

Carbohydrate

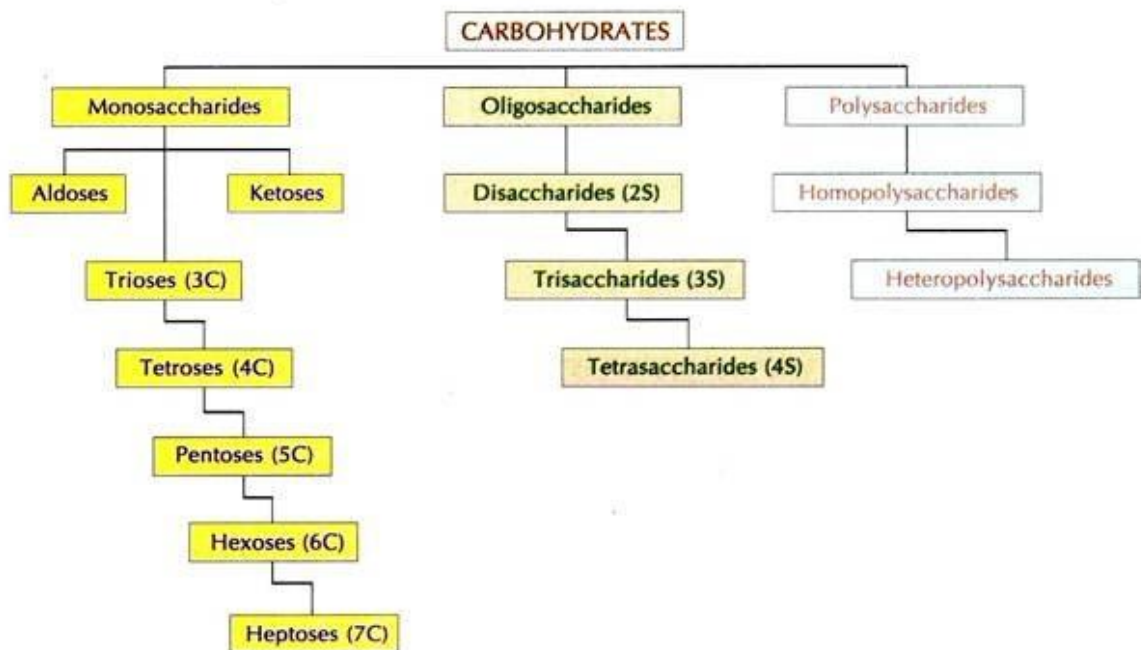
A **carbohydrate** is a biomolecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms, usually with a hydrogen–oxygen atom ratio of 2:1 (as in water). The general structure for carbohydrates is $(\text{CH}_2\text{O})_n$. Monosaccharides, which are simple sugars that necessary for living organisms and are required as energy sources. The carbohydrates are technically hydrates of carbon; structurally it is more accurate to view them as aldoses and ketoses.

The Functions of Carbohydrates

Carbohydrates have six major functions within the body the most important four are included:

- 1- Providing energy
- 2- Regulation of blood glucose.
- 3- Sparing the use of proteins for energy.
- 4- Breakdown of fatty acids and preventing ketosis.

Carbohydrate Classification



Carbohydrate Reactions

1- Carbonyl group

Oxidation to a carboxylic acid group, reduction to a hydroxyl group, cyanohydrin reaction (and reaction with other nucleophiles)

2- Hydroxyl groups

Esterformation, etherformation, cyclic acetal, oxidation to carbonyl, reduction to deoxy and replacement with NH_2 , SH , or X

Where X is halogen

3- Both carbonyl and hydroxyl groups

Cyclic hemiacetals (pyranose/furanose), formation of acetals (glycosides) and aldose/ketose isomerizations