[Template:About](/wiki/Template:About" \o "Template:About) [Template:Chembox](/wiki/Template:Chembox)

**Glucose** is a [sugar](/wiki/Sugar) with the [molecular formula](/wiki/Molecular_formula) [C](/wiki/Carbon)6[H](/wiki/Hydrogen)12[O](/wiki/Oxygen)6. The name "glucose" ([Template:IPAc-en](/wiki/Template:IPAc-en), [Template:IPAc-en](/wiki/Template:IPAc-en)) comes from the [Greek](/wiki/Greek_language) word γλυκός, meaning "sweet wine, [must](/wiki/Must)".[[1]](#cite_note-1) The suffix "[-ose](/wiki/-ose)" is a chemical classifier, denoting a [carbohydrate](/wiki/Carbohydrate). It is also known as **grape sugar**. With 6 [carbon](/wiki/Carbon) atoms, it is classed as a [hexose](/wiki/Hexose), a sub-category of [monosaccharides](/wiki/Monosaccharide). D-glucose is one of the 16 [aldohexose](/wiki/Aldohexose) [stereoisomers](/wiki/Stereoisomer). The D-[isomer](/wiki/Isomer) (**D-glucose**), also known as **dextrose**, occurs widely in nature, but the L-isomer ([L-glucose](/wiki/L-Glucose)) does not. Glucose is made during [photosynthesis](/wiki/Photosynthesis) from water and carbon dioxide, using energy from sunlight. The reverse of the photosynthesis reaction, which releases this energy, is a very important source of power for [cellular respiration](/wiki/Cellular_respiration). Glucose is stored as a [polymer](/wiki/Polymer), in plants as [starch](/wiki/Starch) and in animals as [glycogen](/wiki/Glycogen), for times when the organism will need it. Glucose circulates in the blood of animals as [blood sugar](/wiki/Blood_sugar). Glucose can be obtained by hydrolysis of carbohydrates such as milk, cane sugar, maltose, cellulose, glycogen etc. It is also, however, manufactured by hydrolysis of cornstarch by steaming and diluting acid.[[2]](#cite_note-2) This reaction – [glycation](/wiki/Glycation) – impairs or destroys the function of many proteins.<ref name=Higgins/> Glucose's low rate of glycation can be attributed to it having a more stable [cyclic form](/wiki/Glucose#Cyclic_forms) compared to other aldohexoses, which means it spends less time than they do in its reactive [open-chain form](/wiki/Glucose#Open-chain_form).<ref name=Higgins/> The reason for glucose having the most stable cyclic form of all the aldohexoses is that its [hydroxy groups](/wiki/Hydroxyl#Hydroxy_group) (with the exception of the hydroxy group on the anomeric carbon of D-glucose) are in the [equatorial position](/wiki/Cyclohexane_conformation). Many of the long-term complications of [diabetes](/wiki/Diabetes_mellitus) (e.g., [blindness](/wiki/Blindness), [renal failure](/wiki/Renal_failure), and [peripheral neuropathy](/wiki/Peripheral_neuropathy)) are probably due to the glycation of proteins or lipids.[[3]](#cite_note-3) In contrast, [enzyme](/wiki/Enzyme)-regulated addition of sugars to protein is called [glycosylation](/wiki/Glycosylation) and is essential for the function of many proteins.[[4]](#cite_note-4)

### Analyte in medical blood test[[edit](/index.php?title=(none)&action=edit&section=2)]

[Template:Main](/wiki/Template:Main) Glucose is a common medical [analyte measured in blood samples](/wiki/Blood_test). Eating or fasting prior to taking a blood sample has an effect on the result. A high fasting glucose [blood sugar](/wiki/Blood_sugar) level may be a sign of [prediabetes](/wiki/Prediabetes) or [diabetes mellitus](/wiki/Diabetes_mellitus).

### Energy source[[edit](/index.php?title=(none)&action=edit&section=3)]

Glucose is a ubiquitous fuel in [biology](/wiki/Biology). It is used as an energy source in most organisms, from bacteria to humans, through either [aerobic respiration](/wiki/Aerobic_respiration), [anaerobic respiration](/wiki/Anaerobic_respiration), or [fermentation](/wiki/Fermentation_(biochemistry)). Glucose is the human body's key source of energy, through aerobic respiration, providing about 3.75 [kilocalories](/wiki/Kilocalorie) (16 [kilojoules](/wiki/Kilojoule)) of [food energy](/wiki/Food_energy) per gram.[[5]](#cite_note-5) Breakdown of carbohydrates (e.g. starch) yields [mono-](/wiki/Monosaccharide) and [disaccharides](/wiki/Disaccharide), most of which is glucose. Through [glycolysis](/wiki/Glycolysis) and later in the reactions of the [citric acid cycle](/wiki/Citric_acid_cycle) and [oxidative phosphorylation](/wiki/Oxidative_phosphorylation), glucose is [oxidized](/wiki/Oxidize) to eventually form [CO2](/wiki/Carbon_dioxide) and [water](/wiki/Water), yielding energy mostly in the form of [ATP](/wiki/Adenosine_triphosphate). The insulin reaction, and other mechanisms, regulate the concentration of glucose in the blood.

Glucose supplies almost all the energy for the [brain](/wiki/Brain),[[6]](#cite_note-6)