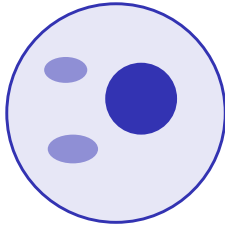


Organisation of the Organism

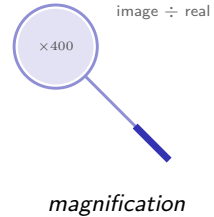
IGCSE Biology ■ Topic 2

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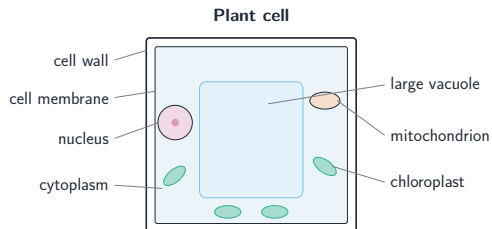
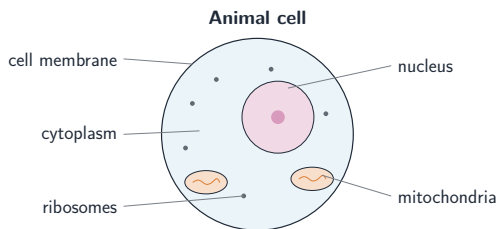


What we will cover

- 1 Animal & plant cells
- 2 Bacterial cells
- 3 What each part does
- 4 Specialised cells
- 5 Levels of organisation
- 6 Magnification

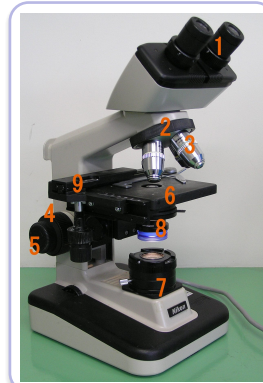
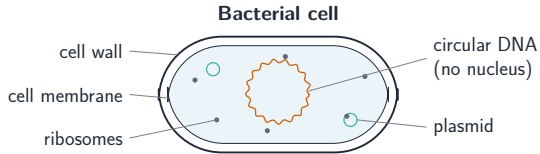


Animal and plant cells



Both share membrane, **cytoplasm** 细胞质, **nucleus** 细胞核, **mitochondria** 线粒体 & ribosomes. A plant cell adds a **cell wall** 细胞壁, a large **vacuole** 液泡 & **chloroplasts** 叶绿体.

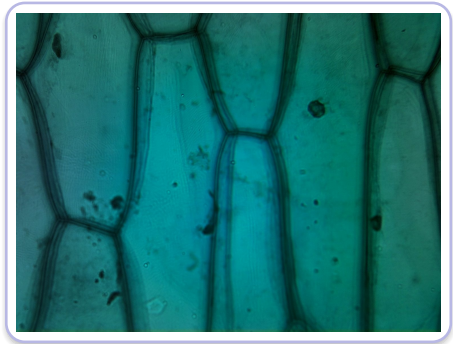
Bacterial cells



*Microscopes
reveal cell structure*

What each part does

- **membrane** – controls what enters/leaves
- **cytoplasm** – where reactions happen
- **nucleus** – controls the cell; holds DNA



Plant cells show walls and vacuoles

Specialised cells



red blood cell
(carries oxygen)



root hair cell
(absorbs water)

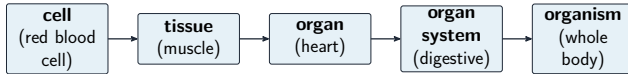


nerve cell
(carries impulses)

A **specialised cell** 特化细胞's shape suits its job:

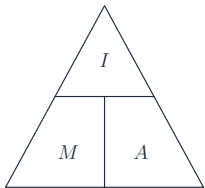
- **red blood cell** 红细胞 – no nucleus, holds more O_2
- **root hair cell** 根毛细胞 – long, big surface
- **neurone** 神经元 – very long, carries impulses

Levels of organisation



cell 细胞 → **tissue** 组织 →
organ 器官 → **organ**
system 器官系统 →
organism 生物体. e.g. muscle
(tissue), heart (organ),
digestive system.

Magnification



I = image size

M = magnification

A = actual size

$$M = \frac{I}{A}$$

cover a letter to get its formula

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}}$$

Example ($\times 250$)

$$\begin{aligned}\text{image } 5.00 \text{ mm} &\rightarrow \text{actual} = 5.00/250 = \\ &0.02 \text{ mm} = 20 \mu\text{m}\end{aligned}$$

1 mm = 1000 μm ; convert to one unit first.

Topic 2 – key takeaways

1 Plant extras

cell wall, vacuole & chloroplasts

2 Bacteria

no nucleus; a DNA loop & plasmids

3 Organisation

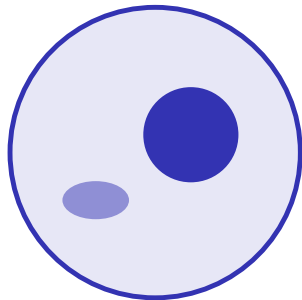
cell to tissue to organ to organism

4 Magnification

image / actual; same unit first

Check yourself

- 1 Which three parts does a plant cell have but an animal cell not?
- 2 What holds a bacterium's DNA?
- 3 Where in a cell does respiration happen?
- 4 A $\times 100$ image is 4 mm – what is the actual size?



Answers 1. cell wall, vacuole, chloroplasts 2. a single loop of DNA (no nucleus)
3. the mitochondria 4. 0.04 mm