

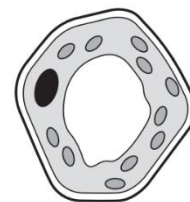
B2 Cells

B2.1 Cell structure

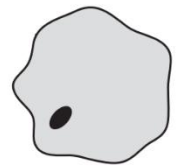
- 1 Describe and compare the structure of a plant cell with an animal cell, limited to: cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, ribosomes, mitochondria, vacuoles
- 2 Describe the structure of a bacterial cell, limited to: cell wall, cell membrane, cytoplasm, ribosomes, circular DNA, plasmids
- 3 Identify the cell structures listed in 2.1.1 and 2.1.2 in diagrams and images of plant, animal and bacterial cells
- 4 Describe the functions of the structures listed in 2.1.1 in plant and animal cells
- 5 Describe the meaning of the terms cell, tissue, organ, organ system and organism as illustrated by examples given in the syllabus
- 6 State that specialised cells have specific functions, limited to: (a) root hair cells – absorption (b) palisade mesophyll cells – photosynthesis (c) red blood cells – transport of oxygen

Plant Cell vs Animal Cell Structure

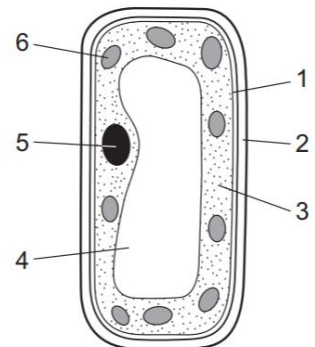
1. Cell membrane: Both: present, controls movement of substances in/out of cell.
 2. Cell wall: Plant: present, made of cellulose, freely permeable, gives cell shape and support. Animal: absent
 3. Cytoplasm: Both: present, jelly-like substance where chemical reactions occur
 4. Vacuole: Plant: one large, permanent vacuole filled with cell sap. Animal: small, temporary vacuoles (if present at all)
 5. Nucleus: Both: present, controls cell activities, contains genetic material (DNA)
 6. Chloroplasts: Plant: present (only in green parts), contain chlorophyll, site of photosynthesis. Animal: absent
- Ribosomes: Both: present, site of protein synthesis (too small to see with light microscope)
- Mitochondria: Both: present, site of respiration (release energy)



plant cell



animal cell



Bacterial Cell Structure

Cell wall – present, but not made of cellulose (different chemical composition from plants)

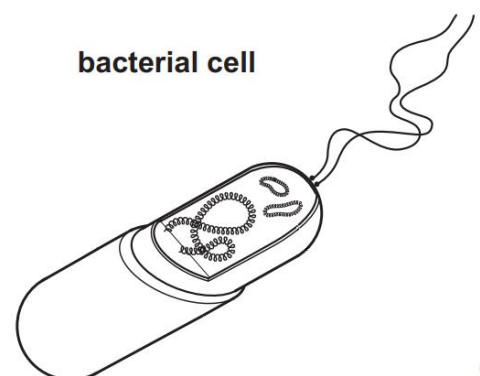
Cell membrane – present, controls entry/exit of substances

Cytoplasm – present, contains enzymes for metabolic reactions

Ribosomes – present, but smaller than those in plant/animal cells

Circular DNA (nucleoid) – single circular strand of DNA, not enclosed in a nucleus (bacteria are prokaryotes)

Plasmids – small, extra circular pieces of DNA, separate from the main circular DNA; can be passed between bacteria



bacterial cell

Functions of Structures (Plant & Animal Cells)

Cell wall - Support; maintains cell shape; prevents cell bursting

Cell membrane - Controls what enters/exits cell (selectively permeable)

Nucleus - Contains DNA/genes; controls cell's activities

Cytoplasm - Site of many metabolic/chemical reactions

Chloroplasts - Absorb light energy for photosynthesis

Ribosomes - Site of protein synthesis

Mitochondria - Site of (aerobic) respiration – releases energy

Vacuole - Stores cell sap; keeps cell turgid (plant)

Cell → Tissue → Organ → Organ System → Organism

Cell – basic unit of life; smallest structural/functional unit of an organism

Tissue – a group of cells with similar structure, working together to perform a shared function e.g. muscle tissue, xylem tissue

Organ – a structure made of a group of tissues working together to perform specific functions e.g. stomach (muscle, glandular, epithelial tissue), leaf

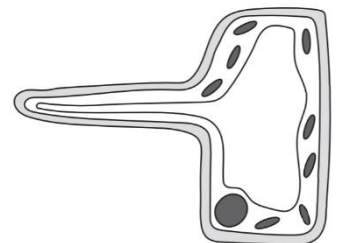
Organ system – a group of organs working together to perform particular functions e.g. digestive system, circulatory system

Organism – a whole living thing, made of organ systems working together e.g. a named plant or animal

Specialised Cells and Their Functions

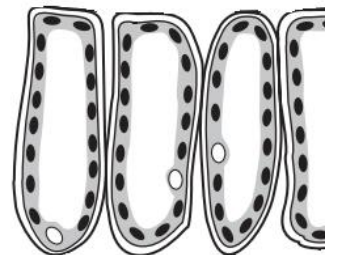
Root hair cell – absorption

- Long, thin extension (hair) increases surface area for water/mineral ion absorption
- Found in roots of plants



Palisade mesophyll cell – photosynthesis

- Column-shaped, packed near leaf surface
- Contains many chloroplasts to absorb maximum light for photosynthesis



Red blood cell – transport of oxygen

- Biconcave disc shape → increases surface area for oxygen absorption
- No nucleus → more space for haemoglobin (which binds oxygen)

