B1.1 Carbohydrates and lipids

Checklist

What you should know

After studying this subtopic you should be able to:

- Describe the nature of a covalent bond and that a carbon atom can form up to four single bonds or a combination of single and double bonds with other carbon atoms or atoms of other non-metallic elements.
- Explain how macromolecules, such as polysaccharides, are formed by condensation reactions that link monomers to form a polymer.
- Explain that water molecules are split to provide the —H and —OH groups that are incorporated to produce monomers in a hydrolysis reaction.
- Recognise monosaccharides (pentoses and hexoses) and know the properties of glucose (glucose is soluble, stable and can be oxidised).
- Outline the role of polysaccharides as energy storage compounds (i.e. glycogen, starch) and as structural components (i.e. cellulose).
- Explain the role of glycoproteins in cell—cell recognition (e.g. ABO antigens).
- Describe lipids such as fats, oils, waxes and steroids as hydrophobic substances in living organisms that dissolve in non-polar solvents.
- Explain the difference between saturated, monounsaturated and polyunsaturated fatty acids.
- Recognise that triglycerides and phospholipids are types of lipids that form by condensation reactions and triglycerides are suited to long-term energy storage.
- Recall that triglycerides are used as thermal insulators to body temperature and habitat.
- Describe the formation of phospholipid bilayers as a consequence of the hydrophobic and hydrophilic regions.
- Define the term ‘amphipathic’.
- Summarise the ability of non-polar steroids (e.g. oestradiol and testosterone) to pass through the phospholipid bilayer.
- Identify compounds as steroids from molecular diagrams.