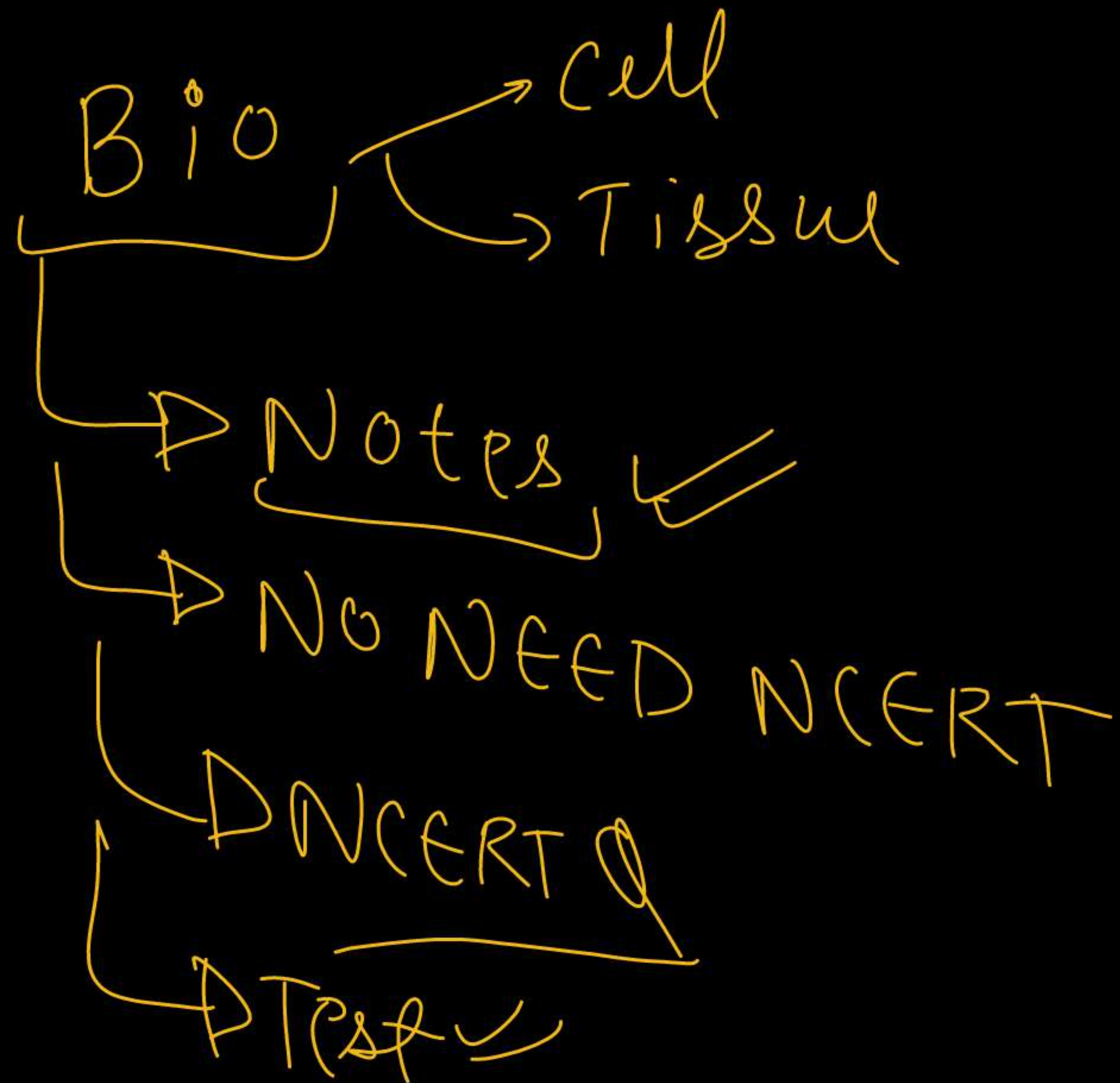


The background of the slide is a dark blue space with bokeh light effects. On the left, a large pink diagram shows the branching network of the human respiratory system. On the right, a pink diagram shows the human circulatory system, including the heart and major blood vessels. Several circular insets are placed around the central text: a yellow circle in the top right shows a pair of lungs with a bronchus; a yellow circle in the bottom left shows a human silhouette with internal organs; a pink circle in the bottom left shows a cross-section of a blood vessel with red blood cells; and a pink circle in the bottom right shows a cross-section of a large organ, possibly the stomach or intestines, with internal structures.

**CLASS 9TH**

# **THE FUNDAMENTAL UNIT OF LIFE**







Kaise ho  
sab?





# AAJ KYA PADHENGGE?

- What is Biology?
- Cell and Its History
- Cell Theory
- Types of Organisms based on number of cells
- Types of cell based on shape and size





**"YAAR BIOLOGY TOH BAHUT  
DIFFICULT LAG RAHI HAI..."**



**DON'T WORRY GUYS,  
PRASHANT BHAIYA HAI  
NA...**



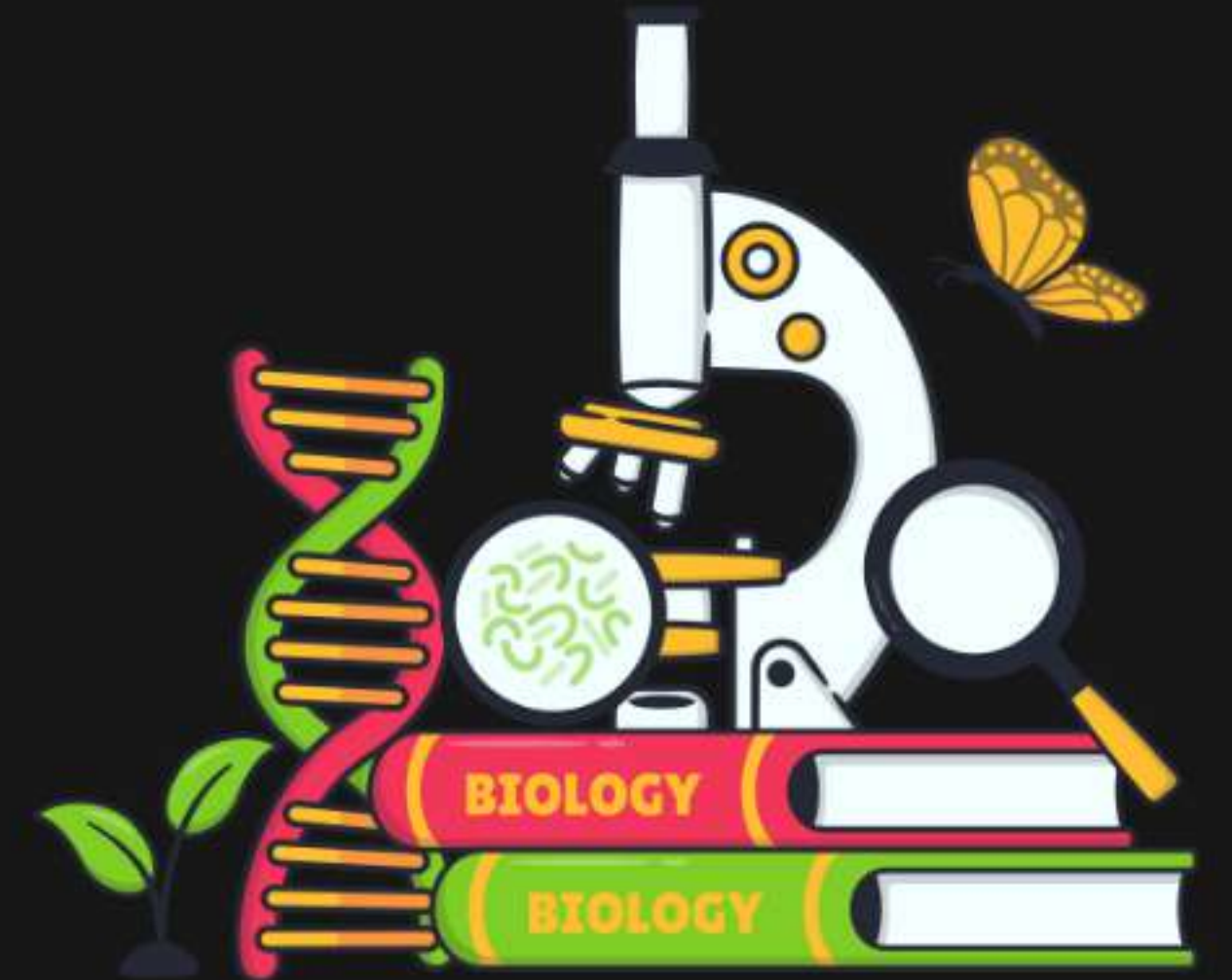


Biology comes from two Greek words:

"Bios" – meaning life

"Logos" – meaning study

So, Biology means "the study of life."





**Biology is mainly divided into three major branches:**

**Botany** – The study of plants.

**Zoology** – The study of animals.

**Microbiology** – The study of microorganisms.



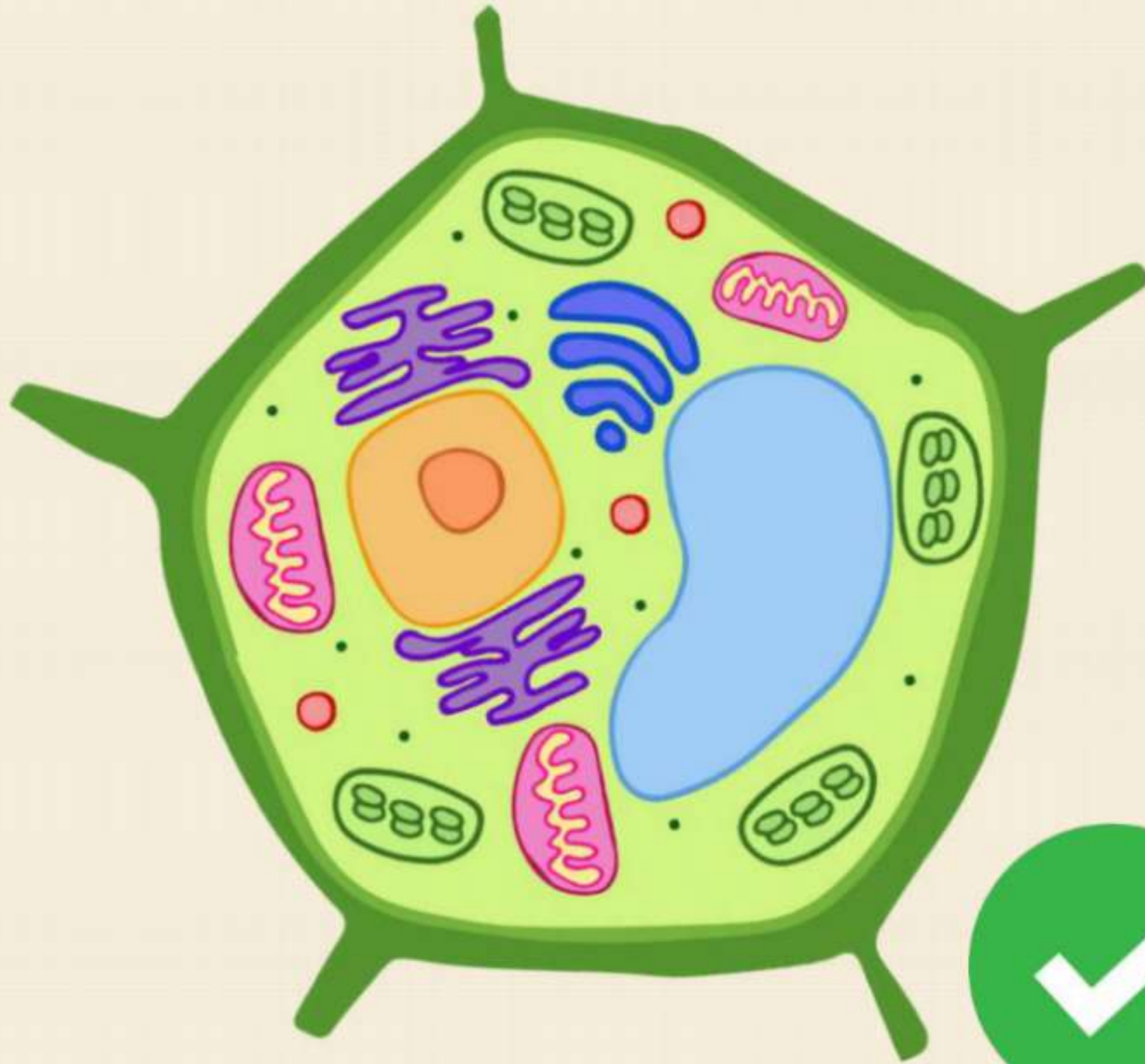


# CELL





## In Biology



## In Physics





When we see them, we  
find something in common

The Cell





✓ A cell is the smallest structural and functional unit of a living organism.

All living things are made up of cells.



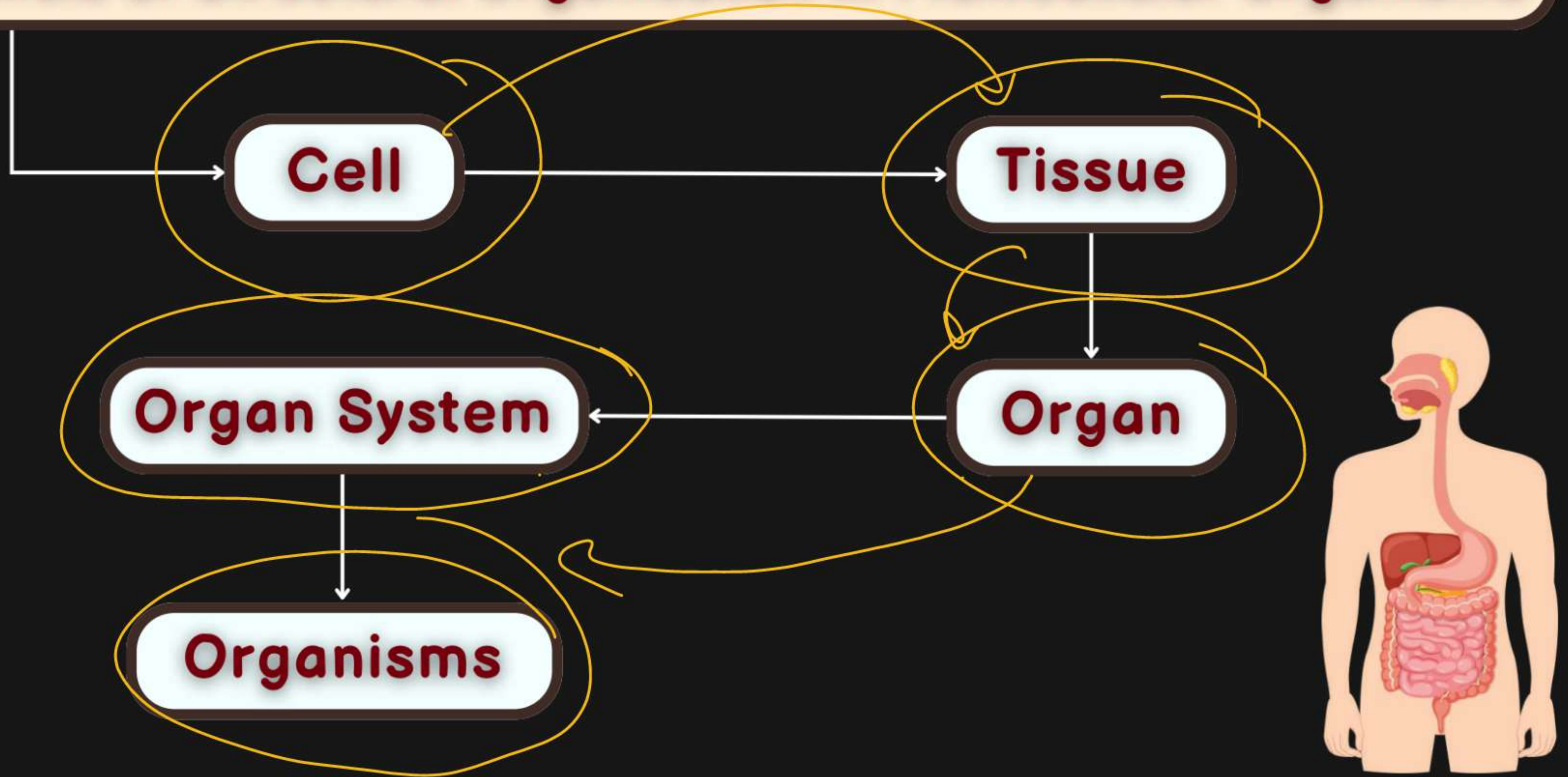
Q → Why cell is called Structural Unit?

Am I Also made up of Cells?





# Levels of Structural Organisation in Multicellular Organisms







Example: human

Example: nervous system

Example: brain

Example: nerve tissue

Example: nerve cell, also called a *neuron*

Organism

Organ System

Organ

Tissue

Cell

A bunch of organ systems working together

A bunch of organs working together

A bunch of tissues working together

A bunch of cells working together

The smallest unit of life



# Imp / DISCOVERY OF CELL

In 1665, an English scientist named **Robert Hooke** was the first to discover cells.

(Non-Living)



Hooke observed a thin slice of cork under a self-made microscope.

Hooke saw Small box-like structures that looked like a honeycomb.

Hooke named them: "Cells" (from Latin cellula, meaning small rooms).

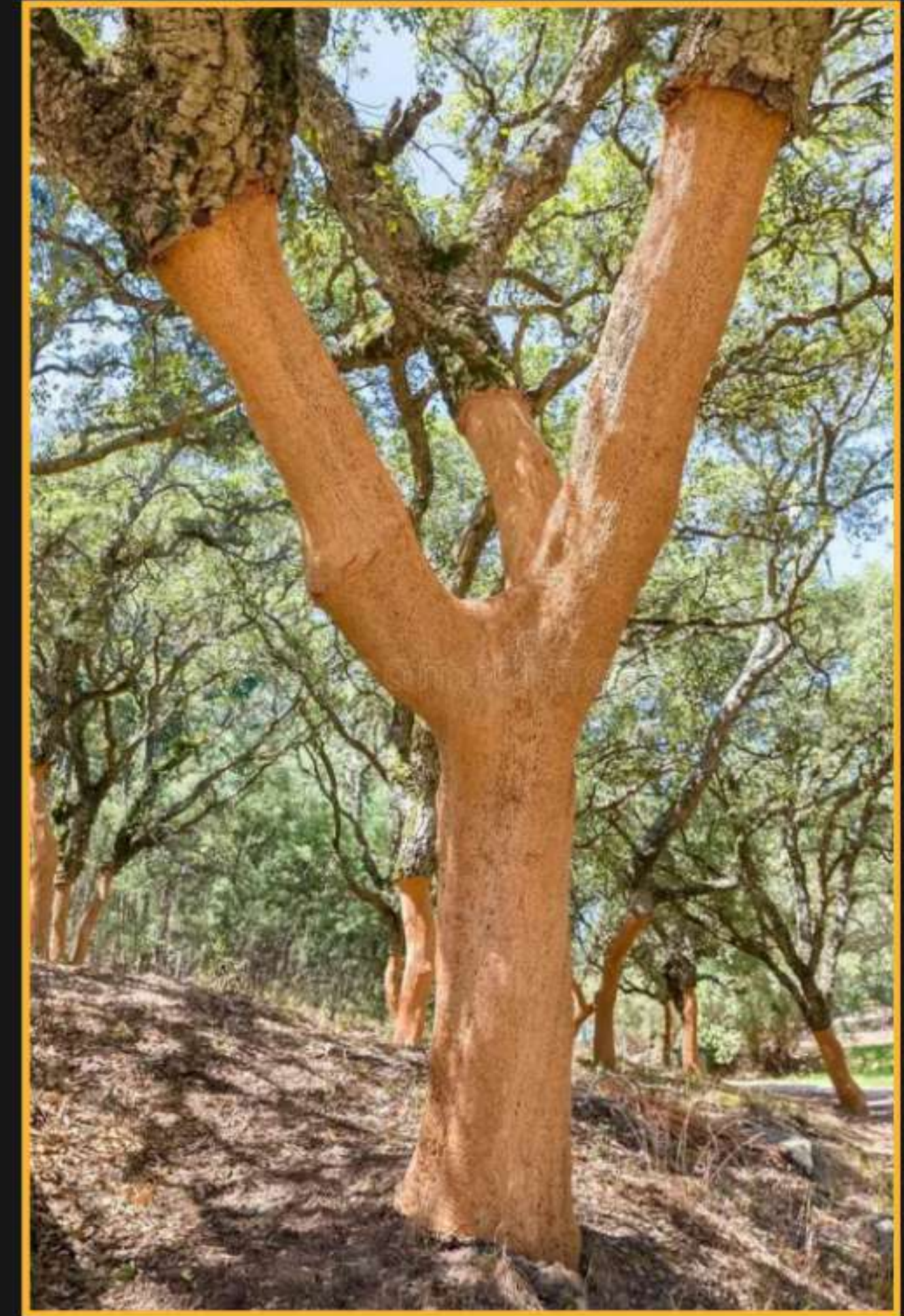
 **Note:** These were dead plant cells.





## What is cork?

Cork is a spongy, dead tissue found in the outer bark of trees, especially the cork oak tree.





WHEN SOMEONE ASKS ROBERT HOOKE ABOUT THE LIVING CELL:

HE WILL BE LIKE:



Apneko kya maalum bhai?



# DISCOVERY OF LIVING CELLS

In 1674, **Anton van Leeuwenhoek**, a Dutch scientist, became the first person to observe living cells.

// **LIVING**



**Anton van Leeuwenhoek** improved the microscope and observed living cells in pond water.

He saw microorganisms like **bacteria** and **protozoa**.



# Important Discoveries Related to the Cell

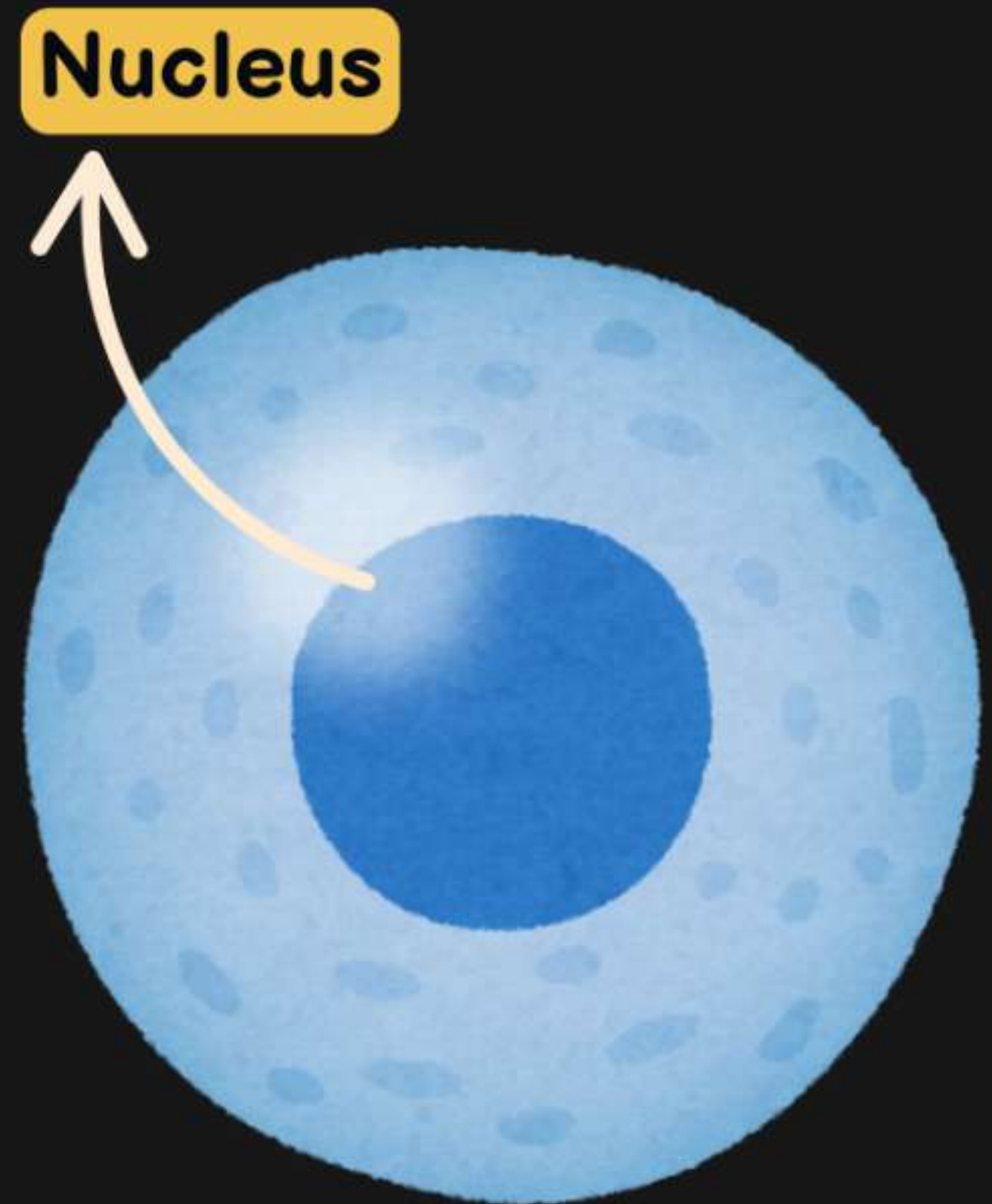
## Discovery of the Nucleus (1831)

- In 1831, Robert Brown was the first to identify and describe the nucleus in plant cells.

Brain of cell

**Importance:** The nucleus acts as the control centre of the cell. It holds the cell's genetic material and manages its activities.

Daag

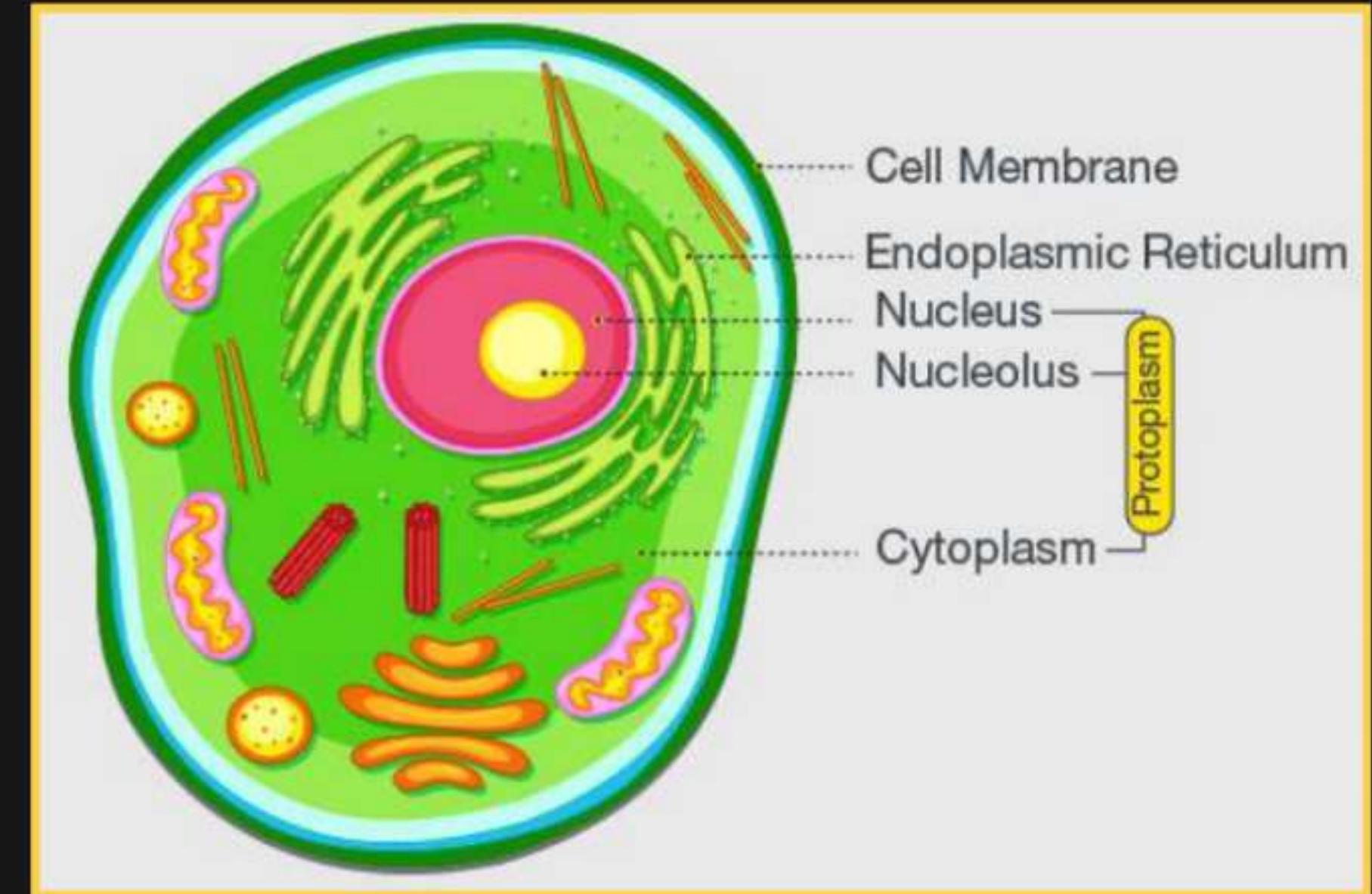




## Term "Protoplasm" Coined (1839)

- J.E. Purkinje introduced the term "Protoplasm" to describe the living part of the cell.

**Note:** Protoplasm includes everything inside the cell that is alive.



**Nucleus + Cytoplasm = Protoplasm**



# CELL THEORY

Matthias Schleiden (plants) & Theodor Schwann (animals)

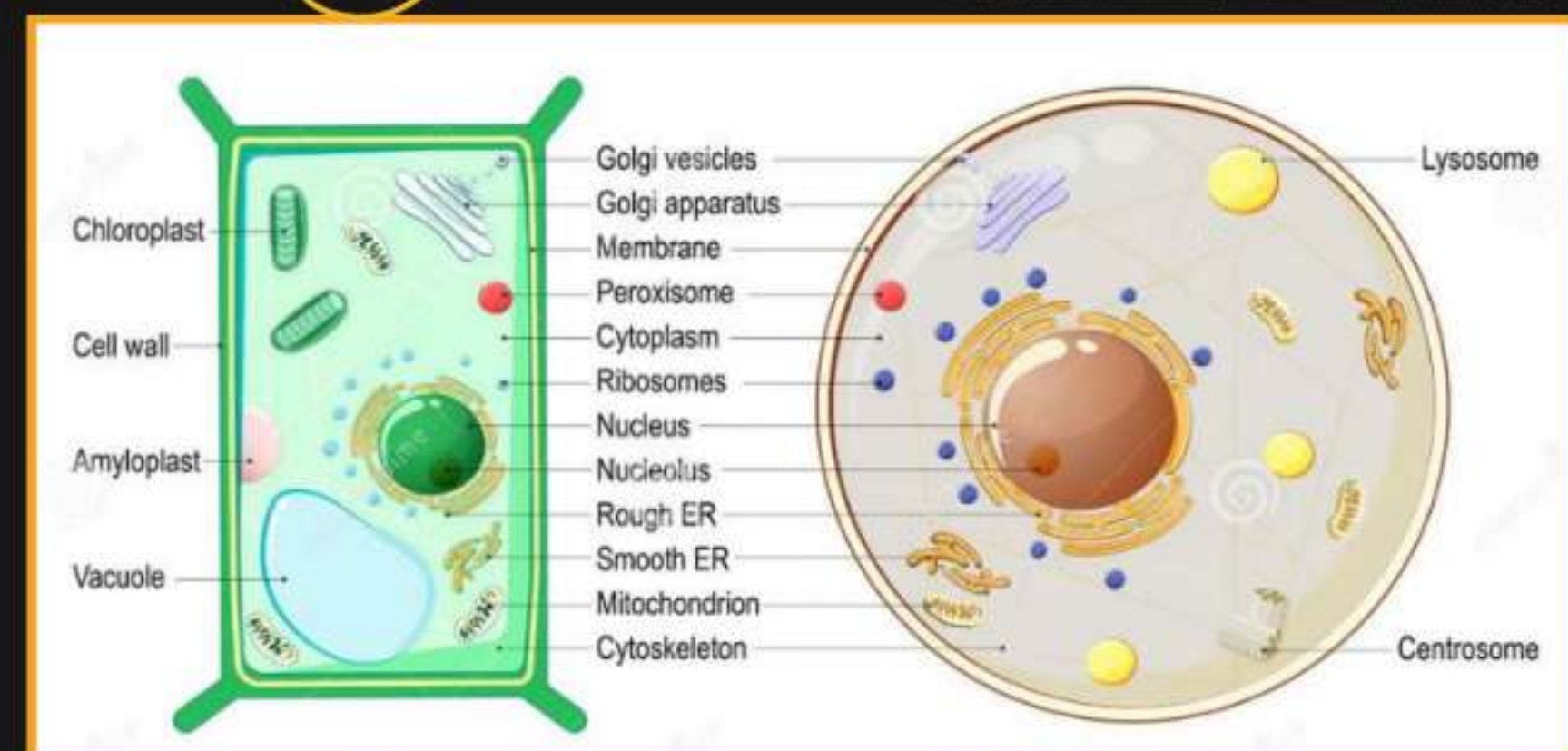
They stated: ① All living things are made of cells.

② The cell is the basic unit of life.

Cell Theory (Completed) – 1855

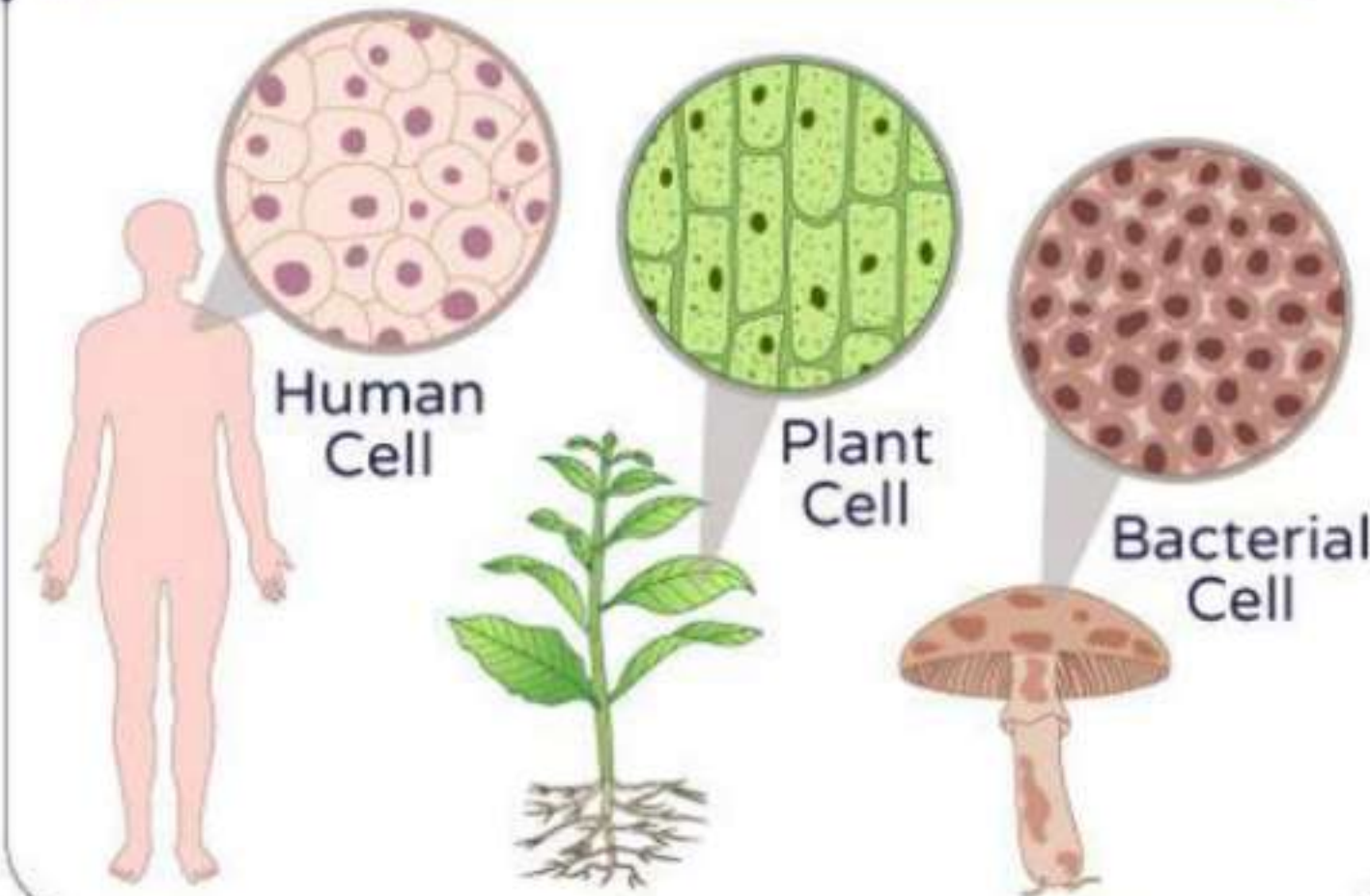
- In 1855, Rudolf Virchow completed the cell theory.

③ He added: "All cells arise from pre-existing cells" (Omnis cellula e cellula).

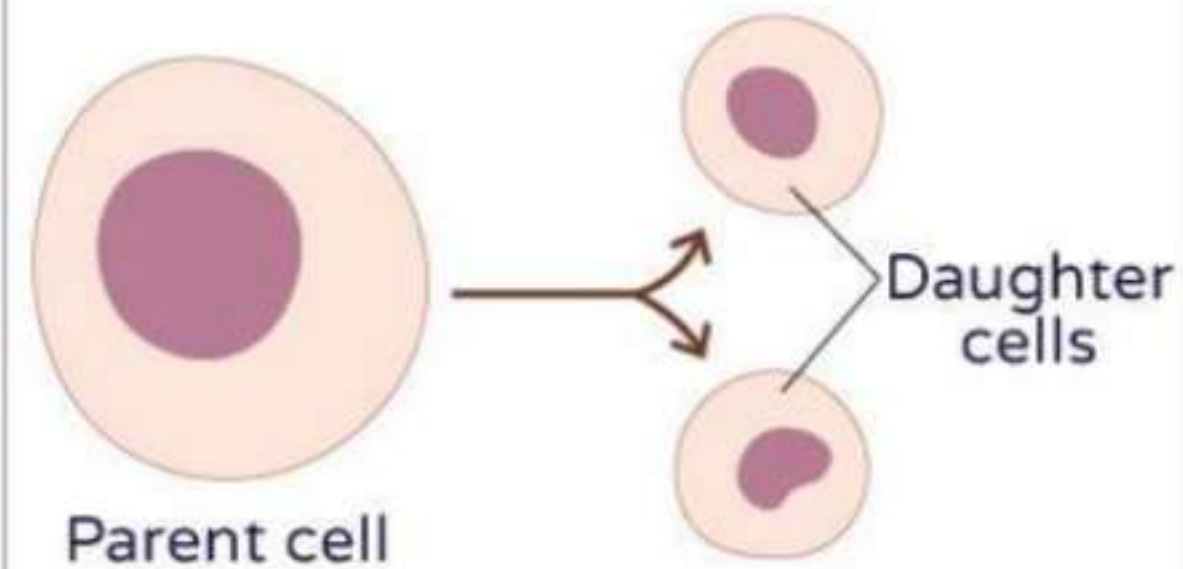




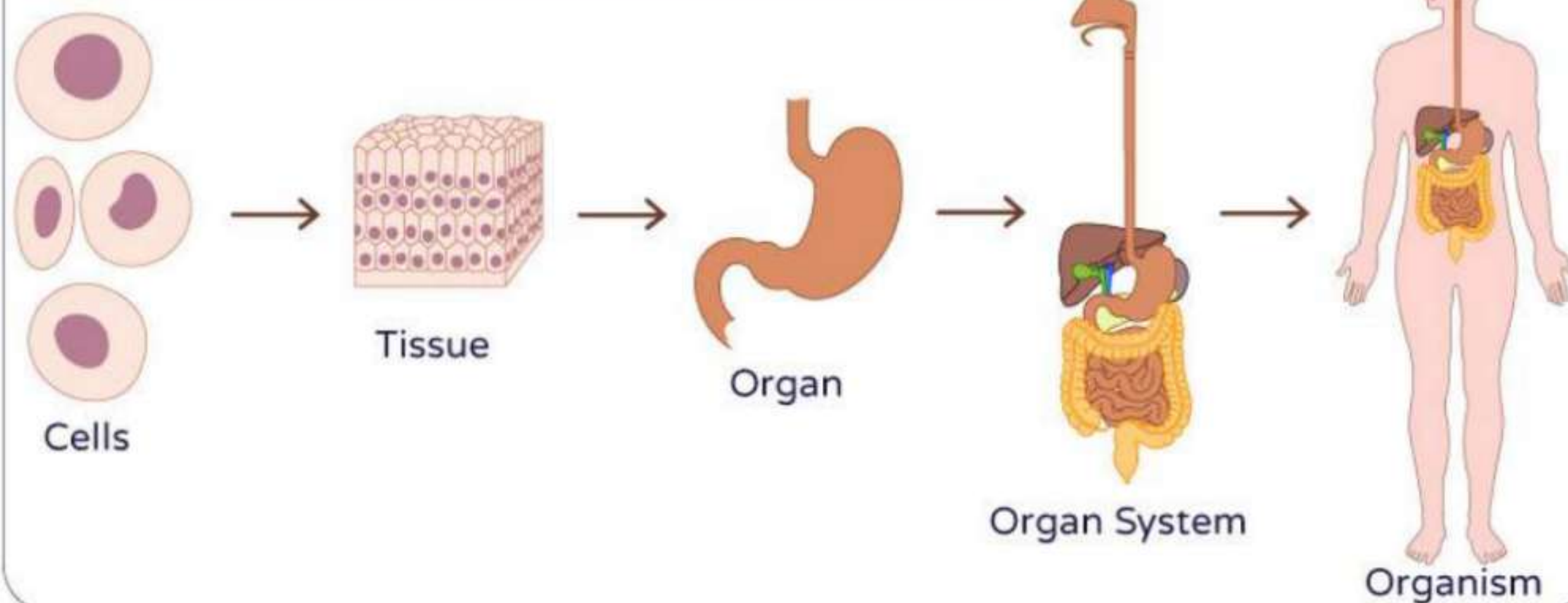
**1** All organisms are composed of one or more cells



**2** All cells arise from pre-existing cells



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





Question: The first living cell was observed by:

- A) Schleiden
- B) Schwann
- C) Virchow
- ☒ D) Anton van Leeuwenhoek

History R A R  
↳ Trick

R A R P





Question: Who discovered the cell in 1665?

- A) Anton van Leeuwenhoek
- B) Robert Brown
- C) Robert Hooke
- D) Rudolf Virchow





Question: Who stated that new cells arise from pre-existing cells?

- A) Robert Hooke
- B) Schleiden
- C) Schwann
- ☒ D) Rudolf Virchow

(D)





1590



**Zacharias Janssen**

- ❑ Invented the first compound microscope
- ❑ Objects looked enlarged under the microscope

1665



**Robert Hooke**

- ❑ Used light microscope to look at thin slices of plant tissue (cork)
- ❑ Saw small, box-like structures and coined the term 'Cell'

1673



**Anton van Leeuwenhoek**

- ❑ First to see living organisms under a microscope
- ❑ Termed these organisms 'animalcules'



1838

cell

**Matthias Schleiden**

- ❑ Stated that 'All living plants are made of cells'
- ❑ Developed the first two tenets of the cell theory (with Schwann)

1839

**Theodore Schwann**

- ❑ Stated 'All living animals are made of cells'
- ❑ Developed the first two tenets of the cell theory (with Schleiden)

1855

**Rudolf Virchow**

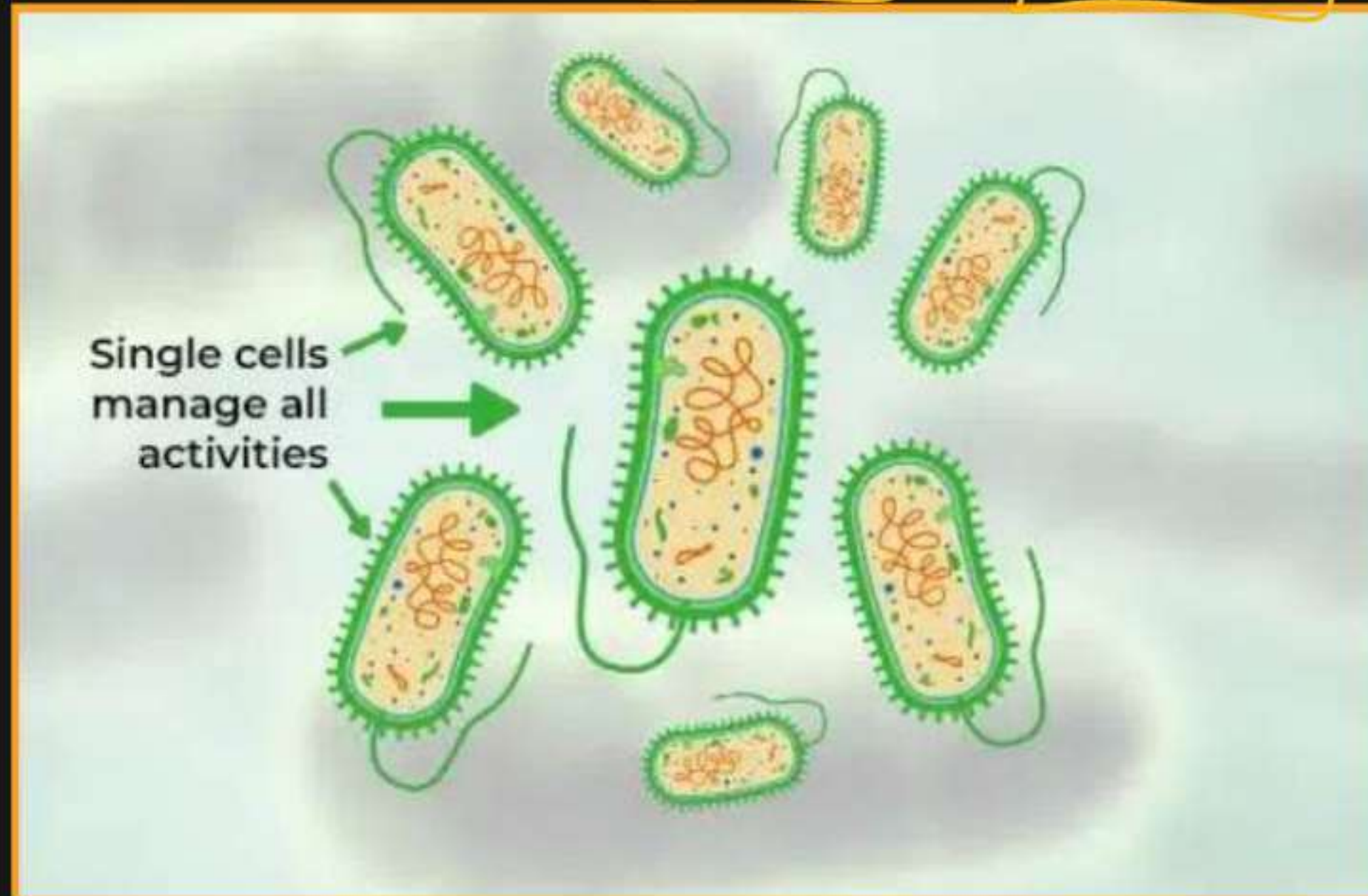
- ❑ Stated that 'Where a cell exists, there must have been a pre-existing cell'
- ❑ Developed the third tenet of the cell theory



# Organisms

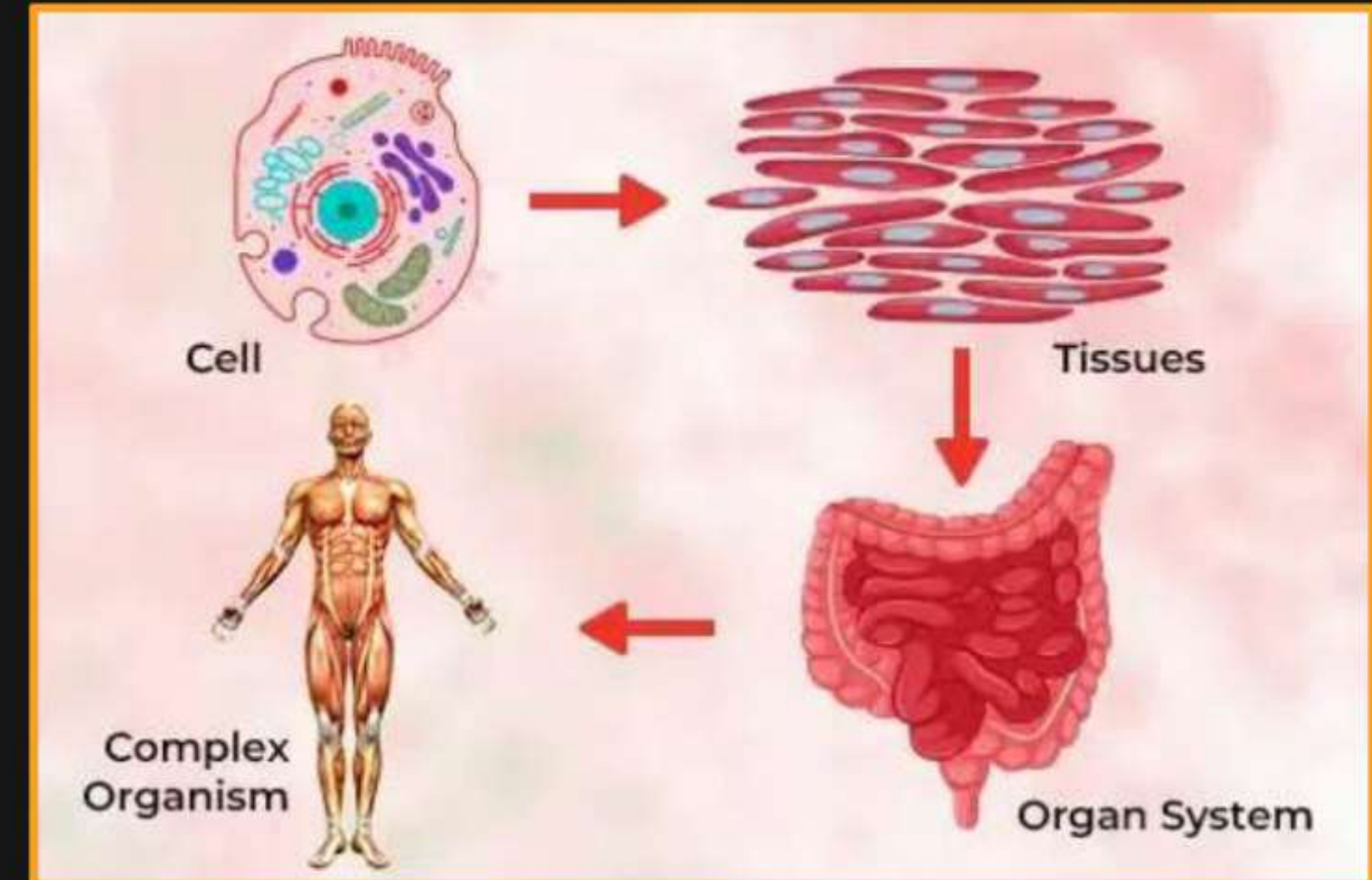
## Unicellular Organisms

Example: Amoeba, Paramecium, Bacteria, Euglena



## Multicellular Organisms

Example: Humans, Plants, Frog, Earthworm

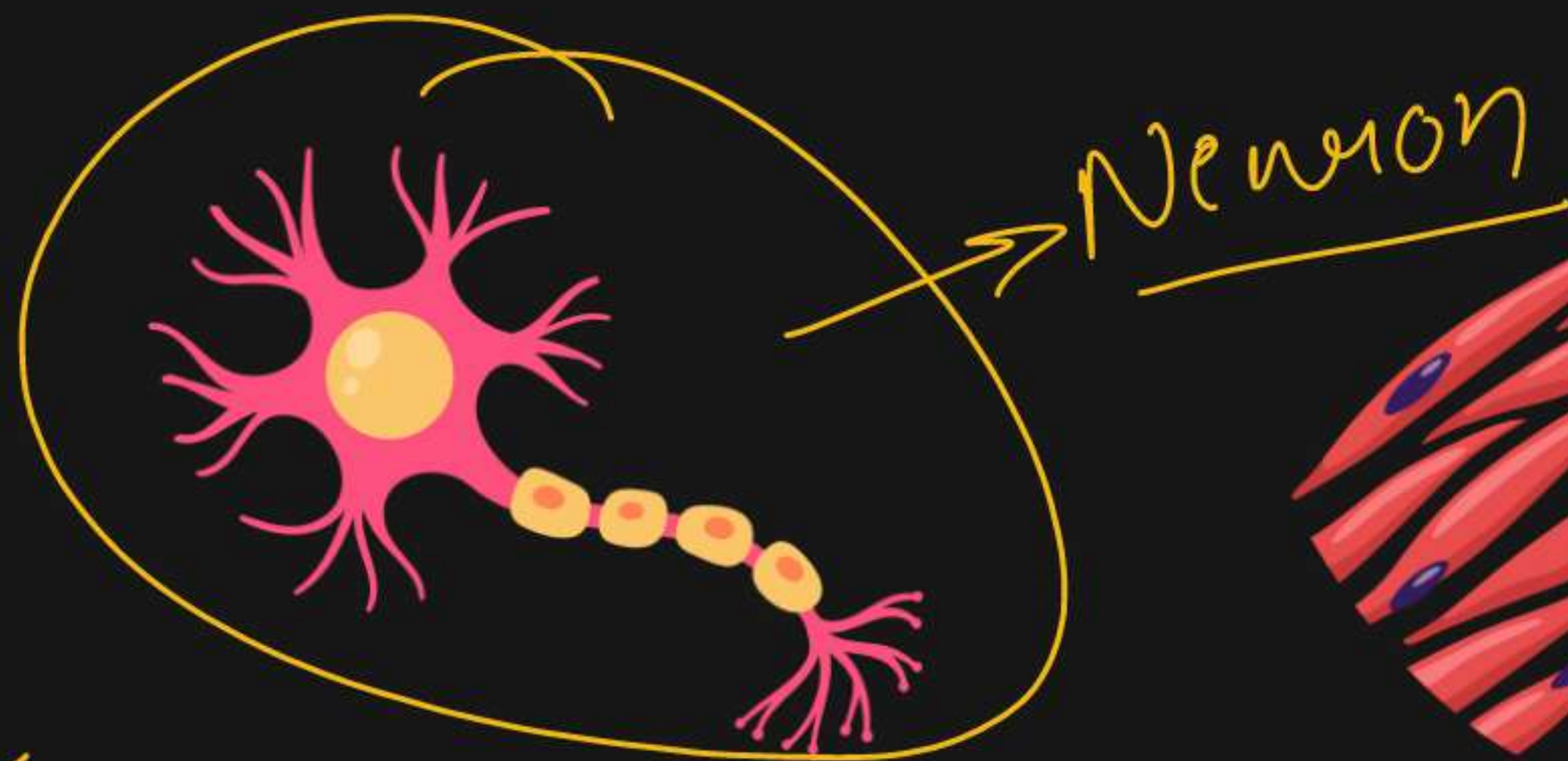




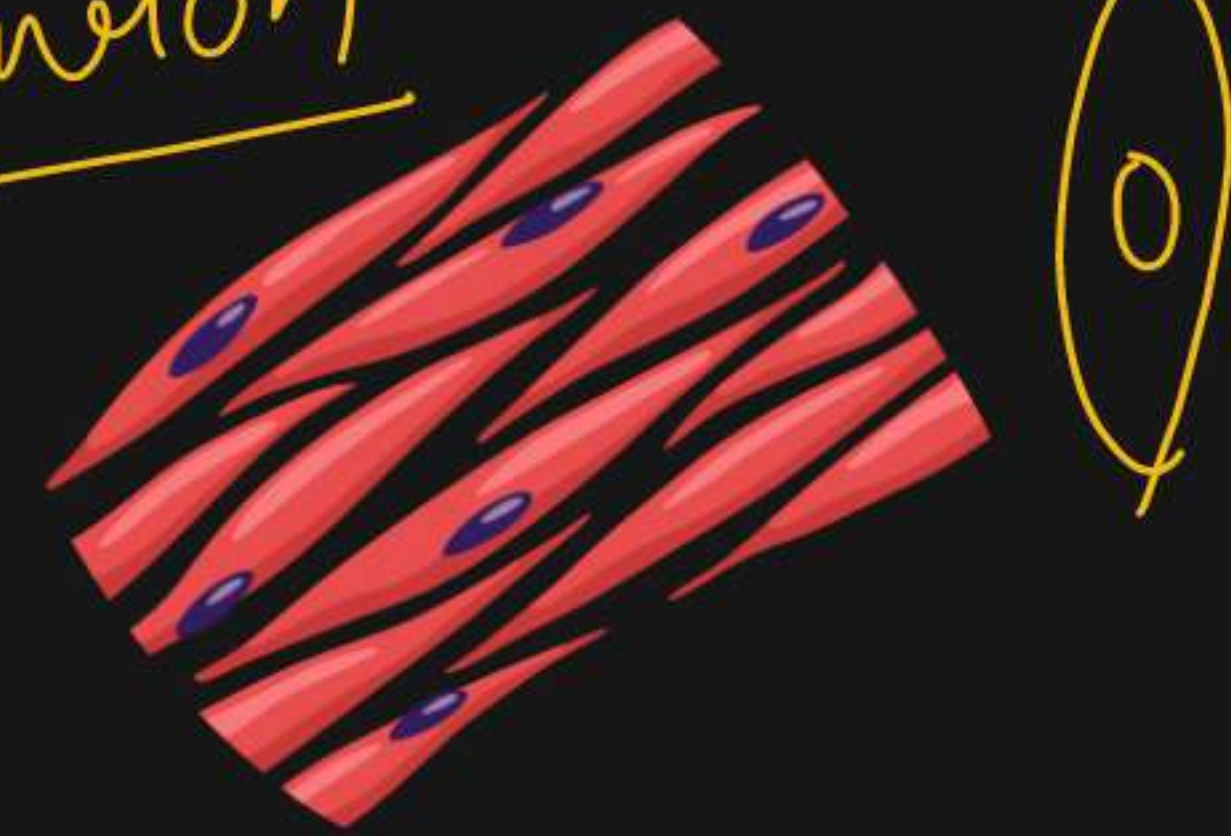


# **TYPES OF CELLS BASED ON THEIR SHAPE**

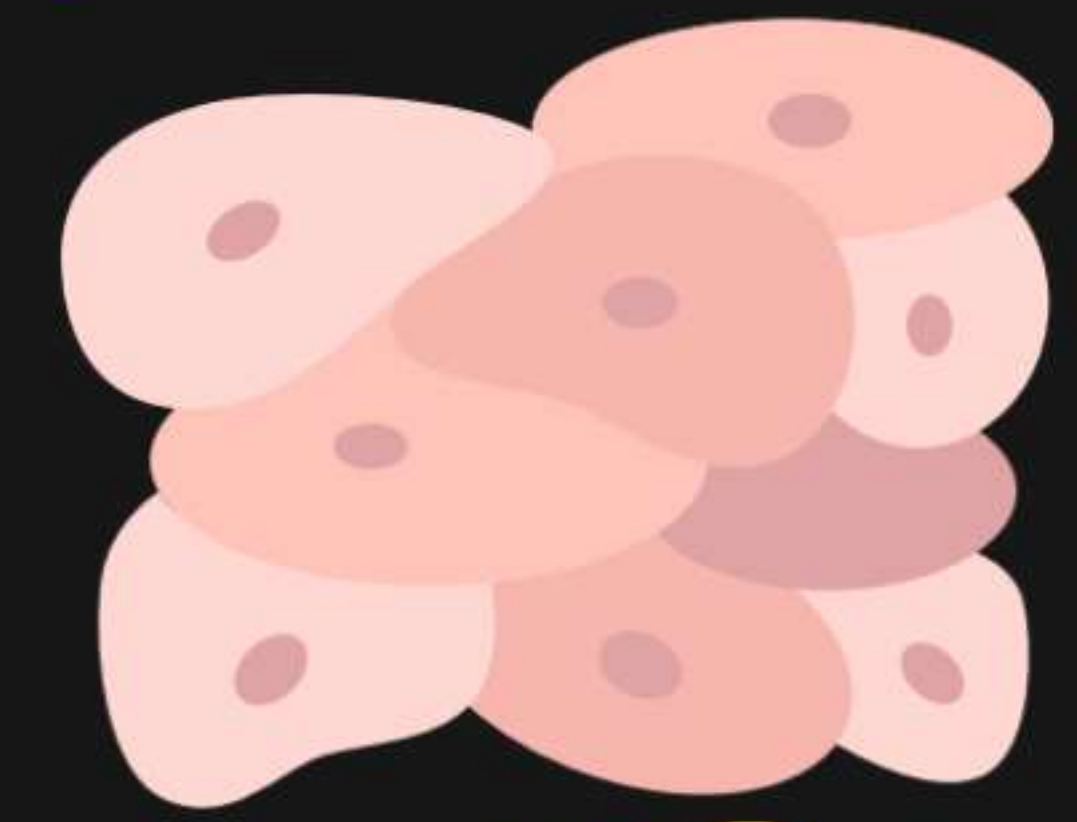




Neuron



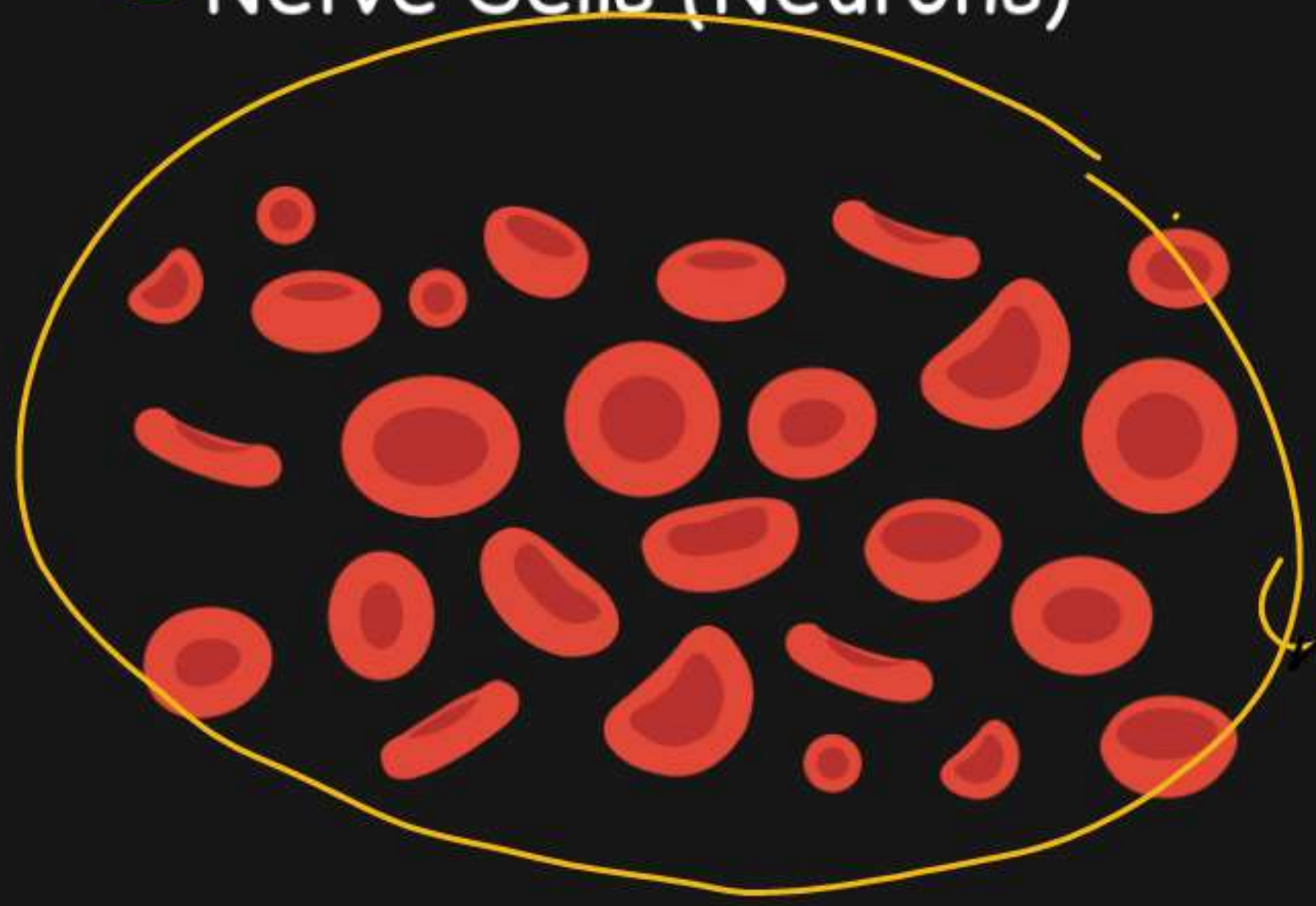
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Long and Thread-Like Cells  
– Nerve Cells (Neurons)

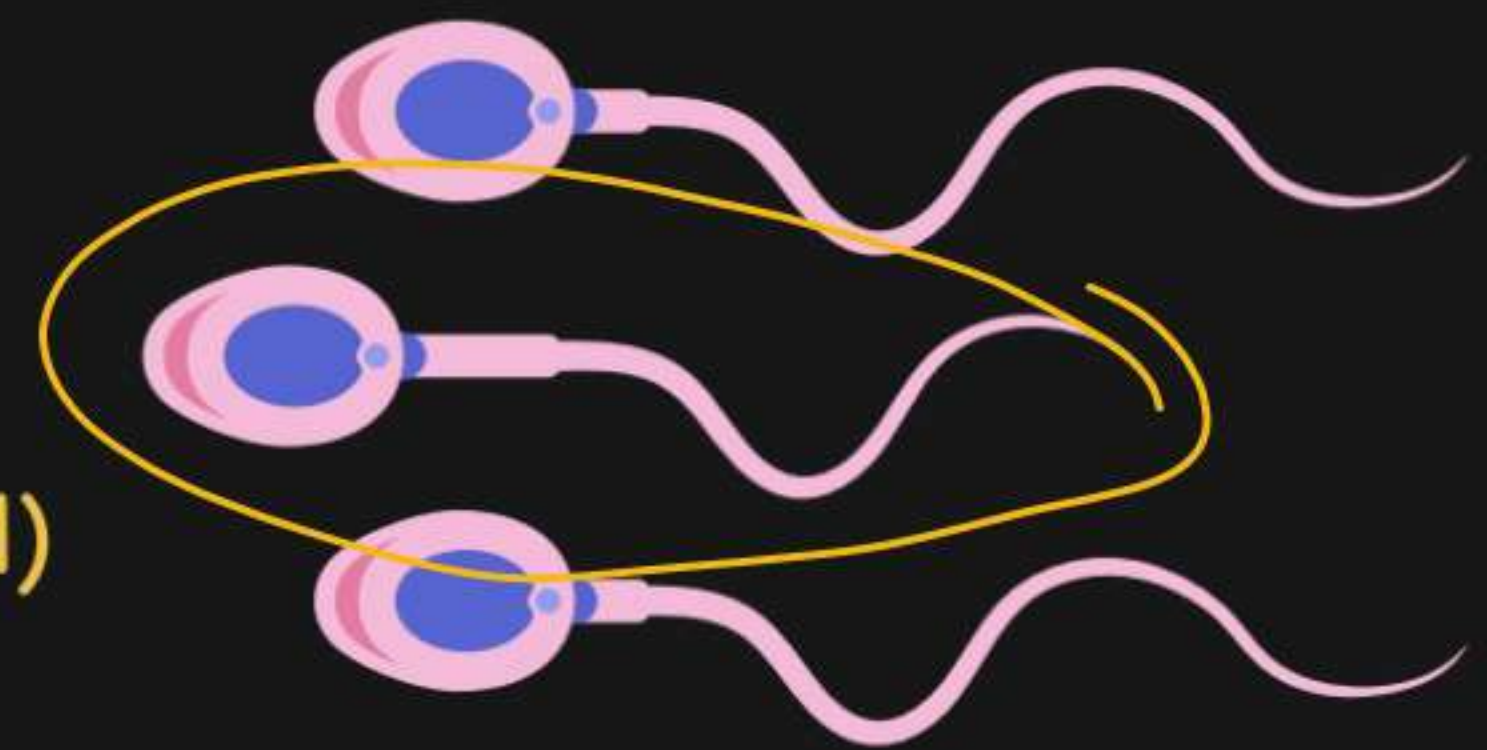
Spindle-Shaped Cells  
– Muscle Cells.

Flat and Thin Cells – Skin  
Cells (Epithelial Cells)



Spherical Cells – Red  
Blood Cells (RBCs)

Tail-Shaped (Flagellated)  
Cells – Sperm Cells





Question: Which cell is the longest in the human body?

- a) Red blood cell
- b) Muscle cell
- c) Nerve cell
- d) Skin cell

(c)



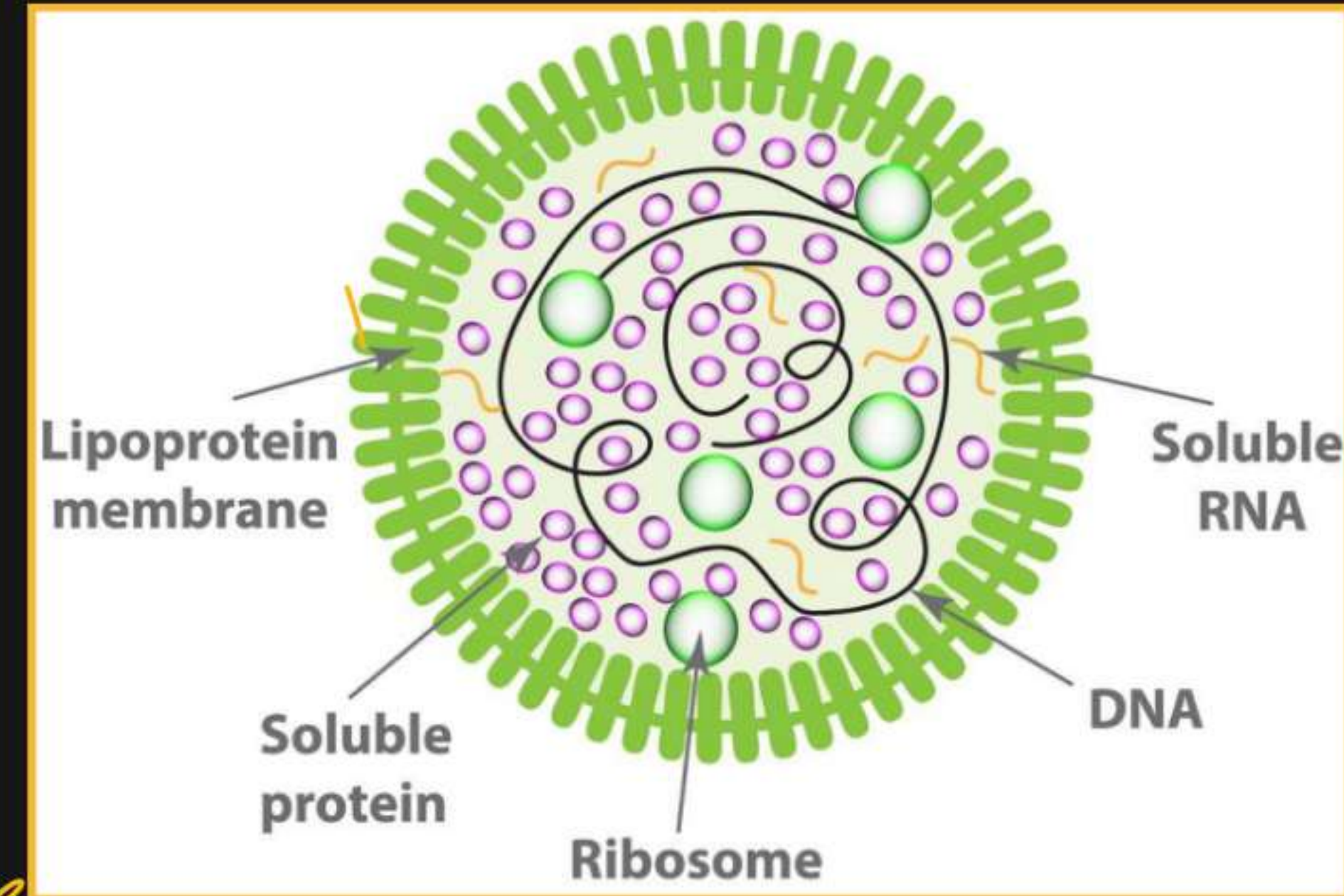


# LARGEST & SMALLEST LIVING CELL



**Largest Living Cell - Ostrich Egg**

Visible to the naked eye;  
represents the largest single cell.

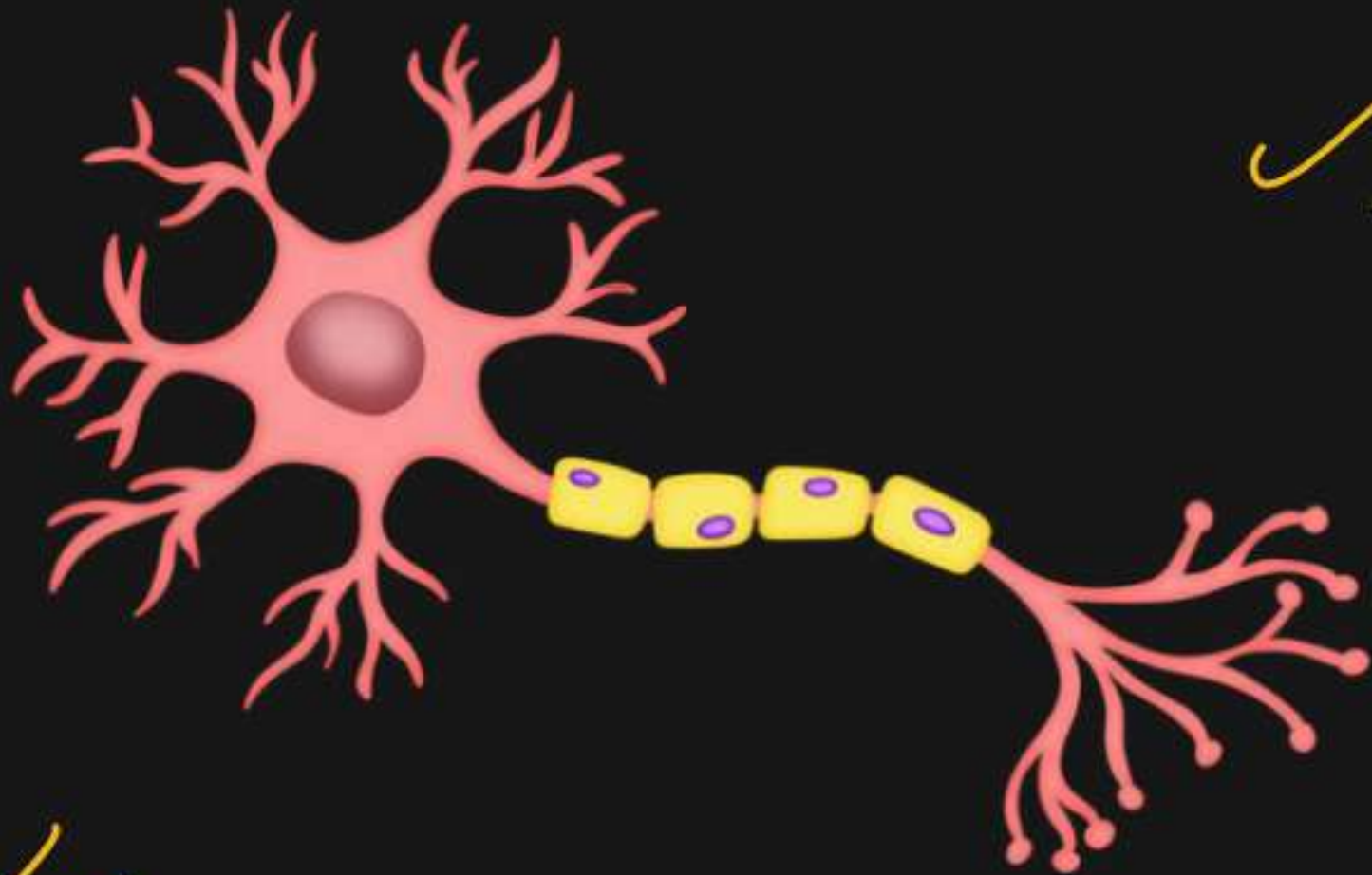


**Smallest Living Cell - Mycoplasma**

A type of ~~bacteria~~ that lacks a cell  
wall. Making it highly flexible.

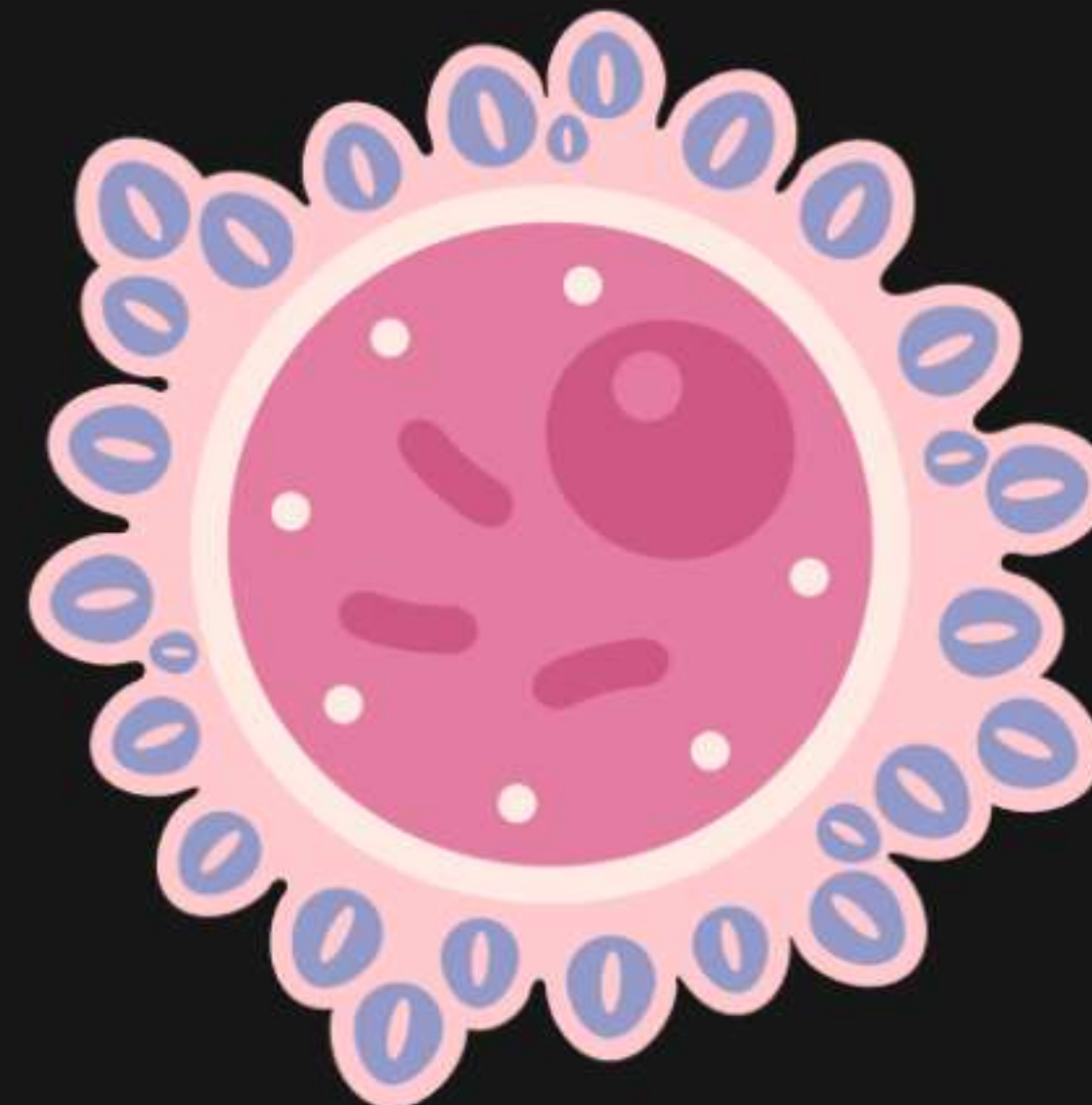


# Key Cells of the Human Body: Size Comparisons

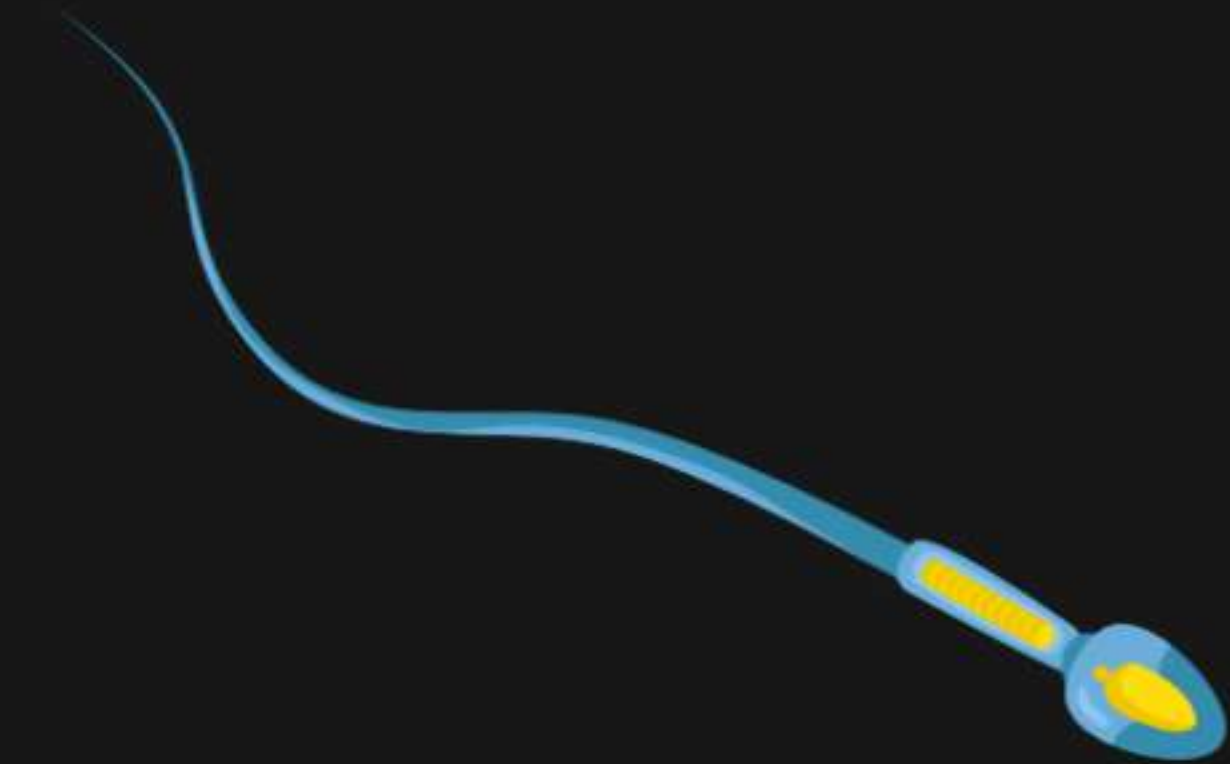


✓  
Longest Cell in Human Body  
– Nerve Cells (Neurons)

✓  
Largest Cell in Human Body  
– Ovum Cell (in females)



Smallest Cell in Human Body  
– Sperm Cells (in males)





Question: largest living cell?

- A) ostrich cell
- B) Amoeba
- C) bacteria
- D) mycoplasma





Question: What is the structural and functional unit of life?

- A) Cell
- B) Organism
- C) Tissue
- D) Organ

(A)





Question: Which of the following is NOT true about multicellular organisms?

- a) They are made of many cells
- b) All cells perform the same function
- c) They show division of labor
- d) They include animals and plants

HW





It's over, So Do  
Revision and  
Have Some  
Fun....

