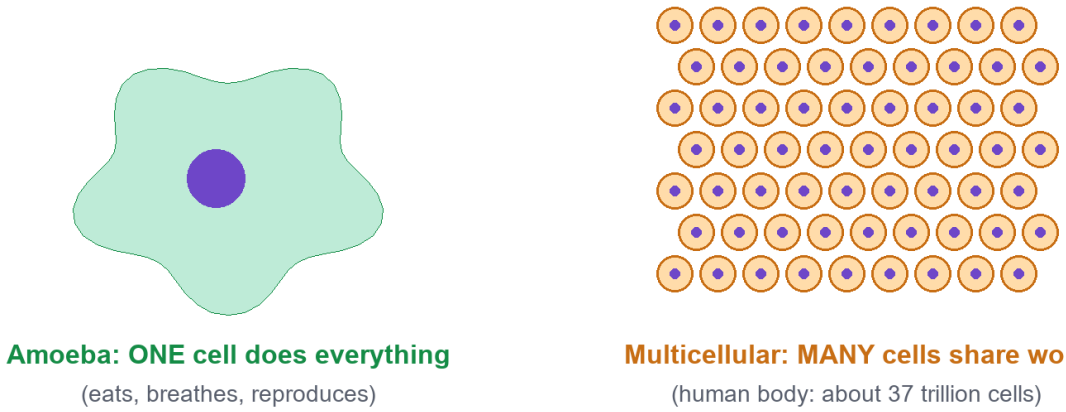
# Unicellular and Multicellular Organisms

**Class 9 Biology · Chapter: The Fundamental Unit of Life**
🎬 **Video explanation (PrayogX reel):** https://www.instagram.com/reel/DfFueY3gJhJ/

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## 1. One cell vs trillions

The whole body of an **Amoeba** is a single cell. Your body has about **37 trillion** cells (an estimate; 1 trillion = $10^{12}$). Both are alive, and both are built from cells.



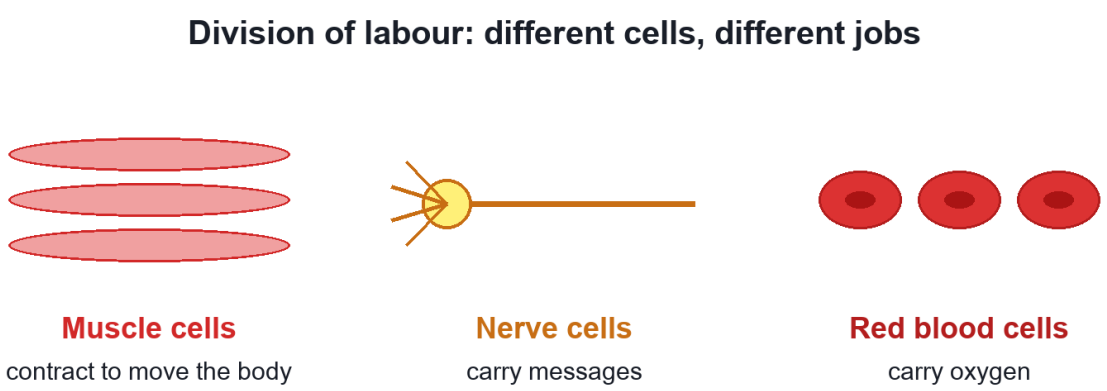

## 2. Key definitions

| Term | Meaning |
|---|---|
| **Unicellular organism** | An organism whose whole body is a single cell, e.g. Amoeba, Paramecium, Chlamydomonas, bacteria. |
| **Multicellular organism** | An organism made of many cells, e.g. fungi, plants, animals, humans. |
| **Division of labour** | In multicellular organisms, different groups of cells are specialised to do different jobs. |
| **Zygote** | The single cell formed at fertilisation, from which a multicellular organism develops by repeated cell division. |

## 3. Unicellular: one cell does everything

In a unicellular organism the single cell carries out **all** life processes: taking in food, respiration (breathing in the cell), getting rid of wastes and reproduction (an Amoeba reproduces by dividing into two).

## 4. Multicellular: division of labour




**Every multicellular organism starts as ONE cell, the zygote.**

| Cell | Shape | Job |
|---|---|---|
| Muscle cell | Long, spindle-shaped | Contracts and relaxes to move body parts |
| Nerve cell (neuron) | Long, branched | Carries messages |
| Red blood cell | Round, biconcave disc | Carries oxygen |

The shape of each cell suits its job.

## 5. Comparison

| Feature | Unicellular | Multicellular |
|---|---|---|
| Number of cells | One | Many |
| Who does the life processes | The single cell does all | Specialised cells share the work |
| Division of labour | Within one cell (by its organelles) | Between cells, tissues and organs |
| Examples | Amoeba, Paramecium, bacteria | Fungi, plants, animals, humans |

# 6. Every multicellular organism starts as one cell

A multicellular organism begins as a single cell, the **zygote**. It divides again and again (1 → 2 → 4 → 8 → …) and the cells then become specialised. This also supports the cell theory: new cells come from existing cells.

# 7. Solved examples

**Example 1.** Why can an Amoeba survive as one cell while a muscle cell cannot live on its own? The Amoeba's single cell performs all life processes; a muscle cell is specialised for one job and depends on other cells for food, oxygen and messages.
**Example 2.** A zygote divides 10 times, each cell dividing into two every time. How many cells are formed? $2^{10}$ = **1024** cells.

# 8. Key takeaways

- **Unicellular:** one cell does everything.
- **Multicellular:** many cells share the work (division of labour).
- Every multicellular organism starts as one cell, the zygote.

# Practice questions (CBSE style)

1. Give two examples each of unicellular and multicellular organisms. (1 mark)
2. What is meant by division of labour in multicellular organisms? (2 marks)
3. Name the cell that carries oxygen in our blood and the cell that carries messages. (1 mark)
4. How is a unicellular organism able to carry out all life processes? (2 marks)
5. "Every multicellular organism starts from a single cell." Explain. (2 marks)
6. Write three differences between unicellular and multicellular organisms. (3 marks)
7. A cell divides into two every hour. Starting with one cell, how many cells will there be after 6 hours? (2 marks)

# Answer key with worked solutions

1. Unicellular: Amoeba, Paramecium (also bacteria, Chlamydomonas). Multicellular: fungi, plants, animals, humans (any two).
2. In multicellular organisms different cells are specialised to carry out different functions (e.g. muscle cells for movement, nerve cells for messages), so the work of the body is shared among them.
3. Red blood cells carry oxygen; nerve cells (neurons) carry messages.
4. Its single cell has all the parts (organelles) needed to take in food, respire, remove waste and reproduce, so it performs all life processes by itself.
5. A multicellular organism develops from one cell, the zygote, which divides repeatedly; the new cells then become specialised to form tissues and organs.
6. (i) One cell vs many cells; (ii) one cell does all functions vs specialised cells share functions; (iii) no division of labour between cells vs division of labour between cells,

tissues and organs. Examples: Amoeba vs humans.

7. 6 divisions: $2^6 = 64$ cells.