

**Sugars**  
10/29/09

**Carbohydrate and sugar structure**

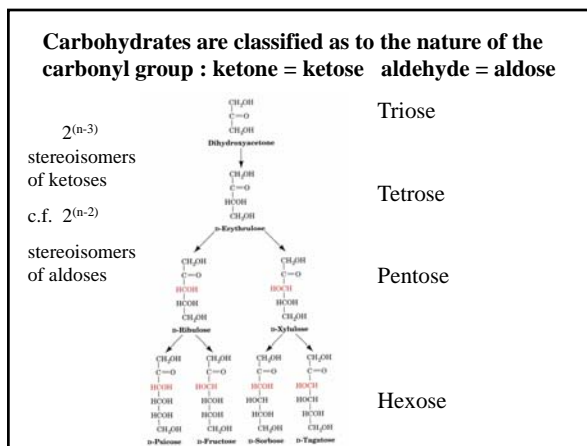
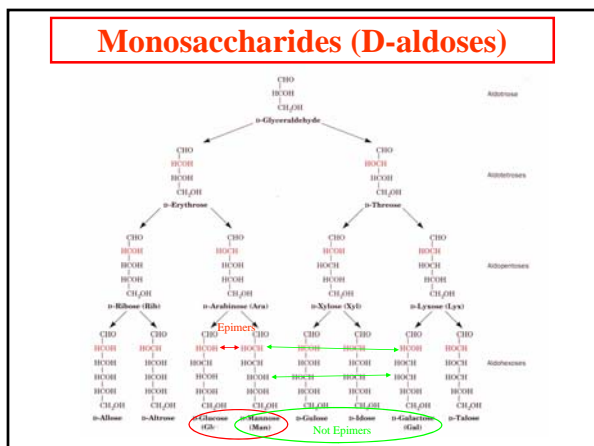
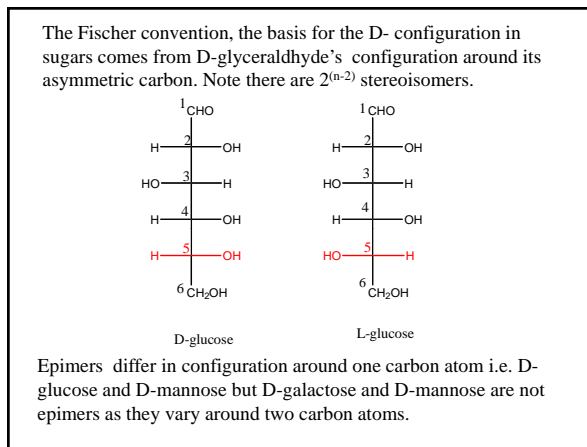
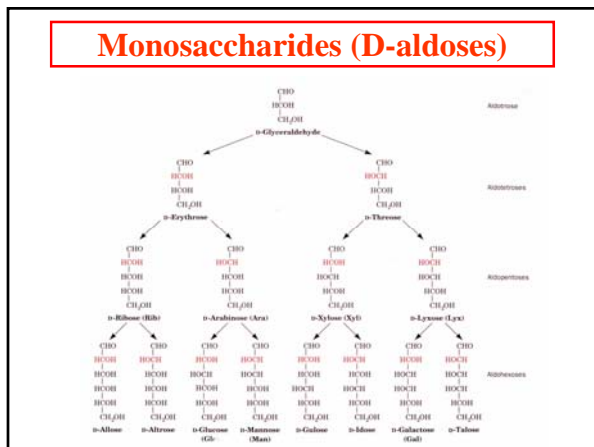
Carbohydrates or saccharides are essential components of living organisms.

$(C \cdot H_2O)_n$  Where  $n=3$  or greater.

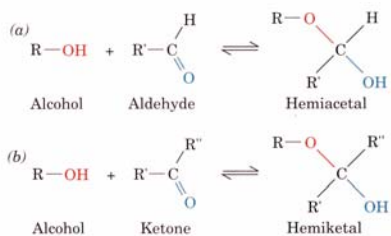
A single saccharide is called a monosaccharide.

Oligosaccharide is a few linked monosaccharides and are at time associated with proteins (glycoproteins) or lipids (glycolipids)

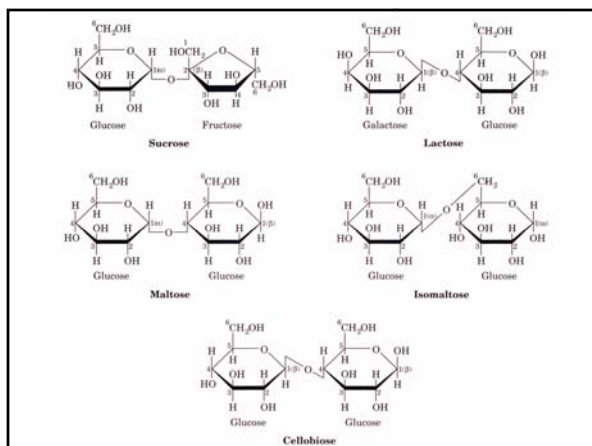
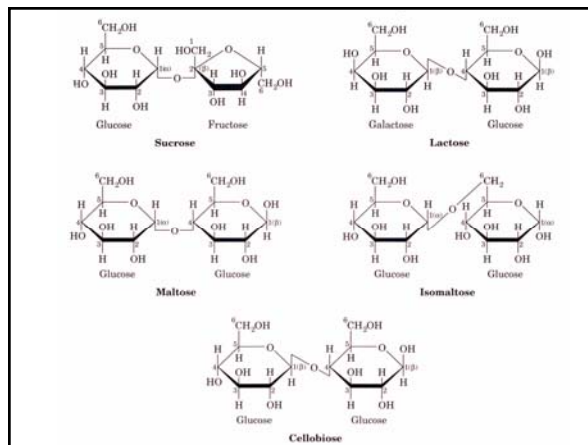
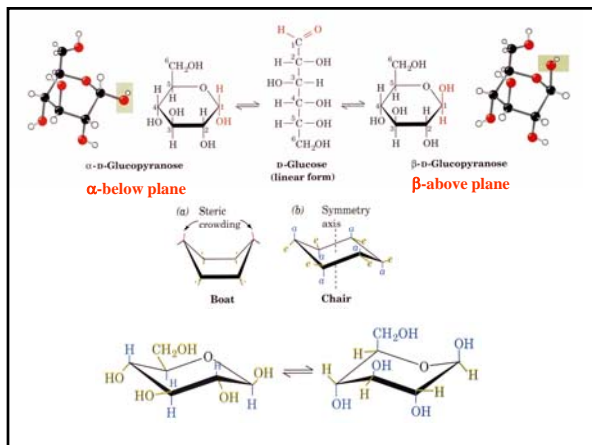
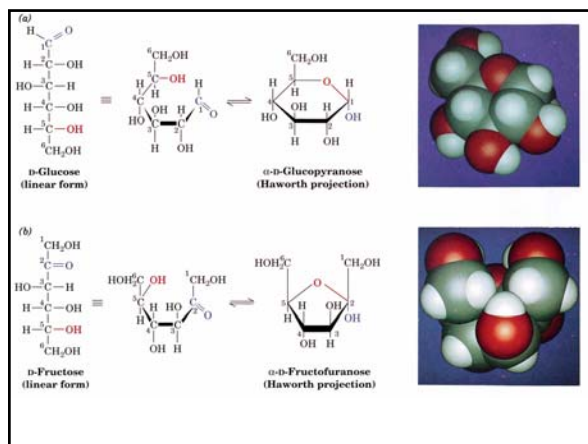
Polysaccharides consist of many monosaccharides i.e. cellulose or glycogen



**Monosaccharides can form ring structures**

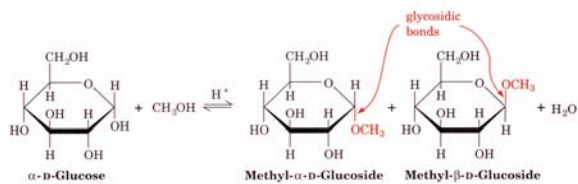


Note that unlike condensation reactions there is NO loss of a water molecule in these cyclization reactions.



**Glycosidic bonds are between two sugars**

They can either be in the  $\alpha$  or  $\beta$  configuration and can be linked through the 1-2, 1-4 or 1-6 linkage

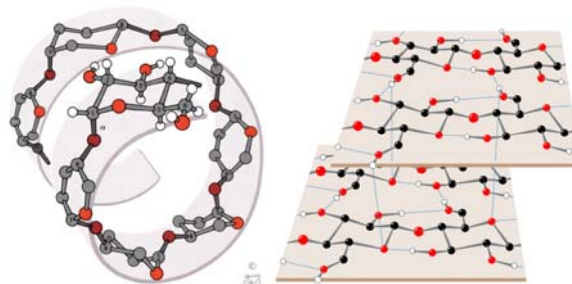


Note loss of water from condensation reaction above.

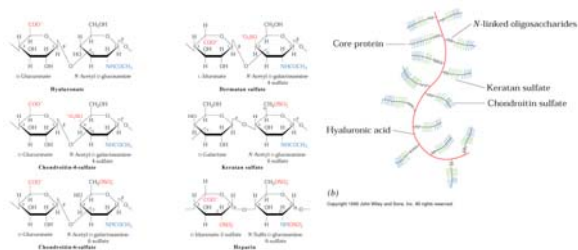
## Sugar Polymers The Polysacchrides

- Energy Storage
  - Starch  $\alpha$ -amylose and amylopectin
- Structural
  - Cellulose and Chitin
- Glycosaminoglycans
- Proteoglycans

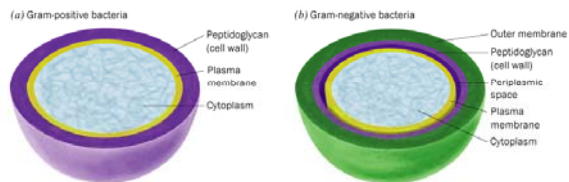
## $\alpha$ -amylose (starch) / Cellulose (poly $\beta$ -glucose)



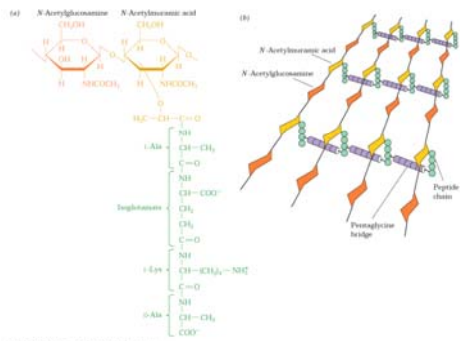
## Glycosaminoglycans & Proteoglycans



## Bacteria Cell Walls



## Peptidoglycan



**Next Lecture  
Tuesday 11/03/09  
Glycolysis I**