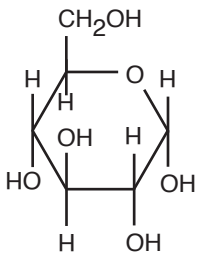
Carbohydrates

Illustrations of

Carbohydrate Structure and Function

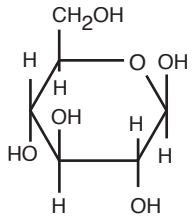
to Accompany Lecture



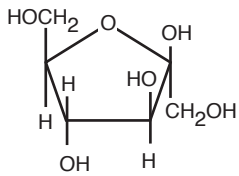
By Noel Ways

Monosaccharides

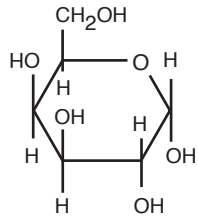
Identical molecular formula for all below: $C_6H_{12}O_6$



Glucose

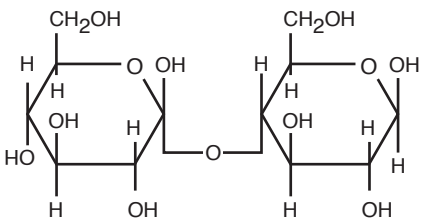


Fructose

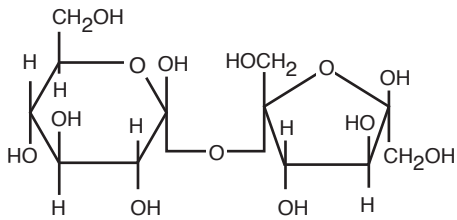


Galactose

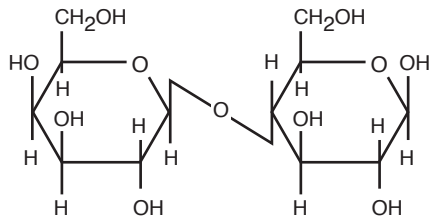
Disaccharides



Maltose

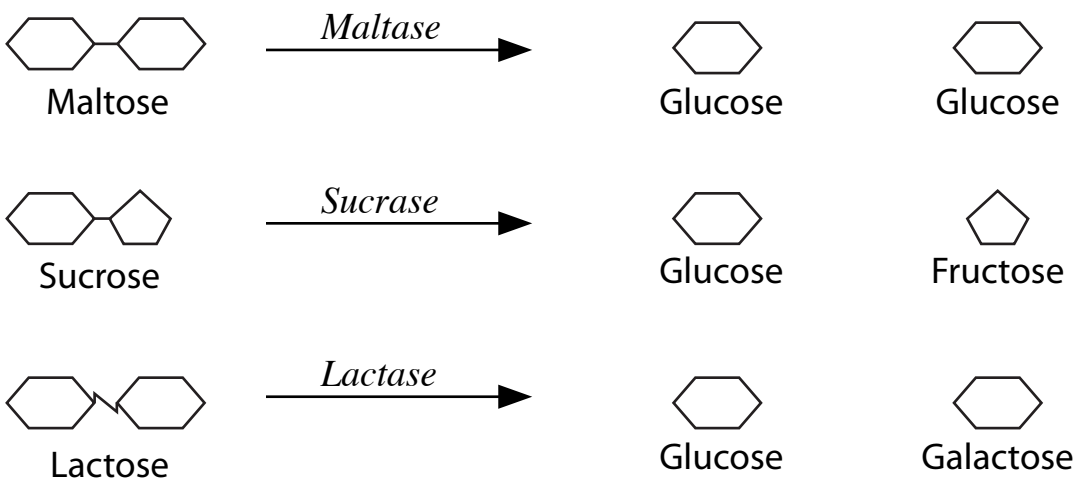


Sucrose



Lactose

Disaccharide Enzymes

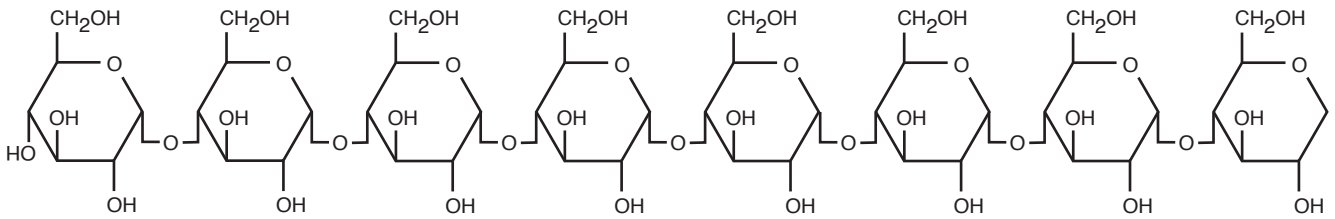


Polysaccharides of Glucose

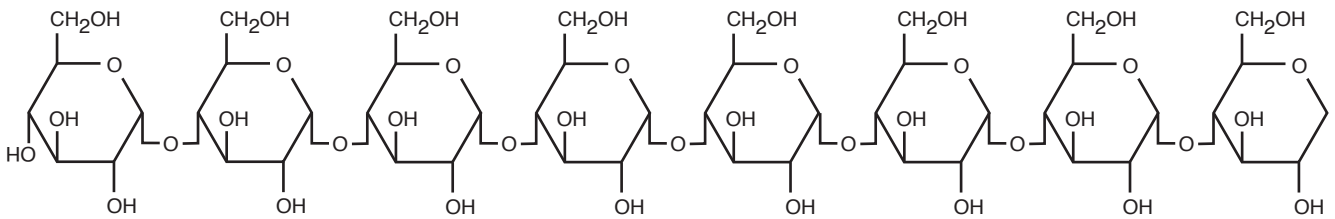
(These polysaccharides may be highly branched)

The sturctures of starch and glycogen are similar except that glycogen branches are shorter and more frequent.

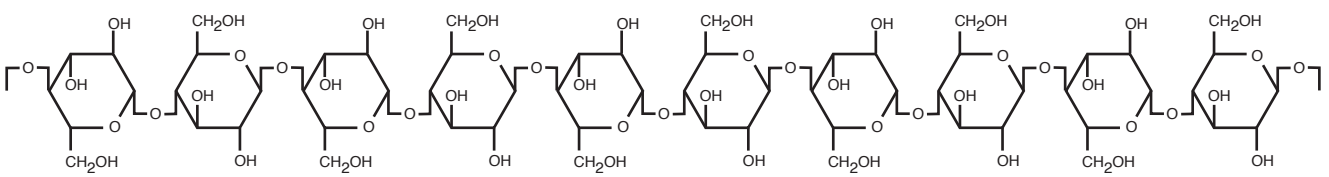
Starch



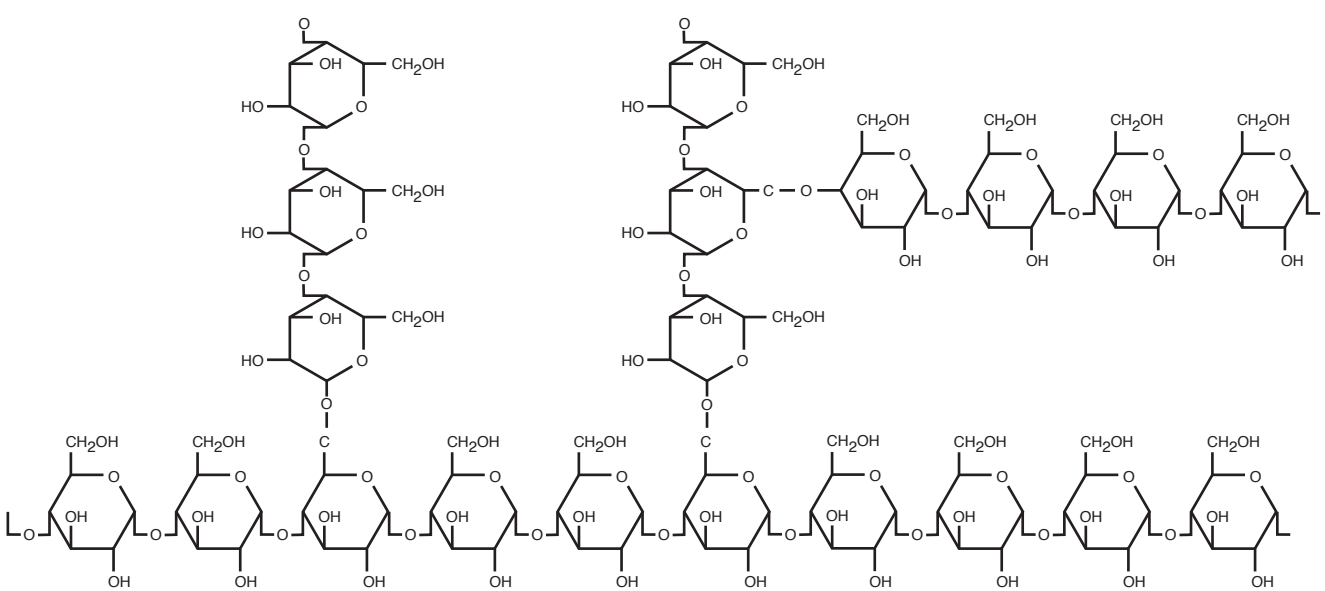
Glycogen



Cellulose



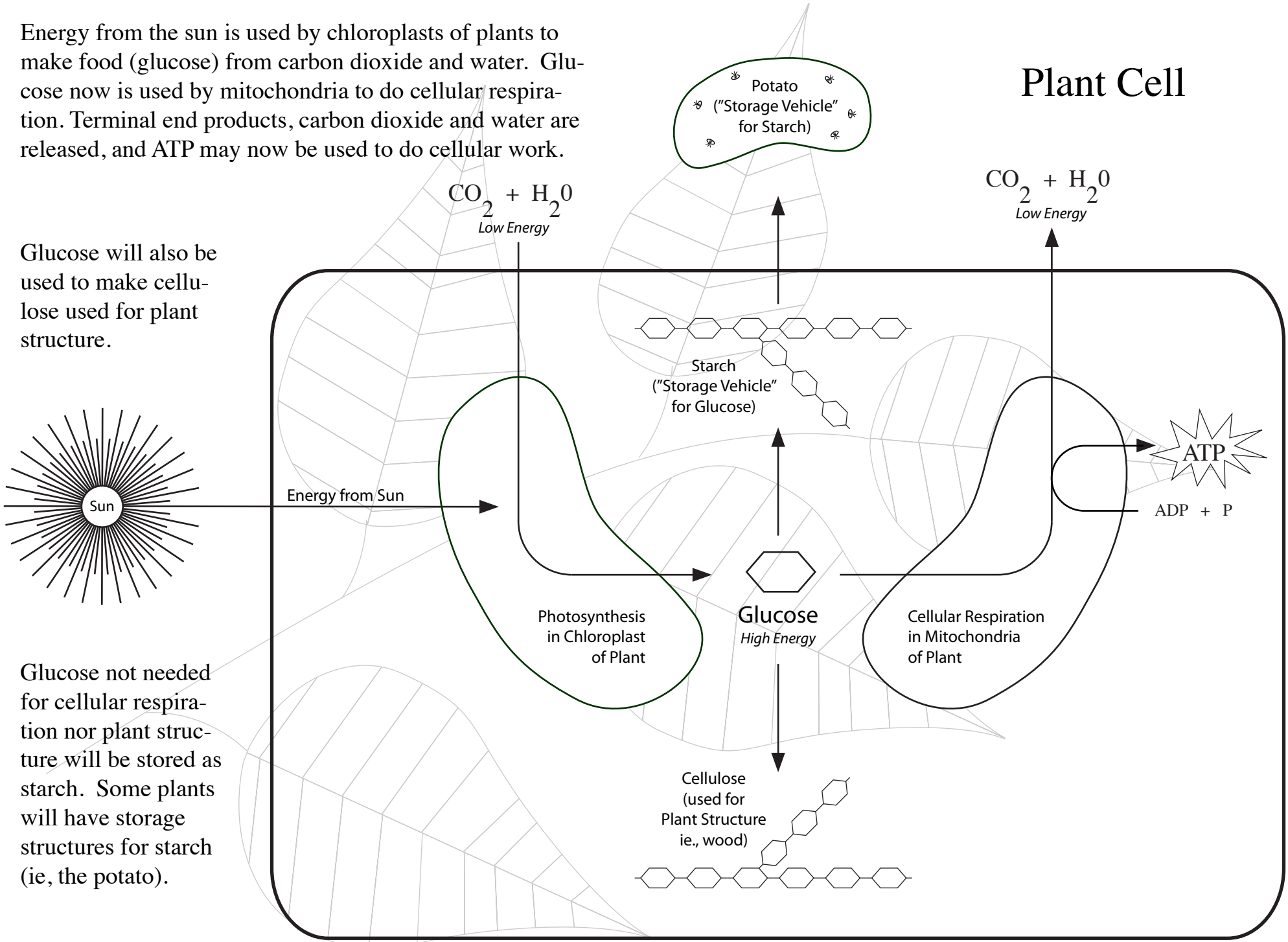
Starch showing branching



Energy from the sun is used by chloroplasts of plants to make food (glucose) from carbon dioxide and water. Glucose now is used by mitochondria to do cellular respiration. Terminal end products, carbon dioxide and water are released, and ATP may now be used to do cellular work.

Glucose will also be used to make cellulose used for plant structure.

Glucose not needed for cellular respiration nor plant structure will be stored as starch. Some plants will have storage structures for starch (ie, the potato).



Man eats the potato and catabolizes starch into glucose. Glucose is absorbed and enters cells where mitochondria do cellular respiration. Terminal end products, carbon dioxide and water are released, and ATP may now be used to do cellular work.

Glucose not needed for ATP synthesis purposes may be stored as glycogen in liver and other organs.

Animal Cell