

Food (Biomolecules)

Functions Of Food	Common Elements	Biomolecular Components
To provide energy and materials for growth and repair of cells.	Carbon, Hydrogen, Oxygen, Nitrogen, Sulfur and Phosphorous.	Carbohydrates, Proteins, Lipids, Vitamins, Minerals, Water.

Carbohydrates

Contain carbon, hydrogen and oxygen / general formula = $C_x(H_2O)_y$ **Most Common "y" = 6**

Monosaccharides: (one sugar unit), e.g. glucose, fructose and galactose

Disaccharides: (two sugar units) e.g. sucrose, lactose and maltose

Polysaccharides: (many sugar units) e.g. starch, glycogen, cellulose and chitin-found in the cell wall of a plant cell

Sources of Carbohydrates: bread, rice, pasta, fruit, cake

Catabolic Process that produces: Digestion

Carbohydrate always found in DNA = **Deoxyribose**

Proteins

Contain: Carbon, Hydrogen, Oxygen and **Nitrogen** / some may also contain sulphur / consist of units called amino acids (20 different amino acids used)

Folded-Globular E.g. Haemoglobin, Insulin **Twisted**-Fibrous E.g. α -keratin

Sources of Proteins: meat, fish, eggs, milk, seeds (e.g. soya beans)

Metabolic Role Of protein: Enzymes/hormones/antibodies/contractile

Structural role: Hair / nails / muscle / membranes / chromosomes

Lipids (fats and oils)

Contain: Carbon, Hydrogen, Oxygen (lipids do not 2H: 10 ratio)

Basic Unit: Triglyceride (1 glycerol + 3 fatty acids)

Fats - solid at room temperature / **Oils** - liquid at room temperature

Phospholipids - fatty acid replaced with a phosphate group, **Found** in Cell membrane

Sources of lipid: butter, oil, red meat, nuts, cheese

Structural Role of Biomolecules

Carbohydrates → Cellulose in plant cell wall / chitin in the cell wall of fungi

Protein → Collagen in skin / myosin in muscle

Lipids → Phospholipids in cell membranes

Metabolic Rate of Biomolecules

Carbohydrates → Release of energy (glucose)
→ Storage of energy (starch in plants, glycogen in animals)

Proteins → Formation of enzymes and some hormones (e.g. insulin)

Lipids → Release and storage of energy

Vitamin D (fat-soluble) → Absorption of calcium in the gut

Deficiency Disease → Rickets in children

Vitamin C (Water-soluble) → Formation of skin and blood vessels

Deficiency Disease → Scurvy

Minerals Required by Plants

Calcium → Formation of middle lamella between plant cell walls

Magnesium → Formation of Chlorophyll

Minerals Required by Animals

Calcium → Formation of bones and teeth

Iron → Formation of haemoglobin

Importance of H₂O for Living Organisms

A component of cytoplasm and body fluids / good solvent / transport medium / medium for chemical reactions / takes part in chemical reactions e.g. photosynthesis / moves dissolved substances in and out of cells, e.g. O₂, CO₂ / controls cell shape, e.g. guard cells / A good absorber of energy / strong cohesion

Cells and body fluids are made up of 70% to 95% water

Vitamins are essential organic catalysts of metabolism.
Vitamins can either be water-soluble or fat-soluble.
Vitamins B and C are water-soluble.
Vitamins ADEK is fat-soluble.