

## Chapter 3 – Biochemistry, Nutrition, and Water



Link in Purple Packet – Box tops, Biochemistry Puzzle Activity / Biochemistry food flyer

### Section 3: The Molecules of Life – Nutritional Information

1. Carbohydrates
2. Lipids
3. Proteins

#### Organic Molecules (“MACROMOLECULES” – very large molecules)

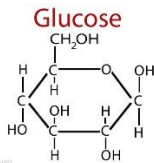
##### 1. Carbohydrates (ends in -ose)

###### a. Properties

- i. Made up of a Hydrogen to Oxygen ratio of 2 to 1
  1. There are 2 hydrogens to every 1 oxygen
- ii. Basic energy source
- iii. Store energy
- iv. Form structures

###### b. Monomer Unit

- i. Glucose:  $C_6H_{12}O_6$



###### c. Types of Carbohydrates

- i. Monosaccharides – Single Sugars  $C_6H_{12}O_6$  (1:2:1 ratio)

###### 1. Glucose

- a. **Remember:** it is the monomer unit
- b. Used in large carbs
- c. Basic energy molecule
  - i. We burn this like wood in a woodstove

###### 2. Fructose

- a. Fruit sugar
  - i. Found in plants, corn syrup
  - ii. It can turn quickly to glucose, but it also quickly turns into fat

###### 3. Galactose

- a. Found in milk

###### 4. Ribose

- a. In RNA (ribonucleic acid)

###### 5. Deoxyribose

- a. In DNA (deoxyribonucleic acid)

**Sidenote:** Sugar has the formula in general of  $C_n(H_2O)_n$

N= the number of molecules

So a 5 carbon sugar molecules would be:  
 $C_5H_{10}O_5$

So a 6 carbon sugar molecule would be:  
 $C_6H_{12}O_6$  – THIS IS THE BASIC FORMULA FOR CARBOHYDRATES

**Prefix:** Mono means one

**Word base:** Saccharide means sugar

3 Most Important to Know

**Isomer:** each of two or more compounds with the same formula  $C_6H_{12}O_6$  but a different arrangement of atoms in the molecule and different properties.

## ii. Disaccharides – Two sugars

- ✓ Formed by joining **two** monosaccharides through **Dehydration Synthesis**

### 1. Sucrose

- Table sugar
- Sucrose is made of glucose + fructose
- Has glucose in it because glucose is the monomer unit

### 2. Maltose

- Malt sugar
  - Ex: whoppers or milk duds
- Maltose is made of glucose + glucose
- Has glucose in it because glucose is the monomer unit

### 3. Lactose

- Milk sugar
- glucose + glucose + galactose
- Has glucose in it because glucose is the monomer unit

## iii. Polysaccharides – Many Sugars

- ✓ Formed by joining **many** monosaccharides through **Dehydration Synthesis**

### 1. Glycogen

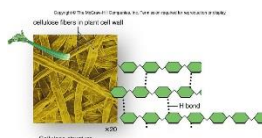
- Storage form of glucose in animals
- Stored in muscles and the liver

### 2. Starch

- Storage form of glucose in plants
- Stored in roots and seeds

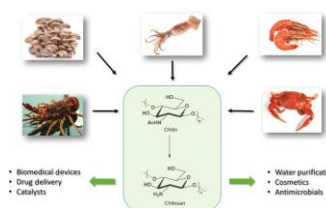
### 3. Cellulose (fiber)

- Bonded glucose in plants
- Makes-up plant cell walls
- Humans cannot digest cellulose



### 4. Chitin

- Modified glucose molecule
- Insect exoskeletons



Link – Biochemistry Foldable - Carbohydrates



**What characteristics do carbohydrates possess that enable them to function in living organisms and support life?**

**Answer:** Carbs are made up of a Hydrogen to Oxygen ratio of 2 to 1, **they are our** basic energy source, they store energy, and they help form structures.