

Macromolecules Review p 26-35

1. Carbohydrates

Carbohydrates are made of the three elements **carbon**, **hydrogen** and **oxygen**.

The most important carbohydrate, glucose, is made by plants during **photosynthesis**.

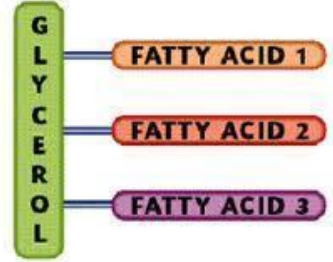
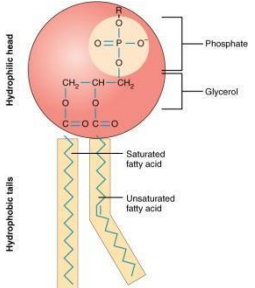
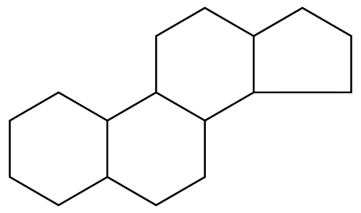
Complete this table comparing carbohydrates.

Category	Name example molecules	Function + Taste	Sample Foods	Sketch
1. Monosaccharides	- Glucose - Galactose - Fructose			
2. Disaccharides	Glucose + glucose ☐ Maltose Glucose + galactose ☐ Lactose Glucose + fructose ☐ Sucrose			
3.a) Starch	Starch			None
b) Glycogen	glycogen			None
c)cellulose	cellulose			None

2. **Lipids** The four main functions of lipids are:

- a. Long-term **energy storage**.
- b. Help to cushion and **support** and provide **temperature regulation** (insulation).
- c. main component of **cell membranes**.
- d. make up **hormones** like **testosterone and estrogen**.

Complete this table describing lipids:

Category	Function	Monomers joined to make this polymer	Sketch
1. Fats or Triglycerides	Energy storage	3 free fatty acids + glycerol	
2. Phospholipids	Form cell membranes, lipoproteins	2 free fatty acids + glycerol + phosphate group	
3. Steroids	Stabilize membranes, form vitamins and hormones	4 Hydrocarbon rings	

The two types of fats are **saturated** and **unsaturated** fats. The healthier fats are the **unsaturated** fats. The foods that contain the healthy fats include **oils (e.g. olive, canola), nuts (e.g. almonds) and avocados**. Are the healthy fats liquid or solid at room temperature? **Liquids**. The unhealthy fats are the **solid** fats. The foods that contain the unhealthy fats include **butter , margarine and fatty cuts of meat**. Which fats contain the “kinky” double bonds in the fatty acid tails? **Unsaturated fats**.

3. Proteins

Foods that are high in protein include **meat, eggs** and nuts. The three functions of proteins in our bodies are:

1. Form **structural elements** of cells.
2. **Enzymes** that speed up chemical reactions.
3. **Transport** substances

Proteins are polymers made of the monomers called **amino acids**. The amino group bonds to the acid group and forms a strong covalent bond called a **peptide** bond. Peptide bonding together 50 to 1000 amino acids forms a **polypeptide** chain. To be a functional protein the polypeptide chain must undergo **secondary** folding (spiral and pleats) and then **tertiary** folding to make a unique 3D shape.

4. Testing for Food Molecules

Indicator Name	Food molecule Tested for	Starting Colour	Ending colour for positive test
Iodine	Starch	light orange-brown	dark blue
Benedicts	Simple sugars (e.g. glucose)	clear blue	“brick-red”
Biurets	Proteins (detects peptide bonds)	Blue	Purple