

Glossary

Listed below are brief definitions for selected terms used in the monographs and/or frequently encountered within the references cited.

- abzyme** Catalytic antibody; antibody that can act like an enzyme in a specific chemical reaction.
- adjuvant** Substance administered with an antigen to augment its immunogenicity.
- adrenergic** System of autonomic innervation activated by epinephrine, norepinephrine or dopamine; particularly referring to substances that mimic the actions of the sympathetic nervous system.
- agonist** Receptor-specific activator; also a substance that mimics the effects of an endogenous regulatory compound.
- aldose reductase** Aldehyde reductase, EC 1.1.1.21; an oxidoreductase that reversibly catalyzes NADPH-dependent reduction of aldehydes, ketones, trioses, and triose phosphates.
- alkaloid** A nitrogenous, basic, usually bitter, substance found in plants. Term also applied to synthetic structural analogs.
- allomone** Chemical messenger used for communication between different species. Causes a reaction in the other species which is favorable to the organism secreting the substance.
- allotrope** One of several possible forms of an element; each of which differs in the atom bonding pattern.
- aminoglycoside** Carbohydrate typically consisting of 3 or 4 rings which has primary or secondary amines as ring substituents. Classification of antibiotics derived from various species of *Streptomyces*, which interfere with the function of bacterial ribosomes, e.g. streptomycin, gentamicin.
- amyloid** Complex proteinaceous fibrillar material deposited in blood vessels, heart, liver, brain, and other tissues in various disease states; gives characteristic starch-like reaction with iodine.
- angiogenesis** The development and formation of new blood vessels; postulated that tumor growth is preceded by an increase in new capillaries which converge upon the tumor.
- antagonist** Receptor-specific blocker; also a compound devoid of intrinsic regulatory activity which blocks or diminishes the action of an agonist.
- anti** Stereodescriptor restricted to bicyclo[X.Y.Z]anes in which the Z bridge reference group is oriented toward the Y bridge. Analogous to *trans* in double-bonded nitrogen systems such as oximes.
- antibiotic** Substance produced and secreted by various microorganisms which in low concentrations is toxic to other species.
- antibody** Immunoglobulin molecule produced in vertebrates by B-cells as a response to antigenic challenge; exist in different forms, each with a different binding site specifically recognizing the antigen that induced its formation.
- antigen** Immunogen; an agent that elicits an immune response including the production of an antibody; also considered to be any substance to which an antibody can bind.
- antisense** The DNA strand which is not transcribed; therefore, it has the same oligonucleotide sequence as the mRNA which codes for the protein.
- antipyretic** An agent that reduces or relieves fever.
- apoprotein** The protein portion of a conjugated protein without its prosthetic group.
- apoptosis** A regulated series of events leading to the death and removal of a cell in response to specific developmental or physiological signals; also known as "programmed cell death".
- aromatase** EC 1.14.14.1; enzyme that catalyzes the conversion of androgens to estrogens.
- atriopeptidase** Neutral endopeptidase, EC 3.4.24.11; an endopeptidase that catalyzes the degradation of atrial natriuretic factor.
- bacteriocin** A protein produced by bacteria that is toxic to another closely related strain.
- balsam** Resinous plant exudate containing the aromatic substances benzoic acid or cinnamic acid or their esters resulting from either a physiological or pathological response.
- biological response modifiers** Agents that alter the immune response such as interleukins, interferons, colony-stimulating factors, and tumor necrosis factor.
- bitter** A liquid, often alcoholic, that is prepared by steeping or distilling of a bitter herb or herb part that is used medicinally.
- carbene** A neutral organic radical containing a divalent carbon atom having only six electrons in its outer shell ($R_2C:$).
- carbonic anhydrase** Carbonate dehydratase, EC 4.2.1.1; catalyzes interconversion (reversible hydration) of carbonic acid to carbon dioxide and water.
- carcinoma** A malignant tumor arising from epithelial cells.
- catechol O-methyl transferase** EC 2.1.1.6; a methyltransferase that catalyzes the transfer of a methyl group from S-adenosyl-L-methionine to catechol or catecholamine.
- chelate** The cyclic structure formed by unshared electrons on neighboring atoms complexing with a metal ion; used as a sequestrant in metal poisoning.
- chemoselectivity** Pertains to the preferential reaction of a reagent with one functional group of a multifunctional molecule.
- chemotaxis** Migration of cells or organisms within a chemical concentration gradient.
- chimeric** Individual organism with cell populations from genetically different sources.
- chiral** The arrangements of atoms in space such that the resulting molecule is nonsuperimposable on its mirror image.
- cholinesterase** EC 3.1.1.8; catalyzes hydrolysis of acetylcholine and other choline esters to form choline and a carboxylic acid.
- chromophore** The group of atoms in a molecule that absorbs light and is responsible for the color of the molecule.
- cis** Relative stereodescriptor limited to cyclic systems with two stereocenters. Configuration where the two groups of higher priority are on the same side of the reference plane. See also *zusammen*.

Glossary (Continued)

- clinical trial, Phase I** Safety testing and pharmacological profiling in humans; usually involves 20-80 healthy volunteers and takes about one year.
- clinical trial, Phase II** Effectiveness testing in volunteer patients; usually involves 100-300 volunteers and takes about two years.
- clinical trial, Phase III** Extensive clinical testing in humans to determine efficacy and to identify adverse reactions; usually involves 1000-3000 patients and lasts about three years.
- clinical trial, Phase IV** Additional post-marketing studies to evaluate long term effects.
- cloning** Proliferation of a single cell to a large colony; replication from a single gene introduced into a host cell.
- coenzyme** Nonprotein molecule that is essential for the activity of an enzyme; functions as a cofactor of an enzyme.
- conformers** Different three-dimensional arrangements of atoms within a molecule that can be interconverted by rotation around single bonds; not usually separable. May also be referred to as conformation isomers or rotamers. (e.g. the chair, boat and twist forms of cyclohexane).
- corticosteroid** A 21-carbon steroid hormone produced by the adrenal cortex in response to the release of corticotropin (ACTH) or angiotensin.
- cyclooxygenase** An activity of prostaglandin endoperoxide synthase (EC 1.14.99.1) that catalyzes the oxidation of arachidonic acid to produce prostaglandins and thromboxanes.
- cytochromes** Family of colored proteins, related by the presence of a porphyrin metal (usually Fe), which undergo rapid oxidation and reduction in organisms.
- cytokines** Diverse group of soluble, nonantibody proteins secreted by a variety of cell types, which modulate the functional activities of individual cells by interaction with specific cell surface receptors, e.g. interferon, interleukin.
- cytokinin** Plant hormone that stimulates cell division and metabolism.
- dative bond** Semipolar linkage between two atoms where one atom contributes both electrons; also referred to as a coordinate covalent bond.
- depsipeptide** Polypeptide that contains ester bonds as well as peptide bonds, commonly but not necessarily alternating. Naturally occurring depsipeptides are often cyclic. Common metabolic products of microorganisms; often have antibiotic activity.
- eicosanoids** Collective term applied to substances such as prostaglandins, thromboxanes, leukotrienes and lipoxins, which are all derived from arachidonic acid; play an important role in inflammation.
- enantioselectivity** Pertains to a stereoselective reaction in which the potential products are mirror images.
- endo** Stereodescriptor used only for ring positions on [X.Y.Z.]anes in which $X \geq Y > Z > 0$ and the group of higher priority is on the opposite side of the ring reference plane to the Z-bridgehead.
- endopeptidase** Endoproteinase, proteinase; catalyzes the cleavage of non-terminal peptide bonds in a polypeptide or protein.
- endorphins** Naturally occurring neuropeptides that bind to opioid receptors with pain relieving action; the name is derived from endogenous morphine.
- endotoxins** Heat-stable lipopolysaccharide-protein complexes contained in cell walls of gram-negative bacteria including non-infectious gram-negatives; released only when the cells are disrupted.
- entactogen** Non-hallucinogenic psychoactive compound which is purported to facilitate communication and introspective states. Derived from the Greek roots of *en* for within or inside, *gen* to produce or originate and the Latin root *tactus* for touch.
- enterotoxin** Exotoxin produced by enterobacteria, which, when ingested or produced within the intestine, affects its function, inducing nausea, diarrhea, vomiting, etc.
- entgegen (E)** German for opposite. Relative stereodescriptor for configuration about double bonds; used when groups of higher priority are on different sides of the vertical reference plane.
- epitope** Structural entity on the antigen that forms the recognition site for binding.
- ergot** The hardened web-like mass of threads of *Claviceps purpurea* developed on rye attacked by the fungus. Ergot alkaloids are used as oxytocics and in treatment of migraine.
- essential fatty acids** A group of polyunsaturated fatty acids, such as linoleic acid, required for growth in mammals; they cannot be synthesized and must be obtained in the diet.
- essential oil** Volatile, aromatic oil physically extracted from plants.
- excipient** Any more or less inert substance added to a drug to give suitable consistency or form to the drug.
- excitotoxin** Neurotoxic analogs of glutamic acid which mimic its excitatory effects on neurons of the CNS.
- exo** Stereodescriptor used only for ring positions on [X.Y.Z.]anes in which $X \geq Y > Z > 0$ and the group of higher priority is on the same side of the ring reference plane to the Z-bridgehead.
- exotoxins** Disease-producing proteins secreted by species of certain bacteria into surrounding medium.
- flavoprotein** Flavin dependent enzymes which normally contain FAD or FMN as tightly bound coenzymes.
- galenic** Prepared from a plant rather than chemically synthesized.
- geminal (gem)** Indicates that the two substituents in a disubstituted compound are on the same carbon atom.
- glioma** A tumor arising from the glial tissue of the brain or spinal cord.
- glucocorticoid** A 21-carbon steroid hormone secreted by adrenal cortex. Acts on carbohydrate, lipid and protein metabolism and inhibits the release of corticotropin (ACTH).
- α -glucosidase** Maltase, glucoinvertase, EC 3.2.1.20; a glucosylhydrolase that catalyzes hydrolysis of terminal non-reducing 1,4-linked α -D-glucose residues to release α -D-glucose.
- green chemistry** Development of chemical products, procedures, and technologies with the goal of minimizing or eliminating the generation of hazardous substances.

Glossary (Continued)

- hapten** Small nonantigenic molecule which becomes an antigen when combined with a larger carrier molecule.
- herbaceous** Plants or parts of plants that do not have woody stems and typically die down annually.
- HMG CoA reductase** β -Hydroxyl- β -methyl glutarate CoA reductase, EC 1.1.1.88; oxidoreductase that catalyzes 3-hydroxy-3-methylglutaryl CoA reduction to mevalonate with NADPH as the electron donor.
- homeopathy** The theory that "like cures like"; wherein small amounts of compounds which in large amounts would produce undesirable symptoms are beneficial.
- hybridoma** Cell line produced by fusing an antibody-secreting cell with a myeloma cell; used to produce specific monoclonal antibodies in great quantity.
- hyperplasia** Abnormal increase in the number of normal cells in a tissue or organ.
- hypertrophy** Abnormal enlargement of an organ or tissue, not due to tumor formation; caused by the increase in size of its cellular components.
- idiotype** The segment of an immunoglobulin molecule that determines its antigenic specificity.
- immunoglobulins** Proteins produced by plasma cells derived from B cells of the immune system; function as antibodies to aid in fighting infection.
- immunotoxins** Molecules that comprise a cytotoxic agent linked to an antibody specific for target cell antigens.
- inosine monophosphate dehydrogenase** IMPH; EC 1.1.1.205; NAD⁺-dependent enzyme that catalyzes oxidation of inosine 5'-monophosphate (IMP) to xanthosine 5'-monophosphate (XMP); rate limiting step in *de novo* guanine nucleotide synthesis.
- isoform** Protein that has the same function as another protein but which is encoded by a different gene or alternative splicing of variant alleles and may have small differences in its primary structure.
- kairomones** Chemical messengers used for communication between different species which are either nonadaptive or actually detrimental to the organisms producing them.
- ketolide** Semi-synthetic derivative of the macrolide erythromycin A.
- knockout mutation** A mutation in which a single gene of choice is inactivated without affecting other genes.
- lake** Organic pigment made of an oil-soluble organic dye, a precipitant, and an absorbent inorganic substrate.
- lantibiotics** Polycyclic bacteriocins consisting of the thioether amino acids lanthionine and beta-methylanthionine.
- liposome** Closed vesicles of lipid bilayer formed by emulsification of cell membranes; the interior may be used to encapsulate drugs for targeted cellular delivery.
- 5-lipoxygenase** EC 1.13.11.34; actin-binding protein that initiates the synthesis of leukotrienes via the oxidation of arachidonic acid.
- lymphoma** A malignant tumor of the lymphoid tissue.
- lymphokine** Nonimmunoglobulin protein synthesized primarily by T-lymphocytes that modulates an immune response, e.g. interleukin-2, γ -interferon.
- major histocompatibility complex** Large, multigene cluster that encodes for the cell surface glycoproteins which are essential in the cellular immune response to distinguish "self" and "non-self".
- matrix metalloproteinase** Zinc-dependent endopeptidases that catalyze the hydrolysis of extracellular proteins, particularly collagen and elastin.
- melanoma** A malignant tumor derived from melanocytes.
- meso compound** Pertaining to a compound which contains equal numbers of enantiomeric groups which are identically linked. Compound having at least two chiral centers, yet no optical rotation because it contains a plane of symmetry.
- mesomerism** The existence of chemical structures having the same molecular arrangements that differ only in the location of electrons; the actual electronic distribution is not represented by any one structure, but is a hybrid of contributing structures.
- monoamine oxidase** MAO, amine oxidase, EC 1.4.3.4; flavoprotein enzyme that catalyzes oxidative deamination of monoamines to form aldehydes or ketones with the release of hydrogen peroxide and ammonia.
- monoclonal antibody** Antibody produced by a cloned hybridoma cell, active against a single target antigen.
- mordant** Substance used to fix a dyestuff on a material by combining with the dye to form an insoluble compound.
- morphogens** Soluble substances that control the embryonic differentiation of cells and tissues.
- multidrug resistance** The resistance of tumor cells to varied chemotherapeutic agents mediated by the expression of a transmembrane pump, P-glycoprotein, which actively pumps the drugs out of the cells, lowering the intracellular concentration and cytotoxic effectiveness.
- mutagen** Agent that causes a permanent inheritable change in the DNA of the organism.
- mutein** Name applied to a protein arising as a result of a mutation.
- mycotoxins** Fungal toxins that are harmful to other organisms.
- myeloma** A malignant tumor derived from hemopoietic tissue.
- neuraminidase** Acetyl-neuraminyl hydrolase; sialidase; EC 3.2.1.18; enzyme that catalyzes the hydrolysis of terminal sialic acid groups from glycoproteins and oligosaccharides; found on the surface of the influenza virus.
- neuroleptic** Agent that pharmacologically manages the manifestations of a psychotic disorder, affecting cognition and behavior; also called major tranquilizer or anti-psychotic.
- nitrene** Carbene analog consisting of an electron-deficient, neutral monovalent nitrogen species.
- neurotrophic factors** Polypeptides that support the growth and survival of specific populations of neurons.
- nootropic** Agent having positive effects on organically impaired cognition or nervous system function; from the Greek *noos* or *nous* for mind and *-tropic* for nourishing, stimulating.

Glossary (Continued)

- nor** Originally the abbreviation for *Nitrogen ohne Radikal*. Currently a subtractive prefix for stereocenters indicating ring contraction or the loss of a methyl group from the carbon skeleton.
- nucleic acids** Biologically occurring polynucleotides in which the nucleotide residues are linked in a specific sequence by phosphodiester bonds; DNA and RNA.
- nucleoside** A purine or pyrimidine base in glycosidic linkage with a pentose sugar (e.g. adenosine, cytosine, guanosine, thymidine).
- nucleotide** The phosphate ester of a nucleoside.
- oleoresin** Plant exudate containing essential oil and resin.
- orexigenic** Appetite stimulating.
- peptidyl dipeptidase A** Angiotensin converting enzyme; EC 3.4.15.1; a zinc-containing hydrolase that catalyzes cleavage of a C-terminal dipeptide; catalyzes conversion of angiotensin I to yield the active angiotensin II.
- peroxidases** Oxidoreductase enzymes that catalyze oxidation of substrates by hydrogen peroxide.
- pharmacodynamics** Study of the biochemical and physiological effects of drugs on living systems and their mechanism of action.
- pharmacognosy** Study of biological and chemical properties of naturally occurring medicinal products.
- pharmacokinetics** Study of the action of drugs in the body over time, including absorption, biotransformation, tissue distribution, and elimination of the drugs and their metabolites.
- pharmacophore** An abstract concept that defines the set molecular characteristics (steric, and electronic) and chemical functionalities necessary to ensure the optimal interaction with the target site.
- pheromones** Chemical substances used for communication between individual organisms of the same species. Perceived primarily by the olfactory sense and to a lesser extent the gustatory sense. From the Greek *pherein* to transfer, and *hormon* to excite or stimulate.
- phytosterols** Sterols obtained from higher plants; differ from sterols occurring in animals by having C₁ or C₂ residues at C-24 and/or a double bond at C-22.
- prebiotic** Food ingredients that function by stimulating growth of beneficial bacteria of the digestive system.
- primary structure (protein)** Amino acid sequence.
- prion** A small proteinaceous infectious particle which resists inactivation by procedures that modify nucleic acids.
- probiotic** Beneficial bacteria of the digestive system.
- prochiral** Achiral compound or group that would become chiral if one of two identical substituents is replaced by a new ligand.
- prodrug** A drug precursor; a substance which is inactive by itself and which must undergo chemical conversion by metabolic processes to become an active pharmacological agent.
- prostaglandin endoperoxide synthase** Prostaglandin synthase; EC 1.14.99.1; heme-containing enzyme that with oxygenase and peroxidase activity; catalyzes the biosynthesis of prostaglandins G and H from arachidonic acid.
- prosthetic group** Tightly bound non-protein portion of a conjugated protein essential for the activity of a protein or enzyme.
- pyrogens** Fever-producing substances; agents which produce a febrile response when administered parenterally to man and certain animals.
- quaternary structure (protein)** Three-dimensional structure of a protein, in particular how subunits are integrated; typically classified as fibrous, globular, or conjugated.
- receptor** Protein or protein complex that binds a specific ligand such as a neurotransmitter, hormone, lymphokine, etc., producing a secondary biological signal within the cell.
- rectus (R)**—(right) Opposite of (*S*). Absolute term describing the spatial arrangement about an asymmetric carbon when the substituent of lowest priority lies below the reference plane and the priority of the remaining substituents decreases in a clockwise direction.
- 5- α reductase** EC 1.3.99.5; membrane-bound enzyme that catalyzes the irreversible reduction of testosterone to the more potent androgen, dihydrotestosterone.
- regioselectivity** Pertains to the preferential formation of one structural isomer when two or more are possible.
- reverse transcriptase** EC 2.7.7.49; RNA-directed DNA polymerase; required for the replication of retroviruses.
- RNA interference (RNAi)** Process in which short interfering RNA (siRNA) binds to specific mRNA and silences gene expression.
- saponins** Foaming glycoside of sterols or triterpenes that are widely distributed in plants. Causes cell lysis.
- sarcoma** Malignant tumor arising from connective tissue or muscle cells.
- secondary structure (protein)** Residue by residue conformation of the backbone of the polypeptide chain. Typical conformations include the α helices, β sheets and random coils; given rise to by the regular hydrogen-bond interactions within contiguous stretches of polypeptide chain.
- semiconductor** Material with electric conductivity range between metals and insulators.
- sinister (S)**—(left) Opposite of (*R*). Absolute term describing the spatial arrangement about an asymmetric carbon when the substituent of lowest priority lies below the reference plane and the priority of the remaining substituents decreases in a counterclockwise direction.
- sol-gel process** Solution process for the transformation of colloidal liquids into ultrahomogeneous ceramic and glass gels used in material science.
- stereoselectivity** Pertains to the preferential formation of one stereoisomer when two or more are possible.
- stereospecific reaction** A reaction where starting materials, which differ only in their configuration, are converted to stereoisomerically distinct products. Applies when the reaction processes are constrained to proceed in a stereochemically defined manner.
- superconductors** Materials that below a certain critical temperature show zero resistance to electrical current flow. Ideally if resistance is truly zero, then electrons flowing in a loop of superconducting wire would never lose any energy.

Glossary (Continued)

- syn** Stereodescriptor restricted to bicyclo[X.Y.Z]anes in which the Z bridge reference group is oriented toward the X bridge; analogous to *cis* in double-bonded nitrogen systems such as oximes.
- teratogen** Agent that causes abnormal fetal development.
- terpene** Hydrocarbon derived from essential oils, resins, etc., containing multiples of the C₅ isoprene unit as its carbon skeleton. Monoterpene is C₁₀H₁₆.
- tertiary structure (protein)** Three dimensional conformation of the polypeptide chain after folding.
- tocolytic** Compound to reduce uterine contractions.
- topoisomerase** Enzyme that can remove (or create) supercoiling in double stranded DNA by creating transitory breaks in one (type I) or both (type II) strands of the sugar-phosphate backbone.
- toxoid** A toxin which has been treated by a chemical agent or by heat to destroy its toxic properties while retaining its ability to stimulate antibody production.
- trans** Relative stereodescriptor limited to cyclic systems with two stereocenters. Configuration where the two groups of highest priority are on opposite sides of the reference plane.
- transduction** Transfer of genetic material from one cell to another by a viral vector.
- transfection** Introduction of exogenous DNA (usually viral or bacterial) into mammalian cells or bacterial cells.
- transgenic** Containing artificially introduced DNA as a result of experimental splicing of a segment of DNA from one genome into the germ line of another.
- vasopeptidase inhibitor** Cardiovascular drug that simultaneously inhibits both neutral endopeptidase and angiotensin-converting enzyme.
- vicinal (vic)** Indicates that two substituents in a disubstituted compound are on adjacent carbon atoms.
- ylide** Compounds in which a carbon atom with an unshared electron pair is connected to cation from Group 15 (Va) or 16 (VIa) of the periodic table.
- zusammen (Z)** German for together. Relative stereodescriptor for configuration about double bonds; used when groups of higher priority are on the same side of the vertical reference plane.
- zwitterion** Dipolar ion in which positive and negative charges are physically separated.
- zymogen** Inactive precursor molecule to an enzyme which is activated as a result of catalysis. Also known as a proenzyme.