



Chapter 2

Cell: The Building Block of Life



Cells are the basic units of life
that build, protect, and power every living thing.



Observe



Think



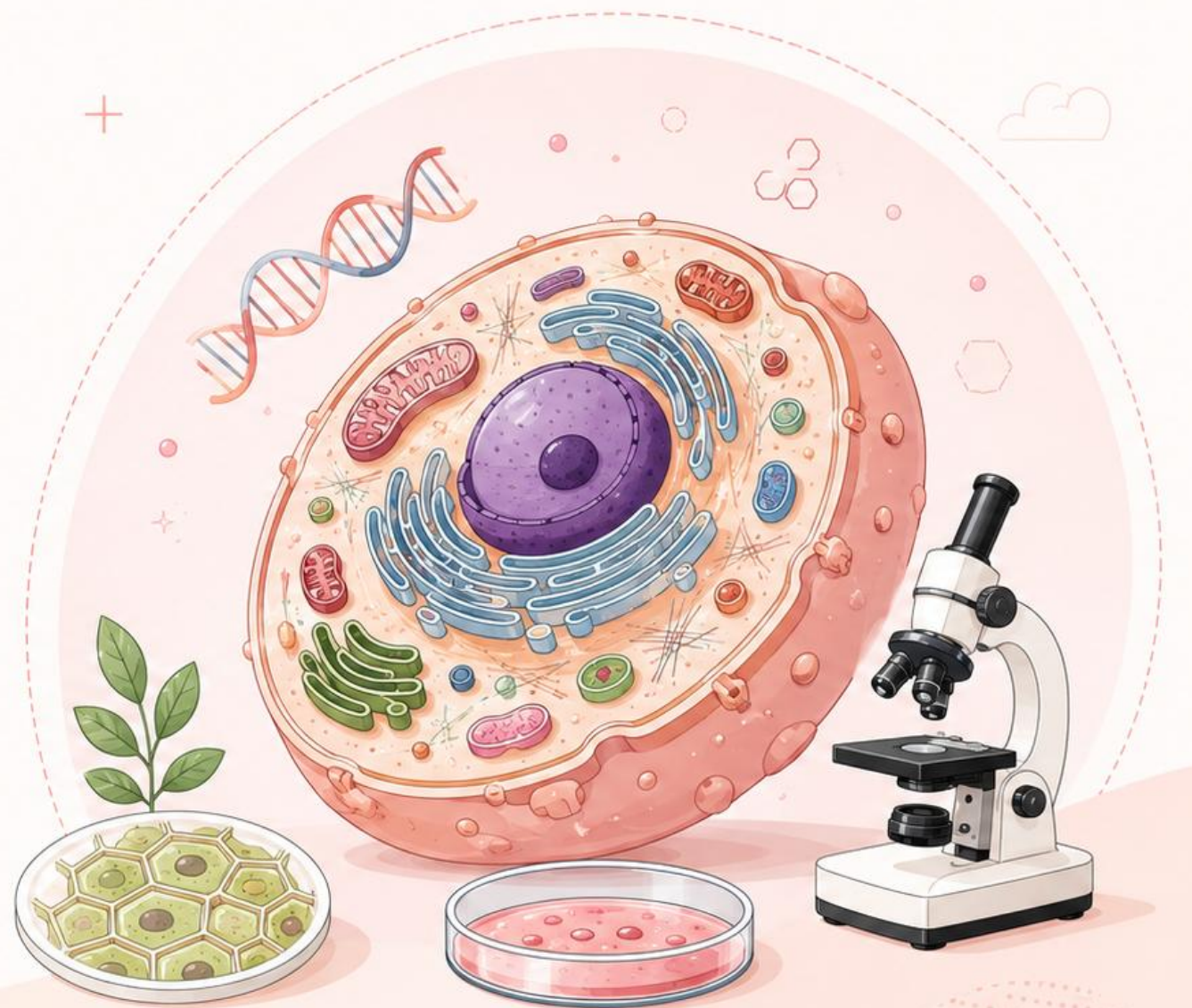
Experiment



Explore



Discover

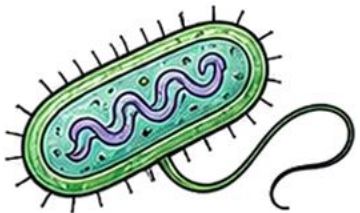


THE CELL: BASIC UNIT OF LIFE

The cell is the basic structural and functional unit of life.

ALL LIVING THINGS HAVE CELLS

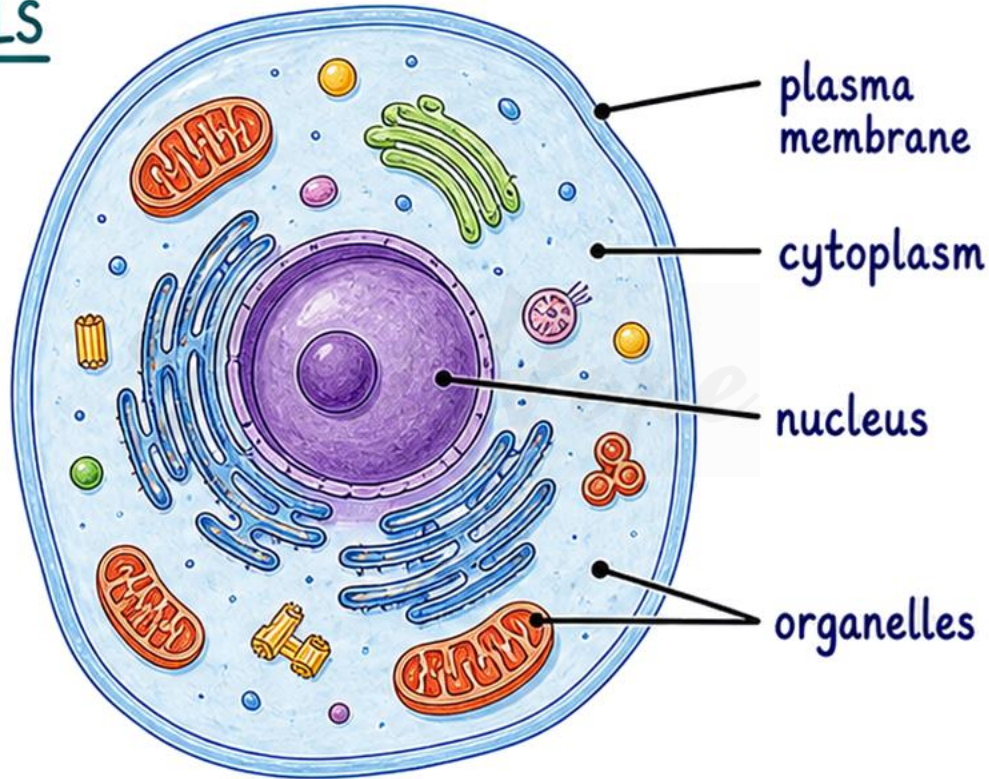
- Every living organism is made of one or more cells.
- Life first exists at the cell level.
- A cell carries out basic life processes.



one cell



many cells



WHY CELLS MATTER

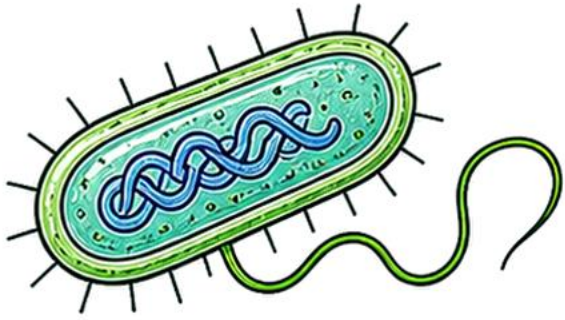
- Cells give an organism its structure.
- Cells perform the functions needed for life.
- Even a large body begins from cells.

KEY IDEA: The cell is the smallest unit that is fully alive.

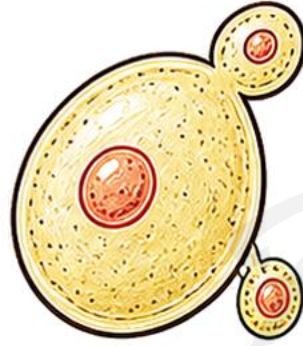
ONE CELL OR MANY?

Living organisms may be unicellular or multicellular.

UNICELLULAR



bacterium



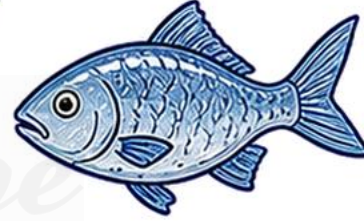
budding yeast

- An organism made of one cell.
- That one cell performs all life processes.
- Examples: bacteria and yeast.

MULTICELLULAR



plant



fish



bird



human

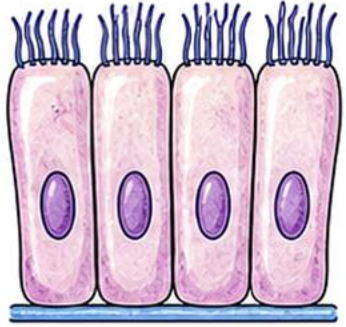
- An organism made of many cells.
- Cells become specialised and work together.
- Examples: plants, fish, birds and humans.

ONE CELL can be a whole organism; **MANY CELLS** share the work.

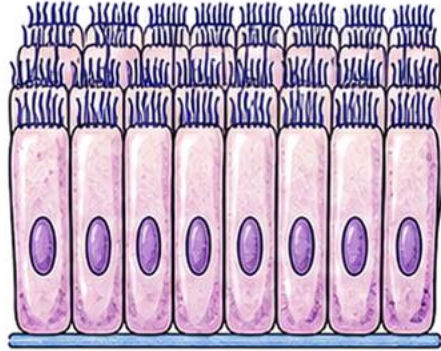
LEVELS OF ORGANISATION

In a multicellular organism, specialised cells work together.

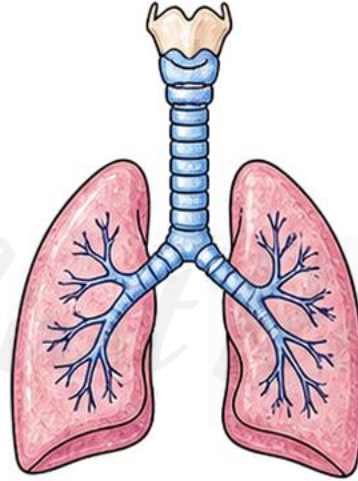
CELL → TISSUE → ORGAN → ORGAN SYSTEM → ORGANISM



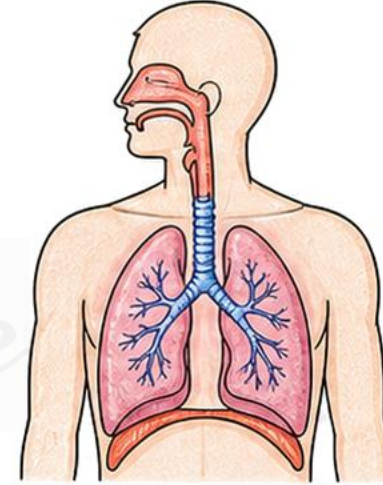
ciliated/lining cell



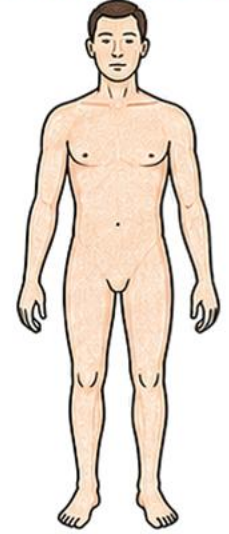
respiratory tissue



trachea and lungs



respiratory system



human

- A cell is the basic unit of life.
- Similar cells doing a similar job form a tissue.

- Different tissues work together to form an organ.
- Organs working together form an organ system.

- Organ systems together make an organism.

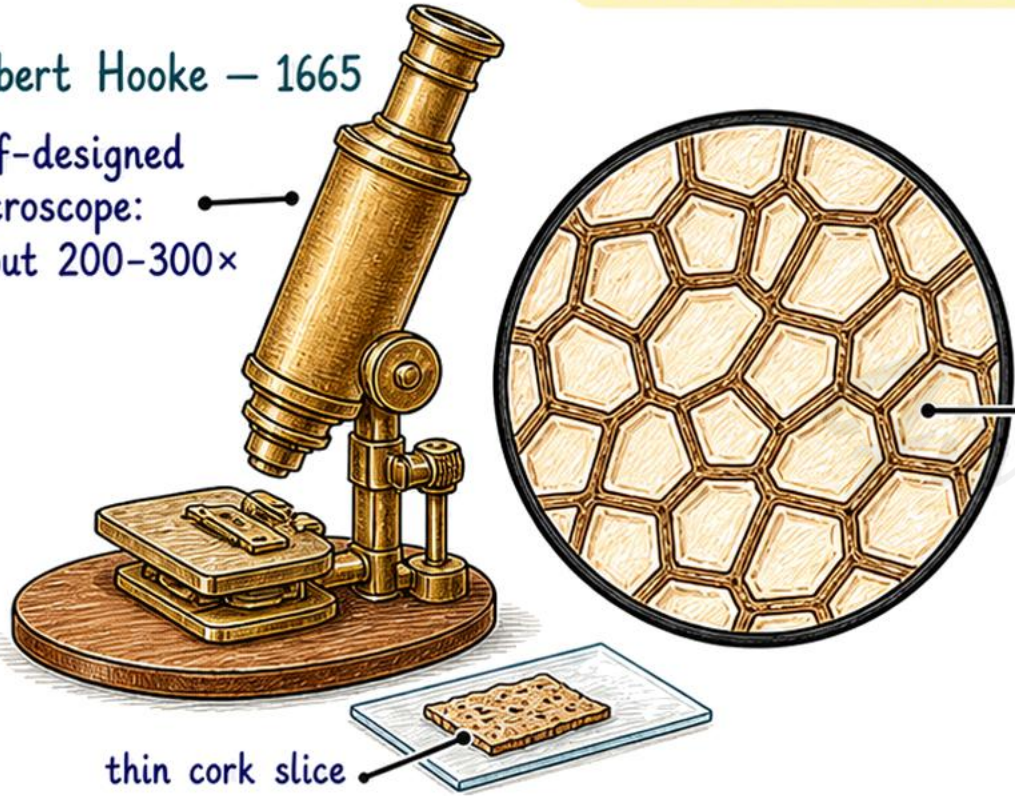
CELLS build **TISSUES**; tissues build **ORGANS**; organs build **SYSTEMS**.

HOW WE DISCOVERED CELLS

Most cells are too small for the unaided eye.

Robert Hooke – 1665

self-designed
microscope:
about 200–300×

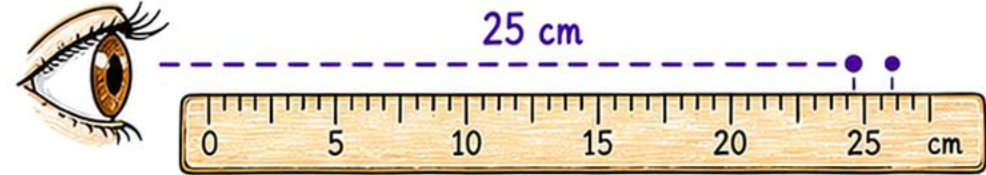


empty cork
cell
walls

thin cork slice

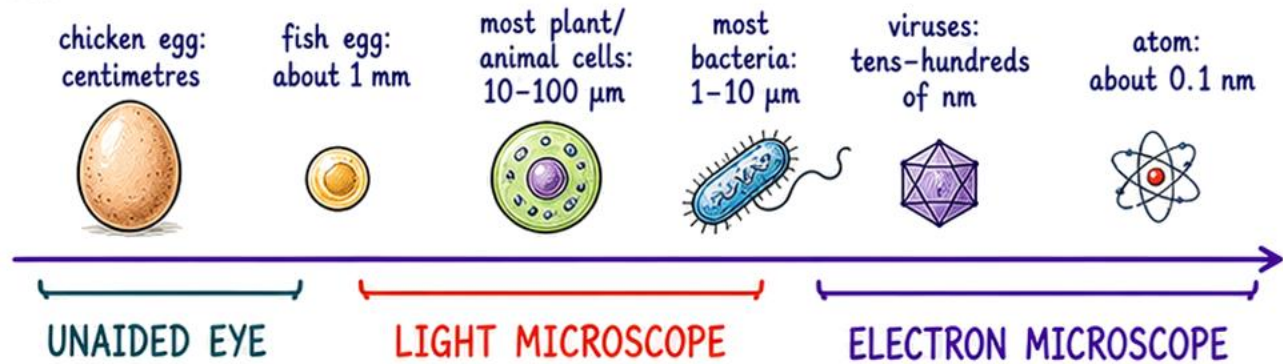
- Hooke saw tiny box-like spaces in cork.
- He named these spaces 'cells'.
- Cork was dead; he mainly saw the cell walls.

LIMIT OF THE HUMAN EYE



- Viewing distance: about 25 cm.
- Two points closer than about 0.1 mm merge into one.

SIZE & VISIBILITY



Microscopes opened a world that the unaided eye cannot resolve.

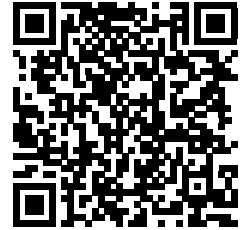


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