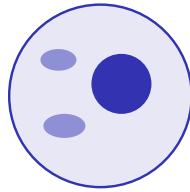


Organisation of the Organism

IGCSE Biology ■ Topic 2

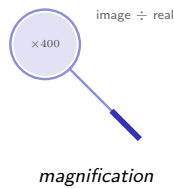
IGCSE Biology



Organisation of the Organism

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



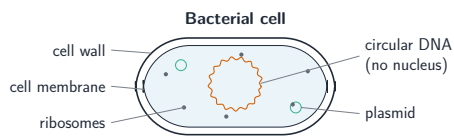
1 Cells

Animal and plant cells



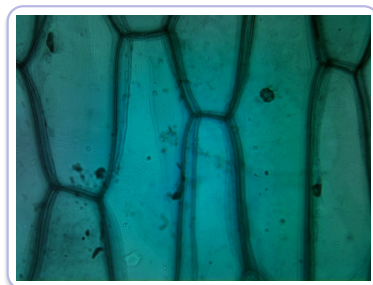
Both share membrane, **cytoplasm** 细胞质, **nucleus** 细胞核, **mitochondria** 线粒体 & ribosomes. A plant cell adds a **cell wall** 细胞壁, a large **vacuole** 液泡 & **chloroplasts** 叶绿体.

Bacterial cells



- **image size** = the size in the drawing or photo.
- **actual size** = the real size of the specimen 标本.

What each part does

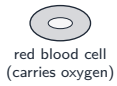


Plant cells show walls and vacuoles

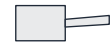
- **membrane** – controls what enters/leaves
- **cytoplasm** – where reactions happen
- **nucleus** – controls the cell; holds DNA

Specialised cells

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



red blood cell
(carries oxygen)



root hair cell
(absorbs water)



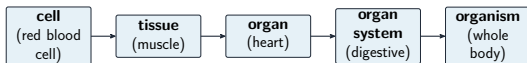
nerve cell
(carries impulses)

- **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

2

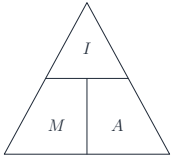
Scale

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 ($\times 250$)

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

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

3

Recap

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

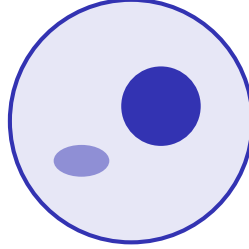
4

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