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CARBOHYDRATE

Sugars or carbohydrates are usually into three groups: (I) Monosaccharides (II) oligosaccharides (III) Polysaccharides. Simplest sugars are monosaccharides with the general formula $(CH_2O)_n$, where n is an integer varying from 3 to 7. The simplest of these monosaccharides are those, with $n=3$ giving a molecular formula $C_6H_6O_3$ represented by compounds the glyceraldehyde (an aldehyde) or dehydroxyacetone (a ketone) shown in fig. Another class of common monosaccharides are represented by pentoses (ribose and deoxyribose), which are used as building blocks to nucleotides and nucleic acids.

However, the most common monosaccharide found in the cell is glucose with the formula $C_6H_{12}O_6$ and having either an open chain form or a ring form. In their open chain form, in addition to number of hydroxyl groups, sugars contain either an aldehyde (H-C=O) group as in glucose or a keto (C=O) group as in fructose. The aldehyde or keto group can react with a hydroxyl group in the same molecule to convert open chain into a ring form, which can exist in several isomeric forms (ex D-glucose and L-glucose; α-D glucose and β-D glucose;. In its ring form the carbon of the original aldehyde or keto group can be recognized as the only carbon atom, that is bonded with two oxygens. The hydroxyl groups of a simple monosaccharide can also be replaced by other groups to give derived monosaccharides. Further, in its ring form, the carbon of the original aldehyde or ketone group in a sugar molecule can become linked to

to the sugar molecule through one of its carbon atoms bearing a hydroxyl group) to form a disaccharide. The phenomenon is described as condensation (the reverse process being hydrolysis). The linkage between two monosaccharide sugar molecule is called glycosidic linkage or glycosidic bond, because the hydroxyl group at carbon atom no. 1 (C-1), which is involved in this linkage is described as glycosidic hydroxyl. Depending upon the positions of carbon atoms in two monosaccharide molecules involved in glycosidic linkage, the linkage can be described as 1-4, 1-6 or 1-2. Further, dependig upon the α or β forms of each of the two molecules (or α form of one molecule and β form of the other molecule) involved in linkage, the linkages

can be described as follows: α-1, 4 linkage, β-1, 4 linkage; α-1, 6 linkage and α-1, β-2 linkage etc. Even a simple disaccharide consisting of two glucose residues can exist in eleven different forms. Some the common disaccharides, their monosaccharide constituents and glycosidic linkages are summarized