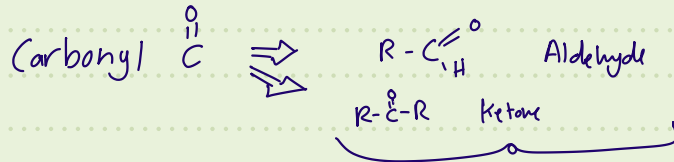
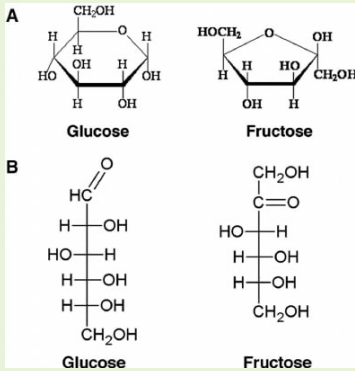
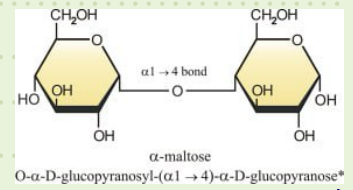
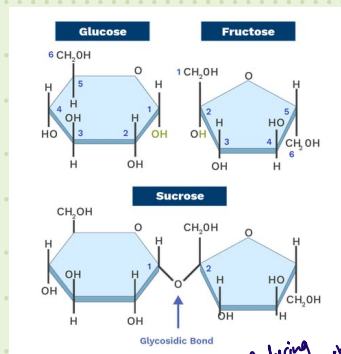


Major types of Nutrients



Upon making the cyclic form $\Rightarrow$ Anomeric carbon

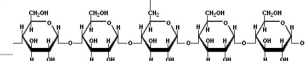
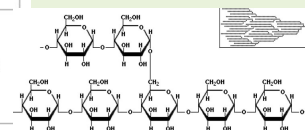
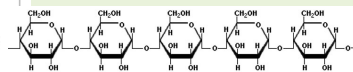


Reducing
 $\hookrightarrow$ when there is a free anomeric carbon

Non-Reducing
 $\hookrightarrow$ when there is not any free anomeric Carbon

Disaccharide	Reducing or Non-Reducing?	Reason
Lactose (Glucose + Galactose, $\beta 1 \rightarrow 4$)	Reducing	Free anomeric carbon on glucose.
Maltose (Glucose + Glucose, $\alpha 1 \rightarrow 4$)	Reducing	Free anomeric carbon on one glucose.
Sucrose (Glucose + Fructose, $\alpha 1 \rightarrow \beta 2$)	Non-Reducing	Both anomeric carbons are involved in the glycosidic bond.
Cellobiose (Glucose + Glucose, $\beta 1 \rightarrow 4$)	Reducing	Free anomeric carbon on one glucose.
Isomaltose (Glucose + Glucose, $\alpha 1 \rightarrow 6$)	Reducing	Free anomeric carbon on one glucose.
Trehalose (Glucose + Glucose, $\alpha 1 \rightarrow \alpha 1$)	Non-Reducing	Both anomeric carbons are involved in the bond.

Type	Subcategory	Structure	Bond Type	Source	Digestibility
Starch	Amylose (20%)	Straight-chain glucose polymer	α -1,4 glycosidic bonds	Grains (wheat, rice, corn, oats, barley), tubers (potatoes)	Digestible
	Amylopectin (80%)	Branched glucose polymer	α -1,4 chains with α -1,6 branches	Grains (wheat, rice, corn, oats, barley), tubers (potatoes)	Digestible
Non-Starch Polysaccharides	Cellulose	Straight-chain glucose polymer	β -1,4 glycosidic bonds	Plant cell walls (fruits, vegetables, grains)	Indigestible
	Hemicellulose, Pectins, Gums	Various polysaccharides	Various β -glycosidic bonds	Plant cell walls (fruits, vegetables, grains)	Indigestible



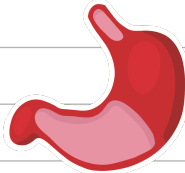
Digestion & Absorption of dietary carbohydrates

Digestion



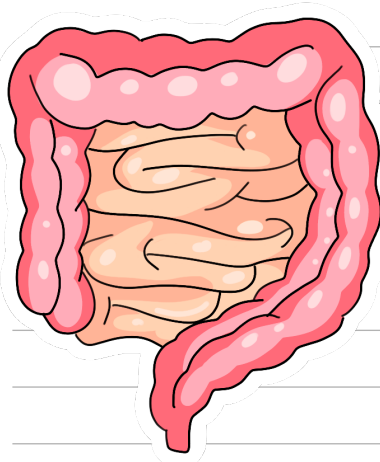
1. Mouth
(1L saliva daily
containing α -amylase)

- Starch & glycogen $\rightarrow$ maltose, isomaltose & α -dextrins
- Enzyme? α -amylase $\rightarrow$ Endo glucosidase (α -1,4)
 $\rightarrow$ Requires Cl^-
 $\rightarrow \text{pH} = 7$.

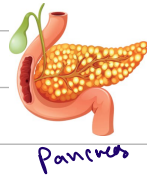


- No digestion, why? α -amylase is inactivated by the acidity
 $+ \text{Gastric juice} \rightarrow$ No enzymes for carb digestion

2. Stomach - HCl MAY hydrolyze Sucrose $\rightarrow$ Glu + Fru



3. Small intestine



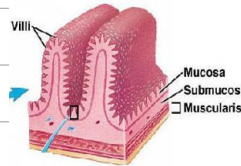
- secretions 1.5 L/day

↳ Latics

↳ 1. Pancreatic α -amylase $\rightarrow$ Similar to Salivary α -amylase

↳ maltose, isomaltose, maltotriose & branched oligosaccharides

α -amylase $\rightarrow$ no activity toward sugars containing polymers other than glucose α -1,4



Intestinal Brush Border

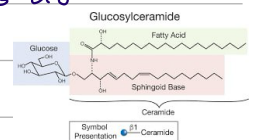
4 enzymes

1. Glucoamylase

2. Sucrose-isomaltase

3. Trehalase

4. β -Glucosidase complex



Lumen

Apical membrane

Absorption

Epithelial cell

Basal lateral membrane

Blood Capillary



Na^+ $\rightarrow$ SGLT2 (GLUT1)
 $\text{Glu} \rightarrow$

Fructose $\rightarrow$ GLUT5

Glu $\rightarrow$ GLUT2

Fruc $\rightarrow$ GLUT2

ATPase Pump $\rightarrow$ Na^+

