Glycolipids

They are associations of lipids with carbohydrates. Carbohydrates form a polar head to the molecule (found in membranes)

Steroids

4 rings of C fused together. With functional groups. Cholesterol is used to synthesise:

- Male and female sex hormones
- Aldosterone
- Cortisol
- Bile salts



Vitamins

(Fat soluble vitamins)

- Vitamin A: formed from β -carotene (found in green and yellow vegetables). Involved in reception of light in the eyes.
- Vitamin D: (found in fish liver oil, dairy products) produced by the action of sunlight on cholesterol-like compound in the skin. Regulates absorption of Ca²⁺ in intestine and deposition of Ca in the bones.
- Vitamin E: (found in brown flour, liver, green vegetables) protects the cell membranes
- Vitamin K: (found in green leafy plants) synthesised by bacteria present in the gut essential for blood clotting.

Carbohydrates

Monosaccharides

Consists of one sugar molecule $(CH_2O)_n$, it is soluble in water and they are all reducing sugars (give brick red precipitate with Benedict's Test)

They have a backbone of 3-7 Carbons: trioses (3), tetroses (4), pentoses (5), hexoses (6), heptoses (7).

All C, expect one, have an OH group. The remaining C is an aldehyde (aldose) or a keto group (ketose).

• Glucose: C₆H₁₂O₆

Forms fructose and galactose (isomers)



Optical isomers: 4 different groups are attached to a C (asymmetric C). They are classified dextro and levo referring to the directions in which solutions of these compounds rotate the plane of polarising light. D-isomer is what occurs in living things.

Functions:

- Broken down to release energy for cellular activity
- Linked to form disaccharides and polysaccharides
- Ribose and deoxyribose imp for DNA and RNA synthesis
- Ribulose biphosphate made from ribulose and CO_2 acceptor in photosynthesis
- Triose sugars such as glyceraldehydes and dihydroxycetone are intermediates in respiration and photosynthesis



2. Phosphate group (from phosphoric acid) which gives acidic character.



2 nucleotides form a dinucleotide by condensation by a phosphodiester bond.

