

## Outline

- Carbohydrates
  - Structure
  - Classification
  - Properties
- Energy
- Nutrasweet

## Carbohydrate

- General Formula =  $C_m(H_2O)_n$

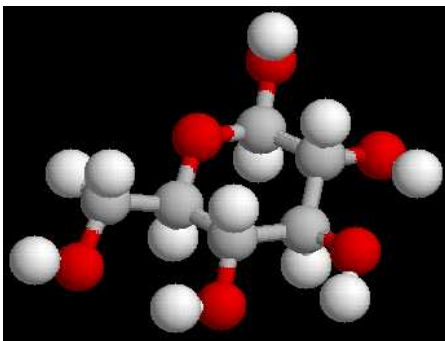
## Examples:

- Glucose (blood sugar):  $C_6H_{12}O_6$
- Sucrose (table sugar):  $C_{12}H_{22}O_{11}$

## Structural Feature

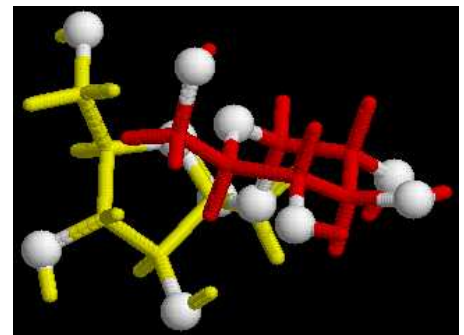
- Lots of  $-O-H$  groups
- High solubility in water

## Glucose



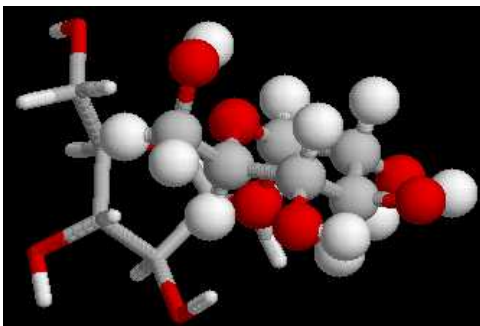
Glucose is a **monosaccharide**

## Disaccharides



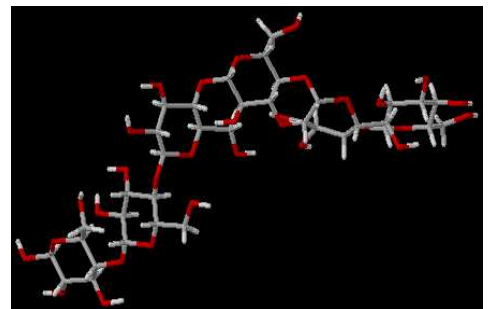
Sucrose contains two different monosaccharide rings.

## Sucrose

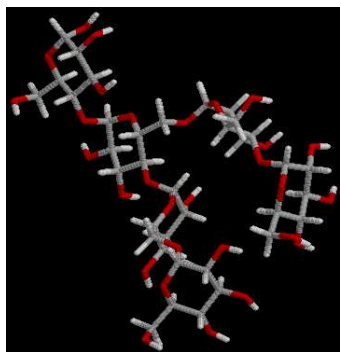


Sucrose is a **disaccharide**

## Cellulose



Cellulose is a **polysaccharide** - made from glucose



Starch is a **polysaccharide** - made from glucose

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Glucose is a common carbohydrate

- **Monosaccharide**  
Glucose itself is blood sugar
- **Disaccharide**  
Glucose is found in sucrose, lactose (milk sugar), and other disaccharides
- **Polysaccharides**  
Glucose polymers form cellulose, starch, and glycogen

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The following are standard values for different classes of foods.  
Note that a Nutritional calorie is equal to 1000 scientific calories.

Class	Fuel Content	Average Supply
Carbohydrates	~4 Cal/gram	~1 day
Fats	~9 Cal/gram	~3 months
Proteins	~4 Cal/gram	?

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■ **Sugars:**



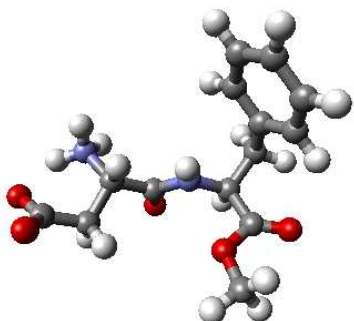
$$6 \text{O}_2 / 6 \text{ carbons} = 1 \text{O}_2 \text{ per C atom}$$

■ **Fats:**



$$26 \text{O}_2 / 18 \text{ carbons} \simeq 1.4 \text{O}_2 \text{ per C atom}$$

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[D. Eric Walters \(Chicago Medical School\) site](#)

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