

Introduction to Carbohydrates

CONTEXT-

- Composition**
- Formula**
- Discovery**
- Types of Carbohydrates**
- Important examples**
- Importance of Carbohydrates**
- Occurrence of Carbohydrates**
- Classification of Carbohydrates**

INTRODUCTION. Carbohydrates represent a broad group of substances which include the sugars, starches, gums and celluloses. The common attributes of **carbohydrates** are that they contain only the elements carbon, hydrogen and oxygen, and that their combustion will yield carbon dioxide plus one or more molecules of Water.

Carbohydrates are naturally occurring sugars, starches and fiber in food. All **carbohydrates** are made up of sugar molecules. Sugar molecules linked together form starches and fiber. In the body, starches and sugars are broken down in the digestive system to glucose.

The chemical **formula** of a **carbohydrate** is $C_x(H_2O)_y$, which denotes some carbons (C) with some water **molecules** (H_2O) attached—hence the word **carbohydrate**, which means “hydrated carbon.”

The human body is unable to make the slightest muscular movement without the burning of sugar. In the 19th century, the great French physiologist, Claude Bernard, **discovered** glycogen, the starch-like substance found in muscles and the live

There are three main types of carbohydrates:

- Sugars. They are also called simple carbohydrates because they are in the most basic form. ...
- Starches. They are **complex carbohydrates**, which are made of lots of simple sugars strung together. ...
- Fiber. It is also a complex carbohydrate.

The saccharides are divided into four **chemical** groups: monosaccharides, disaccharides, oligosaccharides, and polysaccharides. Monosaccharides and disaccharides, the smallest (lower

molecular weight) carbohydrates, are commonly referred to as sugars.

In the mid-1800s, German chemist **Justus von Liebig** was one of the first to recognize that the body derived energy from the oxidation of foods recently eaten, and also declared that it was carbohydrates and fats that served to fuel the oxidation-not carbon and hydrogen as **Antoine-Laurent Lavoisier** had thought.

A **carbohydrate** is an organic compound such as sugars, starches, celluloses and gums, that occurs in living tissues and food. It is important for nutrition since it can be broken down into energy by people or animals.

Following are the important examples of carbohydrates:

- **Glucose.**
- **Galactose.**
- **Maltose.**

- . **Fructose.**
- . **Sucrose.**
- . **Lactose.**
- . Starch.
- . Cellulose.

Examples of whole carbs include **vegetables**, whole fruit, legumes, **potatoes** and whole grains. These foods are generally healthy. On the other hand, refined carbs include **sugar**-sweetened beverages, fruit juices, pastries, white bread, white pasta, white rice and others.

Carbohydrates are rich in-

Dairy. Milk, yogurt, and ice cream.

Fruit. Whole fruit and fruit juice.

Grains. Bread, rice, crackers, and cereal.

Legumes. Beans and other plant-based proteins.

Starchy Vegetables. Potatoes and corn.

Sugary Sweets. Limit these! Soda, candy, cookies, and other desserts.

Carbohydrates are classified into three subtypes: **monosaccharides**, (mono- = "one", "alone"; saccharide = "sugar, sweet") **disaccharides** (di = "two"), and **polysaccharides**. (poly- = "many, much"). **Monosaccharides** and **disaccharides** are also called simple carbohydrates, and are generally referred to as sugars .

Carbohydrates are found in a wide array of both healthy and unhealthy foods—bread, beans, milk, popcorn, potatoes, cookies, spaghetti, soft drinks, corn, and cherry pie. They also come in a variety of forms. The most **common** and abundant forms are sugars, fibers, and starches.

The four primary functions of carbohydrates in the **body** are to provide energy, store energy, build macromolecules, and spare protein and fat for other uses. Glucose energy is

stored as glycogen, with the majority of it in the muscle and liver.

The three main types of carbohydrates are sugars, starches, and **fiber**. They're called “simple” or “complex” based on their chemical makeup and what your body does with them. But since many foods contain one or more types of carbohydrates, it can still be tricky to understand what's healthy for you and what's not.

Carbohydrates are your body's main source of **energy**: They help fuel your **brain**, kidneys, **heart muscles**, and central nervous system. For instance, **fiber** is a carbohydrate that aids.

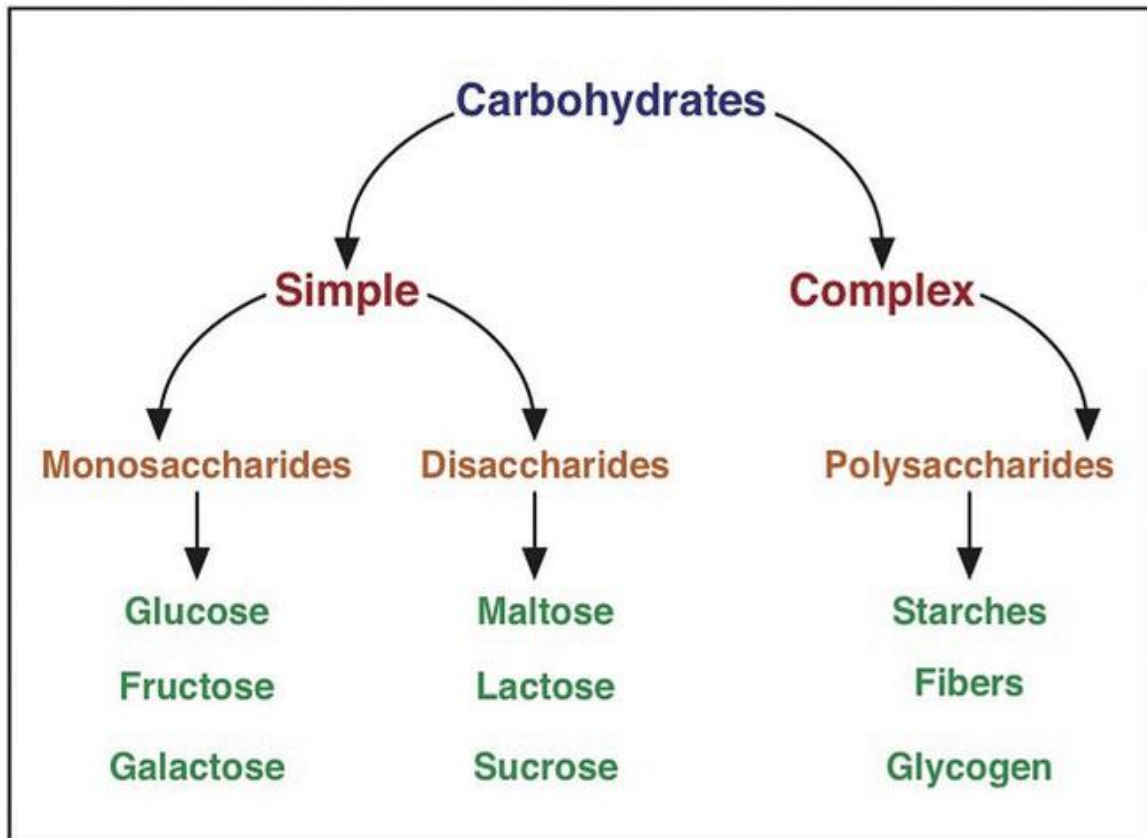
Severely restricting **carbohydrates** to less than 0.7 ounces (20 grams) a day **can** result in a process called ketosis. Ketosis occurs **when you** don't have enough sugar (glucose) for energy, so

your body breaks down stored fat, causing ketones to build up in your body.

in **digestion**, helps you feel full, and keeps blood **cholesterol levels** in check.

Carbohydrates are the **body's** main source of energy. In their absence, your **body** will use protein and fat for energy. It may also be hard to get enough fibre, which is important for long-term health. Carbohydrates are the most abundant class of organic compounds found in living organisms. They originate as products of **photosynthesis**, an endothermic reductive condensation of carbon dioxide requiring light energy and the pigment chlorophyll.

CLASSIFICATION-



Carbohydrates are one of the four major classes of biomolecules along with proteins, nucleic acids, and lipids. Carbohydrates are compounds that contain at least three carbon atoms, a number of hydroxyl groups, and usually an aldehyde or ketone group. They may contain phosphate, amino, or sulfate

groups. First, carbohydrates serve as energy stores, fuels, and metabolic intermediates. Second, ribose and deoxyribose sugars form part of the structural framework of RNA and DNA. Third, polysaccharides are structural elements in the cell walls of bacteria and plants.
