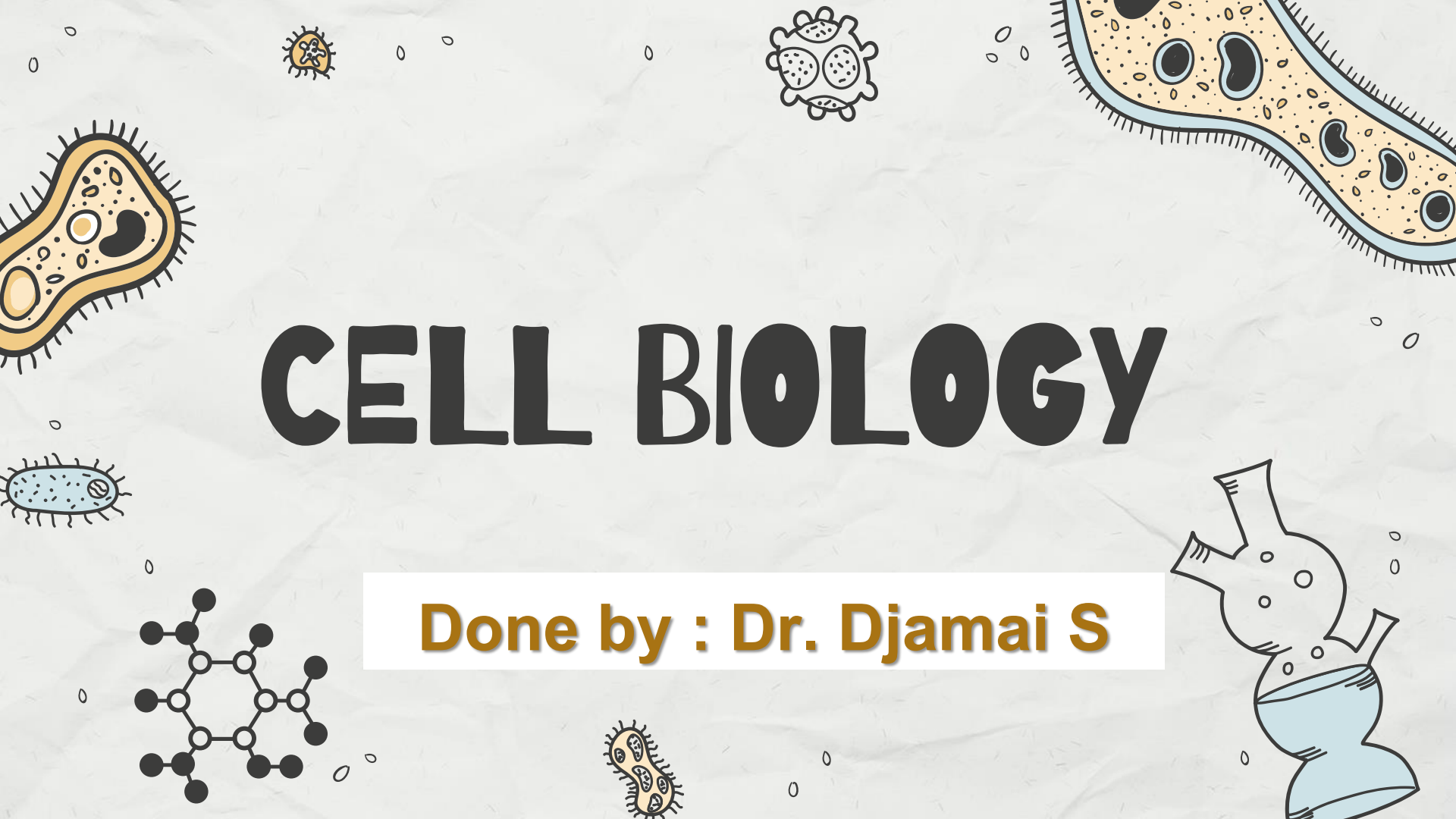


CELL BIOLOGY

Done by : Dr. Djamai S



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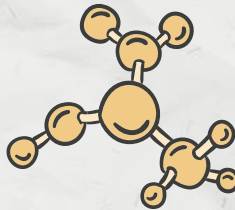
a-Prokaryotic cells

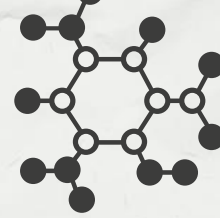
Types of prokaryotic cells

b-Eukaryotic cells

Types of eukaryotic cells

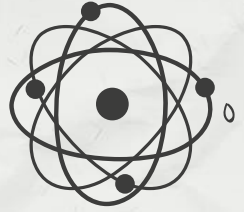
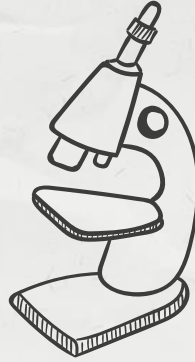
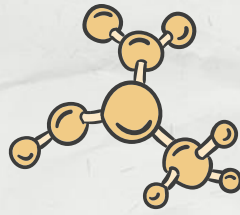
Types of human cells



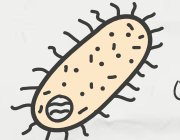
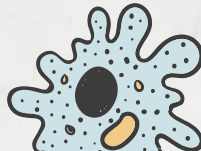


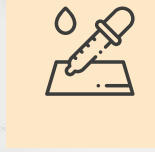
“Cell biology or cytology is a branch of biology that deals with studies related to the structure and function of a cell-based on the concept that the cell is the fundamental unit of life.”

01



What is a Cell Theory?





All living things are made up of cells.



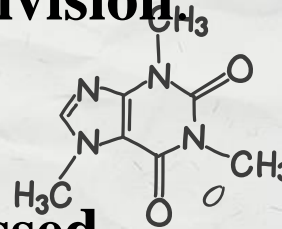
The cell is the structural and functional unit of all living things.



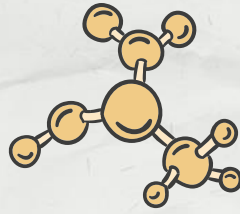
All cells come from pre-existing cells through division



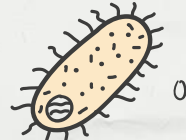
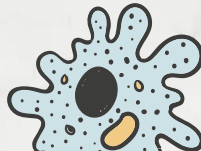
All cells carry genetic information, which is passed from cell to cell during cell division.



02

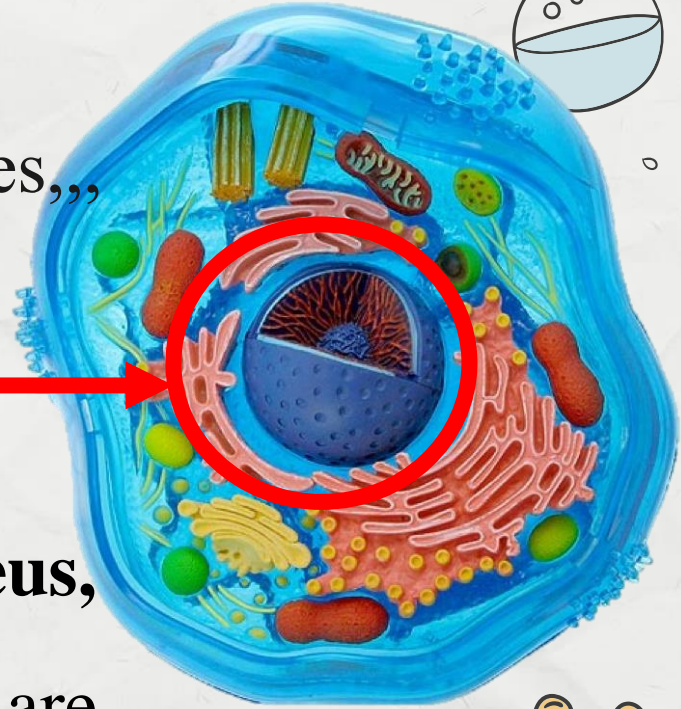


What are Cell Organelles?



Nucleus

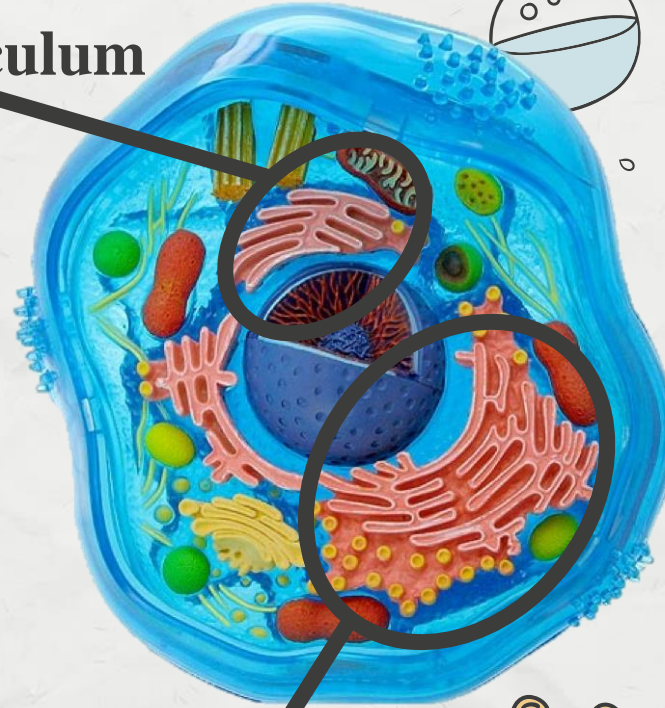
- It is the largest organelle.
- It controls all of the cell's activities,,
growth and **metabolism**,
- The **DNA**'s genetic information.
- Each cell contains **only one nucleus**,
whereas other types of organelles are
present in **multiple copies**



Endoplasmic Reticulum (ER)

Smooth Endoplasmic Reticulum

- It is a network of membranous canals filled with fluid.
- They are the transport system of the cell, involved in transporting materials throughout the cell.



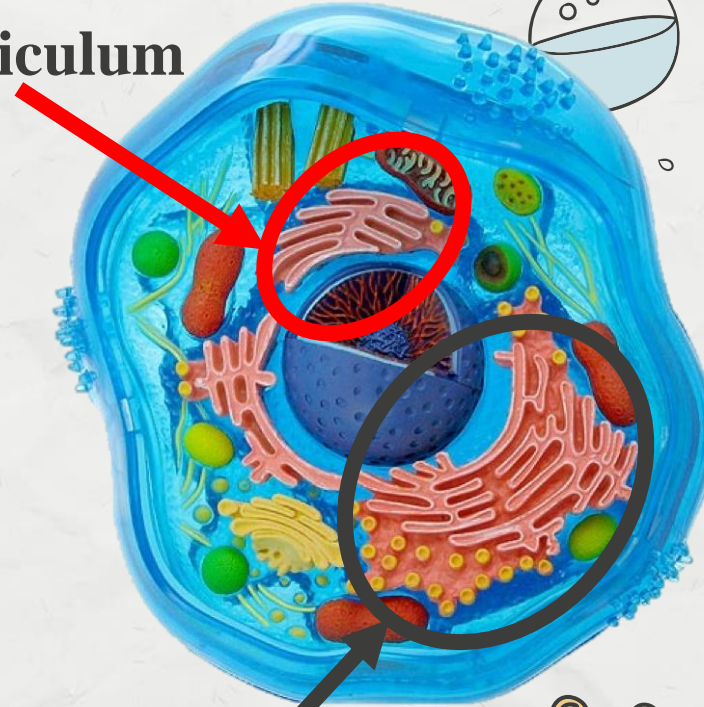
Rough Endoplasmic Reticulum

Endoplasmic Reticulum (ER)

Smooth Endoplasmic Reticulum

The smooth ER

- No ribosomes
- Produces lipids, cholesterol, hormones



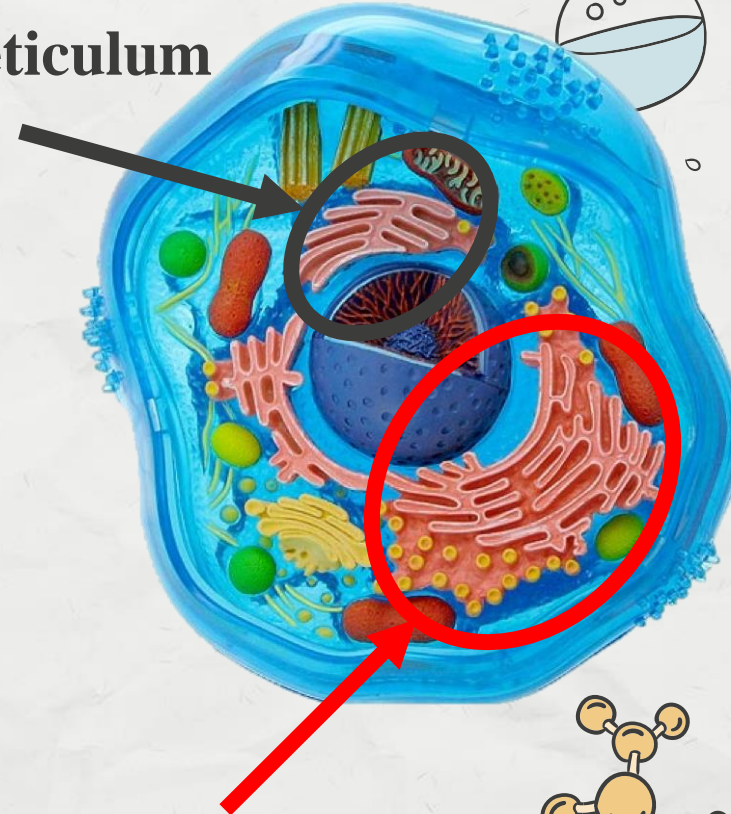
Rough Endoplasmic Reticulum

Endoplasmic Reticulum (ER)

Smooth Endoplasmic Reticulum

The rough ER

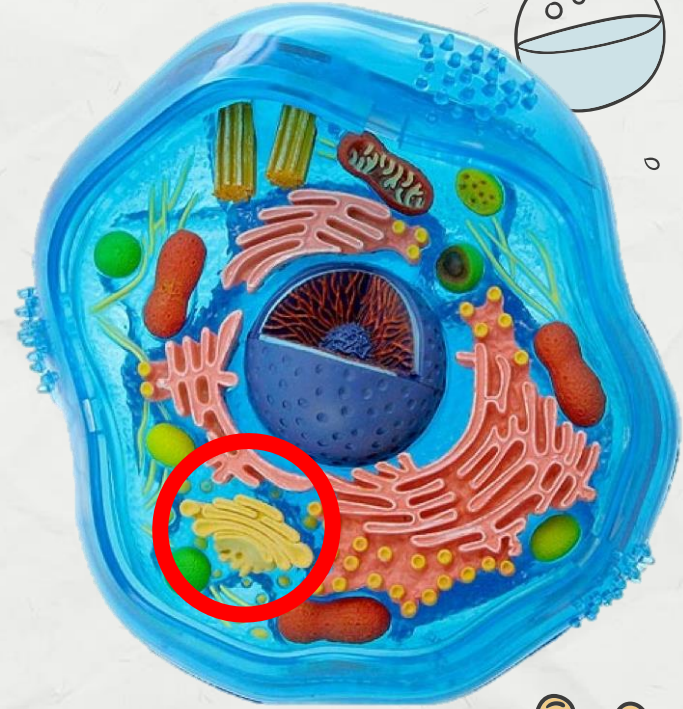
- Contains **ribosomes**
- produce **protein**.
- Transport proteins to **Golgi apparatus** using **vesicles**



Rough Endoplasmic Reticulum

Golgi apparatus

- Receives the proteins and modifies it.
- Adds lipids and carbs.
- These processed proteins are then **stored** in the Golgi or **packed** in vesicles to be **shipped** elsewhere in the cell.

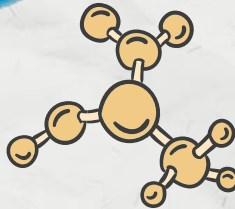




Mitochondria



- They have their own DNA, RNA molecules
- Cellular respiration
- Transform molecules such as glucose into an energy molecule known as **ATP** (adenosine triphosphate)



Mitochondria

- Mitochondria are most plentiful in cells that require significant amounts of energy to function, such as liver and muscle cells.

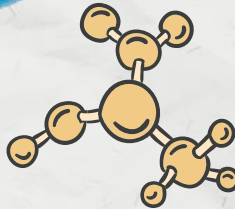




lysosomes



- It is also called as the “suicidal bags”.
- Helps in the digestion and removes wastes and digests dead and damaged cells component.

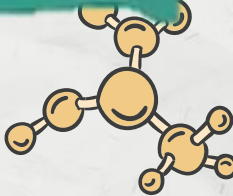
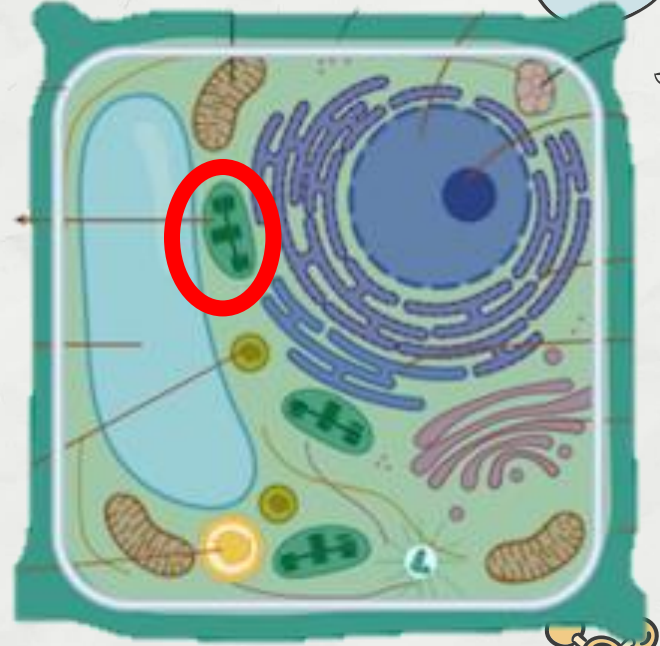




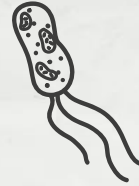
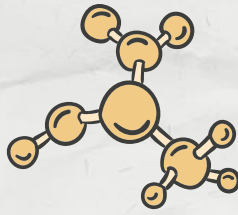
Chloroplast



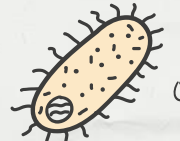
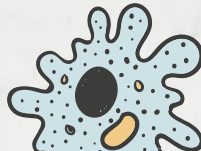
- The cells of plants and green algae.
- Contains an essential pigment called chlorophyll necessary to trap sunlight for the production of glucose.
- The site of photosynthesis.



03



Types of cells



Two types of cells




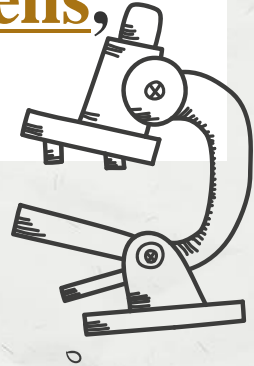
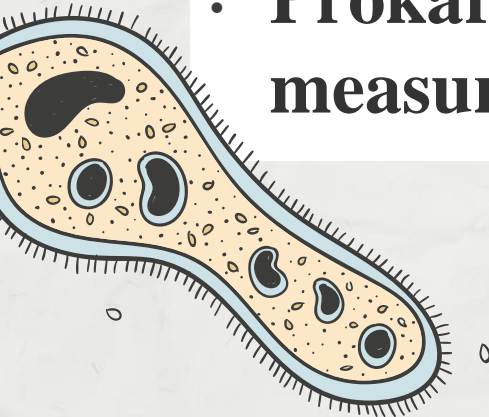
a/ Prokaryotic cells

b/ Eukaryotic cells

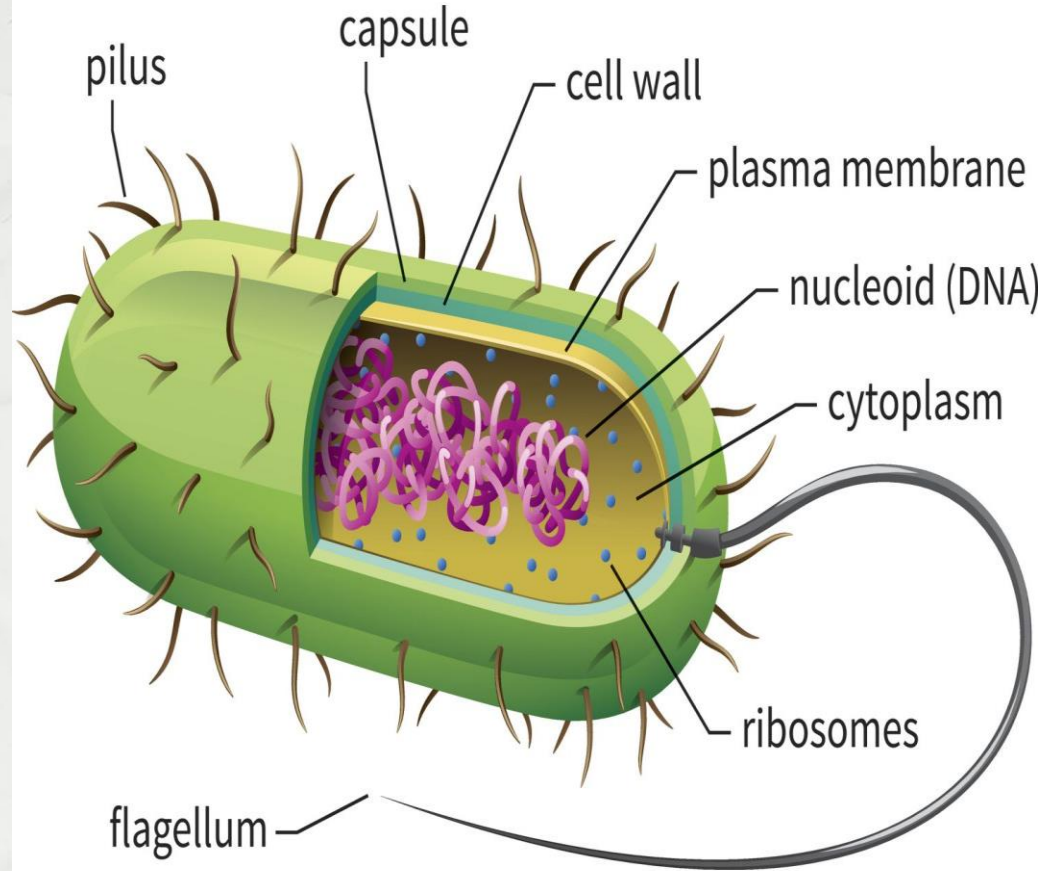


a/ Prokaryotic cells

- 
- **Unicellular organisms.**
 - Prokaryotic cells tend to be small, simple cells, measuring around $0.1\text{-}5\text{ }\mu\text{m}$ in diameter.

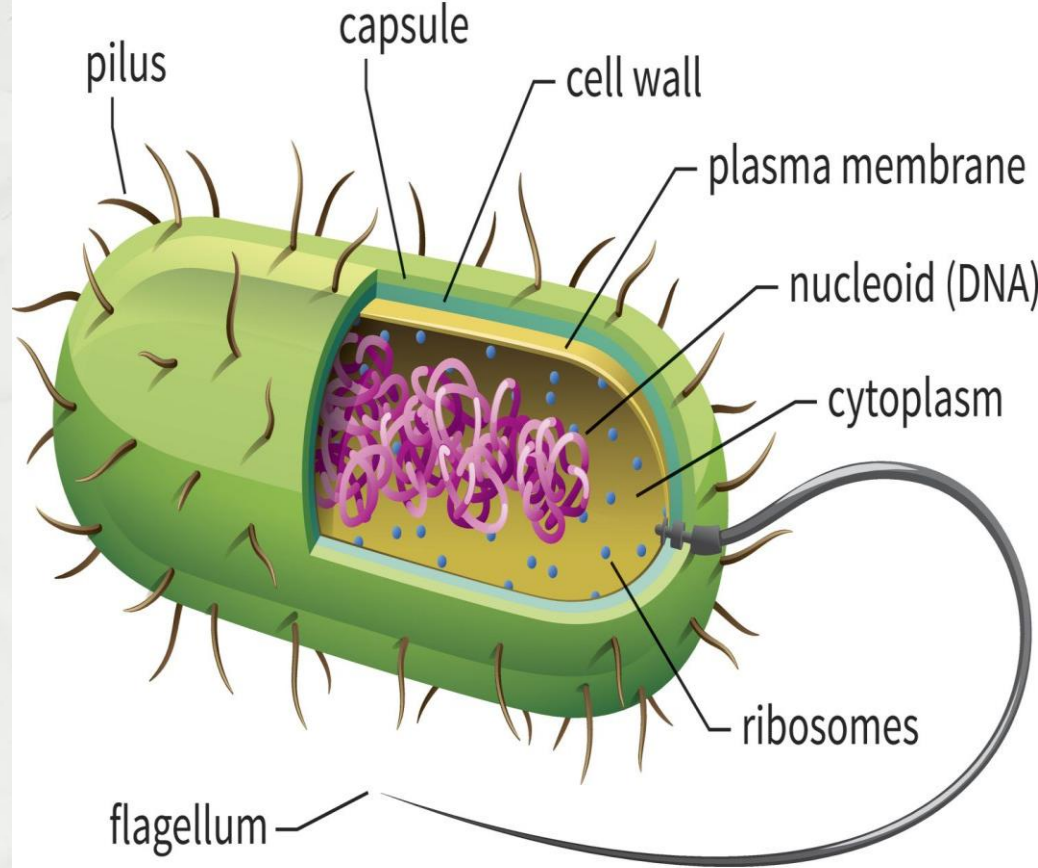


Capsule: Some bacteria have a layer of carbohydrates that surrounds the cell wall called the capsule. The capsule helps the bacterium attach to surfaces.



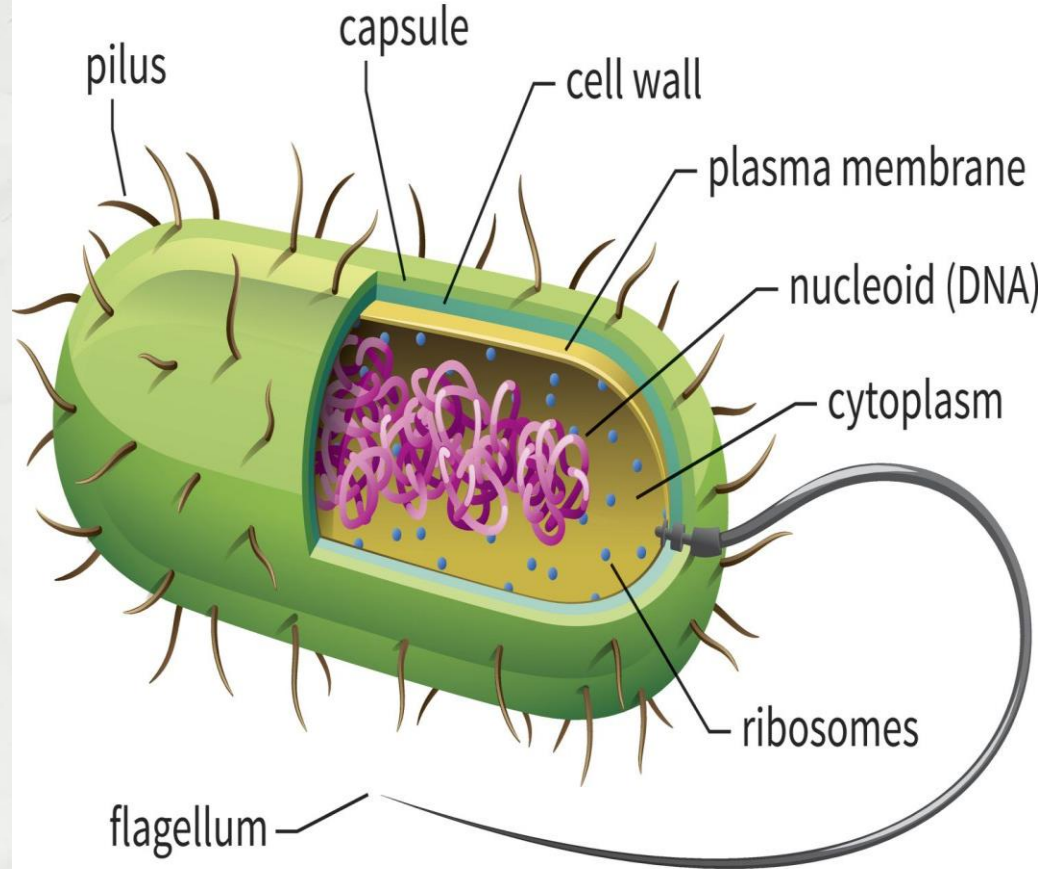


- **Cell wall:** The cell wall provides structure and protection from the outside environment. Most bacteria have a rigid cell wall.
- **Cell membrane:** Every prokaryote has a cell membrane, also known as the plasma membrane, that separates the cell from the outside environment.





- **No nucleus.**
- Their DNA is **circular** and can be found in a region called **the nucleoid**, which floats in the cytoplasm



Types of Prokaryotic cells

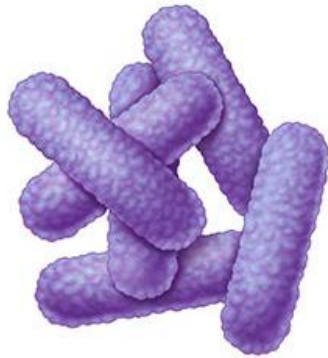


Bacteria

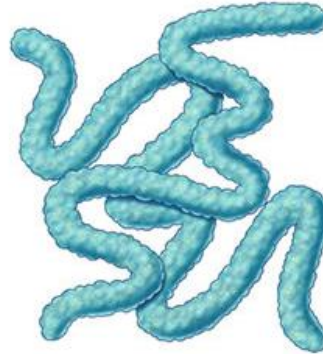
- Bacteria are simple, and they come in various shapes. Including spherical, filamentous, or spirally twisted forms.



Sphere-shaped
(cocci)



Rod-shaped
(bacilli)



Spiral-shaped
(spirochetes)



Filamentous-shaped



Types of Prokaryotic cells

Bacteria



MICROBIOLOGY ● ● ●

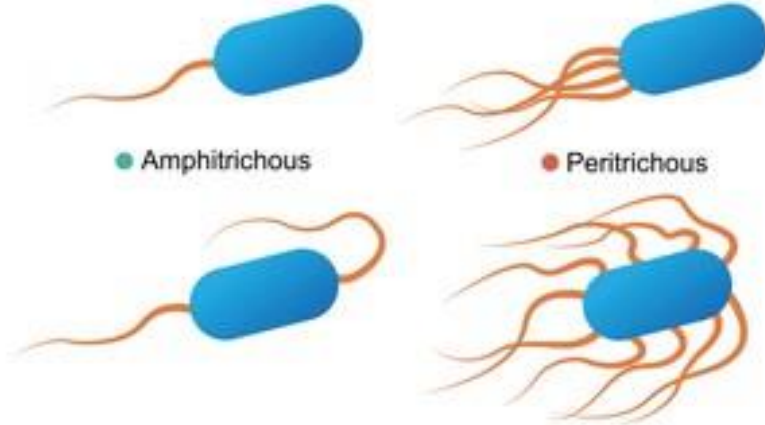
Bacterial Flagella

● Monotrichous

● Lophotrichous

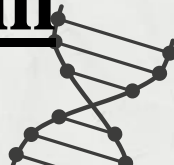
● Amphitrichous

● Peritrichous



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- Some bacteria have additional structures like **flagella** to facilitate movement and **pili** for attachment.

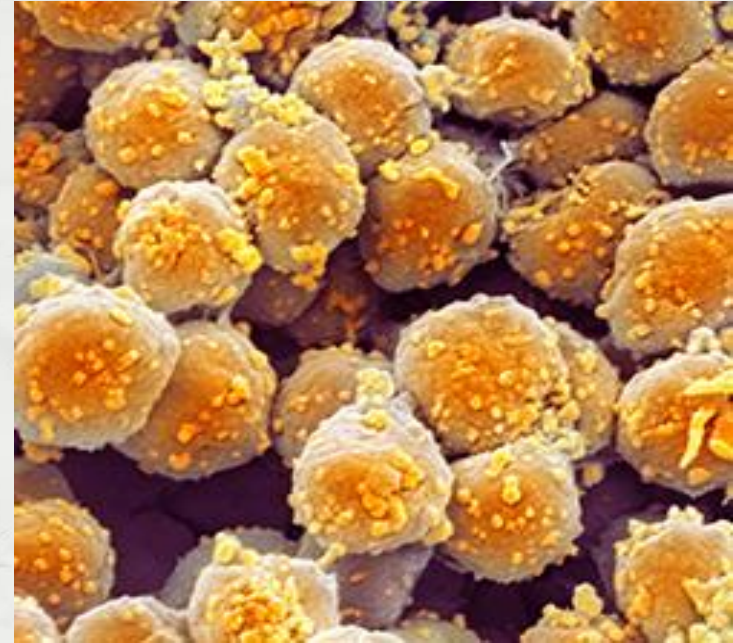


Types of Prokaryotic cells



Archaea

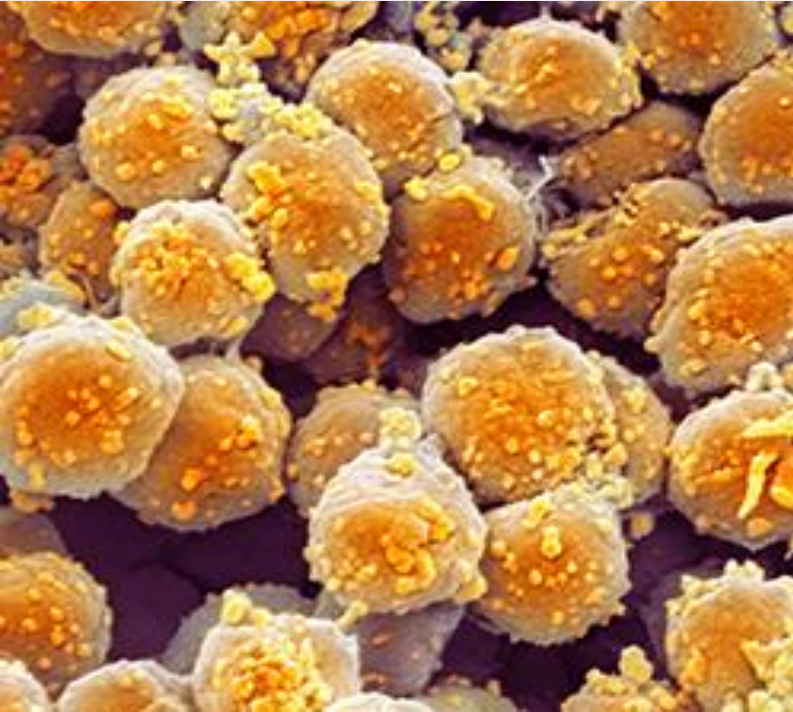
- Archaeal cells also have diverse shapes, including spheres, rods, and spirals.
- They possess a cell wall, similar to bacteria, but the composition of their cell wall is different from bacterial cell walls.



Types of Prokaryotic cells



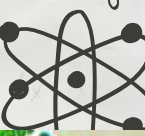
Archaea



- Many archaea are **extremophiles**, meaning they thrive in harsh environmental conditions such as high pressures, acidic lakes, high salt concentration, and deep-sea hydrothermal vents.



Types of Prokaryotic cells



Cyanobacteria

- **Cyanobacteria** are aquatic and photosynthetic. They live in the water, and can manufacture their own food.



b/ Eukaryotic cells



- **Unicellular or Multicellular organisms**
 - include a wide range of organisms such as plants, fungi, and animals.



- **Presence of nucleus**
 - It contains the genetic material.
 - nucleus is surrounded by a nuclear membrane, which separates it from the cytoplasm.



- The size of the cells ranges between 10–100 μm in diameter



b/ Eukaryotic cells



- They also contain various **organelles**, each performing specific functions.

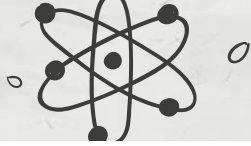


- Multicellular eukaryotes, on the other hand, organize into specialized tissues and organs, performing complex physiological functions and interactions with their environment.



Types of eukaryotic cells

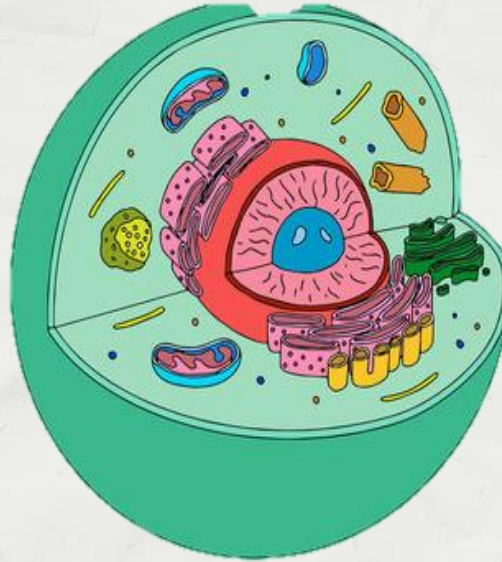




Animal cells

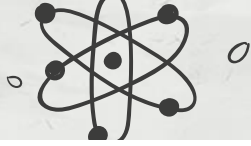
They perform various functions, including energy production, metabolism, and structural support.

They are enclosed by a plasma membrane.



Animal cells contain a nucleus, cytoplasm, mitochondria, endoplasmic reticulum, Golgi apparatus, and lysosomes.

They do not have cell wall and chloroplast.



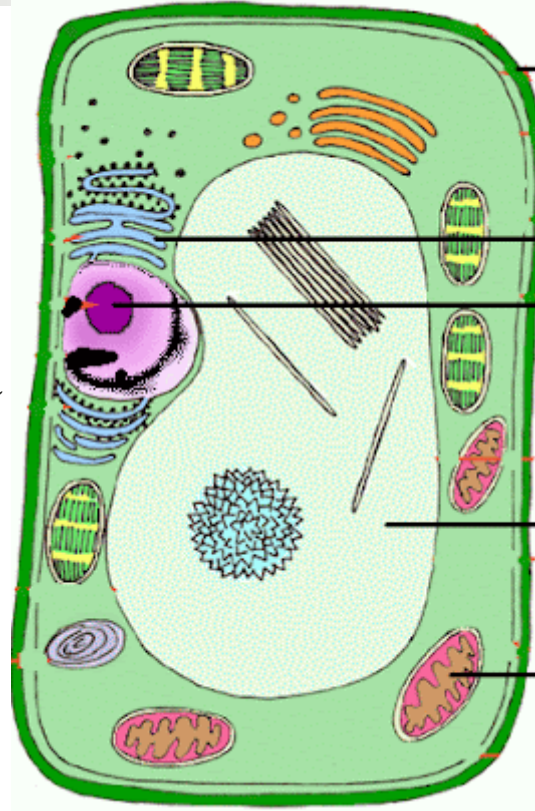
Plant cells

Plant cells have organelles similar to animal cells.

In addition, they have unique structures such as a cell “**Wall made**” of cellulose.

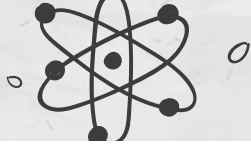
“**Chloroplast**” for photosynthesis .

“**Central vacuole**” filled with fluids.



They produce energy through photosynthesis,

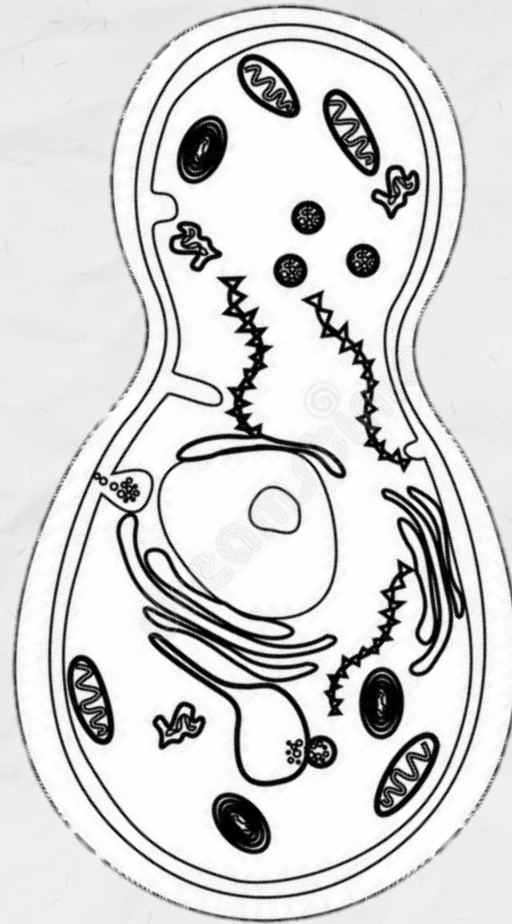
They provide structural support, and store nutrients and water in the vacuole.



Fungal cells

Fungal cells, similar to plant cells, have a nucleus, cytoplasm, and various organelles. They also have a cell wall.

Fungal cells include yeasts, molds, and mushrooms.

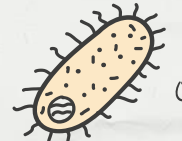
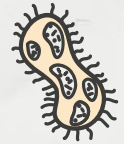
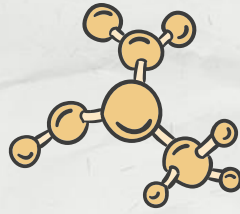


Fungi play important roles in decomposing organic matter and forming **symbiotic relationships** with other organisms.



04

Types of human cells





BLOOD CELLS

Cellular components

**red
blood
cells**

-Facilitate the transport of oxygen from the lungs to tissues. - Carry carbon dioxide back

**white
blood
cells**

For immune responses, they defend against pathogens

platelets

Blood clotting

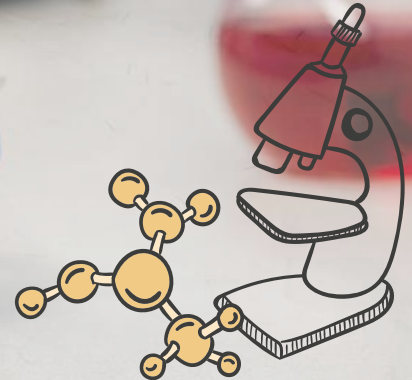
Liquid components « plasma »

water

**Hormone
s**

proteins

**waste
product
s**





1-BLOOD CELLS

Cellular component s

red blood
cells

Facilitate the transport of oxygen
from the lungs to tissues.
Carry carbon dioxide back.

white blood
cells

For immune responses, they
defend against pathogens

platelets

Blood
clotting.

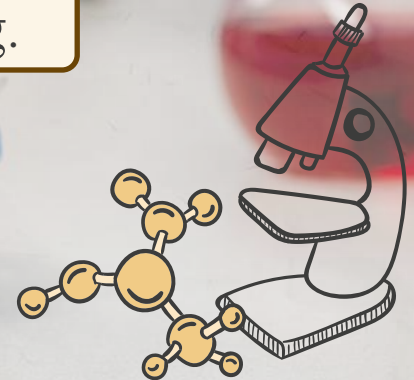
water

Liquid component s « plasma »

Hormone
s

proteins

Waste
products



A microscopic image of a cancer cell, showing a large, irregularly shaped cell with a prominent nucleus and a rough, textured surface. The cell is set against a dark, blue, textured background.

2- Cancer cells

- Cancer cells are abnormal cells characterized by uncontrolled growth and division.
- Cancer cells can develop from genetic mutations caused by exposure to various factors, including chemicals, radiation, ultraviolet light.

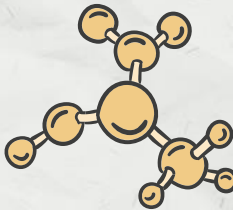
A detailed microscopic image of adipose tissue, showing numerous large, clear, spherical adipocytes (fat cells) packed closely together. Each cell contains a large, clear lipid droplet that pushes the nucleus to the periphery. The cells are separated by thin layers of connective tissue and small blood vessels containing red and white blood cells.

3- Fat cells

- are an important cellular component of adipose tissue.
- Fat cells store energy in the form of triglycerides. When the body needs extra energy, such as during fasting or increased physical activity, fat cells release stored triglycerides.



4. Skin cells,
5. Bone cells
6. Female egg cell « the female reproductive cells»
7. Sperm cells « the male reproductive cells».
8. Muscle cells
9. Nerve cells.





References



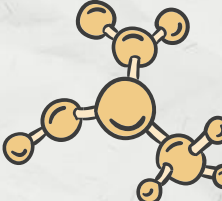
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