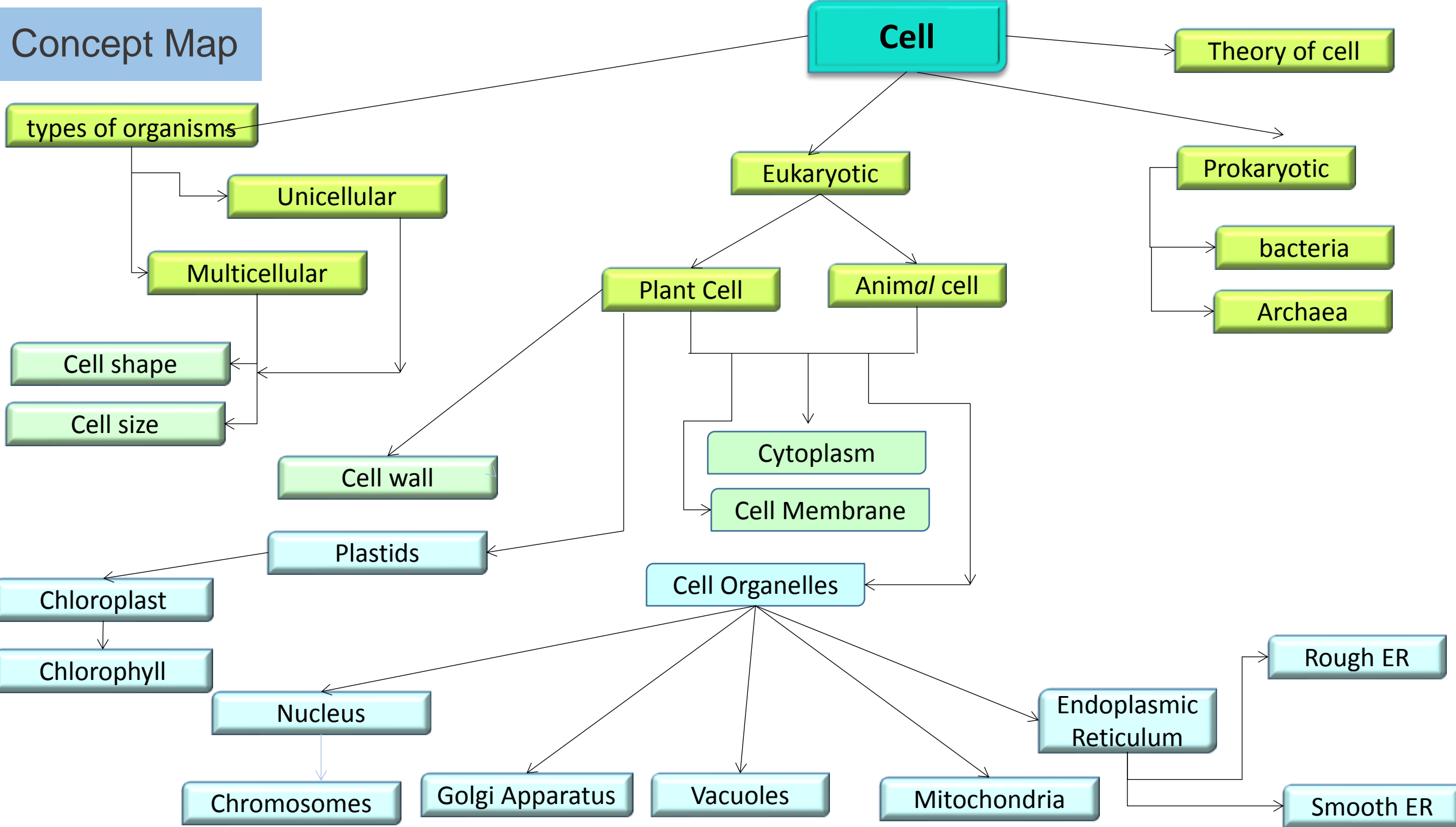


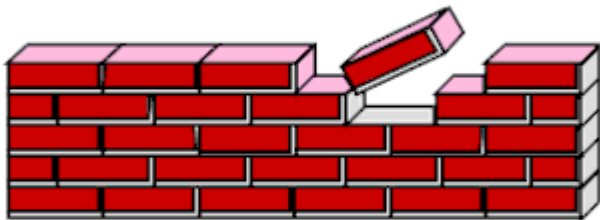
**CELL :FUNDAMENTAL UNIT OF LIFE**

# Concept Map

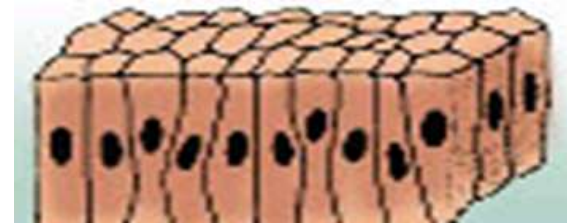




- Though the structures of buildings are different, they are made up of common structural building blocks. It means bricks.
- similarly all living things look different but they are made up of cells.
- Cell is the building block of all living organisms.
- The common basic, structural and functional unit of living beings is called as cells.



Many bricks come together to build wall.



Living things are made up of one or many cells



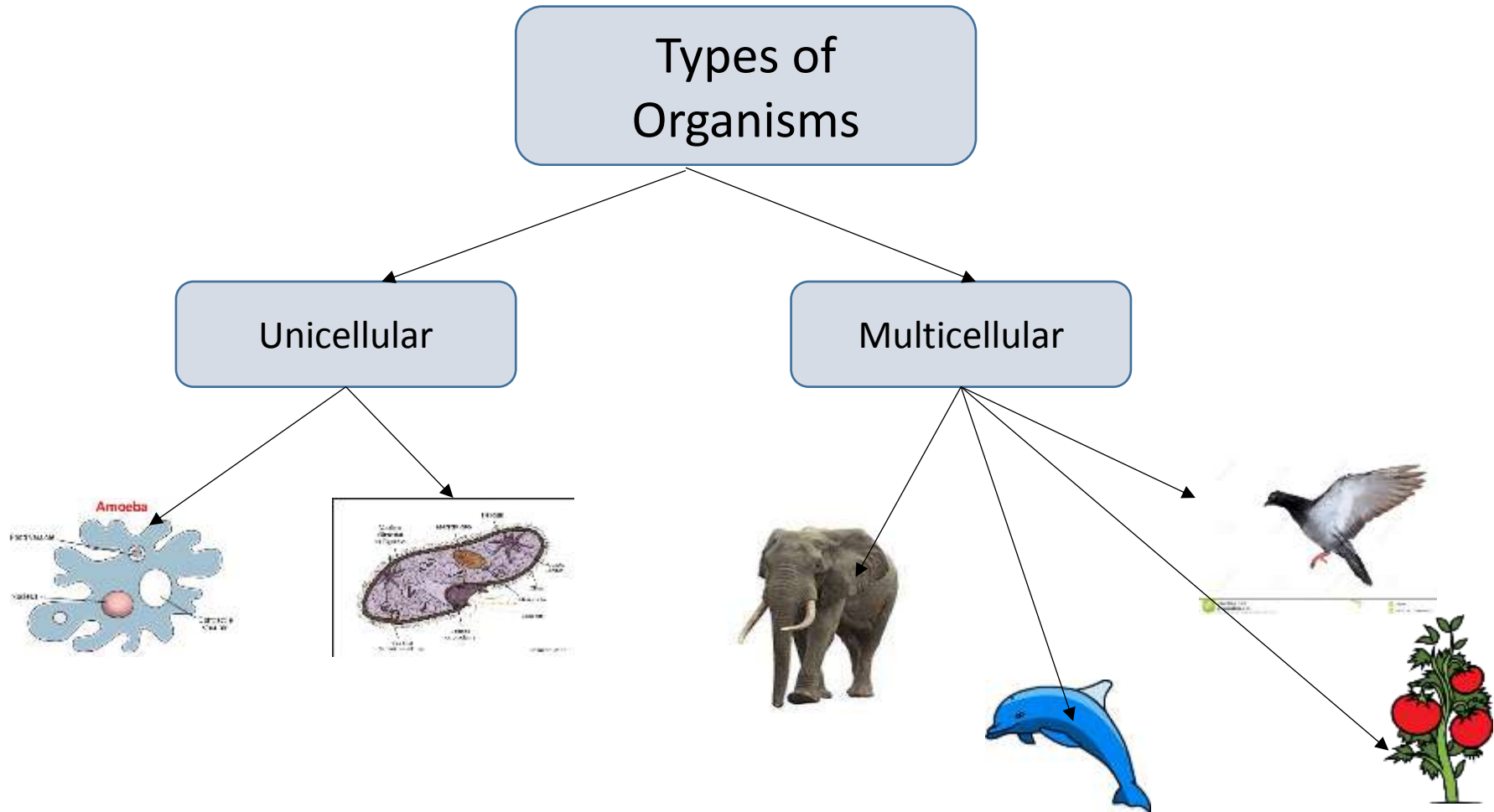




✓ Activity - Collect the information about the scientist who first discovered Cell.



# ■ Cells – How many?



<https://www.youtube.com/watch?v=qEHQbjido9I>

## ➤ Remember

- The unit used to measure size of cell is micrometer ( $\mu\text{m}$ )
- 1 Micrometer =  $\frac{1}{1000}$  millimeter

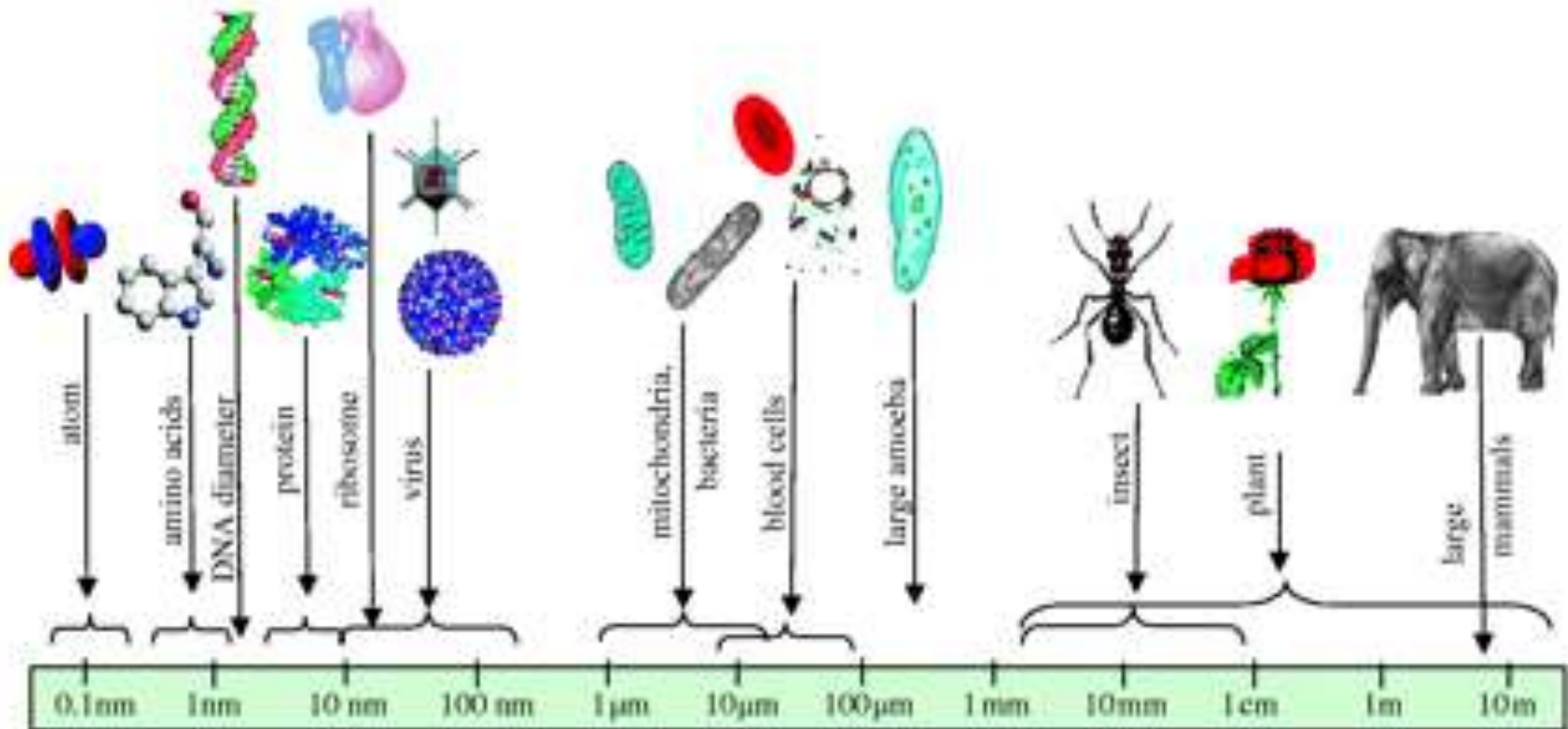
- 

$$1 \mu\text{m} = \frac{1}{1000} \text{mm}$$

- Size of cell varies greatly (0.1  $\mu\text{m}$  to 18 cm) in diameter.

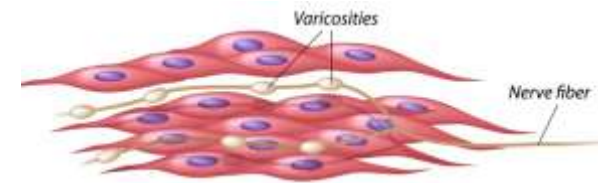
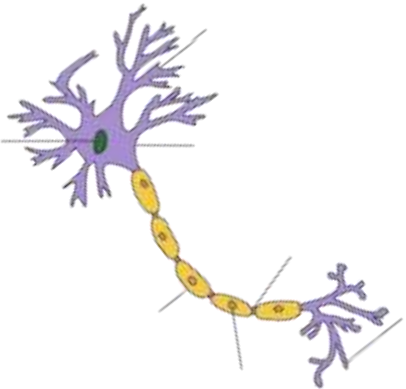
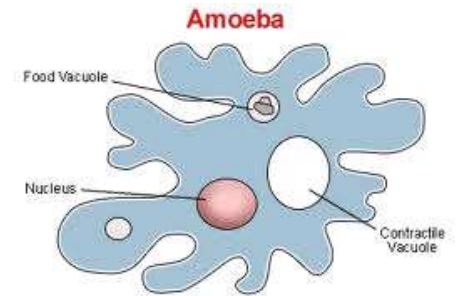
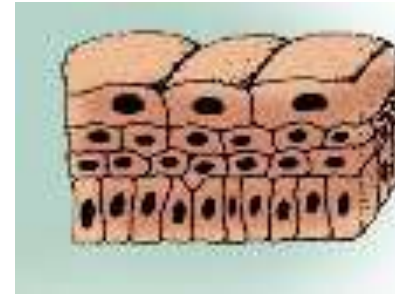
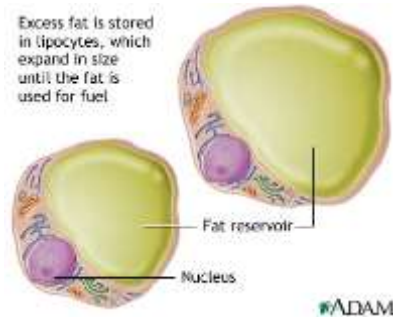


# ➤ scale of life

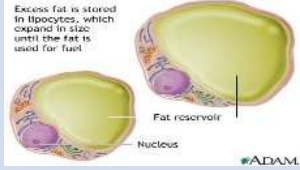
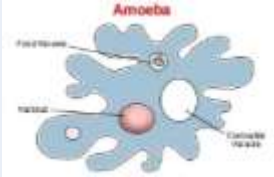
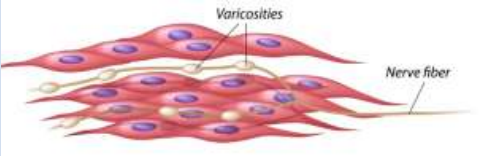

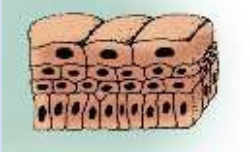







# ➤ How do cell look like?

- Following are the pictures of cell. Observe it and answer the questions.



- Match the following

Shape of cell	Examples of cell
1. Spindle Shaped	a.  <p>Excess fat is stored in lipocytes, which expand in size until the fat is used for fuel.</p> <p>Fat reservoir</p> <p>Nucleus</p> <p>ADAM</p>
2. Columnar	b.  <p>Amoeba</p> <p>Pseudopodia</p> <p>Nucleus</p> <p>Contractile vacuole</p>
3. Circular Biconcave	c.  <p>Varicosities</p> <p>Nerve fiber</p>
4. Irregular	d. 
5. Oval	e. 

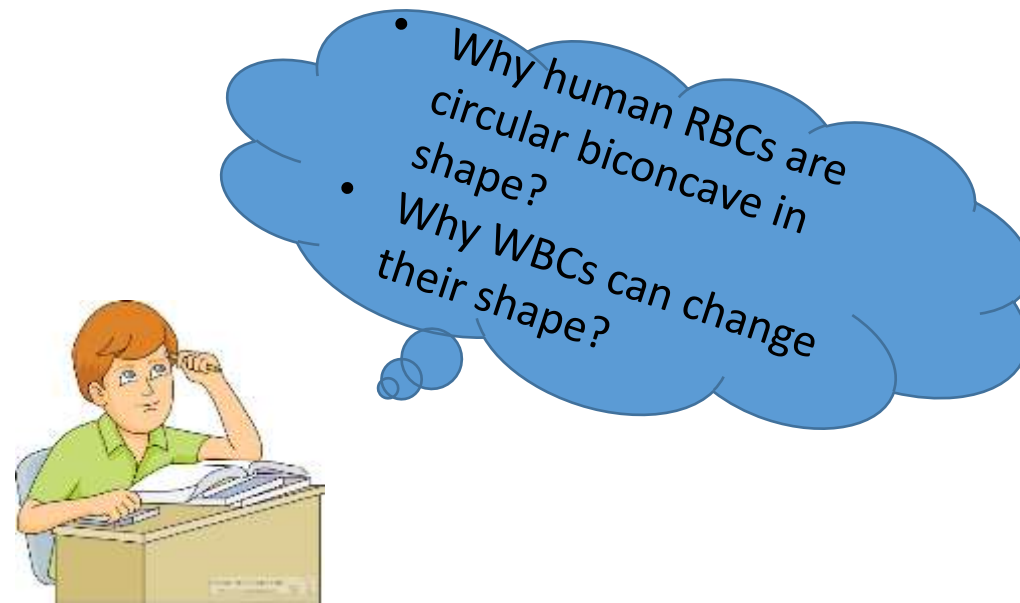
Shape of cell	Examples of cell	
6. Circular	f.	
7. Branched	g.	
8. Spiral	h.	
9. Rectangular	i.	
10. Rod shaped	j.	

➤ Why do cells have different shapes?

- Shapes of cells are related to specific function they perform.

➤ Why human body has cells of different shapes and sizes?

- The shape and size of the cells depend upon the function they perform. In a human body, each organ performs a specific function, hence the cells of different organs have different shapes and sizes





- **Why human RBCs are circular biconcave in shape?**

- Ans. RBCs are circular biconcave in shape ,they are elastic as they can pass through any small capillaries making the blood flow easy.

- **Why WBCs can change their shape?**

- WBCs have the ability to change their shape that helps them to go through the walls of blood vessels and between other cells as they are primarily responsible for fighting foreign organisms that enter the body.

## ➤ Structural Organization of a Cell

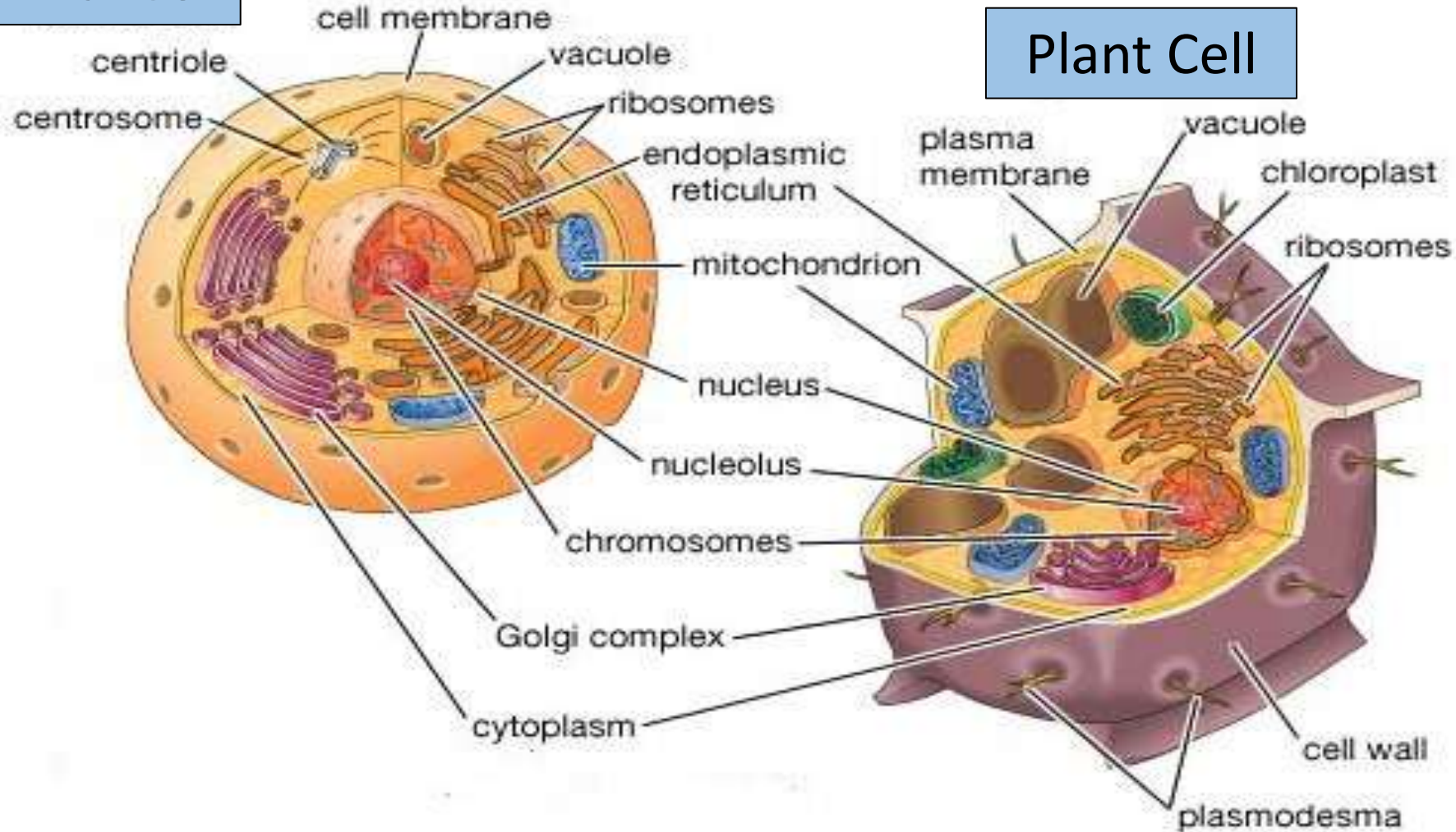
- Each thing has a specific structure. Each part in structure is designed for specific function.
- For example: Bicycle
  - Bicycle has two wheels, spokes, brake cable, chain, handle bar, front brake, rear brake, seat and much more.
  - Each part has specific function to perform.
- Similarly each cell has different parts or components which performs specific functions in a cell.
- Example : cell membrane - exchange of material, Ribosomes - synthesis of protein etc.



# ➤ Animal cell and Plant cell

## Animal Cell

## Plant Cell





## Exercise

- Observe previous slide carefully.
- watch given link on previous slide carefully.
- Compare animal cell and plant cell.
- Write similarities and differences in table form on following points:
  - Cell Shape
  - Cell Wall
  - Cell Membrane
  - Nucleus
  - Vacuole
  - Plastids
  - Chloroplast
  - Endoplasmic Reticulum
  - Ribosomes
  - Mitochondria



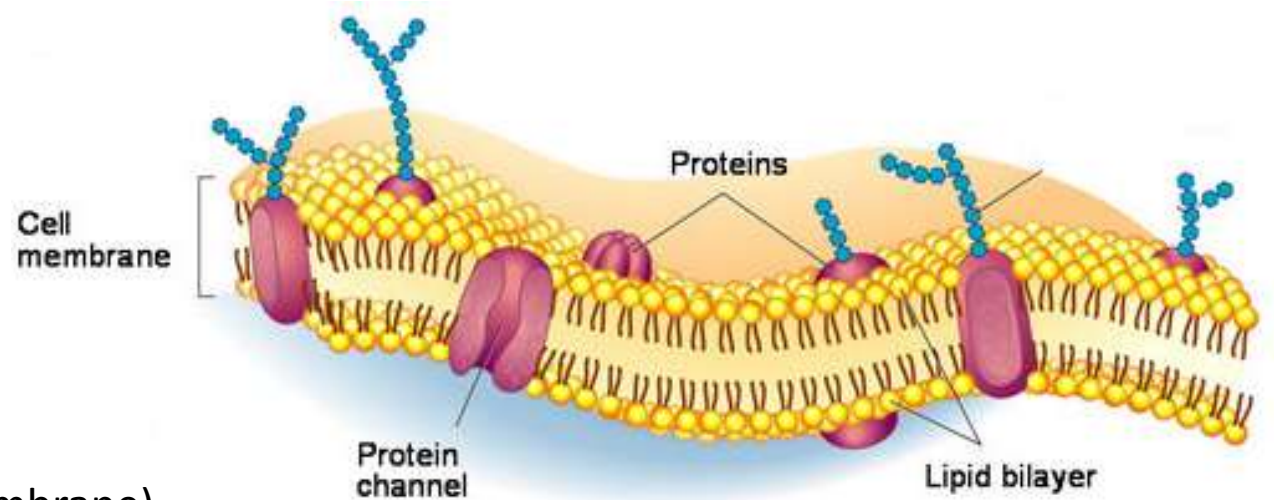
# Cell Structure

- These are parts of cell:
  1. Cell membrane(plasma membrane)
  2. Cell wall
  3. cytoplasm
  4. Cell Organelles



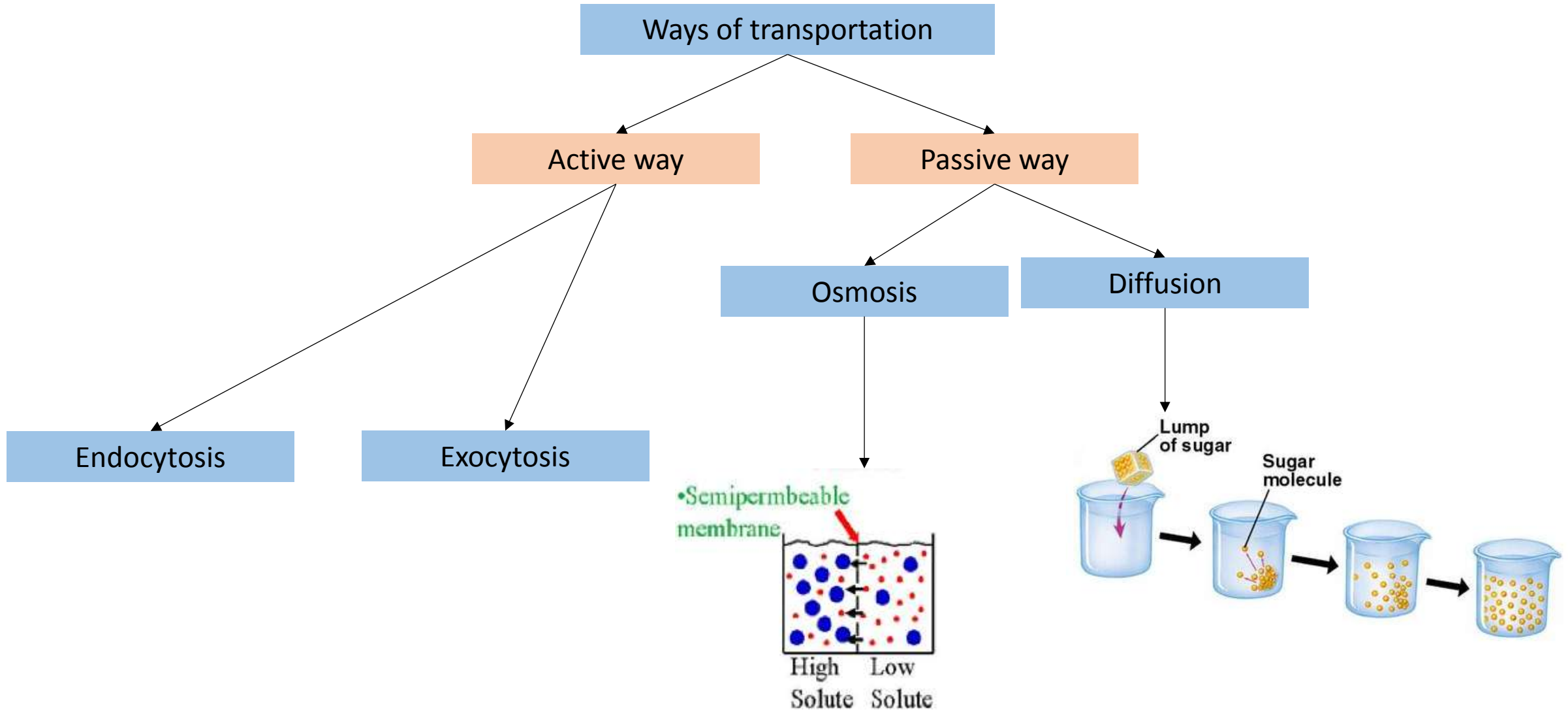
# ➤ Cell membrane/Plasma membrane

- Cell membrane or plasma membrane is outermost elastic covering of cell. It is made up of lipids and proteins.
- It is called as selectively permeable.



- What is the meaning of 'selectively permeable'?
- Selectively permeable means it permits(plasma membrane) the entry and exit of some material in cell and also prevent the other materials to do so.
- Find out which material enters, remains and leaves the cell through cell wall.

# ➤ How does the transportation in cell membrane work?

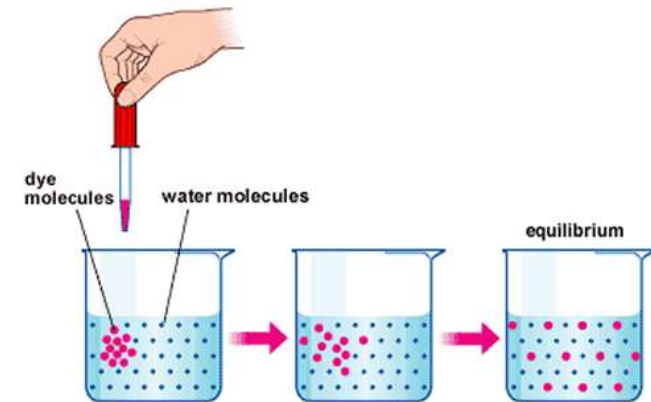


## ➤ Let's do some activity to understand Osmosis and diffusion:-

- Activity for osmosis:-
- children can do this activity at home.
- A potato, salt, water (if you have distilled water, that kind is best), Two glasses.
- **Procedure:**
- Fill two glasses with water
- In one of the glasses add 2-3 tablespoons of salt, and stir it
- Slice up a potato into long thick pieces
- Make your observations on these pieces: pay attention to color, how flexible it is, smell, etc.
- Take a guess about how you think these slices might change by putting them into the salt water and plain water
- Dunk the pieces in the water, and then let them sit for 1-2 hrs.
- Remove the pieces onto a plate and make your final observations



- Activity for diffusion:
- **Materials:**
- Any food colour , One glass of tap water, one glass of hot water, Two glasses or beaker.
- **Procedure:**
- Fill one glass with regular tap water and other glass with hot water.
- In one glass with regular tap water add colour
- In other glass with hot water, add colour.
- Observe it and write down observations.
- Watch following link



<https://www.youtube.com/watch?v=VY0mZUDvbH4>

➤ Answer the following questions:

▪ What is the difference between osmosis and diffusion?

▪ What is the role of cell membrane in osmosis?

▪ What is the meaning of Endocytosis and exocytosis?

▪ How does substance like CO<sub>2</sub> move in and out of cell? Discuss with friends.

▪ How does amoeba obtain its food?



# Cell Wall:

## Structure :

- cell wall is present only in plant cell.
- Cell wall is additional rigid outer covering in addition to plasma membrane.
- Cell wall is made up of cellulose.
- The plant cell wall consists of three layers. Each layer has its own unique structure and function.
- Cell wall is freely permeable. What is the meaning of freely permeable? Find it out.\*

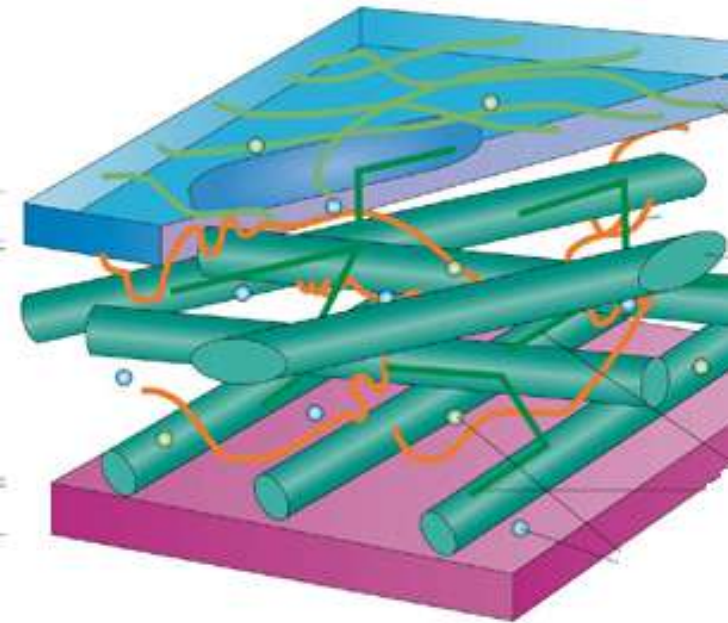
## Function:

- Cell wall gives the cell a definite shape and structure.
- It Provides structural support and separates interior of the cell from the outer environment.
- It prevents water loss.
- It prevents the cell from rupturing due to turgor pressure.

Middle Lamella

Primary wall

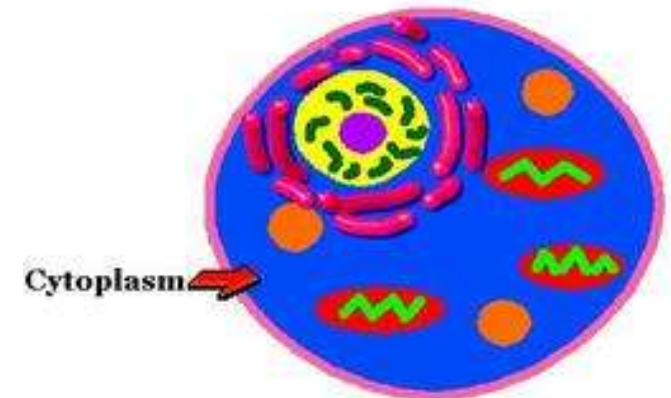
Plasma membrane



- Why there is difference between cell walls of mango tree and marigold tree? Find out.

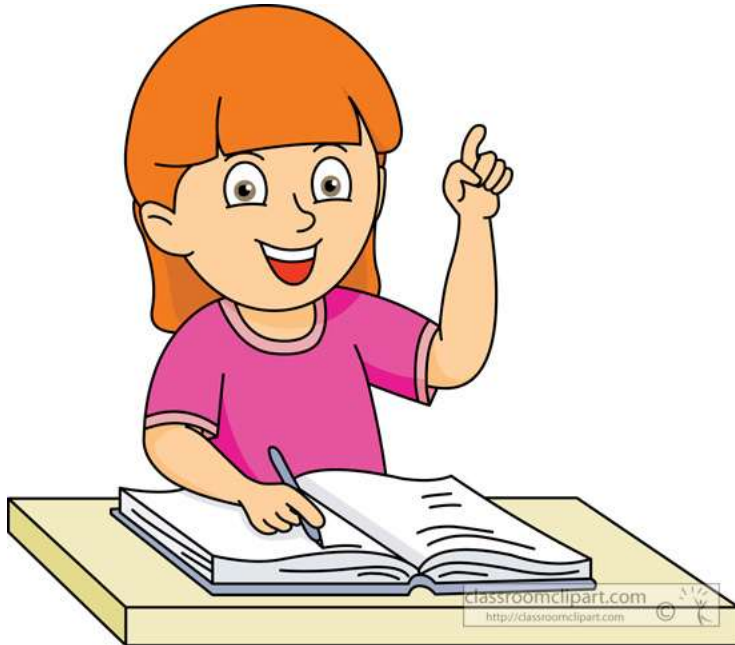
## ➤ Cytoplasm:

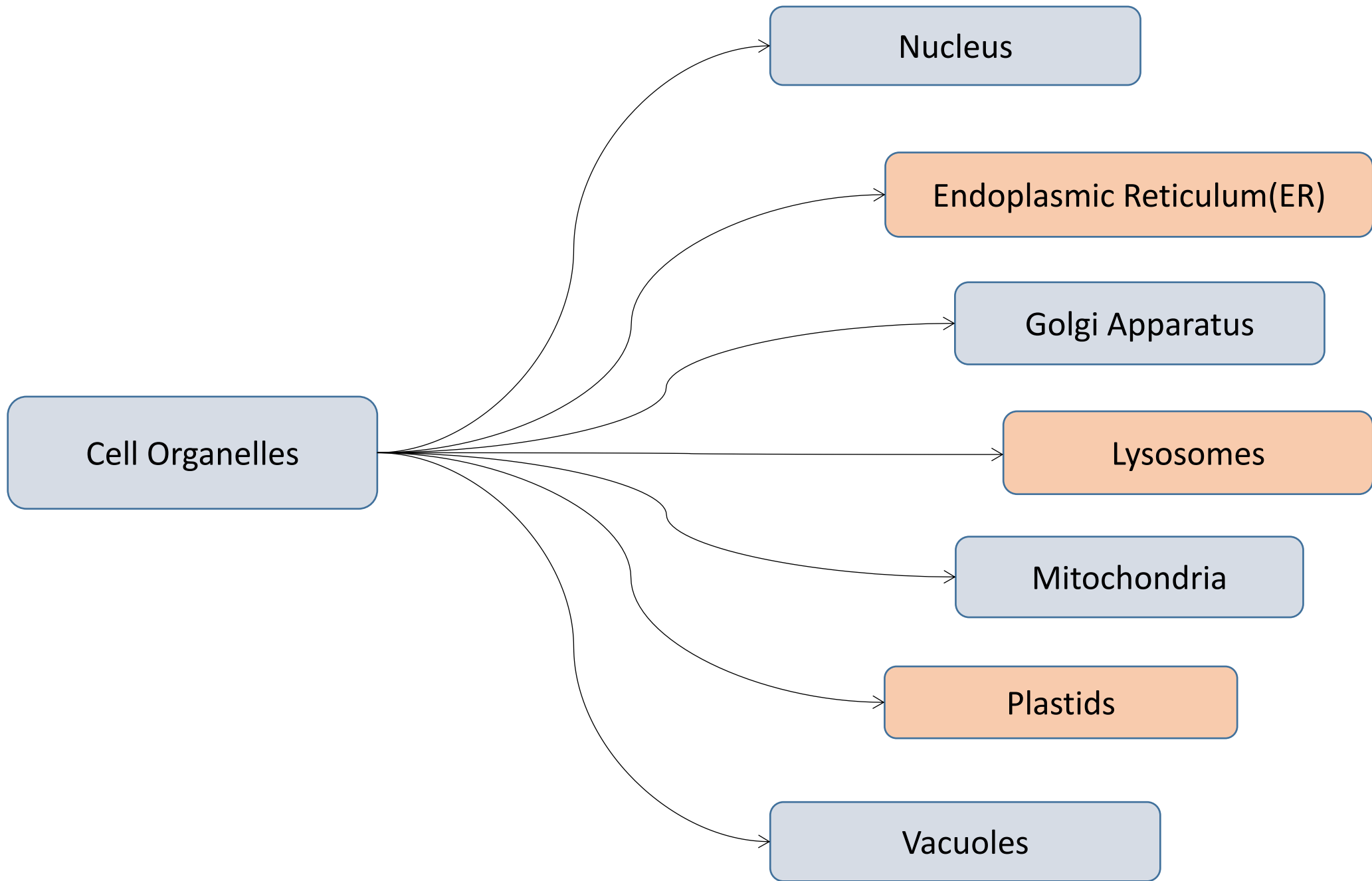
- Structure:
  - It is a jelly-like substance and it is made up of eighty percent water and is usually clear and colorless.
  - Cytoplasm is a thick gel-like fluid substance that fills the space between the cell membrane and the cellular organelles.
  - The part of cytoplasm other than organelles is called cytosol.
- Function:
  - The cytoplasm is a substance where the cell expands and growth of the cell takes place.
  - It is the site of most of the biochemical reactions.



Did you  
Know

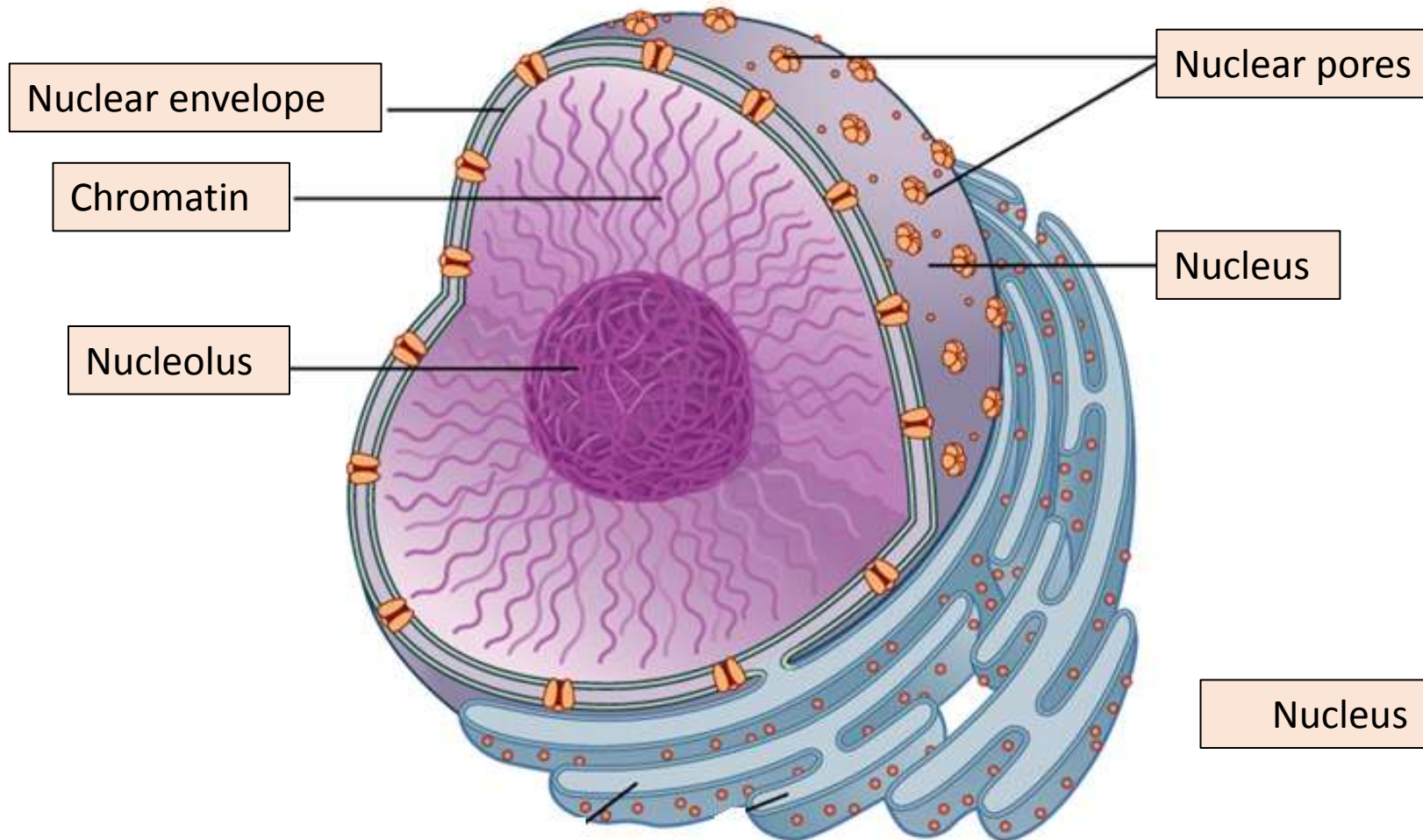
- Each Cell Organelle is a specialized subunit within cell with specific function
- Membrane of each organelles helps to keep its activities separate.
- All organelles are seen with the help of electron microscope except nucleus and chloroplast



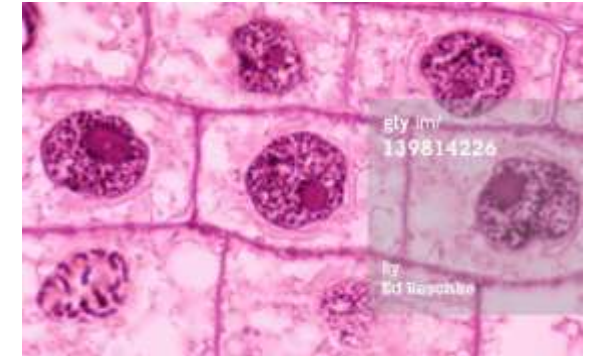




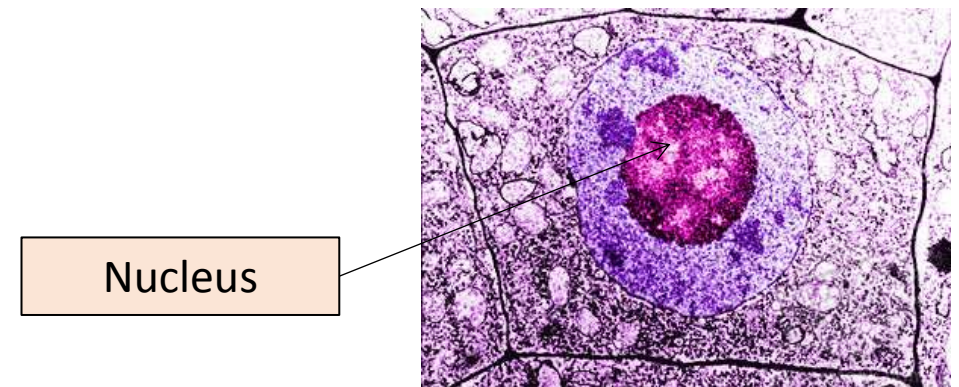
# Nucleus



#



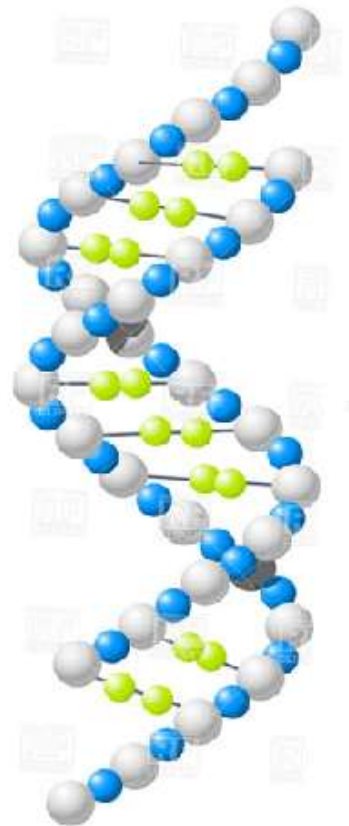
Stained onion peel





# What is DNA?

- Find out What DNA stands for what?



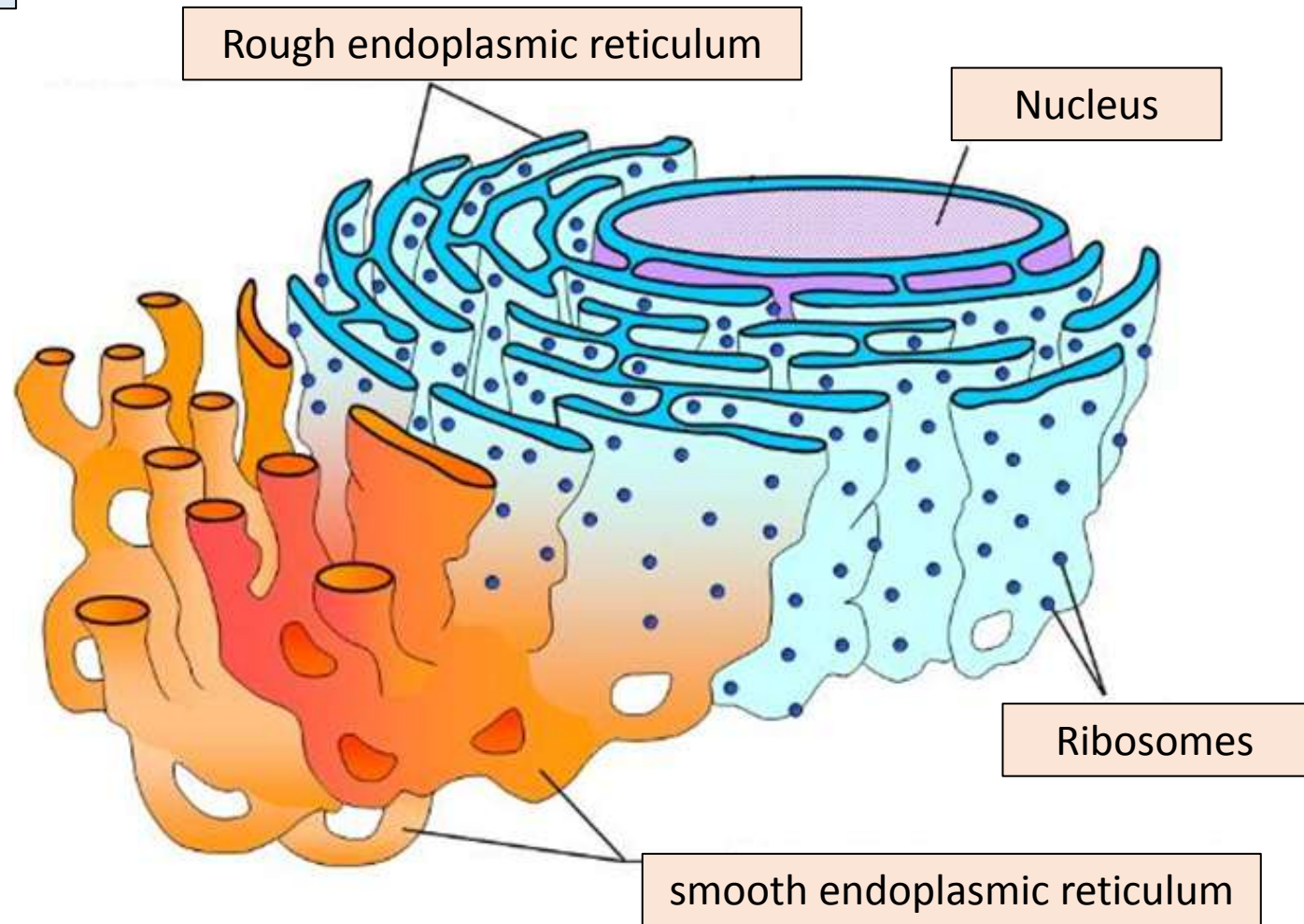
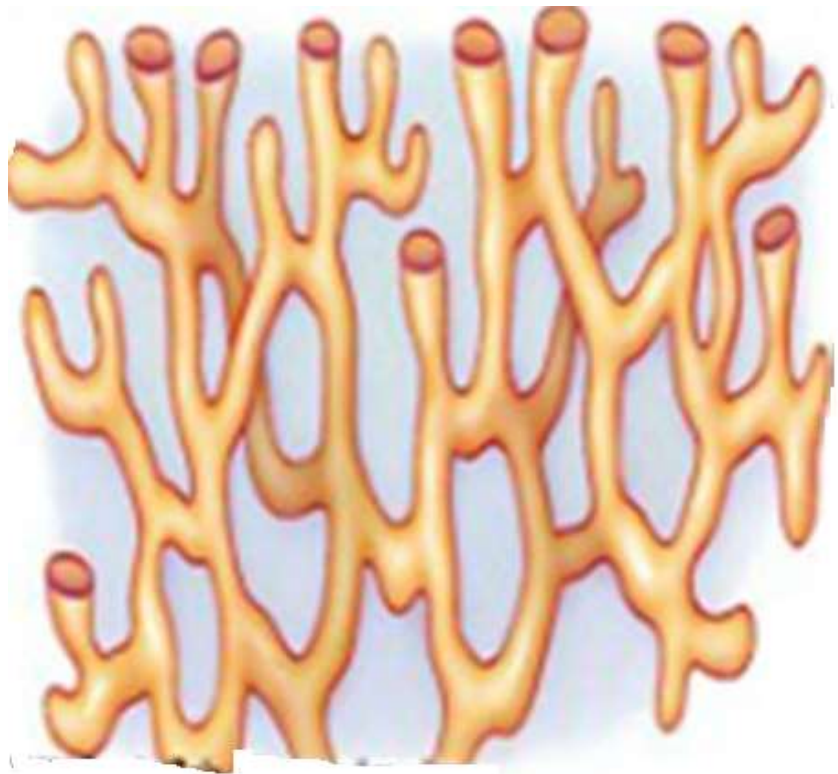


➤ Observe both the pictures and write its use/function



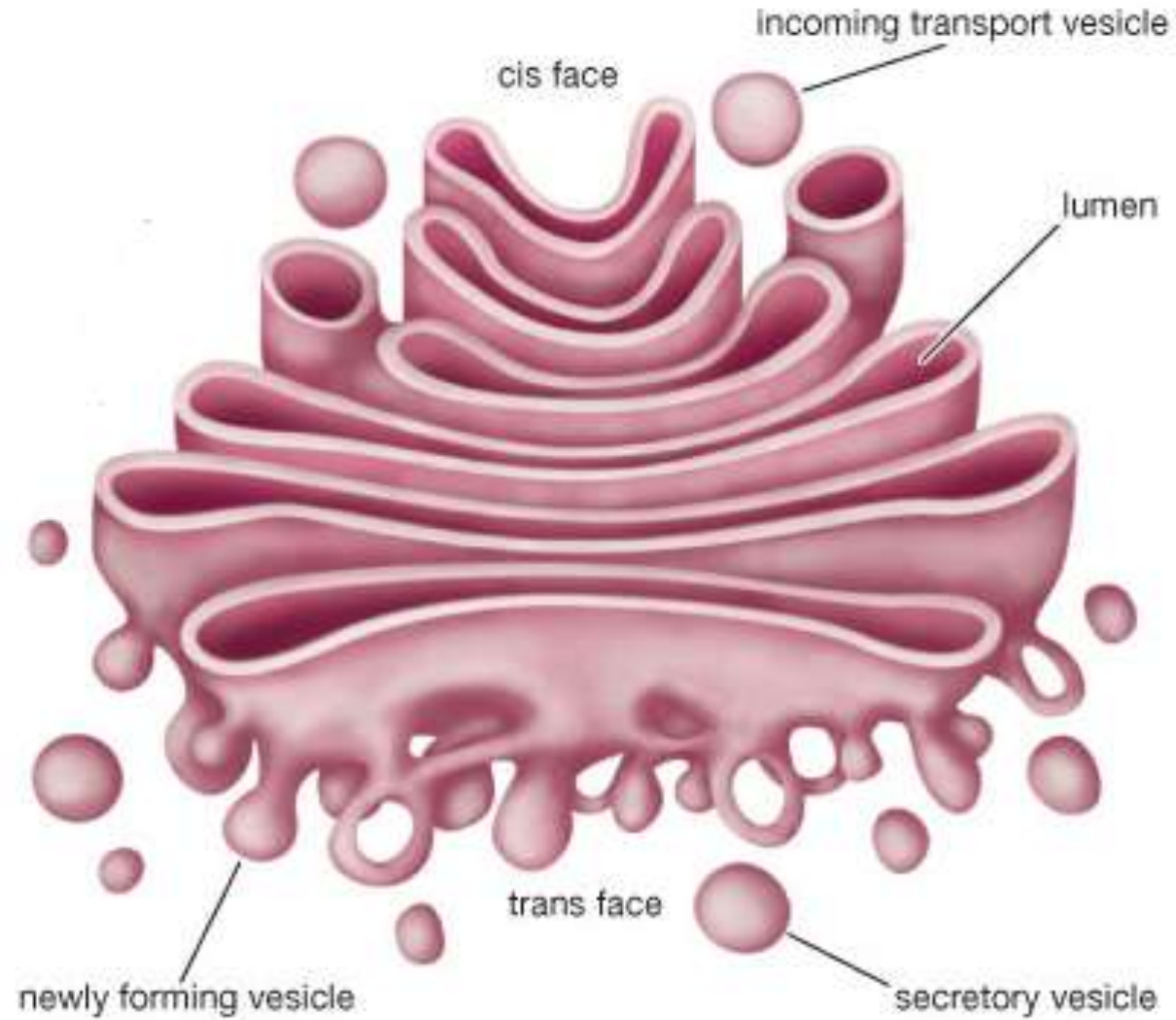


# Endoplasmic Reticulum



- Find out the functions of Endoplasmic Reticulum.

➤ Golgi Apparatus(Golgi Complex)



➤ Answer the following questions:

▪ Who described Golgi apparatus first?

▪ List out functions of each parts of Golgi apparatus.

▪ What is the role of enzymes in living [organisms](#)?



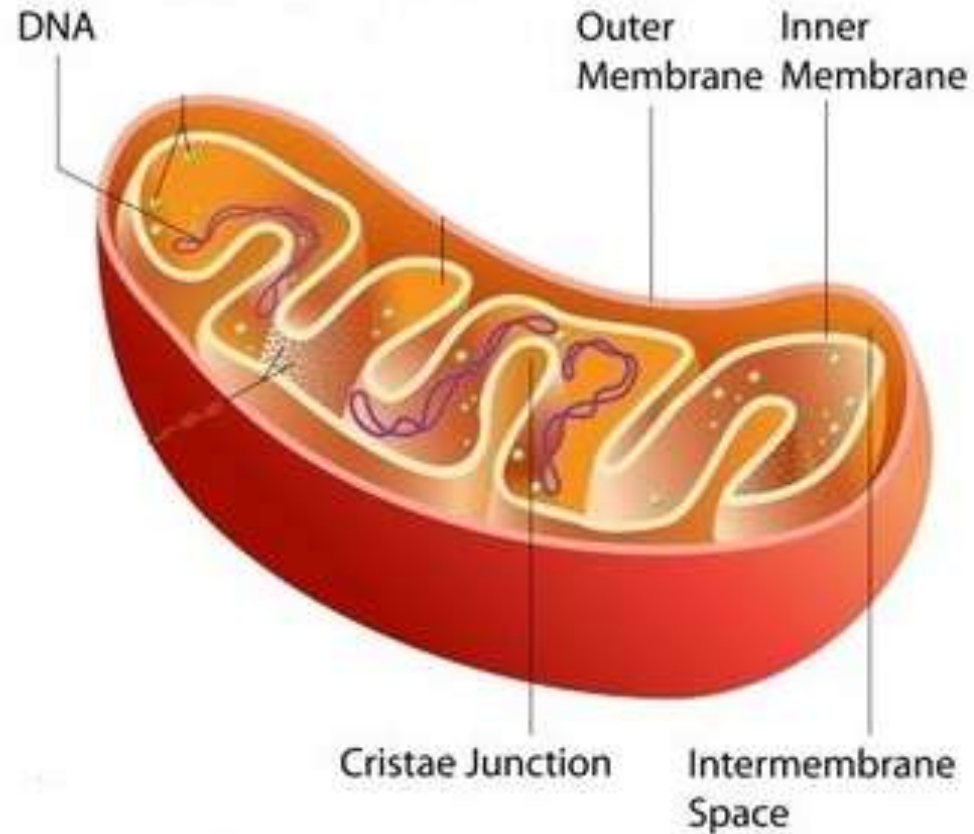
- Does our body need energy to perform different task?

- How does body get energy?

- Does the cell also need energy?



# Mitochondria : The Powerhouse of cell



Mitochondria are able to make their own **proteins** as they have their own DNA and Ribosomes

Did you  
Know?

RBCs do not have mitochondria.

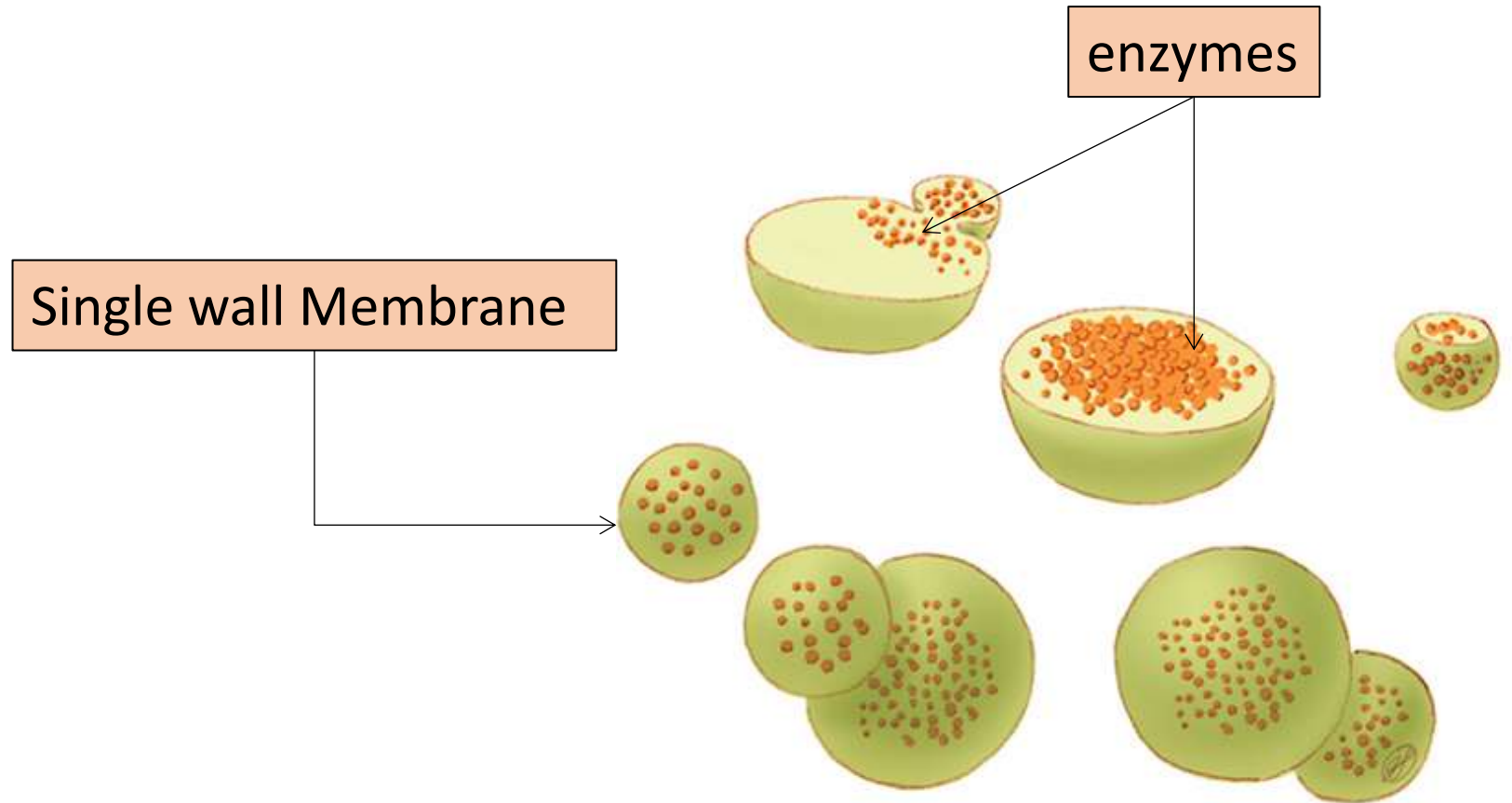
Muscle cells have more mitochondria.

Find out why RBCs don't have mitochondria?

Find out muscle cell have more mitochondria?



# ■ Lysosomes:

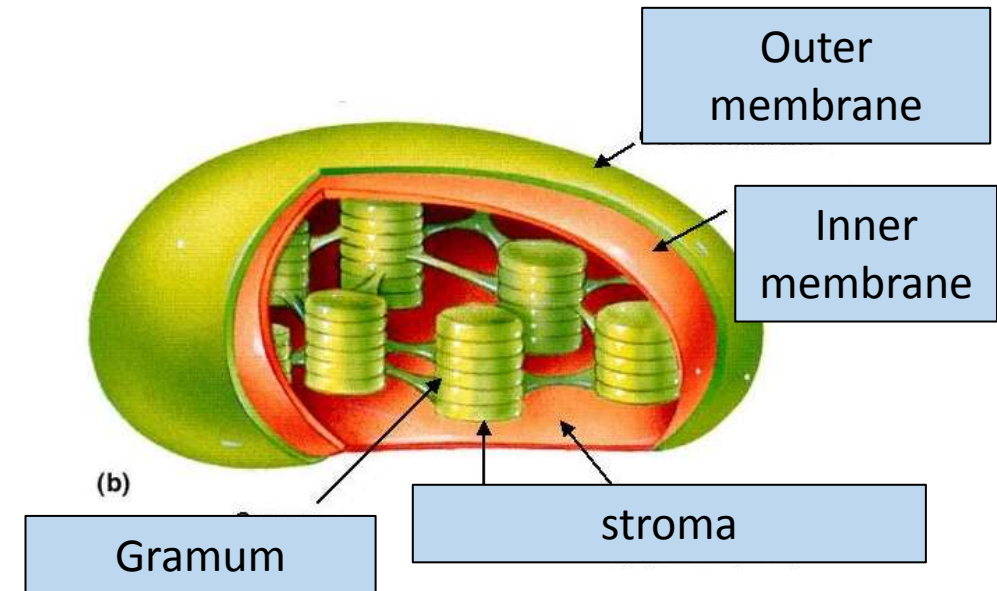
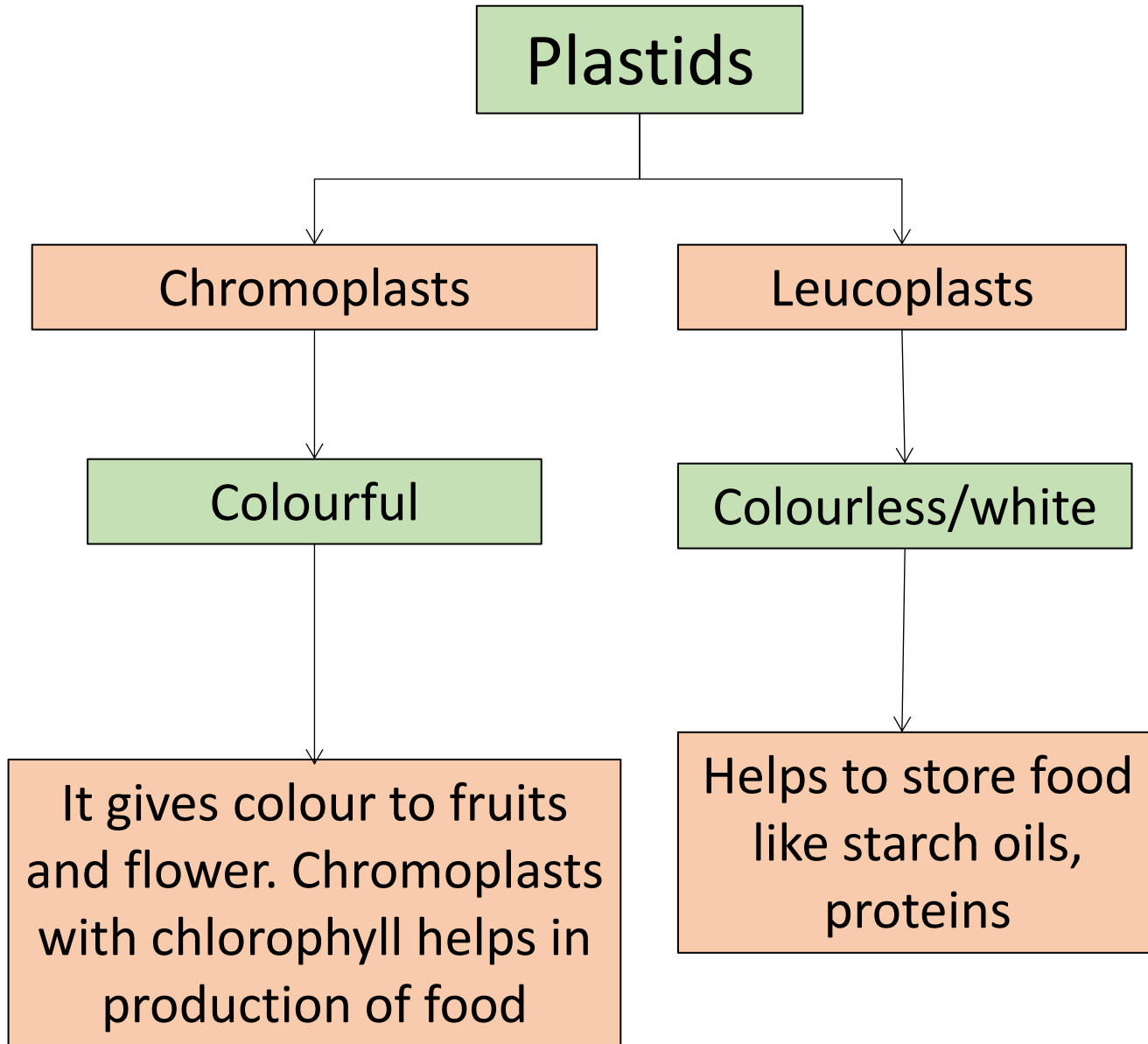


- [http://highered.mheducation.com/sites/9834092339/student\\_view0/chapter4/lysosomes.html](http://highered.mheducation.com/sites/9834092339/student_view0/chapter4/lysosomes.html)

# ➤ Plastids:

- Plastids are double membrane structure present only in plant cells.





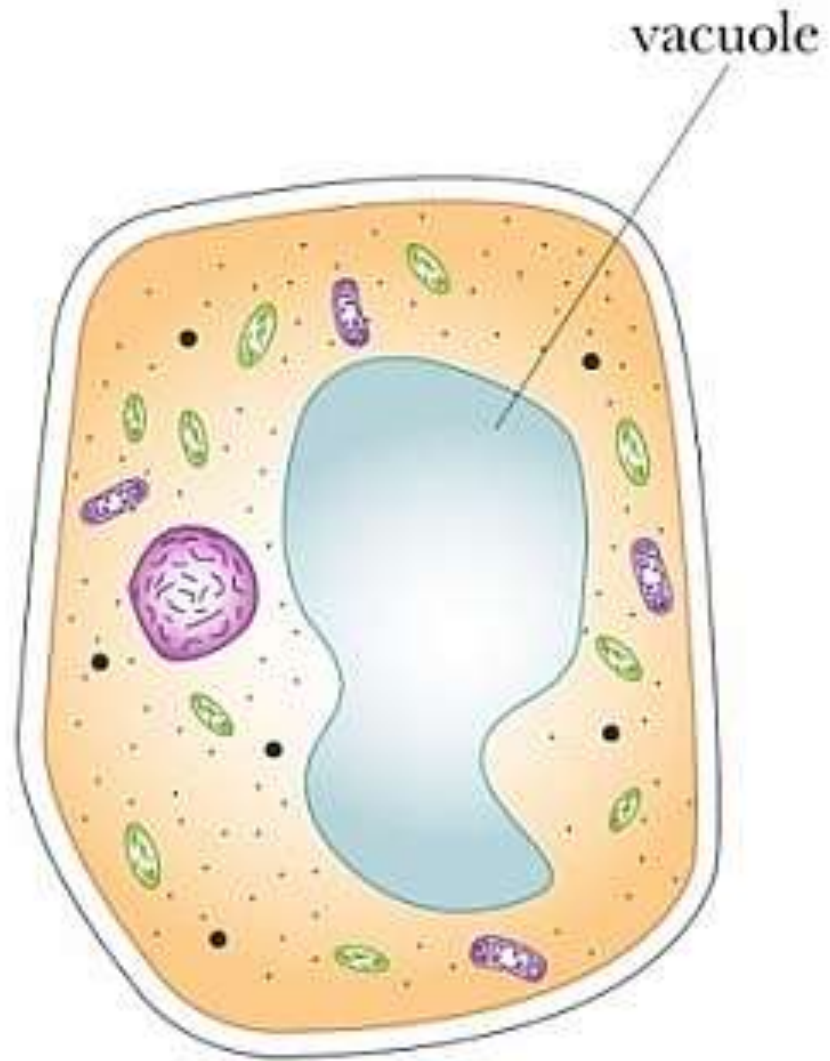
Internal Structure of chloroplast

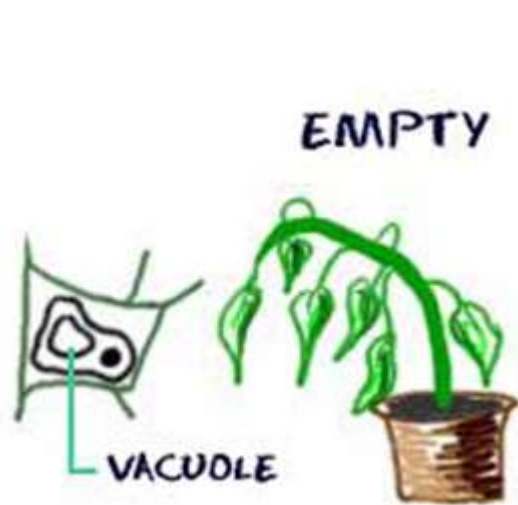
## ■ Discuss

- Which pigment from chromoplast gives orange colour to fruits?
- Raw tomato turns red. How?

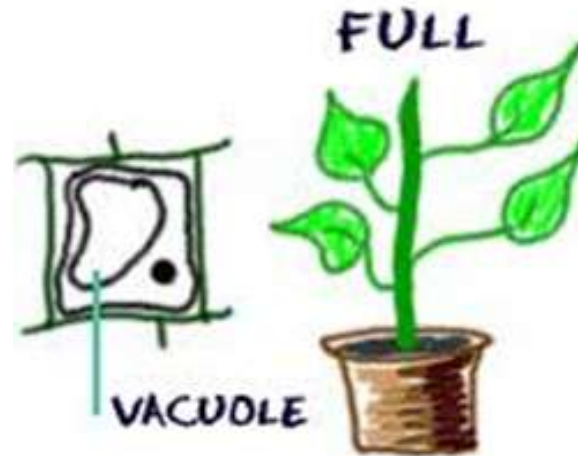


# ➤ Vacuoles





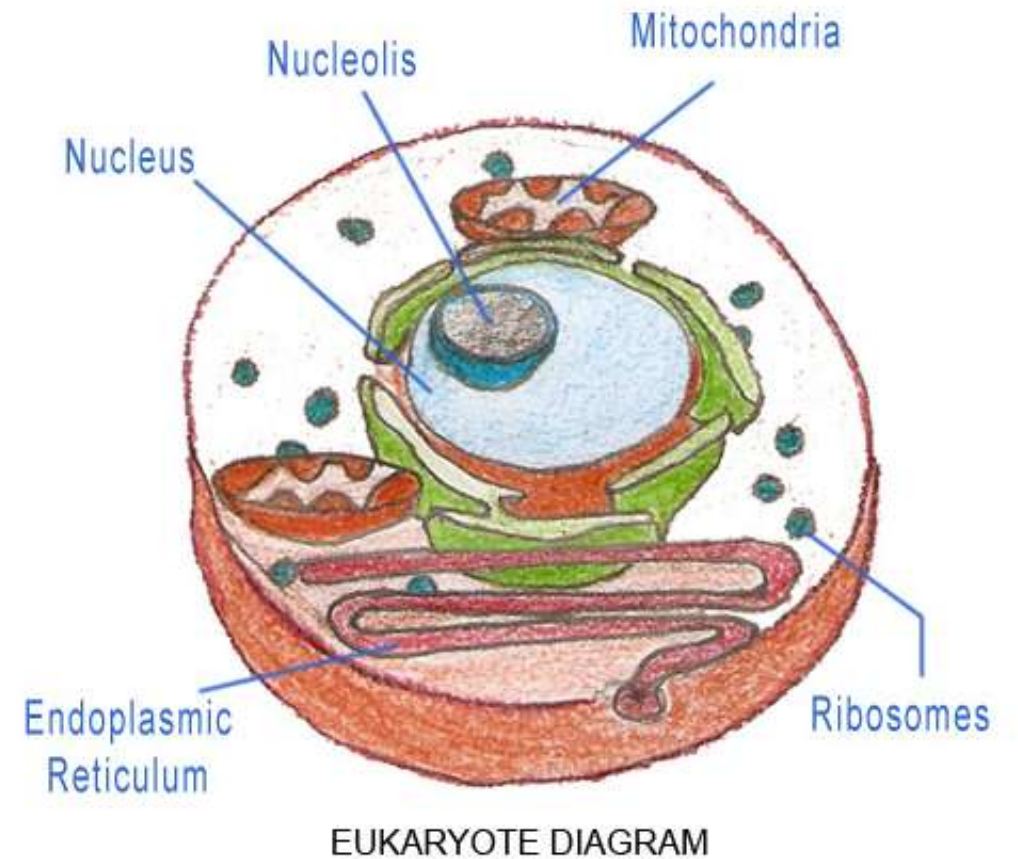
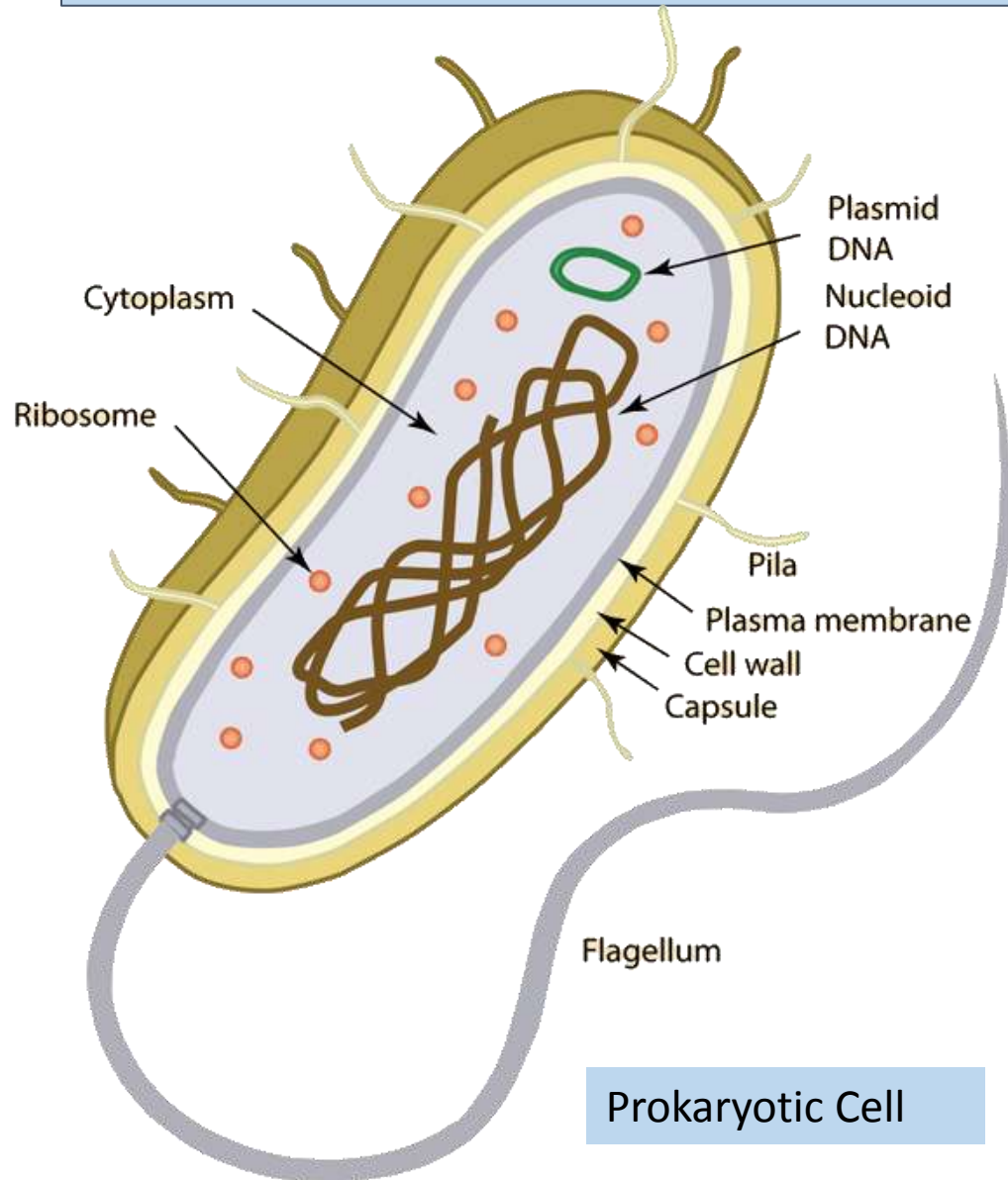
Before watering



After watering

- What are the functions of Vacuoles in plant cell?
- How Vacuoles plays an important role in animal cell?

# ➤ Prokaryotic and Eukaryotic Cells



➤ Write the difference based on following point

	Eukaryotic Cell	Prokaryotic cell
1. Size		
2. Nucleolus		
3. Chromosome		
4. Mitochondria		
5. Endoplasmic Reticulum		
6. Cell Wall		
7. DNA structure		

## Contributors to the study of cells:

Name of scientist	Year of contribution	Stage
Zacharias Jansen	1590	First invented microscope
Robert Hooke	1665	Discovered dead cells from cork
Leeuwenhoek	1674	First observed living cells of bacteria, sperm, and protozoan.
Robert Brown	1831	Demonstrated the presences of nucleus in the cells
Johannes Purkinje	1839	Named the fluid content of the cells as protoplasm.

# Assessment

➤ Fill in the Blanks with appropriate option

1. \_\_\_\_\_ are the sites where proteins are synthesized.

A) Golgi Apparatus

B) Nucleus

C) Lysosomes

D) Ribosomes

2. The outer membrane of mitochondria is \_\_\_\_\_.

A) deeply folded

B) porous

C) transparent

D) thick

3. Cisternae are filled with different \_\_\_\_\_.

A) enzymes

B) cells

C) matrix

D) vacuoles

4. Nucleus, plastids and \_\_\_\_\_ have double membrane covering around them.

A) Golgi Apparatus

B) ER

C) mitochondria

D) Vacuoles

5. Cells are enclosed by a \_\_\_\_\_ composed of lipids and proteins.

A) plasma membrane

B) cell wall

C) cytoplasm

D) sugar



# Match the following :

A	B
1. Powerhouse of cell	RBCs
2. Longest cell	Ribosomes
3. Cell without Nucleus	Mitochondria
4. Suicide bags of cell	Human nerve cell
5. Protein factory	Lysosomes

```
graph LR; A1[1. Powerhouse of cell] --> B3[Mitochondria]; A2[2. Longest cell] --> B4[Human nerve cell]; A3[3. Cell without Nucleus] --> B1[RBCs]; A4[4. Suicide bags of cell] --> B5[Lysosomes]; A5[5. Protein factory] --> B2[Ribosomes];
```

## ➤ Guess who am I?

▪ I help to transfer the material from nucleus to the cytoplasm.

Nuclear Membrane

▪ I control all the activities of cell.

Nucleus

▪ I give colours to fruits, flowers, leaves and vegetables.

Plastids

▪ I oxidize carbohydrates and fats in cell with the help of enzymes.

Mitochondria

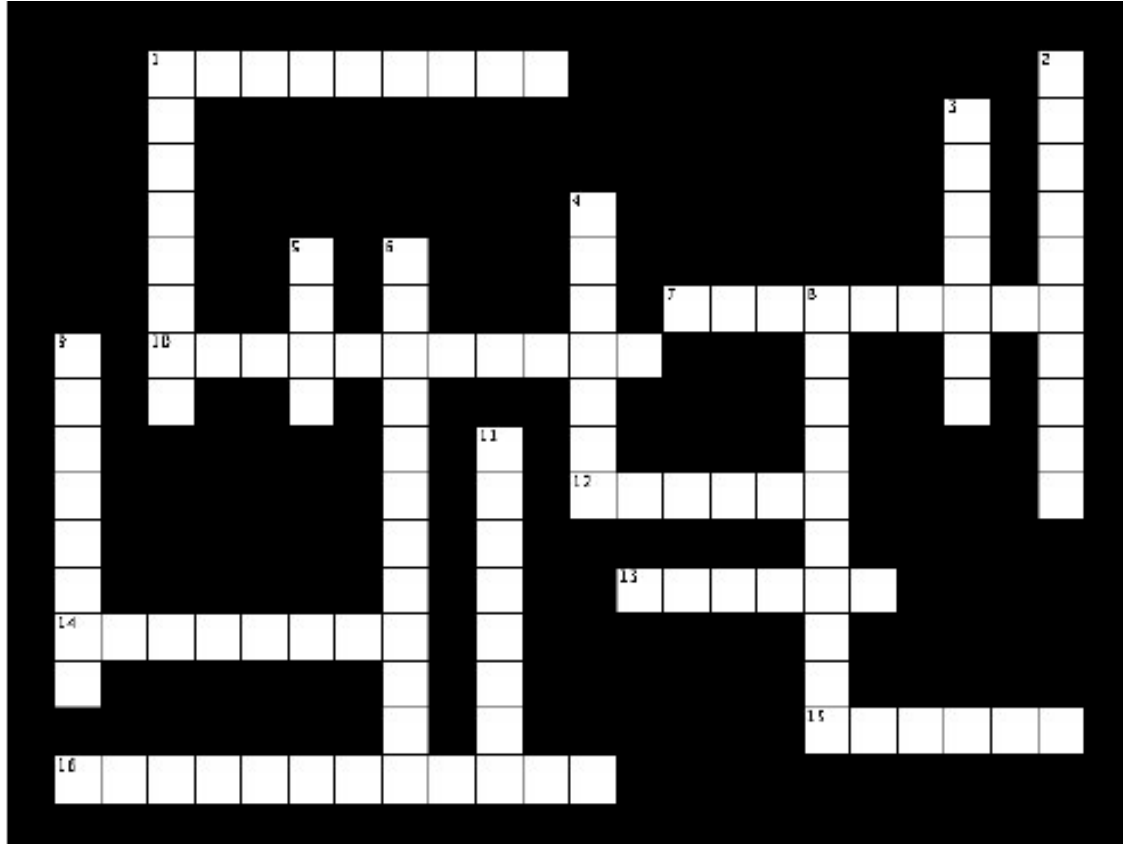
▪ I invented first microscope in 1673.

Anton Van Leeuwenhoek

## ➤ Project work

- Collect information about scientist who invented first microscope.
- Draw a family tree and note down similarities in your family members and close relatives like uncle, aunt, cousins.
- Points for family tree : body posture, hair and skin colour, eating habits, interests ,strengths, weaknesses etc.

# ■ Solve the puzzle



## Across

1. endoplasmic \_\_\_\_\_
7. structure in animal cells but not plant cells
10. cytoskeletal element assembled at the centrosome
12. fluid in chloroplast
13. \_\_\_\_\_ pressure
14. organelle containing digesting enzymes
15. if not "rough", the ER is \_\_\_\_\_
16. cell power centers

## Down

1. site of protein synthesis
2. structures that distinguish eucaryotic cells
3. this "water balloon" can be very large in plant cells
4. most prominent structure in a eucaryotic cell
5. nuclear \_\_\_\_\_ : channel between nucleus and cytosol
6. a cell's "shape-shifting" machinery
8. stackable chloroplast structures
9. plant cell structure composed of polysaccharide
11. cell membrane equivalent of a "taste bud"

[http://www.cellsalive.com/puzzles/animal\\_cell\\_puzzle.html](http://www.cellsalive.com/puzzles/animal_cell_puzzle.html)

[http://www.cellsalive.com/puzzles/plant\\_cell\\_puzzle.html](http://www.cellsalive.com/puzzles/plant_cell_puzzle.html)