

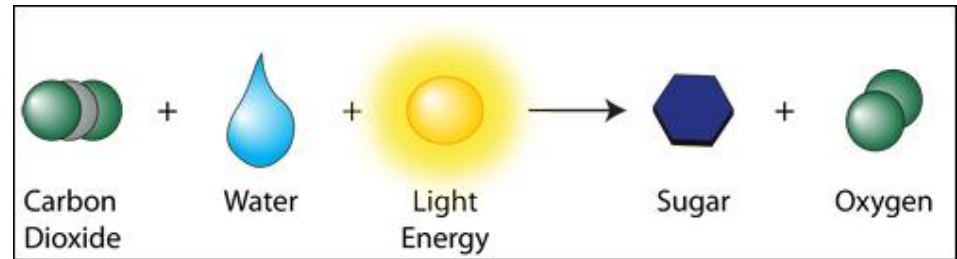
Carbohydrates: Saccharides Breakdown



Carbohydrates

- Glucose provides energy for the brain and $\frac{1}{2}$ of energy for muscles and tissues
 - Immediate energy
- Glycogen is stored glucose
 - Reserve energy
 - Excess turns to fat in the body

Carbohydrates



- Found in all foods from plants
 - Nature's means of storing solar energy
 - Photosynthesis:
 - Plants convert energy from the sun into carbohydrates

- Found in milk



- Carbohydrates are not equal
 - Simple carbohydrates
 - complex carbohydrates

Simple Carbohydrates Review

- Sugars
 - Monosaccharides – single sugars
 - Disaccharides – 2 monosaccharides

Simple carbohydrates

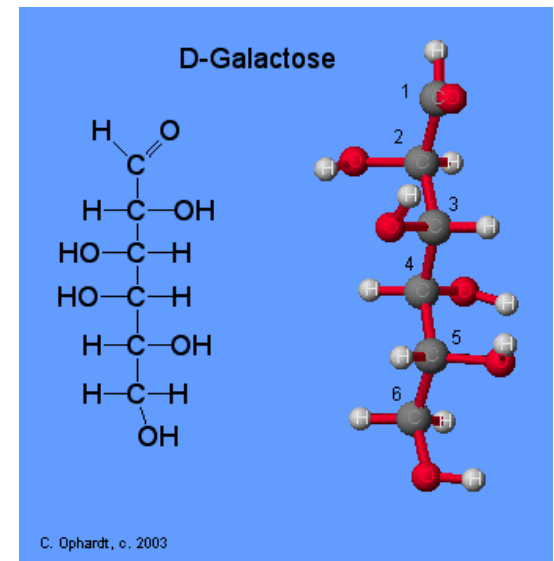
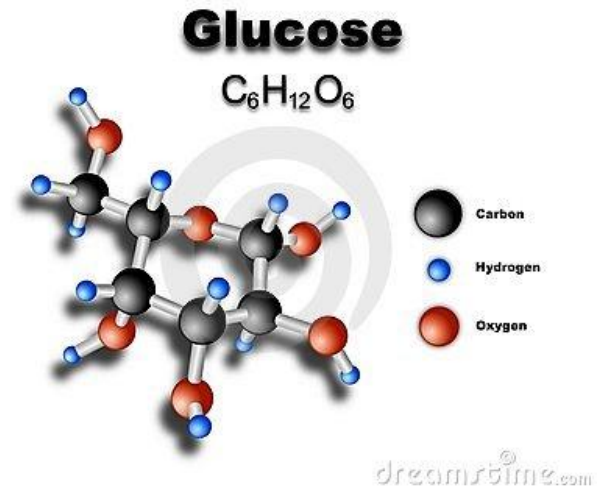
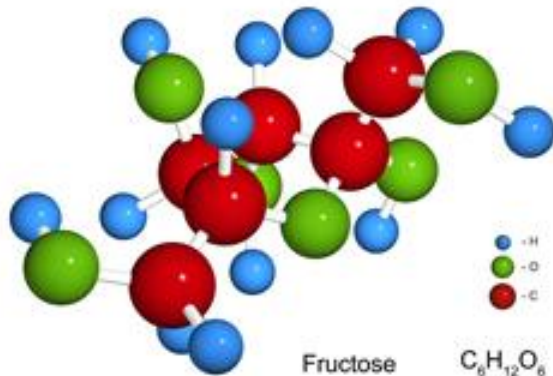
Simple carbohydrates are found in foods such as fruits, milk, and vegetables

Cake, candy, and other refined sugar products are simple sugars which also provide energy but lack vitamins, minerals, and fiber



Simple Carbs

- Monosaccharides
 - All are 6 carbon hexes
 - 6 carbons
 - 12 hydrogens
 - 6 oxygens
 - Arrangement differs
 - accounts for varying sweetness
 - Glucose, Fructose, Galactose



Glucose

- Mild sweet flavor
- Known as blood sugar
- Essential energy source
- Found in every disaccharide and polysaccharide



Your goal is to maintain normal blood glucose levels

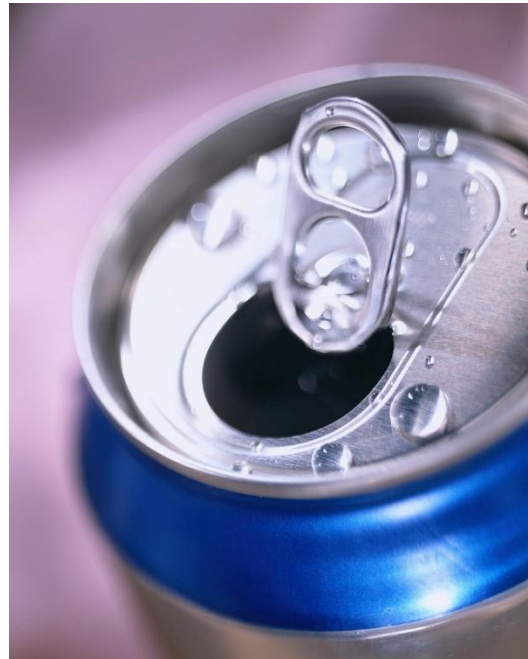


ADAM.



Fructose

- Sweetest sugar
- Found in fruits and honey
- Added to soft drinks, cereals, deserts



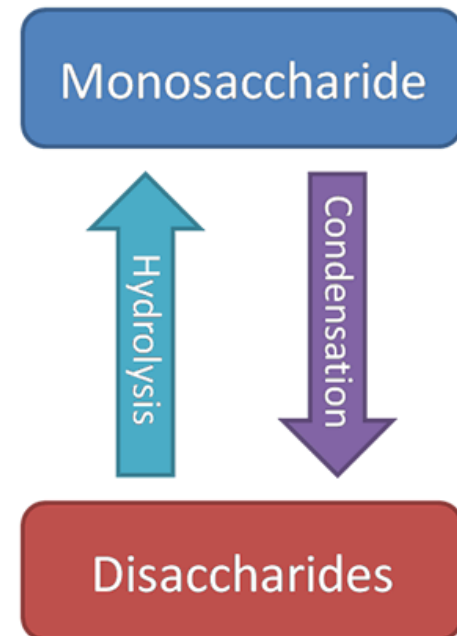
Galactose

- Only found in animals and humans
- Basic sugars found in milk
- Rarely found naturally as a single sugar



Disaccharides

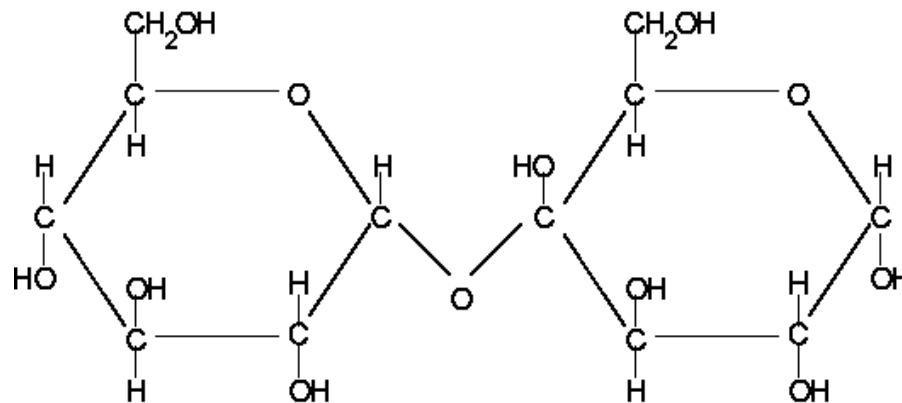
- Pairs of the monosaccharides
 - Glucose is always present
 - 2nd of the pair could be fructose, galactose or another glucose
 - Taken apart by **hydrolysis**
 - Put together by **condensation**
- **DISACCHARIDES:**
 - Maltose, Sucrose, Lactose



Condensation

- Making a disaccharide
 - Chemical reaction linking 2 monosaccharides

Structure of a Disaccharide



Maltose
(A compound of 2 glucose molecules)

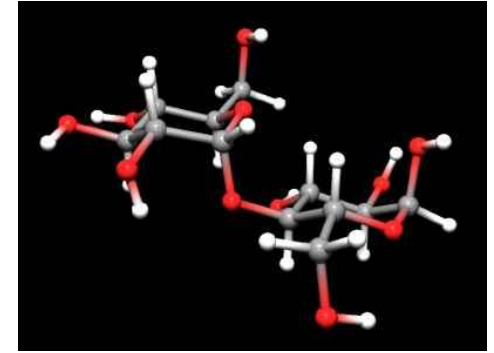
Hydrolysis

- **Breaking a disaccharide**
 - Molecule is divided into smaller parts by adding water
 - Body uses process to digest disaccharides in food
 - Water must be present
 - Sweetened drinks are not as thirst-quenching as plain water
 - Part of the water must be used to digest the sugar and is not available for other functions



Maltose

- 2 glucose units
- Least sweet
- Produced when starch breaks down
- In powder form: tan color



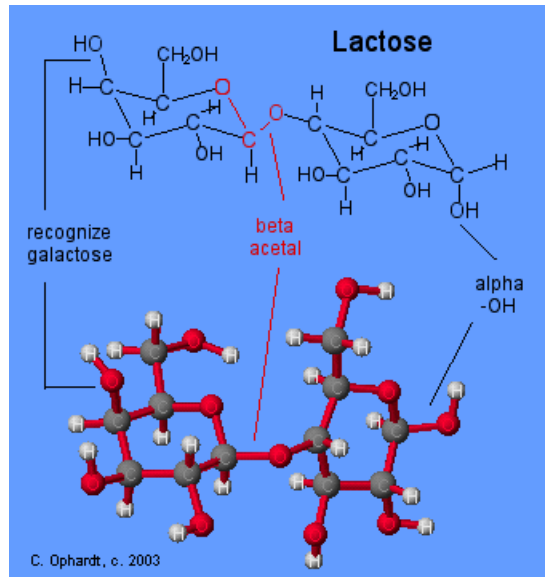
Sucrose

- Fructose + Glucose
- Tastes sweet
 - Fruit, vegetables, grains
- Table sugar is refined sugarcane and sugar beets
- Brown, white, powdered



Lactose

- Glucose + Galactose
- Main carbohydrate in milk
 - Known as milk sugar
- Pure form: White

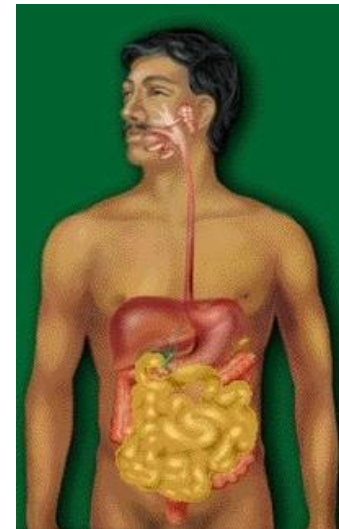


Carbohydrate Digestion

- Break down into glucose
 - Body is able to absorb and use
- Disaccharides
 - Broken once
- Monosaccharides
 - Don't need to be broken down

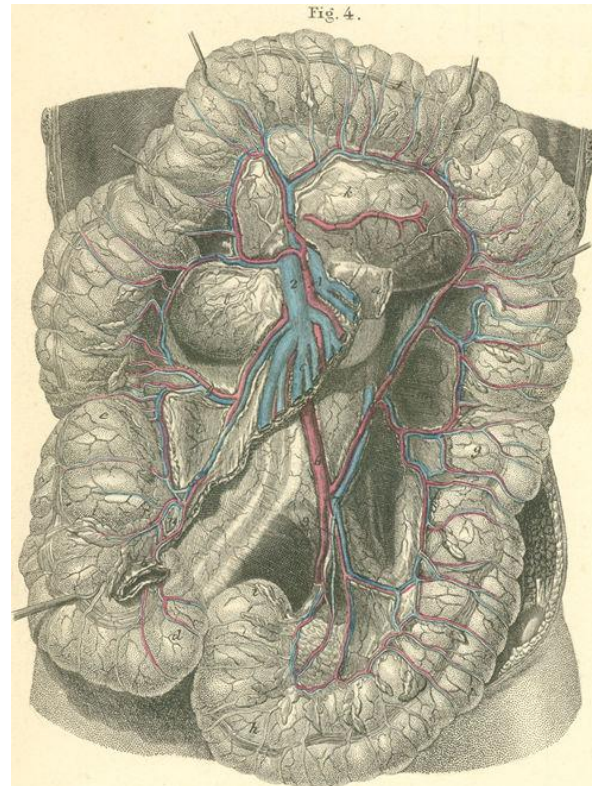
Small Intestine

- Majority of carbohydrate digestion takes place here
- Specific enzymes finish the job
 - Maltase
 - Maltose into 2 glucose
 - Sucrase
 - Sucrose into glucose and fructose
 - Lactase
 - Lactose into glucose and galactose



Large Intestine

- 1-4 hours for sugars to be digested



Problems with Digestion of Saccharides

Lactose Intolerance

- More lactose is consumed than can be digested
 - Lactose molecules attract water
 - Bloating
 - Abdominal discomfort
 - Diarrhea
 - Intestinal bacteria feed on undigested lactose
 - Produce acid and gas



Lactose Intolerance

- Factors affecting likelihood:
 - Age
 - Damage to intestines
 - Medication
 - Malnutrition
- Management requires dietary change
 - 6 grams (1/2 cup) usually tolerable
 - take in gradually
 - hard cheeses contain little to no lactose
 - enzyme drops or tablets



- **Sweet Expressions Worksheet**
 - Use chapter 8 in the textbook to help fill in the blanks.
 - Not all content has been covered- please read the chapter to prepare for our next lesson set on forms of sugar and preparing foods with sugar
- **Testing for Simple Sugars Lab (Next lesson)**
 - Identify the presence of mono- and disaccharides using the Benedict's test
 - Identify foods that contain mono- and disaccharides
 - Read lab and complete "Purpose"
- **Extra time= Extra Credit**
 - Create models of saccharides
 - Use pipe cleaners to create molecular structures of monosaccharides and disaccharides
 - Label the type of saccharide it is (ex. Fructose, lactose, etc.)