

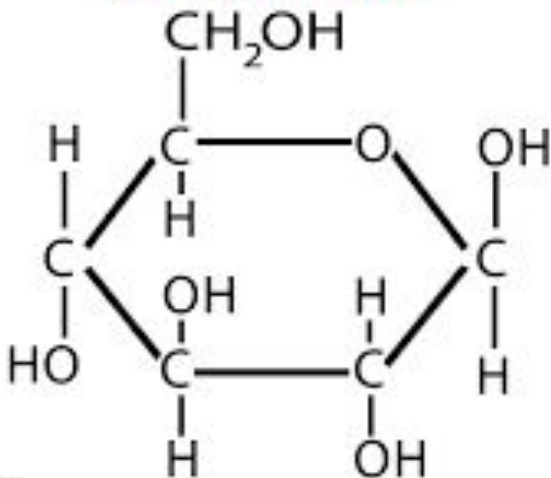
# Carbohydrates. Starch.



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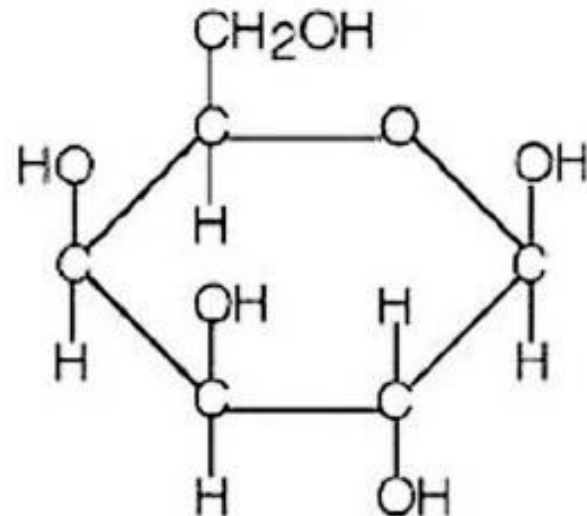
A **carbohydrate** is a biological molecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms.

**Glucose**



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**Galactose**



The term is most common in biochemistry, where it is a synonym of **saccharide**, a group that includes

- starch
- sugars
- cellulose
- saccharides

# The saccharides are divided into four chemical groups

- **monosaccharides**
- **disaccharides**
- **oligosaccharides**
- **polysaccharides**

# Carbohydrates perform numerous roles in living organisms.

- **Polysaccharide**

- s serve for the storage of energy (e.g. starch and glycogen) and as structural components (e.g. cellulose in plants and chitin in arthropods).

- **Deoxyribose**

- is a component of DNA.

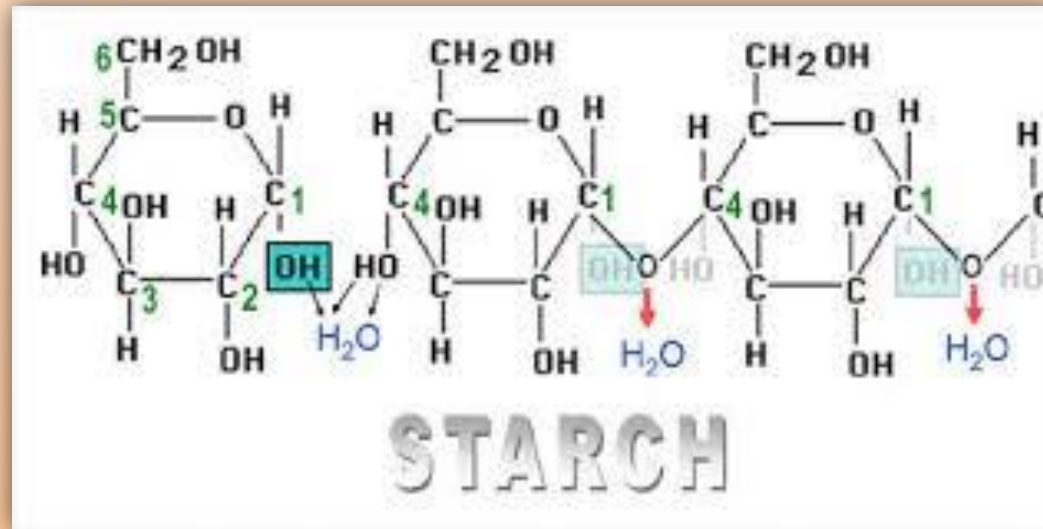
- **Saccharides**

- and their derivatives include many other important
- biomolecules that play key roles in the immune system, fertilization, preventing pathogenesis, blood clotting, and development.

**Starch** or **amylum** is a carbohydrate consisting of a large number of glucose units joined by glycosidic bonds. This polysaccharide is produced by most green plants as an energy store. It is the most common carbohydrate in human diets and is contained in large amounts in staple foods such as potatoes, wheat, maize (corn), rice, and cassava.



Pure starch is a white, tasteless and odorless powder that is insoluble in cold water or alcohol. It consists of two types of molecules: the linear and helical *amylose* and the branched *amylopectin*.



Depending on the plant, starch generally contains 20 to 25% amylose and 75 to 80% amylopectin by weight.

# History

- Starch grains from the rhizomes of *Typha* (cattails, bullrushes) as flour have been identified from grinding stones in Europe dating back to 30,000 years ago.
- Pure extracted wheat starch paste was used in Ancient Egypt possibly to glue papyrus.
- Romans used it also in cosmetic creams, to powder the hair and to thicken sauces.
- Persians and Indians used it to make dishes similar to gothumai wheat halva.
- Rice starch as surface treatment of paper has been used in paper production in China, from 700 AD onwards.



