

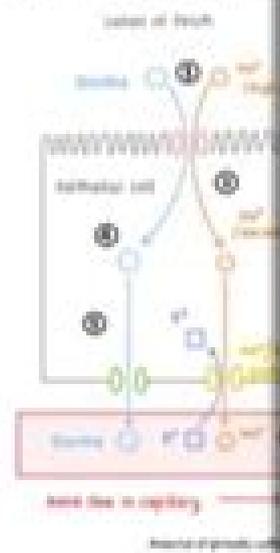
# A\* A-LEVEL BIOLOGY TOPIC 2 NOTES

## CELLS

How do transport work for this example?

1. Surface ions are actively transported out the back, into the blood, by the gulliver.
2. Maintaining a concentration gradient of potassium ions in lumen than out.
3. Surface ions and glucose move by facilitated diffusion from the lumen, into a space.
4. Creating a concentration gradient of all glucose in epithelial cell than lumen.
5. Glucose moves out of cell into blood through a protein channel.

Diagram showing the absorption of water



### Water potential

**Definition:** High movement of water molecules across water potential gradient. They point water always

Water potential = the likelihood ('potential') of water

- Pure water has the highest water potential (0 kJ mol<sup>-1</sup>)
- Adding solutes to a solution lowers the water potential
- Measured in kilojoules mol<sup>-1</sup>
- Can be denoted by the symbol  $\psi$

How about osmosis

- Depends on ATP / energy required
- Factors affecting rate = surface area, water potential difference, thickness of exchange surface / diffusion distance

Application example

Red blood cells contain a variety of solutes dissolved

- If a red blood cell is placed in pure water, it will gain water potential than pure water
- The cell surface membrane will break and burst the cell

- However, if a red blood cell is placed in a solution of pure water, water will leave the cell by osmosis
- The cell shrinks and becomes crenated

Key takeaway point: Water will always move to a

Diagram showing red blood cells in different solutions



### Antibodies

Remember the definition of an antibody

**Antibody:** A protein, specific to an antigen, which

Structure of antibodies - key points

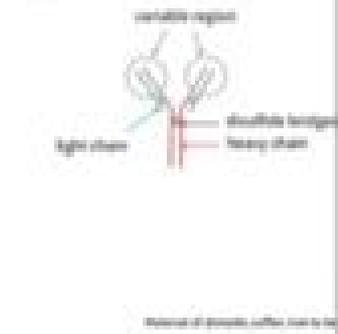
- Quaternary structural protein (links to 1.1.4.2)
- Composed of 4 polypeptide chains (2 heavy and 2 light) joined together by disulphide bridges
- Each chain has a specific region for a specific antigen
- Each specifically to antigens (structural formula)

Exam question example

Describe and explain how the structure of an antibody

- Specific structure of protein = importance of primary structure
- This determines the position of disulphide bonds, which
- which determines the specific shape of the binding site
- Quaternary structure = 4 polypeptide chains (heavy and light)
- Each chain has a specific region (variable region) for a specific antigen
- Contains antigen antibody complex to form

Diagram of an antibody



### Meiosis

The stage of the cell cycle where the cell spends most of its time in G1 and produces most of the cells (this is about as much as you need to know) for your comprehensive examination from 1.1.5.2

- During meiosis, in addition to DNA replication, these processes are also occurring
- DNA replication
  - Protein synthesis
  - Replication of organelles



But this is beyond the scope of A-level and the amount of detail you would be required to know - so don't worry about learning that

### Meiosis

Parent cell 'divides' into two in the G1 phase into two cells

Results in the formation of two genetically identical daughter cells

Stage of mitosis = G2

Complete transcription: Mitosis is not actually the process where the cell divides into two daughter cells. Rather,

Meiosis is the process of the cell, resulting into two genetically identical cells



### Stages of mitosis

Prophase - key points

- Chromosomes condense, becoming shorter and thicker (they appear as two sister chromatids, joined by a centromere)
- Chromosomes become visible under a microscope
- Nuclear envelope breaks down and granules move to opposite sides, forming the spindle apparatus (needed for later stages)

Metaphase - key points

- Chromosomes align along the equator / middle of the cell
- Spindle fibres attach to chromosomes by their centromeres



Source of genetic information is subdivided without generation

# As Level Biology Revision Notes

**RS Peters**



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