

1.1 - Introduction to cells

calculating magnification - Scale bar measurement
Scale bar Label

- Cells multiply through division
- Mitosis results in genetically identical diploid daughter cells
- Meiosis - generates haploid gametes.

Striated muscle:

- Challenges the idea that cell has one nucleus
- Muscle cells called fibres can be very long
- They are surrounded by a single plasma membrane but they have many nuclei

Aseptate fungal hyphae:

- Challenges the idea that a cell is a single unit.
- They are very large with many nuclei continuous cytoplasm
- Hyphae - Structure of a fungus - form dense networks called mycelium - root like structure.
- They also have many nuclei
- They have cell walls composed of chitin - substance consisting of polysaccharides.
- The cytoplasm is continuous with no end cell wall

Giant algae (Acetabularia)

- Single-celled organism that challenges the idea that cells must be small
- Size - 5-100mm
- Complex in form - bottom rhizoid, long stalk, top umbrella of branches.
- Single nucleus located in rhizoid

How does paramecium show the functions of life?

Metabolism - Pathways happen in the cytoplasm.

Response - cilia moves the paramecium towards food.

Homeostasis - contractile vacuole pull up with water and expel through the plasma.

Reproduction - The nucleus can divide to support cell division by mitosis.



Growth - The paramecium gets larger until it divides.

1.1.03 - Surface area to volume ratio is important in the limitation of cell size.

Diffusion pathways are shorter - molecules do not have to travel far to get in/out of cell.

Concentration gradients are easier to generate - makes diffusion more efficient.

Large surface area is not always an advantage.

Warm blooded mammals lose heat very quickly.

How do organisms maximise surface area: vol ratio?

- As they grow, the cells divide. Two small cells are efficient than one large cell. → allows differentiation

cells compartmentalise → use membranes to carry out metabolic processes

Roots maximise the surface area because they are long, branched and with root hairs.

• Cells and tissues specialised for gas or material exchange will increase their surface area to optimise the transfer of materials

1.1.04 - Multicellular organisms have properties that emerge from the interaction of their cellular components.

- Multicellular organisms are capable of completing functions that individual cells could not undertake

The hull is the system and is composed of a filament made of tungsten, a metal cup and a glass container

1.1.06 - Differentiation involves the expression of some genes and not others in a cell's genome

- All diploid cells of an individual organism share an identical genome. Newly formed cells receive signals which deactivate

1.1.05 specialised tissues can develop by cell differentiation in multicellular organisms.

- All specialised cells and the organs constructed from them have developed as a result of differential