

AQA Biology A-level

1.3 - Lipids, 1.7 - Water,

1.8 - Inorganic ions

Flashcards



Describe how to test for lipids in a sample.



Describe how to test for lipids in a sample.

1. Dissolve solid samples in ethanol.
2. Add an equal volume of water and shake.
3. Positive result: milky white emulsion forms



How do triglycerides form?



How do triglycerides form?

condensation reaction between **1** molecule of **glycerol** & **3 fatty acids** forms **ester bonds**

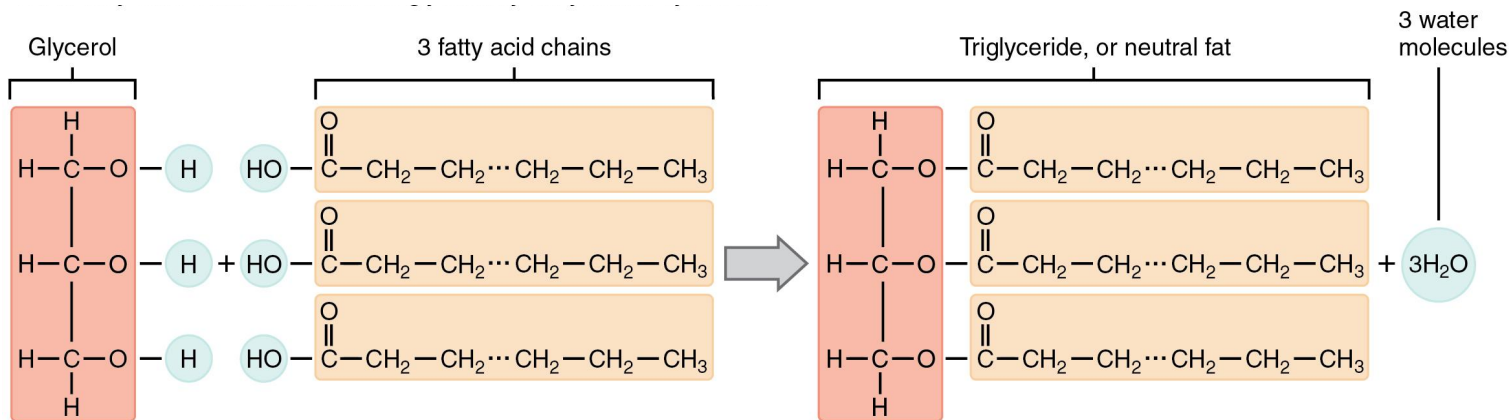


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Contrast saturated and unsaturated fatty acids.



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Saturated:

- Contain only single bonds
- Straight-chain molecules have many contact points
- Higher melting point = solid at room temperature
- Found in animal fats

Unsaturated:

- Contain C=C double bonds
- 'Kinked' molecules have fewer contact points
- Lower melting point = liquid at room temperature
- Found in plant oils



Relate the structure of triglycerides to their functions.



Relate the structure of triglycerides to their functions.

- High energy:mass ratio = **high calorific value** from oxidation (energy storage).
- Insoluble hydrocarbon chain = no effect on water potential of cells & used for **waterproofing**.
- Slow conductor of heat = **thermal insulation** e.g. adipose tissue.
- Less dense than water = **buoyancy** of aquatic animals.



Describe the structure and function of phospholipids.



Describe the structure and function of phospholipids.

Amphipathic molecule: **glycerol** backbone attached to **2 hydrophobic fatty acid** tails & **1 hydrophilic polar phosphate** head.

- Forms phospholipid **bilayer** in water = component of membranes.
- Tails can splay outwards = waterproofing.



Compare phospholipids and triglycerides.



Compare phospholipids and triglycerides.

- Both have glycerol backbone.
- Both may be attached to a mixture of saturated, monounsaturated & polyunsaturated fatty acids.
- Both contain the elements C, H, O.
- Both formed by condensation reactions.



Contrast phospholipids and triglycerides.



Contrast phospholipids and triglycerides.

phospholipids:

- 2 fatty acids & 1 phosphate group attached
- Hydrophilic head & hydrophobic tail
- Used primarily in membrane formation

triglycerides:

- 3 fatty acids attached
- Entire molecule is hydrophobic
- Used primarily as a storage molecule (oxidation releases energy)



Are phospholipids and triglycerides
polymers?



Are phospholipids and triglycerides polymers?

No; they are not made from a small **repeating unit**. They are **macromolecules**.



Why is water a polar molecule?



Why is water a polar molecule?

O is more electronegative than H, so attracts the electron density in the covalent bond more strongly.

forms O δ^- (slight negative charge) & H δ^+ (slight positive charge).



State 4 biologically important properties of water.



State 4 biologically important properties of water.

due to polarity & intermolecular H-bonds:

- Metabolite / solvent for chemical reactions in the body.
- high specific heat capacity.
- high latent heat of vapourisation.
- cohesion between molecules.



Explain why water is significant to living organisms.



Explain why water is significant to living organisms.

- Solvent for polar molecules during metabolic reactions.
- Enables organisms to avoid fluctuations in core temperature.
- Cohesion-tension of water molecules in transpiration stream.



What are inorganic ions and where are they found in the body?



What are inorganic ions and where are they found in the body?

- Ions that do not contain carbon atoms.
- Found in cytoplasm & extracellular fluid.
- May be in high or very low concentrations.



Explain the role of hydrogen ions in the body.



Explain the role of hydrogen ions in the body.

- High concentration of H^+ = low (acidic) pH.
- H^+ ions interact with H-bonds & ionic bonds in tertiary structure of proteins, which can cause them to denature.



Explain the role of iron ions in the body.



Explain the role of iron ions in the body.

Fe²⁺ bonds to **porphyrin ring** to form **haem group** in **haemoglobin**.

Haem group has binding site to **transport 1 molecule of O₂** around body in bloodstream.

4 haem groups per haemoglobin molecule.



Explain the role of sodium ions in the body.



Explain the role of sodium ions in the body.

Involved in co-transport for absorption of glucose & amino acids in lumen of gut (Topic 2.3).

Involved in propagation of action potentials in neurons (Topic 6.2).



Explain the role of phosphate ions in the body.



Explain the role of phosphate ions in the body.

component of:

- DNA
- ATP
- NADP (Topic 5.1)
- cAMP (Topic 6.4)

