryote



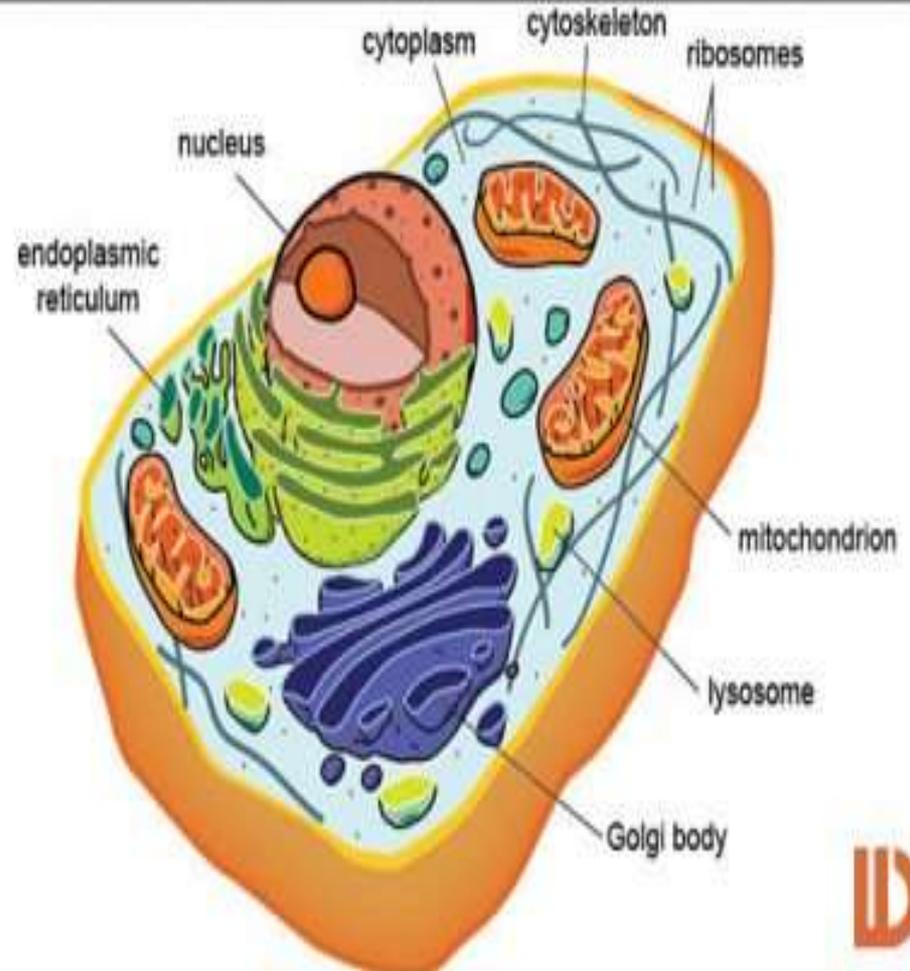
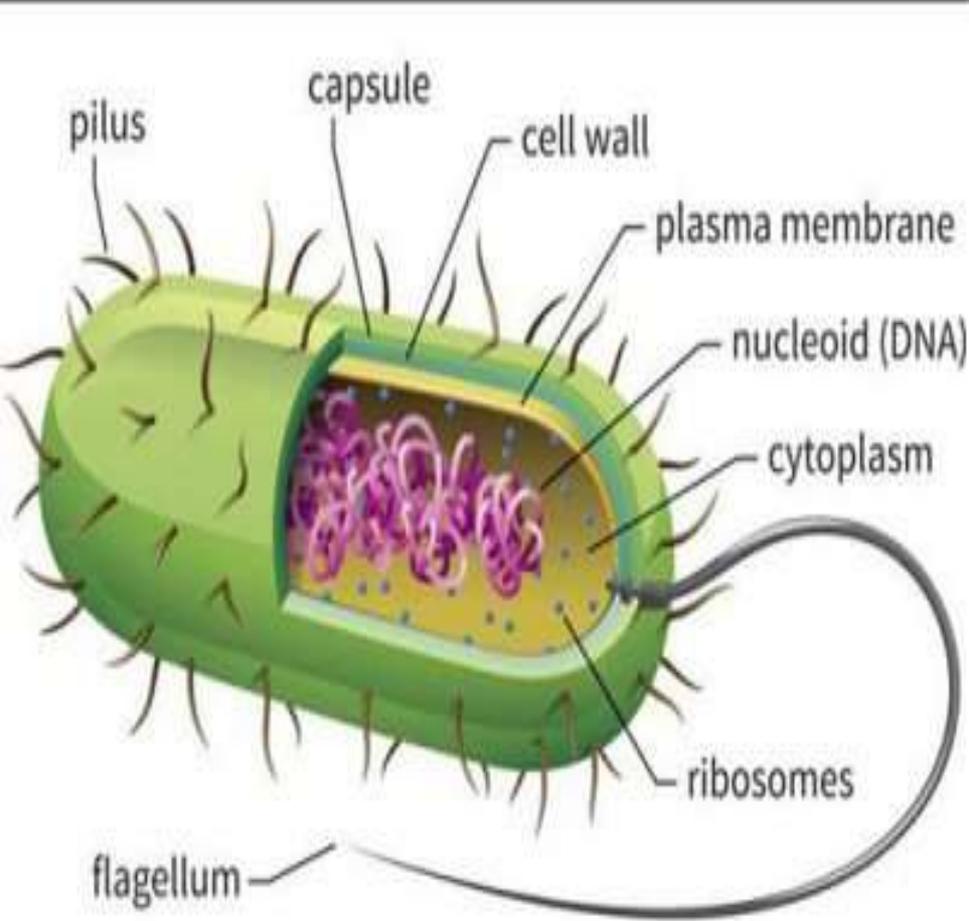
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PROKARYOTIC CELL

VS

EUKARYOTIC CELL



INTRODUCTION

- ▶ All living things are made up of cells. Cells are the smallest units that can be alive.
- ▶ During 1950's scientist developed the concept that life on earth is classified into six kingdom and each of them have their own characteristic kind of cell.
- ▶ However biggest division is between the cell of prokaryotic kingdom (Eubacteria & Archebacteria) and those of other four kingdoms (Animals, Plants, Fungi, Protistas) which are under Eukaryotic kingdom.

CELL

PROKARYOTIC

EUKARYOTIC



BACTERIA

ARCHAEBACTERIA



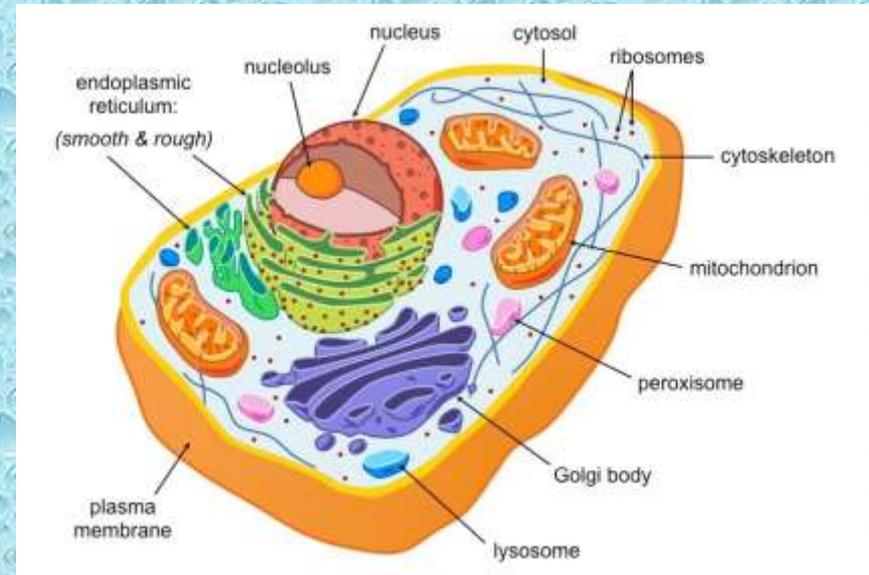
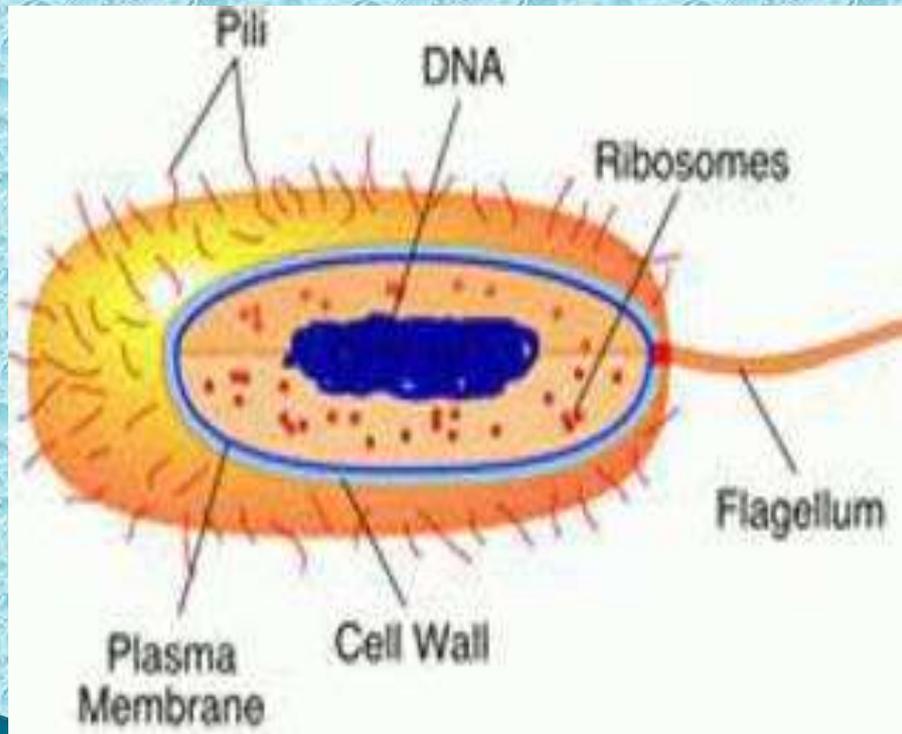
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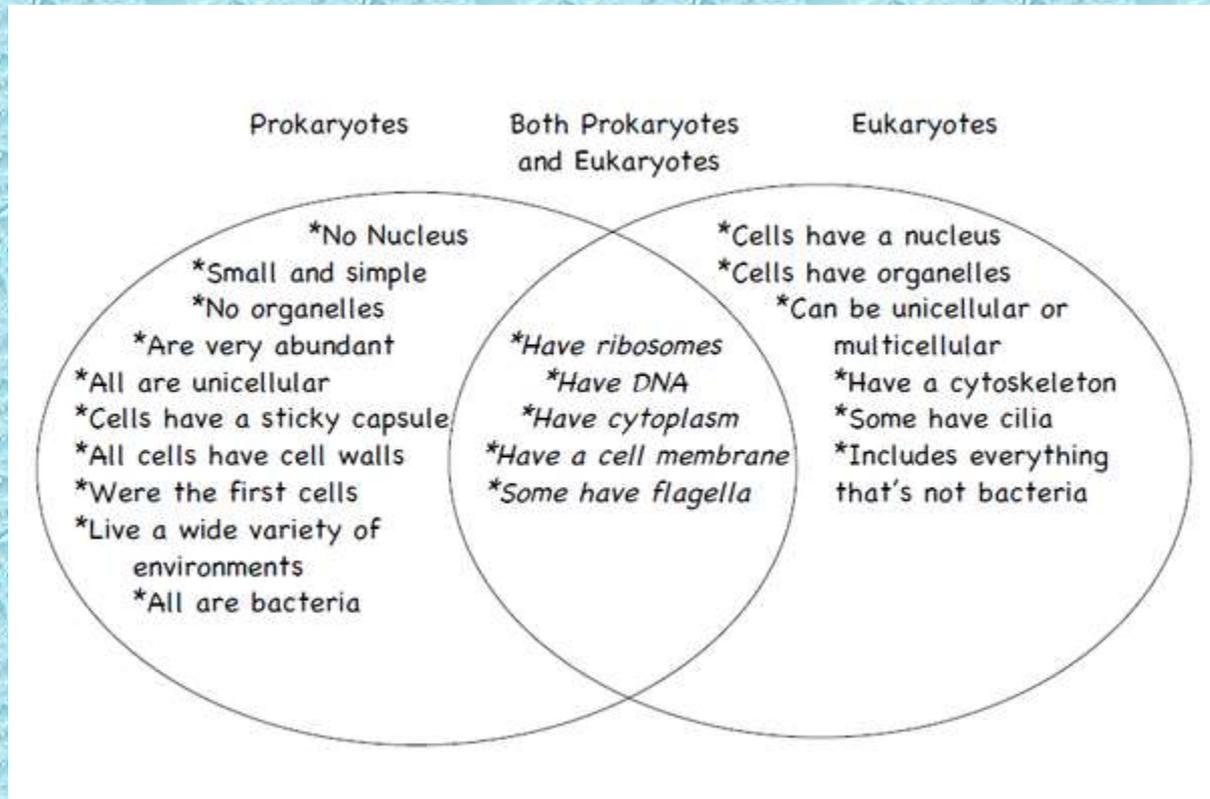
PLANTS

ANIMALS

Structure of Prokaryotic & Eukaryotic Cell



Venn diagram of Prokaryote & Eukaryote



	Prokaryotes	Eukaryotes
DNA	DNA is naked	DNA bound to protein
	DNA is circular	DNA is linear
	Usually no introns	Usually has introns
Organelles	No nucleus	Has a nucleus
	No membrane-bound	Membrane-bound
	70S ribosomes	80S ribosomes
Reproduction	Binary fission	Mitosis and meiosis
	Single chromosome (haploid)	Chromosomes paired (diploid or more)
Average Size	Smaller (~1–5 μm)	Larger (~10–100 μm)



Organelle of each Cell

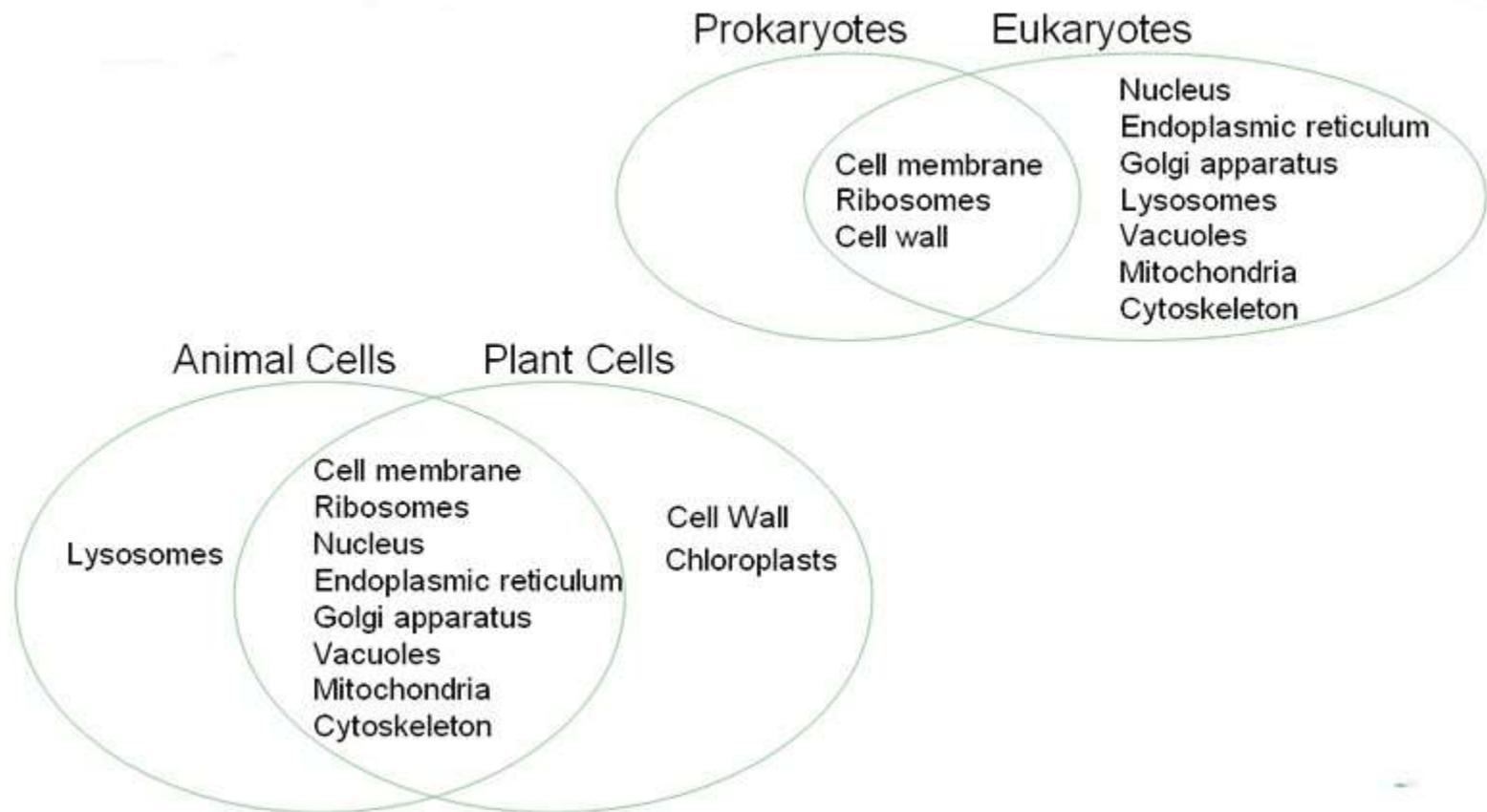
Prokaryotic Cell

- The Cell Wall
- The Plasma Membrane
- The Cytoplasm
- The Genetic Material
- The Ribosomes

Eukaryotic Cell

- The Cell Wall
- The Plasma Membrane
- The Nucleus
- The Nuclear Membrane
- The Nucleolus
- The Mitochondria
- The Chloroplast
- The Endoplasmic Reticulum
- The Ribosomes
- The Golgi Bodies
- The Lysosomes
- The Vacuoles
- The Cytoplasm
- The Chromosomes

Types of Eukaryotic Cell



Prokaryotic Cell

- ✦ Prokaryotic organisms are commonly called Bacteria.
- ✦ They are cells with simple structure.
- ✦ They have no membrane around the nucleus and lack any membrane bound organelles.
- ✦ They have a cell wall.
- ✦ They have a naked loop of DNA which stores the genetic information.
- ✦ They also have circular rings of DNA called **plasmids**.



Functions of Parts of Prokaryotic Cells

☀ Structures present in Prokaryotic Cells include:

– **Cell Wall**

- forms a protective outer layer that prevents damage from outside
- Prevents the cell from bursting due to high internal pressure

– **Plasma Membrane**

- Controls the transfer of substances in and out of the cell

– **Cytoplasm**

- Contains enzymes that catalyse the chemical reactions of metabolism

– **Pili**

- Are for **adhesion** allowing bacteria to colonize environmental surfaces or cells and resist flushing. Some bacteria can produce a special pilus called a **conjugation or sex pilus** that enables **conjugation**, the transfer of DNA from a donor bacterium to a recipient to enable genetic recombination.

Functions of Parts of Prokaryotic Cells

☀ Structures present in Prokaryotic Cells include:

- **Flagella**

- A slender whip-like structure used for locomotion ('swimming').

- **Ribosomes**

- Protein synthesis

- **Naked DNA (Nucleoid)**

- Stores the genetic information that controls the cell and is passed onto daughter cells

- **Mesosome**

- In folding of the plasma membrane
- Plays a role in cellular respiration and movement of DNA

Functions of Parts of Prokaryotic Cells

☀ Structures *sometimes* present in Prokaryotic cells:

– **Plasmids**

- Circular rings of naked DNA
- Extra genetic material
- Can be passed from one cell to another cell
- Used as vectors in genetic engineering

– **Slime capsule**

- Protects the cell against chemicals and drying out

– **Photosynthetic Membranes**

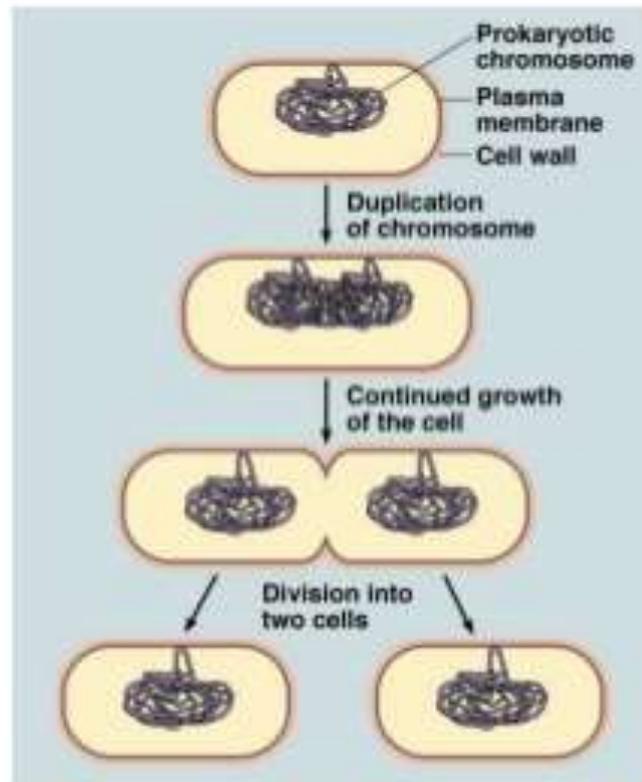
- Possess pigments to assist in photosynthesis

Types of Prokaryote

- ☀️ Prokaryotes are more commonly called Bacteria.
- ☀️ Although small and relatively simple in structure, they show a wide range of metabolic activity:
 - **Photosynthesis:**
 - Blue-green bacteria make their own food by photosynthesis (Autotrophic).
 - **Nitrogen fixation:**
 - Nitrogen fixing bacteria in the soil convert atmospheric nitrogen into nitrogen compounds in the soil as part of the nitrogen cycle.
 - **Fermentation:**
 - Many bacteria absorb large organic substances, convert them into other organic substances and release them (Heterotrophic).
 - e.g.: yoghurt, vinegar and cheese production

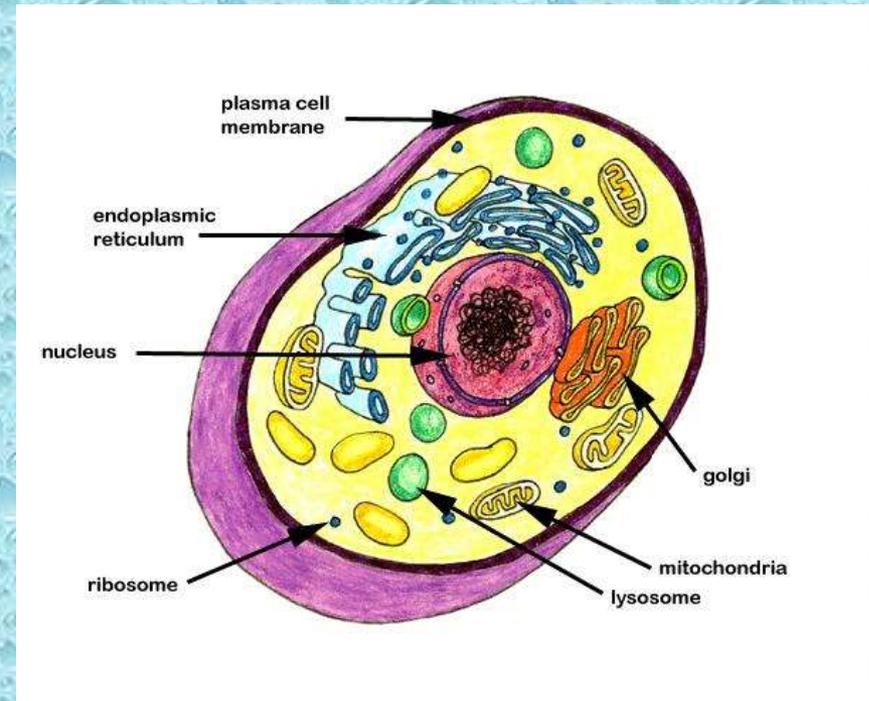
Reproduction

- ☀ Prokaryotes reproduce by binary ('two') fission ('splitting').
- ☀ The two new 'daughter' cells are clones of the original cell – genetically identical.



Eukaryotic Cell Structure

- ▶ The plasma membrane/cell membrane
 - the flexible boundary of a cell
 - separates a cell from its surroundings



Plasma Membrane/Cell Membrane continued:

- ▶ Allows nutrients to enter the cell and waste to be removed
 - This is referred to as **selective permeability**.
(Selective=Chooses, Permeability=filter through)
- ▶ keeping a healthy balance of nutrients and water within the cell, which is called **homeostasis**

Overview of Organelles

▶ Nucleus–

- Largest organelle in the cell and it is the most inner compartment of the cell
- contains chromatin (DNA); genetic information on strands called chromosomes
- “control center” for cell metabolism and reproduction

▶ Chromatin– Package DNA into a small volume to fit into nucleus of the cell and protect the DNA structure and sequence.

▶ Nucleolus– Found inside nucleus; ribosomes are made here

Overview Cont'd

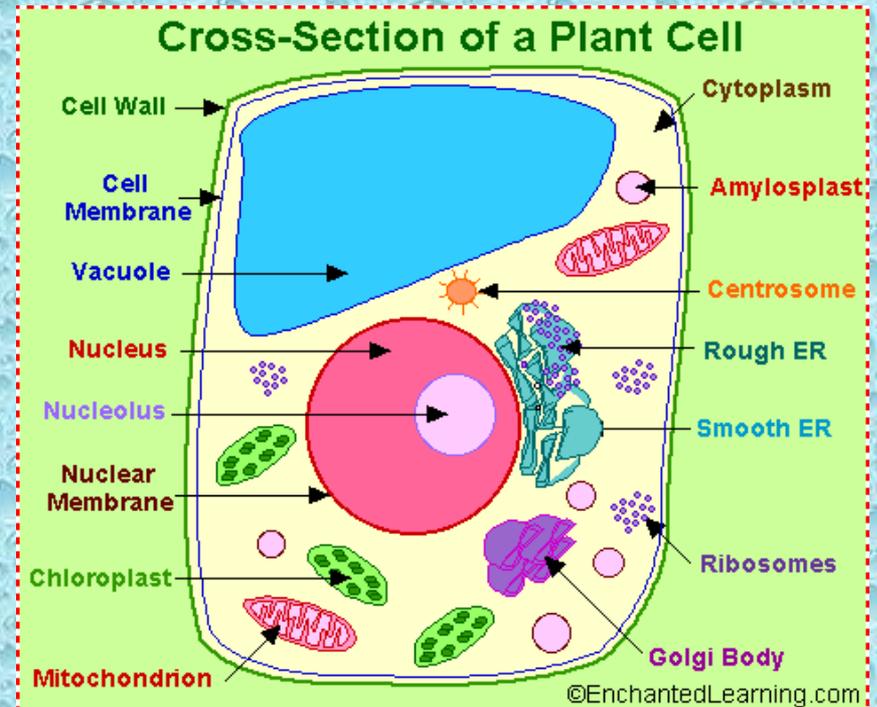
- ▶ Ribosomes– make proteins (made up of RNA and protein); are said to be “protein factories”.
- ▶ Cytoplasm– clear gel like fluid inside the cell, which suspends all organelles
- ▶ Endoplasmic Reticulum– extensive network of membranes
 - Rough ER: with ribosomes
 - Smooth ER: with no visible ribosomes
- ▶ Golgi Apparatus– Help in processing and bundling of macromolecules like protein and lipid as they are synthesized within the cell.

Overview Cont'd

- ▶ Lysosome– organelles that are filled with digestive enzymes to remove waste and invading bacteria
- ▶ Mitochondria– often referred to as the “powerhouse” of the cell
 - release energy for the cell
 - It converts the energy stored in glucose into ATP for the cell
- ▶ Vacuoles– fluid filled organelles enclosed by a membrane
 - Store materials such as food, sugar, water, and waste products

Eukaryotic plant cell

- ▶ Plant cells are also Eukaryotic cells, but plant cells contain some organelles that are not found in animal cells.



Plant Cell Organelles

- ▶ Cell wall– rigid wall outside the plasma membrane. It provides the cell with extra support.
- ▶ Chloroplasts– captures light and energy; and converts it into chemical energy.
- ▶ Chlorophyll– green pigment found inside the chloroplast.
- ▶ Plastids– organelles that store things such as food in the plant cell.



Thank
you!!