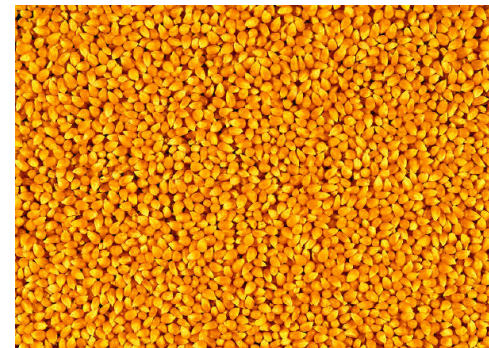


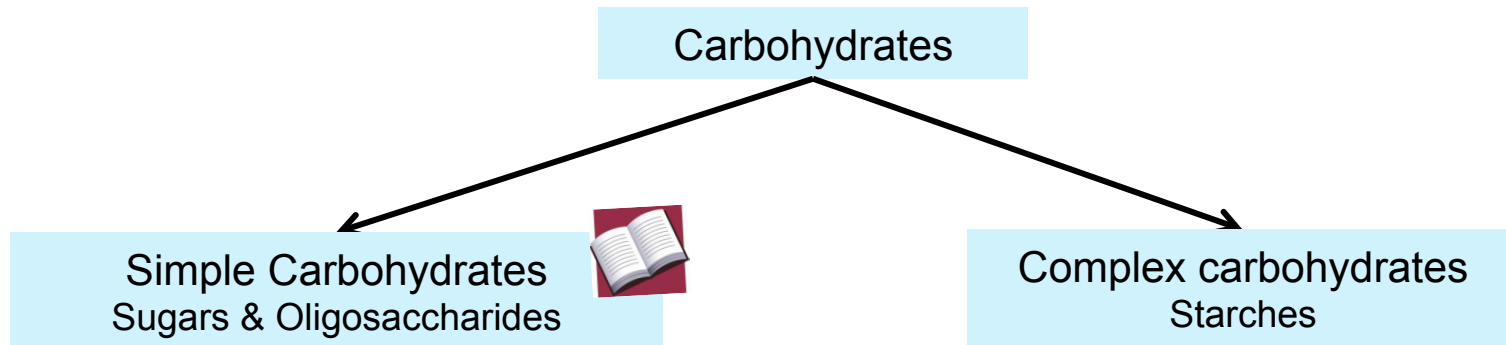
Carbohydrate

- Composition
- Function
- Metabolism



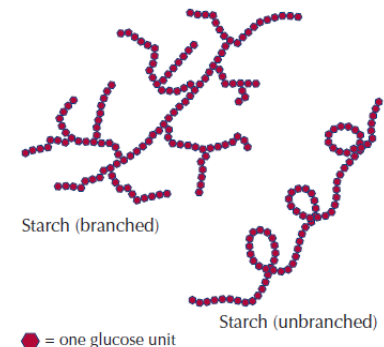
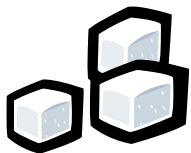
Carbohydrate – Composition

- Carbohydrate consists of simple carbohydrates (mono-, di- and oligo-saccharides) and complex carbohydrates (starches and fibers).
- Monosaccharides** are the **building blocks** that make up carbohydrates.



- Simple sugars** include the **monosaccharides** (glucose, fructose, galactose) & **disaccharides** (sucrose, lactose, maltose)
- Oligosaccharides like maltodextrin contain from two to nine (2–9) simple sugars

- Starches:** Polysaccharides made of 10 or more **simple sugar** units
- May be either branched or unbranched
- Mainly found in grains and vegetables



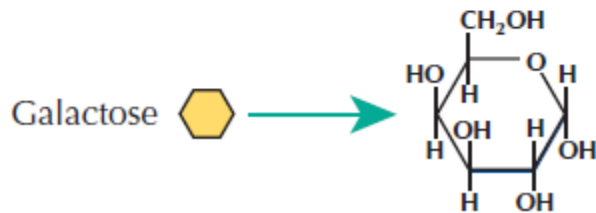
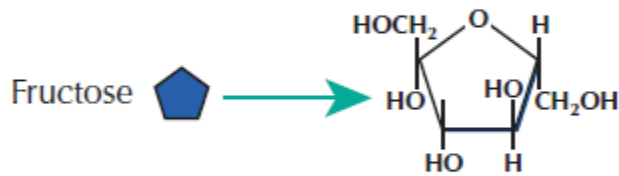
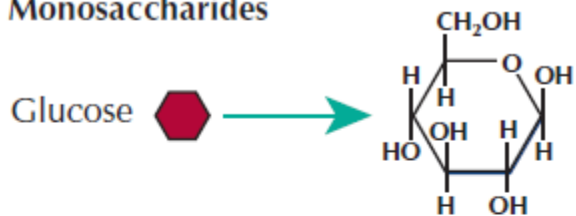


Carbohydrate – Composition (continued)

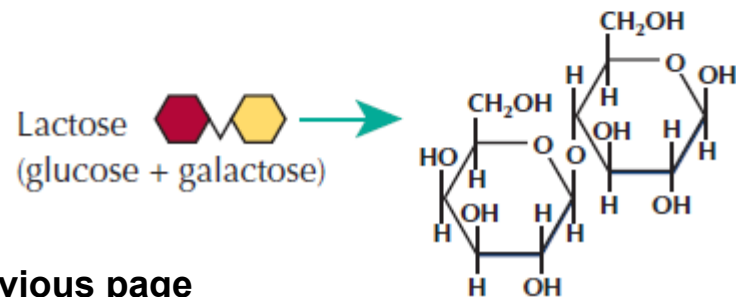
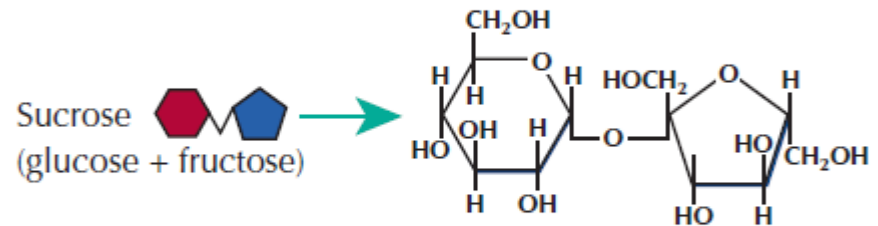
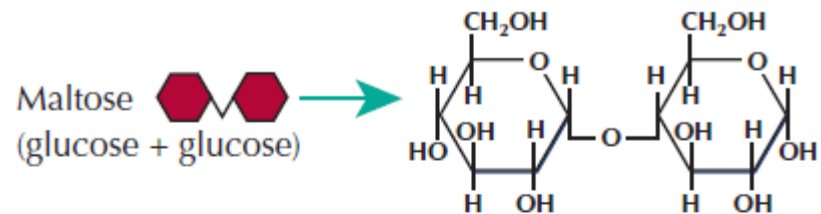
Simple sugars – Mono & disaccharides

- Most common simple sugars have the same chemical formula $C_6H_{12}O_6$ but different structural organization

Monosaccharides



Disaccharides



[Back to previous page](#)



Carbohydrate – Functions & Metabolism



- Carbohydrates are the **main source of Energy** for the body, glucose is the primary fuel for many of the body's cells.

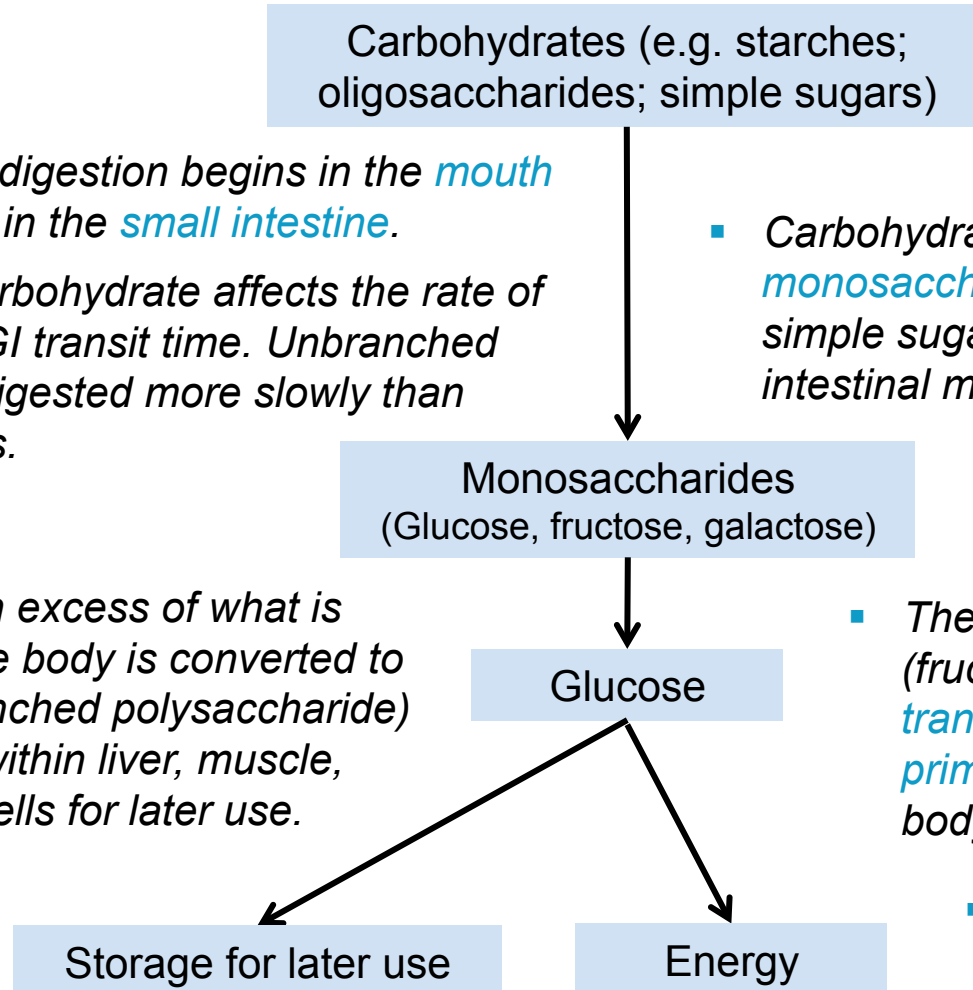
- Carbohydrate digestion begins in the **mouth** and continues in the **small intestine**.*
- The type of carbohydrate affects the rate of absorption & GI transit time. Unbranched starches are digested more slowly than branched ones.*

- Any glucose in excess of what is required by the body is converted to **glycogen** (branched polysaccharide) or **fat**, stored within liver, muscle, and adipose cells for later use.*

- Carbohydrates are **broken down into monosaccharides**, because only these simple sugars can be absorbed by the intestinal mucosa.

- The different monosaccharides (fructose & galactose) are then **transformed into glucose** the **primary fuel** for many of the body's cells.

- Carbohydrates provide 4 kcal/g**



Fibers – A special category of carbohydrates



Composition Function & Metabolism

- According to the CODEX alimentarius definition, **fibers** are carbohydrate polymers with ten or more monosaccharide units¹ from plants that humans **do not have the ability to digest**.
- Fibers have a wide range of benefits on:
 - Bowel function
 - Gut health
 - Immune system
 - Blood glucose control
 - Serum lipid levels
- Fibers provide up to **2 kcal/g** (nutritional labeling requirement may differ across markets)
- Fibers can be soluble or insoluble
 - **Soluble fibers** (e.g. the **prebiotics** fructo-oligosaccharides (FOS) & inulin) are readily fermentable by bacteria in the colon. Once fermented, they encourage the growth of beneficial bacteria already present in the colon.
 - **Insoluble fibers** are either not or only partially digested by bacteria in the colon. It contributes to the normalization of bowel function in cases of diarrhea or constipation, with adequate water intake.
- Note: even if fibers are carbohydrate polymers, in some markets they are counted separately in the nutritional information table.

¹ Decision on whether to include carbohydrates from 3 to 9 monosaccharide units is left to national authorities.