

Let's begin our discussion of carbohydrates.

Carbohydrates are one of the four major classes of biological molecules.

Carbohydrates are also the most abundant biological molecules.

The various sugars, starches and cellulose are common carbohydrates.

Carbohydrates derive their name from the general formula  $C_n(H_2O)_m$  where  $n \geq 3$ .

For most simple sugars,  $m = n$ .

glyceraldehyde	$C_3H_6O_3$
ribose	$C_5H_{10}O_5$
glucose	$C_6H_{12}O_6$

For simple sugars, the formula is then sometimes represented as  $(CH_2O)_n$ .

Carbohydrates are chemically characterized as polyhydroxyaldehydes or polyhydroxyketones.

In simple sugars, however, one of the hydroxyl groups generally reacts with the carbonyl group to form an intramolecular hemiacetal or hemiketal as previously observed for ribose and deoxy ribose.

Consider the structure, nomenclature and occurrence of carbohydrates.

Among the carbohydrates are the simple sugars that contain 3-7 carbon atoms. The most abundant of these contain 5 and 6 carbon atoms.

Simple sugars are also referred to as monosaccharides because they are the monomer units of more complex carbohydrates called polysaccharides.

Sugars that contain an aldehyde group are called aldoses.

Sugars that contain a keto group are called ketoses.

Simple sugars are also classified according to the number of carbon atoms, i.e., pentoses, hexoses and heptoses.

More specific names are also used to indicate the kind of carbonyl group and the number of carbon atoms, i.e., aldopentose, ketohexose etc.

The names and structures of D-aldoses and D-ketoses up to C<sub>6</sub> are shown in Figs 20-1 and 20-2.