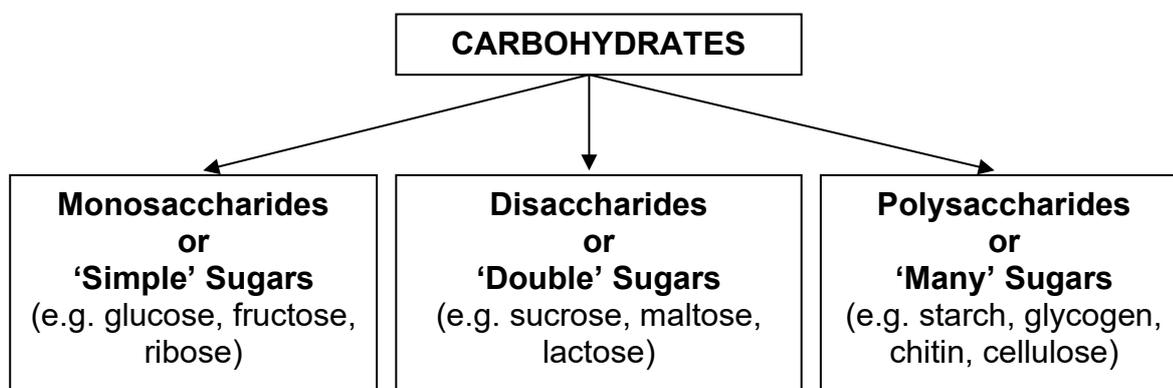


ORGANIC MACROMOLECULES

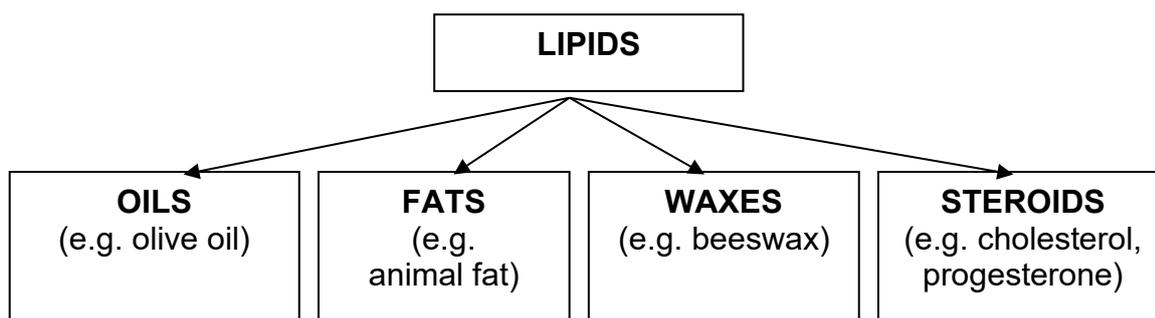
- **Organic compounds** are those that contain _____ (e.g. carbohydrates, lipids, _____, nucleic acids).
- For example, a piece of human liver contains 80% water, 12% protein, 5% fats, 2% nucleic acids, 1% carbohydrate and less than 1% of other substances.
- Many organic molecules are assembled from **small repeated units**. Proteins are macromolecules made from _____ acids, nucleic acids are made from nucleotides, carbohydrates are made from _____ sugars, and lipids are made from fatty acids and _____
- Carbohydrates, proteins and nucleic acids are generally large macromolecules, whereas lipids are _____

CARBOHYDRATES

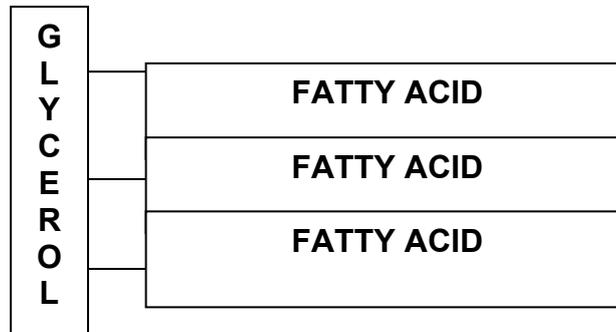


- Carbohydrates are a ready source of _____
- All carbohydrates are built up from monosaccharides or simple _____, which can be formed in photosynthesis. During digestion, carbohydrates are mostly broken down to _____. Sugar in animals is transported in the form of glucose.
- Polysaccharides or 'many sugars' differ in their chemical structure. Animals cannot digest _____ and store their carbohydrates as glycogen. Plants use cellulose as a major component in cell _____. Chitin is a major component of the exoskeleton of insects and crabs.

LIPIDS (FATS AND OILS)



- Lipids are hydrophobic ('water-hating' or insoluble in water).
- Functions of lipids are:
 1. Long-term energy storage, providing 6 times as much _____ as carbohydrates
 2. Lipids and proteins are the major structural components of _____ membranes
 3. Insulation e.g. whale blubber



- Lipids are made of 1 glycerol molecule (an alcohol) and 3 different fatty acid molecules, and are often called triglycerides. Human digestive enzymes break down lipids to _____ and glycerol in digestion.

PROTEINS (POLYPEPTIDES)

- Proteins are macromolecules that consist of long, unbranched chains of amino acids. These chains may contain about 20 up to hundreds of _____ acids. An example of the size of proteins is the red pigment in red blood cells called haemoglobin with the chemical formula –
- $C_{3032} H_{4816} O_{872} N_{780} S_8 Fe_4$
- Each cell contains hundreds of different proteins, and each kind of cell has some proteins that are _____ to it.
- There are about 20 different amino acids, that can be arranged in billions of ways to make long-chain _____
- Not all proteins contain all of the possible amino acids.
- Proteins are broken down by digestive enzymes to amino acids, and then these amino acids are reassembled to form different body proteins (e.g. _____, hormones).
- About 12 of the amino acids can be synthesised by the human body (in ribosomes), but 8 amino acids cannot be made by the body. These 8 must be included in the diet, and are called _____ amino acids.
- 5 Functions of Proteins:
 1. Supporting structure (e.g. cell _____)
 2. Metabolism (e.g. enzymes)
 3. Immune defence (e.g. _____)
 4. Body regulation (e.g. hormones)
 5. Last resort _____ source after carbohydrates and lipids
- Proteins may also be completely broken down to form the nitrogenous wastes of urea and _____ acid (in human urine and _____) or ammonia (in other animals).

NUCLEIC ACIDS (DNA and RNA)

- DNA or Deoxyribonucleic Acid forms the _____ and is found only in the nucleus of cells
 - RNA or Ribonucleic Acid is found in the nucleus, ribosomes, and some other parts of the cell such as mitochondria and chloroplasts.
-

GLOSSARY OF CHEMISTRY TERMS

Atom

- The building block of matter
- There are more than 100 different types of atoms known, as shown in the Periodic Table. Only 92 are naturally-occurring with hydrogen as the lightest and uranium as the heaviest of these.
- The most common atoms on earth are carbon (C), hydrogen (H), oxygen (O), nitrogen (N), phosphorus (P) and sulphur (S).

Ion

- A charged atom
- If an atom loses an electron/s, it becomes a positively-charged ion (e.g. hydrogen ions are H^+).
- If an atom gains an electron/s, it becomes a negatively-charged ion (e.g. oxygen ions are O^{2-}).

Element

- A substance composed of only one type of atom (e.g. gold Au)

Compound

- A substance composed of more than one type of atom (e.g. water H_2O)

Molecule

- The smallest particle of an element or a compound

Acid

- A compound containing hydrogen ions
- Has a pH less than 7 (7 is neutral e.g. water)
- Sour taste
- Changes blue litmus paper to a red colour
- Examples of acids in living organisms are: vinegar (acetic acid), lactic acid (from sour milk), sweat, urine

Base or Alkali

- A compound that neutralises an acid
- Has a pH more than 7
- Soapy feel
- Changes red litmus paper to a blue colour
- Example of a base in a living organism is blood