

Glossary

achiral | objects/molecules have superimposable (identical) mirror images

active transport | occurs when ions and small polar molecules move across the membrane in the opposite direction of diffusion (from low to high concentration); energy is required

addition reaction | reaction in which an atom or molecule is added to an unsaturated molecule, making a single product

adenosine triphosphate (ATP) | energy currency of the cell; nucleotide; undergoes hydrolysis to ADP (low energy) during which energy is released. [NEUROtiker, Public domain, via Wikimedia Commons]

aerobic conditions | with oxygen

alcohols | molecules that contain the hydroxyl (–OH) functional group

aldehyde |

molecules that contain a hydrogen directly bonded to the carbon of a carbonyl group; condensed notation: R–CHO

aldose | monosaccharide that contains an aldehyde group

alkane | hydrocarbons with only C–C and C–H single bonds.

alkenes | Molecules that contain a carbon-carbon double bond (C=C) and general molecular formula: C_nH_{2n}

alkyl halide | organic molecules where a halogen (F, Cl, Br, or I) has replaced a hydrogen

alkynes | Molecules that contain a carbon-carbon triple bond (C≡C) and general molecular formula: C_nH_{2n-2}

amidation | condensation reaction that occurs when a carboxylic acid and amine (or ammonia) combine to form an amide and water [" Condensation Reactions" by LibreTexts is licensed under CC BY-NC .]

amide | molecules that are derivatives of carboxylic acids, formed by replacing the OH of the carboxyl group with ammonia or an amine; condensed notation: R–CONH₂'

amine | Molecules derived from ammonia (NH₃), where one or more hydrogen is replaced with a carbon

amino acids | protein building blocks that contain an amino and carboxylic acid group [Benjah-bmm27, Public domain, via Wikimedia Commons]

amphipathetic | contain both polar and nonpolar parts

anabolic pathway |

chemical reactions that convert smaller molecules into larger molecules; energy is absorbed [CNX OpenStax, CC BY 4.0, via Wikimedia Commons]

anaerobic | without oxygen

anomeric carbon | carbon of the carbonyl group

anomers | diastereomers that differ only at the anomeric carbon

aromatic |

class of cyclic compounds that contain a benzene ring [

Cacycle, Benzene Structure, CC BY-SA 3.0, via Wikimedia Commons]

Benedict's test | qualitative test to determine whether a carbohydrate is a reducing sugar

beta-oxidation (β-oxidation) | stage II of catabolism where fatty acids are converted to acetyl CoA

carbohydrates |

Sugars composed of carbon, hydrogen and oxygen that provide energy when consumed.

carbonyl group | represents a carbon-oxygen double bond (C=O)

carboxylic acid | molecules that contain a hydroxyl (–OH) directly bonded to the carbon of a carbonyl group; condensed notation: R–COOH

catabolic pathway |

chemical reactions that convert larger molecules into smaller molecules; energy is released [CNX OpenStax, CC BY 4.0, via Wikimedia Commons]

cellular respiration | biochemical process in which energy is transferred from carbohydrates and fats (high potential energy molecules) to ATP

cerebrosides | glycolipids with a monosaccharide. [Epithelyann, CC BY-SA 4.0, via Wikimedia Commons]

chiral | objects/molecules that have nonsuperimposable (not identical) mirror images

chiral center | tetrahedral carbon bonded to four different atoms or group of atoms.

citric acid cycle (or Krebs cycle or the tricarboxylic acid cycle) | series of reactions that degrade the two-carbon acetyl groups from acetyl CoA into carbon dioxide while generating the high-energy molecules NADH and FADH₂. [Narayanese, WikiUserPedia, YassineMrabet, TotoBaggins, CC BY-SA 3.0, via Wikimedia Commons]

codon | triplets sequence of nucleotides in mRNA; transcribed from DNA contains a sequence of bases specifying the protein to be made [Thomas Spletstoesser (www.scistyle.com), CC BY-SA 4.0, via Wikimedia Commons]

cofactor | inorganic substances that serve as non-protein helpers

competitive inhibitors |

reversible inhibitors that have structures similar to that of the substrate that compete with a substrate for the active site

condensation reaction | reaction that involves two molecules combining to form one larger organic molecule and water.

Condensed structural formulas | an abbreviated formula that shows all the atoms in a molecule, without showing all of the bonds

conenzyme | organic substances, derived from vitamins, that serve as non-protein helper

conformers | different rotational forms of a molecule

crenation | shrinking/shriveling; water flows out of the cell to dilute the concentration until they are equalize

cycloalkane | Three or more carbon atoms arranged in a ring with only C–C and C–H bonds

cycloalkene | cyclic molecule that contains a C=C

dehalogenation reaction | elimination reaction where a halogen is removed from the molecule to form an alkene

dehydration reaction | elimination reaction where water is removed from the molecule to form an alkene

dehydrogenation reaction | elimination reaction where molecular hydrogen is removed from the molecule to form an alkene

deletion (mutation) | the loss/removal of a nucleotide [Hullo97, CC BY-SA 4.0, via Wikimedia Commons]

denaturation | process that disrupts the stabilizing attractive forces in the secondary, tertiary, and quaternary structures

diastereomers | stereoisomers that are not enantiomers (not exact mirror images) [FlyScienceGuy, CC BY-SA 4.0, via Wikimedia Commons]

diene | molecule that contains two C=C

diffusion | movement of solute molecules from an area of high solute concentration to a low concentration

digestion | stage I of catabolism where food molecules are broken down by hydrolysis reactions into the individual monomer units; occurs in the mouth, stomach, and small intestine

diol | molecules that contain two hydroxyl (–OH) functional groups

dipeptide | peptide containing only two amino acids

disaccharides | carbohydrate consisting of two monosaccharide units chemical combined through a condensation reaction

elimination reaction | reaction that involves the removal of adjacent atoms from a molecule to form an alkene

enantiomers | stereoisomers with nonsuperimposable mirror images. [FlyScienceGuy, CC BY-SA 4.0, via Wikimedia Commons]

enzyme | biological catalyst; biologically active globular proteins that accelerate chemical reactions.

enzyme–substrate (ES) complex | interaction of the enzyme with the substrate; intermediate of an enzyme-catalyzed reaction

epimers | diastereomers that differ only at one chiral carbon

essential amino acids | must be consumed because the body cannot make them.

esterification | condensation reaction that occurs when a carboxylic acid and alcohol combine to form an ester and water [" Condensation Reactions" by LibreTexts is licensed under CC BY-NC .]

esters | molecules that are derivatives of carboxylic acids, formed by replacing the H of the carboxyl group with an alkyl (carbon) group; condensed notation: R-COOR'

ether | molecules contain the R-O-R' functional group

facilitated transport | occurs when small polar molecules and ions pass through a channel formed by integral membrane proteins; no energy required

fat |

consist of triglycerides made up of mostly saturated fatty acids; exist as a solid or semisolid at room temperature.

fatty acids | long-chained carboxylic acids with properties similar to alkanes.

functional group | atoms bonded in a specific way that represents a specific class of organic compounds

furanose | five-membered ring (four carbon atoms and an oxygen) formed from ketoses

genetic code | assigns all 20 amino acids to codons of mRNA [Sarah Greenwood, CC BY-SA 4.0, via Wikimedia Commons]

geometric (cis-trans) isomers | molecules that have different arrangements because of restricted rotation around a carbon-carbon double bond (or ring)

glycerophospholipids (or phospholipids) | lipids that have a glycerol backbone with two fatty acids linked to it through an ester bond and a third group which forms a phosphoester bond with an amino alcohol. [Clbt88 at English Wikibooks, Public domain, via Wikimedia Commons]

glycolipids |

lipids that contain a carbohydrate.

glycolysis | catabolic process in which glucose is converted into pyruvate via ten enzymatic steps [Thomas Shafee, CC BY-SA 4.0, via Wikimedia Commons]

glycosidic bond | connects two molecules to one another through a condensation reaction

halogenation reaction |

addition of a halogen to an alkene to produce a di-substituted alkyl halide

hemolysis (or lysis) | swelling; water flows into the cell to dilute the concentration until they are equalized

hydration reaction |

addition of water to an alkene in the presence of an acid catalyst to produce an alcohol

hydrocarbons | Organic molecules containing only carbon and hydrogen atoms

hydrogenation reaction |

addition of H₂ to an alkene in the presence of a metal catalyst to produce an alkane

hydrohalogenation reaction | addition of a hydrogen halide to an alkene to produce a mono-substituted alkyl halide

hydrolysis reaction |

reaction that involves water reacting with an organic molecule to break it down to form two or more smaller organic molecules; opposite of condensation [FrozenMan, CC BY-SA 4.0, via Wikimedia Commons]

hypertonic solution | solute concentration outside of the cell is higher than that inside of the cell

hypotonic solutions | solute concentration outside of the cell is lower than that inside of the cell

induced-fit model | active site that is flexible and undergoes a conformational change, adjusting to the shape of the substrate when the substrate interacts with the enzyme.

inhibitor | Molecules that cause enzymes to lose activity by preventing the active site from interacting with substrate to form the ES complex

insertion (mutation) | a different nucleotide is substituted [Hullo97, CC BY-SA 4.0, via Wikimedia Commons]

irreversible inhibition | occurs when the inhibitor causes a permanent loss of activity; forms a covalent bond with an amino acid side chain in the enzyme's active site

isotonic solutions | solute concentration inside and outside of the cell are equal

ketone | molecules that contain two carbon groups directly bonded to the carbon of the carbonyl group; condensed notation: R-CO-R'

ketose | monosaccharide that contains a ketone group

Lewis Structure | shows all atoms and electrons (bonding and nonbonding) attaching them

lipid | class of biomolecules defined by low solubility in water and high solubility in nonpolar, organic solvents

lock-and-key model | active site that has a rigid, inflexible shape that is an exact complement to the substrate

messenger RNA (mRNA) | codes for proteins

metabolic pathway | series of steps in the chemical reactions in biological systems

metabolism | chemical reactions occurring in the body during the break down or building up of molecules

molecular formula | shows the type and number of atoms in a molecule

monomer | smaller units that make up a polymer

monosaccharides | simplest carbohydrates that cannot be broken down to smaller carbohydrates; general formula: C_n(H₂O)_n

monounsaturated fatty acid | fatty acids that contain only one carbon-carbon double bond

mutagen | chemical or physical agents that cause mutations

mutation | change in a DNA nucleotide sequence

noncompetitive inhibitors | reversible inhibitors that do not have structures similar to that of the substrate and do not compete with a substrate for the active site

nucleic acids | biomolecules composed of nucleotides

nucleoside | sugar/base combination between a pentose and a nitrogen containing purine or pyrimidine base

nucleotide | combination between a pentose, a nitrogen containing purine or pyrimidine base, and phosphate; building blocks of nucleic acids

oil | consist of triglycerides made up of mostly unsaturated fatty acids; exist as a liquid at room temperature

oligosaccharide | carbohydrate consisting of 3-9 monosaccharide units chemical combined through a condensation reaction

organic chemistry | study of the chemistry of the carbon compounds

organic molecule | Compound that contains carbon and hydrogen

osmosis | occurs when water travels across the cell membrane (from a lower to a higher solution concentration) to equalize solute concentrations inside and outside of a cell

oxidation | loss of electrons; or in organic compounds, involves an increase in oxygen and/or decrease in hydrogen

oxidizing agent | undergoes reduction; responsible for something else getting oxidized

parent chain | longest continuous chain of carbon atoms

passive (or simple) diffusion | small molecules and nonpolar molecules use this process to move across the semipermeable membrane; no energy required

peptide | compound containing amino acids joined by a peptide bond

phenol | molecules that contain the hydroxyl (-OH) functional group directly attached to a benzene ring

polyene | molecule that contains more than two C=C

polymer | large molecule formed of repeating smaller units that are covalently bonded to one another in a repeating pattern

polyol | molecules that contain many hydroxyl (-OH) functional groups

polypeptide | peptide containing many amino acids

polysaccharide | carbohydrate consisting of 10 or more monosaccharide units chemical combined through a condensation reaction

polyunsaturated fatty acid | fatty acids that contain more than one carbon-carbon double bond

primary (1°) alcohol | alcohols that have one alkyl group attached to the carbon where the functional group is bonded

primary (1°) amine | amine that has one alkyl group attached to the nitrogen of the functional group

protein | biologically active polypeptide containing 50 or more amino acids

pyranose | six-membered ring (five carbon atoms and an oxygen) formed from aldoses

pyruvate | result of the breakdown of glucose during glycolysis [Pyruvic-acid-2D-skeletal.png: Benjah-bmm27/derivative work: Kpengboy (talk)/further derivative work GKFXtalk, Public domain, via Wikimedia Commons]

Redox (oxidation-reduction) reaction | reactions involving a transfer of electrons

reducing agent | undergoes oxidation; responsible for something else getting reduced

reducing sugar | carbohydrate that can act as a reducing agent

reduction | gain of electrons; or in organic compounds, involves an decrease in oxygen and/or increase in hydrogen

replication | process of making new copies of DNA

reversible inhibition |

occurs when the inhibitor causes a temporary loss of activity

ribosomal RNA (rRNA) | component of ribosomes

saponification | alkaline hydrolysis of an ester resulting in an alcohol and fatty acid salt (ionic compound of the conjugate base) [[The original uploader was Rhadamante at French Wikipedia.](#), CC BY-SA 3.0, via [Wikimedia Commons](#)]

saturated | maximum number of H atoms

saturated fatty acid | fatty acids that contain only carbon-carbon single bonds

secondary (2°) alcohol | alcohols that have two alkyl groups attached to the carbon where the functional group is bonded

secondary (2°) amine | amine that has two alkyl groups attached to the nitrogen of the functional group

semipermeable | meaning that some things can enter, and some things cannot

Skeletal Structures (or line-angle structures) | shows all the bonds between carbon atoms, but omits some atom labels

sphingolipid | phospholipids that contain an 18-carbon unsaturated amino alcohol called *sphingosine*, instead of glycerol. [[Karol Langner at en.Wikipedia](#), Public domain, via [Wikimedia Commons](#)]

sphingosine | an amino alcohol found in all sphingolipids [[Ed \(Edgar181\)](#), Public domain, via [Wikimedia Commons](#)]

stereoisomers | molecules that have the same molecular formula and same connectivity/bonding between the atoms.

steroids |

lipids that do not contain fatty acids; contain a steroid nucleus with four fused rings

Structural (or constitutional) isomers | molecules with the same molecular formula but a different connectivity.

structural formula | shows all atoms and the bonds attaching them

substituents | groups that replace at least one H in order to branch from the alkane chain.

substitution (mutation) | a different nucleotide is substituted [[Hullo97](#), CC BY-SA 4.0, via [Wikimedia Commons](#)]

substitution (mutation) | the addition of a new nucleotide [[Hullo97](#), CC BY-SA 4.0, via [Wikimedia Commons](#)]

substrate | reactant in a chemical reaction (typically refers to enzyme-catalyzed reactions)

sugar acid | product of the oxidation of a monosaccharide

sugar alcohol | product of the reduction of a monosaccharide

template strand | DNA sequence that is transcribed to make RNA

tertiary (3°) alcohol | alcohols that have three alkyl groups attached to the carbon where the functional group is bonded

tertiary (3°) amine | amine that has three alkyl groups attached to the nitrogen of the functional group

thiol | molecules that contain the sulfhydryl (–SH) functional group

transcription | a segment of DNA is used to produce RNA; first step of making a protein from DNA is to make a copy of the gene from the DNA

transfer RNA (tRNA) | adapter molecule that brings the amino acid to the ribosome

translation | process in which information in RNA is translated into a protein sequence

triacylglycerol (triglyceride) | fats or oils; produced by the esterification of the hydroxyl groups of glycerol and the carboxyl groups of three fatty acids [[Hbf878](#), CC0, via [Wikimedia Commons](#)]

triol | molecules that contain three hydroxyl (–OH) functional groups

wax | lipid produced by the esterification of one fatty acid and a long-chain alcohol each containing 14 to 30 carbons

zwitterion | form of an amino acid that contains the protonated amine and carboxylate; typically occurs at neutral pH

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