





Biochemistry

Mrs. Kornelsen



Great Website for interactive biochemistry activities:

- <http://www.wiley.com/legacy/college/boyer/0470003790/animations/animations.htm>
- http://www.youtube.com/watch?v=SH1eYpryRVc&safety_mode=true&persist_safety_mode=1&safe=active

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- The 4 main types of biomolecules include:
 - Carbohydrates
 - Lipids
 - Proteins
 - Nucleic acids

Carbohydrates - Monosaccharides

- **Monosaccharides – simple sugars**

i. Glucose $C_6H_{12}O_6$ blood sugar

i. Fructose $C_6H_{12}O_6$ fruit sugar

ii. Galactose $C_6H_{12}O_6$ produced by
the breakdown of lactose

Carbohydrates - Monosaccharides

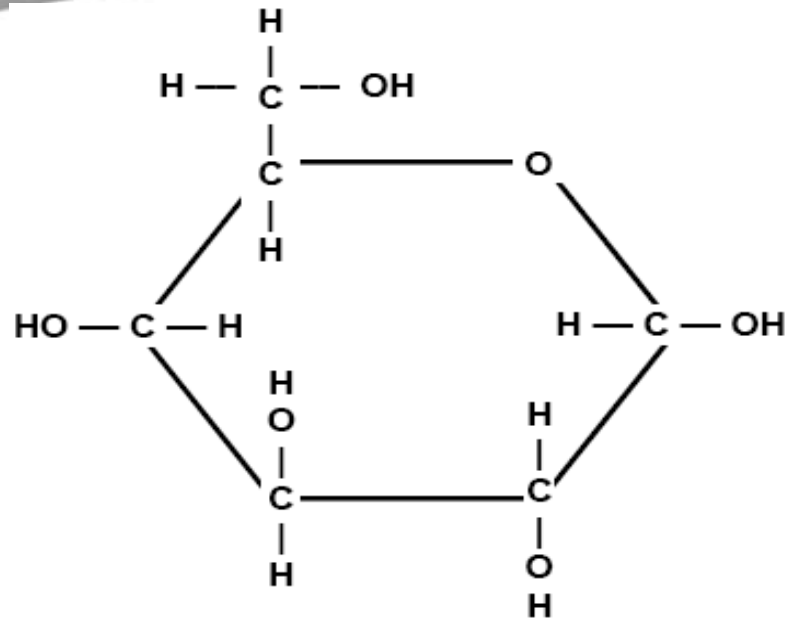
- **Monosaccharides – simple sugars**

i. Glucose $C_6H_{12}O_6$ blood
sugar

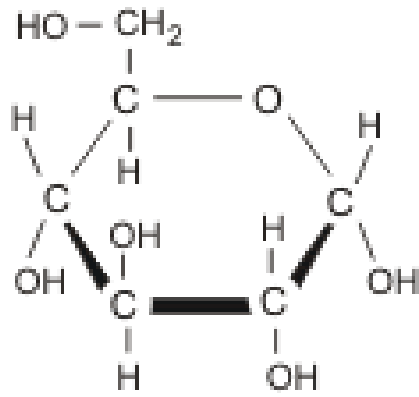
i. Fructose $C_6H_{12}O_6$ Fruit sugar

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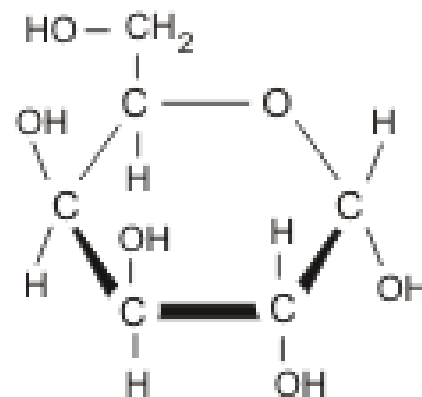
Glucose



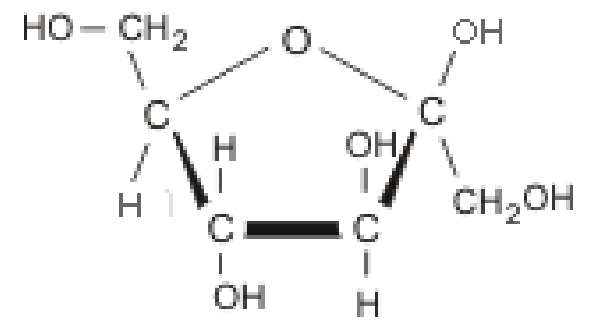
- The structural diagram of **glucose**. Glucose differs from fructose and galactose only in the arrangement of the elements



Glucose



Galactose



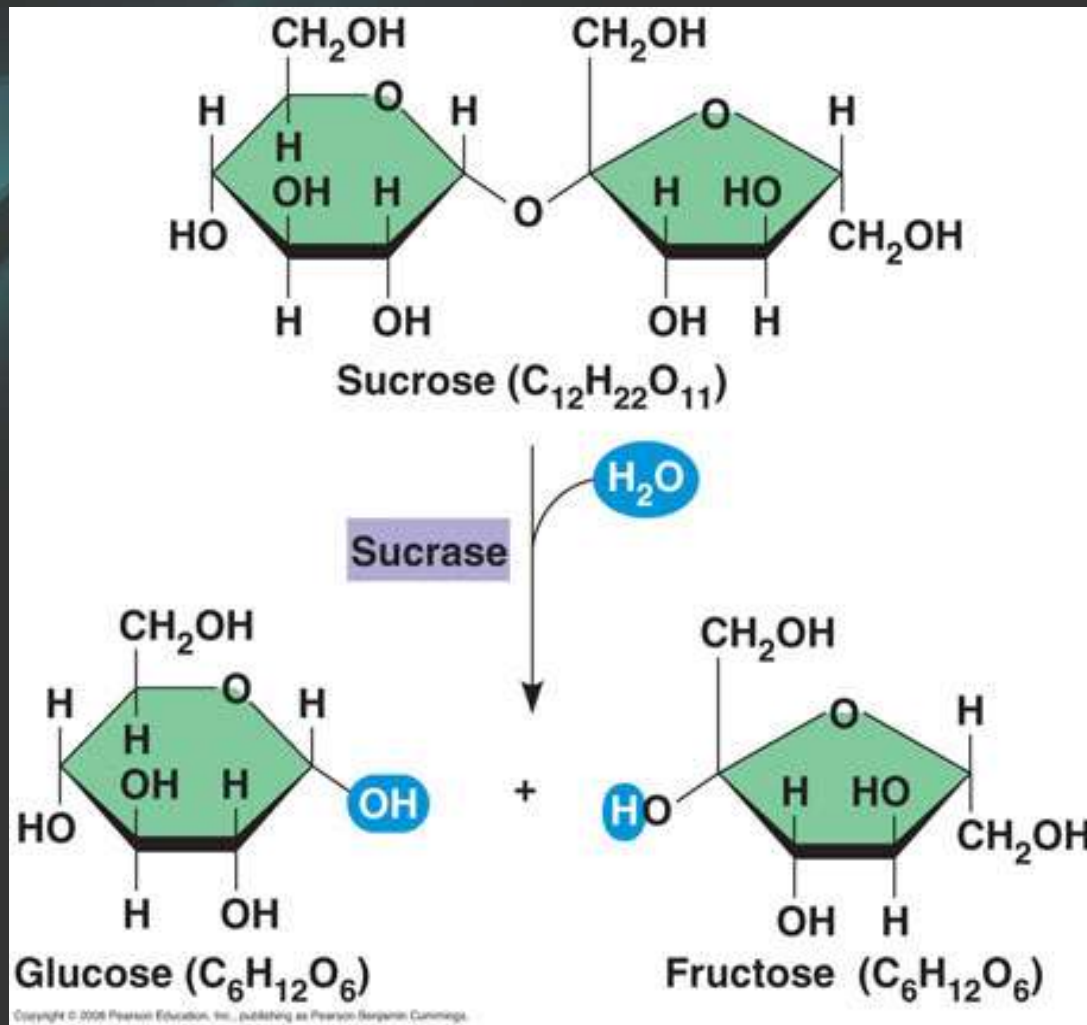
Fructose

Figure 3 : Glucose, galactose et fructose représentés en HA WORTH

Carbohydrates – Disaccharides (compound sugars)


- i) **Maltose** $C_{12}H_{22}O_{11}$
- Produced by starch digestion present in malt. Composed of two molecules of **glucose**
- ii) **Sucrose** $C_{12}H_{22}O_{11}$
- Table sugar, produced in sugar cane and beets. Composed of **glucose** and **fructose**
- iii) **Lactose** $C_{12}H_{22}O_{11}$
- Milk sugar, composed of **glucose** and **galactose**

Hydrolysis of Sucrose



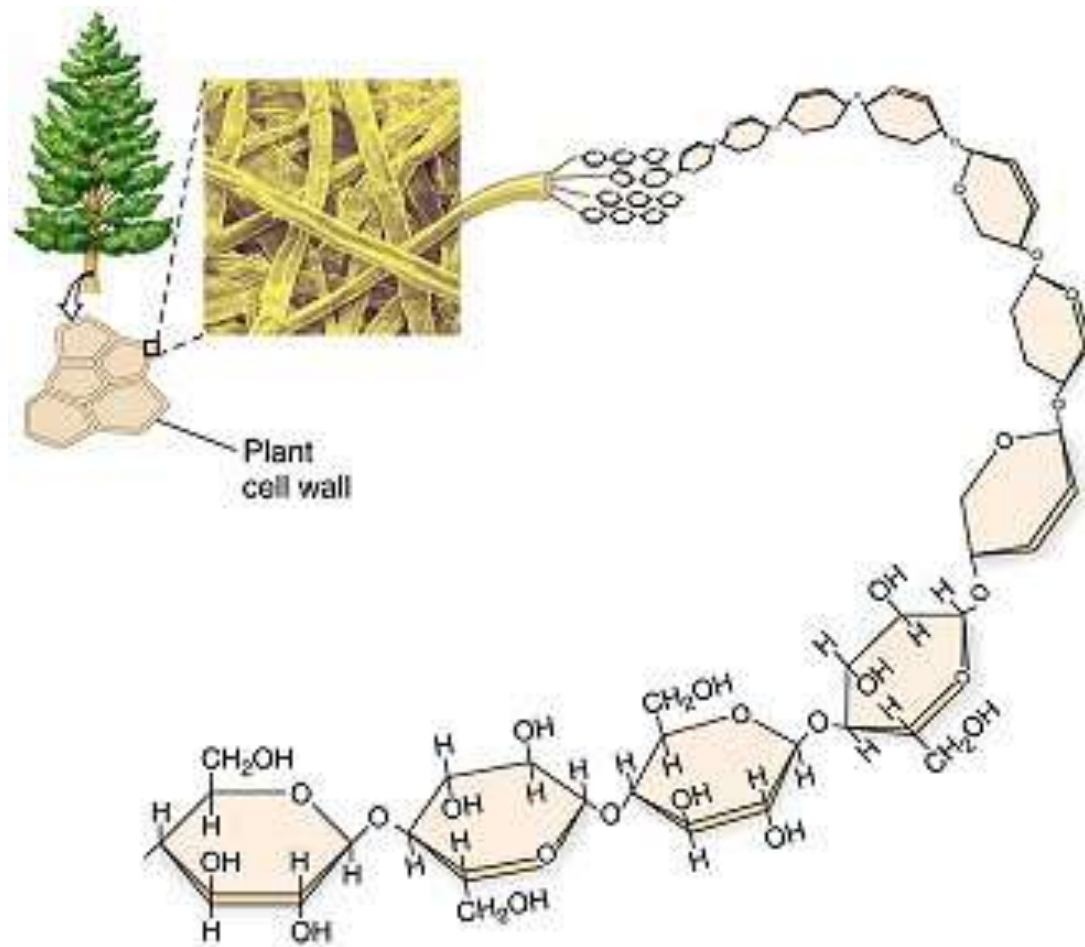
Note

- All monosaccharides have the formula $\text{C}_6\text{H}_{12}\text{O}_6$
- All disaccharides have the formula $\text{C}_{12}\text{H}_{22}\text{O}_{11}$
 - These molecules are known as structural isomers. They have the same molecular formula but different structural formula



Carbohydrates - Polysaccharides

Cellulose, starch, and glycogen are examples of complex carbohydrates. These occur when many monosaccharides are bonded together.

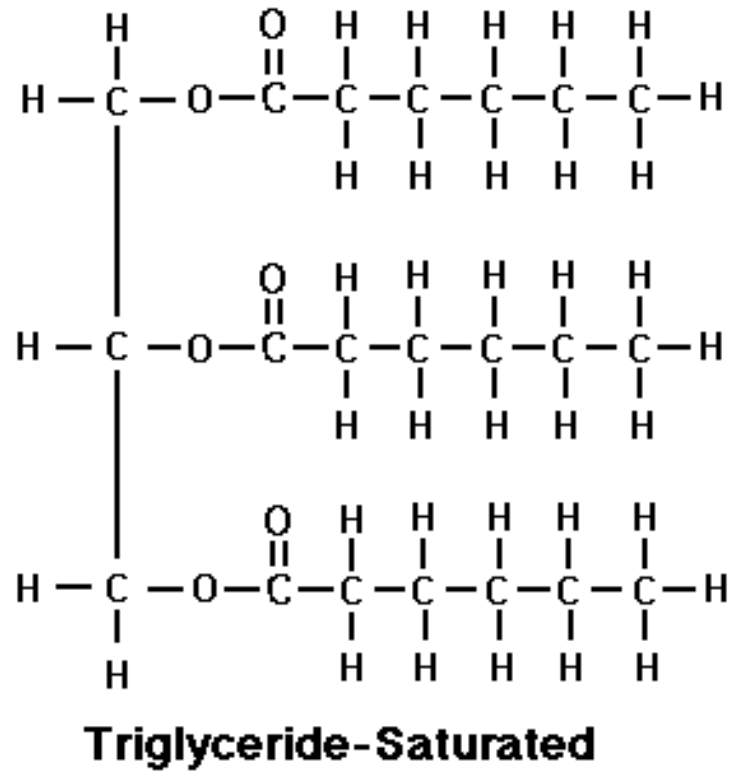
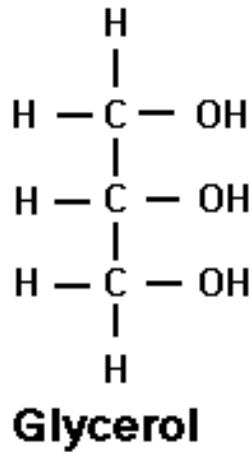




Lipids

Lipids (fats) are made up of the following:

- i. One glycerol
- ii. 3 fatty acid chains



Because three fatty acids are attached to one glycerol, a lipid is sometimes referred to as a **triglyceride**

Functions of Lipids

Function of Lipids:

- Insulation from cold
- Protection of internal organs from injury
- Energy as a food source
- Structural (waxes)
- Dissolves fat soluble vitamins

Unsaturated Fats vs. Saturated Fats:

Saturated Fats (animal)	Unsaturated Fats (plant)
Solid at room temperature	Liquid at room temperature
Found mainly in animals	Found mainly in plants
Raise blood cholesterol	Tend to lower blood cholesterol
Contain only single bonds in fatty acid chains	Contain double bonds in fatty acid chains

Passive Transport Website

- <http://www.northland.cc.mn.us/biology/BIOLOGY1111/animations/passive1.swf>
- * See [Just Passing Through Animation](#)