## Sugars = Carbohydrates = Saccharides

- $C + H_2O$
- $C_N H_{2N} O_N$  is the approximate general molecular formula



$$CO_2 + H_2O \xrightarrow{hv} C_6H_{12}O_6 + O_2$$
  
D-glucose

- $4 \times 10^{11}$  metric tons of CO<sub>2</sub> fixed
- hv = 0.02% sun's energy on earth used in photosynthesis
- Green Plants perform photosynthesis

D-Glucose:



- groups on horizontal are toward you Fischer projection Aldo-Hexose







• A D-sugar has R configuration for highest number stereogenic center.

D-Ribose:



## Isomers of monosaccharide:



\* In the above case, the hemiacetal formation could give both isomers ( $\alpha$  and  $\beta$ ), depending on which face of the carbonyl is attacked. Usually  $\alpha$  favoured (anomeric effect)

Taste and Sweetness:





OH C-O R hemiacetal ( has one -OH and one -OR group)

H, Δ

R 0

an acetal ( has two -OR groups)

Mechanism of acetal formation



- Sucrose – disaccharides (glucose + fructose)



Non-reducing (acetals)

 $\beta$ -D-fructofuranosyl- $\alpha$ -D-glucopyranoside