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a 1. Subscript denoting the more active form of an interconvertible enzyme. 2. Atto.

A 1. Adenine. 2. Adenosine. 3. Absorbance. 4. Angstrom unit. 5. Mass number. 6. Alanine. 7. Helmholtz free energy. 8. Ampere.

2,5-A TWO-FIVE A.

Å Angstrom unit

AA 1. Amino acid. 2. Atomic absorption.

AA-AMP Aminoacyl adenylate.

AAN Amino acid nitrogen.

AAS Atomic absorption spectrophotometry.

AA-tRNA Aminoacyl-tRNA.

AA-tRNA^{AA} Aminoacyl transfer RNA; the prefix AA denotes the aminoacyl group attached to the transfer RNA (tRNA) molecule, while the superscript AA denotes the amino acid for which the transfer RNA is specific.

AAV Adenovirus-associated virus.

Ab Antibody.

ABA Abscisic acid.

A band A transverse dark band that is seen in electron microscope preparations of myofibrils from striated muscle and that consists of thick and thin filaments.

Abbe refractometer A refractometer for the direct measurement of the refractive index of a solution. A few drops of liquid are placed between two prisms in a water-thermostated compartment and light is then passed through the prisms into a telescope, attached to a measuring scale.

ABC Antigen binding capacity.

a × b × c code An early version of the genetic code according to which there exist, respectively, *a*, *b*, and *c* distinguishable and nonequivalent bases for each of the three positions of the codon, so that the product $a \times b \times c$ is equal to the number of categories into which the triplet codons are divided. The original $a \times b \times c$ code was thought to be a $4 \times 3 \times 2$ code.

ABC excinuclease An enzyme, present in *E. coli*, that mediates both the incision and excision steps of the excision repair of DNA. The enzyme is composed of three subunits and appears to recognize helical distortions in DNA, such as those produced by ultraviolet irradiation or alkylating agents.

aberration See chromosomal aberration.

abetalipoproteinemia A genetically inherited

metabolic defect in humans that is characterized by the absence of low-density lipoproteins.

abiogenesis 1. The formation of a substance other than by a living organism. 2. The doctrine that living organisms can come from nonliving matter; spontaneous generation.

abiogenetic Of, or pertaining to, abiogenesis.

abiogenic Of, or pertaining to, abiogenesis.

abiological Of, or pertaining to, nonliving matter.

abiosis The absence of life.

abiotic Of, or pertaining to, abiosis.

ablation The breakup and wearing of a solid surface by impact with particles or radiation; the etching of the surface of a biological tissue by exposure to ultraviolet lasers is an example.

ABM paper Aminobenzyloxy methylcellulose paper, used in the study of nucleic acids. When this paper is chemically activated, it binds single-stranded nucleic acid covalently.

abnormal hemoglobin A hemoglobin that differs from normal hemoglobin in its amino acid sequence.

ABO blood group system A human blood group system in which there are two antigens, denoted A and B, that give rise to four serum groups, denoted A, B, AB, and O. The antigens are mucopeptides and contain a mucopolysaccharide that is identical in both antigens except for its nonreducing end. The serum groups A, B, AB, and O are characterized, respectively, by having red blood cells that carry A antigens, B antigens, both A and B antigens, and neither A nor B antigens.

abortive complex 1. NONPRODUCTIVE COMPLEX. 2. A ternary, dead-end complex; an inactive complex, consisting of enzyme, substrate, and product.

abortive infection A viral infection that either does not lead to the formation of viral particles or leads to the formation of noninfectious viral particles.

abortive initiation An initiation of transcription that is terminated after only a few nucleotides have been polymerized. In this case, the 5'-fragment synthesized (consisting of pppA and one or more additional nucleotides) dissociates from the promoter so that the initiation process must start again. Abortive

initiation may occur if a needed nucleotide is missing as a result of other factors.

abortive transduction Bacterial transduction in which the DNA from the donor cell is introduced into the recipient cell, but fails to become integrated into the chromosome of the recipient bacterium.

ABP Androgen-binding protein.

abrin A plant protein in the seeds of *Abrus precatorius* that is toxic to animals and humans and that has antitumor activity; it inhibits protein synthesis in eukaryotes by inhibiting the binding of aminoacyl-tRNA to ribosomes.

abscisic acid A widely occurring sesquiterpene plant hormone that is antagonistic to many other plant hormones; it inhibits growth, seed germination, bud formation, and leaf senescence. *Abbr* ABA. *Aka* abscisin, dormin.

abscissa The horizontal axis, or *x*-axis, in a plane rectangular coordinate system.

absolute alcohol Anhydrous ethyl alcohol.

absolute configuration The actual spatial arrangement of the atoms about the asymmetric carbon atoms in a molecule.

absolute counting The counting of radiation that includes every disintegration that occurs in the sample; such counts are expressed as disintegrations per minute.

absolute defective mutant A cell or an organism that exhibits its mutant phenotypic behavior under all conditions. *See also* conditional mutant.

absolute deviation The numerical difference, regardless of sign, between an experimental value and a given value; the latter may be a constant, a sample value, or a mean.

absolute error The absolute deviation of an experimental value from the true, or the best, value of the quantity being measured.

absolute oil *See* essential oil.

absolute plating efficiency The percentage of cells that give rise to colonies when a given number of cells are plated on a nutrient medium.

absolute reaction rates *See* theory of absolute reaction rates.

absolute specificity The extreme selectivity of an enzyme that allows it to catalyze only the reaction with a single substrate in the case of a monomolecular reaction, or the reaction with a single pair of substrates in the case of a bimolecular reaction. *Aka* absolute group specificity.

absolute temperature scale A temperature scale on which the zero point is the absolute zero, and the degrees, denoted K (no degree sign), match those of the Celsius scale. *Aka* Kelvin temperature scale.

absolute zero The zero point on the absolute

temperature scale (-273.2°C); the theoretical temperature at which all atomic motion ceases.

absorb To engage in the process of absorption.
absorbance A measure of the light absorbed by a solution that is equal to $\log I_0/I$, where I_0 is the intensity of the incident light, and I is the intensity of the transmitted light. *Sym* A. *Aka* optical density.

absorbance index ABSORPTIVITY.

absorbance unit The amount of absorbing material contained in 1 mL of a solution that has an absorbance of 1.0 when measured with an optical path length of 1.0 cm.

absorbancy Variant spelling of absorbance.

absorbate A substance that is absorbed by another substance.

absorbed antiserum An antiserum from which antibodies have been removed by the addition of soluble antigens.

absorbed dose *See* radiation absorbed dose.

absorbent 1. *n* A substance that absorbs another substance. 2. *adj* Having the capacity to absorb.

absorber A material used to absorb radioactive radiation.

absorptiometer 1. An instrument for measuring the amount of gas absorbed by a liquid. 2. A device for measuring the thickness of a layer of liquid between parallel glass plates. 3. COLORIMETER.

absorption 1. The uptake of one substance by another substance. 2. The passage of materials across a biological membrane. 3. The process by which all or part of the energy of incident radiation (includes heat, electromagnetic, and radioactive radiation) is transferred to the matter through which it passes. 4. The removal of antibodies from a mixture by the addition of soluble antigens, or the removal of soluble antigens from a mixture by the addition of antibodies.

absorption band A portion of the electromagnetic spectrum in which a molecule absorbs radiant energy.

absorption cell CUVETTE.

absorption coefficient 1. ABSORPTIVITY. 2. BUNSEN ABSORPTION COEFFICIENT. 3. The rate of change in the intensity of a beam of radiation as it passes through matter.

absorption cross section The product of the probability that a photon passing through a molecule will be absorbed by that molecule and the average cross-sectional area of the molecule; the absorption cross section s is related to the molar absorptivity ϵ by $s = 3.8 \times 10^{-21} \epsilon$.

absorption optical system An optical system that focuses ultraviolet light passing through a solution in such a fashion that a photograph

is obtained in which the darkening of the photographic film depends on the amount of light transmitted by the solution. A boundary in the solution appears as a transition between a lighter and a darker region, and measurements are made on the film by means of a densitometer tracing. The optical system is used in the analytical ultracentrifuge.

absorption ratio The ratio of the concentration of a compound in solution to its absorptivity.

absorption spectrum A plot of the absorption of electromagnetic radiation by a molecule as a function of either the frequency or the wavelength of the radiation.

absorptive lipemia The transient increase in the concentration of lipids in the blood that follows the ingestion of fat.

absorptivity The proportionality constant ϵ in Beer's law, $A = \epsilon lc$, where A is the absorbance, l is the length of the light path, and c is the concentration.

abstraction The removal of either an atom or an electron from a compound.

abundance The average number of molecules of a specific mRNA type in a given cell. The abundance (A) is given by $A = NRf/M$, where N is Avogadro's number, R is the RNA content of the cell in grams, f is the fraction of the specific mRNA relative to the total RNA content of the cell, and M is the molecular weight of the specific mRNA in daltons. *Aka* representation.

Ac Acetyl group.

acanthocyte A cell that has numerous projecting spines or "thorns."

acanthocytosis 1. A condition characterized by blood that contains spherical erythrocytes that have numerous projecting spines.
2. ABETALIPOPROTEINEMIA.

acanthosome A membranous vesicle that appears in fibroblasts, isolated from the skin of hairless mice that have been subjected to chronic UV irradiation.

ACAT Acyl-CoA:cholesterol transferase; the enzyme that forms cholesteryl esters from cholesterol.

acatalasemia ACATALASIA.

acatalasia A genetically inherited metabolic defect in humans that is due to a deficiency of the enzyme catalase.

acceleration A stage in carcinogenesis in which, according to the Busch theory, an accelerator protein is synthesized which functions in accelerating the production of cancer RNA from cancer DNA.

accelerator An instrument for imparting high kinetic energy to subatomic particles by means of electric and magnetic fields.

accelerator globulin PROACCELERIN.

accelerator protein *See* acceleration.

accelerin The activated form of proaccelerin that converts prothrombin to thrombin during blood clotting.

acceptor 1. A protein that is activated by a hormone receptor and that directly mediates the action of a rate-limiting enzyme. Hormone action thus involves the following stages: (a) the hormone binds to a receptor which undergoes a conformational change; (b) the hormone-receptor complex interacts with an acceptor molecule to form a hormone-receptor-acceptor complex; (c) formation of the latter complex activates the acceptor; (d) the activated acceptor molecule mediates the activity of a rate-limiting enzyme. 2. The atom that receives a hydrogen in the formation of a hydrogen bond.

acceptor control The dependence of the respiratory rate of mitochondria on the ADP concentration. *See also* loose coupling; tight coupling.

acceptor-control ratio The rate of respiration, in terms of oxygen uptake per unit time, in the presence of ADP, divided by the rate in the absence of ADP; measured either in the intact cell or in isolated mitochondria.

acceptor end The trinucleotide CCA at the 3'-end of tRNA. The amino acid becomes esterified to the 2'- or 3'-position of the terminal adenine nucleotide in this sequence.

acceptor junction *See* splicing junctions.

acceptor protein ACCEPTOR (1).

acceptor RNA TRANSFER RNA.

acceptor site AMINOACYL SITE.

acceptor splicing site *See* splicing junctions.

acceptor stem *See* arm.

accessible surface That part of the van der Waals surface of a protein that is defined by the center of a suitable probe, generally a water molecule having a radius of 1.4 Å. The accessible surface (A_s) for a small protein of molecular weight M can be approximated by the relation $A_s = 11.12 \times M^{2/3}$. For a large protein, with conspicuous domains, A_s becomes directly proportional to the molecular weight.

accessory factor A protein in blood clotting that, when activated proteolytically, serves to enhance the rate of proteolytic activation of some other blood clotting factor.

accessory pigment A photosynthetic pigment, such as a carotenoid or a phycobilin, that functions in conjunction with a primary photosynthetic pigment.

AcCoA Acetyl coenzyme A.

accumulation theory A theory of aging according to which aging is due to the accumulation of either a deleterious or a toxic substance.

accumulator organism An organism capable of

absorbing and retaining large amounts of specific chemical elements.

accuracy The nearness of an experimental value to either the true, or the best, value of the quantity being measured.

ACD solution Acid-citrate-dextrose solution.

acellular Not composed of cells.

ACES *N*-(2-Acetamido)-2-aminoethanesulfonic acid; used for the preparation of biological buffers in the pH range of 6.1 to 7.5. *See also* biological buffers.

acetal A compound derived from an aldehyde and two alcohol molecules by splitting out a molecule of water.

acetate hypothesis The hypothesis that a multitude of complex substances may be formed naturally as a result of modification of the linear chains formed by repeated head-to-tail condensation of acetic acid residues; typical modifications are cyclization, oxidation, and alkylation.

acetate-replacing factor LIPOIC ACID.

acetate thiokinase A fatty acid thiokinase that catalyzes the activation of fatty acids having two or three carbon atoms to fatty acyl coenzyme A.

acetification The spoilage of beverages, such as wine and beer, due to the aerobic oxidation of ethyl alcohol to acetic acid by microorganisms.

acetoacetic acid A ketoacid that can be formed from acetyl coenzyme A and that is one of the ketone bodies.

acetogenin One of a large number of compounds that are formally equivalent to head-to-tail condensation products of acetic acid residues. Acetogenins are biosynthesized by means of a multienzyme complex via condensations of acetyl coenzyme A molecules or other derivatives of coenzyme A. Acetogenins are responsible for many of the brilliant colors that occur in nature. Major subgroups include flavonoids, tetracyclines, and macrolide antibiotics. *Aka* polyketide.

acetoin 2-Keto-3-hydroxybutane; a compound that can be formed by air oxidation of butylene glycol in the course of butylene glycol fermentation.

acetoin fermentation BUTYLENE GLYCOL FERMENTATION.

acetone A ketone that can be formed from acetyl coenzyme A and that is one of the ketone bodies.

acetone body KETONE BODY

acetone-butanol fermentation The fermentation of glucose that is characteristic of some *Clostridium* species and which, at first, yields acetic acid and butyric acid, but after the pH drops, yields acetone and butanol as major end products. *Aka* solvent fermentation.

acetonemia 1. The presence of excessive amounts of acetone in the blood. 2. The presence of excessive amounts of ketone bodies in the blood.

acetone powder A preparation of one or more proteins that is produced by removal of acetone by vacuum filtration from an acetone extract of a tissue; used in the course of isolating and purifying an enzyme or other protein.

acetonuria 1. The presence of excessive amounts of acetone in the urine. 2. The presence of excessive amounts of ketone bodies in the urine.

acetyl-S-CoA An inhibitory analog of acetyl coenzyme A; the compound $\text{CH}_3\text{—CO—CH}_2\text{—S-CoA}$.

acetylation An acylation reaction in which an acetyl radical $\text{CH}_3\text{CO—}$ is introduced into an organic compound.

acetylcholine The acetylated form of choline; the hydrolysis of acetylcholine to choline and acetic acid is catalyzed by acetylcholinesterase and is a key reaction in the transmission of the nerve impulse. *Abbr* ACh.

acetylcholinesterase The enzyme that catalyzes the hydrolysis of acetylcholine to choline and acetic acid during the transmission of a nerve impulse. *Abbr* AChE. *Aka* true cholinesterase; choline esterase I; specific cholinesterase. *See also* cholinesterase.

acetyl CoA Acetyl coenzyme A.

acetyl-CoA carboxylase A multienzyme system that catalyzes the ATP-requiring biosynthesis of malonyl-S-CoA from acetyl-S-CoA and HCO_3^- . The enzyme from *E. coli* and plants consists of three components: (a) biotin carboxyl carrier protein (BCCP or BCP); a protein that contains two identical subunits, each of which has one molecule of biotin linked covalently to the $\epsilon\text{-NH}_2$ group of a lysine residue; (b) biotin carboxylase (BC); an enzyme having two identical subunits; (c) transcarboxylase (TC or carboxyl transferase); a tetrameric enzyme containing two pairs of non-identical subunits.

acetyl coenzyme A The acetylated form of coenzyme A; a key intermediate in the citric acid cycle, in fatty acid oxidation, in fatty acid synthesis, and in other metabolic reactions. Various abbreviations as acetyl-S-CoA, acetyl-CoA, CoASAc, AcS-CoA, and AcCoA.

acetyl coenzyme A carboxylase *See* acetyl-CoA carboxylase.

acetylene 1. The hydrocarbon $\text{CH}\equiv\text{CH}$. 2. ALKYNE.

acetyl group The acyl group of acetic acid; the radical $\text{CH}_3\text{CO—}$. *Abbr* Ac, OAc.

N-acetylmuramic acid A compound derived from acetic acid, glucosamine, and lactic acid

that is a major building block of bacterial cell walls.

N-acetylneuraminic acid A compound derived from acetic acid, mannosamine, and pyruvic acid that is a major building block of animal cell coats. *Abbr* NANA; NAcneu; NeuAc.

acetyl number A measure of the number of hydroxyl groups in a fat; equal to the number of milligrams of potassium hydroxide required to neutralize the acetic acid in 1 gram of acetylated fat. *Aka* acetyl value.

acetylornithine cycle A cyclic set of reactions in bacteria and plants that constitutes a major pathway for the synthesis of ornithine from glutamic acid and *N*-acetylornithine.

acetyl-SCoA Acetyl coenzyme A.

N-acetylserine The acetylated form of serine that is believed to function in the initiation of translation in mammalian systems, much as *N*-formylmethionine functions in the initiation of translation in bacterial systems.

acetyltransferase An enzyme that catalyzes the transfer of an acetyl group from acetyl coenzyme A to another compound.

AcG Accelerator globulin.

Ac globulin Accelerator globulin.

ACh Acetylcholine.

A chain 1. The shorter of the two polypeptide chains of insulin, containing 21 amino acids and one intrachain disulfide bond. 2. The heavy chain (H chain) of the immunoglobulins.

AChE Acetylcholinesterase.

achiral Not chiral.

achirotopic Not chirotopic.

achlorophyllous Lacking chlorophyll.

achromic Devoid of color.

achromic point A stage in the hydrolysis of starch at which the addition of iodine fails to produce a blue color.

achromotrichia factor *p*-AMINO BENZOIC ACID.

achromycin *See* tetracyclines.

acid *See* Bronsted acid; Lewis acid.

acidaminuria AMINOACIDURIA.

acid anhydride A compound containing two acyl groups bound to an oxygen atom. The compound is referred to as either a simple or a mixed anhydride depending on whether the two acyl groups are identical or different. In biochemistry, both simple and mixed anhydrides frequently contain the phosphoryl group.

acid-base balance The reactions and factors involved in maintaining a constant internal environment in the body with respect to the buffer systems and the pH of the various fluid compartments.

acid-base catalysis *See* general and specific acid-base catalysis.

acid-base indicator *See* indicator.

acid-base titration A titration in which either acid or base is added to a solution, and the titration is followed by means of pH measurements or by means of indicators.

acid-citrate-dextrose solution An aqueous solution of citric acid, sodium citrate, and dextrose, that is used as an anticoagulant in the collection and storage of blood.

acidemia A condition characterized by an increase in the hydrogen-ion concentration of the blood.

acid-fast Descriptive of the lipid-rich cell walls of some bacteria that resist decolorization by mineral acids after having been stained with basic aniline dyes.

acid hematin A hematin formed from hemoglobin by treatment with acid below pH 3.

acid hydrolase A hydrolytic enzyme that has an acidic optimum pH.

acidic 1. Of, or pertaining to, an acid. 2. Of, or pertaining to, a solution having a pH less than 7.0.

acidic amino acid An amino acid that has one amino and two carboxyl groups; an amino acid that has a net negative charge at neutral pH.

acidic dye An anionic dye that binds to, and stains, positively charged macromolecules. *Aka* acidic stain.

acidic food A food that is rich in phosphorus, sulfur, and chlorine and that leaves an acidic residue when subjected to combustion.

acidification of urine The process whereby the glomerular filtrate of the kidney that has an approximate pH of 7.4 is converted to urine that has a lower pH and may have a pH as low as 4.8.

acidimetry 1. The chemical analysis of solutions by means of titrations, the end points of which are recognized by a change in the hydrogen-ion concentration. 2. A determination of the amount of an acid by titration against a standard alkaline solution.

acidity constant ACID DISSOCIATION CONSTANT.

acid mucopolysaccharides GLYCOSAMINOGLYCANS.

acid number The number of milligrams of potassium hydroxide required to neutralize the free fatty acids in 1g of fat. *Aka* acid value.

acidolysis Hydrolysis by means of an acid.

acidophil A cell that stains with an acidic dye.

acidosis A deviation from the normal acid-base balance in the body that is due to a disturbance which, by itself and in the absence of compensatory mechanisms, would tend to lower the pH of the blood. The actual change in pH depends on whether and to what extent the disturbance is compensated for. The disturbances and the compensatory

mechanisms are considered primarily with respect to their effect on the bicarbonate/carbonic acid ratio of blood plasma. *See also* metabolic acidosis; primary acidosis; etc.

acidosome A nonlysosomal vesicle that functions in the acidification of digestive phagocytic vacuoles in *Paramecium*.

acidotic Of, or pertaining to, acidosis.

acid pH A pH value below 7.0.

acid phosphatase A phosphatase, the optimum pH of which is below 7.0.

acid plant A plant that accumulates organic acids in its leaves; these acids form ammonium salts.

acid rain The environmental phenomenon in which sulfur dioxide and nitrogen oxides, expelled into the air by industrial combustion, react with rainwater to produce dilute solutions of sulfuric and nitric acids. Acid rain leads to acidification of streams and lakes and depletion or loss of their fish life.

aciduria A condition characterized by the excretion of an excessively acidic urine.

aconitase The iron-containing enzyme that catalyzes the interconversion of citrate and isocitrate in the citric acid cycle. The reaction proceeds via the enzyme-bound intermediate *cis*-aconitate (a tricarboxylic acid). *Aka* aconitate hydratase.

aconitate hydratase ACONITASE.

cis-aconitic acid *See* aconitase.

acoustical phonon *See* phonon.

ACP 1. Acyl carrier protein. 2. Acid phosphatase.

ac polarography Alternating-current polarography; a polarographic method in which a small alternating potential is superimposed on the normal, direct-current applied potential, and the ac component of the resulting current is measured.

acquired antibody An antibody produced by an immune reaction as distinct from one occurring naturally.

acquired hemolytic anemia An autoimmune disease in which individuals form antibodies to their own red blood cells.

acquired immunity The immunity established in an animal organism during its lifetime.

acquired immunodeficiency syndrome *See* AIDS.

acquired tolerance The immunological tolerance produced in an animal organism by the injection of antigen into it; acquired tolerance persists only as long as the antigen remains in the organism.

acridine dye A planar heterocyclic molecule used to stain DNA and RNA. Acridine dyes are basic dyes that become intercalated into the nucleic acid molecule; they are mutagenic,

since their intercalation produces insertions or deletions.

acridine orange An acridine dye that functions both as a fluorochrome for staining nucleic acids and as a mutagen, producing insertions or deletions.

acriflavin An acridine dye that leads to frame shift mutations.

acrolein test A qualitative test for glycerol, based on the dehydration and oxidation of glycerol to acrolein by heating with potassium bisulfate.

acromegaly A condition characterized by overgrowth of skeletal structures due to the excessive production of growth hormone.

acronym A word formed from the initial letters of other words; the words LASER and LET are two examples.

acrosome A cap-like structure, beneath the cell membrane, at the head of a spermatozoon; it serves to digest the egg coatings to permit fertilization.

acrosome reaction The release of the contents of an acrosome by exocytosis upon contact of a sperm with an egg.

acrylamide *See* polyacrylamide gel.

AcSCoA Acetyl coenzyme A.

ACTH Adrenocorticotrophic hormone.

ACTH family A group of peptide hormones, including ACTH, lipotropin, and melanotropin, that are derived from a common precursor. The opioids β -endorphin and γ -endorphin are also derived from the same precursor which is known as prepro-opiomelanocortin. *Aka* ACTH/endorphin peptides.

actidione CYCLOHEXIMIDE.

actin A major protein component of the myofilaments of striated muscle and the principal constituent of the thin filaments of muscle and of the microfilaments of the cytoskeleton. *See also* F-actin; G-actin.

actin filament A thin filament of striated muscle that consists largely of actin and that is linked to thick filaments by means of cross-bridges which protrude from them; a myofilament. The polymerization of actin monomers to form filaments proceeds with polarity. The plus, or barbed, end of the filament is the fast-assembly end which requires a lower critical concentration of monomer (the concentration at which addition of monomer just balances dissociation); the minus, or pointed, end is the slow-assembly end which requires a higher critical concentration of monomer. *See also* microfilament; treadmilling.

actin-fragmenting protein One of a number of proteins, such as villin and gelsolin, that bind

to actin filaments and sever them. These are generally calcium-dependent proteins and they are thought to bind so strongly to the actin filaments that the latter are broken at the binding sites.

actinin A minor protein component of striated muscle, believed to be part of the thin filaments and to be concentrated in both the Z line and the I band. Two components, denoted α - and β -actinin, have been identified: α -actinin links actin filaments together to form a random, three-dimensional network; β -actinin tends to reduce the length of an F-actin strand and may serve to determine the length of actin filaments.

actinometer A device for the determination of absorbed light by means of a photochemical reaction of known quantum yield.

actinometry A method of chemical analysis by means of an actinometer.

actinomyces A genus of gram-positive bacteria that belongs to the family of Actinomycetaceae (order Actinomycetales or Actinomycetes). Actinomyces are rods or branched filaments and are anaerobes with varying degrees of aerotolerance.

actinomycin D An antibiotic, produced by *Streptomyces chrysomallus*, that inhibits the transcription of DNA to RNA by binding to DNA and that also has immunosuppressive activity. *Aka* actinomycin C1.

action potential The membrane potential of a stimulated membrane, produced by the ion flux across the membrane, when its permeability is changed upon stimulation.

action spectrum A plot of a quantitative biological or chemical response as a function of the wavelength of the radiation producing the response; the death of bacteria, the occurrence of mutations, the occurrence of fluorescence, and photosynthetic efficiency are examples of responses.

activated *See also* active.

activated alumina Alumina that has been thoroughly dried.

activated carbon A porous material, consisting primarily of carbon, that is prepared by the destructive distillation of plants; used for adsorption of gases and decolorization of solutions.

activated complex theory THEORY OF ABSOLUTE REACTION RATES.

activated form *See* active form.

activated macrophage A macrophage that has been stimulated, generally by a lymphokine, to increase in its size, in its number of enzyme molecules, and in its phagocytic activity.

activating enzyme 1. FATTY ACID THIOKINASE. 2. AMINOACYL-tRNA SYNTHETASE.

activation 1. The conversion of a compound to a more reactive form; the change of an amino acid to aminoacyl transfer RNA, the change of a fatty acid to fatty acyl coenzyme A, and the change of an inactive enzyme precursor to the active enzyme are some examples. 2. The increase in the extent, and/or the rate, of an enzymatic reaction. 3. The drying of chromatographic supports. 4. The first stage in the conversion of a spore to a vegetative cell; this stage can frequently be produced by heat or aging and is believed to involve damage to an outer layer of the spore. 5. The conformational change of a receptor upon the binding of a hormone.

activation analysis A method for the qualitative and quantitative analysis of the chemical elements in a sample; based on identification and determination of the radionuclides formed when the sample is bombarded with neutrons or other particles.

activation energy The difference in energy between that of the activated complex and that of the reactants; the energy that must be supplied to the reactants before they can undergo transformation to products. *Sym* E_a ; E_A .

activation hormone An insect hormone that controls the secretion of the corpora allata, the paired glands that synthesize the juvenile hormone in insect larvae. The activation hormone is a polypeptide, produced in the brain.

activation stage That part of the blood-clotting process that consists of the formation of active thrombin.

activator A metal ion that serves as a cofactor for an enzyme.

activator constant The equilibrium constant for the reaction $EA \rightleftharpoons E + A$, where E is an enzyme and A is an activator.

activator protein 1. CALMODULIN. 2. *See* Britten-Davidson model.

activator RNA *See* Britten-Davidson model.

active acetaldehyde An acetaldehyde molecule attached to thiamine pyrophosphate; α -hydroxyethylthiamine pyrophosphate.

active acetate ACETYL COENZYME A.

active acetyl 1. ACETYL COENZYME A. 2. Acetyl lipoic acid.

active acyl 1. An acyl coenzyme A. 2. An acyl lipoic acid.

active adenosyl ADENOSINE-5'-TRIPHOSPHATE.

active adenylate ADENOSINE-5'-TRIPHOSPHATE.

active aldehyde An aldehyde molecule attached to thiamine pyrophosphate; α -hydroxyalkylthiamine pyrophosphate.

active aldehyde theory The theory according to which the nonenzymatic browning of foods

is due to reactions involving very active aldehydes that are formed by the dehydration of sugars.

active amino acid 1. An amino acid linked to the phosphate group of AMP; an aminoacyladenylate. 2. An amino acid linked to the hydroxyl group of ribose in the terminal adenosine nucleotide in transfer RNA; an aminoacyl-tRNA. 3. A Schiff base of an amino acid as that formed in transamination.

active ammonia 1. CARBAMOYL PHOSPHATE. 2. GLUTAMINE.

active anaphylaxis The anaphylactic reaction produced in an animal organism as a result of the injection of antigen.

active carbohydrate 1. A UDP-sugar. 2. A GDP-sugar. 3. An ADP-sugar.

active carbon dioxide CARBOXYBIOTIN.

active carboxylic acid A reactive derivative of a carboxylic acid that is capable of reactions which the free acid does not undergo. Biochemically important active carboxylic acids are acid anhydrides and thioesters.

active center ACTIVE SITE.

active concentration ACTIVE TRANSPORT.

active enzyme centrifugation A method that permits the hydrodynamic study of an enzyme-substrate complex; involves layering a small amount of an enzyme solution over a substrate solution and then centrifuging. While the enzyme layer sediments, one observes spectroscopically either the appearance of a product or the disappearance of a substrate. When carried out in the analytical ultracentrifuge, the method permits a determination of the sedimentation or diffusion coefficient of the actual active enzyme molecule. *Abbr* AEC.

active fatty acid A fatty acid linked to coenzyme A; a fatty acyl-SCoA. These thioesters are high-energy compounds.

active form 1. That derivative of a metabolite that can serve as a high-energy compound and/or as a compound that initiates a reaction or a series of reactions. 2. That form of a macromolecule that possesses biological activity.

active formaldehyde ACTIVE FORMYL.

active formate 1. ACTIVE FORMYL. 2. ACTIVE FORMIMINO.

active formimino A formimino group $NH=CH-$ attached to tetrahydrofolic acid.

active formyl A formyl group $O=CH-$ attached to tetrahydrofolic acid.

active fructose FRUCTOSE-1,6-BISPHOSPHATE.

active glucose 1. UDP-GLUCOSE. 2. ADP-GLUCOSE.

active glycolaldehyde A glycolaldehyde group $CH_2OH-CO-$ attached to thiamine pyrophosphate; α , β -dihydroxyethyl thiamine pyrophosphate.

active hydroxyethyl ACTIVE ACETALDEHYDE.

active hydroxymethyl 5,10-Methylene tetrahydrofolic acid.

active immunity The immunity acquired by an animal organism as a result of the injection of antigens into it.

active iodine That form of iodine, possibly an iodinium ion I^+ , which reacts with tyrosine to form iodotyrosines in the thyroid gland.

active mediated transport An active transport that requires one or more transport agents.

active methionine S-ADENOSYLMETHIONINE.

active methyl 1. 5-Methyltetrahydrofolic acid. 2. S-ADENOSYLMETHIONINE.

active one-carbon unit A one-carbon fragment linked to tetrahydrofolic acid.

active oxygen The form of oxygen as it is used in reactions catalyzed by monooxygenases; the oxygen linked to the enzyme-copper complex of dopamine β -monooxygenase is an example.

active patch ANTIGEN BINDING SITE.

active phosphate 1. ADENOSINE-5'-TRIPHOSPHATE. 2. GUANOSINE-5'-TRIPHOSPHATE.

active phospholipid A cytidine-5'-diphosphate derivative of either a phospholipid or a component of phospholipids.

active pyrophosphate ADENOSINE-5'-TRIPHOSPHATE.

active pyruvate α -Hydroxyethylthiamine pyrophosphate; the compound formed by the reaction of pyruvate with enzyme-bound thiamine pyrophosphate. Active pyruvate is the first intermediate formed in the pyruvate dehydrogenase reaction whereby pyruvate is converted to acetyl-SCoA.

active site 1. That portion of the enzyme molecule that interacts with, and binds, the substrate, thereby forming an enzyme-substrate complex. 2. That portion of the antibody molecule that interacts with, and binds, the antigen, thereby forming an antigen-antibody complex.

active site-directed irreversible inhibitor An artificially designed inhibitor for the irreversible inhibition of a given enzyme. The inhibitor is a trifunctional molecule that contains (a) a functional group that can bind to the active site of the enzyme, (b) a nonpolar fragment that can attach to a nonpolar region just outside the active site, and (c) a group, such as sulfonyl chloride, that can alkylate a functional group of the enzyme just outside the nonpolar region. The first functional group serves to direct the inhibitor to the active site of the enzyme; the nonpolar fragment serves to align the inhibitor so that the alkylating group is brought into contact with a susceptible group on the enzyme; and the third functional group then leads to an

alkylation reaction that results in the irreversible inhibition of the enzyme. *See also* affinity labeling.

active succinate Succinic acid linked to coenzyme A; succinyl-S-CoA.

active sulfate 1. The compound 3'-phosphoadenosine-5'-phosphosulfate that serves as a sulfating agent in the esterification of sulfate with alcoholic and phenolic hydroxyl groups. *Abbr* PAPS. 2. The compound adenosine-5'-phosphosulfate that serves as an intermediate in the synthesis of 3'-phosphoadenosine-5'-phosphosulfate and that can be reduced directly to sulfite in *Desulfovibrio desulfuricans*. *Aka* adenyllyl sulfate.

active translocation ACTIVE TRANSPORT.

active transport The movement of a solute across a biological membrane such that the movement is directed upward in a concentration gradient (i.e., against the gradient) and requires the expenditure of energy. When the energy is supplied by the simultaneous hydrolysis of ATP (ATPase activity), or some other high-energy compound, on the surface of the transport agent, the process is known as primary active transport or pump. When the energy is supplied by coupling the active transport to the simultaneous movement of a second substance down its concentration gradient, the process is known as secondary active transport. The second substance may be moving in the same direction as the first (symport) or in the opposite direction (antiport).

activity 1. A measure of the effective concentration of an enzyme, drug, hormone, or other substance, and by extension, the substance the effectiveness of which is being measured. 2. The product of the molar concentration of an ionic solute and its activity coefficient. Activity represents an effective concentration, reflecting solute-solute interactions, and must be used in place of molar concentrations for nonideal solutions.

activity coefficient The ratio of the activity of an ion to its molar concentration; the logarithm of the activity coefficient is equal to $-0.5Z^2\sqrt{I}$, where Z is the charge of the ion and I is the ionic strength. *See also* mean ionic activity coefficient.

actomere A subcellular organelle, believed to initiate the assembly of actin filaments in some sperm cells.

actomyosin The complex formed between myosin and actin, either as extracted from muscle or as prepared from the purified components.

acumentin A protein in macrophages that binds to the minus (pointed, slow-assembly) end of actin filaments.

acute disease A disease that has a rapid onset and is of short duration (days or weeks), terminating either in recovery or in death.

acute porphyria A porphyria that is of short duration and that is characterized by the excretion of excessive amounts of uroporphyrin III, coproporphyrin III, and porphobilinogen.

acute serum A serum obtained soon after the onset of a disease. *Aka* acute phase serum.

acute test A toxicity test that is performed on laboratory animals and that requires only a single dose of a chemical, administered in a single application.

acute transfection A brief infection of cells with foreign DNA.

acyclic ALIPHATIC.

acyclovir 9[2-Hydroxyethoxy)methyl]guanine; an antiviral drug that is particularly effective in the treatment of genital herpes. The antiviral activity of this drug is initiated when it is phosphorylated, a reaction catalyzed by the enzyme thymidine kinase.

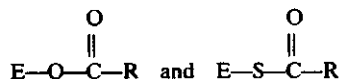
acylated tRNA A transfer RNA molecule to which an amino acid is linked; an aminoacyl-tRNA molecule; a charged tRNA molecule.

acylation The introduction of an acyl radical RCO— into an organic compound.

acyl carrier protein A small protein that is a component of the fatty acid synthetase system; it carries a phosphopantetheine group, which contains an SH-group and which is esterified via its phosphate to a serine hydroxyl in the protein. All of the acyl intermediates in fatty acid biosynthesis are covalently linked to the SH-group of phosphopantetheine in the acyl carrier protein much as the acyl intermediates in β -oxidation of fatty acids are linked to the SH-group of phosphopantetheine in coenzyme A. *Abbr* ACP.

acyl-CoA synthetase THIOKINASE.

acyl-enzyme intermediate One of a group of structures formed transiently between an enzyme and its substrate during covalent catalysis; two examples are



where E represents the enzyme.

acylglycerol An ester of glycerol and one to three molecules of a fatty acid; a neutral fat. Depending on the number of fatty acid molecules esterified, the product is called mono-, di-, or triacylglycerol. *Aka* glyceride.

acyl group The radical RCO— that is derived from an organic acid by removal of the OH from the carboxyl group.

acyl-SCoA Acyl coenzyme A.

acyltransferase An enzyme that catalyzes the transfer of an acyl group from acyl coenzyme A to another compound.

AD Alzheimer's disease.

ADA *N*-(2-Acetamido)iminodiacetic acid; used for the preparation of biological buffers in the pH range of 6.0 to 7.2. *See also* biological buffers.

Adair equation A general equation for the binding of a ligand to a macromolecule; refers to the case where there are from 1 to *n* identical binding sites for a specific ligand per macromolecule and where the binding is independent (no interaction between the binding sites).

Adamkiewicz reaction The production of a violet color upon treatment of a solution containing protein with acetic acid and sulfuric acid.

Adam's catalyst Platinum oxide, a catalyst for hydrogenation reactions.

ada protein The protein product of the *ada* gene which is responsible for control of the adaptive response in *E. coli*; it participates mechanistically in the repair of damaged DNA and also regulates the expression of a number of genes whose products function in DNA repair. *See also* adaptive response.

adaptation DESENSITIZATION (3).

adapter hypothesis The hypothesis, proposed by Crick in 1958, that an amino acid is joined to a specific adapter molecule during protein synthesis. The adapter serves to carry the amino acid to the ribosome and becomes bound to the codon of the amino acid in the messenger RNA which is attached to the ribosome. In this fashion the adapter, now known to be transfer RNA, assures the insertion of the amino acid into its proper place in the growing polypeptide chain.

adapter RNA TRANSFER RNA.

adaptive enzyme INDUCIBLE ENZYME.

adaptive response A set of induced processes in *E. coli* that involve repair of damage made to DNA by methylating and ethylating agents. The lesions repaired by these processes include purine bases alkylated at ring nitrogens or at exocyclic oxygens, pyrimidine bases alkylated at exocyclic oxygens, and phosphotriesters. The regulation of the adaptive response is independent of the SOS regulatory network and is controlled by the *ada* protein.

adaptor A short, synthetic fragment of DNA that contains a restriction site and that is used in recombinant DNA research to join one

molecule, having blunt ends, to a second molecule, having cohesive ends. When the resultant molecule is cleaved by a restriction enzyme, two DNA molecules are obtained that have mutually complementary cohesive ends.

adaptor RNA Variant spelling of adapter RNA.

ADCC Antibody-dependent cellular cytotoxicity.

Addison's disease The pathological condition resulting from adrenal insufficiency and characterized by general weakness, loss of appetite, gastrointestinal disturbances, and weight loss.

addition polymer CHAIN-GROWTH POLYMER.

addition reaction A chemical reaction in which there is an increase in the number of groups attached to carbon atoms so that the molecule becomes more saturated.

adduct The product formed by the chemical addition of one substance to another.

adductor muscle CATCH MUSCLE.

ade Adenine.

adenine The purine 6-aminopurine that occurs in both RNA and DNA. *Abbr* A; Ade.

adenine nucleotide barrier ATRACTYLOSIDE BARRIER.

adenohypophyseal Of, or pertaining to, the anterior lobe of the pituitary gland.

adenohypophysis The anterior lobe of the pituitary gland which produces the adrenocorticotrophic, gonadotropic, lipotropic, somatotrophic, and thyrotrophic hormones.

adenoma A tumor of epithelial tissue that is generally benign and in which the cells form glands or glandlike structures.

adenosine The ribonucleoside of adenine. Adenosine mono-, di-, and triphosphate are abbreviated respectively, as AMP, ADP, and ATP. The abbreviations refer to the 5'-nucleoside phosphates unless otherwise indicated. *Abbr* Ado; A.

adenosine-3',5'-cyclic monophosphate A cyclic nucleotide, commonly called cyclic AMP, that is formed from ATP in a reaction catalyzed by the enzyme adenylyl cyclase. Cyclic AMP functions as a second messenger and mediates the effect of a large number of hormones. The hormones interact with the adenylyl cyclase system in the cell membrane, and the intracellular cyclic AMP then interacts with specific enzymes or other intracellular components. *Abbr* cAMP. *Aka* cyclic adenylic acid.

adenosine deaminase *See* Taka diastase.

adenosine diphosphate The high-energy compound, adenosine-5'-diphosphate, that can undergo hydrolysis to adenosine-5'-monophosphate and inorganic phosphate. *Abbr* ADP.

adenosine diphosphate glucose ADP-GLUCOSE.

adenosine monophosphate The nucleotide, adenosine-5'-monophosphate, that can be formed by hydrolysis of either of the high-energy compounds, ATP or ADP. *Abbr* AMP.

adenosine-5'-phosphosulfate *See* active sulfate (2).

adenosine triphosphatase One of a group of enzymes that catalyze the hydrolysis of ATP either to ADP and inorganic phosphate or to AMP and pyrophosphate. The enzymes are widely distributed in biological membranes and are named according to the cation(s) required for their activation. *Abbr* ATPase. *See also* Na⁺, K⁺-ATPase; H⁺-ATPase.

adenosine triphosphate The high-energy compound, adenosine-5'-triphosphate, that functions in many biochemical systems. It can be hydrolyzed to either adenosine-5'-monophosphate or adenosine-5'-diphosphate; the hydrolysis reaction is accompanied by the release of a large amount of free energy which is used to drive a variety of metabolic reactions. *Abbr* ATP.

S-adenosylmethionine A high-energy compound that is derived from ATP and methionine and that functions as a biological methylating agent. *Abbr* SAM.

adenovirus A naked, icosahedral virus that contains double-stranded DNA. Adenoviruses infect mammals, often leading to respiratory infections; some are oncogenic.

adenovirus-associated virus A small, naked, icosahedral virus that contains single-stranded DNA and that is found in association with adenoviruses; a subclass of parvoviruses.

adenylate A compound consisting of adenylic acid that is esterified through its phosphate group to another molecule.

adenylate charge hypothesis *See* energy charge.

adenylate control hypothesis The hypothesis that cellular metabolism is regulated by feedback effects that are a function of the relative amounts of AMP, ADP, and ATP in the cell. *See also* energy charge.

adenylate cyclase *See* adenylyl cyclase.

adenylate kinase The enzyme that catalyzes the interconversion between two molecules of ADP and one molecule each of ATP and AMP. *Aka* myokinase.

adenylate pool The total intracellular concentration of AMP, ADP, and ATP.

adenyl cyclase The enzyme that catalyzes the formation of cyclic AMP from ATP by the splitting out of pyrophosphate.

adenylic acid The ribonucleotide of adenine.

adenylation The transfer of a 5'-AMP group (5'-adenylyl group) from ATP; used specifically for the reaction catalyzed by the

enzyme glutamine synthetase adenylyl-transferase. In this reaction, a 5'-AMP group is transferred to form a phosphodiester bond with the phenolic hydroxyl group of a specific tyrosine residue in each of the 12 subunits of the enzyme glutamine synthetase. The progressive adenylylation of glutamine synthetase leads to its progressive inactivation and this forms part of the complex regulation of the activity of this enzyme.

adenylyl sulfate *See* active sulfate (2).

adermine VITAMIN B₆.

ADH 1. ALCOHOL DEHYDROGENASE. 2. ANTIDIURETIC HORMONE.

adhesion plaque *See* vinculin.

adhesion protein One of a group of proteins, such as fibronectin, collagen, and fibrinogen, that are present in the extracellular matrix and that function in cell adhesion, cell migration, and cell differentiation.

adhesive protein ADHESION PROTEIN.

adiabatic process A process conducted without either a gain or a loss of heat; a process conducted in an isolated system.

adiabatic system A thermodynamic system that is thermally insulated from its surroundings.

adipocyte A fat cell; a cell of adipose tissue.

adipokinetic hormone LIPOTROPIN.

adipose tissue Lipid tissue; fat deposits in an organism. *Aka* depot fat. *See also* brown fat; white fat.

adiposis A condition characterized by excessive accumulation of fat in the body; the accumulation may be local or general.

adiposity OBESITY.

adipsin A serine protease, present in the blood, that is synthesized and secreted by adipose cells. Some genetic and some acquired obesity syndromes are associated with reduced expression of adipsin mRNA and with reduced concentration of circulating adipsin.

adjuvant A substance that increases the immune response of an animal to an antigen when injected together with the antigen.

adjuvanticy The capacity of a substance to function as an adjuvant.

ad libitum Referring to the feeding of experimental animals where the animals are allowed to eat without any imposed restrictions. *Abbr* ad lib.

admix To mix one substance with another.

admixture 1. A mixture. 2. The act of mixing.

A DNA *See* DNA forms.

Ado Adenosine.

AdoMet S-Adenosylmethionine.

adoptive immunity The immunity acquired by an animal organism when it is injected with lymphocytes from another organism; the

immunity acquired through an adoptive transfer.

adoptive tolerance The immunological tolerance acquired by an animal organism when it is injected with lymphocytes from another organism; the tolerance acquired through an adoptive transfer.

adoptive transfer The transfer of an immune function from one organism to another that is brought about by the transfer of cells that are immunologically competent or active.

ADP 1. Adenosine diphosphate. 2. Adenosine-5'-diphosphate.

ADP-ATP translocation ATP-ADP CARRIER.

ADPG ADP-glucose.

ADP-glucose A nucleoside diphosphate sugar that is the donor of a glucose residue in the biosynthesis of starch in plants and in the biosynthesis of $\alpha(1 \rightarrow 4)$ glucans in bacteria. *Abbr* ADPG.

ADP-ribosylation The reaction whereby an ADP-ribose moiety is linked covalently to another compound. The cleavage of NAD^+ by cholera toxin and the subsequent attachment of the ADP-ribose moiety from NAD^+ to an arginine residue of a G protein, thereby inhibiting the latter's GTPase activity, is an example. Diphtheria toxin ADP-ribosylates elongation factor eEF₂ (translocase) in a similar manner.

ADR Adrenaline.

adrenal cortex That part of the adrenal gland, derived from mesodermal tissue, which secretes the adrenal cortical hormones.

adrenal cortical hormone A steroid hormone secreted by the adrenal cortex. Major adrenal cortical hormones are the glucocorticoids, cortisol and corticosterone, and the mineralocorticoid, aldosterone; minor adrenal cortical hormones are the sex hormones.

adrenal cortical steroid A steroid produced by the adrenal cortex. Many of these steroids are hormones, such as the glucocorticoids, mineralocorticoids, and sex hormones; some, such as cholesterol, are not hormones.

adrenal corticosteroid ADRENAL CORTICAL STEROID.

adrenalectomy The surgical removal of an adrenal gland.

adrenal gland The endocrine gland located near the kidney and composed of two parts, a medulla that secretes epinephrine and norepinephrine, and a cortex that secretes the adrenal cortical hormones.

adrenaline EPINEPHRINE.

adrenaline tolerance test A test used in the diagnosis of glycogen storage disease type I; the test is based on measuring the level of blood glucose as a function of time following the injection of an individual with adrenaline.

adrenalism A condition resulting from insufficient function of the adrenal glands.

adrenal medulla That part of the adrenal gland, derived from ectodermal tissue, which secretes the hormones epinephrine and norepinephrine.

adrenal virilism The appearance of male secondary sexual characteristics in a female as a result of excessive secretion of androgens by the adrenal cortex.

adrenergic Of, or pertaining to, nerve fibers that release epinephrine and norepinephrine at the nerve endings.

adrenergic receptor A tissue receptor that mediates the action of catecholamines. Adrenergic receptors are classified as α - and β -receptors, based on their relative response to the synthetic agonist isoproterenol: α -receptors are more sensitive to adrenaline than they are to isoproterenol, while β -receptors are more sensitive to isoproterenol than they are to adrenaline. Some of the physiological processes mediated by these receptors are the following: α -receptors—increased liver glycogenolysis, increased gluconeogenesis, and relaxation of intestinal smooth muscles; β -receptors—increased muscle glycogenolysis, increased liver gluconeogenesis and glycogenolysis, increased mobilization of depot fat, and increased heart rate and contractility. In addition to α - and β -receptors, which are widely distributed, there are dopamine adrenergic receptors which are largely confined to renal and mesenteric vasculature and to certain regions of the central nervous system.

adrenocortical steroid ADRENAL CORTICAL STEROID.

adrenocorticoid ADRENAL CORTICAL STEROID.

adrenocorticotrophin Variant spelling of adrenocorticotropin.

adrenocorticotropic hormone A polypeptide hormone of 39 amino acids that stimulates the synthesis and secretion of adrenal cortical hormones by the adrenal cortex. The adrenocorticotropic hormone is secreted by the anterior lobe of the pituitary gland. *Var sp* adrenocorticotrophic hormone. *Abbr* ACTH.

adrenocorticotropin ADRENOCORTICOTROPIC HORMONE.

adrenodoxin A nonheme, iron-sulfur protein that functions in nonphosphorylating electron transport systems such as the cytochrome P₄₅₀-mediated side chain cleavage of cholesterol.

adrenoleukodystrophy A genetically inherited metabolic defect in humans that is characterized by an unusual accumulation of very long-chain saturated fatty acids (VLCFA). These are normally present in

small amounts in the diet and are also synthesized within the body. In an unknown manner, these fatty acids result in demyelination which leads to loss of voluntary motion and death. *Abbr* ALD.

adsorb To attract and hold a substance to the surface of another substance.

adsorbate A substance that is adsorbed to the surface of another substance from either a solution or a gas phase.

adsorbed antiserum An antiserum from which antibodies have been removed by the addition of particulate antigens.

adsorbent 1. *n* A substance that adsorbs another substance from either a solution or a gas phase. 2. *adj* Having the capacity to adsorb.

adsorption 1. The adhesion of molecules to surfaces of solids. 2. The removal of antibodies from a mixture by the addition of particulate antigens, or the removal of particulate antigens from a mixture by the addition of antibodies. 3. The attachment of phage particles to a bacterial cell.

adsorption chromatography A chromatographic technique in which molecules are separated on the basis of their adsorption properties. The stationary phase is a solid adsorbent, generally in the form of a column; the mobile phase is either an aqueous or an organic solution. The rate of movement of the molecules through the column depends on the degree of their adsorption to the solid adsorbent.

adsorption coefficient A constant, under defined conditions, that relates the elution of a substance from a chromatographic column to the weight of adsorbent.

adsorption isotherm A plot of the fractional saturation (or of some other property related to ligand binding to a macromolecule) as a function of the ligand concentration at constant temperature.

adsorptive endocytosis LIGAND-INDUCED ENDOCYTOSIS.

adult hemoglobin The major form of hemoglobin in normal adults that is designated HbA; a minor form is designated HbA₂.

adult-onset diabetes *See* diabetes.

adult rickets OSTEOMALACIA.

advanced glycosylation end product One of a group of substances, derived from Amadori products by dehydration, rearrangement, and combination with other molecules. Many of these substances are able to cross-link adjacent proteins. *Abbr* AGE.

AEC Active enzyme centrifugation.

AE-cellulose Aminoethylcellulose, an anion exchanger.

aequorin A bioluminescent protein from jellyfish (*Aequorea* sp.) that is used for the assay of calcium in serum and subcellular organelles.

aerial mycelium That portion of a fungal mycelium that projects above the surface of the medium and frequently bears either reproductive cells or spores.

aerobe *See* facultative aerobe; obligate aerobe.

aerobic 1. In the presence of oxygen; in an environment or an atmosphere containing oxygen. 2. Requiring the presence of molecular oxygen for growth. 3. Capable of using molecular oxygen for growth. *See also* oxybiontic.

aerobic glycolysis The group of cellular reactions, occurring in the presence of oxygen, whereby glucose is converted to pyruvic acid. *See also* glycolysis.

aerobic respiration RESPIRATION (3).

aerobiosis Life under aerobic conditions.

aerobiotic Of, or pertaining to, aerobiosis.

aerogel A gel in which removal of the dispersing agent (the solvent) does not lead to shrinkage and an unswollen state, but rather results in a rigid structure.

aerogenic Of, or pertaining to, an organism that forms gas (as well as other metabolic by-products) from particular substrates.

aerosol A colloidal dispersion of liquid droplets or solid particles in a gas.

aerosporin POLYMYXIN.

aerotaxis A form of chemotaxis in which the chemical gradient is due to oxygen.

aerotolerant 1. Of, or pertaining to, an anaerobic organism that can survive, but not grow, in the presence of oxygen. 2. Of, or pertaining to, an anaerobic organism that can grow at suboptimal rates in the presence of oxygen. *See also* microaerophilic.

afferent 1. Leading or conveying toward a cell or an organ. 2. Of, or pertaining to, the stages involved in activating the immune system. *See also* efferent.

afferent inhibition The prevention of transplantation immunity through the binding of antibodies from the recipient animal to antigens in the transplant; as a result, the transplant antigens are unable to reach and/or to stimulate the antibody-forming cells in the recipient animal.

affinity 1. The capacity of an enzyme to bind substrate; generally measured by the affinity constant. 2. The capacity of an antibody to bind either antigens or haptens; frequently measured by the average intrinsic association constant for the binding reaction.

affinity chromatography A column chromatographic technique based on the specific affinity between a molecule to be isolated

(such as a protein or an enzyme) and a molecule that it can bind (a ligand). The ligand may be a small molecule or a macromolecule, and its binding to the molecule of interest may involve biochemical or immunological reactions. The ligand is linked covalently to an insoluble support (sepharose, agarose, cellulose, etc.) without destroying its activity and specificity. Frequently, a spacer is inserted between the ligand and the matrix to avoid steric hindrance when the ligand binds the molecule of interest. When a mixture of molecules is passed through the column, the covalently linked ligands will bind specifically the molecule of interest. Elution of the latter is achieved by changing the conditions to such in which binding does not occur. Two examples are the use of DNA-cellulose for the isolation of DNA-dependent DNA polymerase, and the use of agarose-antibody preparations for the isolation of antigens. *See also* magnetic affinity chromatography.

affinity constant The reciprocal of the dissociation constant for the complex PL in the reversible system $P + L \rightleftharpoons PL$ where P is usually a protein and L is a ligand such as a substrate, an inhibitor, or an activator. The association or binding constant for a specific ligand to a macromolecule. *See also* association constant.

affinity electrophoresis Electrophoresis on a carrier that contains an immobilized ligand, capable of specific interaction with some component(s) of the mixture to be separated.

affinity elution A chromatographic technique in which compounds are adsorbed nonspecifically to a column and the compound of interest is then eluted specifically through its binding to a ligand in the eluting solvent.

affinity labeling A method for the specific labeling of the active site of an enzyme, antibody, or other protein. A reagent A-X that can bind specifically, reversibly, and noncovalently to the active site through its A group is first allowed to bind to the active site. The reagent is then linked covalently through its chemically reactive group X to an amino acid at or close to the active site. *See also* active site-directed irreversible inhibitor.

affinity partitioning A phase-partitioning technique, used for the isolation and purification of proteins, in which a polymeric ligand, having specific affinity for a given protein, is used. If the polymeric ligand partitions itself predominantly into one phase, then the corresponding protein is also shifted into that phase.

affinity ratio The ratio of the substrate constant for one reaction to the substrate constant for a second reaction that is

catalyzed by the same enzyme but involves a different substrate.

affinoelectrophoresis AFFINITY ELECTROPHORESIS.

affinophore A macromolecular polyelectrolyte bearing affinity ligands for a specific protein. When a mixture of proteins is electrophoresed in the presence of an affinophore, the protein having an affinity for the ligand will form a complex with the affinophore; as a result, the apparent electrophoretic mobility of the protein will be altered. If the protein is sufficiently accelerated, it can be separated from the other proteins.

affinophoresis The electrophoretic separation of proteins by means of affinophores.

afibrinogenemia A genetically inherited metabolic defect in humans that is characterized either by the complete absence of fibrinogen or by the presence of a defective fibrinogen.

aflatoxin A toxic and carcinogenic compound produced by fungi; a coumarin derivative that belongs to the group of mycotoxins. Aflatoxin has been found in a number of foodstuffs and is believed to inhibit RNA synthesis.

A form *See* DNA forms.

AFP Alpha-fetoprotein.

Ag 1. Antigen. **2.** Silver.

agammaglobulinemia A genetically inherited metabolic defect in humans that is characterized by the complete absence of immunoglobins. *See also* hypogammaglobulinemia.

agar An acidic polysaccharide extracted from certain seaweeds; used as a solidifying agent of culture media in microbiology and as a support medium for zone electrophoresis.

agar diffusion method A method of determining the sensitivity of a microorganism to an antimicrobial drug; based on measuring the zone of growth inhibition when the drug is placed in a cylinder, a hole, or a filter paper disk on a petri plate that has been seeded with the microorganism.

agar gel electrophoresis Zone electrophoresis in which the supporting medium consists of a gel prepared from agar.

agarose A sulfate-free, neutral fraction of agar; a linear galactan hydrocolloid that is used in gel filtration, electrophoresis, and immunodiffusion.

agar plate count A plate count in which the solid nutrient medium contains agar.

age The length of time that a preparation of cells or a subcellular fraction has been stored.

AGE Advanced glycosylation end product.

Agent Orange A herbicide used in the Vietnam War. *See also* dioxin.

age pigment An insoluble pigment granule that accumulates in certain animal tissues upon aging; believed to be a lipid-protein complex

resulting from crosslinking of protein with compounds formed by peroxidation of lipids. The pigment is brown colored and exhibits green-yellow fluorescence when activated with long wavelength ultraviolet light. *Aka* ceroid pigment; lipofuscin; senility pigment.

agglutinating antibody AGGLUTININ.

agglutination The clumping of bacterial and other cells that is brought about by an antigen-antibody reaction between the particulate antigens on the cell surface and added antibodies.

agglutinin An antibody that can bind to particulate antigens on the surface of cells to produce an agglutination reaction.

agglutinogen A surface antigen of bacterial and other cells that can induce the formation of agglutinins and can bind to them to produce an agglutination reaction.

aggregate 1. MULTIENZYME SYSTEM. 2. METABOLON (2).

aggregate anaphylaxis An anaphylactic shock that is produced by a single injection of antigen.

aggressin A substance that is produced by a microorganism and that, though not necessarily toxic by itself, promotes the invasiveness of the microorganism in the host; the enzymes hyaluronidase and collagenase are two examples.

aglucone The noncarbohydrate portion of a glucoside.

agonist A molecule, such as a drug, an enzyme activator, or a hormone, that enhances the activity of another molecule or receptor site. A hormone that binds to a receptor in a productive manner, triggering the normal response, is an example. *See also* decamethonium; full agonist; partial agonist.

agranulocyte A white blood cell (leukocyte) that contains few, if any, granules in the cytoplasm.

A/G ratio Albumin/globulin ratio.

Agrobacterium tumefaciens *See* crown gall tumor.

agrobactin A linear siderophore of the phenol-catechol type found in *Agrobacterium tumefaciens*.

AHF Antihemophilic factor.

AHG 1. Antihemophilic globulin. 2. Anti-human globulin.

AIA Anti-immunoglobulin antibodies.

AICAR 5-Aminoimidazole-4-carboxamide ribonucleotide; an intermediate in the biosynthesis of purines.

AICF Autoimmune complement fixation.

AIDS Abbreviation for acquired immunodeficiency syndrome; a severe viral disease, caused by a retrovirus. The virus destroys T lymphocytes of the immune system and infects cells within the central nervous system.

The syndrome first occurred among homosexuals and users of intravenous drugs (1981) but has since spread throughout the world. Most infections occur through sexual transmission, use of contaminated needles, and as a result of infected mothers passing the virus to newborns.

AIDS virus One of a group of retroviruses implicated as the cause of acquired immunodeficiency syndrome (AIDS). Various virus isolates appear to be closely related members of the same virus group. They have been designated LAV (lymphadenopathy-associated virus), HTLV-III (human T-cell lymphotropic virus type III), IDAV (immunodeficiency-associated virus), and ARV (AIDS-associated retrovirus). Two compound designations, HTLV-III/LAV and LAV/HTLV-III have also been used. It has been proposed that the AIDS retroviruses be officially designated as human immunodeficiency viruses, abbreviated as HIV. *See also* antigenic drift.

AIP Aldosterone-induced proteins.

air dose The dose of radiation delivered to a specified point in air.

air peak The gas chromatographic peak that is produced when a small amount of air is injected with the sample into the chromatographic column.

Akabori hypothesis The hypothesis that the origin of proteins is based on the polymerization of non-amino acid building blocks to form polyglycine and on the subsequent replacement of the α -hydrogens in polyglycine by various R groups in secondary reactions.

Akabori reaction The formation of an alkamine by the reaction of an aldehyde with the amino group of an amino acid.

Al Aluminum.

Ala 1. Alanine. 2. Alanyl.

alanine An aliphatic nonpolar amino acid; α -alanine occurs in proteins and β -alanine occurs in the peptides anserine and carnosine. *Abbr* Ala; A.

alarmone A signal molecule in bacteria that has a regulatory effect on metabolism by exerting control on many biochemical reactions at once. The action of an alarmone is similar to that of a hormone in multicellular organisms. In bacteria, such regulation may come into play in response to environmental stresses. As an example, amino acid starvation results in the accumulation of the compounds known as magic spots. These are believed to function as alarmones, leading to cessation of protein synthesis and cessation of transcription of rRNA genes.

alarm reaction GENERAL ADAPTATION SYNDROME.

albinism A genetically inherited metabolic

- defect in humans that is characterized by the lack of skin pigmentation and that is due to a deficiency of the enzyme tyrosinase.
- albino** A person or an animal that is deficient in skin pigmentation.
- albomycin** An iron-containing antibiotic, produced by *Actinomyces subtropicus*; a cyclic polypeptide that contains cytosine. The compound is either similar, or identical, to grisein.
- albumin** A water-soluble, globular, and simple protein that is not precipitated by ammonium sulfate at 50% saturation.
- albumin/globulin ratio** The ratio of the concentration of serum albumin to that of serum globulin. *Abbr* A/G ratio.
- albuminimeter** An apparatus for determining protein in biological fluids on the basis of the volume of the precipitated protein.
- albuminuria** The presence of excessive amounts of protein, mainly albumin, in the urine.
- Albustix test** A rapid, semiquantitative test for protein in urine by means of paper strips impregnated with buffer and indicator. *See also* protein error.
- alcapton** Variant spelling of alkapton.
- alcaptonuria** Variant spelling of alkaptonuria.
- alcohol** 1. An alkyl compound containing a hydroxyl group. The alcohol is designated as a primary, a secondary, or a tertiary alcohol depending on whether the hydroxyl group is attached to a carbon atom that is linked to one, two, or three other carbon atoms. 2. Ethyl alcohol; ethanol.
- alcohol dehydrogenase** A pyridine-linked dehydrogenase that catalyzes the oxidation of ethanol to acetaldehyde.
- alcoholic fermentation** The group of reactions, characteristic of yeast, whereby glucose is fermented to ethyl alcohol.
- alcoholic hydroxyl group** A hydroxyl group attached to an aliphatic carbon chain.
- alcoholic steroid** STEROL.
- alcohololysis** The cleavage of a covalent bond of an acid derivative by reaction with an alcohol ROH so that one of the products combines with the H of the alcohol and the other product combines with the OR group of the alcohol.
- ALD** Adrenoleukodystrophy.
- aldaric acid** A dicarboxylic sugar acid of an aldose in which both the aldehyde group and the primary alcohol group have been oxidized to carboxyl groups.
- aldehyde** An organic compound that contains an aldehyde group.
- aldehyde group** The carbonyl group attached to one carbon and one hydrogen atom; the grouping —CHO.
- aldehyde indicator** SCHIFF'S REAGENT.
- aldimine** An organic compound that has the general formula $R-CH=NH$.
- alditol** A derived carbohydrate in which the aldehyde group of an aldose has been reduced to an alcohol group.
- aldo-** 1. Combining form meaning aldose. 2. Combining form meaning aldehyde.
- aldofuranose** An aldose in furanose form.
- aldolase** 1. An aldehyde lyase. 2. The enzyme of glycolysis that catalyzes the interconversion of fructose-1,6-bisphosphate to dihydroxyacetone phosphate and glyceraldehyde-3-phosphate.
- aldol condensation** An addition reaction of two ketones, or two aldehydes, or an aldehyde and a ketone.
- aldonic acid** A monocarboxylic sugar acid of an aldose in which the aldehyde group has been oxidized to a carboxyl group.
- aldopyranose** An aldose in pyranose form.
- aldose** A monosaccharide, or its derivative, that has an aldehyde group.
- aldosterone** The major mineralocorticoid in humans.
- aldosterone-induced proteins** The group of proteins whose synthesis is stimulated by mineralocorticoids; they mediate the effects of the mineralocorticoids on water and electrolyte balance. *Abbr* AIP.
- aldosteronism** A pathological condition characterized by the excessive production and secretion of aldosterone.
- alexin** COMPLEMENT.
- ALG** Antilymphocyte globulin.
- alga** (*pl* algae.) A chlorophyll-containing, photosynthetic protist; algae are unicellular or multicellular, are generally aquatic, and are either eukaryotic or prokaryotic.
- algal** Of, or pertaining to, algae.
- algicide** A chemical compound that selectively kills algae; used to inhibit the growth of algae in swimming pools and water reservoirs.
- alginic acid** An algal polysaccharide of mannuronic acid.
- algorithm** 1. A computational method or a set of rules for obtaining the solution of all problems of a specified type in a finite number of operations; a fixed sequence of formulas and/or algebraic and/or logical steps for calculations of a given problem. 2. A defined process consisting of a number of fixed step-by-step procedures for accomplishing a given result in a finite number of steps. *See also* heuristic process; stochastic process.
- alicyclic** Designating a compound derived from a saturated cyclic hydrocarbon.
- alien addition monosomic** The genome of a species that contains, in addition to the normal complement of chromosomes, a single chromosome from another species.
- altesterase** CARBOXYLESTERASE.

alimentary 1. Of, or pertaining to, food or nutrition. 2. Nutritious.

alimentary canal DIGESTIVE TRACT.

alimentary glycosuria The temporary increase in the level of glucose in the urine that follows a meal rich in carbohydrates.

aliphatic Of, or pertaining to, an organic compound that has an open chain structure. *Aka* acyclic.

aliquot 1. A part of a whole that divides the whole without a remainder; thus 4 mL, but not 7 mL, is an aliquot of 12 mL. 2. Any part or fraction of a whole.

alkalemia A condition characterized by a decrease in the hydrogen-ion concentration of the blood.

alkali A base, specifically one of an alkali metal.

alkali disease One of a number of animal poisonings of either plant or mineral origin.

alkali metal An element of group IA in the periodic table that consists of the elements lithium (Li), sodium (Na), potassium (K), rubidium (Rb), cesium (Cs), and francium (Fr).

alkalimetry 1. The chemical analysis of solutions by means of titrations, the end points of which are recognized by a change in the hydrogen-ion concentration. 2. A determination of the amount of a base by titration against a standard acid solution.

alkaline BASIC.

alkaline earth An element of group IIA in the periodic table that consists of the elements beryllium (Be), magnesium (Mg), calcium (Ca), strontium (Sr), barium (Ba), and radium (Ra).

alkaline hematin A hematin formed from hemoglobin by treatment with alkali above pH 11.

alkaline hydrolase A hydrolytic enzyme that has a basic optimum pH.

alkaline pH A pH value above 7.0.

alkaline phosphatase A phosphatase, the optimum pH of which is above 7.0.

alkaline reserve The plasma bicarbonate concentration that is determined either from the carbon dioxide combining power of plasma or from the direct titration of plasma. *Aka* alkali reserve.

alkaline rigor The increase in pH upon death that occurs in some species of fish where death was preceded by struggling.

alkaline tide The increase in the pH of the blood and of the urine that occurs shortly after a meal; thought to be due to the withdrawal of chlorides from the blood for the formation of hydrochloric acid in the stomach.

alkaloids A group of basic, nitrogenous organic compounds which occur primarily in plants. Alkaloids are generally heterocyclic

compounds of complex structure and almost invariably have intense pharmacological activity. Major classes of alkaloids, and the precursors from which they are biosynthesized, are the following: indole (tryptophan), isoquinoline (phenylalanine or tyrosine), piperidine (acetate and lysine), pyrrolidine (acetate and ornithine), pyrrolizidine (ornithine), quinolizidine (lysine), Rutaceae (anthranilic acid), terpene (mevalonic acid), and tropane (acetate and ornithine).

alkalophilic Of, or pertaining to, bacteria that grow at high external pH values.

alkalosis A deviation from the normal acid-base balance in the body that is due to a disturbance which, by itself and in the absence of compensatory factors, would tend to raise the pH of the blood. The actual change in pH depends on whether and to what extent the disturbance is compensated for. The disturbances and the compensatory mechanisms are considered primarily with respect to their effect on the bicarbonate/carbonic acid ratio of blood plasma. *See also* metabolic alkalosis; primary alkalosis; etc.

alkalotic Of, or pertaining to, alkalosis.

alkane A saturated aliphatic hydrocarbon.

alkapton HOMOGENTISIC ACID.

alkaptonuria A genetically inherited metabolic defect in humans that is characterized by the urinary excretion of black melanin pigments formed from homogentisic acid (alkapton); the defect is due to a deficiency of the enzyme homogentisic acid oxidase which functions in the metabolism of phenylalanine and tyrosine.

alkene An unsaturated aliphatic hydrocarbon that contains one or more double bonds.

alkenyl group The radical derived from an alkene, or from a derivative of an alkene, by removal of a hydrogen atom.

alkylating agent One of a group of compounds, including the nitrogen and sulfur mustards, that alkylates specific sites of biologically important molecules such as DNA and protein. Alkylating agents are frequently carcinogenic, mutagenic, and immunosuppressive; they are classified as mono-, bi-, and polyfunctional depending on the number of reactive groups per molecule of alkylating agent.

alkylation The introduction of an alkyl group into an organic compound.

alkyl group The radical derived from an alkane, or from a derivative of an alkane, by the removal of a hydrogen atom.

alkyne An unsaturated aliphatic hydrocarbon that contains one or more triple bonds.

alkynyl group The radical derived from an alkyne, or from a derivative of an alkyne, by the removal of a hydrogen atom.

allantoic acid The carboxylic acid that is the

end product of purine catabolism in some teleost fishes.

allantoin The heterocyclic compound that is the end product of purine catabolism in mammals, other than primates, and in some reptiles.

allantoinase The enzyme that catalyzes the hydrolysis of allantoin to allantoic acid.

allatum hormone An insect hormone that affects differentiation after molting and that is required for vitellogenesis in the adult female. *See also* juvenile hormone.

allele A specific form of a gene; one of several possible mutational forms of a gene.

allelic Of, or pertaining to, an allele.

allelic allotype ALLOTYPIC.

allelic complementation INTRAGENIC COMPLEMENTATION.

allelic exclusion The phenomenon that, in any immunoglobulin producing cell, only one set of immunoglobulin genes (there are two sets per cell, one from each parent) will be expressed. The mechanism whereby expression of the other set of allelic genes is excluded is currently unknown.

allelism test COMPLEMENTATION TEST.

allelochemical A compound, produced by a microorganism or a plant, that is toxic to a microorganism or a plant of a different species. In the case of plants, such compounds may be exuded from living roots, leaves, or fruits, or they may be leached out from decaying plant tissue as a result of microbial action. *Aka* allelopathic chemical. *See also* allomone, pheromone.

allelomorph ALLELE.

allelopathy The phenomenon of plants or microorganisms producing substances that are toxic to plants or microorganisms of different species; the production of allelochemicals.

allelotype The frequency of alleles in a breeding population.

allelozyme One of a number of enzymes that catalyze the same reaction but are specified by different alleles within a group of closely related species.

Allen correction A method of correcting absorbance measurements for the absorbance due to interfering substances. The absorbance is measured at the peak wavelength and at two other wavelengths, generally equidistant from the peak. A baseline is drawn by connecting the measurements on either side of the peak, and the absorbance at the peak is corrected by subtracting the baseline value at the peak. The correction assumes that the absorbance change is linear between the three points.

Allen's test A modification of Fehling's test for glucose in urine; the urine is added to boiling

Fehling's solution and turbidity develops as the solution is cooled.

allergen An antigen that produces an allergic response.

allergic contact dermatitis An inflammation of the skin that is due to an allergic response brought about by exposure of the skin to a chemical sensitizer.

allergic response The formation and the reactions of antibodies that occur when a sensitized animal is exposed to an allergen.

allergy A hypersensitive reaction to intrinsically harmless antigens, most of which are environmental. Allergy is manifested principally in the gastrointestinal tract, the skin, and the respiratory tract.

allo- 1. Combining form meaning other or dissimilar. 2. Combining form referring to an isomeric form such as an enantiomer of a compound that has more than one pair of enantiomers, or the more stable form of two geometrical isomers. 3. Combining form referring to a dissimilar genome.

alloantibody An antibody produced in response to the administration of an alloantigen.

alloantigen An antigen that produces an immune response when administered to a genetically different individual of the same species.

allogenic Referring to genetically dissimilar individuals of the same species.

allogenic disease GRAFT-VERSUS-HOST REACTION.

allogenic inhibition The destruction of cells that is apparently nonimmunological and that is brought about by contact with genetically different cells or with extracts from such cells.

allogenic Variant spelling of allogeneic.

allograft A transplant from one individual to a genetically dissimilar individual of the same species.

allograft reaction The immune reaction whereby an allograft is rejected.

allolactose A variant form of the disaccharide lactose in which the two monosaccharides, galactose and glucose, are joined via an $\alpha(1 \rightarrow 5)$ glycosidic bond.

allomerism The variation in the chemical composition of substances that have the same crystalline form.

allomerization The oxidation of chlorophyll by air in the presence of alkali.

allometry The relation between the rate of growth of a part of an organism and the rate of growth of another part or of the organism as a whole.

allomone A compound that is produced by one organism and influences the behavior of a second organism from another species, resulting in some benefit only to the producer

of the compound. In contrast, if only the recipient organism benefits, the compound is known as a kairomone; if both organisms benefit, it is known as a synomone. *See also* allelochemical; pheromone.

allomorphy The variation in the crystalline form of substances that have the same chemical composition.

allophenic Descriptive of a phenotype that is not due to the mutant makeup of the cells showing the phenotype.

allophycocyanin A red accessory pigment of algal chloroplasts that consists of a protein conjugated to a phycobilin.

alloplex interaction The interaction that takes place when a disordered protein molecule undergoes refolding upon contact with another protein molecule.

allopurinol An analogue of hypoxanthine, used to treat individuals suffering from hyperuricemia as a result of gout and other conditions.

all-or-none Descriptive of a reaction or a response that occurs either to its fullest extent or does not occur at all. The highly cooperative, thermal denaturation of DNA and the dose response of an animal to a drug are two examples.

all-or-none model CONCERTED MODEL.

allosteric Pertaining to two or more topologically distinct sites on the same protein molecule.

allosteric activation The activation of an allosteric enzyme by a positive effector.

allosteric coefficient A mathematical term that is a measure of the allosteric nature of an enzyme, based on the concerted model. It is equal to the ratio of the tensed and relaxed forms ($[T_0]/[R_0]$), multiplied by the ratio of an inhibition term to an activation term. An increase in the inhibition term (for example, by an increase in inhibitor concentration) will cause the binding function to become more sigmoidal; an increase in the activation term (for example, by an increase in activator concentration) will cause the binding function to become more hyperbolic. If the allosteric coefficient is equal to zero, then the binding function reverts to a normal hyperbolic curve. *See also* allosteric constant.

allosteric constant The equilibrium constant for the transition from the relaxed to the tensed form in the concerted model ($[T_0]/[R_0]$). *See also* allosteric coefficient.

allosteric effector *See* effector.

allosteric enzyme A regulatory enzyme that has the capacity of having its catalytic activity modified through the binding of one or more metabolites; it is generally an oligomeric protein that readily undergoes conformational

changes. An allosteric enzyme has two or more topologically distinct sites, either interacting catalytic (active) sites or interacting catalytic and regulatory (allosteric) sites. As a result of such interactions, the enzyme frequently exhibits sigmoidal, rather than hyperbolic, kinetics. The metabolites that bind to the regulatory sites may be activating or inhibiting and are called effectors (modifiers, modulators). *See also* concerted model; sequential model.

allosteric inhibition The inhibition of an allosteric enzyme by a negative effector.

allosteric interactions The interactions of an allosteric enzyme or nonenzyme protein with allosteric effectors.

allosteric protein A protein that has two or more topologically distinct binding sites such that the binding of ligands (effectors) to these sites alters the properties of the protein.

allosteric site REGULATORY SITE.

allosteric transition The conformational change of an allosteric enzyme or of an allosteric protein as a result of its interaction with an effector.

allosterism The phenomenon of allosteric interactions.

allostery ALLOSTERISM.

allotopic Of, or pertaining to, allotopy.

allotopy The phenomenon of a substance, such as an enzyme, possessing different properties when it exists in a particulate or in a soluble form.

allotropy The phenomenon of an element existing in different forms in the same phase; the different crystal forms of phosphorus and the molecular forms of oxygen and ozone are two examples.

allotype One of a group of different antigenic determinants of a given serum protein or immunoglobulin that occur in different individuals of the same species; such proteins are under the control of one genetic locus but are produced by different alleles of the same gene. *Aka* allelic allotype. *See also* idiotypic; isotype.

allotype suppression The suppression of the expression of an immunoglobulin allotype in an individual that is brought about by the administration of antibodies against the allotype.

alloxan diabetes An experimentally produced diabetes in which the level of insulin in an animal is lowered through preferential destruction of the insulin-producing cells of the pancreas by the administration of the pyrimidine drug alloxan.

allozyme One of a group of enzymes that are produced by alleles of the same gene.

all-trans-retinal The isomeric form of retinal

that is produced by light from the 11-*cis* isomer.

allylic Next to a double bond; the allyl group has the structure $\text{CH}_2=\text{CH}-\text{CH}_2-$.

allysine A derivative of lysine in which the ϵ -amino group has been converted to an aldehyde group; allysine undergoes an aldol condensation with hydroxyallysine during the cross-linking of collagen chains.

alpha 1. Denoting the first carbon atom next to the carbon atom that carries the principal functional group of the molecule. 2. Denoting a specific configuration of the substituents at the anomeric carbon in ring structures of carbohydrates. 3. Denoting observed rotation (α) and specific rotation ($[\alpha]$) in optical rotation. *Sym* α .

alpha adrenergic receptor *See* adrenergic receptor.

alpha amanitin An amatoxin that is a potent inhibitor of eukaryotic RNA polymerase II and, to a lesser degree, of RNA polymerase III.

alpha amino acid *See* amino acid.

alpha amylase *See* amylase.

alpha amylose AMYLOSE.

alpha blocker An antagonist (inhibitor) of alpha adrenergic receptors. Some alpha blockers are used to treat migraine, diabetic gangrene, and spastic vascular disease. *Aka* alpha adrenergic blocker.

alpha bungarotoxin A small basic protein that is the snake venom poison of snakes from the genus *Bungarus*; a neurotoxin that binds noncovalently to nicotinic receptors of acetylcholine. It blocks the binding of acetylcholine at the postsynaptic cell and prevents depolarization of the postsynaptic membrane. It is referred to as an antagonist of the cholinergic system.

alpha chain 1. The heavy chain of the IgA immunoglobulins. 2. One of the two types of polypeptide chains present in adult hemoglobin.

alpha decay The radioactive disintegration of an atomic nucleus that results in emission of an alpha particle.

alpha error TYPE I ERROR.

alpha fetoprotein *See* carcinoembryonic antigen.

alpha fraction 1. HIGH-DENSITY LIPOPROTEIN. 2. VERY HIGH-DENSITY LIPOPROTEIN.

alpha helix A coil- or spring-like configuration of protein molecules that occurs particularly in globular proteins. In this configuration, the polypeptide chain is held together by means of intrachain hydrogen bonds between the $>\text{CO}$ and $>\text{NH}$ groups of peptide bonds in such a fashion that there are 3.6 amino acid residues per turn of the helix, that the rise per residue is 1.5 Å, and that the pitch of the

helix is 5.4 Å; each $>\text{CO}$ group is hydrogen-bonded to the $>\text{NH}$ group of the fourth residue ahead of it in the chain. The helix may be left- or right-handed depending on whether it is twisted in the manner of a left- or right-handed screw. The right-handed alpha helix is the configuration most commonly encountered in proteins.

alpha keratin The helical form of keratin in which the polypeptide chains are in the alpha-helical configuration.

alpha lactalbumin A heat-stable protein in the milk of mammals; a component (B protein) of the enzyme lactose synthetase.

alpha lipoprotein HIGH-DENSITY LIPOPROTEIN.

alpha method DEAN AND WEBB METHOD.

alpha orientation The orientation of atoms or groups that are attached below the plane of the steroid molecule.

alpha oxidation An oxidative pathway of fatty acids in which they are oxidized at the alpha carbon and degraded one carbon at a time. The carbon is removed as CO_2 by decarboxylation and the residual fatty acid molecule is converted to an aldehyde; occurs in germinating plant seeds.

alpha particle 1. A subatomic particle consisting of two protons and two neutrons; the alpha particle is identical to the nucleus of the helium atom and is frequently emitted by radioactive isotopes. 2. A cluster of glycogen granules in the liver; the granules are referred to as beta particles.

alpha plateau The low-potential portion of the characteristic curve of a proportional radiation detector at which the count rate is almost independent of the applied voltage, and at which the potential is of sufficient magnitude to detect alpha particles.

alpha radiation A radiation consisting of alpha particles.

alpha ray A beam of alpha particles.

alpha receptor *See* adrenergic receptor.

alpha threshold The lowest potential at which alpha particles can be detected with a proportional radiation detector.

alpha tocopherol *See* vitamin E.

ALS Antilymphocyte serum.

alteration enzyme A phage T4 enzyme that is injected with the phage DNA into the host bacterium; it modifies the host RNA polymerase and, thereby, inhibits the initiation of host RNA synthesis.

alternate-site model A model proposed to explain the anticooperative effects of certain oligomeric enzymes. It is similar to the flip-flop model and is based on the notion that a chemical event or binding that occurs on one subunit can facilitate the release of product from another subunit.

alternation of generations The phenomenon, in the life cycle of certain organisms, in which a mature haploid individual alternates with a mature diploid individual; exhibited by some fungi, algae, and plants.

alternative pathway See complement.

alum A double sulfate salt of aluminum and either a monovalent metal or an ammonium ion.

alumina Aluminum oxide; an adsorbent used in column chromatography

alumina gel A gel prepared from ammonium sulfate and aluminum sulfate; used in the purification of proteins by adsorption chromatography.

aluminum adjuvant An aluminum compound, such as aluminum hydroxide, aluminum phosphate, or alum, that functions as an adjuvant in alum precipitation.

alum precipitated toxoid A toxoid precipitated with an aluminum adjuvant. *Abbr* APT.

alum precipitation An immunochemical technique in which soluble antigens are mixed with aluminum adjuvants to form a precipitate. When injected into an animal, the precipitate forms a depot from which the antigen is slowly released.

Alu sequences A set of some 300,000 copies of base sequences, consisting of about 300 base pairs each, that occurs in human DNA. The name is derived from the fact that each unit contains a tetranucleotide that can be cleaved by the restriction enzyme Alu I. The Alu sequences are scattered throughout the genome and account for about 5% of the total human DNA. They may constitute transposable elements.

alveolar Of, or pertaining to, alveoli.

alveolus (*pl* alveoli). One of a large number of air cells in the lung through which the gas exchange of respiration takes place.

Alzheimer's disease An age-related, progressive, neurodegenerative disease in humans that is characterized by gradual loss of memory, reasoning, orientation, and judgment. One of the hallmarks of the disease is the formation of numerous neuritic plaques in the brain which consist of degenerating axons and neurites surrounding an amyloid core. At least some forms of the disease are due to a specific genetic defect of chromosome 21.

am Abbreviation for amber mutation.

Amadori product A compound formed by the nonenzymatic reaction between the aldehyde group of glucose and the amino group of a protein.

Amadori rearrangement The isomerization of *N*-substituted aldosylamines into *N*-substituted 1-amino-1-deoxy-2-ketoses; occurs

in the Maillard reaction, in the reaction of carbohydrates with phenylhydrazine, and in the biosynthesis of pteridines.

α -amanitin See alpha amanitin.

amatoxin One of a group of bicyclic octapeptides that are toxic components of the poisonous mushroom *Amanita phalloides*. An important member of the group is α -amanitin which inhibits eukaryotic RNA polymerase II. See also phallotoxin.

amaurotic familial idiocy TAY-SACHS DISEASE.

amber codon The codon UAG, one of the three termination codons.

Amberlite Trademark for a group of ion-exchange resins.

amber mutant A conditional lethal mutant that contains an amber codon in a gene with a vital function.

amber mutation A mutation in which a codon is mutated to the amber codon, thereby causing the premature termination of the synthesis of a polypeptide chain. *Abbr* am.

amber suppression The suppression of an amber codon.

ambient conditions The conditions, such as temperature and pressure, of the surrounding environment.

ambiguity The occurrence of mistakes in protein synthesis, particularly in in vitro systems, such as the incorporation of one amino acid in response to a codon for a different amino acid.

ambiguous codon A codon that can lead to the incorporation of more than one amino acid.

ambiquitous enzyme An enzyme whose distribution between soluble and particulate forms varies with the metabolic state of the cell.

ambiquity The property of an enzyme that can exist either by being bound to a structure or by being free in solution.

ambivalent codon A codon that is expressed in some mutants as a result of suppression but that is not expressed in other mutants; a nonsense codon; a termination codon.

ambivalent mutation NONSENSE MUTATION.

amboceptor A term introduced by Ehrlich to describe hemolysin, an antibody that possesses two different binding sites, one for the antigen and one for complement; currently used to describe an antibody to a surface antigen of erythrocytes. The combination of erythrocytes with homologous amboceptors results in sensitized erythrocytes that can function as detectors of complement.

amelogenin A protein in dental enamel.

Ames test A bacterial bioassay for detecting mutagenic compounds that was developed by Bruce N. Ames in 1974. Since many chemical carcinogens are also mutagenic, the Ames test

is also used as a screen for the potential carcinogenicity of chemical compounds. The test involves growing cells of *Salmonella typhimurium* that are unable to grow in the absence of histidine (due to a mutation in a gene involved in the biosynthesis of histidine) in the presence of the test mutagen. This results in many new mutations, some of which are revertants of the original mutation and can now synthesize histidine and grow in the absence of exogenous histidine. The number of revertants formed is scored at various test mutagen concentrations and this permits the construction of a dose-response curve.

amethopterin A folic acid analogue that inhibits the enzyme dihydrofolate reductase and that is used in the treatment of leukemia.

amidation The introduction of an amide group into an organic compound.

amide group The radical $-\text{CONH}_2$, derived from an acid by replacement of the OH of the carboxyl group with an amino group.

amidinotransferase The enzyme that catalyzes the transamidation reaction in which a guanido group is transferred from arginine to glycine.

amido black 10B A dye used for the spectrophotometric determination of proteins. This method is not affected by most of the reagents that interfere with the Lowry method. *Aka* amidoschwarz 10B; buffalo black NBR; naphthol blue black.

amination The introduction of an amino group into an organic compound.

amine A basic organic compound derived from ammonia by substitution of one more organic radicals for the hydrogens. The amine is designated as a primary, a secondary, or a tertiary amine depending on whether one, two, or three organic radicals have been substituted for the hydrogen atoms in ammonia.

aminoacetic acid GLYCINE.

amino acid An organic compound that contains both a basic amino group and an acidic carboxyl group. The alpha amino acids, in which the amino group is attached to the alpha carbon, are the building blocks of peptides and proteins. The amino acids are commonly classified either as (a) neutral, basic, or acidic, or as (b) nonpolar, polar and uncharged, or polar and charged; the presence or absence of a charge on the amino acid refers to that at pH 7.0

amino acid accepting RNA TRANSFER RNA.

amino acid activating enzyme AMINOACYL-tRNA SYNTHETASE.

amino acid activation A set of two reactions, catalyzed by an aminoacyl-tRNA synthetase, whereby an amino acid becomes covalently

linked first to AMP and then to a specific tRNA molecule.

amino acid analysis The analytical determination of both the relative amounts and the types of the amino acids in a peptide or in a protein.

amino acid analyzer An instrument for the automated amino acid analysis of peptide and protein hydrolysates. The amino acids are separated by ion-exchange chromatography and are quantitatively determined by colorimetry.

amino acid arm The acceptor stem in the clover leaf model of tRNA to which the amino acid is covalently linked; the segment contains both the 5'- and 3'-ends of the tRNA. *See also* arm.

amino acid attachment site The site, on a tRNA molecule, to which the amino acid becomes covalently linked; the 2'- or 3'-hydroxyl group of the terminal adenosine nucleotide, at the 3'-end of the tRNA molecule, to which the amino acid becomes esterified.

amino acid composition The makeup of a peptide or a protein in terms of both the relative amounts and the types of its constituent amino acids; generally expressed in terms of mole percent.

amino acid incorporation The in vivo or in vitro reactions whereby amino acids become constituents of proteins as a result of protein synthesis.

amino acid nitrogen The nitrogen of the amino acids in serum. *Abbr* AAN.

aminoacidopathy A genetically inherited metabolic defect in humans that involves amino acid metabolism.

amino acid oxidase An enzyme that catalyzes the oxidative deamination of amino acids. An L-amino acid oxidase is specific for L-amino acids and is a flavoprotein having FMN as a prosthetic group; a D-amino acid oxidase is specific for D-amino acids and is a flavoprotein having FAD as a prosthetic group.

amino acid replacement The substitution of one amino acid for another at a position in a polypeptide chain as a result of a mutation in the corresponding codon. *See also* conservative substitution; radical substitution.

amino acid residue That portion of an amino acid that is present in a peptide or a polypeptide; the amino acid minus the atoms that are removed from it in the process of linking it to other amino acids by means of peptide bonds. Depending on its position in the peptide or in the polypeptide chain, the amino acid loses a hydrogen atom, a hydroxyl group, or a molecule of water as it becomes linked to the other amino acids.

amino acid sequence The linear order of the amino acids as they occur in a peptide or in a protein; the amino acid sequence is conventionally written with the N-terminal amino acid on the left and with the C-terminal amino acid on the right.

amino acid sequencer See sequenator.

amino acid side chain The atoms of the amino acid molecule exclusive of the alpha carbon atom and its hydrogen atom, the alpha amino group, and the alpha carboxyl group.

amino acid starvation See starvation (2).

amino acid substitution AMINO ACID REPLACEMENT.

amino acid:tRNA ligase AMINOACYL-TRNA SYNTHETASE.

aminoaciduria The presence of excessive amounts of amino acids in the urine.

aminoacyl- Combining form denoting an amino acid that is esterified through its carboxyl group to another molecule.

aminoacyl adenylate An amino acid that has been esterified through its carboxyl group to the phosphate group of AMP; an intermediate in the activation of an amino acid to the aminoacyl-tRNA. *Abbr* AA-AMP.

aminoacyl site The site on the ribosome at which the incoming aminoacyl-tRNA is bound during protein synthesis; the A-site.

aminoacyl-tRNA An amino acid that has been esterified through its carboxyl group to the 2'- or 3'-hydroxyl group of the terminal adenosine at the 3'-end of a transfer RNA molecule; aminoacyl-tRNA is the form in which an amino acid is transported to the ribosomes for protein synthesis. *Abbr* AA-tRNA; AA-tRNA^{AA}. *Aka* aminoacylated-tRNA.

aminoacyl-tRNA site AMINOACYL SITE.

aminoacyl-tRNA synthetase The enzyme that catalyzes the coupled reactions of amino acid activation whereby an amino acid is first attached to AMP to form an aminoacyl adenylate, and is then attached to a transfer RNA molecule to form an aminoacyl-tRNA molecule.

aminoadipic pathway A biosynthetic pathway of lysine that proceeds by way of α -aminoadipic acid and occurs in fungi.

p-aminobenzoic acid A component of folic acid that is generally classified with the B vitamins, since it is a growth factor (provitamin) for some bacteria. It has no vitamin activity in humans because humans lack the ability to synthesize folic acid from it. *Abbr* PAB; PABA.

γ -aminobutyrate bypass A reaction sequence for the conversion of α -ketoglutaric acid to succinic acid that differs from the normal sequence in the citric acid cycle and

occurs in brain tissue. *Aka* GABA shunt.

γ -aminobutyric acid A fatty acid derivative that functions in the metabolism of brain. *Aka* 4-aminobutyric acid.

aminoethyl cellulose An anion exchanger.

aminoglycoside antibiotics A diverse group of antibiotics, isolated from various bacterial species, that are valuable agents for the treatment of infectious diseases. Their primary growth-inhibiting action is due to their specific attachment to ribosomes and subsequent disruption of the translation mechanism of the microbial cell, leading to inhibition of protein synthesis at one or more steps. The group includes such antibiotics as kanamycin, neomycin, and streptomycin. *Aka* aminoglycosides; aminoglycoside-aminocyclitol antibiotics.

amino group The radical $-\text{NH}_2$.

p-aminohippuric acid A compound used for renal clearance tests. *Abbr* PAH.

δ -aminolevulinic acid A key intermediate in the biosynthesis of porphyrins in which two molecules of δ -aminolevulinic acid condense to form the pyrrole porphobilinogen. *Abbr* DALA.

aminopeptidase An exopeptidase that catalyzes the sequential hydrolysis of amino acids in a polypeptide chain from the N-terminal.

amino precursor uptake and decarboxylation See APUD theory.

aminopterin A folic acid analogue that inhibits the enzyme dihydrofolate reductase and that is used in the treatment of leukemia.

2-aminopurine A purine analogue that is incorporated into nucleic acids and thereby produces transitions. *Abbr* AP.

p-aminosalicylic acid An analogue of p-aminobenzoic acid that is used in the treatment of tuberculosis. *Abbr* PAS.

amino sugar A monosaccharide in which one or more hydroxyl groups have been replaced by an amino group.

amino terminal N-TERMINAL.

aminotransferase TRANSAMINASE.

amitosis A form of nuclear division in which a spindle is not formed, the nuclear membrane persists throughout the division, and the nucleus divides by constriction; occurs in the macronuclei of ciliates and in certain fungi.

ammonia A colorless gas that is the major form in which nitrogen is utilizable by living cells. Ammonia is the first compound formed in biological nitrogen fixation and is also the end product of purine catabolism in some marine invertebrates and in crustaceans.

ammonia fixation A group of three reactions, one or more of which occur in every organism, whereby ammonia is converted to

glutamic acid, glutamine, or carbamoyl phosphate.

ammonification The formation of ammonia by the degradation of organic compounds.

ammonification of nitrate See nitrate respiration.

ammonium plant ACID PLANT.

ammonium sulfate fractionation A fractional precipitation by means of ammonium sulfate that is used in the purification of enzymes and other proteins.

ammonolysis The cleavage of a covalent bond of an acid derivative by reaction with ammonia so that one of the products combines with the hydrogen atom and the other combines with the amino group of ammonia.

ammonotelic organism An organism, such as a teleost fish, which excretes the nitrogen from amino acid and purine catabolism primarily in the form of ammonia.

amniocentesis A procedure for the sampling and testing of the amniotic fluid during pregnancy; permits a determination of the sex of the embryo and a detection of various genetic diseases.

amnion 1. The fluid-filled sac within which the embryos of reptiles, birds, and mammals develop. The wall of the sac consists of two layers of epithelium; the inner one is called amnion, the outer one chorion. 2. The inner layer of epithelium of the amniotic sac.

amniotic fluid The fluid that fills the membranous sac enclosing the embryo.

amorph A mutant allele that has little or no effect on the expression of a trait compared to the effect that the wild-type allele has.

amorphous 1. Noncrystalline; devoid of a regular shape and a molecular lattice structure. 2. Lacking a definite form or organization; descriptive of nonhelical regions in macromolecules.

AMP 1. Adenosine monophosphate (adenylic acid). 2. Adenosine-5'-monophosphate (5'-adenylic acid). 3. Avian myeloblastosis virus.

ampere A unit of electrical current intensity; equal to the constant current that, when passed through a standard aqueous solution of silver nitrate, deposits silver at the rate of 0.001118 g/s. *Sym* A.

amperometric titration A titration in which either the titrant or the substance being titrated is electroactive and the limiting current is plotted as a function of added titrant.

amphetamine The drug, 1-phenyl-2-amino-propane, that stimulates the central nervous system and inhibits sleep.

amphibarc Descriptive of a pharmacologically active substance that can either lower or raise

the blood pressure depending on its dose or concentration.

amphibiotic Descriptive of an organism that can behave either as a symbiont or as a parasite with respect to a given host.

amphibolic pathway The metabolic pathway composed of the reactions of the citric acid cycle and some of the reactions of glycolysis. The pathway occupies a central position in metabolism, since it can be used either catabolically for the oxidation of metabolites to carbon dioxide and water, or anabolically for the synthesis and interconversion of metabolites. *Aka* central metabolic pathway.

amphipathic Descriptive of a molecule that has both polar (hydrophilic) and nonpolar (hydrophobic) groups.

amphiphilic AMPHIPATHIC.

amphiprotic Descriptive of a compound that can either gain or lose protons; synonymous with amphoteric if acids are defined as proton donors and bases as proton acceptors.

amphiprotic solvent A nonaqueous solvent that can act either as a proton donor or as a proton acceptor with respect to the solute.

amphitrophic Descriptive of an organism that can live photosynthetically in the light and chemotrophically in the dark.

ampholyte An amphoteric electrolyte.

amphoteric Descriptive of a compound that has at least one group that can act as an acid and one group that can act as a base; a compound that can act either as a proton donor or as a proton acceptor. Synonymous with amphiprotic if acids are defined as proton donors and bases as proton acceptors.

amphotropic virus A virus that can replicate either in cells from its host species or in cells from another species. *See also* ecotropic virus.

ampicillin A semisynthetic derivative of penicillin that is more effective against gram-negative bacteria than other derivatives of penicillin.

AMP kinase ADENYLATE KINASE.

amplicon A defective virus vector; a defective viral genome such as those derived from Herpes simplex virus.

amplification *See* cascade mechanism; enzyme amplification; gas amplification; gene amplification; plasmid amplification.

amplifier enzyme A membrane-located enzyme that mediates that action of a hormone in a multiple cascade mechanism. The hormone-receptor complex activates the amplifier enzyme by means of G proteins, and the amplifier enzyme then activates a second messenger molecule which initiates the cascade mechanism.

amplifier T cells A group of T cells that amplify the response and the proliferation of

cytotoxic T cells. *Aka* amplifier T lymphocytes.

amplitude 1. The maximum response of an interconvertible enzyme that can be achieved with saturating concentrations of effectors for a given converter enzyme. 2. The maximum displacement of an oscillation, a vibration, or a wave.

ampoule A small glass container with a thin extended portion that is readily sealed by heating. *Var sp* ampule.

amu Atomic mass unit.

amyelination The failure to form myelin.

A myeloma protein An abnormal immunoglobulin of the IgA type that is produced by individuals suffering from multiple myeloma.

amygdalin A β -cyanogenic glycoside, similar in structure to laetrile but containing an additional glucose residue. It occurs naturally in the kernels or seeds of most fruits. Apricot kernels contain the enzymes β -glucosidase and oxynitrilase (mandelonitrile lyase). The former enzyme catalyzes the hydrolysis of amygdalin to two molecules of glucose and one molecule of mandelonitrile; the latter enzyme catalyzes the hydrolysis of mandelonitrile to cyanide (HCN) and benzaldehyde. *See also* laetrile; vitamin B₁₇.

amylase An enzyme that catalyzes the hydrolysis of starch at $\alpha(1 \rightarrow 4)$ glycosidic bonds. Alpha amylase is an endoamylase that catalyzes random hydrolysis; beta amylase is an exoamylase that catalyzes the sequential removal of glucose residues, commencing at the nonreducing end of the starch molecule.

amylolytic Combining form meaning starch.

amylolytic AMYLOLYTIC.

amylolytic method A method of assaying for the enzyme amylase by determining the amount of unhydrolyzed starch that remains after incubation of the starch with the enzyme.

amylopectin SOLUBLE STARCH.

amyloid One of a number of fibrous proteins that give a starch-like reaction with iodine and that are deposited in blood vessels and other tissues under certain pathological conditions. Amyloid fibers consist of stacks of pleated sheets and are highly resistant to degradation. One type of amyloid, deposited in the brain, is believed to represent the waste product of patients afflicted with Alzheimer's disease.

amyloidosis A pathological condition characterized by the formation of amyloid deposits.

amyololysis The hydrolysis of starch.

amyololytic Of, or pertaining to, amyololysis.

amylometric method A method of assaying for the enzyme amylase by determining the

amount of starch that is hydrolyzed during incubation of the starch with the enzyme.

amylopectin The form of starch that is composed of branched chains of glucose units which are joined by means of $\alpha(1 \rightarrow 4)$ and $\alpha(1 \rightarrow 6)$ glycosidic bonds.

amylopectinosis GLYCOGEN STORAGE DISEASE TYPE IV.

amyloplast A starch-storing plastid.

amyllopsin The α -amylase present in the pancreatic juice.

amylose The form of starch that is composed of long, unbranched chains of glucose units which are joined by means of $\alpha(1 \rightarrow 4)$ glycosidic bonds. *Aka* α -amylose.

amylose synthetase The enzyme that catalyzes the synthesis of amylose from ADP-glucose.

amytal The barbiturate drug, 5-ethyl-5-isoamylbarbituric acid, that inhibits the electron transport system between the flavoproteins and coenzyme Q.

anabiosis ANHYDROBIOSIS (2).

anabolic Of, or pertaining to, anabolism.

anabolic steroid A steroid that stimulates muscle growth and muscle strength; androgens and certain androgen derivatives have this effect.

anabolism 1. The phase of intermediary metabolism that encompasses the biosynthetic and energy-requiring reactions whereby cell components are produced. 2. The cellular assimilation of macromolecules and complex substances from low molecular weight precursors.

anacidity 1. A lack of acidity, particularly the lack of gastric hydrochloric acid. 2. The pathological condition due to a lack of gastric hydrochloric acid.

anaerobe *See* facultative anaerobe; obligate anaerobe.

anaerobic 1. In the absence of oxygen; in an environment or an atmosphere devoid of oxygen. 2. Not requiring the presence of molecular oxygen for growth. 3. Not capable of using molecular oxygen for growth. *See also* anoxybiontic.

anaerobic-aerotolerant MICROAEROPHILIC.

anaerobic fermentation *See* fermentation (2).

anaerobic glycolysis The group of cellular reactions, that do not require oxygen, whereby glucose is converted to lactic acid.

anaerobic respiration The energy-yielding metabolic breakdown of organic compounds in an organism that proceeds in the absence of molecular oxygen and with the use of inorganic compounds, such as nitrate or sulfate, as oxidizing agents. *See also* fermentation (2).

anaerobiosis Life under anaerobic conditions.

anaerobiotic Of, or pertaining to, anaerobiosis.

anaerogenic Of, or pertaining to, an organism that does not produce gas from a particular substrate.

analbuminemia A genetically inherited metabolic defect in humans that is characterized by an impaired synthesis of serum albumin.

analgesia The relief of pain without loss of consciousness.

analgesic 1. *n* An agent that brings about analgesia. 2. *adj* Of, or pertaining to, analgesia.

analog computer A computer that receives information in the form of continuous variables, such as temperature, pressure, and flow, and that processes the information by translating each variable into an analogous or a related mechanical or electrical variable, such as voltage.

analogous Having a similar function and a similar, but not identical, structure.

analogous enzyme variants Enzyme variants that differ significantly in their molecular structures and catalytic properties.

analogue A compound that is structurally similar to another compound and that is used for such purposes as the determination of structural prerequisites of enzyme substrates, the competitive inhibition of specific enzymatic and other reactions, and the synthesis of altered macromolecules. *Var sp* analog.

analysis of covariance A statistical analysis for determining the variability in the principal variable that is due to variability in some other variable; consists of the combined application of linear regression and analysis of variance techniques.

analysis of variance A statistical analysis for segregating the sources of variability in measurements, as in determining the extent to which the variability in sets of observations is due to differences between the sets and the extent to which it is due to random variations. An analysis of the total variability of a set of data into components which can be attributed to different sources of variation. *Abbr* ANOVA.

analyte The ion or compound that is being measured (determined) in a given analytical procedure.

analytical biochemistry A branch of biochemistry that deals with the qualitative and quantitative determination of substances in living systems.

analytical method A method, such as ultracentrifugation, electrophoresis, or chromatography, that requires relatively small amounts of sample and that is used primarily for the

identification and characterization of specific substances. *See also* preparative method.

analytical ultracentrifuge A high-speed centrifuge, equipped with one or more optical systems, that is used for measurements of sedimentation coefficients and molecular weights as well as for a variety of studies of macromolecules. The centrifuge is capable of generating speeds of approximately 60,000 rpm and centrifugal forces of approximately $500,000 \times g$. The optical systems used in conjunction with the analytical ultracentrifuge are a schlieren optical system, an absorption optical system, and an interferometric optical system.

analyzer The nicol prism in a polarimeter that is used for determining the rotation of the plane-polarized light. *See also* polarizer.

anamnestic response SECONDARY IMMUNE RESPONSE.

anaphase The third stage in mitosis during which the chromosomes move to opposite poles.

anaphoresis 1. The movement of charged particles toward the anode. 2. ELECTROPHORESIS.

anaphylactic response The immune reactions of anaphylaxis.

anaphylactic shock A severe and generalized form of anaphylaxis that is characterized by violent cardiac and respiratory symptoms and that may be produced by the injection of a substance to which an individual is either allergic or sensitized.

anaphylactoid reaction A condition that resembles an anaphylactic shock but that is not caused by an immunological reaction.

anaphylatoxin A pharmacologically active substance, apparently a polypeptide fragment of complement, that can cause the release of histamine from mast cells in anaphylaxis.

anaphylaxis An immediate-type hypersensitivity in which the first administration of an antigen to an animal is harmless, but the second administration leads to an intense secondary immune response accompanied by pathological reactions; involves the combination of antigens with homologous, mast cell-bound IgE (reaginic) antibodies. *See also* active anaphylaxis; passive anaphylaxis; reverse passive anaphylaxis.

anaplasia The loss by a cell of its characteristic structure accompanied by its reversion to a more primitive, embryonic type.

anaplastic Of, or pertaining to, anaplasia.

anaplerosis *See* anaplerotic reaction.

anaplerotic reaction A reaction whereby a metabolic intermediate is replenished; this is generally achieved through the insertion of

either a one-carbon fragment, in the form of carbon dioxide, or a two-carbon fragment, in the form of acetyl coenzyme A, into the appropriate metabolic reaction.

anatoxin TOXOID.

anchimeric assistance The facilitation, by one part of a substrate molecule, of an enzyme reaction that occurs at a different part of the same substrate molecule. Thus, different parts of the same substrate molecule participate both in catalysis and in the actual chemical reaction.

anchorage dependence The difference between the extent of cellular transformation that is produced by an oncogenic virus, such as polyoma virus, with cells that are planted in agar and with cells that are suspended in a viscous medium.

anchorage-independent growth The ability of transformed (tumorigenic) cells to grow progressively while suspended in a semisolid medium. This property generally distinguishes tumorigenic from normal (nontumorigenic) cells.

anchorin ANKYRIN.

Andersen's disease GLYCOGEN STORAGE DISEASE TYPE IV.

androgen 1. A 19-carbon steroid that is a male sex hormone or one of its metabolites. 2. Any 19-carbon steroid. *See also* male sex hormone.

androgen-binding protein A protein that is secreted by cells in the testes in response to follicle-stimulating hormone. The protein binds androgens and is believed to function in establishing high local concentrations of testosterone. *Abbr* ABP.

androstande The parent ring system of the androgens.

androsterone A major metabolite of testosterone that has weak androgenic activity and that belongs to the group of ketosteroids.

anemia A condition in which the number of red blood cells, the volume of red blood cells, or the hemoglobin content of the blood are below normal levels. *See also* hemolytic anemia; hypochromic anemia; pernicious anemia; sickle cell anemia.

anemic Of, or pertaining to, anemia.

anergy The total absence of an allergic response in an animal under conditions that would otherwise be expected to lead to such a response.

anesthetic drug A drug that induces either a local, or a total, loss of sensation in the body.

aneuploid state The chromosome state in which there is a loss or a gain of single chromosomes, and the chromosome number is not an exact multiple of the basic number in the genome. *Aka* aneuploidy.

aneurin THIAMINE.

aneurysm 1. A blood-containing tumor connected directly with the lumen of an artery. 2. A circumscribed dilation of an artery.

ANF 1. Antinuclear factor. 2. Atrial natriuretic factor.

angel dust Phencyclidine [1-(1-phenyl-cyclohexyl)piperidine; PCP]; a compound that was first introduced as a general anesthetic and that is now used as an animal tranquilizer. It is frequently abused as a drug by adolescents. Phencyclidine inhibits cholinergic activity, increases brain dopamine activity in rats, and induces psychoses in humans that are similar to schizophrenia.

angiogenesis The formation of new blood capillaries. It is now believed that, once a solid tumor take has occurred, every increase in tumor size must be preceded by an increase in new capillaries that converge upon the tumor.

angiogenic factors A group of naturally occurring substances that promote angiogenesis; includes a number of polypeptides, such as acidic and basic fibroblast growth factors, angiogenin, transforming growth factors α and β , and some lipids.

angiogenin A small protein, isolated from human tumor cells (adenocarcinoma) grown in culture, that induces new blood vessels to grow in living tissue; it is believed to be produced in healthy, nontumor tissue as well and has 35% sequence homology with pancreatic ribonuclease.

angioma A tumor consisting chiefly of blood or lymphatic vessels.

angiotensin I The inactive decapeptide precursor of angiotensin II; it is cleaved off from angiotensinogen in a reaction catalyzed by the enzyme renin.

angiotensin II The active octapeptide formed from angiotensin I by hydrolytic removal of two amino acids in a reaction catalyzed by the serum converting enzyme; a powerful hypertensive agent.

angiotensinogen The hepatic globulin from which the decapeptide angiotensin I is cleaved off in a reaction catalyzed by the enzyme renin.

angiotonin ANGIOTENSIN.

angle rotor A centrifuge rotor in which the tubes containing solution are held at a fixed angle. Such rotors are used for the preparative fractionation of macromolecules and their efficiency is due to the fact that convection is superimposed upon sedimentation in the tube. *Aka* angle head.

angle strain A strain in a ring structure that is

due to expansion or compression of bond angles.

angstrom unit A unit of length equal to 10^{-8} cm and used in describing atomic and molecular dimensions. *Sym* AU; Å; Å. *Aka* angstrom.

angular methyl group A methyl group attached to the perhydrocyclopentanophenanthrene ring system of steroids.

angular resolved photoelectron spectroscopy A technique for the study of surfaces in which photons are allowed to strike a surface, leading to the ejection of photoelectrons from molecules adsorbed to the surface. Measurements of the angles and intensities of these photoelectron emissions allows a determination of the orientation of the adsorbed molecules. *Abbr* ARPES.

angular velocity The velocity of rotation expressed in terms of the central angle, in radians, transversed per unit time.

anhaptoglobinemia A genetically inherited metabolic defect in humans that is due to a lack of haptoglobin in the blood.

anhydride *See* acid anhydride.

anhydrobiosis 1. Life in the absence of water. 2. A state of suspended animation shown by some organisms in which they can sustain the removal of all, or almost all, of their cellular water and return to normal living conditions when resupplied with water.

anhydrous Devoid of water.

animal cephalin PHOSPHATIDYL SERINE.

animal charcoal BONEBLACK.

animal hormone *See* hormone.

animal protein factor VITAMIN B₁₂.

animal saponin A sulfur-containing steroid glycoside that has properties of a plant saponin but is isolated from a marine invertebrate.

animal starch GLYCOGEN.

animal toxin A toxin of animal origin, such as that in snake venom.

animal virus A virus that infects animal cells and multiplies in them. *See also* virus.

anion A negatively charged ion.

anion exchanger A positively charged ion-exchange resin that binds anions.

anion gap A measure for evaluating chemical disturbances of acid-base balance, particularly those of metabolic acidosis; defined as the difference between the concentration, in blood, of the major cation (Na^+) and the sum of the concentrations of the major anions (Cl^- , HCO_3^-), with all values expressed in terms of milliequivalents per liter of serum. Thus, the anion gap is given by $[\text{Na}^+] - ([\text{Cl}^-] + [\text{HCO}_3^-])$.

anionic detergent A surface-active agent in which the surface-active part of the molecule

carries a negative charge. *Aka* anionic surface-active agent.

anion respiration The phenomenon whereby exposure of plant tissues to salt solutions frequently leads to an increase in respiration which appears to be proportional to the rate of anion absorption by the plant.

anion-transport protein An integral protein in the red blood cell membrane that spans the entire width of the membrane; a glycoprotein that has a large part of the molecule protruding on the cytoplasmic side and the carbohydrate chains protruding on the extracellular side of the membrane. The protein functions in the transport of anions across the membrane. *Aka* band 3.

anisotropic Of, or pertaining to, anisotropy.

anisotropic band A BAND.

anisotropy The variation in the physical properties of a substance as a function of the direction in which these properties are measured. *Aka* anisotropism.

ankyrin A peripheral protein of the red blood cell membrane that links spectrin molecules to anion-transport proteins. *Var sp* anchorin. *Aka* syndein.

annealing 1. The renaturation of heat-denatured proteins or heat-denatured nucleic acids by slow cooling. 2. The formation of hybrid nucleic acid molecules, containing paired strands from different sources, by slow cooling of a mixture of denatured nucleic acids. 3. The tempering of glass in glass blowing by slow cooling. *See also* reannealing.

annular Ring-shaped.

annulation reaction A chemical reaction that involves building a new ring onto a molecule.

anode The electrode by which electrons leave the solution of an electrolyte and toward which the anions move in solution. With respect to properties in solution, the anode is a positive electrode; with respect to the external flow of electrons, the anode is a negative electrode.

anodic 1. Of, or pertaining to, the anode. 2. Descriptive of a component that moves toward the anode in electrophoresis.

anomalous dispersion An optical rotatory dispersion that cannot be expressed by a simple, one-term Drude equation; such a dispersion is generally expressed $[m'] = a_0\lambda_0^2/(\lambda^2 - \lambda_0^2) + b_0\lambda_0^4/(\lambda^2 - \lambda_0^2)^2$, where $[m']$ is the reduced mean residue rotation, λ is the wavelength, and a_0 , b_0 , and λ_0 are constants.

anomalous osmosis The electroosmotic flow of water through a charged membrane that is caused by a potential gradient across the membrane. The anomalous osmosis is said to be positive when the water moves from a dilute to a concentrated solution and is said to

be negative when the flow of water is in the opposite direction.

anomer One of two isomeric carbohydrates (designated α and β) that differ from each other only in the configuration about the anomeric carbon of the ring structure. The α -isomer has the hydrogen at the anomeric carbon above (and the β -isomer has it below) the plane of the ring in a Haworth projection.

anomeric carbon The carbon atom of the carbonyl group in a carbohydrate.

anomeric effect The stereochemical effect in carbohydrate chemistry in which the interaction between the oxygen of the monosaccharide ring and the substituent ($-\text{OR}$; $-\text{O}-\text{CO}-\text{R}$; or halogen) at the anomeric carbon is such as to favor the maximum separation between the oxygen and the substituent; as a result, the axial substituent, or α -anomer, is favored over the equatorial substituent, or β -anomer. The molecule having an equatorial anomeric substituent is less stable than the one having an axial substituent.

ANOVA Acronym for analysis of variance. *Aka* ANOVAR.

anovar Acronym for analysis of variance.

anoxia HYPOXIA.

anoxybiontic Not capable of using atmospheric (molecular) oxygen for growth. *Aka* anoxybiotic. *See also* anaerobic (2,3).

anserine A dipeptide of β -alanine and methyl histidine that occurs in vertebrate muscle.

antagonism The phenomenon in which the action of one agent is counteracted by the action of another agent that is present at the same time.

antagonist A molecule, such as a drug, an enzyme inhibitor, or a hormone, that diminishes or prevents the action of another molecule or receptor site. *See also* α -bungarotoxin.

ante-iso fatty acid A fatty acid that is branched at the carbon atom preceding the penultimate carbon atom at the hydrocarbon end of the molecule.

antenna molecules Molecules that are not photochemically active and merely serve in the capacity of a large antenna, passing the excitation energy in photosynthesis from one molecule to another until it is trapped by the photochemically active molecules in the reaction center. Antenna molecules constitute the bulk of the photosynthetic pigment molecules. *Aka* antenna chlorophyll.

ante-penultimate carbon The third carbon atom from the end of a chain.

anterior 1. In front of, or in the front part of, a structure. 2. Before, in relation to time.

anthesin FLOWERING HORMONE.

anthocyanidin The aglycone of an anthocyanin.

anthocyanins Water-soluble plant pigments that occur largely in the form of glycosides of an anthocyanidin. Anthocyanins are bioflavonoids. *See also* bioflavonoid.

anthranilic acid *See* chorismic acid.

anthrone reaction A colorimetric reaction for carbohydrates, particularly hexoses, that is based on the production of a green color on treatment of the sample with anthrone.

anthropic principle The principle according to which the presence of life on earth may explain some of the conditions associated with life. It is usually argued that life arose on the earth because circumstances, such as a moderate temperature, were conducive to its existence. According to the anthropic principle, the argument is reversed; it is postulated that the presence of life on earth explains why the latter has a moderate temperature.

anti 1. Referring to a nucleoside conformation in which the base has been rotated around the sugar, using the C—N glycosidic bond as a pivot, so that the sugar is in direct opposition to the base. This represents a sterically less hindered conformation than the syn conformation; in polynucleotides, it leads to the bulky portions of the bases being pointed away from the sugar-phosphate backbone of the chain. 2. Referring to a trans configuration for certain compounds containing double bonds, such as the oximes which contain the group $\text{C}=\text{N}-\text{OH}$. 3. Referring to the position occupied by two radicals of a stereoisomer in which the radicals are farther apart as opposed to the syn position in which they are closer together. *See also* syn.

antiacrodynia factor VITAMIN B_6 .

antiadrenergic *See* alpha blocker; beta blocker.

antianemia factor VITAMIN B_{12} .

antiantibody An antibody produced in response to an antigenic determinant of an antibody molecule.

antiauxin A compound that functions as a competitive inhibitor of auxin.

antibacterial agent *See* bactericide; bacteristat.

antiberiberi factor VITAMIN B_1 .

antibiosis The association of two organisms in which one produces a substance, such as an antibiotic, or a condition that is harmful to the other.

antibiotic Originally, defined as a compound produced by a microorganism that inhibits the reproduction or causes the destruction of other microorganisms. Now more generally defined as a compound produced by a

microorganism or a plant, or a close chemical derivative of such a compound, that is toxic to microorganisms from a number of other species. *See also* under individual antibiotics and classes of antibiotics, such as streptomycin and macrolide antibiotic.

anti-black-tongue factor NICOTINIC ACID.

antibody A glycoprotein of the globulin type that is formed in an animal organism in response to the administration of an antigen and that is capable of combining specifically with that antigen. *Abbr* Ab. *See also* immunoglobulin.

antibody-binding fraction FAB FRAGMENT.

antibody combining site ANTIGEN BINDING SITE.

antibody-dependent cellular cytotoxicity Cell-mediated cytotoxicity that requires prior binding of antibodies to target cells. *Abbr* ADCC. *Aka* antibody-dependent, cell-mediated cytotoxicity. *See also* killer cells.

antibody diversity ANTIBODY HETEROGENEITY.

antibody-excess zone A zone in the precipitin curve of the antigen-antibody reaction in which the amount of antibody precipitated increases with increasing amounts of antigen.

antibody fixation The binding of antibodies to cell receptors in immediate-type hypersensitivity.

antibody formation *See* theory of antibody formation.

antibody heterogeneity The state of a given preparation of antibodies in which the antibodies differ with respect to size, structure, charge, or other properties.

antibody-mediated hypersensitivity IMMEDIATE-TYPE HYPERSENSITIVITY.

antibody response IMMUNE RESPONSE.

antibody specificity *See* specificity (2).

antibody titer The highest dilution of an antiserum that will produce detectable precipitation or agglutination when reacted with antigens.

antibody valence The number of antigen binding sites, of which there are at least two, per antibody molecule.

antibonding orbital A molecular orbital in which there is a node of electron density between the bonding atomic nuclei, resulting in a weakening of the bond between the nuclei. Antibonding orbitals are generally of higher energy than sigma (σ) and pi (π) orbitals and are designated sigma star (σ^*) and pi star (π^*).

anticancer compound A compound that arrests or reverses the growth of a malignant tumor.

anticarcinogenesis The inhibition of the action of one carcinogen by the simultaneous administration of a second carcinogen.

antichaptropic agent A substance that decreases the solubility of hydrophobic

(nonpolar) molecules; generally, a small, singly charged ion such as fluoride, or multiply charged ions such as citrate, phosphate, or sulfate.

anticholinesterase An inhibitor of the enzyme cholinesterase.

antichymotrypsin An inhibitor of the enzyme chymotrypsin.

antichlinal At right angles to the surface or the circumference; radial.

anticoagulant A substance that prevents the clotting of blood. Most anticoagulants function by binding calcium ions; these include oxalates, citrates, and ethylenediaminetetraacetic acid (EDTA). Another anticoagulant is heparin; it acts by combining with antithrombin, an inhibitor of the enzyme thrombin.

anticode *See* genetic anticode.

anticoding strand That strand of double-stranded DNA that is transcribed into RNA; the strand that serves as a template for transcription; the sense strand.

anticodon A sequence of three nucleotides in tRNA that, in the process of protein synthesis, binds to a specific codon in mRNA by complementary base pairing.

anticodon arm *See* arm.

anticodon deaminase An enzyme that catalyzes the deamination of adenine to hypoxanthine whenever the adenine occurs at the first position (5'-end) of the anticodon in the unmodified tRNA transcript.

anticodon loop *See* arm.

anticollagenase An inhibitor of the enzyme collagenase.

anticompetitive inhibition UNCOMPETITIVE INHIBITION.

anticomplementary Referring to a treatment or an agent that either removes or inactivates a component of complement.

anticomplement fluorescent antibody technique A fluorescent antibody technique in which an antigen-antibody complex is reacted with complement and the entire aggregate is then stained by means of fluorescent antibodies to complement.

anticooperativity NEGATIVE COOPERATIVITY.

antidepressant A stimulatory drug that reduces fatigue, appetite, and sleeping time. Antidepressants are amines (such as amphetamine and ephedrine) that are believed to function as competitive inhibitors of monoamine oxidase. This leads to an accumulation of catecholamines, the natural substrates of the enzyme, and results in stimulatory effects.

antidermatosis vitamin PANTOTHENIC ACID.

antidiuresis A decrease in the excretion of urine.

antidiuretic 1. *n* An agent that decreases the excretion of urine. 2. *adj* Of, or pertaining to, antidiuresis.

antidiuretic hormone VASOPRESSIN.

antidiuretin VASOPRESSIN.

antidotal agent ANTIDOTE.

antidotal therapy Therapy by means of antidotes.

antidote An agent that limits or reverses the effect of a poison.

anti-egg-white-injury factor BIOTIN.

antienzyme An antibody to an enzyme.

anti-fatty-liver factor LIPOCAIC.

antifoam A chemical substance added to liquid cultures of microorganisms to minimize foam formation during growth.

antifolate An antimetabolite of folic acid or of a derivative of folic acid. *Aka* antifolic acid agent.

antifreeze protein An unusual, extracellular glycoprotein that is found in the blood of some arctic and antarctic fish species. It contains a repeating sequence of alanine-alanine-threonine and has a disaccharide unit of D-galactosyl-N-acetyl-D-galactosamine attached to each threonine residue. The antifreeze protein depresses the freezing point of water, apparently because it inhibits the formation of ice crystals.

antigen A substance, frequently a protein, that can stimulate an animal organism to produce antibodies and that can combine specifically with the antibodies thus produced; called also complete antigen as distinct from a hapten. *Abbr* Ag.

antigen-antibody complex The generally insoluble molecular aggregate that is formed by the specific interaction of antigens and antibodies.

antigen-antibody lattice *See* lattice theory.

antigen-antibody reaction PRECIPITIN REACTION.

antigen binding capacity The total antibody concentration in an antiserum based on a determination of the amount of antigen bound by a given volume of the antiserum. *Abbr* ABC.

antigen-binding fragment FAB FRAGMENT.

antigen binding site One of at least two sites on the antibody molecule to which a complementary portion of an antigen, the antigenic determinant, becomes bound in the course of an antigen-antibody interaction; the active site of an antibody. *Aka* antibody combining site.

antigen-excess zone A zone in the precipitin curve of the antigen-antibody reaction in which the amount of antibody precipitated decreases with increasing amounts of antigen.

antigenic competition The decreases in the immune response to one antigen that is

produced by the administration of a second antigen.

antigenic conversion 1. The appearance of one or more specific antigens on cells that have been infected by a virus. *See also* conversion. 2. The expression of new cell surface antigens, and the cessation of the expression of other cell surface antigens, that is brought about by antibodies; a switch in gene activities. *Aka* serotype transformation.

antigenic deletion The cellular loss of antigenic determinants, or the masking of existing cellular antigenic determinants.

antigenic determinant That portion of the antigen molecule that is responsible for the specificity of the antigen in an antigen-antibody reaction and that combines with the antigen binding site to which it is complementary.

antigenic drift A change in the specificity of viral antigens as a function of time. This occurs, for example, in the case of influenza and AIDS viruses. As the human population becomes immune to infection by existing viral strains, there is an increased tendency for natural selection of other, slightly different, strains that can evade the human immune response. As a result, strains of slightly different antigenicity become established.

antigenic gain The cellular acquisition of new antigenic determinants, or the unmasking of existing cellular antigenic determinants.

antigenicity The capacity of an antigen to stimulate the formation of specific antibodies.

antigenic modulation The suppression of cell-surface antigens in the presence of homologous antibodies.

antigenic sin *See* doctrine of original antigenic sin.

antigen-presenting cell A cell that carries a foreign antigen which is then recognized by a helper T cell.

antigen template theory An instructive theory of antibody formation according to which antigens taken up by a cell serve as templates for the synthesis of antibodies by that cell. The antigens are considered to bind to ribosomes or to mRNA, thereby modifying translation so that antibodies are formed, the combining sites of which are complementary to the antigenic determinants of the bound antigens.

antigen tolerance IMMUNOLOGICAL TOLERANCE.

antigen valence The number of antigenic determinants per antigen molecule; an antigen molecule may have one valence with respect to one antibody and have a different valence with respect to another antibody.

antigibberellin A compound that binds to the same active site as the plant hormone

- giberellin; a competitive inhibitor of gibberellin.
- antiglobulin** An antibody formed against the antigenic determinant of a serum globulin molecule, usually an immunoglobulin.
- antiglobulin consumption test** A consumption test in which the binding of immunoglobulin with antigen is measured by subsequent consumption of added antiglobulin.
- antiglobulin method** INDIRECT FLUORESCENT ANTIBODY TECHNIQUE.
- antiglobulin test** COOMBS' TEST.
- anti-gray-hair factor** *p*-AMINOBENZOIC ACID.
- antihemophilic factor** An accessory protein that participates in the activation of Factor X in the intrinsic pathway of blood clotting. Controversy exists as to whether the antihemophilic factor is identical to Factor VIII or whether there are two distinct protein components that together define Factor VIII. *Abbr* AHF. *Aka* antihemophilic factor A; antihemophilic globulin; platelet cofactor I.
- antihemophilic factor B** CHRISTMAS FACTOR.
- antihemophilic factor C** PLASMA THROMBOPLASTIN ANTECEDENT.
- antihemophilic globulin** ANTIHEMOPHILIC FACTOR.
- antihemorrhagic vitamin** VITAMIN K.
- antihistamine** A drug that blocks the action of histamine and that is used in the treatment of immediate-type hypersensitivity.
- antihormone** 1. a substance that decrease or prevents the action of a hormone; a hormone antagonist. 2. An antibody to a hormone.
- anti-idiotypic antibody** An antibody formed in response to an idiotypic marker; an antibody against an idiotype. *See also* idiotype.
- anti-immunoglobulin antibodies** Antibodies that are produced in an animal in response to the administration of foreign antibodies.
- anti-infective vitamin** VITAMIN A.
- anti-insulin** A compound, such as a sex hormone or a corticosteroid, that decreases the activity of insulin.
- antilepton** *See* elementary particles.
- antilipotropic** Descriptive of a substance that has the capacity of diverting methyl groups from the synthesis of choline.
- antilogarithm** The antilogarithm of X is that number the logarithm of which is X . *Abbr* antilog.
- antilymphocyte globulin** The globulin fraction of antilymphocyte serum. *Abbr* ALG.
- antilymphocyte serum** A serum that contains antibodies to lymphocytes and that is used as an immunosuppressive agent. *Abbr* ALS.
- antimalarial** 1. *n* A drug used to prevent or treat malaria. 2. *adj* Preventing or curing malaria.
- antimer** ENANTIOMER.
- antimetabolite** A compound that competitively inhibits a specific enzymatic or other reaction in metabolism because of its similarity in structure to the natural metabolite that participates in the reaction. *See also* competitive inhibitor.
- antimicrobial spectrum** The types of microorganisms against which an antimicrobial drug is effective. *See also* sensitivity spectrum.
- antimitotic agent** A compound that inhibits mitosis.
- antimorph** 1. ENANTIOMER. 2. A mutant gene that has an effect opposite that of its corresponding wild-type gene.
- antimutagen** A substance that counteracts the action of a mutagen by decreasing the rate of induced, and occasionally of spontaneous, mutations.
- antimycin A** An antibiotic, produced by *Streptomyces griseus*, that inhibits the electron transport system between cytochromes b and c_1 .
- antineuritic factor** VITAMIN B₁.
- antinuclear factor** An antibody against a constituent of the cell nucleus. *Abbr* ANF. *Aka* antinuclear antibody.
- antioxidant** A substance, generally an organic compound, that is more readily oxidized than a second substance and hence can retard or inhibit the autoxidation of the second substance when added to it.
- antiparallel chains** 1. Two peptide chains running in opposite directions, with the one progressing from the C-terminal to the N-terminal, and the other progressing in the opposite direction. 2. ANTIPARALLEL STRANDS.
- antiparallel spin** The spin of two particles in opposite directions.
- antiparallel strands** Two polynucleotide strands running in opposite directions, with the one progressing from the 3'-terminal to the 5'-terminal, and the other progressing in the opposite direction.
- antiparticle** *See* elementary particles.
- antipellagra factor** NICOTINIC ACID.
- antipeptic ulcer factor** VITAMIN U.
- antipernicious anemia factor** VITAMIN B₁₂.
- antipode** OPTICAL ANTIPODE.
- antipolarity** The decrease that may occur in the synthesis of an enzyme if the enzyme is specified by a gene that precedes another gene that has undergone a polar mutation.
- antiport** The linked transport in opposite directions of two substances across a membrane. *See also* symport; uniport.
- antipromoter** A substance that counteracts the action of a promoter in carcinogenesis. It may act at the initiation stage by detoxifying a carcinogen or it may act at the promotion stage by, for example, inhibiting a protease that helps a tumor invade neighboring tissue. Several dietary factors are suspected of having

antipromoter activity. These include dietary fiber, vitamin A (or its precursor, beta carotene), vitamin C, vitamin E, the trace element selenium, and indoles, flavones, and isothiocyanates derived from cruciferous vegetables (such as broccoli, cabbage, and cauliflower, which belong to the Cruciferae family of plants).

antipurine A purine analogue; a purine or a purine nucleoside that is structurally similar to the natural compound and that acts as an antimetabolite in nucleic acid metabolism.

antipyrimidine A pyrimidine analogue; a pyrimidine or a pyrimidine nucleoside that is structurally similar to the natural compound and that acts as an antimetabolite in nucleic acid metabolism.

antiquark See elementary particles.

antirachitic vitamin VITAMIN D.

antirepressor INDUCER.

antiscorbutic factor VITAMIN C.

antisense strand CODING STRAND.

antiseptis The destruction and the prevention of growth of microorganisms causing disease, decay, or putrefaction.

antiseptic Of, or pertaining to, antiseptis.

antiserum A serum that contains antibodies and that has been obtained from an animal organism subsequent to its immunization with an antigen.

anti-sigma factor See antispecificity factor.

antispecificity factor A protein that antagonizes the action of a specificity factor and thereby prevents the initiation of transcription of a certain section of DNA. The protein, synthesized during the infection of *E. coli* by T4 phage, is an example; it prevents recognition of the promoter region by the sigma subunit of RNA polymerase and is, therefore, also known as an anti-sigma factor.

antisterility factor VITAMIN E.

antitermination A transcriptional control mechanism that applies to intercistronic termination sites present in some operons. In the presence of antitermination factors, RNA polymerase is able to bypass the termination site of a given proximal gene and continue transcription of the adjacent, distal gene.

antitermination factor A protein that functions in antitermination; it enables RNA polymerase to ignore the signals for the termination of transcription at specific sites along the DNA molecule. *Aka* antiterminator.

antithrombin A protein in blood that reacts with, and inhibits, thrombin, factor X, and factor VII to form inert enzyme-substrate intermediates.

antithyroid agent An agent that inhibits thyroid function by affecting the synthesis, release, or utilization of thyroxine or triiodothyronine.

antithyroid compound A goitrogenic compound; a goitrogen.

antitoxin An antibody to a toxin; an antibody capable of neutralizing a toxin.

antitranscription terminator ANTITERMINATION FACTOR.

antitrypsin An inhibitor of the enzyme trypsin that is also active against other proteases. Important antitrypsins are the soybean trypsin inhibitor, isolated from soybeans, and the α -1-antitrypsin (α -1-AT or α -AT), isolated from human serum.

antitumor antibiotic An antibiotic that arrests or reverses the growth of a malignant tumor.

antitumor antimetabolite An antimetabolite that arrests or reverses the growth of a malignant tumor.

antitumor enzyme An enzyme that inhibits tumor growth. Such enzymes either stimulate the degradation of amino acids that cannot be synthesized by tumor cells or stimulate reactions that lead to an inhibition of the synthesis of tumor-specific DNA.

antitumor protein A protein that inhibits tumor growth. The plant proteins abrin and ricin, which inhibit protein synthesis, and the bacterial protein neocarzinostatin (isolated from *Streptomyces*), which inhibits DNA synthesis, are examples. Neocarzinostatin also has antibiotic-like activity against gram-positive bacteria.

antiviral agent A synthetic compound that inhibits viral replication; a drug, designed to selectively inhibit viral-encoded or virus-induced enzymes without affecting the enzymes normally involved in similar biochemical processes of the host cell. See also acyclovir.

antiviral protein A protein, induced by interferon, that binds to ribosomes and inhibits the translation either of viral RNA or of the mRNA which is derived from viral DNA. *Abbr* AVP.

antivitamin A structural analogue of a vitamin; a vitamin antagonist that acts as a competitive inhibitor of a vitamin.

antixerophthalmic factor VITAMIN A.

antizyme A noncompetitive protein inhibitor of the enzyme ornithine decarboxylase which is a key enzyme in the biosynthesis of polyamines. Antizyme is induced by the addition of the polyamines spermine, spermidine, and putrescine to a variety of eukaryotic cell lines and rat liver preparations.

anucleate Lacking a nucleus.

anucleolate Lacking a nucleolus.

anucleolate mutation A mutation that produces a cell lacking the nucleolus organizer.

anuresis The failure or the inability to void urine that is formed but which is retained in the urinary bladder.

anuria The lacking or the defective excretion of urine due to a failure in the function of the kidneys.

AP Aminopurine.

APA Apurinic acid.

apamine A polypeptide of 18 amino acids that is the toxin of bee venom.

AP endonuclease An enzyme that cleaves phosphodiester bonds next to an AP site. Two types are known, cleaving the DNA at the 5'-end and at the 3'-end, respectively, of the AP site. Removal of the sugar phosphate moiety of the AP site, plus removal of several adjacent nucleotides, prepares the way for DNA repair by means of DNA polymerase and DNA ligase. *See also* uracil-N-glycosylase.

aperiodic polymer A polymer consisting of nonidentical repeating units.

aphasic lethal A mutation that becomes expressed randomly during the development of an organism and leads to its death.

apholate An aziridine mutagen that is used for the sterilization of insects.

aphorism of Clausius A combined statement of the first and second laws of thermodynamics: The energy of the universe is constant, but its entropy is increasing to a maximum.

aphthovirus A virus that belongs to a subgroup of picornaviruses which includes foot-and-mouth disease virus.

aplasia 1. The defective development of an organ or a tissue. 2. The absence of an organ or a tissue from the body.

apnea *See* drug-induced apnea.

apo- Combining form denoting the protein portion of a conjugated protein.

apocrine gland A gland that contributes a part of its cytoplasm to its secretion.

apoenzyme The protein portion of a conjugated enzyme.

apoferritin The protein component of ferritin.

apoinducer A protein that becomes bound to DNA and stimulates transcription by RNA polymerase.

apolar NONPOLAR.

apoplast The extracellular compartment of a plant consisting of all the cell walls, the xylem tubes, and the water contained in both. *See also* symplast.

apoprotein The protein component of a conjugated protein; used among others, to designate the lipid-free protein components of the various lipoprotein fractions.

apoprotein D CHOLESTEROL ESTER TRANSFER PROTEIN.

aporepressor A protein that is the product of a regulator gene and that, when combined with a corepressor, forms an active repressor which binds to the operator and inhibits transcription.

a posteriori Proved by induction; of, or pertaining to, (a) reasoning that derives principles from observed facts; (b) knowledge that cannot be acquired except by experience; (c) tests in which comparisons are unplanned and are made only after experimental results are obtained.

apparent competitive inhibition A competitive inhibition of enzyme activity in which the presence of the inhibitor on the enzyme affects the affinity of the enzyme for the substrate.

apparent equilibrium constant 1. An equilibrium constant based on molar concentrations rather than on activities. 2. An equilibrium constant calculated for a fixed pH for a reaction in which protons are produced; $K_{eq}/[H^+]$. *Sym* K' .

apparent specific volume The change in volume per gram of solute when a known weight of solute is added to a known volume of solvent.

approach to sedimentation equilibrium ARCHIBALD METHOD.

a priori Marked by deduction; of, or pertaining to, (a) consequences from definitions formed or principles assumed; (b) knowledge that can be acquired by reason alone; (c) tests in which comparisons are made on theoretical grounds before experimental results are obtained.

A protein 1. A protein (attachment protein) of single-stranded RNA phages. *Aka* maturation protein. 2. An experimentally produced oligomer of protein coat subunits of tobacco mosaic virus. 3. A protein subunit of the enzyme tryptophan synthetase. 4. A component of the enzyme lactose synthetase.

aprotic solvent A nonaqueous solvent that acts neither as a proton acceptor nor as a proton donor with respect to the solute; a nonhydroxylic solvent such as benzene, ether, and acetone.

APS Adenosine-5'-phosphosulfate.

AP site An apurinic or apyrimidinic site; that is, a site in a polynucleotide strand from which a purine or a pyrimidine has been removed.

APT Alum-precipitated toxoid.

aptitude The physiological state of a lysogenic bacterium that enables it, upon induction, to produce infectious phage particles.

APUD theory Acronym for amino precursor uptake and decarboxylation theory. A theory according to which the ectopic production of small peptide hormones by certain tumors correlates with the presence of cells (APUD cells) that are derived from common ancestral cells. These APUD cells can be identified by a set of shared biochemical properties including the ability to take up and store certain amine precursors (such as DOPA and 5-hydro-

xytryptophan) and to decarboxylate them to bioactive amines (such as catecholamines and serotonin). These amines are related in an unknown way to the secretion of ectopic hormones.

apurinic acid A DNA molecule from which the purines have been removed by mild acid hydrolysis. *Abbr* APA.

apyrase The enzyme that catalyzes the hydrolysis of ATP to AMP and two molecules of orthophosphate.

pyrimidinic acid A DNA molecule from which the pyrimidines have been removed by treatment with hydrazine.

aq Aqueous.

aquometry The quantitative determination of water.

aquated ion AQUO-ION.

aquation The formation of aquo-ions.

aqueous Of, or pertaining to, water. *Abbr* aq.

aqueous humor The clear fluid that fills the anterior chamber of the eye.

aqueous micelle *See* micelle.

aqueous phase separator centrifugation An interface centrifugation in which particles are selectively transferred from a crude aqueous solution to a short isodensity column; used for the purification of viruses.

aqueous solution A solution having water as its principal solvent.

aquo-ion A complex ion containing one or more water molecules.

AR Analytical reagent; denotes a chemical reagent for which either the actual or the maximum permissible concentrations of impurities are known.

Ara Arabinose.

araBAD A cluster of three genes that code for arabinose degradation and that form part of the arabinose operon.

araban A high-molecular weight, branched polysaccharide of arabinose that occurs in the hemicellulose of plants.

arabinan A homopolysaccharide of arabinose.

arabinose An aldose having five carbon atoms.

araC Cytosine arabinoside.

arachidic acid A saturated fatty acid that contains 20 carbon atoms.

arachidonic acid A 20-carbon noncyclic, unsaturated fatty acid that is the precursor of leukotrienes, prostaglandins, and thromboxanes; its systematic name is 5,8,11,14-eicosatetraenoic acid.

arachidonic acid cascade The series of enzymatic reactions that leads from arachidonic acid to the prostaglandins, thromboxanes, prostacyclin, and leukotrienes.

Araldite Trademark for a plastic used in electron microscopy for the embedding of tissues.

arbovirus An enveloped virus containing single-stranded RNA. Arboviruses multiply in

both vertebrates and arthropods, with the arthropods generally serving as vectors.

arc The line of antigen-antibody precipitate obtained in immunodiffusion and in immunoelectrophoresis.

archaeobacteria A class of unusual bacteria that, phylogenetically, are neither prokaryotes nor eukaryotes. They have some characteristics of prokaryotes (such as absence of a nucleus and cell organelles), some characteristics of eukaryotes (such as initiation of protein synthesis with methionine and ribosome insensitivity to chloramphenicol), and some characteristics that are unique to them (such as composition of the cell wall and the types of membrane lipids). Accordingly, the archaeobacteria are believed to represent a third primary kingdom such that three lines of descent lead from a common ancestor (progenote) to archaeobacteria, prokaryotes, and eukaryotes, respectively. Archaeobacteria include thermoacidophiles, extreme halophiles, and methanogens and may represent some of the earliest forms of living cells. *Var sp* archaeobacteria.

Archeozoic era One of the two subdivisions of the Precambrian era; the earliest period of geologic time and an era that is devoid of fossil remains. It extended over a period of about 600 million years and ended about 1.6 billion years ago.

Archibald method A centrifugal method for determining molecular weights and assessing size homogeneity of macromolecules that is generally performed in the analytical ultracentrifuge, using relatively low speeds of rotation. The method is based on applying sedimentation equilibrium criteria to both the meniscus and the bottom positions of the cell, and on measuring the curvature of the gradient curve at those positions.

arene An alkyl-substituted benzene.

Arg 1. Arginine. 2. Arginyl.

argentaffin cells Specialized cells that secrete gastrointestinal hormones and that have an affinity for silver stains.

argentation chromatography A chromatographic technique based on the rapid formation of loose complexes between silver ions in an adsorbent and the π electrons of double and triple bonds in the molecules being separated; the greater the extent of unsaturation in a molecule, the greater is the extent of complex formation, and hence the slower is the rate of chromatographic migration. The method is used particularly for the separation of lipids.

arginase The enzyme that catalyzes the hydrolysis of arginine to urea and ornithine in the urea cycle.

arginine An aliphatic, basic, and polar alpha

amino acid that contains the guanido group.

Abbr Arg; R.

arginine cycle UREA CYCLE.

arginine dihydrolase pathway An energy-generating pathway in some microorganisms; involves the conversion of arginine to ornithine and carbamoyl phosphate and use of the latter for the synthesis of ATP.

argininemia HYPERARGININEMIA.

arginine-rich histone An older term for histones H3 and H4.

arginine vasopressin A vasopressin molecule in which the eighth amino acid residue has been replaced by an arginine residue. *Abbr* AVP.

arginine vasotocin A vasotocin molecule in which the eighth amino acid residue has been replaced by an arginine residue.

argininosuccinic aciduria A genetically inherited metabolic defect in humans that is associated with mental retardation and that is characterized by a high blood concentration and a large renal excretion of argininosuccinic acid; due to a deficiency of the enzyme argininosuccinate lyase (argininosuccinase). *Aka* argininosuccinic acidemia.

argininosuccinuria ARGININOSUCCINIC ACIDURIA.

argon detector An ionization detector, employed in gas chromatography, in which argon is used to ionize the organic compounds being separated; useful for trace analysis of steroids, fatty acids, and related compounds of relatively high molecular weights.

arithmetic mean MEAN.

arithmetic growth LINEAR GROWTH.

arm A segment of the cloverleaf model of tRNA. It consists of a helical, hydrogen-bonded section (stem) and a section that is not hydrogen-bonded (loop). There are 4 or 5 arms per molecule: (a) amino acid arm; consists only of a stem, called the acceptor stem, to which the amino acid becomes covalently linked; (b) anticodon arm, which contains the anticodon; (c) dihydro U arm (DHU arm, D arm) which contains dihydrouracil; (d) T ψ C arm (pseudo-U arm, T arm) which contains pseudouridine (ψ); (e) variable arm (extra arm, S region) which consists only of a loop of variable length.

Aroclor Trademark for a mixture of polychlorinated biphenyls.

aromatase A microsomal enzyme system which catalyzes the conversion of testosterone to 17- β -estradiol by means of three successive hydroxylations. In this reaction, testosterone functions as a prohormone.

aromatic Of, or pertaining to, a carbocyclic organic compound that contains the benzene nucleus.

aromatic amino acid An amino acid that contains the benzene ring.

ARPES Angular resolved photoelectron spectroscopy.

Arrhenius activation energy *See* Arrhenius equation.

Arrhenius complex A catalyst-reactant complex for which the reversion to free catalyst plus reactant proceeds at a much faster rate than the conversion to free catalyst plus product. *See also* van't Hoff complex.

Arrhenius equation An equation relating the rate constant k of a reaction to the absolute temperature T ; specifically $\ln k = \ln A - E/RT$, where R is the gas constant, E is the activation energy of the reaction, and A is a constant known as the frequency factor, preexponential factor, or Arrhenius factor.

Arrhenius factor *See* Arrhenius equation.

Arrhenius plot A plot of the logarithm of the rate constant of a reaction versus the reciprocal of the absolute temperature; used for determining the activation energy of the reaction. *See also* Arrhenius equation.

arrow poison One of a group of natural toxins used to coat arrows, spears, and blowpipe darts. Among the compounds used are ouabain, other cardiac glycosides, and curare alkaloids.

arsenic An element that is essential to humans and animals. Symbol, As; atomic number, 33; atomic weight, 74.9216; oxidation states, +3, +5; most abundant isotope, ^{75}As ; a radioactive isotope, ^{76}As , half-life, 26.5 h, radiation emitted, beta particles.

arsenical An arsenic-containing compound; many have antimicrobial activity and some have been used as therapeutic agents.

arsenolysis The cleavage of a covalent bond of an acid derivative by reaction with arsenic acid H_3AsO_4 so that one of the products combines with the H and the other product combines with the H_2AsO_4 group of the arsenic acid.

artefact Variant spelling of artifact.

arterial Of, or pertaining to, arteries.

arteriole A small blood vessel; a small artery.

arteriosclerosis The hardening and calcification of the arteries.

artery A blood vessel that transports blood from the heart to the tissues.

arthropod-borne virus ARBOVIRUS.

Arthus reaction An allergic reaction characterized by skin inflammation in response to repeated subcutaneous injections of antigen; similar reactions can also be produced in tissues other than skin. The Arthus reaction may be active, passive, or reverse passive; *see* active, passive, and

reverse passive anaphylaxis for a definition of these terms.

artifact Any structure or substance that is not representative of the *in vivo* state of the specimen or of the makeup of the original sample but which is, instead, a result of the isolation procedure, the handling, or other factors.

artificial induction The induction of a prophase by a change in the conditions of the bacterial culture such that the immunity substance is either inactivated or not synthesized.

artificial kidney HEMODIALYZER.

artificial nitrogen fixation A synthetic reaction, such as the Haber process, that converts atmospheric nitrogen to ammonia.

artificial pH gradient A pH gradient formed by the layering of two or more buffers of different pH values; used originally for isoelectric focusing, but, since it changes with time upon the application of an electric field, is useful only for experiments of short duration.

aryl group An organic radical derived from an aromatic compound by loss of a hydrogen atom.

ascending boundary The electrophoretic boundary that moves upward in one of the arms of a Tiselius electrophoresis cell. *See also* Tiselius apparatus.

ascending chromatography A chromatographic technique in which the mobile phase moves upward along the support.

Aschheim-Zondek test A test for pregnancy based on the injection of urine, voided during the early stages of pregnancy and containing human chorionic gonadotropin, into immature female mice or rats. A positive test is indicated by ripening and rupture of the ovarian follicles.

ascites The abnormal accumulation of serous fluid in the abdominal cavity.

ascitic Of, or pertaining to, ascites.

Ascoli test 1. RING TEST. 2. A precipitin test for anthrax antigens.

ascorbic acid VITAMIN C.

ascus (*pl* asci) A microscopic, sac-like, structure that encases the spores of some fungi.

-ase Combining form denoting an enzyme.

asepsis 1. The prevention of access of microorganisms causing disease, decay, or putrefaction to the site of a potential infection. 2. A state of sterility.

aseptic Of, or pertaining to, asepsis.

A-site AMINOACYL SITE.

A-site-P-site model The model of translation according to which a ribosome possesses two binding sites; the aminoacyl-, or A-, site binds

the incoming aminoacyl-tRNA and the peptidyl-, or P-, site binds the peptidyl-tRNA subsequent to the addition of each new amino acid to the growing polypeptide chain.

Asn 1. Asparagine. 2. Asparaginyl.

Asp 1. Aspartic acid. 2. Aspartyl.

asparagine An aliphatic, polar alpha amino acid that is the amide of aspartic acid. *Abbr* Asn; AspNH₂; N.

aspartame A dipeptide, L-aspartyl-L-phenylalanine methyl ester, used as an artificial sweetener; called Nutrasweet when it is an ingredient in a product and Equal when it is sold as a sugar substitute.

aspartate transcarbamoylase A regulatory enzyme that catalyzes the first step in the biosynthesis of the pyrimidines in which *N*-carbamoyl aspartic acid is formed from carbamoyl phosphate and aspartic acid. The enzyme consists of two classes of subunits referred to as catalytic and regulatory subunits. *Var sp* aspartate transcarbamylase; *Abbr* ATCase.

aspartic acid An aliphatic, acidic, and polar alpha amino acid. *Abbr* Asp; D.

aspartic semialdehyde A derivative of aspartic acid in which only one of the two carboxyl groups has been converted to an aldehyde group.

aspirin Acetylsalicylic acid, an analgesic.

AspNH₂ Asparagine.

asporogenous mutant A mutant that is unable to form spores. *Aka* asporogenic mutant.

assay A measurement of either the concentration or the activity of a substance. *See also* enzyme assay.

assembly *See* self-assembly.

assimilation The conversion of nutrients by an organism into intra- and extracellular compounds utilized by that organism.

assimilation time The average time required for the reduction of one molecule of carbon dioxide by a molecule of chlorophyll when a plant is exposed to bright light.

assimilation transfer The penetration of a protein, either partially or totally, into a membrane such that the protein remains lodged in, and becomes a functional component of, the membrane; may involve cotranslational or post-translational transfer.

assimilatory reduction The process in plants whereby sulfate and nitrate, after reduction, are assimilated into cellular organic compounds. *See also* dissimilatory reduction.

association colloid A surface-active agent that tends to aggregate and to form micelles in solution.

association constant 1. The equilibrium constant for the formation of a more complex compound from simpler components, as the

association of a proton and an anion to form an acid. 2. The equilibrium constant for the formation of a complex containing one or more macromolecules, as the binding of an inhibitor to an enzyme, or the binding of an antigen to an antibody. *See also* affinity constant.

associative recognition A mechanism of T lymphocyte activation in which there is simultaneous binding to the cell of an antigen in association with another structure; the latter is normally a cell surface alloantigen coded for by the major histocompatibility complex. *See also* dual recognition.

Astrup method A method for determining the acid-base balance of blood by measuring the pH of blood, collected to avoid CO₂ loss, and then remeasuring the pH after equilibrating the blood with a rather high partial pressure of CO₂.

Asx The sum of aspartic acid and asparagine when the amide content is either unknown or unspecified.

asymmetric 1. Lacking symmetry; unsymmetric. 2. Descriptive of a molecule that is totally lacking in symmetry as contrasted with a disymmetric one. 3. Descriptive of an elongated macromolecule, the shape of which differs significantly from that of a sphere.

asymmetric carbon A carbon atom to which are attached four different substituents; a chiral carbon. *See also* chirality.

asymmetric center An asymmetric carbon atom or one of several identical asymmetric carbon atoms in a molecule.

asymmetric strand-transfer model A model for genetic recombination that is similar to the Holliday model and that is based on an initial asymmetric pairing of DNA strands.

asymmetric synthesis The synthesis of only one of two optical isomers; generally the case for enzymatic, but not for nonenzymatic, reactions.

asymmetric transcription The normal mode of in vivo RNA synthesis in which only one of the two complementary DNA strands of any double-helical segment is being transcribed.

asymmetric unit The smallest part of a structure which, when operated on by symmetry elements, will reproduce the complete structure. The asymmetric unit is equal to, or smaller than, the unit cell.

asymmetry effect The decrease in the electrophoretic mobility of a protein that is brought about by the cloud of counterions. The protein is believed to move along an irregular path and at every change in position, the counterion cloud is temporarily left behind, thereby setting up an opposing

electric field which leads to a decrease in the mobility of the protein. *See also* electrophoretic effect.

asymmetry factor SHAPE FACTOR.

asymmetry potential 1. The potential across two permselective membranes (M₁ and M₂) which are separated by a concentrated polyelectrolyte solution (B), and which have another, but identical, electrolyte solution (A) on the other side of each membrane (i.e., A-M₁-B-M₂-A). 2. The potential of a membrane electrode, such as the glass electrode, that arises from slight imperfections in the membrane.

asymmetry ratio The sum of the concentrations of adenine and thymine divided by the sum of the concentrations of cytosine and guanine for a given DNA; the concentrations are expressed in terms of mole percent.

asynchronous growth The growth of cells that are randomly distributed with respect to their stage in cell division.

asynchronous muscle A muscle that yields a number of contractions for every motor nerve impulse that it receives.

ATA Aurintricarboxylic acid.

atactic polymer A polymer in which the R groups of the monomer are randomly distributed on both sides of the plane that contains the main chain.

ATCase Aspartate transcarbamoylase.

AT content *See* GC content.

A + T/G + C ratio ASYMMETRY RATIO.

atherogenesis The development of atherosclerosis; the formation of atheromas.

atherogenic Having the capacity to initiate, or to increase, the process of atherogenesis.

atheroma 1. A lipid-containing deposit in arteries undergoing hardening. 2. ATHEROSCLEROSIS.

atheromatous Of, or pertaining to, atheromas.

atherosclerosis A disease of the arteries, characterized by a gradual accumulation of cholesterol, cholesterol esters, collagen, elastic fibers, and proteoglycans in the arterial wall. Cholesterol and cholesterol esters are major components of atherosclerotic lesions (plaques). An increased level of plasma cholesterol and an increase in the major cholesterol-carrying lipoprotein (LDL) are associated with an increased risk of atherosclerosis. A primary cause of atherosclerosis appears to be a deficiency of LDL membrane receptors. As a result, LDL particles are not removed efficiently from the blood and, therefore, have increased chance of invading the lining of the arteries and participating in plaque formation.

athymic mice NUDE MICE.

Atmungsferment CYTOCHROME OXIDASE.

atom The smallest part of an element that is capable of undergoing a chemical reaction and that is chemically indestructible and indivisible; a structural unit of matter that remains unchanged in chemical reactions except for the loss or gain of electrons.

atom beam scattering A technique for the study of surfaces in which a beam of low-energy noble gas atoms is used to probe the surface. The noble gas atoms, striking the surface, are diffracted. Measurements of the angles of diffraction provide information on the structure and periodicity of ordered surface layers.

atomic absorption spectrophotometry A sensitive analytical method for the spectrophotometric determination of elements; based on a measurement of the radiation absorbed by unexcited, nonionized, and ground-state atoms which are produced when compounds are dissociated into atoms by means of a flame. *Abbr* AAS.

atomic mass The mass of a neutral atom expressed in terms of atomic mass units.

atomic mass unit One-twelfth of the mass of the carbon isotope ^{12}C , and equal to 1.661×10^{-24} g; prior to 1961 the atomic mass unit was defined as one-sixteenth of the mass of the oxygen isotope ^{16}O . *Abbr* amu. *See also* atomic weight unit; dalton.

atomic number The number of protons in the nucleus of an atom which is also equal to the number of orbital electrons surrounding the nucleus of the neutral atom. *Sym* Z.

atomic orbital The orbital of an electron about the nucleus of an atom.

atomic radius The distance between the nucleus and the outermost electron shell of an atom. *See also* van der Waals radius.

atomic weight The average weight for the neutral atoms of an element, existing as a mixture of isotopes identical to that found in nature; expressed in atomic mass units.

atomic weight unit One-twelfth of the mass of the carbon isotope ^{12}C , and equal to 1.661×10^{-24} g; identical to the atomic mass unit. Prior to 1961 the atomic weight unit was defined as one-sixteenth of the average mass of the oxygen isotopes weighted in the same ratio as they occur in nature. *Abbr* awu.

atomizer A spraying device for breaking up a solution into fine droplets.

atom percent excess A measure of the concentration of a stable isotope expressed in terms of the excess, in percent of atoms, of the isotope over its natural abundance.

atom smasher ACCELERATOR.

atopic Of, or pertaining to, atopy.

atopic reagin REAGIN.

atopy An immediate-type hypersensitivity,

such as asthma or hay fever, that is due to the production of reagins and that tends to occur as an inherited tendency.

ATP 1. Adenosine triphosphate. **2.** Adenosine-5'-triphosphate.

ATP-ADP carrier The inner mitochondrial membrane system that couples the outward translocation of ATP (formed via oxidative phosphorylation) to the inward movement of ADP (formed by ATP hydrolysis in the cytosol); an electrogenic pump and active transport system that is inhibited by bongkreikic acid and atractyloside.

ATP-ADP cycle The sum of the reactions by which (a) ADP is converted to ATP by means of the energy derived from food in the course of catabolism, and (b) ATP is hydrolyzed to ADP with the release of energy which is used to drive the energy-requiring reactions of an organism.

AT pair An adenine-thymine base pair.

ATPase Adenosine triphosphatase.

ATPase-linked pump PRIMARY ACTIVE TRANSPORT.

ATP regenerating system An enzymatic system for the synthesis of ATP from ADP that is used in cell-free amino acid incorporation experiments for replenishing the ATP that is used up in the course of amino acid activation. The system consists either of phosphocreatine and creatine kinase or of phosphoenolpyruvate and pyruvate kinase.

ATP synthase COMPLEX ν (F_1F_0 -ATPase). *See also* H^+ -ATPase.

atractyloside A toxic glycoside that inhibits the ATP-ADP carrier system of the inner mitochondrial membrane.

atractyloside barrier The block to adenine nucleotide transport across the inner mitochondrial membrane that is produced by atractyloside.

atrial natriuretic factor A peptide hormone, secreted by the heart, that lowers blood pressure and acts as a diuretic. *Abbr* ANF.

atrophy The reduction in size of a tissue or an organ as a result of nutritional deficiencies and/or decreased functional activity.

atropine A tropane alkaloid that inhibits muscarinic receptors and acts like decamethonium.

attachment site *See* prophage attachment site.

attenuate 1. To decrease the virulence of a bacterium or a virus. 2. To decrease the intensity of a beam of radiation by passage of the beam through matter. 3. To terminate transcription prematurely.

attenuation A proposed mechanism of control in some bacterial operons which results in premature termination of transcription and which is based on the fact that, in bacteria,

transcription and translation can and do proceed simultaneously. Attenuation involves a provisional stop signal (attenuator), located in the DNA segment that corresponds to the leader sequence of mRNA. During attenuation, the ribosome becomes stalled in the attenuator region in the mRNA leader. Depending on the metabolic conditions, the attenuator either stops transcription at that point or allows read-through to the structural gene part of the mRNA and synthesis of the appropriate protein.

attenuator A nucleotide sequence in DNA that can lead to premature termination of transcription. *Aka* attenuator region. *See also* attenuation.

atto- Combining form meaning 10^{-18} and used with metric units of measurement. *Sym a.*

att site ATTACHMENT SITE.

A-type particles One of two types of particles (A and B) seen in electron microscope preparations of mouse mammary tumors. The A particles are intracellular particles from which viral particles (B particles) develop. *See also* B-type particles.

atypical insulin INSULIN-LIKE ACTIVITY.

AU Angstrom unit.

Auger effect The process whereby an orbital electron passes from an excited to a lower energy level and thereby produces an x ray that collides with, and ejects, an orbital electron (Auger electron); subsequent to the ejection of the electron, the x ray escapes from the sphere of influence of the atom.

Auger electron *See* Auger effect.

aureomycin *See* tetracyclines.

AU-rich DNA DNA-LIKE RNA.

aurintricarboxylic acid An inhibitor of the initiation of protein synthesis in both prokaryotic and eukaryotic systems; it inhibits the binding of mRNA to the small ribosomal subunit. *Abbr* ATA.

aurosomes A gold-containing, electron-dense lysosomal organelle; it is artificially induced in cultured animal cells that have been administered gold complexes.

Australia antigen An antigen in the serum of individuals suffering from type B viral hepatitis; the antigen shows up as a virus-like particle in electron micrographs and was originally detected in the serum of an Australian aborigine. It constitutes part of the Dane particle which is believed to be the virus responsible for type B hepatitis. *See also* hepatitis.

autacoids A group of substances that occur naturally in the body, resemble hormones or drugs in their activity on cells, and act on restricted areas within the body. Histamine, serotonin, angiotensin, and the prostaglandins

are some examples. Hormones and chalone (2) are sometimes referred to as excitatory and inhibitory (restraining) autacoids, respectively. *Aka* local hormones.

autarky Self-sufficiency as opposed to parasitic existence.

autoallergic disease AUTOIMMUNE DISEASE.

autoallergy Allergy to autoantigens.

autoanalyzer An instrument for the automated analysis of elements and compounds. The instrument consists of automated devices that replace such manual steps as the pipetting of reagents, the preparation of protein-free filtrates, and the heating of solutions for the development of colors.

autoantibody An antibody that is formed in an individual in response to antigens of the same individual.

autoantigen An antigen that is a normal constituent of an individual and that has the capacity of producing an immune response against itself in the same individual.

autocatalysis The phenomenon in which the product of a reaction serves as a catalyst for the reaction that forms the product so that the velocity of the reaction keeps increasing with time.

autocatalytic Of, or pertaining to, autocatalysis.

autocatalytic induction A self-accelerating enzyme induction as that occurring when (a) an inducer induces both an enzyme and a transport system that actively transports the inducer, or (b) an enzyme is induced by the product of the reaction that it catalyzes.

autochthonous Originating or formed in the place where found; said of a disease or a tumor that originated in that part of the body in which it is found.

autocide A substance produced by bacteria, that is bactericidal to the producing and closely related strains, but that has no activity against other bacteria.

autoclave An instrument for sterilizing materials in an airtight chamber by the use of steam at high pressure.

autocoid Variant spelling of autacoid.

autocoupling hapten A reactive low molecular weight compound, such as a diazonium salt or an acid anhydride, that, when injected into an animal, will combine with tissue antigens to form hapten-antigen compounds which then lead to the formation of antibodies.

autocrine hormone A substance, such as interleukin 2, that acts on the same cells that released it.

autocrine hypothesis A theory of carcinogenesis according to which cell transformation is linked to growth factors. Most normal cells are considered to be controlled by

growth factors produced by other cells. A cancerous (transformed) cell, on the other hand, is considered to be one that somehow develops the ability both to make growth factors and to respond to them (have receptors for them).

autocytolysis AUTOLYSIS.

autofluorescence The fluorescence of tissues that is due to molecules naturally present in the tissues and that is unrelated to the treatment of the tissues with fluorochromes. *See also* intrinsic fluorescence.

autogenous AUTOLOGOUS (1).

autogenous control A genetic regulatory mechanism in which a gene is regulated by its own product. In positive autogenous control, the product enhances the activity of the gene, and in negative autogenous control, the product inhibits the activity of the gene. An example of autogenous control would be the coding of the repressor protein in enzyme induction by a gene that is part of the operon itself; thus, the repressor regulates the rate of transcription of its own mRNA. *Aka* autogenous regulation; autoregulation.

autogenous vaccine A vaccine made from the microorganisms that have infected an individual and then used to reinoculate the same individual.

autograft A transplant from one site to another in the same individual.

autoimmune complement fixation A complement fixation test in which both the antigens and the antibodies are derived from the same individual. *Abbr* AICF.

autoimmune disease A disease produced by an autoimmune response.

autoimmune response 1. The formation of antibodies to autoantigens. 2. The allergic response produced by the injection of autoantibodies.

autoimmunity The immune reactions in an individual in which both the antigens and the antibodies are derived from that individual.

autoinduction The induction of a drug-metabolizing enzyme by the chronic administration of that drug.

autointerference The decrease in viral multiplication in animal cells that are infected with a large dose of virus particles as compared to the extent of viral multiplication in cells that are infected with a small dose. The effect is due to the appreciable concentration of interferon that is produced when the cells are infected with the larger viral dose.

autointoxication theory The theory that psychoses and other mental diseases are caused by the endogenous production of toxins.

autologous 1. Derived from the same

organism. 2. Designating a transplant from one site to another in the same individual.

autolysate The suspension of broken cells obtained upon autolysis. *Var sp* autolyzate.

autolysin An autolytic enzyme; an endogenous enzyme that functions in autolysis.

autolysis The self-destruction of a cell as a result of the action of its own hydrolytic enzymes.

autolysosome An organelle formed by fusion of an autophagosome with teleolysosomes.

autolytic Of, or pertaining to, autolysis.

automatic buret A buret that is connected to a reservoir of liquid and that is automatically refilled after delivery of a given volume of liquid; used for the repeated delivery of a fixed volume of liquid.

automutagen A compound that is produced by the metabolic reactions of an organism and that is mutagenic for the same organism.

autonomous Existing and functioning independently; said of a tumor cell that is free of host control, or of an episome that replicates independently of the chromosome.

autonomous controlling element A controlling element that appears to have functions corresponding to both receptor elements and regulator elements. *See also* controlling element.

autooxidation Variant spelling of autoxidation.

autophagic Self-digesting.

autophagic vacuole A secondary lysosome that contains intracellular membranes or organelles, such as mitochondria or secretory vesicles.

autophagolysosome A subcellular organelle formed by fusion of an autophagic vacuole with a primary lysosome.

autophagosome A vacuole into which cytoplasmic components of uncertain identity have been sequestered; a phagosome formed by autophagy. Such organelles have been observed in rat liver cells.

autophenic Descriptive of a phenotype that is due to the mutant makeup of the cells showing the phenotype.

autoprothrombin I PROCONVERTIN.

autoprothrombin II CHRISTMAS FACTOR.

autoprothrombin III STUART FACTOR.

autoradiogram The photographic record of a chromatogram that contains radioactively labeled compounds; prepared by exposing a sensitive photographic film to the radioactive radiation by placing it in contact with the chromatogram.

autoradiograph The photographic record obtained in autoradiography.

autoradiographic efficiency The number of activated silver grains produced in a photographic emulsion, in contact with a labeled

tissue section, per 100 radioactive disintegrations occurring in that tissue section during the exposure interval.

autoradiography A technique for studying the location of radioactive isotopes in macromolecules and in larger structures. The material to be studied is labeled with a radioactive isotope and is placed in contact, in the dark, with a photographic film or a photographic emulsion; the latent image produced by the radioactive radiation is subsequently developed.

autoretardation The phenomenon whereby the rate of an endonuclease-catalyzed hydrolysis of a nucleic acid decreases as the high molecular weight nucleic acid is broken down to smaller fragments.

autoregulation AUTOGENOUS CONTROL.

autosome Any chromosome that is not a sex (X or Y) chromosome.

autosynthetic cell A cell-like structure obtained by combining lipid and protein extracts of the brain.

autotroph A cell or an organism that uses carbon dioxide as its sole carbon source, and that synthesizes all of its carbon-containing biomolecules from carbon dioxide and other small inorganic molecules.

autoxidation The oxidation of a compound by air alone.

auxanographic method A method for identifying growth factors of microorganisms; involves inoculating the surface of a solid basal or minimal medium with the organism to be tested, followed by discrete application of various carbon sources, vitamins, or other substances.

auxesis The growth in size that results from an increase in cell volume without an increase in cell number, that is, in the absence of cell division.

auxiliary enzyme An enzyme that is added to a reaction mixture to assay a second enzyme that is not readily assayed directly. The auxiliary enzyme converts the product, formed by the second enzyme, quantitatively to a substance that can be determined by some analytical technique. The entire system is known as a coupled assay.

auxiliary pigment ACCESSORY PIGMENT.

auxiliary protein of DNA polymerase δ CYCLIN.

auxin One of a group of plant hormones, such as indoleacetic acid, that promote cell enlargement, chromosomal DNA synthesis, and growth along the longitudinal axis of a plant.

auxocarcinogen An auxiliary group of atoms in the molecule of a chemical carcinogen that influences the activity of the carcinophore.

auxochrome A group of atoms that, when

attached to a molecule containing a chromophore, intensifies the color of the chromophore.

auxotroph A mutant microorganism that has a block in a metabolic pathway as a result of either the lack of an enzyme or the presence of a defective enzyme. Such mutants require for their growth either the product of the blocked enzymatic reaction or other metabolites that are not required by the wild-type organism.

avalanche See Townsend avalanche.

average MEAN.

average affinity AVERAGE INTRINSIC ASSOCIATION CONSTANT.

average binding number The average number of ligands bound per molecule of protein; equal to the number of moles of bound ligand divided by the number of moles of total protein. *Sym v.*

average deviation The average of the absolute deviations for a set of measurements regardless of the signs of the individual deviations.

average intrinsic association constant The value of the association constant for the binding of a given antigen by the corresponding antibodies that is determined for the case when one-half of all the antibody sites are occupied by the antigen. *Sym K_0 . See also* heterogeneity index.

average life The average length of time that a radioactive atom exists before it disintegrates; the average life is equal to the reciprocal of the decay constant.

average molecular weight The value of the molecular weight that is determined for a sample consisting of a mixture of molecules. The type of average molecular weight obtained depends on the physical method used in studying the molecules. *See also* number average molecular weight; weight average molecular weight; *Z*-average molecular weight; viscosity average molecular weight.

average radius of gyration The value of the radius of gyration that is based on all the different conformations that a molecule may assume; specifically, $R_G = (\bar{R}^2)^{1/2}$, where R_G is the average radius of gyration and \bar{R}^2 is the average of the squares of all possible radii of gyration.

avian Of, or pertaining to, birds.

avian leukosis virus An RNA-containing virus that produces leukemia in chickens and that belongs to the group of leukoviruses.

avian myeloblastosis virus An oncogenic RNA virus.

avian polypeptide PANCREATIC POLYPEPTIDE.

avian sarcoma virus ROUS SARCOMA VIRUS.

avidin A protein in raw egg white that

combines tightly with the vitamin biotin; when fed to an animal, avidin can produce symptoms of biotin deficiency.

avidity 1. The tendency of an antibody to bind antigen; measured by the rate of the binding reaction. 2. AFFINITY (2).

avirulent Not virulent.

A virus See oncornavirus; hepatitis.

avitaminosis HYPOVITAMINOSIS.

Avogadro's number 1. The number of molecules in a gram-molecular weight of a compound; denoted by the symbol N and equal to 6.023×10^{23} . 2. The number of atoms in a gram-atomic weight of an element; denoted by the symbol N and equal to 6.023×10^{23} .

AVP 1. Antiviral protein. 2. Arginine vasopressin.

awu Atomic weight unit.

axenic Descriptive of the condition in which an organism of a given species grows in the complete absence of organisms from other species. The growth of a pure culture and of a germ-free animal are examples of axenic growth.

axenic animal GERM-FREE ANIMAL.

axerophthal VITAMIN A ALDEHYDE.

axerophthol VITAMIN A.

axial bond A bond in a molecule having a ring structure that is at right angles to the plane of the ring.

axial ratio The ratio, for an ellipsoid of revolution, of the axis of revolution to the axis perpendicular to it. The axial ratio is an indication of the overall asymmetry of a macromolecule, since a macromolecule in solution is approximated by an equivalent ellipsoid of revolution.

axial substituent A substituent attached to an axial bond.

axis of rotational symmetry An axis of symmetry such that rotation of a body about it will yield one or more structures that are identical to the structure before rotation. The axis is an n -fold axis and is denoted C_n if the identical structure is produced by a rotation of $360/n$ degrees, or $1/n$ of a turn.

axis of symmetry An imaginary axis through a symmetrical body.

axon The long process of a nerve cell that generally conducts impulses away from the nerve cell body.

axoneme A bundle of microtubules in cilia and flagella of unicellular eukaryotic organisms.

axoplasm The cytoplasm of an axon.

5-azacytidine A pyrimidine analogue that, when incorporated into newly synthesized DNA, can turn on certain genes and lead to the synthesis of the corresponding proteins.

8-azaguanine A purine analogue that retards the growth of some cancers.

azaserine An antibiotic, either produced by a species of *Streptomyces* or prepared synthetically, that inhibits purine biosynthesis and leads to chromosomal aberrations.

azathioprene An immunosuppressive drug.

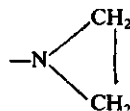
6-azauracil A pyrimidine analogue; consists of uracil in which a carbon atom of the ring has been replaced by a nitrogen atom.

azeotrope A mixture of two or more liquids that has a constant boiling point and that is distilled without a change in composition. The boiling point of the mixture is below the boiling points of the component liquids.

azide The grouping $N=N=N^-$ (N_3^-); azide is an inhibitor of the electron transport system where it prevents the reduction of the oxidized a_3 component of cytochrome oxidase. Sodium azide is an antimicrobial agent used as a preservative of laboratory reagents.

azide group The grouping $-N=N=N^-$.

aziridine mutagen A chemical mutagen that contains the aziridiny group (shown below) and that functions as an alkylating agent.



azo compound A compound containing the azo group.

azo dye A dye that contains the azo group.

azo-dye protein AZOPROTEIN.

azoFd Azoferradoxin; see nitrogenase.

azofer See nitrogenase.

azofermo See nitrogenase.

azoferradoxin See nitrogenase.

azo group The grouping $-N=N-$.

azoic Without life, particularly in reference to geologic periods antedating life on earth.

azoprotein A modified protein in which a tyrosine residue has been coupled to an aromatic diazo compound.

azotobacter A genus of nonsymbiotic, nitrogen-fixing bacteria that is found in soil and water.

azotoflavin A flavodoxin that functions as an electron carrier in nitrogen fixation in *Azotobacter vinelandii*.

azure B A metachromatic dye used in cytochemistry.

azurin 1. A low molecular weight, blue, copper-containing, bacterial protein, believed to function in respiration as an electron carrier in an electron transport chain. 2. A solution of copper sulfate and ammonium hydroxide used in agriculture as an antifungal agent.

B

- b** Subscript denoting the less active form of an interconvertible enzyme.
- B** 1. The sum of aspartic acid and asparagine when the amide content is either unknown or unspecified. 2. Boron. 3. 5-Bromouridine.
- bacillus** (*pl* bacilli). 1. A bacterium having a cylindrically or rod-shaped cell; bacilli represent one of the three major forms of bacteria. *See also* coccus; spirillum. 2. A bacterium belonging to the genus *Bacillus*.
- bacitracin** A cyclic peptide antibiotic produced by *Bacillus subtilis* and *Bacillus licheniformis*; it inhibits peptidoglycan biosynthesis.
- backbone** The chain structure of a polymer from which the side groups, and/or the side chains, project.
- background** 1. The counts of radioactivity registered by a radiation detector in the absence of a radioactive sample; such counts are caused by cosmic radiation, instrument noise, radioactive contamination, and other factors. 2. The appearance of a chromatogram, an electropherogram, or an electron micrograph in areas that are devoid of sample substances.
- background constitutive synthesis** The occasional transcription of genes in a repressed operon; brought about by the temporary dissociation of the repressor from the DNA which permits the binding of RNA polymerase to the promoter and the initiation of transcription. *Aka* basal synthesis; sneak synthesis.
- back mutation** REVERSION (1).
- backscattering** *See* backward scattering.
- backside displacement** S_N2 MECHANISM.
- back titration** The titration of the reagent left after an excess of the reagent has been added to the solution and has been allowed to react with it.
- backward flow** The flow of the solvent of a solution of macromolecules that occurs in a closed vessel and that is in a direction opposite to the direction of movement of the macromolecules.
- backward flow interface centrifugation** Interface centrifugation, used for cells, bacteria, and viruses, in which the interface is displaced according to the hydrodynamic volume of the particles.
- backward scattering** The scattering of radiation in the direction of the beam of radiation and toward the source of the radiation.
- bacteremia** The presence of viable bacteria in the blood.
- bacteria** *See* bacterium.
- bacterial** Of, or pertaining to, bacteria.
- bacterial ferredoxin** *See* iron-sulfur protein.
- bacterial nucleus** NUCLEOID.
- bacterial toxin** *See* endotoxin; exotoxin.
- bacterial-type ferredoxin** *See* iron-sulfur protein.
- bacterial virus** BACTERIOPHAGE.
- bactericidal agent** BACTERICIDE.
- bactericide** An agent that kills bacteria.
- bacterifactor** The production of desired materials by bacteria such as the production of specific proteins following the insertion of recombinant DNA into bacteria.
- bacterin** A vaccine consisting of dead pathogenic bacteria.
- bacteriochlorin** A specific porphyrin structure; 7,8,17,18-tetrahydroporphyrin.
- bacteriochlorophyll** The chlorophyll of photosynthetic bacteria; it differs from chlorophyll *a* of plants in having one of the pyrrole rings in a more reduced form and having a vinyl group replaced by an acetyl group.
- bacteriocidal** Variant spelling of bactericidal.
- bacteriocin** A protein produced by one bacterium that is toxic for another bacterium; a bacteriocin differs from an antibiotic in being a protein, having a narrower microbial spectrum, and generally being much more potent. The synthesis of bacteriocins is controlled by plasmids.
- bacteriocin factor** BACTERIOCINOGEN.
- bacteriocinogen** The plasmid that controls the formation of a bacteriocin.
- bacteriology** The science that deals with studies of bacteria.
- bacteriolysin** An antibody capable of leading to the dissolution of bacterial cells in the presence of complement.
- bacteriolysis** The lysis of bacterial cells.
- bacteriolytic** Of, or pertaining to, bacteriolysis.
- bacteriophage** A virus that infects bacteria and multiplies in them. *Aka* bacterial virus; phage. *See also* virus.
- bacteriophage packaging** The introduction of phage DNA into a bacterial cell for replication and encapsidation to form infective phage particles; used specifically for the introduction of phage lambda DNA into *E. coli* cells.
- bacteriorhodopsin** The sole protein component

- of the purple membrane of *Halobacterium halobium*; so called because it contains a retinal prosthetic group much as the rhodopsin of animals. Bacteriorhodopsin is a large protein that spans the membrane seven times, with each segment being a helix, and that functions as a light-driven transmembrane proton pump. It is an inside-out protein, having polar amino acids in the interior of the helix and nonpolar ones on the outside. *See also* purple membrane.
- bacteriostatic agent** An agent that prevents the growth of bacteria without killing the cells.
- bacteriotropic index** OPSONIC INDEX.
- bacteriotropin** IMMUNE OPSONIN.
- bacteristasis** The prevention of bacterial growth without killing the bacterial cells.
- bacteristat** BACTERIOSTATIC AGENT.
- bacteristatic** Variant spelling of bacteriostatic.
- bacterium** (*pl* bacteria). A minute, unicellular prokaryotic organism that is classified as a lower protist; bacteria occur in soil, water, and air and as symbionts, parasites, or pathogens of humans and other animals, plants, and other microorganisms.
- bacteroid** A bacterium-like cell; used, for example, to describe morphologically differentiated, nonmotile, nonviable derivative cells of *Rhizobium* in root nodules of leguminous plants.
- bactogen** CHEMOSTAT.
- bactoprenol** A long-chain, lipid-soluble, membrane-bound polyisoprenyl alcohol that consist of 11 isoprene units. It functions as a carrier in the biosynthesis of some bacterial polymers such as peptidoglycan and lipopolysaccharides, presumably by facilitating transfer of sugar nucleotides across the cell membrane.
- baker's yeast** One of several strains of yeast belonging to the species *Saccharomyces cerevisiae* and capable of rapid fermentation in dough under low oxygen tension.
- BAL** British anti-Lewisite.
- balanced fermentation** Fermentation in which there is no net oxidation or reduction of a substrate. Involves splitting of the substrate into two fragments such that electrons can be transferred from one to the other with a sufficiently negative free energy change to drive ATP synthesis.
- balanced growth** The growth of cells such that all of the cellular components increase by the same factor and that the overall composition of the cells remains constant. A given increase in the concentration of protein, DNA, RNA, lipid, or some other macromolecule is coincident with the same increase in the mass and number of cells.
- balance study** A study of the overall metabolism of a substance in an organism that is based on a determination of the amount of the substance ingested and of the amount of the same substance, or of its metabolic products, excreted; such a study indicates whether there is a net gain or loss of the substance by the organism.
- BALB/c mice** An inbred strain of white mice that develop myeloma following intraperitoneal injection of mineral oil, complete Freund's adjuvant, or other substances.
- Balbiani ring** A loop-like structure in polytene chromosomes that is formed by extremely large chromosomal puffs.
- bal 31 exonuclease** An exonuclease from *Brevibacterium albidum* that catalyzes the successive removal of nucleotides from both the 3'- and 5'-ends of DNA strands.
- ball and stick model** A molecular model in which the atoms are represented by spheres and the bonds by sticks; the bond lengths and the atomic radii are fixed, and the bond angles are correctly indicated for each atom.
- Balzer freeze fracture apparatus** An apparatus used for preparing electron microscope specimens for freeze etching or freeze fracturing; permits sectioning of the frozen specimen in a vacuum.
- band** 1. A zone of macromolecules, such as the zone obtained in density gradient sedimentation, zone electrophoresis, isoelectric focusing, chromatography, or similar techniques. 2. ABSORPTION BAND.
- band 3** ANION-TRANSPORT PROTEIN.
- bandpass** The range of wavelengths of a radiation that passes through a filter or a similar device.
- band sedimentation** A type of density gradient centrifugation in which a sample, in a solution of low density, is layered over a denser solution (in the absence of a preformed density gradient) and then subjected to centrifugation. Diffusion of solute from the denser to the lighter solution leads to establishment of a self-generated density gradient through which the sample sediments.
- bandwidth** 1. The width of an absorption band. 2. A range of wavelengths.
- Bang method** A method for determining glucose in urine by means of alkaline copper thiocyanate.
- bangosome** LIPOSOME.
- BAP** 1. 6-Benzylaminopurine. 2. Bacterial alkaline phosphatase.
- barbed end** *See* actin filament.
- barbital** Diethylbarbituric acid; a barbiturate.
- barbiturates** A large group of derivatives of barbituric acid (2,4,6-trioxypyrimidine; pyrimidinetrione) that are used as sleep-producing drugs. *See also* narcotic drugs.
- bar chart** A chart used to represent a frequency distribution or a time series;

consists of vertically placed rectangles that are of equal width and adjacent to each other on a common baseline. The heights of the rectangles are proportional to the frequencies (or values) they represent. *Aka* block diagram. *See also* histogram.

bare lipid membrane BLACK LIPID MEMBRANE.

Barfoed's test A colorimetric test for distinguishing mono- from disaccharides by means of a solution of cupric acetate in dilute acetic acid.

barium An element that is essential to a few species of organisms. Symbol, Ba; atomic number, 56; atomic weight, 137.34; oxidation state, +2; most abundant isotope, ^{138}Ba , a radioactive isotope, ^{133}Ba , half-life, 7.2 years, radiation emitted, gamma rays.

barn A unit area of the atomic nucleus equal to 10^{-24} cm² and used as a measure of the capture cross section of the nucleus.

baroreceptor A receptor in the central nervous system that responds to changes in blood pressure.

Barr body An inactive, condensed X chromosome in the nuclei of somatic cells of female mammals.

barrier layer cell PHOTOVOLTAIC CELL.

baryon Any hadron with half-integer spin; that is, any hadron made of exactly 3 quarks. The proton and neutron are baryons. *See also* elementary particles.

basal body KINETOSOME.

basal enzyme An inducible enzyme that is produced in small amounts in the absence of an inducer.

basal granule KINETOSOME.

basal lamina (*pl* basal laminae). A thin layer of specialized extracellular matrix that contains collagen IV and the glycoprotein laminin as major components; a subdivision of the basement membrane. Basal laminae underlie epithelial cell sheets and tubes and surround muscle cells, fat cells, and nerve cells. They function in regulating passage of macromolecules, tissue regeneration, and synapse construction. *Aka* basement lamina.

basal level The low level of concentration at which a basal enzyme is produced by a cell.

basal medium A medium that supports the growth of a range of nutritionally undemanding chemoorganotrophs.

basal metabolic rate The rate of basal metabolism under the following standardized conditions: physical rest, but not sleep; an ambient temperature that does not require energy expenditure for physiological temperature regulation; and a postabsorptive state following a 12-h fast. The basal metabolic rate may be determined from the energy value of the food intake and the

excreted waste products, or from the heat produced by the organism, or from the oxygen consumption by the organism. *Abbr* BMR.

basal metabolism The level of metabolic activity that is required by an animal for the maintenance of vital functions such as respiration, heart contraction, and kidney and liver function; the maintenance of nonvital functions such as muscular work and digestion is excluded. *See also* basal metabolic rate.

basal synthesis BACKGROUND CONSTITUTIVE SYNTHESIS.

base 1. Purine. 2. Pyrimidine. 3. Bronsted base. 4. Lewis base. 5. The fixed number, such as 10 or *e* used in logarithms.

base analogue A purine or pyrimidine that is similar in its chemical structure to the normal base occurring in nucleic acids and that may be incorporated into the nucleic acid in place of the normal base.

base composition The relative amounts of the various purines and pyrimidines in a nucleic acid; generally expressed in terms of mole percent.

base excision repair *See* excision repair.

base line The line in a chromatogram, an ultracentrifuge pattern, or a similar tracing that corresponds to the solvent rather than to the solution.

basement lamina BASAL LAMINA.

basement membrane The fragile, thin layer that underlies the epithelium and is devoid of cells; an extracellular matrix, composed of collagens, glycoproteins, and proteoglycans. The basement membrane is a composite structure, which includes the basal lamina, and forms an interface between epithelial cells and the underlying connective tissue. Basement membranes are involved in the regulation of cellular growth, cell adhesion, and cell differentiation.

base pair 1. A pair of hydrogen-bonded bases; a purine and a pyrimidine that either link two separate polynucleotide strands as in double-helical DNA or link parts of the same polynucleotide strand as in the cloverleaf model of transfer RNA. 2. A unit of length in nucleic acid molecules that is equal to one base pair. *Abbr* bp.

base pairing The complementary binding of the bases in a nucleic acid by means of hydrogen bonding. The binding may be between two strands of a double-stranded molecule or between parts of a single-stranded molecule folded back upon itself.

base-pairing rules The requirements that in a double-helical nucleic acid structure adenine must form a base pair with thymine (or uracil)

and cytosine must form a base pair with guanine, and vice versa.

base-pair ratio ASYMMETRY RATIO.

base-pair substitution A transition (1) or a transversion. *Aka* base-pair switch.

basepiece *See* supermolecule.

base ratio One of three concentration ratios for the bases in a nucleic acid that are generally expressed in terms of mole percent: adenine/thymine (or uracil); guanine/cytosine; and purines/pyrimidines.

base sequence The linear order of the purine and pyrimidine bases, or of their nucleotides, as they occur in a nucleic acid strand.

base specificity The selectivity of a nuclease that accounts for its reaction being limited to specific purine or pyrimidine sites in the nucleic acid.

base stacking The arrangement of the base pairs in parallel planes in the interior of a double-helical nucleic acid structure.

base substitution The replacement of one base for another in either a nucleotide or a nucleic acid.

base unit *See* SI.

basic 1. Of, or pertaining to, a base. 2. Of, or pertaining to, a solution having a pH greater than 7.0.

BASIC Acronym for Beginner's All Purpose Symbolic Instruction Code; the most widely used high-level language for small computers.

basic amino acid An amino acid that has two amino groups and one carboxyl group; an amino acid that has a net positive charge at neutral pH.

basic dye A cationic dye that binds to, and stains, negatively charged macromolecules. *Aka* basic stain.

basic food A food that is rich in sodium, potassium, magnesium, and calcium and that leaves a basic residue when subjected to combustion.

basicity constant BASE DISSOCIATION CONSTANT.

basic number The lowest haploid chromosome number in a polyploid series; the monoploid number.

basic orange ACRIDINE ORANGE.

basic set The smallest number of functional proteins and/or functional genes that could have constituted a primitive cell (protocell).

basophil A cell that stains with a basic dye. *See also* polymorphonuclear leukocyte.

batch adsorption A technique for adsorbing a solute from a solution by stirring the solution together with an adsorbent to form a slurry; subsequently, the solution is separated from the adsorbent by decantation, filtration, or centrifugation.

batch culture A culture grown in a given

volume of medium. *Aka* closed culture. *See also* continuous culture.

batch elution *See* stepwise development.

bathochromic group A group of atoms that, when attached to a compound, shifts the adsorption of light by the compound to longer wavelengths.

bathochromic shift A shift in the absorption spectrum of a compound toward longer wavelengths.

bathorhodopsin A structurally altered form of rhodopsin that is produced after the exposure of rhodopsin to light and prior to its conversion to lumirhodopsin. *Aka* prelumirhodopsin.

baud A measure of data transmission speed by a computer; the number of bits of information that can pass a given point in one second (bits per second, bps).

bay region theory A theory of chemical carcinogenesis involving a specific structural element (a diol epoxide) of certain polynuclear aromatic hydrocarbons.

BC Biotin carboxylase.

BCCP Biotin carboxyl carrier protein.

B cell A bursa-derived lymphocyte. In birds, hemopoietic stem cells (bone marrow cells) migrate to the bursa of Fabricius where they differentiate into bursa lymphocytes which then migrate to peripheral lymphoid tissues to become B cells. Mammals lack a bursa of Fabricius and hemopoietic stem cells develop into lymphocytes in the hemopoietic tissues themselves and then migrate to peripheral lymphoid tissues to become B cells. B cells function in humoral immune responses that are due to circulating antibodies in the blood and antibodies secreted onto mucous surfaces.

BCG *Bacillus Calmette-Guérin*; an attenuated strain of *Mycobacterium tuberculosis* used as a vaccine for protection against tuberculosis and leprosy.

B chain 1. The longer of the two polypeptide chains of insulin that contains 30 amino acids and that is linked to the other chain by two disulfide bonds. 2. The light (L) chain of the immunoglobulins.

BChl Bacteriochlorophyll.

B complex *See* vitamin B complex.

BCP Biotin carboxyl carrier protein.

BD-cellulose Benzoylated diethylaminoethyl-cellulose; a chromatographic support.

B DNA *See* DNA forms.

Beckmann thermometer A thermometer with a large bulb and a fine bore that is used for the measurement of small differences in temperature.

bed The solid support of the column in column chromatography.

Beer-Lambert law A composite of Beer's law

and Lambert's law. It relates the absorbance of a solution to its concentration and to the length of the light path through the solution; specifically, $A = \epsilon lc$, where A is the absorbance, l is the length of the light path, c is the concentration, and ϵ is the absorptivity. When l is in centimeters and c is in moles per liter, then ϵ is the molar absorptivity. *Aka* Beer's law.

Beer's law 1. BEER-LAMBERT LAW. 2. The law that forms part of the Beer-Lambert law. It states that the intensity of monochromatic light passing through an absorbing medium decreases exponentially with increasing concentrations of the absorbing material.

beet sugar Sucrose that is isolated from beets.

behenic acid A saturated fatty acid that contains 22 carbon atoms.

BEI Butanol-extractable iodine; the iodine that can be extracted from serum by butanol.

Belling's hypothesis A forerunner of the copy-choice hypothesis of the mechanism of genetic recombination. It assumes that genes are replicated first and then intergenic connections are made between the newly synthesized genes; there is no breakage and reunion of parental chromosomes.

bell-shaped curve A symmetrical curve, usually of a continuous frequency distribution, having the overall shape of a vertical section through a bell.

belt desmosome A cell junction that consists of a continuous band around the interacting epithelial cells. *See also* cell junction.

Bence-Jones protein An abnormal immunoglobulin that consists only of light chains, generally in the form of dimers, and that is produced by individuals suffering from plasma cell tumors; Bence-Jones protein has unusual thermosolubility properties, is relatively homogeneous, and is formed in large amounts in patients with multiple myeloma.

bending vibration DEFORMATION VIBRATION.

Benedict's reagent An aqueous solution of copper sulfate, sodium citrate, and sodium carbonate that is used in Benedict's test for reducing sugars.

benign neoplasm A harmless, localized, and nonmetastasizing tumor.

Benson model An older model of a biological membrane according to which the proteins are largely globular and are located in the interior of the membrane, and the lipids are intercalated into the folds of the protein chains, with the polar portions of the lipid molecules at the exterior surfaces of the membrane.

bentonite A clay that consists principally of montmorillonite (aluminum-magnesium-silicate) and that is used as an inhibitor of nucleases.

Benzedrine Trade name for amphetamine.

benzidine test A test for blood that is based on the formation of a blue compound, benzidine blue, upon treatment of the sample with glacial acetic acid and hydrogen peroxide.

benzo(a)pyrene A polycyclic hydrocarbon, produced in the incomplete combustion of fossil fuels. It is inactive by itself, but is converted to highly reactive derivatives, which are mutagenic and carcinogenic, by enzymatic action within an organism.

6-benzylaminopurine A synthetic cytokinin.

benzylpenicillin *See* penicillin.

β -benzyme *See* beta benzyme.

beriberi The disease caused by a deficiency of the vitamin thiamine. Dry beriberi is characterized by rapid weight loss, muscle wasting, and muscular weakness; wet beriberi is characterized, additionally, by generalized edema.

Berkefeld filter A filter, made of diatomaceous earth, that retains bacteria and that is used for the sterilization of solutions.

Bernoulli distribution BINOMIAL DISTRIBUTION.

Berthelot reaction A colorimetric test for ammonia in urine that is based on the production of blue indophenol upon treatment of urine with phenol and sodium hypochlorite.

BES *N,N*-Bis(2-hydroxyethyl)-2-aminoethanesulfonic acid; used for the preparation of biological buffers in the pH range of 6.4 to 7.8. *See also* biological buffers.

best fit *See* goodness of fit; method of least squares.

beta 1. Denoting the second carbon atom next to the carbon atom that carries the principal functional group of the molecule. 2. Denoting a specific configuration of the substituents at the anomeric carbon in the ring structure of carbohydrates. 3. Denoting buffer value. *Sym* β .

beta adrenergic blocker *See* beta blocker.

beta adrenergic receptor *See* adrenergic receptor.

beta amylase *See* amylase.

beta barrel A cylindrical, barrel-shaped structure in proteins, formed by the twisting of polypeptide chains in the parallel or antiparallel pleated sheet configuration.

beta bend A tight fold in the polypeptide chain that sharply reverses the direction in which the chain runs; generally formed by having the carbonyl group of one amino acid residue form a hydrogen bond with the amino group of another amino acid residue, three positions farther along the polypeptide chain. Thus, the polypeptide chain is sharply folded back upon itself. Beta bends are largely responsible for giving globular proteins their spherical structure and frequently involve glycine and

- proline as part of the complement of the four consecutive amino acids involved in the folding. *Aka* beta turn; hairpin turn; reverse turn.
- beta benzyme** An artificial, chymotrypsin-like molecule that contains no amino acids and that has a molecular weight of 1365; the catalytic site of this synthetic molecule is derived from β -cyclodextrin.
- beta blocker** An antagonist (inhibitor) of β -adrenergic receptors. Agents that block these receptors have various effects, among them a decrease of the rate and force of heart contractions. *Aka* β -adrenergic blocker.
- beta carotene** A carotene that is a precursor of vitamin A and that is cleaved in animals to yield two molecules of vitamin A per molecule of beta carotene. *See also* anti-promoter.
- beta chain** One of the two types of polypeptide chains occurring in adult hemoglobin.
- beta conformation** The structure of a polypeptide chain that is almost fully extended into a zigzag, rather than a helical conformation; the structure of a polypeptide chain as it occurs in pleated sheets.
- beta decay** The radioactive disintegration of an atomic nucleus that results in the emission of a beta particle.
- beta emitter** A radioactive nuclide that decays by emission of a beta particle. A beta emitter is considered to be soft or hard depending on whether the emitted beta particles are of low energy and have a short penetration range, or whether they are of high energy and have a long penetration range.
- beta error** TYPE II ERROR.
- beta fraction** 1. LOW-DENSITY LIPOPROTEIN. 2. VERY LOW-DENSITY LIPOPROTEIN.
- beta function** *See* Scheraga-Mandelkern equation.
- beta galactosidase** An enzyme that catalyzes the hydrolysis of β -galactosides including lactose. It is an inducible enzyme in *E. coli*, coded for by a gene in the lac operon.
- beta galactoside permease** One of the three enzymes coded for by the lac operon in *E. coli*; it controls the rate of entry of β -galactosides from the medium into the cells.
- beta glucosidase** *See* amygdalin.
- beta glucuronidase** *See* laetrile.
- betaine** 1. *N,N,N*-Trimethyl glycine; a compound that serves as a methyl group donor and occurs in plant and animal tissues. 2. Any dipolar compound in which the positive and negative charges are not adjacent.
- beta keratin** The extended form of keratin, obtainable by stretching alpha keratin, in which the polypeptide chains are in the parallel pleated sheet configuration.
- beta lactam antibiotics** Antibiotics in which the key structural feature is the presence of a beta lactam, a four-membered ring in which a carbonyl group and a nitrogen are joined in an amide linkage. Includes the penicillins and cephalosporins. Beta lactam antibiotics inhibit enzymes that are important for bacterial cell wall synthesis and thus are effective against actively growing bacteria. They have remarkably few side effects.
- beta lactamase** PENICILLINASE.
- beta lactoglobulin** The major whey protein in cow's milk; the first pure protein for which the complete amino acid composition was determined (1947).
- beta lipoprotein** LOW-DENSITY LIPOPROTEIN.
- beta meander** A conformation of antiparallel beta sheets in which the beta conformation segments are connected by relatively tight beta bends and all connections are equivalent.
- beta method** RAMON METHOD.
- beta orientation** The orientation of atoms or groups that are attached above the plane of the steroid molecule.
- beta oxidation** The oxidation of fatty acids in metabolism through successive cycles of reactions, with each operation of the cycle leading to a shortening of the fatty acid by a two-carbon fragment that is removed in the form of acetyl coenzyme A.
- beta particle** 1. An electron originating in the atomic nucleus and emitted frequently by radioactive isotopes. Beta particles are considered to be soft or hard depending on whether they are of low energy and have a short penetration range, or whether they are of high energy and have a long penetration range. 2. A glycogen granule in the liver.
- beta plateau** The high-potential portion of the characteristic curve of a proportional radiation detector at which the count rate is almost independent of the applied voltage and at which the potential is of sufficient magnitude to detect beta particles.
- beta ray** A beam of beta particles.
- beta-ray spectrometer** An instrument for the analysis of either the energy spectrum or the momentum spectrum of beta rays.
- beta receptor** *See* adrenergic receptor.
- beta sheet** PLEATED SHEET.
- beta structure** *See* pleated sheet.
- beta threshold** The lowest potential at which beta particles can be detected with a proportional radiation detector.
- betatron** An accelerator, designed to impart high kinetic energy to electrons by means of electromagnetic induction.
- beta turn** BETA BEND.
- BeV** One billion (10^9) electronvolts.
- bevatron** An accelerator designed to impart high kinetic energy to protons.
- B form** *See* DNA forms.

BGG Bovine gamma globulin.

bi- 1. Combining form meaning two or twice.

2. Referring to two kinetically important substrates and/or products of an enzymatic reaction; thus a uni bi reaction is a reaction with one substrate and two products.

Bial's reaction ORCINOL REACTION.

biamperometric titration An amperometric titration using two like electrodes.

biantennary *See* complex oligosaccharides; high-mannose oligosaccharides.

bias DETERMINATE ERROR.

bicine *N,N*-Bis(hydroxyethyl)glycine; used for the preparation of biological buffers in the pH range of 7.6–9.0. *See also* biological buffers.

bidentate Designating a ligand that is chelated to a metal ion by means of two donor atoms.

bidirectional replication DNA replication proceeding in two directions; two replicating forks moving in opposite directions as in formation of a theta structure.

bifluorescence The variation in the apparent intensity of plane-polarized fluorescence by the rotation of an analyzer through which the fluorescence is observed.

bifunctional antibody An antibody that has two combining sites for antigen (two antigen binding sites); a divalent antibody.

bifunctional catalyst A catalyst that can provide both an acidic and a basic catalytic function.

bifunctional feedback A feedback mechanism that affords control in two directions so that the input of a system is affected both by an increase and by a decrease of the output. An example is a system in which the pH will be adjusted if the pH either rises above or falls below the normal value.

bifunctional reagent A compound that has two reactive functional groups and that can interact either with two groups of one protein or with one group each of two different proteins.

big ACTH One of several, high molecular weight forms of ACTH that have been identified in human pituitaries, plasma, and tumors that secrete ACTH ectopically.

big gastrin *See* gastrin.

big insulin PROINSULIN.

big T T ANTIGEN.

bilayer A layer that is two molecules thick. *See also* lipid bilayer.

bilayer lipid membrane BLACK LIPID MEMBRANE.

bilayer model UNIT MEMBRANE HYPOTHESIS.

bile The secretion of the liver that aids in the digestion of fats by emulsifying them and that serves to excrete bile pigments, heavy metals, and other waste products of metabolism. *See also* bile salt; digestive juice.

bile acid A 24-carbon steroid that occurs in the bile in the form of a bile salt. Cholic acid and chenodeoxycholic acid are sometimes referred to as primary bile acids; they may be hydroxylated by bacteria in the digestive tract to yield the secondary bile acids, deoxycholic acid and lithocholic acid, respectively.

bileaflet membrane LIPID BILAYER.

bile alcohol One of a group of polyhydroxylated steroids, derived structurally from cholestane, that occur as sulfate esters in the bile of lower vertebrates; they function like the bile acids in higher organisms.

bile pigment A degradation product of the heme portion of hemoglobin and other heme proteins; the linear tetrapyrroles, bilirubin and biliverdin, are two examples. *See also* plant bile pigments.

bile salt A surface-active agent in the bile that aids in the emulsification of fats during digestion and that consists of a bile acid coupled to either glycine or taurine.

biliary Of, or pertaining to, the bile.

bilin A colored bile pigment, such as urobilin or stercobilin, that is formed by the oxidation of a colorless bilinogen pigment.

bilinogen A colorless bile pigment, such as urobilinogen or stercobilinogen, that forms a colored bilin pigment upon oxidation.

biliprotein *See* phycobiliprotein.

bilirubin A red-brown bile pigment that may have an antioxidant function. Bilirubin is formed mainly from the hemoglobin of aged erythrocytes in the spleen, the bone marrow, and the liver; it is transported as a complex with serum albumin and is excreted in the bile as a conjugate of glucuronic acid. *See also* direct-acting bilirubin; indirect-acting bilirubin.

bilirubin diglucuronide A conjugated, soluble form of bilirubin that is formed in the liver by the esterification of two molecules of glucuronic acid to two propionic acid residues of bilirubin. *See also* direct-acting bilirubin.

bilirubinemia HYPERBILIRUBINEMIA.

biliverdin A green bile pigment that is reduced by NADPH to bilirubin.

bimolecular lamellar lipid membrane BLACK LIPID MEMBRANE.

bimolecular layer BILAYER.

bimolecular leaflet BILAYER.

bimolecular lipid membrane BLACK LIPID MEMBRANE.

bimolecular reaction A chemical reaction in which either two molecules (or other entities) of a single reactant, or one molecule each of two reactants, interact to form products.

binal symmetry Symmetry in which there are two types of symmetry elements.

binary Consisting of two parts.

binary complex mechanism PING-PONG MECHANISM.

binary digit BIT.

binary fission Asexual division in which a cell divides into two approximately equal parts.

binary number system A numbering system in which all numerical values are expressed in terms of only two digits, 0 and 1.

binder A substance, such as calcium sulfate, that is mixed with a thin-layer chromatographic adsorbent to increase the mechanical strength of the adsorbent layer.

binding assay 1. Any method for measuring protein-ligand interaction as in the binding of sugars to periplasmic proteins and in the binding of cyclic AMP to protein kinase. 2. A method for measuring the binding of aminoacyl-tRNA to ribosomes in response to oligoribonucleotides of defined sequences and in the absence of peptide bond formation; based on using labeled aminoacyl-tRNA, collecting the aminoacyl-tRNA-ribosome-oligoribonucleotide complex on Millipore filters, and counting the radioactivity in this complex. *Aka* ribosome binding technique.

binding constant ASSOCIATION CONSTANT.

binding factor \wedge protein factor required for the binding of aminoacyl-tRNA to ribosomes.

binding number *See* average binding number.

binding protein One of a number of soluble proteins that specifically, and reversibly, bind a number of substances, including amino acids, sugars, inorganic ions, and vitamins. Binding proteins have been found in the periplasmic space of gram-negative bacteria and in some yeasts; they appear to be devoid of enzymatic activity and are believed to function in the transport of the bound substance.

binding protein transport system *See* binding protein.

binding site The structural part of a macromolecule that directly participates in its specific combination with a ligand. Binding sites are said to be interacting or independent depending on whether the binding of one ligand to one site does, or does not, affect the binding of other ligands to other sites on the same molecule. *See also* active site.

binomial coefficient The coefficient of any term that results from the binomial expansion of $(a + b)^n$.

binomial distribution A frequency distribution in which the frequencies have the values of binomial coefficients. It represents a distribution of the number of successes in n trials when the probability of a success remains constant from trial to trial and the trials are independent. *Aka* Bernoulli distribution.

binomial nomenclature A system for naming species of plants and animals in which the name consists of two parts, the first designating the genus, and the second designating the species.

bio- 1. Combining form meaning life. 2. Combining form meaning a biological or a biochemical system.

bioassay The measurement of either the activity or the amount of a substance that is based on the use of living cells or living organisms; measurements of infectivity, antibody formation, weight gain, and bacterial growth are examples.

bioautograph The record obtained when a bioassay is used in conjunction with a chromatographic procedure, as in the case where a paper chromatogram is placed in contact with a bacterial culture on a solid medium.

bioautography A modification of paper chromatography in which the growth of bacteria is used as an indicator for locating growth factors and antibiotics on a paper chromatogram. The method involves placing a paper chromatogram, containing growth factors or antibiotics, in contact with an agar surface, seeded with the indicator organisms.

bioblast MITOCHONDRION.

biochemical Of, or pertaining to, biochemistry.

biochemical coupling hypothesis *See* chemical coupling hypothesis.

biochemical deletion hypothesis *See* deletion hypothesis.

biochemical energetics The free energy relations of biochemical reactions.

biochemical engineering *See* biotechnology; recombinant DNA technology.

biochemical evolution The evolutionary processes concerned with the formation of biomolecules, cells, cellular structures, metabolic pathways, and other attributes of living cells. *See also* biological evolution; chemical evolution.

biochemical fossil *See* chemical fossil.

biochemical genetics MOLECULAR GENETICS.

biochemical inflexibility of tumors The phenomenon that the control mechanisms of many enzyme systems, such as those of enzyme induction, appear to be frozen in tumor cells.

biochemical lesion A biochemical alteration, such as the inactivation of an enzyme, that leads to a pathological condition; may be caused by a mutagen, a carcinogen, or other factors.

biochemically deficient mutant AUXOTROPH.

biochemical marker A mutable site on a chromosome that, when mutated, leads to a

specific enzyme defect which can be detected by biochemical means.

biochemical mutant AUXOTROPH.

biochemical oxygen demand The rate at which the oxygen in water is consumed by microorganisms for the oxidation of organic compounds to simple inorganic molecules. *Abbr* BOD.

biochemical predestination theory The theory that the development of the living cell is determined by, and follows naturally from, the physical-chemical properties of the simplest starting compounds.

biochemical similarity principle The assumption that the biochemical compounds and processes known to occur ubiquitously in contemporary living systems and to be essential for life, also occurred at the early stages of the development of life and were essential to the origin of life.

biochemistry The science that deals with the chemistry of living systems and their components; it deals with such areas as chemical composition, metabolism, nutrition, energetics, enzyme function, transfer of genetic information, membrane properties, cellular organization, and molecular diseases of living organisms.

biochrome A naturally occurring coloring matter in a plant, an animal, or a microorganism; a pigment.

biChronometry The science that deals with the temporal organization and the time-keeping mechanisms of biological systems.

biocide A chemical substance used either to kill or to arrest the growth of living organisms, particularly microorganisms; bactericides, fungicides, and pesticides are examples.

biocytin ϵ -Biotinyllysine; a compound formed by linking biotin through its carboxyl group to the ϵ -amino group of a lysine molecule. Biotin is believed to be similarly linked to a lysine residue in those enzymes that require biotin as a coenzyme.

biod The dry biomass per unit area of the earth's surface.

biodegradable Descriptive of a substance that can be decomposed by the enzyme systems of bacteria or other organisms. Biodegradable detergents are those containing unbranched hydrocarbon chains; branched-chain compounds resist degradation.

bioelements Those elements that are required by, and occur in, living organisms; this includes about 40 elements of which six (C, O, H, N, S, and P) account for about 90% of the mass of living matter.

bioenergetics BIOCHEMICAL ENERGETICS.

biofeedback A process whereby an individual

is trained to gain some control over autonomic (involuntary) body functions such as blood pressure, muscle tension, and brain wave activity. The individual is provided with visual or auditory information about these processes and learns to consciously control them. The technique is based on the principle that a desired response is learned when received information (feedback) indicates that a specific thought complex or action has produced the desired response. An example of biofeedback would be the amplification of the electronic output of a muscle in response to a visual or other signal and the use of that signal to increase the output of the muscle as in physical therapy.

bioflavonoids A group of compounds, originally designated as vitamin P¹ (permeability vitamin) or vitamin C₂ (synergist of vitamin C). Some of the flavonoids exhibit biological activities, including reduction of capillary fragility (vitamin P activity) and protection of biologically important compounds through antioxidant activity (vitamin C₂ activity), but none has been shown to be essential for humans or to cause deficiency syndromes. Hence, they are now considered to be pharmacological rather than nutritional agents. Bioflavonoids constitute a very large group of colored, phenolic pigments that are found in all higher plants and that are related to the parent compound flavone; they are responsible for most of the red, pink, and purple colors of higher plants. Some of the subgroups of the bioflavonoids include flavones, flavanones, flavonols, and anthocyanins. *See also* antipromoter.

Biogel Trademark for a group of polyacrylamide and agarose gels used in gel filtration.

biogenesis 1. The synthesis of a substance in a living organism; biosynthesis. 2. The doctrine that living things can come only from other living things.

biogenetic Of, or pertaining to, biogenesis.

biogenetic law RECAPITULATION THEORY.

biogenic 1. Produced by the action of living organisms. 2. Essential to life.

biogenic amine An amine that is produced by a living organism, particularly a physiologically important amine such as epinephrine, norepinephrine, serotonin, or histamine; an amino acid decarboxylation product or its derivatives.

biogenic amine hypothesis The hypothesis that depression results from depletion of neurotransmitter amines in the areas of the brain involved in sleep, arousal, appetite, sex drive, and psychomotor activity.

biogeochemistry The science that deals with the interaction of living organisms with the mineral environment of the earth's crust.

biolith A geological sediment, such as peat or humus, that consists of residues from organic matter.

biological assay BIOASSAY.

biological buffers A group of buffers, such as Good's buffers, that are especially suited for research of biochemical systems in the physiological pH range; Tris, HEPPS, and MES are three examples. A biological buffer should, ideally, meet all of the following specifications: (a) have a pK_a between 6 and 8; (b) be very water soluble and not move across a biological membrane; (c) be available in a high degree of purity; (d) have a pH that is minimally influenced by the concentration, temperature, ionic composition, and salt effects of the medium; (e) be nontoxic and noninhibitory in biological systems; (f) be stable to enzymatic and nonenzymatic hydrolysis; (g) form only soluble complexes with cations; (h) be devoid of light-absorbing capacity in the visible and ultraviolet regions. *See also* specific buffers.

biological chemistry BIOCHEMISTRY.

biological clock The periodicity of either a biological function or a biochemical reaction.

biological evolution The gradual development of living organisms to their present state; a process that followed the stage of chemical evolution and extended over a period of about 3 billion years. *See also* Oparin hypothesis.

biological half-life *See* half-life (2).

biological nitrogen fixation The conversion of atmospheric nitrogen to ammonia by living organisms.

biological oxidation-reduction 1. The oxidation-reduction reactions in aerobic cellular respiration whereby nutrients are oxidized in the citric acid cycle, electrons are transported by the electron transport system, and ATP is synthesized through oxidative phosphorylation. 2. Any oxidation-reduction reaction occurring in a living system.

biological oxygen demand BIOCHEMICAL OXYGEN DEMAND.

biological response modifier An agent that stimulates the body's own defenses to fight off disease; cytokines, such as interferon, interleukin, and tumor necrosis factor, are examples. *Abbr* BRM.

biological rhythm BIOLOGICAL CLOCK.

biological value The relative nutritional value of a protein that is based on the amino acid composition of the protein, the digestibility of the protein, and the availability of the digested products. The biological value has been defined in terms of (a) the fraction of

absorbed protein nitrogen that is retained in the body; (b) the growth rate of young animals as a function of the dietary level of the protein; (c) the minimal protein concentration required to establish nitrogen balance in adults; and (d) the change in the concentration of essential amino acids in the serum as a function of the dietary level of the protein. *See also* net protein utilization.

biology The science that deals with living things; includes botany, zoology, embryology, genetics, morphology, and allied sciences.

bioluminescence The production of visible light by a living organism. *See also* luciferase.

biolysis Lysis by biological means.

biomacromolecule BIOPOLYMER.

biomass The mass of an organism or a group of organisms; variously used in reference to wet mass, dry mass, or mass per unit area. *See also* biod.

biomembrane A biological membrane. *See* fluid mosaic model.

biometry The science that deals with the application of statistics to biological systems.

biomolecule A molecule, such as a protein or a lipid, that occurs in a living system.

biomonomer A monomer, such as an amino acid or a nucleotide, that occurs in a living system.

bionics The application of structural and functional principles, discovered in living organisms, to man-made objects, especially those involving electronics; the development of robots, the construction of prosthetic devices, and the miniaturization of components are some examples.

bionomics ECOLOGY.

biorthogonal code An early version of the genetic code based on 24 codons, each containing six nucleotides, such that each codon could undergo two base substitutions and still be recognized as being related to its original form.

biophysics The science that deals with the physics of living systems and their components.

biopolymer A polymer, such as a protein or a nucleic acid, that occurs in a living system.

biopsy The removal and microscopic examination of tissue or other material from the body for purposes of diagnosis.

biopterin A derivative of pteridine, the reduced form of which, dihydrobiopterin, serves as a coenzyme for hydroxylation reactions of amino acids.

bioregulation The ability of a living organism to adjust its processes in response to external and internal influences.

biorhythm BIOLOGICAL CLOCK.

bios A term previously used to denote a

growth-promoting substance for yeast; bios I referred to inositol and bios II (or II B) referred to biotin.

biosis LIFE.

biosphere The regions of and around the earth that support life; includes the oceans, the upper portion of the land masses, and the lower portion of the atmosphere.

biosterol VITAMIN A.

biosynthesis The formation of a substance in a living system.

biosynthetic Of, or pertaining to, biosynthesis.

biosynthetic pathway An anabolic pathway that leads to the synthesis of a biomolecule.

biotechnology The various industrial processes that involve the use of biological systems; the collection of microbial and other biochemical processes carried out on an industrial scale. It includes, but is not limited to, the industrial aspects of genetic engineering. Other areas of biotechnology deal with fermentation technology (antibiotics), hybridoma technology (monoclonal antibodies), and agricultural technology (plant and animal transformations). *See also* genetic engineering; recombinant DNA technology.

biotest BIOASSAY.

biotic Of, or pertaining to, life.

biotin A vitamin of the vitamin B complex that functions as a coenzyme in carboxylation-decarboxylation reactions.

biotin carboxylase ACETYL-COA CARBOXYLASE.

biotin carboxyl carrier protein *See* acetyl-CoA carboxylase.

biotinyllysine BIOCYTIN.

biotope 1. The environment of an organism or a group of organisms. 2. The location of a particular parasitic organism within the body. 3. The spatial distribution of the biomass in a cross section of a river, lake, and so on.

biotransformation The metabolic reactions in an organism whereby a foreign chemical, introduced into the organism, is either converted to a different compound or conjugated to a metabolite of the organism.

biotype SEROTYPE.

bireactant reaction A bimolecular reaction in which two different reactants interact to form products.

birefringence The phenomenon of a substance possessing two refractive indices depending on the direction along which light passes through the substance.

bis Prefix indicating two phosphate groups attached to a molecule at two different positions. Thus, fructose-1,6-bisphosphate is now preferred to fructose-1,6-diphosphate.

bispecific antibody HETEROSPECIFIC ANTIBODY.

1,3-bisphosphoglycerate A high-energy com-

pound, the dephosphorylation of which to 3-phosphoglycerate leads to the synthesis of ATP from ADP in the second stage of glycolysis. *Aka* 1,3-diphosphoglycerate.

2,3-bisphosphoglycerate A compound that is present at high concentrations in the red blood cell and that binds to tetrameric hemoglobin to form a 1:1 complex. One molecule of 2,3-bisphosphoglycerate binds in the central cavity of the hemoglobin molecule and greatly reduces the affinity of hemoglobin for oxygen; the binding favors the dissociation of oxygen from oxyhemoglobin. The compound serves as an allosteric effector and regulates the oxygen-binding affinity of hemoglobin in relation to the partial pressure of oxygen in the lungs. *Abbr* DPG. *Aka* 2,3-diphosphoglycerate.

bisubstrate reaction An enzymatic reaction in which two substrates participate.

bit 1. A binary digit (0 or 1); a single character in a notation using two characters. 2. The smallest item of useful information that a computer can handle and that is expressed in terms of binary choices such as "yes" and "no". It is conveyed by an electrical impulse and is based on the fact that every microswitch in a computer can only have one of two positions, on (1) or off (0).

bitter acids A group of bitter-tasting, chemically labile compounds that occur in hops; they are monoacylphloroglucides.

bitter peptides A group of bitter-tasting peptides that sometimes are associated with the spoiling of foodstuffs; it is claimed that bitterness of a peptide correlates with its average hydrophobicity.

bitter principles A diverse group of bitter-tasting compounds, isolated from some plants, that are used as bitter spices to increase appetite and promote digestion.

Bittner's mouse milk factor MOUSE MAMMARY TUMOR VIRUS.

biuret A compound formed by the condensation of two molecules of urea.

biuret reaction A colorimetric reaction for the qualitative and quantitative determination of proteins; based on the production of a purple color upon treatment of biuret, peptides, proteins, or related compounds with copper sulfate in an alkaline solution.

Bjerrum formation function KLOTZ PLOT.

BJP Bence-Jones protein.

black lipid membrane An artificially prepared bimolecular lipid membrane that consists of either naturally occurring or synthetic lipids; usually formed in an annular space connecting two compartments filled with an aqueous medium that contains the lipids. The name

- black lipid membrane is due to the fact that, as the membrane forms, light reflected from it changes as a result of interference so that the membrane eventually turns grayish black. *Aka* black membrane.
- blank** A mixture of reagents that excludes the sample but that is identical to the mixture of reagents with which the sample is treated and that is carried through the same procedures as the sample. *See also* control.
- blast cell** A cell with a poorly differentiated, but RNA-rich, cytoplasm that actively synthesizes DNA.
- blastoma** A tumor consisting of immature and undifferentiated cells.
- blast transformation** TRANSFORMATION (3).
- bleaching** 1. Loss of chlorophyll as brought about, for example, by growth in the absence of light. 2. Change of a chromophore from a colored to a colorless form. 3. Whitening of material by oxidation-reduction reactions such as those involving hydrogen peroxide and chlorine.
- blender** A small appliance used to mix, homogenize, or disintegrate liquids and/or solids.
- blender experiment** HERSHEY-CHASE EXPERIMENT.
- blind test** A test of a substance or a procedure in which an independent observer records the results without knowing either the identity of the samples or the expected results. *See also* double-blind technique.
- Blinks effect** CHROMATIC TRANSIENT.
- BLM** 1. Bare lipid membrane. 2. Bilayer lipid membrane. 3. Bimolecular lamellar lipid membrane. 4. Bimolecular lipid membrane. 5. Black lipid membrane.
- Block** *See* metabolic block; genetic block.
- block copolymer** A copolymer in which different blocks of identical monomer units alternate with each other, as in the polymer —A—A—A—B—B—B—A—A—A—.
- block diagram** BAR CHART.
- block electrophoresis** An electrophoretic technique, used primarily for preparative procedures, in which the supporting medium is in the form of blocks. The material (starch, cellulose, Sephadex, etc.) is made up as a thick slurry, and is poured into a rectangular container. Excess liquid is then removed and samples are applied into slots, cut into the blocks.
- blocking antibody** 1. A protective antibody that prevents anaphylaxis by combining with the allergen; it is formed during desensitization and is primarily of the IgG type. 2. An incomplete antibody that actively inhibits agglutination.
- blocking group** PROTECTING GROUP.
- block nucleotide** A synthetic oligonucleotide that has the structure of a block copolymer. *Aka* block oligonucleotide.
- blood** The fluid that circulates through the cardiovascular system and that is composed of a fluid fraction, plasma, and a cellular fraction consisting of erythrocytes, leukocytes, and thrombocytes.
- blood-brain barrier** The slow penetration into the brain of substances that are transported by the blood as compared to their more rapid penetration into most other tissues. It serves to provide a nearly constant environment for brain function.
- blood-cerebrospinal fluid barrier** BLOOD-BRAIN BARRIER.
- blood clot** The insoluble network of polymerized fibrin molecules and trapped cells that is formed upon the solidification of blood, most commonly in the course of external bleeding.
- blood clotting** The two groups of complex biochemical reactions by which a blood clot is formed. The first group of reactions leads to the formation of the active enzyme thrombin from its inactive precursor, prothrombin; the second group of reactions leads to the thrombin-catalyzed conversion of fibrinogen to the fibrin clot. *Aka* blood coagulation. *See also* extrinsic pathway; intrinsic pathway.
- blood count** A determination of the number of red and white blood cells per cubic millimeter of blood.
- blood group** One of the classes of individuals that belong to a given blood group system.
- blood group antigen** BLOOD GROUP SUBSTANCE.
- blood group chimera** A chimera containing two different blood types.
- blood grouping** BLOOD TYPING.
- blood group substance** A genetically determined particulate isoantigen that is attached to the surface of red blood cells and that may be attached to the surface of other cells; related blood group substances represent alternative antigens, specified by allelic genes.
- blood group system** A classification of individuals into groups on the basis of their possession, or nonpossession, of specific blood group substances. Some of the blood group systems are known as the ABO, Lewis, M-N-S-s, and Rh systems.
- blood plasma** *See* plasma.
- blood platelet** *See* platelet.
- blood serum** *See* serum.
- blood sugar** 1. The glucose in the blood. 2. The trehalose in the hemolymph of insects.
- blood typing** The identification of the blood group substances of an individual.

blood urea nitrogen The nitrogen of the urea in serum. *Abbr* BUN.

blood vessel An artery, a vein, or a capillary through which the blood circulates.

Bloom's disease A genetically inherited metabolic defect in humans that is characterized by chromosomal aberrations and decreased immunity; it is due to defective DNA repair.

blot hybridization See northern blotting; Southern blotting.

blotting Any one of a number of techniques whereby chromatographically or electrophoretically separated DNA, RNA, or protein molecules can be transferred from the support medium, such as a gel, to another medium such as filter paper or a membrane matrix. The transfer can be achieved by capillary action (Southern blotting, northern blotting, western blotting) or by electrophoresis (electroblotting). *Aka* transfer. See also protein blotting.

blue copper protein See blue protein.

blue dextran A polymeric material with an average molecular weight of 2×10^6 that is prepared from dextran and that is used for the calibration of gel filtration columns from which it is excluded because of its size.

blue-green algae CYANOBACTERIA.

blue-green bacteria CYANOBACTERIA.

blue phase See liquid crystal.

blue protein 1. Azurin (1). 2. Plastocyanin.

blue shift HYPSOCHROMIC SHIFT.

blunt end ligation The joining of restriction fragments, terminating in blunt ends, by means of DNA ligase.

blunt ends See restriction enzyme.

B lymphocyte B CELL.

BMR Basal metabolic rate.

BND-cellulose Benzoylated-naphthoylated diethylaminoethyl cellulose; a chromatographic support. Also abbreviated BNC.

boat conformation The arrangement of atoms that resembles the outline of a boat and that is the less stable conformation of the two possible ones for cyclohexane and other six-membered ring systems.

tert-BOC-amino acid An amino acid in which the amino group has been protected by attachment of a tertiary butoxycarbonyl group; used in peptide synthesis by the solid phase (Merrifield) method. *Abbr* *t*-BOC-AA.

BOD Biochemical oxygen demand.

body A structural domain of prokaryotic 30S ribosomal subunits.

Bohr coefficient The change in the logarithm of the partial pressure of oxygen with change in pH at constant oxyhemoglobin concentration (usually at a constant oxygen saturation of

0.5); $\Delta \log P_{O_2}/\Delta pH$.

Bohr effect The decrease in the oxygen affinity of hemoglobin that is produced either by a decrease in the pH or by an increase in the partial pressure of carbon dioxide. The effect is due to changes in the pK values of ionizing groups in hemoglobin upon oxygenation and deoxygenation of the molecule. The effect above pH 6, when oxyhemoglobin is more negatively charged than deoxyhemoglobin, is known as the alkaline Bohr effect; the effect below pH 6, when deoxyhemoglobin is more negatively charged than oxyhemoglobin, is known as the acid Bohr effect.

Bohr magneton The magnetic dipole moment of a spinning electron.

boiled enzyme test A determination of the sensitivity of a reaction to heat; if the reaction is enzyme-catalyzed, it will generally be sensitive to heat as a result of the thermal denaturation of the enzyme.

boivin antigen A lipopolysaccharide-protein complex that can be extracted from the outer membrane of gram-negative bacteria with trichloroacetic acid.

bolometer A temperature transducer used for the measurement of minute quantities of radiant heat.

Boltzmann constant The gas constant divided by Avogadro's number. *Sym* *k*.

Boltzmann distribution The most probable distribution of a large number of molecules or particles in a nonuniform field of force at or near equilibrium; the centrifugal force in an ultracentrifuge, and the potential acting on an ion in electrophoresis are examples of such fields of force. The distribution can be expressed as $n_1 = n_2 e^{-(E_1 - E_2)/kT}$, where n_1 and n_2 are the number of molecules or particles in two locations or in two energy states, E_1 and E_2 are the respective energies, k is the Boltzmann constant, and T is the absolute temperature.

bombesin A substance in the gastrointestinal tract that, when injected into animals, stimulates gastric acid secretion and inhibits intestinal motility.

bond 1. The linkage between two atoms in a molecule. 2. The linkage between two atoms, groups of ions, or molecules, or between combinations of these.

bond angle The angle between any two bonds by which an atom is linked to other atoms in the molecule.

bond energy The energy required to break a chemical bond.

bonding orbital A molecular orbital in which there is no node of electron density between the bonding atomic nuclei, resulting in a

strengthening of the bond between the nuclei. Bonding orbitals are designated sigma (σ) and pi (π) and are generally of lower energy than the antibonding orbitals sigma star (σ^*) and pi star (π^*).

bond length The length of the bond between two atoms; equal to the distance between the centers of the nuclei of the two bonded atoms.

bond radius One-half of the bond length.

bond strength BOND ENERGY.

boneblack An impure charcoal prepared from bone and used as a decolorizing adsorbent.

bone mineral HYDROXYAPATITE.

bone remodeling See remodeling.

bongkrekik acid A fungal antibiotic that inhibits the ATP-ADP carrier of mitochondria.

bookmark hypothesis The hypothesis that peptides containing aromatic amino acids serve in vivo as a means of recognizing DNA sequences by having their aromatic amino acid residues become partially inserted between base pairs at certain intercalating sites in the DNA; the different intercalating sites are referred to as pages in a book, and the intercalating peptides are referred to as bookmarks.

booster dose A dose of antigen, particularly in the form of a vaccine, that is administered to an individual after a priming dose with the intent of stimulating the production of large amounts of antibodies.

booster response SECONDARY RESPONSE.

boron An element that is essential to a wide variety of plants. Symbol, B; atomic number, 5; atomic weight, 10.811; oxidation state, +3; most abundant isotope, ^{11}B .

botromycin One of a group of peptide antibiotics, produced by *Streptomyces*, that inhibit bacterial protein synthesis.

botulism A severe, and often fatal, form of food poisoning due to the toxins of *Clostridium botulinum* which block neural transmission by inhibiting the synthesis or the release of acetylcholine at presynaptic sites.

Bouguer's law LAMBERT'S LAW.

boulevard peripherique GERL.

boundary A transition zone, either between solvent and solution or between two different solutions. In analytical ultracentrifugation, a boundary is produced when molecules are sedimented through the solution; in diffusion and electrophoresis experiments, using a Tiselius apparatus, a boundary is produced by the layering of the solvent over the solution.

boundary sedimentation Sedimentation in which a boundary is formed, as in sedimentation velocity.

bound enzyme INSOLUBLE ENZYME.

bound insulin INSULIN-LIKE ACTIVITY.

Boveri's theory of cancer See chromosome theory of cancer.

bovine Of, or pertaining to, cattle.

Bowman-Birk inhibitor A soybean trypsin inhibitor.

box A sequence of nucleotides that occurs repeatedly as a transcription or regulatory signal. See also CAAT box, GC box, Hogness box, Pribnow box, TATA box.

bp 1. Base pair; a unit of length in nucleic acid molecules equal to one base pair. See also base pair. 2. Boiling point; also abbreviated b.pt.

BPA Bovine plasma albumin.

B protein 1. A protein subunit of the enzyme tryptophan synthetase. 2. A component of the enzyme lactose synthetase.

bps Bits per second. A measure of data transmission speed by a computer; the number of bits of information that pass a given point in one second. Aka baud.

Bradford method A spectrophotometric method of high sensitivity for the determination of proteins; based on the shift in the adsorption maximum of the dye Coomassie brilliant blue upon binding to protein.

Bradshaw test A test for the presence of Bence-Jones protein in urine that is performed by layering dilute, acidified urine over concentrated hydrochloric acid.

bradykinin See kinin.

Bragg angle The angle of incidence, which equals the angle of reflection, in the Bragg equation.

Bragg curve A plot of specific ionization as a function of either distance or energy.

Bragg equation An equation relating the angle at which either light rays or x rays are reflected from a crystal to the spacing of the atomic planes in the crystal; specifically, $2d \sin \theta = n \lambda$, where θ is both the angle of incidence and the angle of reflection, λ is the wavelength of the radiation, d is the spacing between reflecting planes, and n is an integer.

Bragg law BRAGG EQUATION.

Bragg peak The peak of a Bragg curve.

Bragg scattering The scattering of radiation by a crystal that is described by the Bragg equation.

brain barrier system BLOOD-BRAIN BARRIER.

brain hormone PROTHORACICOTROPIC HORMONE.

brain sparing The phenomenon that, during starvation, the loss of bulk matter from the brain is smaller than that from other organs.

branched-chain ketoaciduria MAPLE SYRUP URINE DISEASE.

branched fatty acid A fatty acid having a

branched chain. Branched fatty acids occur in many different tissues and organisms and are frequently associated with specific physiological functions or structures. *See also* ante-iso fatty acid; iso fatty acid.

branched metabolic pathway A sequence of metabolic reactions that diverges and that can give rise to two or more different end products.

branched polymer A polymer that consists of a main chain to which side chains are attached.

branching The simultaneous decay of a given type of radioactive atoms by two different modes; a fraction of the atoms decays by one mode and the remaining fraction decays by the other mode.

branching enzyme A enzyme that catalyzes the synthesis of branch points in a polymer.

branch migration The process whereby a strand segment, that is base-paired with one strand (A) of double-helical DNA, is displaced by a second strand segment that is also able to base pair with the same DNA strand (A). The process is based on the breathing of DNA and results in a branch point of the DNA being displaced sequentially along the DNA molecule.

branch point 1. The point in the main chain of a polymer at which either an additional molecule or a second chain is attached. 2. The point at which a sequence of metabolic reactions diverges so that it can give rise to two or more different end products.

Bray's solution A dioxane-based liquid scintillator designed for the detection of weak beta-emitting isotopes such as ^{14}C or ^3H in biological samples.

breakage and reunion model The model of genetic recombination according to which parts of the parental chromosomes are exchanged as a result of physical breakage of the chromosomes and reunion of the broken fragments. *Aka* breakage hypothesis; break and exchange model.

breakage-reunion enzyme One of a group of enzymes that catalyze the breaking and rejoining of DNA molecules and that act on internal segments, rather than on termini, of the DNA.

breakdown potential The potential at which a Geiger-Mueller tube begins to produce a continuous discharge.

breathing 1. The opening up of double-stranded regions in DNA to become single-stranded bubbles; a random and transient breaking and reforming of hydrogen bonds between the two strands. The process is considered to be necessary to allow for the interaction of specific proteins with the DNA. 2. A local unfolding of the polypeptide chain

in a protein as that which occurs during deuterium exchange.

breeding true The production, by homozygotes, of offsprings that have a phenotype that is identical to that of the parents.

Brei HOMOGENATE.

bremstrahlung An electromagnetic radiation that is produced when high-energy beta particles are decelerated in the electrostatic fields of atomic nuclei.

brewer's yeast One of several strains of yeast belonging to the species *Saccharomyces cerevisiae* and capable of producing and tolerating high levels of ethanol.

bridge complex One of a number of ternary complexes formed between an enzyme (E), a metal ion (M), and a substrate (S). Major types of bridge complexes are substrate bridge complexes (E—S—M), metal bridge complexes (E—M—S), and enzyme bridge complexes (M—E—S).

bridge migration BRANCH MIGRATION.

bridging atom 1. An atom that connects two groups in a molecule, such as the oxygen atom that connects two phosphoryl groups in ATP. 2. The metal ion in a metal bridge complex. *Aka* bridge atom.

Briggs-Haldane treatment The treatment of enzyme kinetics that is based on the assumptions that (a) a steady state attains for the enzyme substrate complex, and (b) the velocity of the reaction is an initial velocity, proportional to the concentration of enzyme-substrate complex, so that the reverse reaction from products to enzyme-substrate complex can be neglected. The resulting rate equation has the form $v = V[S]/(K_m + [S])$, where v is the initial velocity of the reaction, V is the maximum velocity, $[S]$ is the substrate concentration, and K_m is the Michaelis constant. This rate equation is known as the Michaelis-Menten equation. *See also* Michaelis-Menten treatment.

Briggsian logarithm *See* logarithm.

Brij One of a number of polyoxyethylene ethers of higher aliphatic alcohols that are used as nonionic detergents for the solubilization of membrane fractions.

brilliant cresyl blue A basic dye used in cytochemistry.

British anti-Lewisite The sulfhydryl compound, 2,3-dimercaptopropanol, developed during World War II as a detoxicant for certain war poisons and used subsequently as a chelating agent for heavy metal ions. *Abbr* BAL.

British thermal unit The amount of heat required to raise the temperature of 1 lb of water by 1 °F (from 63 to 64 °F). *Abbr* BTU.

Britten-Davidson model A model of gene regulation in eukaryotes that is somewhat

similar to the operon (Jacob and Monod) model in prokaryotes. The model postulates two levels of positive control, requiring two classes of regulatory proteins. The first control level consists of the interaction of a primary regulatory protein, a sensor protein, first with its specific effector, and then with a sensor gene that controls the transcription of a set of integrator genes. Activation of the sensor gene results in the production of an activator RNA. The second control level consists of the synthesis of secondary regulatory proteins, activator proteins, that are coded for by the activator RNA. The activator proteins then interact with specific receptor sequences (receptor sites) to promote the expression of structural genes.

brittle diabetes A disease in which lack of glucose tolerance and sufficiency of insulin activity vary in an unpredictable manner so that glucose and ketone bodies may be present in the urine at one time, and acceptable levels of insulin activity may be present at another time.

BRM Biological response modifier.

broad-beta lipoprotein FLOATING BETA LIPOPROTEIN.

broad-spectrum antibiotic An antibiotic, such as chloramphenicol or a tetracycline, that has a wide range of antibacterial activity.

Brockmann scale A scale for classifying various grades of alumina for adsorption chromatography; based on the adsorption of a series of dyes by the alumina.

Brodie's solution A manometer fluid containing NaCl, sodium choleate, and Evan's blue; it has a density of 1.033 g/mL so that a column 10,000 mm high is equivalent to a pressure of 1 atm.

bromatology Food science.

bromine An element that is essential to a wide variety of species. Symbol, Br; atomic number, 35; atomic weight, 79.909; oxidation states, -1, +1, +5; most abundant isotope, ⁷⁹Br; a radioactive isotope, ⁸²Br, half-life, 35.4 hours, radiation emitted, beta particles and gamma rays.

5-bromodeoxyuridine A thymidine analogue used as an antiviral drug. *Abbr* BUDR. *Aka* 5-bromouracildeoxyriboside.

5-bromouracil A mutagenic pyrimidine analogue that is readily incorporated into DNA in place of thymine to produce transitions. *Abbr* BU.

Bronsted acid A molecule or an ion that acts as a proton donor.

Bronsted base A molecule or an ion that acts as a proton acceptor.

Bronsted catalysis law A quantitative expression of the fact that general acid or base

catalysis of a given reaction is primarily a function of the acid or base strength of the catalyst. This may be stated as $\log k = a \log K + b$, where k is the rate constant of the reaction, a and b are constants, and K is either the dissociation constant in the case of an acid catalyst or the reciprocal of the dissociation constant of the conjugate acid in the case of a base catalyst. *Aka* Bronsted equation.

Bronsted-Lowry theory The theory that describes acids as proton donors and bases as proton acceptors.

Bronsted plot A plot of the logarithm of the rate constant versus the negative logarithm of the dissociation constant. *See also* Bronsted catalysis law.

bronzed diabetes A disease characterized by the presence of excessive amounts of glucose in the urine as a result of the deposition of iron in the pancreas, liver, and other organs. *See also* hemochromatosis.

broth A complex liquid medium for growing bacteria; commonly refers to nutrient broth or any medium based on it.

brown adipose tissue BROWN FAT.

brown fat A special type of adipose tissue that serves to generate heat from fat oxidation. The fat cells are characterized by the presence of numerous fat droplets. The tissue is brown because it contains many mitochondria which, in turn, are rich in red-brown cytochromes. These specialized mitochondria dissipate the energy from electron transport as heat to maintain body temperature, especially in young and hibernating animals. *See also* white fat.

Brownian motion The random, thermal motion of solute molecules that is due to their continual bombardment by molecules of the solvent. *Aka* Brownian movement.

browning reactions A group of complex reactions, both enzymatic and nonenzymatic, that occur in various foods upon processing and/or storage; the enzymatic reactions are thought to involve the oxidation of phenolic compounds, and the nonenzymatic reactions are thought to involve caramelization, decomposition of ascorbic acid, and the Maillard reaction.

BrUrd 5-Bromouridine.

brush border membrane The plasma membrane of certain epithelial cells that is characterized by the presence of many microvilli, frequently packed together like the bristles of a brush. The brush border membrane of the epithelial cells of the small intestine plays an important role in digestion; it contains many hydrolytic enzymes in its microvilli.

BSA Bovine serum albumin.

BSV Bushy stunt virus.

BTU British thermal unit.

B-type particles One of two types of particles (A and B) seen in electron microscope preparations of mouse mammary tumors; now referred to as the mouse (or murine) mammary tumor virus (MMTV) which belongs to the group of leukoviruses. B-type particles differ from C-type particles in that they have an intracellular precursor from which they develop (A-type particles) and have an eccentrically situated genome in the virion. *Aka* B-type virus.

B-type virus *See* B-type particles.

BU 5-Bromouracil.

bubble structure 1. EYE STRUCTURE. 2. D-LOOP.

budding 1. A form of reproduction in which a daughter cell is produced in yeast and other fungi. 2. An outfolding of the host cell wall through which some phages that have infected the cell release their progeny.

BUDR 5-Bromodeoxyuridine.

bufadienolide A steroid that is a 24-carbon homologue of a cardenolide and occurs as a cardiac glycoside in plants and toads.

bufanolide The fully saturated system of the lactones that occur in toad poison.

buffalo black NBR AMIDO BLACK 10B.

buffer A solution containing a mixture of a weak acid and its conjugate weak base that is capable of resisting substantial changes in pH upon the addition of small amounts of acidic or basic substances.

buffer capacity 1. The number of equivalents of either protons or hydroxyl ions that is required to change the pH of 1 L of a 1 M buffer by one pH unit; equal to $(1/m)(dn/dpH)$, where m is the number of moles of buffer, and dpH is the change in pH produced by the addition of dn equivalents of either protons or hydroxyl ions. 2. BUFFER VALUE.

buffer index BUFFER VALUE.

buffer molarity The total concentration of both buffer components. Thus, a 0.1 M $H_2PO_4^-/HPO_4^{2-}$ buffer refers to one in which the sum of the concentrations of the $H_2PO_4^-$ and HPO_4^{2-} forms is 0.1 M.

buffer value The number of equivalents of either protons or hydroxyl ions that is required to change the pH of a buffer by one pH unit; equal to dn/dpH , where dpH is the change in pH produced by the addition of dn equivalents of either protons or hydroxyl ions.

buffy coat The thin layer of white blood cells that forms at the surface of the packed layer of red blood cells when unclotted blood is centrifuged.

building block A molecule that serves as a structural unit in a biopolymer; a biomonomer.

bulbogastrome A substance, released by duodenal cells, that inhibits gastric secretion.

bulk element An element, such as carbon, hydrogen, oxygen, nitrogen, calcium, magnesium, sodium, potassium, phosphorus, and sulfur, that is an essential nutrient for an organism and that is required in relatively large amounts (of the order of grams/day) for humans and animals. *See also* trace elements; macronutrients; micronutrients.

BUN Blood urea nitrogen.

bundle sheath cells The inner layer of cells in the leaves of C_4 plants; site of the reactions of the Calvin cycle which follow preliminary fixation of CO_2 that occurs in the mesophyll cells.

bundling proteins One of a number of proteins that bind to the sides of actin filaments and cause their association into bundles.

α -bungarotoxin *See* alpha bungarotoxin.

Bunsen absorption coefficient The number of gas volumes that are dissolved by one volume of liquid when the liquid is equilibrated with the gas under 1 atm of pressure; the gas volume is calculated as that volume occupied by the gas at 0°C and 1 atm of pressure. *Aka* Bunsen solubility coefficient.

Bunsen-Roscoe law RECIPROCITY.

Bunsen solubility coefficient BUNSEN ABSORPTION COEFFICIENT.

buoyancy factor The term $1 - \bar{v}\rho$ that appears in equations pertaining to hydrodynamic methods of studying macromolecules, where \bar{v} is the partial specific volume of the solute and ρ is the density of the solution.

buoyant density The density of a molecule as determined by density gradient sedimentation equilibrium.

buret A graduated tube with stopcock used for delivery of known volumes of liquid as in a titration. *Var sp* burette.

buried residue MASKED RESIDUE.

Burkitt's lymphoma A lymphoma, afflicting children in Africa, from which the Epstein-Barr virus has been isolated.

Burnet's theory CLONAL SELECTION THEORY.

bursa of Fabricius A sac-like structure in birds where B lymphocytes mature into antibody-secreting plasma cells.

bursicon A insect polypeptide hormone that appears after molting and that promotes the tanning and hardening of cuticle.

burst 1. The rapid pre-steady-state release of the first product in a ping-pong mechanism. 2. The explosion of a phage-infected bacterial cell that is accompanied by the release of

phage particles into the medium. *See also* respiratory burst.

burst size The average number of phage particles released per infected bacterial cell; equal to the ratio of the final titer to the initial titer in a phage multiplication cycle.

burst titration A titration procedure for the active site of an enzyme; based on measuring the increase in absorbance due to the release of a chromogenic product from the stoichiometric reaction between a suitable substrate and the active site of the enzyme. *See also* reverse burst titration.

Busch theory A theory of carcinogenesis that postulates three stages of disease referred to as initiation, promotion, and acceleration. According to this theory, a portion of the DNA is responsible for carcinogenesis and is inhibited in normal cells by combination with a suppressor protein. The carcinogen binds to the cancer DNA-suppressor complex in the initiation stage, releases the DNA in the promotion stage, and allows it to form cancer RNA in the acceleration stage.

bushy stunt virus *See* tomato bushy stunt virus.

busulfan A mutagenic alkylating agent.

butanediol fermentation BUTYLENE GLYCOL FERMENTATION.

butanol fermentation *See* acetone-butanol fermentation.

butterfly mode A mode of DNA replication observed in some animal viruses and plasmids; so called because a partially replicated molecule resembles the shape of

a butterfly. The unreplicated portion is supercoiled and the replicated portion is untwisted in the form of two loops.

butyl alcohol fermentation *See* acetone-butanol fermentation.

butylene glycol fermentation The fermentation of glucose, characteristic of *Aerobacter aerogenes* and related forms, that yields primarily butylene glycol and ethanol, and secondarily a number of other products.

butyric-butylic fermentation The fermentation of glucose that yields butyric acid, *n*-butanol, acetone, and isopropanol in varying proportions.

B virus *See* oncornavirus; B-type particle; hepatitis.

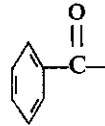
B vitamin *See* vitamin B complex.

bypass *See* metabolic bypass.

by-product A minor product in a chemical reaction.

byte A sequence of bits, usually 8, that is treated as a unit by a computer and that stores a unit of information.

bz The benzoyl group; the acyl group derived from benzoic acid; the grouping



bzl The benzyl group; the grouping $C_6H_5^-$ derived from benzene.

C

c 1. Concentration. 2. Curie. 3. Centi.

C 1. Cytosine. 2. Cytidine. 3. Cysteine. 4. Carbon. 5. Degree Celsius (centigrade). 6. Complement. 7. Coulomb. 8. Heat capacity.

¹⁴C A radioactive isotope of carbon that has a half-life of 5730 years and emits beta particles.

C23 Nucleolin.

Ca Calcium.

CAAT box A nucleotide sequence, present in many eukaryotic promoters at about 75 base pairs upstream from the site at which transcription starts. It has the consensus sequence GG(T/C)CAATCT in which T and C are equally frequent at the third position from the left.

cable properties The electrical characteristics of an axon that are involved in the passive spread of an electrical signal.

cachectin TUMOR NECROSIS FACTOR.

cachexia The malnutrition and wasting of bodily tissue that is produced by chronic diseases, such as the drain on host nutrients produced by the proliferation of cancer cells.

C₄ acid cycle HATCH-SLACK-KORTSCHAK PATHWAY.

CaCl₂ transformation See calcium chloride transformation.

cacodylic acid Dimethylarsinic acid [(CH₃)₂AsO₂H]. Cacodylate buffers are used in preparing fixatives for electron microscopy.

cadaverine A five-carbon polyamine that contains two amino groups; a biogenic amine formed by decarboxylation of lysine; 1,5-diaminopentane.

Ca²⁺-dependent regulatory protein CALMODULIN.

cadmium An element that is essential to humans and animals. Symbol, Cd; atomic number, 48; atomic weight, 112.40; oxidation state, +2; most abundant isotope, ¹¹⁴Cd; a radioactive isotope, ¹⁰⁹Cd, half-life, 453 days, radiation emitted, gamma rays.

CAF See calpain.

caffeine A purine alkaloid (1,3,7-trimethylxanthine) that occurs in coffee beans and tea leaves and that has a stimulatory effect on the central nervous system. Caffeine inhibits the phosphodiesterase that converts cyclic AMP to inactive 5'-AMP; this prolongs the adrenalin-producing effect of cyclic AMP.

cage A cavity or enclosed region in the solvent structure into which solute molecules can fit. See also clathrate.

caged ATP A derivative of ATP [P^3 -1-(2-nitro)phenylethyladenosine] which, upon hydrolysis, yields ATP.

Cahn-Ingold-Prelog sequence rules RS SYSTEM.

Cairns experiment An experiment that provided evidence for the existence of one replicating fork per molecule of DNA undergoing replication. The experiment consisted of labeling the DNA of growing *E. coli* cells with tritiated thymine, isolating the DNA by mild procedures, and determining the distribution of label in the DNA by means of radioautography.

Cairns model The bidirectional mode of replication of double-stranded circular DNA in which the two replicating forks move in opposite directions as is the case for the replication of bacterial DNA.

Cairns molecule THETA STRUCTURE.

cal Small calorie.

Cal Large calorie; a kilocalorie, equal to 1000 small calories.

calcifediol Trivial name, proposed for 25-hydroxycholecalciferol.

calciferol ERGOCALCIFEROL.

calcifetriol Trivial name, proposed for 1,25-dihydroxycholecalciferol.

calcification The formation of calcium salt deposits in a tissue.

calcified Having undergone calcification.

calmedin One of a group of Ca²⁺-binding proteins that occur in several tissues and that differ from calmodulin in their isoelectric points, DEAE-cellulose binding characteristics, and heat stability.

calcineurin An inhibitory protein, composed of two subunits, that is located in nervous tissue and that binds both Ca²⁺ ions and calmodulin. The binding of calcineurin to calmodulin prevents the activation of several Ca²⁺-dependent enzymes by calmodulin. Aka calmodulin-binding protein; inhibitory protein of cyclic nucleotide phosphodiesterase.

calcitonin A polypeptide hormone that lowers the level of calcium in the blood and that is secreted by both the thyroid and the parathyroid glands. *Abbr* CT.

calcium An element that is essential to all plants and animals. Symbol, Ca; atomic number, 20; atomic weight, 40.08; oxidation state, +2; most abundant isotope, ⁴⁰Ca; a radioactive isotope, ⁴⁵Ca, half-life, 165 days,

radiation emitted, beta particles.

calcium-activated factor CALPAIN.

calcium-activated neutral proteinase CALPAIN.

calcium chloride transformation A common technique for cloning DNA that has been inserted into a plasmid; involves mixing recipient bacteria and the modified plasmid in a solution of cold CaCl_2 . In such a solution, bacteria can take in DNA molecules and thus a plasmid is easily transferred from one strain to another.

calcium-dependent proteinase CALPAIN.

calcium-dependent regulatory protein CALMODULIN.

calcium phosphate gel A gel prepared from calcium chloride and trisodium phosphate and used in the purification of proteins by adsorption chromatography.

calcium pump The structure and/or the mechanism that mediates the active transport of calcium across a biological membrane. A primary active transport mechanism in which a Ca^{2+} -ATPase spans the membrane in an asymmetric fashion.

calculus (*pl* calculi). A hard aggregate or stone that is found in the body and that may consist chiefly of inorganic matter, as in the case of kidney stones, or of organic matter, as in the case of uric acid stones associated with gout.

caldesmon A calmodulin-binding protein that is unique in that it also binds F-actin. The former binding is Ca^{2+} -dependent, the latter is not. Formation of the two complexes is regulated by Ca^{2+} which functions as a flip-flop switch.

calelectrin One of a group of proteins that occur in the electric organ of *Torpedo marmorata* and in several mammalian tissues. They have synexin-like activity and become associated with the plasma membrane in a Ca^{2+} -dependent manner; they exist in various states of aggregation (from 32,500 to 67,000 daltons) and include such proteins as chromobindin, synhibin, and endonexin.

calibration The standardization and graduation of a measuring instrument.

calibration curve STANDARD CURVE.

C-alkaloids CURARE ALKALOIDS.

callose A linear homopolysaccharide that occurs in higher plants and that is composed of D-glucose units linked by means of $\beta(1 \rightarrow 3)$ glycosidic bonds.

callus A mass of relatively undifferentiated cells formed from a single plant cell in tissue culture.

calmodulin A calcium-binding protein in eukaryotic cells which mediates the control of a large number of enzymes by Ca^{2+} . The process generally involves two steps: a binding of Ca^{2+} to calmodulin, accompanied by a conformational change of the protein,

followed by the binding of the calmodulin- Ca^{2+} complex to an enzyme, resulting in enhanced enzymatic activity. *Abbr* CAM; CaM.

calomel Mercurous chloride.

calomel electrode A reference electrode for pH measurements that contains mercury, mercurous chloride, and a saturated solution of potassium chloride.

caloric intake The caloric equivalent of the food ingested, calculated on the basis of the energy yield obtainable by complete oxidation of the food.

caloric value The quantity of heat, generally expressed in kilocalories per gram, that is released when a foodstuff is subjected to complete oxidation; the heat of combustion of a foodstuff. *Aka* calorific value.

calorie A measure of energy equal to the amount of heat required to raise the temperature of 1.0g of water by 1°C (from 14.5 to 15.5°C) at a pressure of 1 atm; 1 calorie = 4.184 J. *Abbr* cal. *Aka* small calorie. *See also* empty calorie; large calorie.

calorific Of, or pertaining to, the production of heat.

calorigenesis The production of heat or energy in an organism; an increase in heat or energy production; an increase in oxygen consumption.

calorigenic Of, or pertaining to, calorigenesis.

calorigenic action SPECIFIC DYNAMIC ACTION.

calorimeter An instrument for measuring the heat that is either absorbed or released by a chemical reaction or by a group of chemical reactions.

calorimetry The measurement of the heat change in a chemical reaction or a group of chemical reactions, either in an in vitro system or in an intact organism.

calpain Calcium-dependent papain-like proteinase; one of a group of calcium-activated neutral proteinases. The calpains are sulfhydryl proteases that have about 33% sequence homology, around the catalytic SH-group, with the enzyme papain. *Aka* calcium-activated factor (CAF); calcium-activated neutral proteinase (CANP); calcium-dependent proteinase (CAP, CDP).

calpastatin A specific protein inhibitor of the calpains which has been isolated from a variety of mammalian and avian tissues; the molecular weight of the protein varies from 24,000 to 400,000, depending on the source and the method of extraction.

calsequestrin An acidic glycoprotein, rich in aspartic and glutamic acids, that is present in the sarcoplasmic reticulum where it binds more than 40 Ca^{2+} ions per molecule of protein. It serves to store Ca^{2+} and to release it upon muscle contraction.

Calvin cycle A cyclic set of reactions, occurring in chloroplasts, that results in the fixation of carbon dioxide and in its conversion to glucose by means of the ATP and the NADPH formed in the light reaction of photosynthesis. *Aka* Calvin-Bassham cycle; Calvin-Benson cycle.

calvinosome A prokaryotic compartment containing all of the enzymes of the Calvin cycle for autotrophic carbon dioxide fixation.

Calvin plant C_3 plant.

CaM Calmodulin.

CAM 1. Calmodulin. 2. Cell adhesion molecule. 3. Chloramphenicol.

camera lens A lens that focuses an image on a photographic plate.

cAMP Cyclic AMP.

Campbell model *See* insertion model.

cAMP-CRP The complex formed between cyclic AMP (cAMP) and cyclic AMP receptor protein (CRP).

cAMP-dependent protein kinase One of a group of enzymes in animal cells that mediate the effect of cyclic AMP; they catalyze the transfer of a phosphate group from ATP to a serine or a threonine residue of a protein in the target cell.

cancellous bone *See* lamellar bone.

cancer 1. A disease of multicellular organisms that is characterized by seemingly uncontrolled cellular growth and by the spreading within the organism of apparently abnormal forms of the organism's own cells; cancer cells thus show excessive multiplication, autonomy with respect to the host, and invasiveness (metastasis). 2. A malignant tumor.

cancer biochemistry The biochemistry of cancer cells. *See also* first law of cancer biochemistry; second law of cancer biochemistry.

cancer gene ONCOGENE.

cancer-inducing virus ONCOGENIC VIRUS.

cancerocidal Capable of killing cancer cells.

cancerogenesis CARCINOGENESIS.

cancer theory *See* theory of cancer.

cancroid 1. *n* A skin tumor of low malignancy. 2. *adj* Cancer-like.

candidate hormone A substance whose hormonal status is not yet clearly established; vasoactive intestinal peptide, enteroglucagon, bombesin, motilin, and urogastrone are some examples.

cane sugar Sucrose isolated from sugar cane.

canine Of, or pertaining to, dogs.

cannabinol *See* THC.

cannabis *See* hashish.

canonical sequence CONSENSUS SEQUENCE.

canonical structure Any one of the possible resonance structures of a compound.

CANP Calcium-activated neutral proteinase.

cap 1. The modified 5'-end of eukaryotic

mRNA. The cap is introduced enzymatically shortly after initiation of mRNA synthesis and consists of 7-methylguanosine-5'-monophosphate linked 5' → 5' via a phosphate group to the terminal nucleotide of the mRNA [(7-MeG)-5'-ppp-terminal nucleoside]. In unicellular eukaryotes, such as yeast and slime molds, this is the predominant structure and it is designated as Cap 0. In multicellular eukaryotes (animals), the predominant structure has an additional methyl group at the 2'-position of the original terminal nucleotide; this structure is designated as Cap 1. In some cases, there is a further methylation at the 2'-position of the next nucleotide and this structure is designated as Cap 2. The cap is believed to be necessary for efficient protein synthesis by serving to protect the mRNA against degradation by nucleases. 2. A network of antigens and antibodies that forms on the surface of a cell and then redistributes itself to one region of the cell surface. *Aka* cell cap.

CAP 1. Catabolite activator protein. 2. Calcium-dependent proteinase. 3. Calf intestine alkaline phosphatase.

capacitance An electrical unit equal to the total charge that can be stored in a condenser divided by the potential difference across the plates.

capillarity The action by which the surface of a liquid, where it is in contact with a solid, is either elevated or depressed as a result of the relative attractions of the molecules of the liquid for each other and for the molecules of the solid.

capillary 1. *n* A tube or a vessel having a very small diameter. 2. *adj* Of, or pertaining to, a tube or a vessel having a very small diameter.

capillary action CAPILLARITY.

capillary attraction The force of adhesion between a solid and a liquid in capillarity.

capillary precipitin test RING TEST.

capillary viscometer An instrument for measuring the viscosity of a liquid from the time required for a given volume of the liquid to flow through a capillary. *See also* Ostwald viscometer.

capneic Descriptive of organisms that actually require increased carbon dioxide tensions, rather than reduced oxygen tensions, for growth.

capon test A bioassay for androgen activity that is based on the stimulation of comb growth in capons. Castration of a capon causes secondary sex characteristics to disappear and this can be counteracted by administration of androgens. A capon unit is defined as the amount of androgen that, when administered to a castrated capon, causes an

increase of 20% in the surface area of the degenerated comb.

capped 5'-end The 5'-end of eukaryotic mRNA that carries a methylated cap.

capping 1. Addition of a methylated cap to eukaryotic mRNA. 2. Formation of a cell cap composed of antigen-antibody complexes. 3. The lateral movement of some membrane proteins to specific sites or zones in the membrane according to the fluid mosaic model.

capping proteins Proteins that bind selectively to one or the other end of actin filaments and microtubules which are subject to tread-milling.

capric acid A saturated fatty acid that contains 10 carbon atoms; the systematic name decanoic acid is preferred.

caprin The triacylglycerol (triglyceride) of capric acid.

caprine Of, or pertaining to, goats.

caprinized vaccine A vaccine that contains live organisms whose virulence has been decreased by serial passage through goats.

CAPS 3-(Cyclohexylamino)-1-propanesulfonic acid; used for the preparation of biological buffers in the pH range of 9.7 to 11.1 *See also* biological buffers.

capsid The protein coat, composed of capsomers, that surrounds the nucleic acid of a virus and determines the overall shape of the virus.

capsomer The morphological unit, one or more of which constitute the viral capsid. The capsomer, in turn, consists of one or more structural units, called protomers or monomers. A capsomer that consists of five structural units is known as a pentagonal capsomer, or pentamer, and a capsomer that consists of six structural units is known as a hexagonal capsomer, or hexamer. *Var sp* capsomere.

capsular polysaccharide A polysaccharide that is a component of a bacterial capsule and that is frequently antigenic.

capsule A loose gel- or slime-like structure that is rich in polysaccharides and that frequently coats the outer surface of a bacterial cell wall. Capsules may be divided into three categories: (a) macrocapsules, which are sufficiently thick to be detected by light microscopy; (b) microcapsules, which are too thin to be detected by light microscopy but can be detected by serological techniques; and (c) slime layers, which are diffuse secretions that adhere loosely to the cell wall and have no definite borders; they generally become dispersed in the medium when the organism is grown in liquid culture. *See also* cell coat.

capsule swelling reaction QUELLUNG REACTION.

capture cross section The product of the probability that a particle impinging on an atomic nucleus will be captured by that nucleus and the cross-sectional area of the nucleus (in barns).

caramelization The browning of sugars when they are heated above their melting points.

carbamide UREA.

carbamino compound A compound formed by the reaction of carbon dioxide with a primary aliphatic amine.

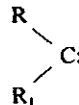
carbaminohemoglobin The carbamino compound that is formed by the reaction of hemoglobin with carbon dioxide and that represents one of the forms in which carbon dioxide is transported by the blood.

carbamoyl group The acyl group of carbamic acid; the radical $\text{H}_2\text{NCO}-$. *Aka* carbamyl group.

carbamoyl phosphate The high-energy compound $\text{NH}_2-\text{COO}-\text{PO}_3\text{H}_2$ that functions in the urea cycle, ammonia fixation, and pyrimidine biosynthesis. *Aka* carbamylating agent; carbamyl phosphate.

carbanion A carbon anion; the species R_3C^- in which the carbon atom carries an unshared pair of electrons. A carbanion is formed by removal of a group attached to the carbon atom without removing the pair of bonding electrons.

carbene A neutral organic compound that contains a divalent carbon atom and that is formed by removal of two groups attached to one carbon atom together with one pair of the bonding electrons; the species



carbocation CARBONIUM ION.

carbocyclic Of, or pertaining to, an organic compound that has a ring structure consisting only of carbon atoms.

carbohydrazase An enzyme that catalyzes the hydrolysis of glycosidic bonds in carbohydrates; a glycosidase.

carbohydrate An aldehyde or a ketone derivative of a polyhydroxy alcohol that is synthesized by living cells. Carbohydrates may be classified either on the basis of their size into mono-, oligo-, and polysaccharides, or on the basis of their functional group into aldehyde or ketone derivatives.

carbohydrate tolerance test *See* glucose tolerance test; galactose tolerance test.

carbolic acid PHENOL (1).

carbolygase The enzyme that catalyzes the formation of acetoin from acetaldehyde and active acetaldehyde.

carbometer An instrument for measuring the carbon dioxide content of breath.

carbon An element that is essential to all plants and animals. Symbol, C; atomic number, 6; atomic weight, 12.01115; oxidation states, -4, +2, +4; most abundant isotope, ^{12}C ; the stable isotope, ^{13}C ; a radioactive isotope, ^{14}C , half-life, 5730 years, radiation emitted, beta particles.

carbonaceous Consisting in part, or entirely, of carbon.

carbon assimilation CARBON DIOXIDE FIXATION.

carbon chain A chain of covalently linked carbon atoms.

carbon clearance test See phagocytic index (2).

carbon clock The radioactive isotope of carbon, ^{14}C , that is used in radiocarbon dating for establishing the age of biological remains.

carbon cycle 1. The set of reactions whereby photosynthetic organisms reduce carbon dioxide to carbohydrates and heterotrophic organisms oxidize the carbohydrates back to carbon dioxide. 2. CALVIN CYCLE. 3. A series of thermonuclear reactions in the sun believed to be responsible for the energy released by it.

carbon dating See radiocarbon dating.

carbon dioxide assimilation CARBON DIOXIDE FIXATION.

carbon dioxide capacity of plasma See carbon dioxide combining power of plasma.

carbon dioxide combining power of plasma The maximum amount of carbon dioxide that 100 mL of plasma can hold in the form of bicarbonate when the plasma is saturated with carbon dioxide at a tension corresponding to the tension of carbon dioxide in normal arterial blood.

carbon dioxide compensation point The concentration of carbon dioxide, at a given light intensity, at which the rate of CO_2 fixation by a plant (photosynthesis) is equal to the rate of photorespiration. See also light compensation point.

carbon dioxide fixation The photosynthetic conversion of carbon dioxide to carbohydrates. See also Calvin cycle.

carbon dioxide transport The carrying of carbon dioxide by the blood from the tissues to the lungs.

carbon fixation CARBON DIOXIDE FIXATION.

carbon-fixation cycle CALVIN CYCLE.

carbonic anhydrase The enzyme, located in the erythrocytes, that catalyzes the reversible decomposition of carbonic acid to carbon dioxide and water in the course of respiration.

carbonium ion A carbon cation; the species R_3C^+ that is formed by the removal of a group attached to a carbon atom together with the pair of bonding electrons. Thus, the

carbon has only six electrons in its valence shell.

carbon monoxide hemoglobin CARBOXYHEMOGLOBIN.

carbon number EQUIVALENT CHAIN LENGTH.

carbon-oxygen cycle CARBON CYCLE (1).

carbon radical A radical formed from a compound by removal of a group attached to a carbon atom together with one of the two bonding electrons.

carbon reduction cycle CALVIN CYCLE.

carbon skeleton The structure of a molecule considered solely in terms of its carbon atoms.

carbonyl group The grouping that occurs in aldehydes and ketones:



Carborundum Trademark for silicon carbide (SiC); an abrasive.

carboxybiotin A biotin molecule to which a molecule of carbon dioxide has been attached.

carboxydismutase RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE.

carboxyhemoglobin A hemoglobin derivative in which the sixth coordination position of the iron is occupied by carbon monoxide. *Abbr* HbCO.

carboxylation The introduction of a molecule of carbon dioxide into an organic compound.

carboxylation phase The first stage of the Calvin cycle in which one molecule of ribulose-1,5-bisphosphate is converted to two molecules of 3-phosphoglyceric acid.

carboxyl carrier protein See biotin; biocytin.

carboxylesterase An enzyme of low specificity that catalyzes the hydrolysis of esters of carboxylic acids.

carboxyl group The radical $-\text{COOH}$ of an organic acid.

carboxylic acid An organic compound containing the carboxyl group; an organic acid.

carboxyl terminal C-TERMINAL.

carboxyltransferase See acetyl-CoA carboxylase.

carboxylase An enzyme that catalyzes a decarboxylation reaction.

carboxypeptidase An exopeptidase that catalyzes the hydrolysis of amino acids in a polypeptide chain from the C-terminal. Carboxypeptidase *A* catalyzes the hydrolysis of most amino acids and leads to the sequential degradation of the polypeptide chain from the C-terminal; carboxypeptidase *B* catalyzes only the hydrolysis of C-terminal lysine and C-terminal arginine.

carboxysome A polyhedral inclusion body, present in some blue-green algae and

- autotrophic bacteria, that contains the enzyme ribulose-1,5-bisphosphate carboxylase and that functions in the fixation of carbon dioxide by these organisms.
- Carbowax** Trademark for polyethylene glycol.
- carcinoembryonic antigens** A group of plasma glycoproteins that serve as an aid for the early recognition of certain tumors and that are present in the embryo but cannot be detected shortly after birth. They can be formed again later in life in response to malignant tumors. Examples are α -fetoprotein, embryonogenic colon antigen, and Regan isoenzyme. *Abbr* CEA.
- carcinogen** A physical or a chemical agent that is capable of producing cancer.
- carcinogenesis** The production of cancer.
- carcinogenic** Capable of producing cancer.
- carcinogenic index** A measure of the activity of a carcinogen; equal to $100A/B$, where A is the number of animals bearing a tumor divided by the number of animals living on the day of appearance of the first tumor, and B is the mean time in days of the appearance of tumors.
- carcinogenicity** The capacity to produce cancer.
- carcinogenophore** A grouping of atoms in a chemical carcinogen that is primarily responsible for the carcinogenic activity of the molecule. *See also* auxocarcinogen; K region; L region.
- carcinoid** A cancer-like tumor of the gastrointestinal tract that grows slowly and rarely metastasizes.
- carcinoma** A malignant tumor, derived from epithelial cells, that can occur in a variety of sites such as skin, breast, and liver.
- carcinomatosis** A condition in which multiple carcinomas develop simultaneously in different parts of the body as a result of the widespread dissemination of a carcinoma from a primary source.
- carcinosis** CARCINOMATOSIS.
- carcinostasis** The inhibition of tumor growth.
- carcinostatic** Of, or pertaining to, carcinostasis.
- cardanolide** The fully saturated lactone system of the cardenolides.
- cardenolide** A steroid that contains 23 carbon atoms and that is characterized by a 14- β -hydroxyl group and an α,β -unsaturated γ -lactone ring; cardenolides occur as cardiac glycosides in plants and insects.
- cardiac** Of, or pertaining to, the heart.
- cardiac genins** A collective term for the steroids present in cardiac glycosides; cardenolides and bufadienolides.
- cardiac glycoside** One of a group of steroid glycosides, such as ouabain and digitalis, that act directly on the heart muscle, increasing the force of systolic contraction and thereby improving cardiac output; they also cause mild vasoconstriction and influence the $\text{Na}^+ - \text{K}^+$ transport across erythrocyte and other cell membranes.
- cardiac muscle** The involuntary, striated muscle of the heart.
- cardiac puncture** A technique for withdrawing blood from an animal by inserting a syringe directly into the heart.
- cardiolipin** The phospholipid hapten, diphosphatidyl glycerol, that is used as an antigen for reacting with the Wasserman antibody in the Wasserman test for syphilis; it accounts for more than 10% of the lipid of the inner mitochondrial membrane. *Abbr* CL.
- cardiotonic** Tending to increase the contraction of heart muscle.
- cardiotonic steroid** CARDIAC GLYCOSIDE.
- cardiotoxin** A substance that, in toxic doses, causes heart damage and may lead to heart stoppage. A cardiac glycoside is an example.
- cardiovascular** Of, or pertaining to, the heart and the blood vessels.
- cardiovirus** A virus that belongs to a subgroup of picornaviruses which includes encephalomyocarditis virus and Mengo virus.
- carriogenic** Promoting dental caries (tooth decay).
- carnitine** A compound that functions in beta oxidation by transporting fatty acyl groups across the inner mitochondrial membrane. It has been classified as a B vitamin by some investigators due to its requirement in the diets of some organisms and its solubility in water. *Sym* Vit B₁₂; Vit B₇.
- carnitine barrier** The limited ability of long-chain fatty acids to cross the inner mitochondrial membrane in the form of fatty acyl coenzyme A, as contrasted with their ability to cross the membrane in the form of fatty acyl carnitine.
- carosine** A dipeptide of β -alanine and histidine occurring in vertebrate muscle.
- carotene** A hydrocarbon carotenoid. *See also* beta carotene.
- carotenoid** A polyisoprenoid that may be linear or cyclic and that consists of eight isoprene units (a tetraterpenoid) linked largely in a head-to-tail manner. Carotenoids are water-insoluble pigments that occur in plants and photosynthetic bacteria and that frequently function as accessory pigments in photosynthesis.
- carrageenan** A mixture of polysaccharides, obtained from red algae, that forms a gel similar to that produced by agar.

carrier 1. An element or a compound that is added to a sample as an aid in the chemical manipulation of the same, but labeled, element or compound that is present in the sample. 2. Any related or unrelated substance that is added to a sample as an aid in the chemical manipulation of another substance that is present in the sample. 3. A transport agent, generally a protein or an enzyme, that combines with a substance and transports it either across a biological membrane or within a biological fluid. 4. CARRIER GAS.

carrier ampholyte The ampholyte that forms the pH gradient in isoelectric focusing, as distinct from the sample ampholyte which is fractionated.

carrier culture A culture, infected with a virus, that nevertheless maintains the multiplication of both the cells and the virus particles. Such a culture can be obtained by making most of the cells of a culture resistant to viral infection as a result of the interferon produced by a small portion of virus-infected cells present in the same culture.

carrier displacement chromatography Displacement chromatography in which either related or unrelated substances are added to the mixture being chromatographed as an aid in the chemical manipulation of the separated components.

carrier-facilitated diffusion MEDIATED TRANSPORT.

carrier-free Descriptive of a radioactive nuclide that is essentially free of its stable isotopes.

carrier gas The inert gas that functions as the mobile phase in gas chromatography.

carrier protein 1. A protein that functions as a transport agent. 2. The protein to which a hapten may be conjugated in vitro or to which it may become conjugated in vivo.

carrier state infection A viral infection in which only a small portion of the cells are infected.

Carr-Price reaction A colorimetric reaction for the determination of vitamin A that is based on the production of a blue color upon treatment of the sample with antimony trichloride.

cartilage Connective tissue that consists largely of collagen and chondroitin sulfate.

casamino acids An acid hydrolysate of casein used for bacteriological media.

cascade mechanism 1. The sequence of successive activation reactions that constitute the process of blood clotting and that achieve a continuous amplification of the initial event due to the fact that the concentrations of the components in the blood increase step by step

from the initiating factor to fibrinogen. 2. A sequence of successive activation reactions pertaining to either enzymes or hormones, such as the reaction sequences for the activation of phosphorylase, adreno-corticotropin, and complement.

casein A phosphoprotein that is the principal protein in milk.

cassette One of a group of eukaryotic DNA sequences of related loci that can be substituted for a genetically identical or different sequence by transposition. The expression of mating types in yeast is believed to involve the transposition of such cassette sequences.

castanospermine An alkaloid from the nuts of the Australian tree *Castanospermum australe* that is toxic to animals eating these nuts; a competitive inhibitor of α -glucosidases and an inhibitor of glycoprotein processing.

CAT 1. Computer of average transients; an instrument, used in conjunction with NMR spectroscopy, that permits the accumulation and averaging of spectral data and that increases the signal to noise ratio. 2. Computerized axial tomography.

catabolic Of, or pertaining to, catabolism.

catabolic deletion hypothesis An early formulation of the deletion hypothesis of cancer, according to which loss of one or more key catabolic enzymes through a deletion mutation in DNA was thought to increase the availability of building blocks for polymers and thereby permit continued cell growth. *Aka* catabolic enzyme deletion hypothesis.

catabolism 1. The phase of intermediary metabolism that encompasses the degradative and energy-yielding reactions whereby nutrients are metabolized. 2. The cellular breakdown of complex substances and macromolecules to low molecular weight compounds.

catabolite Any metabolic intermediate produced in the catabolism of food molecules.

catabolite activator protein CYCLIC AMP RECEPTOR PROTEIN.

catabolite inactivation The irreversible inactivation of some enzymes, involved in the catabolism of sugars, that is brought about by the addition of glucose to the medium. This occurs in yeast, but not in *E. coli*, and is so called to distinguish the process from catabolite repression.

catabolite repression The inhibition of the synthesis of a number of enzymes, involved in the catabolism of sugars, that is produced by glucose or closely related compounds such as glucose-6-phosphate and fructose. The effect is due to the inhibition of adenyl cyclase by

glucose and a resultant decrease in the level of cyclic AMP (cAMP). The latter must complex with the cyclic AMP receptor protein (CRP) and the complex binds to the promoters of operons subject to catabolite repression. In the absence of cAMP-CRP binding, RNA polymerase cannot bind to the promoter, and transcription of the genes coding for some of the enzymes of sugar catabolism is repressed. Catabolite repression occurs in bacteria and may also occur in yeast.

catabolite-sensitive operon One of several inducible operons that control the synthesis of enzymes, involved in the metabolism of various sugars, and that cannot be induced if glucose is present. Each of these operons is regulated by the cyclic AMP-cyclic AMP receptor protein complex.

catalase The hemoprotein enzyme that catalyzes the decomposition of hydrogen peroxide to oxygen and water.

catalysis The change in the rate of a chemical reaction, generally an increase, that is brought about by the action of a catalyst. *See also* acid-base catalysis; covalent catalysis, etc.

catalysome An organelle, found in adipose tissue, that functions in lipid metabolism; it might represent a specialized type of mitochondrion.

catalyst A substance that changes the rate of a chemical reaction, generally increasing it. A catalyst remains either unchanged during the reaction or is regenerated in its original form at the end of the reaction. A catalyst functions by changing the activation energy of the rate-determining step, by affecting the orientation of molecules in collision, or by making possible another pathway or mechanism that has a different activation energy.

catalytic Of, or pertaining to, a catalyst or catalysis.

catalytic amount The amount of substance that is used in a chemical reaction for catalytic purposes and that is much smaller than the stoichiometric amount of either a reactant or a product; a catalyst, a primer, and a sparker are all used in catalytic amounts.

catalytic antibody An antibody that has the potential of behaving like an enzyme and thus catalyzes specific reactions. Such antibodies function by stabilizing the transition states of selected chemical reactions. One approach to designing such antibodies has been to use a compound, resembling the transition state of the reaction, as an antigen for generating monoclonal antibodies.

catalytic center 1. CATALYTIC SITE. 2. A region within the catalytic site.

catalytic center activity A measure of

enzymatic activity that is equal to the number of molecules of substrate transformed into products per minute per catalytic center of the enzyme. *See also* molar activity.

catalytic constant *See* k_{cat} .

catalytic exchange method A method for randomly labeling a compound with tritium by dissolving the compound in a tritiated hydroxylic solvent in the presence of metal catalysts and either acid or base.

catalytic rate constant *See* k_{cat} .

catalytic reduction method A method for labeling a compound with tritium in which the compound is dissolved in a nonhydroxylic solvent and double bonds in the compound are reduced by exposure of the solution to tritium gas.

catalytic site The active site of an enzyme, specifically the active site of an allosteric enzyme as distinct from its regulatory site.

catalytic subunit The subunit of the regulatory enzyme aspartate transcarbamoylase that has enzymatic activity but does not bind the negative effector CTP. *See also* regulatory subunit.

catalyze To change the rate of a chemical reaction through catalysis.

cataphoresis 1. The movement of charged particles toward the cathode. 2. ELECTROPHORESIS.

catatoxic Descriptive of a substance or a condition that causes an animal to defend itself vigorously against an irritation, a toxin, or other factors.

catatoxic steroid A steroid that protects an animal against a drug by stimulating the activity of drug-metabolizing enzymes.

catch muscle A muscle, occurring in mollusks, that can remain locked in a contracted form for long periods of time.

catecholamine A dihydroxyphenylalkylamine derived from tyrosine, such as dopa, dopamine, epinephrine, or norepinephrine; they are amine-containing derivatives of catechol (1,2-dihydroxybenzene). Catecholamines affect blood vessels, intermediary metabolism, and nerve transmission.

catecholestrogen A compound formed by enzymatic hydroxylation of an estrogen; catecholestrogens are devoid of estrogenic activity and are structurally related to the catecholamines.

catechol-O-methyl transferase An enzyme that functions in the metabolism of epinephrine and norepinephrine and that utilizes S-adenosyl-L-methionine as a methyl group donor. *Abbr* COMT.

catemer CONCATEMER.

catenane A structure consisting of two

- interlocking, circular, double-stranded, DNA molecules; catenation and decatenation are catalyzed by DNA gyrase. *Aka* catenate; catenated dimer.
- catenase** A collective term for an enzyme of either the endo or the exo type that catalyzes the cleavage of a polymeric chain; ribonuclease, lysozyme, and carboxypeptidase are examples.
- catenated** Interlocked like the links in a chain; said of interlocking, circular, double-stranded DNA molecules.
- catharometer** Variant spelling of katharometer.
- cathepsin** One of a group of intracellular proteolytic enzymes that occur in most animal tissues.
- cathode** The electrode by which electrons enter a solution of electrolytes and toward which the cations move in solution. With respect to properties in solution, the cathode is a negative electrode; with respect to the external flow of electrons, the cathode is a positive electrode.
- cathodic** 1. Of, or pertaining to, the cathode. 2. Descriptive of a component that moves toward the cathode in electrophoresis.
- cation** A positively charged ion.
- cation exchanger** A negatively charged ion-exchange resin that binds cations.
- cationic detergent** A surface-active agent in which the surface-active part of the molecule carries a positive charge. *Aka* cationic surface-active agent.
- cavitand** A synthetic organic compound that contains an enforced, rigid cavity of dimensions at least equal to those of the smaller ions, atoms, or molecules. The shape of the cavity can vary and is determined by the organic chemical structure of the molecule.
- cavitation** 1. The phenomenon in a flowing liquid that entails formation of vapor bubbles in a low-pressure area and collapse of these bubbles in a subsequent high-pressure area. 2. The forcing of an inert gas, such as nitrogen, into cells under high pressure and the subsequent release of the pressure, resulting in an "explosion" of the cell membrane and cell lysis.
- CBG** Cortisol-binding globulin.
- CBN** Commission on Biochemical Nomenclature of the International Union of Pure and Applied Chemistry and the International Union of Biochemistry.
- CBZ-amino acid** An amino acid in which the amino group has been protected by attachment of a carbobenzyloxy group; used in peptide synthesis by the solid phase (Merrifield) method. *Abbr* CBZ-AA.
- cc** Cubic centimeter.
- CCA-end** ACCEPTOR END.
- CCA-enzyme** The enzyme that catalyzes addition of the segment 3'-CCA to the 3'-end (acceptor stem) of tRNA; a nucleotidyl-transferase.
- cccDNA** Covalently closed circular DNA.
- CCD** Countercurrent distribution.
- CCF** Crystal-induced chemotactic factor; a chemotactic factor of the complement system. A peptide, produced by polymorphonuclear leukocytes upon phagocytosis of crystalline substances such as monosodium urate.
- C-chain** CONNECTING PEPTIDE.
- CCK** Cholecystokinin.
- cd** Candela; a unit of luminous intensity.
- CD** Circular dichroism.
- ¹⁴C dating** See radiocarbon dating.
- cDNA** Complementary DNA; a molecule of DNA that is complementary to a molecule of RNA. The DNA synthesized by the enzyme RNA-dependent DNA polymerase (reverse transcriptase) is cDNA. Complementary DNA may be single-stranded or double-stranded. *Aka* copy DNA.
- C DNA** See DNA forms.
- cDNA clone** A double-stranded DNA segment that is complementary to an RNA molecule and that is carried in a cloning vector.
- cDNA library** A clone library that differs from a gene library in that it contains only transcribed DNA sequences (exons) and no nontranscribed sequences (introns, spacer DNA). It is established by making complementary DNA from a population of cytoplasmic mRNA molecules, using the enzyme RNA-dependent DNA polymerase (reverse transcriptase), converting the single-stranded cDNA to double-stranded DNA, and cloning the latter as in the establishment of a gene library.
- CDP** 1. Cytidine diphosphate. 2. Cytidine-5'-diphosphate. 3. Calpain.
- CDPC** CDP-choline.
- CDP-choline** A cytidine diphosphate derivative of choline that serves as a donor of a choline residue for the synthesis of certain phosphoglycerides.
- CDP-sugar** Cytidine diphosphate sugar; an activated form of carbohydrates. CDP-glucose functions in the biosynthesis of cellulose in some plants and CDP-ribitol functions in the biosynthesis of bacterial cell walls.
- CDR** Calcium-dependent regulatory protein; calmodulin.
- CEA** Carcinoembryonic antigen.
- Celite** Trademark for a preparation of diatomaceous earth.
- cell** 1. The fundamental unit of living organisms; a structure that is capable of

independent reproduction and that consists of cytoplasm and a nucleus, or a nuclear zone, surrounded by a cell membrane. 2. An electrical device capable of converting chemical energy into electrical energy, or vice versa; consists of two half-cells, each of which is characterized by a half-reaction. 3. A small container, such as that which holds a solution subjected to centrifugation in an analytical ultracentrifuge.

cell adhesion CELL AFFINITY.

cell adhesion molecule A neuronal cell surface glycoprotein that helps to mediate the cohesive interactions between developing neurites. *Abbr* CAM.

cell affinity The property of eukaryotic cells of a given type to adhere to each other but not to cells of a different type. *Aka* cell adhesion.

cell-associated virus The virus that is released into the medium upon the disruption of infected cells which have previously been washed to remove extracellularly adsorbed virus.

cell blotting One of a number of techniques in which cells are blotted on nitrocellulose paper and then reacted with a dye, a protein, or some other substance.

cell body PERIKARYON.

cell cap CAP (2).

cell cloning *See* cloning.

cell coat The covering of the outer surface of many eukaryotic cells that is rich in glycoproteins and mucopolysaccharides; it plays a role in contact inhibition. *See also* capsule.

cell count *See* total cell count; viable cell count.

cell culture The in vitro growth of either single cells or groups of cells that are not organized into tissues.

cell cycle The sequence of events occurring in a eukaryotic cell from one mitotic division to the next. The cell cycle is commonly divided into four periods: a mitotic phase (M), a DNA synthesis phase (S), and two gap phases (G) which separate the mitotic and synthesis phases. The sequence of phases is M, G₁, S, G₂; the G₂ phase is then followed by another mitotic phase, and so on.

cell-detaching factor PENTON.

cell differentiation *See* differentiation.

cell disruption The breakage of cells.

cell division The process whereby a parent cell divides, giving rise to two daughter cells.

cell envelope CELL MEMBRANE.

cell factor A protein that is produced by cells of solid tumors, occurring in humans and animals, and that may be produced in very small quantities by normal cells. The cell factor is an arginine-specific protease that acts

as a plasminogen activator and thereby leads to proteolysis of fibrin.

cell fractionation The separation of subcellular components; entails breakage of cells by such techniques as lysis, ultrasonication, or grinding, followed by removal of unbroken cells and cell debris (typically by ultracentrifugation) and fractionation of the remaining cell-free extract by such techniques as ultracentrifugation, electrophoresis, precipitation, or chromatography.

cell-free amino acid incorporating system A reconstituted cell-free system for the in vitro study of protein synthesis. It generally consists of ribosomes, messenger RNA (natural or synthetic), transfer RNA, enzymes, amino acids, ATP, GTP, an ATP regenerating system, buffer, and other inorganic and organic compounds.

cell-free extract A cytoplasmic extract of cells, prepared by rupturing the cells and removing unbroken cells and cell debris, commonly by centrifugation.

cell-free protein synthesis *See* cell-free amino acid incorporating system.

cell-free system A system composed of subcellular fractions and/or cell-free extracts, but devoid of intact cells.

cell fusion HYBRIDIZATION (3).

cell hybridization HYBRIDIZATION (3).

cell interaction genes A number of genes in the major histocompatibility complex of the mouse that affect the ability of various cellular components of the immune system to mount an effective immune response.

cell junction A specialized intercellular region formed by the interaction of two eukaryotic cell membranes. Cell junctions are grouped into three functional categories: (a) adhering junctions, which hold cells together mechanically (spot desmosomes, belt desmosomes, and hemidesmosomes); (b) impermeable junctions, which hold cells together and seal them so that molecules cannot leak in between them (tight junctions and septate junctions); and (c) communicating junctions, which mediate the passage of small molecules from one cell to another (gap junctions and chemical synapses).

cell line A heterogeneous group of cells derived by the first subculturing (transfer), or at any stage during the serial subculturing, of a primary culture. *See also* established cell line.

cell-mediated immunity CELLULAR IMMUNITY.

cell-mediated lympholysis An in vitro test for cellular immunity in which activated T lymphocytes are used to destroy target cells by direct contact.

cell membrane The membrane, composed of

- lipids and proteins, that surrounds a cell; in eukaryotic cells the cell membrane is frequently covered by a cell coat, and in prokaryotic and plant cells it is covered by a cell wall.
- cellulose** A disaccharide of glucose in which the glucose molecules are linked by means of a $\beta(1 \rightarrow 4)$ glycosidic bond; the repeating unit in cellulose.
- cellogel** Gelatinized cellulose acetate; an electrophoretic support.
- Cellophane** Trade name for transparent sheets of regenerated cellulose.
- Cellosolve** Trademark for ethylene glycol monoethyl ether.
- cell plate** The structure that is formed between the two daughter nuclei of a dividing plant cell during mitosis and that is the precursor of the cell wall.
- cell renewal system** A steady-state normal cell population in an animal in which there is a rapid cell loss that is offset by a rapid replacement of cells.
- cell sap** CYTOSOL.
- cell strain** A group of cells of limited transferability that have been derived from either a primary culture or an established cell line by selection and cloning of cells that have specific properties or markers.
- cell theory** The theory, proposed by Schleiden and Schwann in 1838, that all animals and plants are composed of cells and products of cells, that cells are the structural and functional units of an organism, and that an organism grows and reproduces by cell division.
- cellular** Of, or pertaining to, cells.
- cellular immunity** Immunity that is due to cell-bound antibodies, in contrast to humoral immunity. Cellular immunity involves immune responses against invading microorganisms, including fungi, parasites, intracellular viruses, cancer cells, and foreign tissues. It is responsible for such reactions as allograft rejection and delayed-type hypersensitivity and is associated with T lymphocytes. *Aka* cellular immune response; cell-mediated immune response.
- cellular oncogene** PROTOONCOGENE.
- cellular respiration** *See* respiration (1).
- cellular retinol-binding protein** A protein, found in many tissues of the rat, that is smaller than the plasma retinol-binding protein and that binds vitamin A but does not bind transthyretin. *Abbr* cRBP.
- cellulase** An enzyme that catalyzes the hydrolysis of cellulose.
- cellulifugal** In a direction away from the center of the cell.
- cellulolytic organism** An organism that has the ability to digest (hydrolyze) cellulose because it contains a cellulase that can cleave the $\beta(1 \rightarrow 4)$ glycosidic bonds in cellulose.
- cellulose** A straight chain polysaccharide composed of glucose molecules linked by means of $\beta(1 \rightarrow 4)$ glycosidic bonds; the major structural material in the plant world.
- cellulose acetate electrophoresis** Zone electrophoresis in which a cellulose acetate sheet is used as the supporting medium.
- cellulytic** Capable of causing cell lysis.
- cell wall** The rigid structure that is external to the cell membrane and that encloses prokaryotic and plant cells; the cell wall of prokaryotic cells consists primarily of peptidoglycan and that of plant cells consists primarily of cellulose.
- CELO virus** Chick embryo lethal orphan virus; an adenovirus.
- Celsius temperature scale** A temperature scale on which the freezing and boiling points of water at 1 atm of pressure are set at 0 and 100, respectively, and the interval between these two points is divided into 100 degrees. *Aka* centigrade temperature scale.
- cementum** The calcified covering of dentine at the submerged portion of a tooth.
- Cenozoic era** The most recent geologic time period that began about 63 million years ago and that is characterized by the development of mammals.
- center of symmetry** The central point of a symmetrical body about which like faces are arranged in opposite pairs.
- centi-** Combining form meaning one-hundredth and used with metric units of measurement. *Sym c*.
- centigrade temperature scale** CELSIUS TEMPERATURE SCALE.
- centile** PERCENTILE.
- central complex** An intermediate in an enzyme-catalyzed reaction that cannot participate in a bimolecular reaction with substrate or product because all binding sites are occupied; a transitory complex that can only undergo a unimolecular reaction with release of a substrate or a product. *See also* transitory complex.
- central dogma** A description of the basic functional relations between DNA, RNA, and protein. The central dogma states that DNA serves as the template for its own replication and for the transcription of RNA, and that RNA serves as the template for translation into protein. Hence, the flow of genetic information is $\text{DNA} \rightarrow \text{RNA} \rightarrow \text{protein}$. In view of our current knowledge of reverse transcriptase and RNA replication, the central dogma must now be schematically represented as $\text{DNA} \rightleftharpoons \text{RNA} \rightarrow \text{protein}$. *Aka*

- Central dogma of molecular biology. *See also* reverse transcriptase.
- central ion** The ion, in the Debye-Hueckel theory, that is surrounded by the ion atmosphere in which there is a statistical preference for ions of opposite charge (counterions).
- central metabolic pathway** AMPHIBOLIC PATHWAY.
- central nervous system** That part of the nervous system of vertebrates that consists of the brain, the spinal cord, and the nerves originating therefrom. *Abbr* CNS.
- centrifugal elutriation** A centrifugal separation technique that is based on the sedimentation of particles through a liquid which flows in a direction opposite to the direction of particle sedimentation. A specially designed rotor is used so that particles that sediment more slowly than the flow velocity of the liquid are washed out from the rotor. The separation process is controlled by varying the flow velocity of the liquid and by varying the rotation rate of the rotor.
- centrifugal field** The space within which a centrifugal force is of sufficient strength that its effect can be detected.
- centrifugal force** The force exerted on a rotating particle and directed away from the center of rotation; the force increases with increasing distance from the center of rotation.
- centrifugal partition chromatography** A liquid chromatographic technique for separating complex mixtures of chemical substances in the absence of a solid support; involves the simultaneous application of countercurrent distribution and centrifugation. Separation columns are connected in series with column cartridges, which are arranged in a circle around the rotor of a centrifuge with their longitudinal axes parallel to the direction of the applied centrifugal force. *Abbr* CPC.
- centrifugation** The process of subjecting either a solution or a suspension to a centrifugal force to separate the components of the solution or the suspension; used for the collection of precipitates, the separation of phases, and the sedimentation of macromolecules. Separation of the components is based on differences in their size, shape, and density.
- centrifuge** An instrument capable of generating centrifugal forces by the rotation of a rotor; the rotor holds tubes filled with the solution that is being subjected to centrifugation.
- centrifuge cell** *See* cell (3).
- centrifuge head** CENTRIFUGE ROTOR.
- centrifuge rotor** *See* rotor.
- centrifuge tube** The container, constructed of glass, metal, or plastic, that holds the solution that is subjected to centrifugation.
- centriole** The central granule in the centrosome; a self-replicating organelle that consists of nine groups of microtubules, arranged in the form of a hollow cylinder.
- centripetal force** The force that is exerted on a rotating particle and that is directed toward the center of rotation.
- centromere** The junction between the two arms of a chromosome to which the spindle fibers attach during mitosis.
- centrosome** A macromolecular complex, consisting of two centrioles, satellite bodies, and differentiated cytoplasm, that is responsible for the organization of the mitotic spindle during nuclear division. *Aka* centrosphere.
- cephalic** Of, or pertaining to, the head.
- cephalin** 1. PHOSPHATIDYL ETHANOLAMINE. 2. PHOSPHATIDYL SERINE.
- cephalin-cholesterol flocculation test** A liver function test that is based on the formation of a flocculant precipitate when serum from individuals with one of several forms of hepatitis is treated with a cephalin-cholesterol suspension.
- cephalosporin** An antibiotic, produced by the mold *Cephalosporium*, that resembles penicillin in its action. *See also* beta lactam antibiotics.
- cer** Ceramide.
- ceramidase** An enzyme that cleaves the bond between the fatty acid and sphingene in ceramides.
- ceramide** An *N*-acylated sphingoid; an *N*-acyl fatty acid-substituted compound formed from sphingene, its homologues, its isomers, or its derivatives. *Abbr* cer. *See also* glycosyl ceramide.
- ceramide glycoside** *See* glycosyl ceramide.
- ceramide lactoside** *See* cytolipin.
- cercidosome** A specialized organelle in trypanosomes for terminal oxidative metabolism.
- cerebral** Of, or pertaining to, the brain.
- cerebrocuprein** A copper-containing protein present in the brain.
- cerebroside** A monoglycosyl derivative of a ceramide that generally contains either glucose or galactose and that is abundant in the myelin sheath of nerves and in brain tissue; a 1- β -glycosylceramide; a ceramide monosaccharide.
- cerebrospinal fluid** The fluid that circulates through the subarachnoid spaces of the brain and the spinal cord. *Abbr* CSF.
- Cerenkov radiation** A radiation consisting of photons and produced when high-energy beta

- particles pass through either a solid or a liquid medium at speeds greater than that of light in the same medium.
- ceride** A wax that is an ester of a long-chain fatty acid and a higher aliphatic alcohol.
- ceroid** A lipid granule that may be formed in an animal, particularly in the liver, as a result of either the injection of oils rich in unsaturated fatty acids or the ingestion of various experimental diets.
- ceroid pigment** AGE PIGMENT.
- cerotic acid** A saturated fatty acid that contains 26 carbon atoms.
- ceruloplasmin** A serum globulin that binds eight atoms of copper per molecule and that serves to transport copper in the blood; an enzyme that is also called ferroxidase I because of its ability to catalyze the oxidation of ferrous iron to the ferric state.
- cesium chloride gradient centrifugation** See density gradient sedimentation equilibrium.
- Cetavlon** Trade name for a cationic detergent and bacteriostatic agent; cetyl trimethyl ammonium bromide (CTAB).
- cevitamic acid** ASCORBIC ACID.
- CF** 1. Citrovorum factor. 2. Complement fixation.
- CF₁** Chloroplast coupling factor.
- CF₀-CF₁ complex** A chloroplast system that has very similar properties to the mitochondrial F₀F₁-ATPase.
- C form** See DNA forms.
- CFT** Complement fixation test.
- CG** Chorionic gonadotropin.
- CGA** Catabolite gene activator protein.
- C genes** Genes coding for segments of the constant regions of immunoglobulin molecules.
- cGMP** Cyclic GMP.
- cgs units** The units of measurement that are based on the centimeter-gram-second system. See also SI.
- c_H** The constant region of the heavy chains of the immunoglobulins. See also c_L.
- Ch** Choline.
- chain** 1. A group of like atoms linked together in succession. 2. A group of repeating units linked together in succession to form a polymer.
- chain conformation** The combined secondary and tertiary structure of either a polypeptide chain or a polynucleotide strand.
- chain elongation** See elongation.
- chain-growth polymer** A polymer formed by the addition of monomers to the growing chain through the breaking of double bonds in the monomers. Aka addition polymer.
- chain initiation** See initiation.
- chain isomer** One of two or more isomers that differ from each other in the manner in which the side chains are attached to the main chain and in the lengths of the chains.
- chain length** See double chain length; triple chain length.
- chain propagation** 1. CHAIN ELONGATION. 2. The second stage in a chain reaction.
- chain reaction** 1. A series of chemical reactions characterized by initiation, propagation, and termination steps. The reactions of the propagation step are such that each produces a product that can serve as a reactant for a subsequent reaction and the last reaction regenerates a reactant for the first reaction; in this fashion the entire sequence of reactions in the propagation step can be repeated over and over. 2. An autocatalytic reaction, particularly a nuclear one, in which the products react with the reactants to produce more products.
- chain termination** See termination.
- chain termination codon** See termination codon.
- chain termination mutation** A mutation in which a normal codon, that specifies an amino acid, is altered to one of the three termination codons; a nonsense mutation.
- chain terminator** A compound that stops the extension of a DNA strand during replication; 2',3'-dideoxynucleoside triphosphates, which are analogues of normal 2'-deoxynucleoside triphosphates, are an example.
- chain terminator method** SANGER-COULSON METHOD.
- chair conformation** The arrangement of atoms that resembles the outline of a chair and that is the more stable of two possible conformations for cyclohexane and other six-membered ring systems.
- chalcones** A group of yellow-orange bioflavonoids, derived from the parent compound chalcone. They occur primarily as glycosides and serve as intermediates in bioflavonoid biosynthesis.
- challenge** A dose of antigen, particularly the second or a subsequent dose, that is injected into an animal for the purpose of provoking an immune response.
- challenge virus** The virus that is introduced into a host subsequent to, or simultaneously with, the introduction of an interfering virus.
- chalone** 1. A chemical substance, such as a hypothalamic hormone, that acts like a hormone in having a target-specific effect but that is not secreted by an endocrine gland. 2. An endogenous, tissue-specific, but specifies nonspecific inhibitor of cell proliferation; a peptide, or other compound, that is a growth inhibitor. Chalones are of potential use in the control of neoplasia.
- chance variable** VARIATE.
- channel** 1. The interval between the settings of

the two discriminators in a scintillation detector that defines the range of pulse intensities that will be recorded by the system. *See also* differential counting. 2. An opening in a biological membrane through which transport of solutes may occur. A channel is generally presumed to be a water-filled passage, lined by hydrophilic groups of integral membrane proteins. *See also* ionophore.

channeling The control of a biosynthetic pathway brought about by having an assembly of enzymes such that metabolic intermediates pass directly from one enzyme to the next. In this way, metabolites are channeled along the pathway with restricted opportunity for their diffusion into the medium or their entry into the general intracellular metabolic pool. Nucleotide biosynthesis appears to involve such a control system. *Aka* processivity.

channel protein A protein that mediates passive transport across a biological membrane by forming an aqueous channel through which solutes of appropriate size and charge can diffuse.

channels ratio method A method of correcting for quenching in liquid scintillation counting by using two channels to measure the average energies of pulses of beta particles both before, and after, quenching.

chaotic oscillations *See* oscillating reactions.

chaotropic agent A substance that enhances the partitioning of nonpolar molecules from a nonaqueous to an aqueous phase as a result of the disruptive effect that the substance has on the structure of water. Chaotropic agents tend to solubilize hydrophobic (nonpolar) molecules; they are generally ions, such as thiocyanate (SCN^-), perchlorate (ClO_4^-), and trichloroacetate (CCl_3COO^-), that have a large radius, a single negative charge, and a low charge density; they are used to solubilize membrane-bound proteins, to alter the secondary and tertiary structure of proteins and nucleic acids, and to increase the solubility of small molecules. *See also* antichaotropic agent.

chaotropic series An arrangement of ions in the order of their effectiveness as chaotropic agents.

CHAPS 3-[(3-Cholamidopropyl)dimethylammonio]-1-propanesulfonate; a nondenaturing, zwitterionic detergent used for membrane biochemistry.

CHAPSO 3-[(3-Cholamidopropyl)dimethylammonio]-2-hydroxy-1-propanesulfonate; an unusual detergent that has a high critical micelle concentration (8 mM) and that does not denature membrane bound proteins.

characteristic The whole-number part of a logarithm.

characteristic curve A plot of the potential applied to a radiation detector versus the count rate.

characteristic ratio A quantity that describes the variation of a real polymer from a random flight chain; equal to the ratio of the square of the average end-to-end distance of the polymer divided by the square of the end-to-end distance of the random flight chain.

Chargaff's rules A set of two quantitative rules that express the base composition of double-stranded, Watson-Crick-type DNA: (1) $[\text{A}] = [\text{T}]$; (2) $[\text{G}] = [\text{C}]$, where the brackets indicate concentrations of the bases in mole percent and any minor bases, if present, are included in the appropriate concentration terms. Three corollaries follow from these rules: (a) $[\text{A}]/[\text{T}] = [\text{G}]/[\text{C}] = 1$; (b) Σ purines = Σ pyrimidines; (c) $[\text{A}] + [\text{C}] = [\text{G}] + [\text{T}]$, or Σ 6-aminobases = Σ 6-ketobases according to the former numbering system of purines and pyrimidines.

charge density The net electrical charge of a particle per unit surface area of the particle.

charged polar amino acid A polar amino acid that carries a charge in the intracellular pH range of about 6 to 7.

charged tRNA A transfer RNA molecule to which an amino acid has been covalently linked; an aminoacyl-tRNA molecule.

charge effect *See* primary charge effect; secondary charge effect.

charge fluctuation interactions 1. KIRKWOOD-SHUMAKER INTERACTIONS. 2. Any interaction between molecules and/or atoms that is due to fluctuating charges; Kirkwood-Shumaker interactions and London dispersion forces are two examples.

charge relay system A series of hydrogen bonds between amino acid side chains that is present at the active site of chymotrypsin and other serine proteases. It is responsible for the high degree of a nucleophilicity of the hydroxyl group of the serine residue at the active site. The series of hydrogen bonds permits a flow of electrons from a negatively charged carboxyl group of aspartic acid to the oxygen of the hydroxyl group of the serine residue, thus making the hydroxyl oxygen highly nucleophilic.

charge reversal spectrum A series of mono- and polyvalent ions in which the ions are arranged in the order of their effective concentrations for reversing the charge of an oppositely charged molecule to which the ion can bind.

charge transfer complex A complex that may be formed in oxidation-reduction reactions

when, as a result of the electron transfer, the electron donor becomes positively charged and the electron acceptor becomes negatively charged so that the two are held together in a complex by electrostatic attraction.

charge transfer relay system CHARGE RELAY SYSTEM.

charging The covalent attachment of an amino acid to a transfer RNA molecule to form an aminoacyl-tRNA molecule.

Charon bacteriophage One of a group of bacteriophage derivatives, prepared by modifying phage lambda, that are used as cloning vectors in recombinant DNA technology. They are named for the boatman of Greek mythology who ferried passengers across the River Styx to the underworld.

chase 1. The effective stoppage of the incorporation of either an isotope or a labeled compound into a substance by the addition of large amounts of either the nonradioactive element or the unlabeled compound; used particularly to stop incorporation following a pulse. 2. The amount of nonradioactive element or unlabeled compound used to stop the incorporation of an isotope or a labeled compound.

chaumoogric acid An unsaturated, cyclic fatty acid that occurs in plants and that contains 18 carbon atoms.

Chauvenet's criterion A criterion for deciding whether or not to reject a measurement that differs greatly from other, identical measurements of the same sample. The criterion states that the measurement should be rejected if the probability of its occurrence is equal to, or less than, $N/2$ where N is the total number of measurements.

ChE Cholinesterase.

chelate The ring structure formed by the reaction of two or more groups on a ligand with a metal ion. *Aka* chelate compound.

chelating agent A compound that can form a chelate with a metal ion; ethylenediaminetetraacetic acid (EDTA) is an example.

chelation The formation of a chelate.

chelator CHELATING AGENT.

cheluviation The downward movement of chelate complexes in the soil.

chemical 1. *n* COMPOUND. 2. *adj* Of, or pertaining to, chemistry.

chemical bond *See* bond.

chemical coupling hypothesis A hypothesis of the coupling of ATP synthesis to operation of the electron transport system in oxidative phosphorylation. According to this hypothesis, the transport of electrons leads to the formation of high-energy phosphorylated intermediates which are then used to

phosphorylate ADP to ATP in coupled reactions using the high-energy compounds as common intermediates.

chemical element *See* element.

chemical equilibrium (*pl* chemical equilibria) The state of a chemical reaction in which there is no more change in the concentrations of the reactants and the products, and the free energy is at a minimum; the rate of the forward reaction is equal to the rate of the reverse reaction so that a small change in one direction is balanced by a small change in the opposite direction. *See also* steady state.

chemical evolution The gradual development of the structure and function of biomolecules which includes the synthesis of primitive molecules, their condensation to form primitive polymers, and the self-assembly of these polymers to form large molecular aggregates; a process preceding the stage of biological evolution and extending over a period of about 2 billion years. *See also* Oparin's hypothesis.

chemical fossil A fossil that contains one or more types of organic compounds that were part of the original animal or plant.

chemical interference The interference that occurs in atomic absorption spectrophotometry if chemical compounds react with the sample and prevent its dissociation into free atoms.

chemical ionization mass spectrometry A mass spectrometric technique that requires volatilization of the sample, generally in the form of derivatives, prior to ionization by collisions with ions of a reagent gas. The technique usually yields higher intensities of molecular ions and fragment ions in the high mass range than those obtained with electron impact mass spectrometry. *Abbr* CI-MS.

chemical kinetics The branch of chemistry that deals with the rate behavior of chemical reactions.

chemical messenger HORMONE.

chemical potential The partial molar free energy of a substance.

chemical quenching The quenching that occurs in liquid scintillation counting if some of the energy of the radiation is absorbed either by the sample itself or by other substances in the solution.

chemical race CHEMOVAR.

chemical reaction A reaction in which there are changes in the orbital electrons of the reacting atoms as distinct from a nuclear reaction in which there are changes in the atomic nuclei.

chemical score A measure of the nutritional

quality of a protein based on a comparison of its amino acid composition with that of egg, which has a nearly ideal balance of essential amino acids. The amount of each amino acid in the protein is expressed as a percentage of the amount of the same amino acid in egg; the lowest value, or score, is given by the essential amino acid that is limiting for growth and is a measure of the nutritional quality of the protein.

chemical shift The shift in the position of a peak in nuclear magnetic resonance relative to the position of the peak produced by a standard nucleus; it is equal to the difference between the applied magnetic field strength required to produce absorption of energy in a nucleus and the magnetic field strength predicted by the gyromagnetic ratio for an identical nucleus. The chemical shift is due to the fact that each nucleus is in a different part of the molecule and hence experiences a different field, determined by its environment. By convention, chemical shifts are measured from a reference point which is the signal obtained with tetramethylsilane $[(\text{CH}_3)_4\text{Si}; \text{TMS}]$; this signal is arbitrarily set as the zero point. Chemical shifts are recorded in terms of an arbitrary scale, called the delta scale; one delta unit is equal to 1 ppm of the spectrometer frequency.

chemical synapse A coupling between two neurons that is mediated by chemical means as opposed to one that is mediated by electrical means (electrical synapse). *See also* synapse.

chemical taxonomy The deduction of taxonomic relationships between organisms that is based on an analysis of the distribution, composition, and structure of certain natural products found in these organisms.

chemical thermodynamics The branch of thermodynamics that deals with chemical compounds and chemical reactions.

chemical transmitter A compound, such as acetylcholine, that mediates the transmission of a nerve impulse from one nerve cell to another.

chemiluminescence The production of visible light as a result of a chemical reaction.

chemiosmotic coupling hypothesis A hypothesis of the coupling of ATP synthesis to operation of the electron transport system in oxidative phosphorylation. According to this hypothesis (proposed by Mitchell), the transport of electrons generates an energy-rich proton gradient across the mitochondrial membrane and the proton motive force associated with this gradient then drives the phosphorylation of ADP to ATP.

chemisorption Sorption that requires strong

chemical forces, such as those operative in the formation of chemical bonds.

chemistry The science that deals with the composition, structure, properties, and transformations of substances.

chemoautotroph 1. A chemotrophic autotroph. 2. LITHOTROPH.

chemoencephalography The study of the metabolic patterns of the brain as a function of the behavioral experiences of the individual.

chemoheterotroph 1. A chemotrophic heterotroph. 2. ORGANOTROPH.

chemokinesis The random migration of cells, brought about by a specific substance, in the absence of a concentration gradient.

chemolithotroph An organism or a cell that utilizes for its growth (1) oxidation-reduction reactions as a source of energy, (2) inorganic compounds as electron donors for these oxidation-reduction reactions, and (3) carbon dioxide as its source of carbon atoms.

chemoorganotroph An organism or a cell that utilizes for its growth oxidation-reduction reactions as a source of energy, and organic compounds both as electron donors for these oxidation-reduction reactions and as a source of carbon atoms.

chemoreceptor A receptor that is stimulated by chemical compounds.

chemostat An apparatus for maintaining bacteria in the exponential phase of growth over prolonged periods of time. This is achieved by the continuous addition of fresh medium, which is balanced by the continuous removal of the overflow, so that the volume of the growing culture remains constant.

chemosynthetic Chemotrophic.

chemosynthetic organism 1. CHEMOLITHOTROPH. 2. CHEMOORGANOTROPH.

chemotactic Of, or pertaining to, chemotaxis.

chemotactic hormone A hormone that has a chemotactic effect such as a steroid that causes aggregation of amoeba and slime molds.

chemotaxin A substance that is derived from complement and that induces leukocytes to move from an area of lower to one of higher chemotaxin concentration.

chemotaxis A taxis in which the stimulus is a chemical compound and cells or organisms move along a concentration gradient. Such directed migration is believed to play a role in the localization of immune effector cells at inflammation sites, the movement of phagocytic cells toward various attractants, and the secretion of lysosomal enzymes. *See also* lymphocyte-derived chemotactic factors.

chemotaxonomy The classification of organisms on the basis of the distribution and/or the

composition of chemical substances in these organisms; the use of DNA base composition data for the taxonomy of bacteria is an example.

chemotherapeutic agent A chemical that interferes with the growth of either microorganisms or cancer cells at concentrations at which it is tolerated by the host cells.

chemotherapy The treatment of a disease by means of chemotherapeutic agents.

chemotroph An organism or a cell that uses oxidation-reduction reactions as a source of energy.

chemotropism A tropism in which the stimulus is a chemical compound.

chemovar A plant that, when grown in one locality, contains one or more different chemical substances as compared to those it contains when grown in a different locality.

chemurgy A branch of applied chemistry dealing with the industrial use of chemicals derived from farm produce.

chenic acid CHENODEOXYCHOLIC ACID.

chenodeoxycholic acid A bile acid that has two hydroxyl groups and that is the major component of the bile of hens, geese, and other fowl; it occurs in small amounts in the bile of other animals and humans. *Aka* chenic acid.

CHES 2-(*N*-Cyclohexylamino)ethanesulfonic acid; used for the preparation of biological buffers in the pH range of 8.6 to 10.0. *See also* biological buffers.

chiasma (*pl* chiasmata) The cytological manifestation of crossing over; the visible connection between chromatids during meiosis.

chick antidermatitis factor PANTOTHENIC ACID.

chickenpox VARICELLA.

chicle *See* gutta.

chimera An individual composed of two or more, genetically different, types of cells, derived from genetically different zygotes. *See also* blood group chimera; mosaic; radiation chimera.

chimeric DNA A recombinant DNA molecule that carries unrelated genes from different species.

chimeric protein 1. A fused protein in which the two linked proteins are derived from two different organisms. 2. A multifunctional protein prepared by artificial manipulation of a native protein.

Chinese restaurant syndrome A condition characterized by severe headaches, numbness, palpitation, and other symptoms of neurological disturbance resulting from increased levels of glutamic acid; can be brought about by ingestion of Chinese food to which

large quantities of monosodium glutamate are generally added as seasoning. *Aka* Kwok's disease.

chip A generic term for an integrated circuit; a single package (a slice of silicon; a wafer) holding hundreds of thousands of microscopic components and used in computers.

chirality The necessary condition that allows for a discrimination between two enantiomers; the right- or left-handedness of an asymmetric molecule or of an asymmetric object. Due to their chirality, enantiomeric molecules cannot be brought into coincidence with each other by rotation about axes of symmetry, by reflection in planes of symmetry, or by a combination of these maneuvers. An asymmetric carbon is a chiral carbon.

chiroptical properties Optical properties (such as circular dichroism and optical rotatory dispersion) that relate to specific stereochemical and electronic structural features of a compound (such as chirality).

chirotopic Describing an atom residing in a chiral environment; both an asymmetric carbon atom and the atoms attached to it are considered to be chirotopic. Thus, in the compound CHBrClF, all of the atoms and the spaces between them are chirotopic because the entire molecule is chiral. Chirotopicity deals with the local geometry of compounds as opposed to stereogenicity which deals with stereoisomerism.

chi sequence A segment of eight bases (GCTGGTGG) in the DNA of *E. coli* that acts as a hot spot in genetic recombination involving the *rec A* protein; the segment occurs at about every 10 kb in the genome.

chi-squared distribution A distribution that may be regarded as that of the sum of squares of independent variates from a normal population. The distribution is of importance for inferences concerning population variances or standard deviations.

chi-squared test A test of significance based upon chi-squared statistics; permits a comparison of the goodness of fit of a set of observed values with theoretically expected ones.

chi structure A structure that resembles the Greek letter chi (χ) and that is formed in genetic recombination during crossover between two double-stranded DNA molecules.

chitin A homopolysaccharide of *N*-acetyl-D-glucosamine that is a major constituent of the hard, horny exoskeleton of insects and crustaceans.

chitosamine GLUCOSAMINE.

chitosome An organelle in fungi that contains

the enzyme chitin synthetase and that functions in the synthesis of chitin microfibrils.

Chl Chlorophyll.

chloragosome A cytoplasmic particle of unknown composition that is found in modified peritoneal cells of the earthworm.

chlorambucil A mutagenic, alkylating agent.

chloramphenicol A broad-spectrum antibiotic, produced by *Streptomyces venezuelae*, that inhibits protein synthesis by attaching to the 70S prokaryotic ribosome and inhibiting peptidyl transferase, thereby preventing peptide bond formation. Chloramphenicol also inhibits the peptidyl transferase of eukaryotic mitochondrial (not cytoplasmic) ribosomes and has immunosuppressive activity. *Abbr* CM; CAM.

chloramphenicol particle A ribosomal subparticle isolated from bacteria in which protein synthesis has been inhibited by chloramphenicol. *Abbr* CM particle.

chlorella A genus of unicellular, nonmotile, green algae used for the study of photosynthesis.

chloremia HYPERCHLOREMIA.

chlorenchyma Plant tissue that contains chloroplasts.

chlorhemin crystals TEICHMANN'S CRYSTALS.

chloride shift The movement of chloride and hydroxyl ions across the erythrocyte membrane as a result of the movement of bicarbonate ions in the opposite direction; this exchange of ions occurs at both the tissue and the lung level, but the relative directions of ion movement are reversed at the two levels.

chlorin The parent compound of the chlorophylls; dihydroporphyrin.

chlorine An element that is essential to humans and several classes of animals and plants. Symbol, Cl; atomic number, 17; atomic weight, 35.453; oxidation states, -1, +1, +5, +7; most abundant isotope, ³⁵Cl, half-life, 3×10^5 years, radiation emitted, beta particles and positrons.

Chlorobium chlorophyll A chlorophyll occurring in some sulfur bacteria.

Chlorobium vesicle CHLOROSOME.

chlorocruorin A hemoglobin-like, respiratory pigment of invertebrates that has a molecular weight of 3.5×10^6 and that contains 190 heme groups per molecule.

p-chloromercuribenzoic acid A reagent that reacts with the sulfhydryl groups of proteins. *Abbr* PCMB.

chloromycetin CHLORAMPHENICOL.

chlorophyll The green pigment that occurs in plants and that functions in photosynthesis by absorbing the radiant energy of the sun. The

chlorophylls are a group of closely related pigments, structurally related to the porphyrins, but containing magnesium instead of iron. Major chlorophylls of land plants are chlorophyll a and b, that of some marine organisms is chlorophyll c, and that of photosynthetic bacteria is bacteriochlorophyll.

chlorophyllide A molecule of chlorophyll from which the phytol side chain has been removed by hydrolysis.

chlorophyll unit PHOTOSYNTHETIC UNIT.

chloroplast A chlorophyll-containing chromoplast that is the site of photosynthesis in green plants.

chloroplast coupling factor A protein factor in chloroplasts that is analogous to the mitochondrial coupling factor F₁.

chlorosis The yellowing of normally green plant components that is due to a failure of chlorophyll development.

chlorosome The light-harvesting structure in green, anaerobic bacteria of the families *Chlorobiaceae* and *Chloroflexaceae*. Chlorosomes are ovoid, bag-like structures, closely associated with the cytoplasmic membrane, that contain the bulk of the antenna bacteriochlorophyll; they do not contain the photosynthetic reaction centers which are located in the cytoplasmic membrane. *Aka* chlorobium vesicle.

cholagogue A substance that aids in the solubilization of cholesterol.

cholecalciferol A compound that has vitamin D activity and that is obtained by ultraviolet irradiation of 7-dehydrocholesterol; designated vitamin D₃.

cholecystokinin A polypeptide hormone, secreted by the duodenum, that stimulates the secretion of digestive enzymes by the pancreas and that stimulates the contraction of the gall bladder. *Abbr* CCK.

cholecystokinin-pancreozymin CHOLECYSTOKININ.

choleic acid A specific complex formed between a steroid, particularly a bile acid, and fatty acids, hydrocarbons, or other organic compounds.

cholelithiasis A disease, characterized by the formation of concretions (calculi) in the biliary tract that consist chiefly of cholesterol.

cholera A toxin of the cholera bacillus that affects the plasma membrane of intestinal cells.

cholera toxin An endotoxin, produced by *Vibrio cholerae*, that has enzymatic activity; it catalyzes the transfer of ADP-ribose from intracellular NAD⁺ to a G protein which, in turn, functions as a regulatory protein of adenyl cyclase. *See also* ADP-ribosylation.

cholestane The parent ring system of the sterols.

cholestanol A minor sterol of the animal body; 5,6-dihydrocholesterol.

cholesteremia CHOLESTEROLEMIA.

cholesteric structure One of the three specific structures of a thermotropic liquid crystal. *See also* liquid crystal.

cholesterol The principal sterol of vertebrates and a precursor of bile acids and steroid hormones; it is synthesized entirely from acetyl coenzyme A by condensation reactions of isoprene units.

cholesterol desmolase *See* desmolase.

cholesterolemia The presence of excessive amounts of cholesterol in the blood.

cholesterol ester An ester formed from cholesterol and a fatty acid. Cholesterol esters are very hydrophobic. *Aka* cholesteryl ester.

cholesterol ester transfer protein A protein, believed to catalyze the transfer of cholesterol esters from high-density lipoproteins to very low-density or low-density lipoproteins.

cholesterol intoxication theory A theory according to which atherogenesis results from either the ingestion of high-cholesterol fat or the deficiency of certain vitamins.

cholesterolosis A condition that is characterized by the formation of cholesterol deposits in various organs and tissues, and that is caused by a disturbance in lipid metabolism.

cholesterol oxidase DESMOLASE.

cholesterosis CHOLESTEROLYSIS.

cholesteryl ester CHOLESTEROL ESTER.

cholic acid The most abundant bile acid in human bile; it has three hydroxyl groups.

choline A methyl group donor that occurs in some phospholipids and in acetylcholine. It is generally classified with the B vitamins, since it is required in the diet under certain conditions, but it is not a typical vitamin and has no known coenzyme function. *Abbr* Ch.

choline acetyltransferase The enzyme that catalyzes the reaction in which choline and acetyl coenzyme A are converted to acetylcholine and coenzyme A.

cholinergic Of, or pertaining to, nerve fibers that release acetylcholine at the nerve endings.

cholinergic agonist *See* decamethonium.

cholinergic antagonist *See* alpha bungarotoxin.

cholinesterase The enzyme that catalyzes the hydrolysis of acetylcholine and a variety of other choline esters and that is present in various tissues other than the nervous system. *Aka* cholinesterase II; nonspecific cholinesterase; pseudocholinesterase. *See also* acetylcholinesterase.

cholinolytic Descriptive of a pharmacological substance that blocks the action of acetylcholine.

cholinomimetic Descriptive of a pharmacological substance that imitates the action of acetylcholine.

chondriogene 1. A plasmagene that is attached to a mitochondrion. 2. A gene of mitochondrial DNA.

chondrioid MESOSOME.

chondriome 1. A collective term for all of the mitochondria of a cell. 2. A composite intracellular structure involving several organelles, one of which is a mitochondrion; the complex of kinetoplast and mitochondrion found in trypanosomes is an example.

chondriosome 1. MITOCHONDRION. 2. Any mitochondrial macromolecular complex involved in biosynthetic reactions.

chondrocyte A cartilage cell; a specialized cell of connective tissue that produces collagen and proteoglycans.

chondroitin A glycosaminoglycan (mucopolysaccharide) composed of D-glucuronic acid and N-acetyl-D-galactosamine.

chondroitin sulfate The sulfate ester of chondroitin and a major constituent of bone and cartilage. *See also* glycosaminoglycan.

chondrome The genetic information contained within the mitochondria of a cell.

chondronectin A factor, distinct from fibronectin, which mediates the attachment of chondrocytes to collagen.

chopper A rotating wheel with alternate silvered and cut out sections that is placed in the light path of a spectrophotometer, thereby allowing the light beam to pass alternately through the sample solution and through the reference solution.

chorioallantoic membrane The membrane, used in the assay of viruses, that surrounds the embryo of the chicken and other birds.

choriogonadotropin HUMAN CHORIONIC GONADOTROPIN.

choriomammatotropin PLACENTAL LACTOGEN.

chorion *See* amnion.

chorionic Of, or pertaining to, the placenta.

chorionic gonadotropin *See* human chorionic gonadotropin.

chorionic somatomammatotropin PLACENTAL LACTOGEN.

chorismic acid An important intermediate in the biosynthesis of aromatic compounds. It can be converted to anthranilic acid or prephenic acid; the former is a precursor of tryptophan and the latter is a precursor of both phenylalanine and tyrosine.

Chou-Fassman method A statistical method for predicting the secondary structure of a

protein from its amino acid sequence. The method uses the known three-dimensional structures of soluble proteins to calculate the frequency of occurrence of amino acid residues in specific secondary structures, such as the alpha helix, the beta sheet, and the beta turn. On the basis of this information, and the known amino acid sequence of a given protein, one can then predict the type of secondary structure that a given segment of the polypeptide chain is likely to have. *Aka* Chou and Fassman rules.

Christmas disease HEMOPHILIA B.

Christmas factor The factor in the intrinsic pathway of blood clotting that activates factor X.

ChRNA Chromosomal RNA.

chromaffin granule A subcellular organelle in the adrenal medulla that synthesizes, stores, and releases the catecholamines epinephrine and norepinephrine.

chroman A redox lipid such as tocopherol.

chromatic transient A sudden short-lived increase or decrease in the rate of a photosynthetic reaction when the wavelength, but not the effective intensity, of the incident light is suddenly changed.

chromatid One of the two strands that result from the duplication of a chromosome and that are held together by a centromere; the chromatids become separate chromosomes upon division of the centromere.

chromatin The nuclear material of the chromosomes in higher organisms that consists principally of DNA and histones. *See also* euchromatin; heterochromatin.

chromatin body NUCLEOID (1).

chromatofocusing A separation method for proteins that is similar to isoelectric focusing but requires no specialized equipment; it is carried out on an ion exchange column. Like isoelectric focusing, chromatofocusing uses a stabilizing medium containing a pH gradient but in this case, a titration reaction, rather than an electric field, is employed to create the gradient. Gradient stability presents no problem since the gradient is defined by the rate of titration which can be controlled.

chromatogram The visual record of a chromatographic separation, either in the form of the chromatographic support itself, or in the form of a tracing thereof.

chromatographic Of, or pertaining to, chromatography.

chromatographic resolution *See* resolution (3).

chromatographic spray An atomizer used in the spraying of chromatograms for detecting the separated sample spots.

chromatographic support *See* support.

chromatography The separation of complex mixtures of molecules that is based on the repetitive distribution of the molecules between a mobile and a stationary phase. The mobile phase may be either a liquid or a gas, and the stationary phase may be either a solid or a solid coated with a liquid. The distribution of the molecules between the two phases is determined by one or more of four basic processes, namely adsorption, gel filtration, ion exchange, and partitioning. The operation of these processes, coupled to the movement of the mobile phase, results in a differential migration of the molecules along the stationary phase. *See also* adsorption chromatography; gel filtration chromatography; ion exchange chromatography; partition chromatography.

chromatophore A bacteriochlorophyll-containing chromoplast of photosynthetic bacteria.

chromatophoresis A separation technique for complex protein mixtures that involves the sequential use of chromatography (HPLC) and electrophoresis (PAGE).

chromatophoretropic hormone MELANOCYTE-STIMULATING HORMONE.

chromatopile A stack of filter paper disks that have the same diameter and that are compressed within a chromatographic column which is used for preparative-scale separations.

chromatoplate The plate, covered with a support, that is used in thin-layer chromatography.

chromatosome A macromolecular complex consisting of one molecule of H1 or H5 histone, two molecules each of histones H2A, H2B, H3, and H4, and a DNA segment of about 160 base pairs. *See also* nucleosome.

chromium An element that is essential to humans and animals and that is a component of the glucose tolerance factor. Symbol, Cr; atomic number, 24; atomic weight, 51.996; oxidation states, +2, +3, +6; most abundant isotope, ⁵²Cr; a radioactive isotope, ⁵¹Cr, half-life, 27.8 days, radiation emitted, gamma rays.

chromobindin *See* calelectrin.

chromocenter A heterochromatic structure formed by the aggregation of polytene chromosomes in the fruit fly, *Drosophila*.

chromogen 1. The colorless precursor of a pigment. 2. The colorless parent compound of a dye.

chromogenic 1. Producing a pigment or a color. 2. Of, or pertaining to, a chromogen.

chromogranin A soluble protein in chromaffin granules.

chromoisomer One of two or more isomers that differ from each other in their color.

chromomere A thickening along a eukaryotic chromosome that results from the local coiling of the chromosome threads.

chromonema (*pl* chromonemata). One of the coiled threads in a eukaryotic chromosome.

chrononeme The thread of DNA in bacterial cells and in viruses.

chromophobe A cell that does not stain readily.

chromophore The group of atoms in a compound that is capable of absorbing light and that is responsible for the color of the compound.

chromoplast A pigment-containing plastid, such as a chloroplast or a chromatophore, that functions in photosynthesis.

chromoprotein A conjugated protein in which the nonprotein portion is a pigment or some other chromophoric material.

chromosomal aberration An abnormality in a chromosome that results from the deletion, the duplication, or the rearrangement of the genetic material; the abnormality is referred to as intrachromosomal or interchromosomal depending on whether it is the result of changes in one or in two chromosomes. *Aka* chromosomal mutation.

chromosomal puff *See* chromosome puff.

chromosomal RNA RNA that is associated with the chromosome and that is distinct from RNA involved in protein synthesis (messenger, transfer, and ribosomal RNA); primer RNA is an example.

chromosome 1. A structure in the nucleus of eukaryotic cells that consists of one or more large double-helical DNA molecules that are associated with RNA and histones; the DNA of the chromosome contains the genes and functions in the storage and in the transmission of the genetic information of the organism. 2. The nuclear DNA of eukaryotic cells, the DNA of prokaryotic cells, or the DNA of viruses. 3. The RNA of viruses. *See also* genophore.

chromosome break A break in the structure of a chromosome as that produced by some carcinogenic alkylating agents.

chromosome jumping A type of chromosome walking in which use is made of chromosomal aberrations to shift the walking to another position on either the same or a different chromosome. *See also* chromosome walking.

chromosome map 1. GENETIC MAP. 2. CYTOGENETIC MAP.

chromosome puff A localized swelling in a polytene chromosome that represents a region of active RNA or DNA synthesis. Very large chromosome puffs form loop-like structures known as Balbiani rings.

chromosome rearrangement A chromosomal aberration in which chromosomal segments

are rearranged by inversion and translocation.

chromosome scaffold *See* scaffold.

chromosome set The entire group of chromosomes representing the genome of an organism.

chromosome substitution Replacement of one or more chromosomes by homologous or homoeologous chromosomes from a different source.

chromosome theory of cancer A theory, proposed by Boveri in 1912, according to which cancer is due to the presence of abnormal chromosomes in the cells as a result of irregularities in mitosis.

chromosome walking A technique for the sequential identification and isolation of DNA clones representing regions larger than, and adjacent to, a given DNA region. A specific gene that has been cloned is used as a probe to screen a gene library for all the DNA fragments containing the marker gene. The fragment, containing a nucleotide sequence farthest removed from the marker gene, is then cloned. This represents a single walking step. The procedure is then repeated, using the new fragment as a new probe, and so on. Thus, step by step, nucleotide sequences farther and farther removed from the original marker gene, are identified and isolated.

chromosorb A chromatographic adsorbent prepared by the fusion of diatomaceous earth either with, or without, sodium carbonate.

chromotrope A substance that can appear in two or more different colors depending on the extent to which it is covered with a metachromatic dye.

chronic disease A disease that persists for a relatively long period of time (months or years), terminating either in recovery or in death.

chronic exposure Prolonged exposure to radiation; used to describe experimental conditions in which an organism is exposed either to a continuous low-level of radiation or to a fractionated dose.

chronic toxicity test A toxicity test performed on laboratory animals that requires the administration of a chemical at least once daily for periods of 1 to 2 years.

chronometric method A method of assaying for the enzyme amylase by measuring the time that is required for the complete hydrolysis of all the starch in the reaction mixture.

chronon A hypothetical linear sequence of DNA, the transcription of which takes about a day, that is believed to be related to circadian rhythms.

chronopotentiometry An electroanalytical method for studying electrolysis reactions by measuring the potential, as a function of time,

at a microelectrode on which is impressed a small constant current.

chronotropic effect An effect on the rate of rhythmic movements, especially those of the heart.

C'H₅₀ unit UNIT OF COMPLEMENT.

chyle The lymphatic fluid that is taken up by the lymph vessels from the intestine during digestion and that is characterized by its high content of fat globules.

chylomicron (*pl* chylomicrons; chylomicra) A colloidal fat globule that occurs in blood and lymph and that serves to transport fat from the intestine. Chylomicrons represent the plasma lipoprotein fraction of lowest density (less than 0.95 g/mL) and contain about 2% protein, 7% phospholipid, 8% cholesterol and cholesterol esters, and 83% triglycerides (triacylglycerols). Chylomicrons have a molecular weight of about 10⁹ to 10¹⁰, a flotation coefficient above 400 S, and are classified as the omega fraction on the basis of electrophoresis. *See also* lipoprotein.

chymase A chymotrypsin-like, mast cell proteinase, that is present in fairly large concentrations in skeletal muscle, lung, and skin, and that is believed to be involved in inflammatory reactions.

chyme The semifluid mass of partially digested material that is passed from the stomach into the intestine.

chymodenin A basic polypeptide, isolated from duodenal mucosa, that stimulates pancreatic secretion of chymotrypsinogen.

chymosin A proteolytic enzyme from the fourth stomach of the calf that has properties similar to those of pepsin. It leads to milk coagulation by hydrolyzing casein to give paracasein which then reacts with calcium to yield the insoluble curd.

chymotropic pigment A pigment dissolved in the vacuole of a plant cell.

chymotrypsin An endopeptidase that catalyzes the hydrolysis of peptide bonds, principally those in which the carbonyl group is contributed by tryptophan, phenylalanine, or tyrosine.

chymotrypsinogen The inactive precursor of chymotrypsin.

chymotryptic Of, or pertaining to, chymotrypsin.

chymotryptic peptides The peptides obtained by the digestion of a protein with the enzyme chymotrypsin.

Cl Curie.

CIE Crossed immunoelectrophoresis.

CIEP Counterimmunoelectrophoresis.

CIG Cold insoluble globulin.

ciliary Of, or pertaining to, cilia.

cillum (*pl* cilia). A thread-like cellular

extension that functions in the locomotion of bacteria and unicellular eukaryotic organisms; cilia are more numerous and shorter than flagella.

CI-MS Chemical ionization mass spectrometry.

cinchona alkaloids *See* quinoline alkaloids.

circadian rhythm A biological clock that has a period of approximately 24 hours.

circular birefringence The birefringence produced by left and right circularly polarized light.

circular chromatography A paper chromatographic technique in which the material is allowed to migrate radially; may be carried out by the use of a circular piece of filter paper, to the center of which the sample is applied, and from which a sector is cut out and dipped into the solvent.

circular covalent Descriptive of a circular polynucleotide strand in which the 3'- and 5'-termini are linked together covalently.

circular dichroism The dichroism that results from the differences, at a given wavelength, between the extinction coefficients of left and right circularly polarized light when such light is passed through a solution containing a chromophore. Circular dichroism depends on the asymmetry of the electric charge distribution around the chromophore and may either be an intrinsic property of the molecule or be induced in the molecule as a result of perturbations in the surroundings. Circular dichroism is used in the study of the secondary structure of macromolecules. *Abbr* CD. *See also* magnetic circular dichroism.

circular DNA A DNA molecule that has a closed ring-type structure, not necessarily that of a geometric circle.

circular genetic map The genetic map of a closed, ring-type chromosome as that of *E. coli* and other bacteria. *Aka* circular linkage map.

circularly polarized light Light in which the electric field vectors, at any point on the axis along which the light is being propagated, rotate in a plane perpendicular to that axis. The light is referred to as right or left circularly polarized light, depending on whether the electric field vector rotates in a clockwise or in a counterclockwise direction as seen when looking toward the light source.

circular noncovalent Descriptive of a circular polynucleotide strand in which the 3'- and 5'-termini are held together by noncovalent bonds.

circular permutation The formation of different linear segments when the same circle is opened at one or more different points; a principle that is invoked in relating a circular

genetic map to the genetic structure of linear DNA molecules.

circulating water bath A water bath equipped with a pump so that the water can be pumped from the bath to some apparatus and returned from there to the bath.

circulation The movement of a liquid through a circuit, such as the movement of blood or lymph through the blood or lymphatic vessels, respectively.

circulative virus PERSISTENT VIRUS.

circulin One of a group of peptide antibiotics, produced by *Bacillus circulans*, that are related in structure and function to polymyxin.

cirrhosis An inflammatory disease of the liver that is characterized by the replacement of liver cells with fat and fibrous tissue.

cis 1. Referring to the configuration of a geometrical isomer in which two groups, attached to two carbon atoms linked by a double bond, lie on the same side with respect to the plane of the double bond. 2. Referring to two mutations, particularly those of pseudoalleles, that lie on the same chromosome.

cis-acting locus A region on a DNA molecule that affects the activity of genes that are located on the same molecule. *See also* trans-acting locus.

cis-dominant Descriptive of a genetic region that affects the activity of one or more adjacent regions in the same chromosome.

cis effect The influence of one gene on the expression of another gene that is located on the same chromosome.

cis interactions Noncovalent interactions between adjacent segments, located on the same polypeptide chain of an immunoglobulin molecule.

cis isomer *See* cis (1).

cisplatin A coordination compound, *cis*-diamminedichloroplatinum, that is highly cytotoxic and that has been used as an effective antitumor agent.

cisterna (*pl* cisternae) A sac in a cell or in an organism that serves as a reservoir.

cis-trans isomers *See* cis (1); trans (1).

cis-trans test A complementation test of pseudoalleles.

cistron The unit of genetic function; a section of the chromosome that codes for a single polypeptide chain; a structural gene.

citrate-activated thrombin The material obtained by the dissociation of thrombin when thrombin is dissolved in 25% sodium citrate solution.

citrate cleavage enzyme The cytoplasmic enzyme, ATP citrate lyase, which cleaves citrate to acetyl-S-CoA and oxaloacetate. This

reaction provides acetyl-S-CoA for the cytoplasmic reactions of fatty acid biosynthesis.

citrate cycle CITRIC ACID CYCLE.

citrate lyase CITRATE CLEAVAGE ENZYME.

citrate-pyruvate cycle A cyclic set of reactions, involving the sequence citrate-oxaloacetate-pyruvate, that functions in fatty acid synthesis.

citrate synthase The enzyme that catalyzes the first reaction of the citric acid cycle in which acetyl coenzyme A condenses with oxaloacetic acid to yield citric acid and coenzyme A.

citric acid The symmetrical tricarboxylic acid that is formed in the first reaction of the citric acid cycle in which acetyl coenzyme A condenses with oxaloacetic acid.

citric acid cycle The cyclic set of reactions that constitutes the core of the central metabolic pathway in most living cells. The citric acid cycle is initiated by the condensation of acetyl coenzyme A with oxaloacetic acid which yields citric acid and coenzyme A. One turn of the citric acid cycle, in conjunction with the operation of the electron transport system and oxidative phosphorylation, achieves the equivalent of the oxidation of one molecule of acetic acid to carbon dioxide and water and the synthesis of 12 molecules of ATP. *Abbr* TCA cycle.

citroens A group of complex information-transforming reproducing objects that evolve by natural selection; a family of "living" organisms, terrestrial or nonterrestrial, that are believed to have been the forerunners of intelligent life.

citrogenase CITRATE SYNTHASE.

citrovorum factor Folic acid; a growth factor for *Leuconostoc citrovorum*. *Abbr* CF.

citrulline A nonprotein alpha amino acid that is an intermediate in the urea cycle.

citrullinuria A genetically inherited metabolic defect in humans that is associated with mental retardation and that is characterized by high concentrations of citrulline in the blood and in the urine; due to a deficiency of the enzyme argininosuccinate synthetase. *Aka* citrullinemia.

CK Creatine kinase.

Cl Chlorine.

c_L The constant region of the light chains of the immunoglobulins, *See also* c_H.

CL Cardiolipin.

cladogenesis Branching evolution; dendritic evolution.

cladogram PHYLOGENETIC TREE.

Clark electrode An oxygen electrode that usually consists of a platinum cathode and a silver anode, both immersed in the same solution of concentrated KCl, and separated

from the test solution by a membrane. Oxygen is reduced at the cathode to water and the current thus produced is proportional to the oxygen activity in the solution.

classical pathway See complement.

classical sedimentation equilibrium
SEDIMENTATION EQUILIBRIUM.

classical thermodynamics EQUILIBRIUM
THERMODYNAMICS.

classification The systematic arrangement of organisms into groups based on the natural relations between the organisms. The groups, proceeding from the largest to the smallest, are kingdom, phylum, class, order, family, genus, and species.

class II MHC antigens I-REGION-ASSOCIATED ANTIGENS.

class switching The changeover by a lymphocyte from the synthesis of antibodies of one class (such as IgM) to the synthesis of antibodies of a different class (such as IgG or IgA). *Aka* heavy chain class switching.

clastic reaction See phosphoroclastic reaction; thioclastic reaction.

clastogen A compound that produces chromosomal abnormalities.

clathrate An inclusion complex produced by trapping molecules of one kind in the lattice network formed by molecules of a second kind; frequently refers to the stable complex produced by trapping nonpolar solute molecules in a cage formed by water molecules. *Aka* clathrate compound; clathrate crystal.

clathrin The scaffolding protein that covers the surface of coated pits. Three molecules of clathrin (MW 180,000) associate with three molecules of smaller polypeptides to form a three-legged protein complex, called a triskelion; a network of the latter covers the coated pits.

Clausius' law APHORISM OF CLAUSIUS.

clearance A measure of the efficiency of the kidney in removing a substance from the blood; specifically, $C = UV/P$, where C is the clearance in milliliters of plasma per minute, U and P are the concentrations of the substance in the urine and in the plasma, and V is the flow of urine in milliliters per minute. The clearance is known as either a maximum or a standard clearance depending on whether the flow of urine is more or less than 2 mL/min.

clearance factor LIPOPROTEIN LIPASE.

clearing factor LIPOPROTEIN LIPASE.

clear plaque A plaque that is produced when all of the cells in the area of the plaque are lysed.

cleavage map RESTRICTION MAP.

Cleland's convention A simplified repre-

sentation of multisubstrate enzyme systems in which the different enzyme forms are written from left to right below a horizontal line and reactants (A,B,C,...) and products (P,Q,R,...) are indicated by vertical arrows pointing toward the line (for reactants) or away from it (for products). The terms uni, bi, ter, and so on are used to designate the number of substrates (reactants) and products; thus a uni bi reaction is one having one substrate and two products. *Aka* Cleland's notation.

Cleland's reagents The compounds dithioerythritol (DTE) and dithiothreitol (DTT), that are used for the protection of sulfhydryl groups against oxidation to disulfides and for the reduction of disulfides to sulfhydryl groups.

Cleland's rules A set of rules for predicting the type of inhibition of an enzyme-catalyzed reaction, or the type of interaction between an enzyme and a cosubstrate or other substance, from an inspection of experimental kinetic data. The rules apply to a steady-state mechanism that either contains no random sequences or contains random sequences in rapid equilibrium. The two fundamental rules may be stated as follows: (a) The ordinate intercept of a double reciprocal plot is affected by a substance that associates reversibly with an enzyme form other than the one with which the variable substrate combines. (b) The slope of a double reciprocal plot is affected by a substance that associates with an enzyme form that is the same as, or is connected by a series of reversible steps to, the enzyme with which the variable substrate combines.

climacteric rise The increase to a maximum in the respiration of ripening fruits that may occur either before or after the removal of the fruit from the plant, depending on the fruit and on the harvesting procedure.

clinical centrifuge A centrifuge, generally considered to be a small table model, that is capable of generating speeds of approximately 3000 rpm and centrifugal forces of approximately $2000 \times g$.

clinical chemistry A branch of chemistry that deals with the qualitative and quantitative determination of chemical substances in humans, particularly of substances related to medicine.

Clinistix Trademark for a group of paper strips impregnated with chemicals and used for semiquantitative determinations of components in urine and/or blood.

CLIP Corticotropin-like intermediate lobe peptide.

C₅₅ lipid carrier BACTOPRENOL.

clock-timing A method of timing used in scintillation counters in which the timing device is not turned off during the interval that is required for the electronic processing of a pulse. *See also* live-timing.

clonal selection theory A selective theory of antibody formation according to which an antigen selects a particular cell clone from among a large number of lymphoid cell clones and then stimulates these cells to proliferate and to synthesize antibodies. Each cell clone is believed to be different and to contain a unique set of genes for specific immunoglobulins so that each clone can synthesize either antibodies having only one type of specificity or, at most, antibodies having a few types of specificity.

clone 1. A group of genetically identical cells or organisms, derived from a single cell or organism by asexual reproduction; proceeds via binary fission in prokaryotes and via mitosis in eukaryotes. 2. Multiple copies of identical DNA sequences produced by recombinant DNA technology.

cloned DNA PASSENGER.

cloned line A cell line consisting of a single clone.

clone library A large collection of bacterial or viral recombinant DNA clones that contain many of the DNA sequences from a single organism. Two general kinds of clone libraries are gene libraries and cDNA libraries.

cloning 1. Molecular cloning. The production of many identical copies of a gene, replicated from a single gene introduced into a host cell. The phrase "to clone a particular gene" is common usage to mean "to form a vector containing a particular gene." *See also* recombinant DNA technology. 2. Cell cloning. The production of a group of genetically identical cells from a single cell; the production of cells that synthesize a specific antibody is an example. *See also* monoclonal antibodies; hybridoma.

cloning host HOST (3).

cloning vector VECTOR (3).

cloning vehicle VECTOR (3).

clonotype 1. The phenotype of a clone of cells. 2. The homogeneous product of a clone of cells.

closed chain RING.

closed circle CIRCULAR DNA.

closed circuit system A system for measurements of indirect calorimetry in which the oxygen consumption, but not the carbon dioxide production, is determined.

closed culture BATCH CULTURE.

closed-promoter complex The initial conformation in transcription in which RNA polymerase has become bound to the

promoter but the two DNA strands have not yet become locally unwound.

closed reading frame A segment in mRNA that cannot be translated into an amino acid sequence because it contains one or more termination codons.

closed system A thermodynamic system that can exchange energy, but not matter, with its surroundings.

close packing Descriptive of a structure in which nonbonded atoms are surrounded by other nonbonded atoms in such a way that the distances between the atoms are equal, to the extent possible, to the sum of their van der Waals contact radii.

Clostridium A genus of spore-forming, chemoorganotrophic bacilli that is widespread in soil, mud, and the intestinal tract of humans and animals; includes the organisms causing botulism, gangrene, and tetanus.

closure transformation The transformation of a micellar membrane from one having large spaces between the micelles ("open") to one having small spaces between them ("closed").

clot *See* blood clot.

clot-promoting factor HAGEMAN FACTOR.

clot retraction The shrinking of a blood clot that occurs upon standing and that is accompanied by the expressing of the serum.

clotting time The time, in minutes, required for blood to clot when it is exposed to air.

cloud chamber A chamber that contains a supersaturated atmosphere and that is used for observing the tracks produced by ionizing particles; the ions formed by an ionizing particle serve as nuclei for the formation of fog droplets which indicate the path taken by the ionizing particle.

cloverleaf model A model for the structure of transfer RNA that resembles a cloverleaf and that is based upon the folding of the transfer RNA strand back upon itself so as to permit the formation of a maximum number of intrachain hydrogen bonds; the structure contains four (or five) hydrogen-bonded segments, referred to as arms, to which are attached three (or four) non-hydrogen-bonded segments, referred to as loops.

clupein A protamine isolated from herring; a protein containing 30 amino acid residues.

cluster 1. MULTIENZYME SYSTEM. 2. METABOLON (2).

cm Centimeter.

CM Chloramphenicol.

cmc Critical micelle concentration.

CM-cellulose *O*-(Carboxymethyl)cellulose; a cation exchanger.

CMP 1. Cytidine monophosphate (cytidylic acid). 2. Cytidine-5'-monophosphate (5'-cytidylic acid).

CM-particle Chloramphenicol particle.

CM-sephadex *O*-(Carboxymethyl)Sephadex; a cation exchanger which contains the grouping $-\text{CH}_2\text{CO}_2^-$, linked via ether bonds to the sephadex.

CMV Cytomegalovirus.

CNS Central nervous system.

Co Cobalt.

CoI Cozymase I.

CoII Cozymase II.

CoA Coenzyme A.

coacervate A polymer-rich phase or droplet that is formed by coacervation and that is believed by some to have been a forerunner of primitive cells.

coacervation The spontaneous separation of an aqueous solution of a highly hydrated polymer into two phases, one having a relatively high, and the other having a relatively low concentration of the polymer.

coagulase The enzyme, produced by *Staphylococcus*, that has thrombokinase-like activity and causes citrated, or oxalated, plasma to coagulate. *Aka* coagulating enzyme.

coagulation The formation of a clot as that formed in blood clotting or in the boiling of egg white; clots may be soft, semisolid, or solid.

coarctation An increase in the cross-linking, the hardening, and the shrinking of a membrane.

coarse control The control of biochemical systems that is achieved by the regulation of the amount of an enzyme, as in enzyme induction and enzyme repression.

CoASAc Acetyl coenzyme A.

CoASH Coenzyme A.

coat See spore coat; viral coat.

coated pit A cell membrane depression, so called because it is coated with a scaffolding protein (clathrin). Various polypeptide hormones, such as insulin and epidermal growth factor, show the phenomenon of down regulation which involves internalization and degradation of the hormone receptors via coated pits. Receptors may either be located in the coated pit and bind ligands there, or move toward the coated pit, after binding ligands elsewhere. In either case, the receptor-ligand complexes aggregate in the coated pits. Small vesicles, called receptosomes, bud off from the coated pits and entrap the receptor-ligand complexes. The receptosomes move into the cell (endocytosis), associate with structures known as GERL, and fuse with lysosomes which then degrade both the receptors and their ligands (the hormones). *Aka* coated vesicle.

coated vesicle COATED PIT.

coat protein A protein of the viral coat.

cobalamin A 5,6-dimethylbenzimidazole derivative of a cobamide. Depending on the substituent (R) at the 6th coordination position of the cobalt atom, these compounds are named as follows: R = $-\text{CN}$, cyanocobalamin (vitamin B₁₂); R = $-\text{OH}$, hydroxycobalamin (vitamin B_{12a}); R = $-\text{H}_2\text{O}$, aquacobalamin (vitamin B_{12b}); R = $-\text{NO}_2$, nitritocobalamin (vitamin B_{12c}); R = 5'-deoxyadenosyl, 5'-deoxyadenosyl cobalamin (coenzyme B₁₂); R = $-\text{CH}_3$, methylcobalamin (methyl B₁₂). *Var sp* cobalamine.

cobalt An element that is essential to several classes of animals and plants. Symbol, Co; atomic number, 27; atomic weight, 58.9332; oxidation states, +2, +3; most abundant isotope, ⁵⁹Co; a radioactive isotope, ⁶⁰Co, half-life, 5.26 years, radiation emitted, beta particles and gamma rays.

cobamide A coenzyme form of vitamin B₁₂ in which the 6th coordination position of the cobalt atom is linked covalently to the 5'-carbon of 5'-deoxyadenosine. *Var sp* cobamid; *Aka* coenzyme B₁₂; 5'-deoxyadenosyl cobalamin.

coboglobin An artificially prepared hemoglobin or myoglobin molecule in which the iron atom has been replaced by a cobalt atom.

cobratoxin A snake venom poison from the cobra, *Naja naja*, that acts like α -bungarotoxin.

cocaine A tropane alkaloid and the main alkaloid of the coca plant, *Erythroxylan coca*, and related forms. A narcotic drug that has euphoric or hallucinogenic effects.

carboxylase THIAMINE PYROPHOSPHATE.

cocarcinogen An agent that enhances the effect of a carcinogen either by increasing the yield of tumors or by shortening the time required for a tumor to appear.

cocarcinogenesis The enhancement of the action of one carcinogen by the simultaneous administration of a second carcinogen.

coccus (*pl* cocci). A bacterium having a more or less spherically shaped cell; cocci represent one of the three major forms of bacteria. See *also* bacillus; spirillum.

cochromatography A chromatographic technique for establishing the identity of a compound by applying the compound, together with one or more known compounds, to a chromatographic support.

cocktail 1. The mixture of reagents required for a cell-free amino acid incorporating system; excludes the mRNA, ribosome, and enzyme fractions. 2. The solution of fluors used for liquid scintillation counting.

coconversion The concurrent conversion of two chromosomal sites during gene conversion.

codase AMINOACYL-tRNA SYNTHETASE.

code 1. *n* GENETIC CODE. 2. *v* To direct the incorporation of an amino acid in response to a codon.

codecarboxylase PYRIDOXAL PHOSPHATE.

codegenerate codon SYNONYM CODON.

codehydrogenase I NICOTINAMIDE ADENINE DINUCLEOTIDE.

codehydrogenase II NICOTINAMIDE ADENINE DINUCLEOTIDE PHOSPHATE.

codeine An opium alkaloid which is converted to morphine as the poppy ripens. A narcotic drug which is slightly analgesic, strongly inhibits coughing, and is fairly nondangerous regarding the development of addiction.

codeword CODON.

code word family A group of codons that code for either one or two amino acids and that differ only in their 3'-terminal base.

codeword triplet CODON.

coding DNA Sections of DNA that actually code for proteins or nontranslated RNAs such as tRNA and rRNA.

coding ratio The ratio of the number of nucleotides in an mRNA molecule to the number of amino acids in the polypeptide chain that is coded for by the mRNA; the number of nucleotides in a codon.

coding strand That strand of double-stranded DNA that has the same base sequence as that in mRNA except that thymine in DNA substitutes for uracil in RNA; the strand that does not serve as a template for transcription; the antisense strand.

coding triplet CODON.

codogenic strand ANTICODING STRAND.

codon The sequence of three adjacent nucleotides that occurs in mRNA and that functions as a coding unit for a specific amino acid in protein synthesis. The codon determines which amino acid will be incorporated into the protein at a particular position in the polypeptide chain. There are 64 codons, 61 of which code for amino acids and 3 of which serve as termination codons. Codons are written 5'-XYZ-3'.

codon dictionary See dictionary.

codon recognizing site ANTICODON.

coef Coefficient; used in the Cleland nomenclature of enzyme kinetics to indicate a factor, composed of one or more rate constants, by which the concentration of a component must be multiplied. Thus, (coef *A*)*A* may mean, for example, ($k_3 + k_5$) [*A*], where [*A*] is the concentration of component *A*, and k_3 and k_5 are rate constants.

coefficient of coincidence COINCIDENCE (2).

coefficient of correlation See correlation coefficient.

coefficient of variation A measure of the relative variation of data with respect to the

mean; equal to the ratio of the standard deviation to the mean. Often multiplied by 100 to express it as a percentage. Thus, $CV = (\sigma/\bar{X})100$, where CV is the coefficient of variation, σ is the standard deviation, and \bar{X} is the observed mean.

coefficient of viscosity VISCOSITY.

coenocyte A multinucleate organism that lacks cell walls.

coenzyme The organic molecule that functions as a cofactor of an enzyme.

coenzyme I NICOTINAMIDE ADENINE DINUCLEOTIDE.

coenzyme II NICOTINAMIDE ADENINE DINUCLEOTIDE PHOSPHATE.

coenzyme A The coenzyme form of the vitamin pantothenic acid that functions in metabolism as a carrier of an acetyl or some other acyl group; the acyl group is linked to the sulfhydryl group of coenzyme A. *Abbr* CoASH; CoA.

coenzyme B₁₂ COBAMIDE.

coenzyme-coupled reactions A set of coupled reactions which are linked by means of a coenzyme; the coenzyme is a product of the first reaction and serves as a reactant for the second reaction.

coenzyme F FOLATE COENZYME.

coenzyme M 2,2'-Dithiodiethanesulfonic acid; an intermediate in the formation of methane by methanogenic bacteria.

coenzyme Q One of a group of benzoquinone derivatives that have an isoprenoid side chain of varying length and that function as electron carriers in the electron transport system. Coenzyme Q is structurally related to vitamin K and is not tightly bound or covalently linked to a protein. Instead, a small pool of this compound is in the lipid phase of the mitochondrial membrane and serves as a mobile carrier of electrons. *Abbr* CoQ.

coenzyme Q-cytochrome c reductase complex COMPLEX III.

coenzyme R BIOTIN.

CoF Coenzyme F.

cofactor The nonprotein component that may be required by an enzyme for its activity. The cofactor may be either a metal ion (activator) or an organic molecule (coenzyme) and it may be attached either loosely or tightly to the enzyme; a tightly attached cofactor is known as a prosthetic group.

cofactor-requiring mutant A phage mutant that requires a cofactor for its adsorption to the host cell.

cognates A transfer RNA molecule (cognate tRNA) and its corresponding aminoacyl-tRNA synthetase (cognate synthetase).

cognon The passive part of a two-component cell-cell interaction (agglutination) system that provides the site that is recognized;

- analogous to the substrate in an enzyme-substrate complex, the antigen in an antibody-antigen complex, or the ligand in a receptor-ligand complex. *See also* cognor.
- cognor** The active recognizer part of a two-component cell-cell interaction (agglutination) system; analogous to the enzyme in an enzyme-substrate complex, the antibody in an antibody-antigen complex, and the receptor in a receptor-ligand interaction. *See also* cognon.
- coherent light** Light in which all of the waves are in phase.
- coherin** A heat-stable, hypophyseal polypeptide that stimulates the coordinate contractions of the intestine.
- cohesive end** One of two complementary, single-stranded segments at opposite ends of each of the two strands of a double-stranded nucleic acid molecule; the presence of these segments permits the joining of the ends of the molecule and its conversion to a double-stranded circular form. *Abbr* cos. *Aka* cohesive sites (termini). *See also* restriction enzymes.
- cohesive end ligation** The joining of restriction fragments, terminating in cohesive ends, by means of DNA ligase.
- Cohn fraction** One of a number of fractions of proteins that are precipitated from plasma when the plasma is treated with ethanol at low temperatures.
- coiled coil** SUPERHELIX.
- coimmune** Denoting two mutants of the same phage that do not differ in the gene that controls the synthesis of the immunity substance.
- coincidence** 1. The occurrence of radioactive events within a span of time that is too short to permit their resolution by a radiation counter. 2. The ratio of the observed number of double crossovers to the theoretical number of double crossovers.
- coincidence circuit** An electronic circuit that has two inputs but only one output and that produces an output pulse only if two input pulses arrive either simultaneously or within a known time interval; used in liquid scintillation counting to decrease the level of the dark current due to background counts.
- coincidence correction** The correction that is applied in radiation counting for coincidence loss.
- coincidence counting** The counting of pulses, produced by radioactive disintegrations, by means of a coincidence circuit.
- coincidence loss** The loss of register of pulses as a result of their occurring within too short an interval to permit their resolution by the electronic circuit.
- coincidence time** 1. The minimum length of time that must elapse between two events to permit them to be registered as two separate events. 2. The maximum length of time that may separate two pulses and still permit the registration of an output pulse by means of a coincidence circuit.
- cointegrate formation** REPLICON FUSION.
- cointegrate structure** The circular molecule, formed in plasmid fusion, that contains the two plasmids and two copies of the transposon. Formation of the cointegrate structure is believed to be a necessary step in transposition.
- co-ion** An ion that has a charge of the same sign as that of another ion; ions, used in ion-exchange chromatography, that have charges of the same sign as those of the ion-exchange resin, are considered to be co-ions.
- coisogenic** Descriptive of animals that are genetically identical except for one or two genetic loci that have been altered by mutation.
- Colcemid** Trade name for a colchicine derivative that is a mitotic poison.
- colchicine** An alkaloid that binds to tubulin and prevents its polymerization; an anti-mitotic drug that prevents formation of the mitotic spindle and blocks cells in mitosis.
- cold** Containing no radioactive isotopes.
- cold agglutinin** *See* cold hemagglutinin.
- cold antibody** An antibody that has a higher titer at lower temperatures.
- cold-blooded** POIKILOTHERMIC.
- cold hemagglutinin** A hemagglutinin that causes agglutination of red blood cells at lower temperatures but leads to their dispersion at higher temperatures.
- cold-insoluble globulin** A serum-derived protein that behaves like a cryoglobulin and that is closely related to the membrane protein fibronectin; it represents the plasma form of fibronectin. *Abbr* CIG. *See also* cryoglobulin.
- cold-sensitive enzyme** An enzyme that loses its activity and stability as the temperature is lowered; due to dissociation of the enzyme into inactive subunits as hydrophobic and/or electrostatic interactions become weakened as the temperature is decreased.
- cold-sensitive mutant** A mutant that has a higher minimum temperature of growth than the wild-type organism.
- cold shock** A sudden chilling.
- cold-stable enzyme** An enzyme that has an unusually low optimum temperature.
- Col factor** Colicin factor.
- colicin factor** A bacterial plasmid that allows the organism to produce colicins. *Abbr* Col factor.
- colicinogen** The bacteriocinogen of colicin; the colicin factor.
- colicinogenic factor** Colicin factor.

colicins A group of proteins, produced by certain strains of *Enterobacteriaceae*, that are bactericidal for certain other strains of the same family; bacteriocins produced by strains of *E. coli*.

coliform bacteria 1. Bacteria belonging to the genera *Escherichia* and *Aerobacter*. 2. A large and diverse group of bacteria that includes *E. coli* and bacteria related to it.

colinear code A code in which the sequence of the codons in mRNA corresponds to the sequence of the amino acids in the polypeptide chain that is coded for by that mRNA.

colinearity The concept that the sequence of the nucleotides in a gene corresponds to the sequence of the amino acids in the polypeptide chain that is specified by that gene. The concept is supported by studies of the enzyme tryptophan synthetase from *E. coli* and of the gene specifying this enzyme; it has been shown that the order and spacings of mutational changes in the gene correspond to the order and spacings of the amino acid substitutions in the enzyme.

colipase A protein, present in pancreatic juice, that stabilizes the interaction of lipase with fat droplets in the intestine.

coliphage A phage that infects the bacterium *E. coli*.

collagen A fibrous scleroprotein that is the major protein of connective tissue and the most abundant protein in higher animals. Collagen forms an unusual triple helix and has an unusual amino acid composition in which glycine, proline, and hydroxyproline together constitute about two-thirds of the total amino acid residues. The basic unit of collagen is tropocollagen. Several types of collagen occur: Type I—the major adult form, widespread, lowest carbohydrate content, low hydroxylation of lysine; type II—in cartilage, intermediate hydroxylation of lysine; Type III—in blood vessels and fetal skin, disulfide bonds, low hydroxylation of lysine; Type IV—in basement membranes, disulfide bonds, highest carbohydrate content, high content of hydroxylysine and hydroxyproline; Type V—in basement membranes, high content of carbohydrate and hydroxylysine.

collagenase An enzyme that catalyzes the hydrolysis of collagen; the only proteolytic enzyme capable of degrading native collagen to low molecular weight, soluble peptides.

collagen helix The unusual triple helix of collagen in which the polypeptide chains do not have the alpha helical configuration.

collateral sensitivity The increased sensitivity of an individual to an anticancer drug that results from the individual's resistance to a different anticancer drug.

colligative property A property of a solution, such as osmotic pressure, that depends on the number of solute particles per unit volume of solution and that does not depend on the size or shape of the particles.

collimating lens A lens that converts light striking it into a beam of parallel rays.

collimator A device, composed of either lenses or slits, that is used to convert incident radiation into a narrow beam of parallel rays.

collisional quenching The energy transfer from an excited molecule to another molecule that occurs when the two molecules approach each other to within the contact distance that they attain during molecular collisions.

collision theory The theory of chemical kinetics according to which the velocity of a chemical reaction is a direct function of the molecular collisions. The velocity depends on the frequency of these collisions and on the energy and the relative orientations of the colliding molecules.

colloid 1. A macromolecule or a particle in which at least one dimension has a length of 10^{-9} to 10^{-6} m. 2. THYROID COLLOID.

colloidal Of, or pertaining to, colloids.

colloidal dispersion A colloidal system that consists of a dispersed phase and a dispersion phase and that is thermodynamically unstable and not readily reconstituted after separation of the phases. *See also* colloidal solution; suspension.

colloidal electrolyte ASSOCIATION COLLOID.

colloidal solution A true solution that consists of colloidal macromolecules and solvent and that is thermodynamically stable and readily reconstituted after separation of the macromolecules from the solvent. *See also* colloidal dispersion; suspension.

colloid osmotic pressure The osmotic pressure of a colloidal system that is separated by a membrane that is impermeable to the colloidal particles but is permeable to crystalloids.

colon bacillus *See Escherichia coli*.

colony A group of contiguous cells that grow in or upon a solid medium and are derived from a single cell. A bacterial colony may be of smooth or rough morphology depending on whether or not the cells possess either a capsule or other surface components.

colony bank GENE LIBRARY.

colony hybridization An in situ hybridization technique in which bacterial colonies are transferred from an agar surface to a filter paper. The cells are then lysed on the paper, and the released DNA is fixed, and then hybridized with a labeled DNA or RNA probe. After washing the paper, the labeled DNA segments are located by autoradiography. The technique can also be used for phage plaques.

colony-stimulating factor One of a number of protein growth factors that are required for the proliferation of hematopoietic cells in tissue culture. *Abbr* CSF.

color Whimsical name for a kind of internal charge possessed by quarks. *See also* elementary particles.

colorimeter 1. An optical or a photoelectric instrument for measuring either color differences or color intensities; used for the quantitative determination of compounds in solution by colorimetry. 2. An instrument for the exact matching of two colored solutions.

colorimetry 1. A method of quantitative analysis in which a compound is determined by a comparison of the color produced by the reaction of a reagent with both standard and test solutions of the compound. 2. A method of quantitative analysis in which a compound is determined by the exact matching of the colors produced by the reaction of a reagent with both a standard and a test solution of the compound.

color quenching The quenching that occurs in liquid scintillation counting when some of the light that is emitted by the fluor is absorbed by colored components of the sample.

color vision The capacity to perceive colors that is due to the cones in the retina.

colostral milk COLOSTRUM.

colostrum The milk secreted during the first few days after parturition. *Aka* colostral milk.

col plasmid A plasmid that contains genes for the synthesis of colicins.

column A cylindrical tube that is filled with a chromatographic support and is used in column chromatography.

column chromatography A chromatographic technique in which the stationary phase consists of a porous solid contained in a cylindrical tube, and the mobile phase percolates through the solid; used primarily for adsorption, gel filtration, and ion-exchange chromatography.

coma A state of profound unconsciousness from which the individual cannot be aroused.

comb growth test CAPON TEST.

combination The selection of one or more of a set of distinct objects without regard to order. The number of possible combinations, each containing r objects, that can be formed from a collection of n distinct objects is $n!/(n-r)!r!$ and is denoted as $\binom{n}{r}$, ${}_nC_r$, C_r^n , or $C(n, r)$.

combination code An early version of the genetic code according to which the nucleotide sequence in mRNA was assumed to be random so that all possible sequence permutations of a given triplet could code for the same amino acid.

combination electrode An electrode that

consists of a glass tube into which both a reference electrode and a glass electrode have been incorporated.

combinatorial association The association of heavy chains, of any type, with light chains, of any type, in a given population of immunoglobulin molecules.

combinatorial translocation The association of any variable region gene with any constant region gene, for a given immunoglobulin chain, within the same multigene family.

combined acidity The acidity of gastric juice that is due both to protein-bound hydrochloric acid and to acids other than free hydrochloric acid, such as lactic acid and butyric acid. The combined acidity is equal to the difference between the total titratable acidity of gastric juice and the acidity due to free hydrochloric acid.

combining site *See* antigen binding site.

cometesimal A body of matter formed from primordial dust; the consolidation of cometesimals is believed to have led to the formation of the planets close to the periphery of the solar system.

comicellization The solubilization of an insoluble or a slightly soluble compound through the formation of a mixed micelle that consists of the compound and of an amphipathic compound. The process occurs at concentrations of amphipathic compound that are considerably below its critical micelle concentration.

comma-less code A genetic code in which there are no signals to indicate either the beginning or the end of a codon; in such a code, the displacement of the starting point will lead to the reading of a different set of codons. *Aka* comma-free code.

command voltage The chosen voltage that maintains a fixed membrane potential in the voltage clamp technique.

commensalism A stable condition in which two organisms of different species live in close physical association and neither benefit nor harm accrues to either organism as a result of this association. The term is also used to refer to either symbiosis or parasitism.

comminuted Finely divided.

committed step A reaction that forms part of a sequence of reactions and that, once it takes place, ensures that all the subsequent reactions in the sequence will also take place. It generally proceeds with a large loss in free energy so that the step is essentially irreversible; it may produce a metabolite that has no other role than to serve as an intermediate in the biosynthesis of the end product of the reaction sequence. A committed step may be (a) the first reaction catalyzed by a multienzyme system; (b) the

first reaction in a biosynthesis pathway; or (c) the reaction at a branch point in a biosynthetic pathway.

common intermediate principle The principle that two energetically coupled reactions must proceed by having a common intermediate that transfers the energy from one reaction to the other. *See also* pacemaker enzyme.

commonsense phenomenon PROXIMITY EFFECT.

comparative biochemistry A branch of biochemistry that deals with the nature, the origin, and the control of biochemical differences among organisms.

compartmentation The unequal distribution of a substance, such as a metabolite or an enzyme, within a cell or within an organism; may refer to the occurrence of the substance in particular structures or to its being a part of a given pool.

compensated acidosis An acidosis in which the pH of the blood remains constant due to the effect of mechanisms that counteract the decrease in pH produced initially.

compensated alkalosis An alkalosis in which the pH of the blood remains constant due to the effect of mechanisms that counteract the increase in pH produced initially.

compensation point The concentration of carbon dioxide below which, for a given organism, its uptake by photosynthesis is less than its output by respiration.

competence 1. The physiological state of a bacterial cell that enables it to undergo transformation. 2. The physiological state of a cell that enables it to either recognize an antigen or synthesize antibodies. 3. The physiological state of a part of an embryo that enables it to react to an inductor by determination and differentiation in a specific direction.

competent cell A cell possessing competence.

competitive inhibition The inhibition of the activity of an enzyme that is characterized by an increase in the apparent Michaelis constant (substrate concentration required for one-half the maximum velocity) and by an increase in the slope of a double reciprocal plot ($1/\text{velocity}$ versus $1/\text{substrate concentration}$) compared to those of the uninhibited reaction; the maximum velocity remains unchanged. *See also* degree of inhibition.

competitive inhibitor An inhibitor that produces competitive inhibition and that generally bears a structural similarity to the substrate of the inhibited enzyme. The competitive inhibitor competes with the substrate for, and binds to, the active site of the enzyme. *See also* degree of inhibition.

competitive protection The protection of biomolecules against damage from an ionizing

radiation that is provided by chemical substances (radical scavengers) which compete with the biomolecules for the harmful free radicals produced by the radiation. *See also* restitutive protection.

competitive protein-binding technique An assay for a hormone in body fluids that is similar to a radioimmunoassay except that the binding protein is not antibody but either a plasma or a cellular receptor site for the hormone.

competitive radioassay RADIOIMMUNOASSAY.

competitive radioligand assay RADIOIMMUNOASSAY.

complement A group of at least 9 serum proteins, found in the blood of all vertebrates, that are not immunoglobulins but participate in a variety of immunological reactions; so called, because it complements the action of antibodies in killing cells. Complement may be activated by two separate enzyme cascades, called the classical and alternate pathways. The former involves activation by antigen-antibody complexes containing certain immunoglobulins; the latter involves activation by cell wall polysaccharides of bacteria and yeast. When activated, complement has three functions: (1) it increases vascular permeability and vasodilation (anaphylatoxins); (2) it facilitates ingestion and destruction of antigens by phagocytes (phagocytosis, opsonization); (3) it lyses certain types of foreign cells, such as invading bacteria and erythrocytes from other species (immune hemolysis, immune adherence). *Sym* C; C'. *See also* properdin.

complement activation *See* complement binding reaction; complement fixation.

complemental air The volume of air that can be forcibly drawn into the lungs after the normal tidal air has been inspired.

complementarity The matching up and the mutual adaptation of surfaces in two interacting macromolecules. Complementarity plays a role in such processes as the binding of a substrate to an enzyme, the binding of an antigen to an antibody, and the binding of one nucleic acid strand to another.

complementary Of, or pertaining to, complementarity.

complementary base pairing The linking of bases in double-stranded DNA (via H bonds) according to the base-pairing rules.

complementary base sequence The base sequence in a nucleic acid strand that is related to the base sequence in another strand by the base-pairing rules; thus, the sequence A-T-G-C in a DNA strand is complementary to the sequence T-A-C-G in a second DNA strand and to the sequence U-A-C-G in an RNA strand.

complementary RNA See cDNA.

complementary genes Two genes that are similar in their phenotypic effect when they are present separately but which, when they are present together, interact to produce a different phenotypic effect; two nonallelic genes that complement each other to produce a single trait. *Aka* complementary factor.

complementary interaction The interaction of two genes that leads to phenotypic effects that are different from those produced by either one alone.

complementary RNA A synthetic RNA molecule, transcribed in vitro from a specific DNA molecule; may be radioactively labeled and used as a probe. *Abbr* cRNA.

complementary strand A polynucleotide chain that has a complementary base sequence to that in another chain.

complementation The interaction between two sets of either cellular or viral genes that occurs within the same cell and that permits the cell or the virus to function even though each set of genes carries a mutated and nonfunctional gene. See also intergenic complementation; intragenic complementation; in vitro complementation.

complementation group A group of mutants that carry mutations located within the same cistron.

complementation map A genetic map constructed on the basis of complementation experiments.

complementation test A test for determining whether the mutations of two mutant chromosomes occurred in the same gene so that complementation between the genes is possible; performed by introducing the two mutant chromosomes simultaneously into the same cell.

complement binding reaction The initial event that activates the complement system and that involves binding of the C1 component of complement (C1q) to the Fc portion of an immunoglobulin molecule (IgG or IgM).

complement fixation The activation of complement by either the classical pathway or the alternative pathway. *Abbr* CF. See also complement.

complement fixation inhibition test The inhibition of a complement fixation test, as that produced by the presence of certain haptens or antibodies.

complement fixation test A test for either antigen or antibody that is based on the binding of complement to the antigen-antibody complex and on the consequent disappearance of complement activity from a mixture of antigen, antibody, and complement. *Abbr* CFT.

complement-fixing antibody An immunoglobulin of the IgG or IgM type that binds to (fixes) complement.

complete antibody An antibody that is fully reactive and that gives the ordinary serologic reactions of precipitation and agglutination.

complete antigen See antigen.

complete medium A minimal medium that is fortified with yeast extract, casein hydrolysate, and the like to permit the growth of auxotrophs.

complete oxidation The oxidation of organic compounds such that carbon dioxide is the only carbon-containing product; the term may refer either to a single reaction or to a group of reactions.

complete protein A protein that contains all of the amino acids commonly found in proteins.

complete transduction Transduction in which the DNA from the donor bacterium becomes fully integrated into the chromosome of the recipient bacterium.

complete virion A fully assembled and infective virus particle; a mature virus.

complex 1. An aggregate of two or more molecules, particularly macromolecules, held together by noncovalent forces in a definable structural relation and as a result of specific interactions. The binding can result from any combination of hydrogen bonding, hydrophobic interactions, ionic interactions and van der Waals interactions. 2. The product formed by the interaction of a metal ion and ligands. See also complex ion.

complex I One of the four complexes derived from electron transport particles that, by itself, can catalyze the oxidation of NADH by coenzyme Q.

complex II One of the four complexes derived from electron transport particles that, by itself, can catalyze the oxidation of succinate by coenzyme Q.

complex III One of the four complexes derived from electron transport particles that, by itself, can catalyze the oxidation of reduced coenzyme Q by cytochrome *c*.

complex IV One of the four complexes derived from electron transport particles that, by itself, can catalyze the oxidation of reduced cytochrome *c* by molecular oxygen.

complex V F₀F₁-ATPase.

complex glycoproteins See GLYCOSYLATION.

complex hapten A high molecular weight hapten that constitutes a separate part of a complete antigen and that gives a visible precipitin reaction with the appropriate antibody.

complex ion The product that is formed by the interaction of a metal ion and ligands and that carries a charge. See also complex (2).

complexity A measure of the amount of nonrepetitive DNA in a given sample; defined as the combined length of all the unique DNA segments in the sample. It can be expressed in terms of the number of base pairs or in terms of some mass unit. The complexity increases in evolution from a primitive to an advanced species.

complex lipid 1. AMPHIPATHIC LIPID. 2. One of a group of diverse lipids. *See also* lipid.

complex locus A closely linked cluster of functionally related genes resulting in a plethora of apparently different phenotypes due to mutations in a single gene. Some of the loci in *Drosophila* and the locus for the human hemoglobin genes are complex loci.

complex medium A medium that contains a variety of both known and unknown chemical ingredients.

complex oligosaccharides A group of N-linked oligosaccharides that contain several different monosaccharides in addition to mannose, including sialic acid, fucose, galactose, and *N*-acetyl glucosamine. These oligosaccharides may have 2, 3, or 4 branches and are then designated as bi-, tri-, or tetraantennary.

complexone IONOPHORE.

complex RNA The group of different mRNA molecules of which each one occurs in the form of only a few copies per cell.

complex virion A virus the morphology of which is more intricate than that of either an icosahedral or a helical virus.

component 1. An independently variable, and chemically distinct, substance. 2. An ingredient of a mixture.

component I *See* nitrogenase.

component II *See* nitrogenase.

composite transposon A larger and more complex transposable element in bacteria than an insertion sequence. Composite transposons are flanked by insertion sequences in either an inverted repeat or a direct repeat configuration. They contain genes unrelated to the insertion function, such as genes carrying antibiotic resistance or genes for sugar fermentation.

compositionism HOLISM.

compound A substance composed of two or more elements, such that the atoms of the elements are firmly linked together and are present in definite proportions.

compound lipid COMPLEX LIPID.

compound microscope A microscope having two or more lenses.

Compton effect The ejection of an orbital electron from an atom by the impingement on the atom of a high-energy photon, such as a photon of x rays or gamma rays. Part of the energy of the photon is used to eject the

electron and to impart kinetic energy to it; the remainder of the energy is emitted as a photon having a lower energy and a longer wavelength than the impinging photon.

Compton recoil electron The electron ejected from an atom in the Compton effect.

Compton smear The continuous spectrum of the energies of the photons that are emitted in the Compton effect; a continuous spectrum is obtained, since any fraction of the impinging x-ray or gamma-ray energy can be dissipated in this fashion.

compulsory ordered mechanism ORDERED MECHANISM.

computer An automatic electronic system that can receive a large number of items of information, subject them to specific and often complex calculations, and provide the results either in direct form or in terms of control of other systems; a device that can receive and then follow instructions to manipulate information. *See also* analog computer; digital computer.

computer graphics The combination of various communication and graphic arts skills, computer equipment, and computer techniques that results in rapid and economical production of detailed drawings by a computer.

computer hardware *See* hardware.

computer interface The auxiliary equipment used in linking a computer to an apparatus or to an instrument.

computerized axial tomography A noninvasive x-ray technique for obtaining visualization of cross-sectional planes of living tissues at various depths. The image is produced by computer synthesis of x-ray transmission data obtained in many different directions through the given plane. *Abbr* CAT.

computer language A computer programming system; a set of conventions (symbols and terms) specifying how to tell a computer what to do; the items that, when entered into a computer, cause it to respond and to carry out specific operations.

computer network Two or more connected computers that have the ability to exchange information.

computer program A series of commands, instructions, or statements, put together in a way that tells a computer to do a specific thing or a series of things.

computer software *See* software.

COMT Catechol-O-methyl transferase.

comutation A mutation that occurs in the vicinity of, and simultaneously with, a selected mutation.

Con A Concanavalin A.

conalbumin OVOTRANSFERRIN.

concanavalin A A lectin, isolated from jack beans, that agglutinates red blood cells and stimulates T lymphocytes to undergo mitosis.

concatemer An oligomeric nucleic acid molecule in which complete genomes are held together in an end-to-end manner by either covalent or noncovalent bonds; occurs in the replication of some viral genomes. *Aka* catemer; concatenate; concatener.

concatenate CONCATEMER.

concatenation The formation of concatemers.

concatener CONCATEMER.

concave exponential gradient An exponential density gradient that is formed if the solution introduced into a mixing chamber of constant volume has a lower concentration than the solution initially present in the mixing chamber.

concentrated solution A solution that contains a large amount of solute.

concentration The amount of solute in a solution. *See also* formal solution; molal solution; molar solution; osmolal solution; osmolar solution; percent solution; ppb; ppm.

concentration equilibrium constant APPARENT EQUILIBRIUM CONSTANT (1).

concentration gradient The change of concentration with distance, as the change of concentration along a density gradient or across a membrane.

concentration of enzymatic activity A measure of the concentration of an enzyme in solution that is equal to the enzymatic activity divided by the volume of the solution; it is expressed in terms of katal per liter.

concentration work OSMOTIC WORK.

concentric cylinder viscometer An instrument for measuring the viscosity of a liquid by placing the liquid in the space between two concentric cylinders, rotating one cylinder at a constant speed, and measuring the torque exerted on the other cylinder.

concerted acid-base catalysis Catalysis that consists of the simultaneous action of both acidic and basic catalytic groups.

concerted catalysis Catalysis that results from the presence of more than one catalytic grouping in the active site of an enzyme.

concerted divalent inhibition The inhibition of an allosteric enzyme that is produced when two effectors are bound to the enzyme simultaneously, but that is not produced when either effector is bound to the enzyme alone.

concerted feedback inhibition The feedback inhibition of an enzyme that is produced when two or more end products are present simultaneously, but that is not produced when an end product is present alone.

concerted model A model for allosteric enzymes—proposed by Monod, Wyman, and

Changeux—according to which the enzyme exists in two different conformational forms (a relaxed, R-form, and a tensed, T-form) that are in equilibrium with each other. The two forms differ in their capacity to bind substrate, positive effectors, and negative effectors, but the overall symmetry of the molecule is maintained throughout the various binding steps so that no two identical subunits are in different conformational states at any given time. The binding of an effector or of the substrate shifts the equilibrium from one form to another. *Abbr* MWC model. *Aka* concerted transition model.

concerted reaction A chemical reaction in which a new bond is formed at the same time as, and as a direct consequence of, the breaking of another bond.

concrete oil *See* essential oil.

condensate 1. The crystalline particles of DNA that are formed during an early stage in the maturation of T-even phages. 2. The liquid obtained by condensation of either a gas or a vapor.

condensation 1. The linking of two like, or two unlike, molecules with the elimination of either a molecule of water or some other small molecule. 2. POLYMERIZATION. 3. An early stage in the maturation of T-even phages during which the condensate is formed. 4. The transition of either a gas or a vapor to a liquid.

condensation polymer STEP-GROWTH POLYMER.

condensation principle CONDENSING PRINCIPLE.

condensed conformation A low-energy conformation of mitochondria that occurs in mitochondrial preparations containing an excess of ADP, and that is characterized by a mitochondrial matrix which is not squeezed together tightly and does not stain heavily. *See also* orthodox conformation.

condensing enzyme CITRATE SYNTHASE.

condensing principle A factor that aids in the aggregation of DNA to form a condensate during an early stage in the maturation of T-even phages.

condensing site PEPTIDYL SITE.

conditional lethal mutant A conditional mutant, the ability of which to grow depends on the conditions: it grows as a normal organism under permissive conditions but does not grow, and thus expresses its lethal mutation, under restrictive conditions.

conditional mutant A mutant whose behavior depends on the physical conditions: it shows normal, wild-type behavior under certain (permissive) conditions and abnormal, mutant behavior under other (restrictive) conditions. A temperature-sensitive mutant and a suppressor-sensitive mutant are two examples.

conditioned vitamin deficiency A disorder that is caused by an interference with the digestion, absorption, or utilization of a vitamin as distinct from one that is caused by a lack of the vitamin in the diet. *See also* secondary deficiency.

conductance The property of an electrical circuit that determines the rate at which electrical energy is converted into heat when a given potential is applied across the electrodes; equal to the reciprocal of the electrical resistance.

conduction 1. The act of conveying either matter or energy from one location to another. *See also* nerve impulse conduction.

2. The transfer to a recipient cell of a nonmobilizable plasmid via genetic recombination with a different, conjugative plasmid.

conductivity 1. The capacity to conduct either electricity or heat. 2. CONDUCTANCE.

conductometry A method of chemical analysis that is based on measurements of electrical conductivity.

cone A light receptor in the retina of vertebrates that functions in day and color vision.

cone threshold The lowest light intensity to which the cones are sensitive.

confidence interval An interval for which one can assert with a given probability (called degree of confidence or confidence coefficient) that it will contain the parameter it is intended to estimate. The parameter may be the mean, a standard deviation, a proportion, or any other estimate of a point. The endpoints of a confidence interval are referred to as upper and lower confidence limits.

confidence limits *See* confidence interval.

configuration A unique and fixed spatial arrangement of the atoms in a molecule such that the molecule may be isolated in this stereochemical form. The change from one configuration to another requires the breaking and forming of covalent bonds. *See also* conformation.

confluent growth The growth of bacterial cells on a solid medium such that the entire surface of the medium is covered by the cells.

confluent lysis The complete lysis, in a plaque assay, of the entire bacterial lawn.

conformation A spatial arrangement of the atoms in a molecule that results from the rotation of the atoms about single bonds without a change in the covalent structure of the molecule. Conformation thus refers to a family of structures and not to a single, isolatable stereochemical form. The change from one conformation to another does not require the breaking and forming of covalent bonds. *See also* configuration.

conformational analysis An analysis that attempts to deduce the most stable (least strained) conformation of a flexible molecule in solution; based on minimizing the potential energy of the molecule by considering bond lengths, bond angles, and other factors.

conformational coupling hypothesis A hypothesis of the coupling of ATP synthesis to the operation of the electron transport system in oxidative phosphorylation. According to this hypothesis, the transport of electrons leads to the formation of energy-rich conformations of mitochondrial membrane components, and the energy associated with the relaxation of these membrane components then drives the phosphorylation of ADP to ATP.

conformational isomer CONFORMER.

conformational map RAMACHANDRAN PLOT.

conformer One of two or more isomers that differ from each other in their conformation; any one of the various possible conformations of a molecule.

conformon 1. A quantized package of energy that, according to the conformational coupling hypothesis, is associated with a localized conformational change in the mitochondrial membrane. 2. A vibrational or electronic excitation of a macromolecule that is accompanied by a local deformation. 3. A collection of a small number of catalytic residues of enzymes or segments of nucleic acids that are arranged in space and time with appropriate force vectors so as to cause chemical transformations or physical changes of a substrate or a bound ligand. 4. A packet of energy and/or genetic information, stored as a transient localized conformational strain in a biological macromolecule.

congener One of a family of related chemical substances, such as derivatives of a compound or elements belonging to the same group in the periodic table.

congenic strains Strains of an organism that differ from each other only with respect to a small, restricted, region of the chromosome.

congenital Existing at birth.

congenital goiter FAMILIAL GOITER.

congenital hyperammonemia HYPERAMMONEMIA.

congenital parahemophilia PARAHEMOPHILIA.

congenital porphyria A genetically inherited metabolic defect in humans that is characterized by an overproduction of Type I porphyrins and the excretion of excessive amounts of uroporphyrins in the urine.

conglutination The agglutination of antigen-antibody-complement complexes by conglutinin.

conglutinin A protein that is present in normal

- serum and that causes the agglutination of antigen-antibody-complement complexes; conglutinin is not an antibody. *See also* immunconglutinin.
- conglutinogen** A site on the bound C3b component of complement that is modified enzymatically by KAF and then binds conglutinin during conglutination.
- conidium** (*pl* conidia). An asexual spore of certain fungi. Large and usually multinucleate conidia are known as macroconidia; small and usually uninucleate conidia are known as microconidia.
- conjugate acid-base pair** A Bronsted acid and its corresponding Bronsted base; a proton donor and the corresponding proton acceptor.
- conjugated antigen** An antigen consisting of a protein that is covalently linked to either a molecule or a group which contains an antigenic determinant.
- conjugated double bonds** *See* conjugation (2).
- conjugated enzyme** An enzyme that is a conjugated protein.
- conjugated protein** A protein that contains a nonprotein component in addition to the amino acids. The nonprotein component may be either a metal ion or an organic molecule such as a lipid, a carbohydrate, or a nucleic acid. The nonprotein component may be either loosely associated with the protein or bound to it tightly as a prosthetic group.
- conjugate redox couple** REDOX COUPLE.
- conjugation** 1. The covalent or noncovalent combination of a large molecule, such as a protein or a bile acid, with another molecule. 2. The alternating sequence of single and double bonds in a molecule. 3. The genetic recombination in bacteria and in other unicellular organisms that resembles sexual reproduction and that entails a transfer of DNA between two cells of opposite mating type which are associated side by side.
- conjugative plasmid** A plasmid that carries genes that determine the effective contact function for the transfer of the plasmid DNA from a donor to a recipient cell.
- conjugon** A genetic element, such as the fertility factor, that is required for bacterial conjugation.
- connecting peptide** A peptide of 30 amino acids that, together with 4 basic amino acids, serves to link together the A and B chains of insulin in the proinsulin molecule. *Abbr* C peptide.
- connective tissue** The extracellular matrix and the cells found in it, such as fibroblasts, macrophages, and mast cells. Connective tissue is distributed throughout the body in cartilage, tendons, ligaments, and the matrix of bone; it underlies the skin, binds blood vessels, and binds cells in such tissues as liver and muscle. It consists of insoluble fibers, formed by polymers of high molecular weight, embedded in a matrix called the ground substance.
- connexon** *See* gap junction.
- consecutive reactions** A series of two or more reactions in which the product of one reaction serves as a reactant for the next reaction.
- cons electrophoresis** ISOTACHOPHORESIS.
- consensus sequence** A basic sequence of nucleotides derived from a large set of observed similar sequences in a specific region of a nucleic acid molecule. The sequences of the Pribnow box and the Hogness box are examples. *Aka* canonical sequence.
- conservation equation** An equation that expresses the total concentration of a component in terms of all the various forms in which it occurs. For example, the total concentration of enzyme in a simple enzymatic reaction is equal to the concentration of the free enzyme plus the concentration of the enzyme in the form of the enzyme-substrate complex.
- conservative amino acid replacement** CONSERVATIVE SUBSTITUTION.
- conservative recombination** Genetic recombination, involving breakage and reunion of preexisting DNA strands, in the absence of DNA synthesis.
- conservative replication** A mode of replication for double-stranded DNA (now considered obsolete) in which the parental strands do not separate and in which the progeny consists of both original parental duplexes and of newly synthesized duplexes.
- conservative substitution** The replacement in a protein of one amino acid by another, chemically similar, amino acid, such as the replacement of a polar (nonpolar) amino acid by another polar (nonpolar) amino acid. A conservative substitution is generally expected to lead to either no change or only a small change in the properties of the protein. *See also* radical substitution.
- conserved sequence** A base sequence in a nucleic acid (or an amino acid sequence in a protein) that has changed only very slightly in the course of evolution.
- conspicuous** Belonging to the same species.
- constant region** That part of the immunoglobulin molecule in which virtually no changes in the amino acid sequence are found when immunoglobulins from different sources are compared. The constant region comprises portions of both the light c_L and the heavy c_H chains and does not constitute part of the antigen binding site. *Aka* constant domain. *See also* variable region.
- constituent concentration** The concentration of a component that takes into account all of the forms in which the component occurs; the

total concentration of a macromolecule that exists in two conformational states is an example.

constituent parameter The concentration average of a parameter, such as a sedimentation coefficient or a diffusion coefficient, for a component that exists in several forms in the solution.

constitutive enzyme An enzyme that is present in a given cell in nearly constant amounts regardless of the composition of either the tissue or the medium in which the cell is contained; an enzyme that is constantly produced regardless of the growth conditions.

constitutive expression The unregulated expression of an operon resulting from a constitutive mutation.

constitutive gene A gene whose activity depends only on the efficiency with which the promoter of the gene binds RNA polymerase.

constitutive mutation A mutation that results in extensive constitutive synthesis of an inducible enzyme in the absence of an inducer and that involves an alteration in either the operator or the regulator gene of the enzyme.

constitutive secretory cell A cell, such as a muscle or a liver cell, that secretes proteins as fast as they are synthesized inside the cell. Such cells do not have a large intracellular pool of proteins and the rate of protein secretion is affected by altering the rate of protein synthesis. *See also* regulated secretory cell.

constitutive synthesis The synthesis of a specific protein (or of its mRNA) at a nearly constant rate independent of the presence of any molecule that interacts with the protein (or with its mRNA).

constraint A limitation imposed on a set of data by external conditions. Thus, the requirement that a set of data have a mean of a given value, represents a constraint.

constructive interference *See* interference (1).

constructive metabolism ANABOLISM.

consumption test Any test in which the amount of antigen or antibody removed (consumed), in the form of an antigen-antibody precipitate, is being determined.

contact activation cofactor HIGH MOLECULAR WEIGHT KININOGEN.

contact dermatitis *See* allergic contact dermatitis.

contact factor HAGEMAN FACTOR.

contact guidance The guiding of migrating cells along a specific pathway in the extracellular matrix by contact with oriented surfaces or structures.

contact hypersensitivity The hypersensitivity that is brought about by exposure of the skin to a chemical substance. *See also* allergic contact dermatitis.

contact inhibition The inhibition of cell growth that occurs in tissue culture when cells of multicellular organisms come into contact with each other. Contact inhibition permits the growth of monocellular layers and prevents the disorderly piling up of cells. The loss of contact inhibition is one of the characteristics of a tumorigenic cell.

contact map A two-dimensional graphical representation of the structure of a protein; involves a plot of the distances between all pairs of alpha carbon atoms, either in the order of the amino acid sequence or as falling within a certain distance. *Aka* distance map.

contact skin sensitivity The capacity of an animal organism to respond to a percutaneous application of a chemical sensitizer.

contact surface Those parts of the van der Waals surface of a protein that make contact with the surface of an appropriate probe, generally considered to be a water molecule with a radius of 1.4 Å.

contamination 1. The mixing of an impurity, such as a heavy metal ion or a radioactive substance, with the sample. 2. An impurity that is present in the sample.

continuity equation An equation that expresses the conservation of mass during ultracentrifugation on the basis of sedimentation and diffusion.

continuous assay An assay in which the reaction mixture is analyzed continuously by some monitoring technique without interfering with the progress of the reaction by the removal of samples.

continuous cell line ESTABLISHED CELL LINE.

continuous culture A culture of cells that is maintained in a growing state over prolonged periods of time *Aka* open culture. *See also* batch culture; chemostat.

continuous density gradient A density gradient in which the density changes in an uninterrupted fashion, rather than in a step-wise fashion, from one end of the gradient to the other.

continuous development A chromatographic technique, used particularly with paper and thin-layer chromatography, in which the solvent is allowed to run continuously over the support.

continuous discharge region That portion of the characteristic curve of an ionization chamber in which, during gas amplification, there is a continuous discharge in the chamber so that it is no longer usable as a detector.

continuous distribution A set of experimental data in which the variable being measured can vary continuously and is expressed as a number having one or more decimal places; the weight gain per animal in a group of animals is an example.

continuous emission The emission of light over a range of wavelengths that is produced in flame photometry when nonionic materials are present in the sample.

continuous flow centrifugation A preparative-type centrifugation, used for collecting materials from large volumes of liquid, in which a liquid is fed continuously into a rotor, the sediment is accumulated, and the supernatant is continuously withdrawn.

continuous flow electrophoresis An electrophoretic technique in which the flow of liquid is in a vertical direction and the electric field is at right angles to the direction of liquid flow. The sample is applied continuously at the top of the apparatus and fractions are collected at the bottom, at various spacings along the supporting medium.

continuous flow isoelectric focusing An isoelectric focusing technique in which the flow of liquid is in a vertical direction and the electric field is at right angles to the direction of liquid flow. The sample is applied continuously at the top of the apparatus and fractions are collected at the bottom, at various spacings along the supporting medium.

continuous flow scintillation counter A liquid scintillation counter designed for the continuous monitoring of radioactivity and used for effluents from amino acid analyzers and gas chromatographs.

continuous flow technique RAPID FLOW TECHNIQUE.

continuous spectrum A spectrum in which either the absorption or the emission of radiation covers a range of wavelengths.

continuous variation See method of continuous variation.

contour length The length of an extended polymer as distinct from the end-to-end distance of the folded polymer.

contracted muscle A muscle that has been shortened by contraction.

contractile Capable of contraction.

contractile protein A protein, such as actin or myosin, that is a component of fibrous tissues and that is capable of producing changes in the lengths of its constituent fibrous elements.

contraction The shortening of a muscle. See also isometric contraction; isotonic contraction.

contributing structure CANONICAL STRUCTURE.

control 1. An experiment that serves as a standard of comparison for other experiments; the control is carried out exactly as the other experiments except that it differs from them in one variable, the significance of which can thereby be assessed. See also blank. 2. The regulation of a biochemical process. See also coarse control; fine control.

control analysis A theoretical and experimental approach applied to intact metabolizing systems for the purpose of obtaining quantitative measures of the relative importance of individual steps in the control of a given metabolic pathway.

controlled atmospheric storage GAS STORAGE.

controlling element A genetic element that becomes inserted in a gene and makes it an unstable, hypermutable gene. There are two types of controlling elements, receptor and regulator elements. The former causes inactivation of the target gene; the latter maintains the mutational instability of the target gene.

controlling gene A gene, such as a regulator gene, that can turn other genes on or off.

control strength A measure of flux changes in a metabolic pathway that arise from changes in the activity of an enzyme in the pathway. Specifically,

$$C_i = \frac{\partial \ln v_g}{\partial \ln v_i} = \frac{\partial v_g}{\partial v_i} \frac{v_i}{v_g}$$

where C_i is the control strength, v_g is the net flux through the pathway, and v_i is the net flux through a step in the pathway, catalyzed by enzyme E_i . If the substrates of the enzyme are present in large excess, the relation becomes

$$C_i = \frac{[E_i]}{v_g} \frac{\partial v_g}{\partial [E_i]}$$

convalescent serum The serum obtained during convalescence from a disease.

convection The bulk movement of fluid in which both solvent and solute move together and that is usually due to either density inversions caused by temperature variations or local concentration changes.

conventional animal An animal raised under ordinary conditions as distinct from one raised in a germ-free environment.

conventional sedimentation equilibrium SEDIMENTATION EQUILIBRIUM.

convergence theory of cancer GREENSTEIN HYPOTHESIS.

convergent evolution An evolutionary pattern in which the lines of development for more recent species come together as a result of independent development from earlier species; such a pattern can be depicted as two or more independent networks, arising from different origins.

conversion A change in the properties of the host bacterium, such as antigenic character or toxin production, that is brought about by the prophage of that bacterium. See also antigenic conversion.

conversion coefficient The fraction of gamma rays that produce Auger electrons.

conversion electron The electron emitted from an atom that is undergoing internal conversion.

conversion factor A number that converts one set of dimensions into another.

conversion period The theoretical time required for the conversion of all of the substrate to product by a given amount of enzyme.

conversion stage That part of the blood clotting process that consists of the conversion of fibrinogen to fibrin under the influence of thrombin.

converter enzyme An enzyme that catalyzes the interconversion of two forms of another enzyme; an enzyme that carries out the chemical modification of a regulatory enzyme. The enzymes synthase phosphorylase kinase (SPK) and phosphoprotein phosphatase (PP-1) that catalyze the interconversion of phosphorylase a and b are two examples.

convertin The activated form of proconvertin; one of the factors in the extrinsic pathway of blood coagulation.

converting enzyme *See* serum converting enzyme.

converting phage A phage that brings about conversion in its host cell.

convex exponential gradient An exponential density gradient that is formed if the solution introduced into a mixture chamber of constant volume has a higher concentration than the solution initially present in the mixing chamber.

Conway microdiffusion apparatus An apparatus for the microchemical analysis of a gas, such as ammonia or carbon dioxide, that can be liberated from a sample by treatment with specific reagents. The apparatus consists of two concentric plates, much like a modified petri dish; the central well contains the sample, and the outer space contains a solution for trapping the gas that will be liberated and that will diffuse away from the sample upon addition of the reagents.

Cooley's anemia THALASSEMIA.

Coomassie brilliant blue Trademark for a dye used for the detection of protein bands following electrophoresis. *See also* Bradford method.

Coombs' reagent An antiserum that contains antibodies to human immunoglobulins and that is prepared by injecting these immunoglobulins into rabbits.

Coombs' test A test for demonstrating incomplete antibodies against red blood cells; based on an agglutination reaction in which the incomplete antibodies bind simultaneously to red blood cell antigens and to antibodies against themselves. *See also* direct Coombs' test; indirect Coombs' test.

Coon's method INDIRECT FLUORESCENT ANTIBODY TECHNIQUE.

cooperative binding The binding of ligands to a macromolecule such that the binding of one ligand to one binding site affects the binding of subsequent ligands to other binding sites on the same molecule. The ligands and the binding sites may be of one kind each or they may be different. The binding sites in cooperative binding are known as interacting (binding) sites.

cooperative feedback inhibition The feedback inhibition of an enzyme that is produced by two or more end products such that the inhibition caused by a mixture of two end products present together is greater than that caused by either end product present alone at the same total specific concentration (i.e., the concentration relative to the inhibitor constant).

cooperative hydrogen bonding The interaction between neighboring hydrogen bonds in a molecule such that the energy required to form these bonds is smaller than the sum of the energies for the individual bonds, and the energy required to break these bonds is greater than the sum of the energies for the individual bonds.

cooperative interactions *See* cooperative binding; cooperativity.

cooperative kinetics The kinetics of cooperative binding reactions. *See also* sigmoid kinetics.

cooperativity 1. The interaction between either identical or different binding sites of a macromolecule so that the binding of a ligand to one site affects the binding of subsequent ligands to other sites on the same molecule. 2. The interaction between neighboring hydrogen bonds in either a protein or a nucleic acid. *See also* cooperative hydrogen bonding.

cooperativity coefficient HILL COEFFICIENT.

cooperativity index The ratio of substrate concentrations required to achieve any two fractions of the maximum velocity of an enzymatic reaction. Thus, if a substrate concentration of $[S]_{0.9}$ yields 90% of V_{max} and a substrate concentration of $[S]_{0.1}$ yields 10% of V_{max} , then the cooperativity index is given by $[S]_{0.9}/[S]_{0.1}$.

cooperativity models *See* concerted model; sequential model; Ferdinand model; Rabin model; nearest-neighbor cooperative model.

coordinate covalent bond A covalent bond formed between two atoms and consisting of two electrons, both of which are donated by only one of the bonded atoms.

coordinated enzymes The enzymes that are controlled by genes of one operon and that

are either induced in coordinate induction or repressed in coordinate repression.

coordinated enzyme synthesis The synthesis of coordinated enzymes.

coordinate induction Enzyme induction in which a single inducer brings about the synthesis of a number of inducible enzymes that catalyze a sequence of either consecutive, or related, reactions in which the inducer is generally the first substrate. The structural genes of the coordinated enzymes are contiguous and form part of one operon. *See also* sequential induction. The induction by lactose of the synthesis of the enzymes coded for by the lac operon is an example.

coordinate regulation *See* coordinate induction; coordinate repression.

coordinate repression Enzyme repression in which a single repressor brings about the decreased synthesis of a number of repressible enzymes that catalyze a sequence of either consecutive or related reactions in which the repressor is generally the last end product. The structural genes of the coordinated enzymes are contiguous and form part of one operon. The repression by histidine of the synthesis of the nine enzyme-catalyzed steps in histidine biosynthesis is an example.

coordination 1. The formation of a complex between a metal ion and ligands. 2. COORDINATED ENZYME SYNTHESIS.

coordination number The number of ligands that can be bound to a metal ion to form a complex.

coordination position The position in the space surrounding a metal ion that can be occupied by a ligand for coordination with the metal ion.

cop I Copolymer I; a synthetic copolymer of 4 amino acids that are prevalent in myelin basic protein. The compound is being investigated as a possible means of preventing the immune system in multiple sclerosis from attacking native myelin, thereby leading to demyelination. *See also* myelin basic protein.

copia elements A group of transposable elements in *Drosophila* that have closely related base sequences and code for large (copious, hence the name copia) amounts of RNA. Copia elements contain about 5 kb and are terminated by a 267-bp sequence in direct repeats.

coplanar Lying in the same plane.

copolymer A polymer formed from two or more different types of monomers that polymerized together.

copolymer I *See* Cop I.

copper An element that is essential to all plants and animals. Symbol, Cu; atomic number, 29; atomic weight, 63.54; oxidation

states, +1, +2; most abundant isotope, ^{63}Cu ; a radioactive isotope, ^{64}Cu , half-life, 12.8 h, radiation emitted beta particles, positrons, and gamma rays.

copper proteins A group of metalloproteins, often blue in color, that contain copper. The copper is generally in the divalent form and can usually be removed by dialysis against complex-forming compounds. *See also* azurin; blue protein.

coprecipitating antibody An antibody that does not form an antigen-antibody precipitate by itself, but can be incorporated in an antigen-antibody precipitate under suitable conditions.

coproantibody An antibody present in feces.

coproporphyrin The urinary pigment that is derived from coproporphyrinogen. *Abbr* CP. *See also* porphyrin.

coproporphyrinogen An intermediate in the biosynthesis of heme that is derived from uroporphyrinogen. *Abbr* CPG.

coprostanol A sterol alcohol excreted in the feces and formed by reduction of cholesterol as a result of the action of intestinal bacteria; it represents a major form in which cholesterol is eliminated.

copy-choice hypothesis A hypothesis of the mechanism of genetic recombination according to which the recombinant DNA molecule is synthesized by a system that uses both of the parental DNA molecules as templates, but that copies them in an alternating fashion.

copy DNA COMPLEMENTARY DNA.

copyediting *See* proofreading function.

copy error A mistake in replication.

copy-error mutation A mutation that results from a mistake in replication.

copy number The number of plasmids per cell. A low copy number (stringent plasmid) refers to the case of one or a few plasmids per cell; a high copy number (relaxed plasmid) typically refers to the case of 10-100 plasmids per cell.

copy-splice mechanism A mechanism that describes the genetic control of the synthesis of immunoglobulin chains in terms of the germ line theory.

CoQ Coenzyme Q.

CoQH₂ Reduced coenzyme Q.

cor The bare 15-membered ring of the corrin ring system.

cord factor A glycolipid in the cell walls of certain strains of *Mycobacterium* that is toxic for some laboratory animals. The compound is a mycolic acid diester of trehalose (trehalose-6,6'-dimycolate) and the name derives from the fact that it can be isolated primarily from those bacterial strains that grow in long cord-like skeins.

cordycepin 3'-Deoxyadenosine; an inhibitor of the polyadenylation of RNA.

core See spore core.

core DNA The DNA of a nucleosome core particle.

core enzyme 1. The portion of the enzyme RNA polymerase that consists of an aggregate of four subunits and that possesses catalytic activity, but that requires the attachment of the sigma factor before it can recognize an initiation site of transcription. *Aka* core polymerase. 2. The smallest aggregate of DNA-dependent DNA polymerase III that has enzymatic activity.

core particle A particle obtained from ribosomes by removal of some of the ribosomal proteins, known as split proteins. *Abbr* CP. See also intersome. 2. NUCLEOSOME.

core polymerase CORE ENZYME (1).

corepressor A small molecule that combines with an aporepressor to form an active repressor which binds to the operator and inhibits transcription in enzyme repression. The corepressor is generally either the end product of the enzymatic reaction or a compound that is structurally similar to the product.

core protein 1. A structural protein molecule that occurs in complex IV, one of the respiratory assemblies. 2. See proteoglycan aggregates.

core region A sequence of three monosaccharides that is common to most N-linked oligosaccharides and that is linked to the amide group of asparagine in the glycosylated protein [Man β 1-4 GlcNAc β 1-4 GlcNAc β -Asn].

core sequence The DNA base sequence in a prophage attachment site in which exchange occurs.

Cori coefficient A measure of the rate of monosaccharide absorption by rat intestine that is expressed as the number of milligrams of monosaccharide absorbed per 100 g of rat per hour.

Cori cycle The cyclic group of reactions whereby glycogen is broken down and re-synthesized. The sequence begins with the breaking down of muscle glycogen to lactic acid, which is carried by the blood to the liver where it is converted back to glycogen; the liver glycogen, in turn, is then broken down to glucose, which is carried by the blood to the muscle where it is reconverted to glycogen.

Cori ester Glucose-1-phosphate.

Cori's disease GLYCOGEN STORAGE DISEASE TYPE III.

corn sugar GLUCOSE.

corpus allatum An endocrine gland in insects

that synthesizes and secretes the allatum hormone.

corpuscle A small particle or body.

corpuscular Of, or pertaining to, corpuscles.

corpus luteum (*pl* corpora lutea). A yellow progesterone-secreting body that is formed in a ruptured follicle.

corrected absorbance 1. The absorbance of a solution that has been corrected for the absorbance of either a blank or a reference solution. 2. The absorbance of a solution that is obtained after applying an Allen correction.

correction The replacement in DNA, via excision repair, of mismatched base pairs by complementary base pairs.

correlation The extent to which two statistical variables vary together; the interdependence between two variables. It is measured by the correlation coefficient.

correlation coefficient A measure of the correlation between two statistical variables; it varies from zero for no correlation to +1 or -1 for perfect positive or negative correlation. A correlation coefficient of +0.3 (-0.3) means that as one variable increases, the other will increase (decrease) 30% of the time in the long run. *Sym* r.

correlation time A measure of time, used in resonance studies, that is equal to one-third of the relaxation time.

correndonuclease A correctional endonuclease; an endonuclease that specifically acts on damaged DNA resulting in correctional pathways in vivo. Correndonucleases that act on DNA having single or multiple base modifications are known, respectively, as Type I and Type II correndonucleases.

correxonuclease A correctional exonuclease; an exonuclease that functions in the repair of damaged DNA.

corrin The basic ring structure of vitamin B₁₂ in which a cobalt atom is chelated.

corrinoid Any compound containing the corrin ring system.

cortex See adrenal cortex; spore cortex.

cortical bone See lamellar bone.

corticoid ADRENAL CORTICAL STEROID.

corticoliberin CORTICOTROPIN RELEASING HORMONE.

corticosteroid ADRENAL CORTICAL STEROID.

corticosteroid-binding globulin TRANSCORTIN.

corticosteroid-binding protein TRANSCORTIN.

corticosterone A glucocorticoid that is biosynthesized from progesterone.

corticotrophin Variant spelling of corticotropin.

corticotropin ADRENOCORTICOTROPIC HORMONE.

corticotropin-like intermediate lobe peptide A polypeptide consisting of residues 18-39 of ACTH and formed from it in the intermediate

- lobe of the pituitary gland; its physiological role is not yet established. *Abbr* CLIP.
- corticotropin releasing hormone** The hypothalamic hormone that controls the secretion of corticotropin. *Var sp* corticotrophin releasing hormone. *Abbr* CRH. *Aka* corticotropin releasing factor (CRF); corticoliberin.
- cortin** 1. ADRENAL CORTICAL STEROID. 2. An acetone extract of the adrenal cortex.
- cortisol** The major glucocorticoid in humans that occurs in the blood bound to the protein transcortin, is biosynthesized from progesterone, and has strong antiinflammatory activity.
- cortisol-binding globulin** TRANSCORTIN.
- cortisol-binding protein** TRANSCORTIN.
- cortisone** A glucocorticoid that is biosynthesized from cortisol. When administered, it is converted in vivo back to cortisol which largely accounts for its strong antiinflammatory activity.
- corticoic acid** A carboxylic acid formed by oxidation of cortisol, and some of its metabolites, at carbon 21.
- COS cells** Monkey cells that have been transformed by Simian virus 40 DNA that contains a defective origin of viral replication.
- cosmic rays** The high-energy ionizing radiation that originates outside the earth's atmosphere and that consists primarily of protons and other nuclei.
- cosmid** A cos site carrying plasmid; a plasmid vector that carries the cos sites of phage lambda DNA. This allows the plasmids to be packaged into phage particles for efficient introduction into bacteria. The cos site also guards against breakage of the plasmids and increases the probability of selecting a recombinant plasmid carrying foreign DNA. Lastly, cosmids are useful for cloning very large DNA inserts such as those of eukaryotic DNA.
- cosmochemistry** The study of the chemical composition of, and changes in, the universe.
- cos sites** The nucleotide sequences of the cohesive ends (termini) of a phage DNA molecule. When these become linked to form a double-stranded circular molecule, the hydrogen-bonded region of the cohesive ends is designated as cos.
- cosubstrate** A compound that acts somewhat in the capacity of a substrate during an enzymatic reaction, such as a dissociable coenzyme molecule. A cosubstrate participates stoichiometrically in the reaction and is consumed as the substrate is consumed. The NAD^+ and NADP^+ of pyridine-linked dehydrogenases are examples.
- COSY** Correlated spectroscopy; a two-dimensional nuclear magnetic resonance technique.
- cot curve** The curve obtained by plotting the data of a reassociation kinetics experiment. Since the reassociation of DNA is a bimolecular, second-order reaction, it follows that $C/C_0 = 1/(1 + kC_0t)$ where k is the second-order rate constant ($\text{L mol}^{-1}\text{s}^{-1}$), t is the time (s), C_0 is the initial concentration of single-stranded DNA (moles of nucleotide per liter), and C is the concentration of single-stranded DNA remaining in the reaction mixture at time t (moles of nucleotide per liter). The cot curve is obtained by plotting the fraction of single-stranded DNA remaining (C/C_0) as a function of $\log(C_0t)$, that is, the logarithm of the product of the initial concentration and the elapsed time. The cot curve is an S-shaped curve. *See also* reassociation kinetics.
- cotransduction** The simultaneous transduction of two or more genes that lie on the same segment of the bacterial DNA that is being transduced.
- cotransformation** The simultaneous transformation of two or more genes that lie on the same segment of DNA that is being transformed.
- cotranslational transport** The translocation of a protein across a biological membrane that is coupled to the synthesis of the protein; the translocation is in process before the synthesis of the polypeptide chain is completed. *Aka* cotranslational transfer. *See also* signal hypothesis; post-translational transport.
- cotransport** The simultaneous transport of two different substances across a biological membrane; symport.
- Cotton effect** The change in sign of the optical rotation in the neighborhood of an absorption band. The effect is due to the circular dichroism of the left and right circularly polarized light components of plane-polarized light. A Cotton effect is referred to as positive or negative depending on whether the optical rotation, with increasing wavelength, passes first through a minimum value and then through a maximum value, or vice versa.
- cot value** The value of C_0t in a cot curve; the product of the initial concentration of single-stranded DNA and the time allowed for reassociation. The cot value, when the reaction has proceeded to half completion (the point at which 50% of the DNA has reassociated or annealed, that is, $C/C_0 = 0.5$) is designated as $\text{cot}_{1/2}$ or $(\text{cot})_{1/2}$. This point is also known as half reaction time and is equal to $1/k$, where k is the second-order rate constant.

cotyledon The first leaf that develops in the embryo of a seed plant.

Couette viscometer A concentric cylinder viscometer in which the outer cylinder is rotated at a constant speed and the viscosity is determined from the torque exerted on the inner cylinder.

coulomb A quantity of electricity equal to a current of 1 A flowing for 1 s.

Coulomb effect ION-ION INTERACTION.

Coulombic interactions The electrostatic interactions that can be described by Coulomb's law.

Coulomb's law An expression for the electrostatic force F between two point charges; specifically, $F = Q_1Q_2/Dr^2$, where Q_1 and Q_2 are the two point charges, r is the distance between the charges, and D is the dielectric constant of the medium. The force is repulsive if the charges have the same sign, and the force is attractive if the charges have opposite signs. The energy of such interactions is proportional to the reciprocal of r .

coulometer An instrument for measuring the quantity of electricity.

coulometry A method of chemical analysis that is based on measurements of the quantity of electricity, in coulombs, which is associated with a quantitative electrode reaction. In constant-current coulometry, the current is kept at a constant level so that the elapsed time is proportional to the total number of coulombs consumed; in constant-potential coulometry, the potential is kept at a constant level and the quantity of electricity consumed is measured with a coulometer.

Coulter counter A particle counter used for counting blood cells and bacteria.

counter 1. An instrument for indicating, and frequently recording, radioactive radiation; it may include a detector, sample changer, scaler, and printer. Some counters, such as ionization chambers and Geiger-Mueller counters, use the ionization of a gas to measure the radiation; other counters, such as liquid and solid scintillation counters, use the scintillations produced by fluors to measure the radiation. 2. Any instrument for counting, such as a cell counter, a drop counter, etc.

countercurrent diffusion multiplier system A system for the production of hypertonic urine by certain nephrons in the kidney.

countercurrent distribution A multistep separation procedure that is based on solubility differences of compounds in two immiscible liquid phases. The compounds are partitioned repeatedly between the two immiscible phases as they "move" along a large number of partition tubes. *Abbr* CCD. *Aka* countercurrent extraction.

countercurrent multiplication mechanism
COUNTERCURRENT DIFFUSION MULTIPLIER SYSTEM.

counter double current distribution A variation of countercurrent distribution in which the sample is injected continuously into the apparatus and the unwanted components are removed at both ends of the apparatus.

counterelectrophoresis COUNTERIMMUNOELECTROPHORESIS.

counterflow The movement of a substance from side A of a membrane to side B, after equilibrium has been established between the two sides, in response to the addition of a structurally related substance to side B. In this process, the substrate moves against its own concentration gradient. The occurrence of counterflow is taken as evidence for the existence of a single carrier which moves both of the substances.

counterflow centrifugation CENTRIFUGAL ELUTRIATION.

counterimmuno-electrophoresis A variant of immuno-electrophoresis, performed in a gel. Antigens and antibodies are placed in two wells, close together, and caused to migrate toward one another under the influence of an electric field; when the two components meet and interact, a band of precipitin is formed.

counterion An ion that has a charge of opposite sign to that of another ion. Ions having opposite charges to, and surrounding, either a macromolecule or the central ion in the Debye-Hueckel theory, are examples.

counterselective marker The gene that prevents growth of the desired organism in bacterial conjugation.

counterstain The staining of either a tissue or a culture with a dye that follows a previous staining with another dye.

counterstreaming centrifugation CENTRIFUGAL ELUTRIATION.

counting efficiency The ratio of the number of registered radioactive counts to the number of actual radioactive disintegrations that occurred during the same time; generally multiplied by 100 to give percent efficiency.

counting loss COINCIDENCE LOSS.

counting plateau That portion of the characteristic curve of an ionization chamber that is almost independent of the applied voltage.

counts A measure of radioactivity that represents the fraction of the radioactive disintegrations that are detected and registered by means of a counter.

coupled assay See auxiliary enzyme.

coupled layer chromatography A thin-layer chromatography technique in which a chromatoplate is used, the two halves of

which are covered with two different, but adjacent, layers of a chromatographic support.

coupled neutral pump A coupled pump in which the movement of one ion across the membrane must be linked to the movement of another ion, of equal valence, in the opposite direction.

coupled pump A pump for the transport of one solute across a membrane that also drives the transport of a second solute across the same membrane in the opposite direction and in such a fashion that the transport of the second solute is physically dependent on the pump.

coupled reactions An endergonic and an exergonic reaction that are linked energetically; the endergonic reaction is driven by the exergonic reaction which occurs simultaneously and which shares a common intermediate with the endergonic reaction, such that the overall free energy change for the coupled reactions is negative. The ultimate coupling requirement is that the free energy change for each step in the mechanism (usually $\Delta G'$, at pH 7.0) must be ≤ 0 . *Aka* energetically coupled reactions; energy coupling.

coupled transcription-translation The process, characteristic of prokaryotes, in which transcription and translation proceed simultaneously; the mRNA is being translated into protein before transcription of DNA into the mRNA has been completed.

coupled transport A transport system in which the movement of one solute across the membrane must be linked to the movement of a second solute across the same membrane but in the opposite direction.

coupling 1. The linking of aerobic respiration, specifically the operation of the electron transport system, to the synthesis of ATP. 2. The tendency of linked genes to be inherited together on the same chromosome. 3. CHANNELING.

coupling constant The separation between any two bands of multiple peaks in nuclear magnetic resonance; it is proportional to the magnitude of the spin-spin coupling. *Sym* J.

coupling factors A group of proteins that are required for the coupling of ATP synthesis to the operation of the electron transport system either in mitochondrial oxidative phosphorylation or in chloroplast photosynthesis. The mitochondrial coupling factor 1 is now called F_1 -ATPase. *See also* F_0F_1 -ATPase.

coupling inhibition UNCOMPETITIVE INHIBITION.

covalent bond A bond formed between two atoms and consisting of one or more shared pairs of electrons such that one electron in a

pair is donated by each of the two bonded atoms. *See also* coordinate covalent bond.

covalent catalysis Catalysis that requires the formation of a covalent enzyme-substrate intermediate.

covalent chromatography A column chromatographic technique in which a chemical reagent is linked covalently to the solid support. When a sample is passed through the column, the reagent reacts with, and binds covalently, the substance of interest. An additional chemical reaction then releases the substance from the support and permits its elution from the column, thereby restoring the initial form of the support.

covalent circle *See* circular covalent; covalently closed circle.

covalent enzyme-substrate complex ENZYME-SUBSTRATE COMPOUND.

covalent extension The initiation of DNA replication in which the leading strand is covalently attached to a parental strand as in the rolling circle replication.

covalent intermediate 1. A substance formed during covalent catalysis such as the intermediate formed in the transaminase reaction. 2. A covalently linked, high-energy intermediate that, according to the chemical coupling hypothesis, functions in the coupling aspect of oxidative phosphorylation.

covalent labeling AFFINITY LABELING.

covalently circular *See* circular covalent.

covalently closed circle A circular, double-stranded, DNA molecule in which each single strand is an unbroken, uninterrupted circle.

covalently modified enzyme A regulatory enzyme that has the capacity of having its catalytic activity modified through chemical alteration of the molecule which, in turn, is catalyzed by other enzymes. The enzyme-catalyzed phosphorylation and dephosphorylation of the enzyme phosphorylase is an example.

covalent orbital An orbital that functions in the bonding of a low-spin complex.

covalent structure analysis The determination of the covalent bonds that describe the arrangement of monomers in a macromolecule; the bonds that describe the amino acid sequence and the location of disulfide bonds in a protein, or those that describe the nucleotide sequence in a nucleic acid are examples.

covariance The average product of the deviations from the respective means for all pairs of values for the variables X and Y ; the average of $(X - \bar{X})(Y - \bar{Y})$ for all pairs of values of X and Y , where \bar{X} and \bar{Y} are the means for the X values and Y values, respectively.

covariance analysis See analysis of covariance.

covariation PLEIOTROPISM.

covarion A concomitantly variable codon; the number of codons for a protein that are free to fix mutations at a point in time; it is a property of a single nucleotide sequence. See also varion.

covirus A virus, such as some plant viruses, that consists of two or more different viral particles that must be present together for the initiation of infection. See also segmented genome.

covolume The difference between the volume of a compound in solution and that given by the sum of its atomic volumes. The additional volume results from the intermolecular forces that set a lower limit to the distance of approach between molecules in a liquid. Aka excluded volume.

coxsackievirus A virus that belongs to the enterovirus subgroup of picornaviruses and that is similar in physical parameters to the polio virus.

cozymase An early designation of a heat-stable fraction, consisting chiefly of ATP, ADP, AMP, and NAD⁺, that was isolated from yeast and participated in the reactions of alcoholic fermentation. Subsequently, cozymase I was used to denote NAD⁺ and cozymase II was used to denote NADP⁺.

CP 1. Coproporphyrin. 2. Core particle. 3. Chemically pure.

C₃ pathway CALVIN CYCLE.

C₄ pathway HATCH-SLACK-KORTSCHAK PATHWAY.

CPC Centrifugal partition chromatography.

cpDNA Chloroplast DNA.

C peptide CONNECTING PEPTIDE.

CPG Coproporphyrinogen.

CPK Creatine phosphokinase.

CPK model Cory-Pauling-Koltun model; a space-filling molecular model.

C₃ plants Plants that use the reaction of ribulose-bisphosphate carboxylase as the first CO₂ fixation step; so called because the CO₂ is incorporated into a 3-carbon compound (3-phosphoglycerate.)

C₄ plants Plants in which the C₃ pathway (Calvin cycle) of CO₂ fixation is preceded by additional steps; so called because these additional steps involve a preliminary fixation of CO₂ into a 4-carbon compound (oxaloacetate). These plants grow in hot, arid climates and have an increased efficiency of CO₂ fixation over that of C₃ plants.

cpm Counts per minute; the number of radioactive counts per minute.

C-protein A minor muscle protein; it is tightly bound to myosin and its function is unknown. See also protein C.

Crabtree effect The inhibition of oxygen consumption in cellular respiration that is produced by increasing concentrations of glucose. See also Pasteur effect.

cRBP Cellular retinol-binding protein.

C-reactive protein A protein that reacts with the pneumococcal type C polysaccharide and that is present in plasma during some bacterial infections.

creatine A nitrogenous compound, the phosphorylated form of which, phosphocreatine, is a high-energy compound that serves as a free energy storage compound in muscle.

creatine kinase The enzyme that catalyzes the reversible reaction whereby ATP and creatine react to form ADP and creatine phosphate. Aka CK. Aka creatine phosphokinase.

creatine phosphate See phosphocreatine.

creatine phosphokinase CREATINE KINASE.

creatinine A cyclic compound, formed from creatine, that represents one of the major forms in which nitrogen is excreted in the urine.

creatinine coefficient The number of milligrams of creatinine excreted per 24 hours per kilogram of body weight.

creatinuria The presence of excessive amounts of creatine in the urine.

creationism A movement that advocates the inclusion of the biblical story of creation in school curricula and its presentation as an alternative explanation to that provided by the theory of evolution. Efforts to find support for the biblical story have been termed creation science.

C region Constant region.

crenation The shrinking of red blood cells that occurs when they are placed in a hypertonic solution.

cretinism A condition of arrested growth and impaired mental development brought about by thyroid deficiency that is present at birth.

CRF Corticotropin releasing factor; see corticotropin releasing hormone.

CRH Corticotropin releasing hormone.

Crick strand The DNA strand of Watson-Crick-type DNA that is not transcribed in vivo; the antisense strand. Aka C strand.

Crigler-Najjar syndrome A genetically inherited metabolic defect in humans that is characterized by defective bilirubin metabolism and by jaundice, and that is due to a deficiency of the enzyme uridine diphosphate glucuronosyl transferase.

crinophagy A variant of autophagy in which a secretory vesicle is removed by fusion with a lysosome and the complex is subsequently degraded.

crisis 1. A sudden change in the course of an

- acute disease. 2. The state of a primary cell culture, following a number of cell divisions, during which most of the secondary cells die and disintegrate. If the few remaining cells are maintained in culture, they will ultimately begin to grow, giving rise to an established cell line, the cells of which can grow and divide indefinitely.
- crista** (*pl* cristae). An extended infolding of the inner mitochondrial membrane.
- cristael** Of, or pertaining to, cristae.
- critical concentration** See actin filament; critical micelle concentration.
- critical group** CRITICAL PAIR.
- critical micelle concentration** The concentration of a surface-active compound above which the formation of micelles by this compound becomes appreciable. *Abbr* cmc. *See also* second critical concentration.
- critical pair** Two compounds that are not readily separable from each other by their partitioning between two liquid phases, as in countercurrent distribution.
- critical point** The point at which the temperature is the critical temperature and the pressure is the critical pressure.
- critical point drying** A method for drying specimens for electron microscopy. It involves replacing the water in the specimen by a liquid having a lower critical temperature (such as ethanol or liquid CO₂) and then raising the temperature above this critical temperature. In theory, this allows removal of the liquid phase without shrinkage in the specimen since at the critical point the surface tension of a liquid becomes zero.
- critical pressure** The minimum pressure that must be applied to a gas, at the critical temperature, to liquefy it.
- critical temperature** The temperature above which a gas cannot be liquefied by pressure alone; at that temperature the properties of the liquid and of its saturated vapor become indistinguishable.
- CRM** Cross-reacting material.
- cRNA** Complementary RNA.
- CRO protein** A small, basic, regulatory protein, made by phage lambda, that binds to a specific base sequence in the phage DNA.
- cross** See genetic cross.
- cross-absorption** The absorption of either antigens or antibodies by means of the corresponding cross-reacting antibodies or cross-reacting antigens.
- cross-agglutination test** CROSS-MATCHING.
- crossbreeding** OUTBREEDING.
- cross-bridge** A short projection from the thick filament of striated muscle; cross-bridges are regularly spaced and link the thick filaments to the thin filaments.
- cross- β -conformation** The structure of a polypeptide chain in the β -conformation that loops back upon itself to form an intramolecular pleated sheet; the loops constitute crossover connections between the β -conformation segments. A variety of such structures are possible.
- crossed affino-immunoelectrophoresis** CROSSED IMMUNOAFFINOLECTROPHORESIS.
- crossed hydrophobic interaction immunoelectrophoresis** An analytical technique that combines the principles of hydrophobic interaction chromatography and crossed immunoelectrophoresis.
- crossed immunoaffinoelectrophoresis** A variation of crossed immunoelectrophoresis in which a lectin is either incorporated into the first-dimension gel or incorporated into a gel that is used as an intermediate gel between the first-dimension gel and the antibody-containing gel.
- crossed immunoelectrophoresis** An electrophoretic technique in which antigens are first separated by one-dimensional gel electrophoresis; the antigens are then separated in the second dimension by gel electrophoresis, using a gel that contains antibodies and applying an electric field at right angles to the direction of the first separation. *Abbr* CIE.
- cross-electrophoresis** An electrophoretic technique designed to determine whether two charged substances interact; involves an analysis of the crossing point obtained by having the two substances move across each other in the form of two slanted lines. A pattern of X indicates no interaction, while a pattern of / indicates interaction.
- cross-feeding** The phenomenon of two organisms that can grow only in the vicinity of each other or in each other's medium, since each is dependent on the other for an essential growth factor. *See also* syntrophy.
- cross-hybridization** The molecular hybridization of a nucleic acid probe to a nucleotide segment that is not completely complementary. *See also* hybridization (1).
- cross-induction** The induction of a prophage in a nonirradiated, lysogenic *F*⁻ bacterium in response to compounds transferred to the bacterium by conjugation with an ultraviolet-irradiated *F*⁺ cell.
- cross-infection** The infection of a bacterium by two or more different phage mutants.
- crossing over** The process whereby genetic material is exchanged between homologous chromosomes, leading to gene combinations that are different from those in the parental chromosomes. *See also* breakage and reunion model.

crossing-paper electrophoresis CROSS-ELECTROPHORESIS.

cross-linker One of a number of proteins that bind to the sides of actin filaments and act as spot welds to cross-link these filaments. *Aka* gelation protein.

cross-linking The formation of covalent bonds between chains of polymeric molecules.

cross-matching A serologic procedure for blood typing in which erythrocytes from a donor of unknown blood type are mixed with the serum of recipients of known blood types.

cross of isocline The cross-like pattern observed in flow birefringence; the arms of the cross appear dark on a light background.

crossover 1. The chromosome resulting from crossing over. 2. The individual resulting from crossing over.

crossover connection See cross- β -conformation.

crossover method A method for studying a sequence of oxidation-reduction reactions from the changes produced in the sequence upon the addition of inhibitors. See also crossover theorem.

crossover point 1. The step in a sequence of oxidation-reduction reactions that is being inhibited by the addition of an inhibitor. See also crossover theorem. 2. The step in a sequence of metabolic reactions at which the metabolic flux is altered with a resultant change in the concentrations of the remaining reactants. The crossover point is referred to as positive or negative depending on whether the metabolic flux is increased or decreased at the particular step. A positive crossover point results in a decrease of the steady-state levels of the intermediates preceding the crossover point and in an increase of the steady-state levels of the intermediates following the crossover point. These concentration changes are reversed for a negative crossover point.

crossover region That section of a chromosome that lies between two specified marker genes.

crossover theorem The principle that perturbation of a metabolic pathway at a given enzymatic step will lead to opposite changes in metabolite concentrations before and after the particular step. Thus, if a specific enzyme inhibitor is added, the concentrations of the substrates of the enzyme will increase while the concentrations of the products of the enzyme reaction will decrease. Likewise, addition of an inhibitor to a series of oxidation-reduction reactions, such as the electron transport system, will cause the components on the reduced side of the inhibited reaction to become more reduced, and will cause those on the oxidized side to become more oxidized.

crossover unit A crossover value of 1% between a pair of linked genes.

cross-partition A phase partition technique that permits a determination of the isoelectric point of subcellular particles; involves a measurement of partitioning as a function of pH, using two different salt media. A plot of partition coefficient (or percentage of particles) in one phase as a function of pH yields two curves that cross each other at a pH corresponding to the isoelectric point of the particles.

cross-reacting antibody An antibody that can combine with antigens that are specific for stimulating the production of different antibodies.

cross-reacting antigen An antigen that can combine with antibodies that are produced in response to different antigens.

cross-reacting material A defective protein that is produced by a mutant and that is antigenically similar to the protein produced by the normal wild-type gene. *Abbr* CRM.

cross-reaction The reaction of an antigen with an antibody that is produced in response to a different antigen; the reaction occurs because of structural similarities between the antigenic determinants of the different antigens. *Aka* reaction of partial identity.

cross-reactivation The restoration of the activity of a mutant virus, which carries a lethal mutation as a result of previous exposure to a mutagen, by the simultaneous infection of a host cell with both the mutant virus and with one or more active viruses. The mutant virus is activated by a genetic exchange that leads to a replacement of its damaged DNA. See also multiplicity reactivation.

cross-resistance The resistance of a microorganism to a specific antibiotic that is associated with its resistance to a chemically related antibiotic.

cross-sensitization The immunological sensitization of an organism with an antigen that is different from the antigen that will be used subsequently to trigger an anaphylactic response.

cross-term diffusion coefficient The diffusion coefficient that a component has when it diffuses in the presence of another component; used in the treatment of diffusion data in a system showing interaction of flows. See also main diffusion coefficient.

cross tolerance The immunological tolerance against one antigen that is produced by the administration of a different, but cross-reacting antigen.

crotonase Enoyl CoA-hydratase; the enzyme that catalyzes the hydration reaction of trans unsaturated fatty acyl-CoA in the β -oxidation of fatty acids. So called because one enzyme is most active with crotonyl-CoA ($\text{CH}_3\text{CH}_2=\text{CH}_2\text{COCoa}$).

crown ether A cyclic polyether; synthetic crown ethers have been used as hosts for the study of host-guest systems.

crown gall tumor A tumor that may develop on the stems or roots of a wide variety of plants following infection by the soil bacterium *Agrobacterium tumefaciens*. This transformation of normal to malignant cells is a natural form of genetic engineering and results from the transmission of a tumor-inducing plasmid (Ti plasmid) from the bacterium to the plant cell. During tumor induction, a small DNA fragment of the Ti plasmid (called transferred DNA, or T-DNA) becomes integrated into the plant cell chromosome and alters the hormonally regulated cell division of the plant cell.

CRP Cyclic AMP-receptor protein.

CRS Codon-recognizing site.

cruciferous See antipromoter.

cruciform DNA See foldback DNA.

crude extract A preparation, derived from biological material, that has not been extensively purified; used particularly to describe a preparation of either homogenized tissue or broken cells from which unbroken cells and cell debris have been removed, commonly by centrifugation.

cryo- Combining form meaning cold or freezing.

cryoenzymology The study of enzymes at low temperatures.

cryogenic Of, or pertaining to, low temperatures.

cryoglobulin An immunoglobulin that precipitates, gels, or crystallizes upon cooling of either a serum or a solution containing the globulin. Cryoglobulins are frequently found in inflammatory illnesses and in multiple myeloma. See also cold-insoluble globulin.

cryoprecipitagogue A substance that induces the formation of a cryoprecipitate.

cryoprecipitate A precipitate formed in the cold such as that of cryoglobulins.

cryoscope An instrument for the determination of freezing points.

cryoscopic method The determination of either molecular weight or osmotic pressure from the depression of the freezing point of a solvent that is produced by the addition of solute.

cryostat An apparatus for producing and maintaining a controlled low-temperature environment.

cryosublimation The process whereby water is sublimed from a frozen sample and is collected in a cold trap; cryosublimation refers to the collection of the water, while lyophilization refers to the collection of the dry residue.

cryptate A cyclic polyether containing two nitrogen atoms in the ring.

cryptic DNA A DNA of unknown function.

crypticity 1. The phenomenon that a particulate enzyme has different properties than the same enzyme in soluble form; solubilization of the particulate enzyme requires its detachment from the solid matrix to which it was attached. 2. The phenomenon that an intact cell is unable to use a metabolite because of a deficiency in the transport system that moves the metabolite across the cell membrane; disruption of such a cell permits the utilization of the metabolite by components of the cell. See also latency.

cryptic mutant 1. A cell that can synthesize an inducible enzyme but cannot synthesize a component of the transport system required to move the substrate of that enzyme across the cell membrane. 2. A cell that lacks one or more components of a membrane transport system so that a particular substrate cannot enter the cell and cannot be utilized even though the cell may possess the necessary complement of metabolic enzymes.

cryptic plasmid A plasmid to which no phenotypes (such as toxin production, ability to cause plant tumors, etc.) can be attributed.

cryptic prophage A phage that has suffered a deletion of some of its genes while it was being integrated as a prophage.

cryptic satellite DNA Satellite DNA that cannot be separated from the bulk DNA by density gradient centrifugation but can be separated by other means (for example, by its more rapid reannealing as a result of its high content of repetitive DNA).

cryptoactive Descriptive of triglycerides that show negligible optical rotation despite the fact that they contain an asymmetric center which results from the attachment of different acyl groups to carbon atoms 1 and 3 of the glycerol.

cryptobiosis Latent life, as that in a spore; the absence of detectable metabolism.

cryptogenic phage A phage that can give rise to a cryptic prophage when subjected to ultraviolet curing.

cryptogram A shorthand presentation of viral properties that consists of four pairs of symbols which indicate the following: type of the nucleic acid/strandedness of the nucleic acid; molecular weight of the nucleic acid/percentage of the nucleic acid in infective particles; outline of the viral particle/outline of the nucleocapsid; kinds of hosts infected/kinds of vectors.

crystal A solid of definite form that is characterized by geometrically arranged, external plane surfaces as a result of a regularly repeated, internal arrangement of the atoms.

crystal field splitting The separation of the degenerate *d* orbitals of a metal ion into orbitals

having different energies that is produced by the ligands in a metal ion-ligand complex.

crystal field theory A description of the way in which the *d* orbitals of a metal are deformed by the electrons of a ligand in a metal ion-ligand complex. According to this theory (so called since it was developed to explain the spectra of transition metal impurities in crystals) the ligands in a transition-metal complex are treated as point charges.

crystal lattice The three-dimensional arrangement of the atoms in a crystal.

crystallin The major structural protein of the lens of the eye. A water-soluble protein that occurs in a number of forms not all of which occur in all species. Mammalian crystallins are classified into three major groups, designated α , β , and γ . The first two are oligomeric proteins that occur as various aggregates and cover a large range of molecular weights; γ -crystallins are monomeric proteins having a molecular weight of less than 28,000.

crystalline Of, or pertaining to, crystals.

crystallizable fragment FC FRAGMENT.

crystallization The transition of a substance from the molten, the liquid, or the gaseous state to the crystalline state.

crystallographic model A molecular model, such as a ball and stick or a framework model, in which the bond lengths and the bond angles are clearly indicated.

crystalloid A noncolloidal low molecular weight substance.

crystal protein One of a group of globular proteins that form crystalline inclusions in bacterial cells; they are widespread among *Bacillus* species. The formation of crystal proteins coincides with spore morphogenesis and may be related to it.

crystal violet A basic dye used in cytochemistry.

Cs Cesium.

CS Chorionic somatomammotropin; see placental lactogen.

CSF 1. Cerebrospinal fluid. 2. Colony-stimulating factor.

CSM Corn-soya-milk; a protein-rich baby food (20% protein) made in the United States from 68% precooked corn, 25% defatted soya flour, and 5% skim milk powder, with added vitamins B₁, B₂, B₆, and B₁₂, nicotinic acid, pantothenic acid, folic acid, vitamins A, D, and E, and CaCO₃. The mixture is used as a protein supplement in regions where either a low-protein diet or malnutrition is prevalent.

c-src gene A gene that is present in normal cells of various vertebrates and that is closely related to src, the oncogene of Rous sarcoma virus. The c-src gene codes for a protein (designated pp60 c-src) that has similar properties

to those of the protein coded for by the src gene.

C strand Crick strand.

C substances A group of serologically distinct carbohydrates only one of which may occur in a given strain of *Streptococcus*; used as a basis for the identification and classification of streptococci.

CT Calcitonin.

CTAB See quat.

C-terminal The end of a peptide or a polypeptide chain that carries the amino acid that has a free alpha carboxyl group; in representing amino acid sequences, the C-terminal is conventionally placed on the right side. *Aka* C-terminus.

CTP 1. Cytidine triphosphate. 2. Cytidine-5'-triphosphate.

CTSH Chorionic thyroid stimulating hormone.

C-type particles Particles first seen in neoplastic mouse tissue and now known to be oncogenic RNA viruses belonging to the group of leukoviruses. The C-type particles differ from the B-type particles in that they appear to have intracellular precursors (A-type particles) and have a centrally situated genome in the virion. *Aka* C-type virus. See also B-type particles.

C-type virus See C-type particles; oncornavirus.

Cu Copper.

cubic symmetry Descriptive of a body that has at least four threefold axes of rotational symmetry; includes a perfect cube and point groups that are tetrahedral, octahedral, and icosahedral.

cultivar A variety or a strain of a plant that is produced by humans and that is maintained by cultivation.

cultivation The deliberate propagation of cells or organisms by means of a suitable culture.

culture A population of either microbial cells or tissue cells that grow in or on a nutrient medium.

cumulative feedback inhibition The inhibition of an enzyme that is produced when the enzyme is inhibited separately and independently by two or more end products. When one end product is present, there is a partial inhibition of the enzyme; when two or more end products are present, the inhibition is cumulative.

C₁ unit See active one-carbon unit.

cuprammonium rayon Cellulose that has been regenerated from a solution of cuprammonium hydroxide.

cuproprotein A conjugated protein containing copper as a prosthetic group.

curare A plant extract, used as an Indian arrow poison, that contains alkaloids that

block the transmission of nerve impulses at the neuromuscular junction; a neurotoxin.

curie 1. A unit of radioactivity equal to 3.7×10^{10} disintegrations per second. 2. The quantity of radioactive nuclide that contains 3.7×10^{10} disintegrations per second. *Sym* Ci; *c*.

curing Removal of either a prophage or a plasmid from a bacterium. The former involves conversion of a lysogenic bacterium to a sensitive bacterium that may, upon subsequent infection, be either lysogenized or lysed; commonly achieved either by exposing the bacterial cells to radiation (radiation curing) or by superinfecting them with phage (superinfection curing). Plasmid curing can be achieved by, for example, treating some plasmid-containing cells with intercalating acridine dyes.

CURL 1. Endosome. 2. Compartment of uncoupling receptor and ligand; a vesicle that fuses with an endosome and functions in the receptor-mediated endocytosis of LDL. The CURL has a low internal pH (about 5.0) which induces the dissociation of LDL from its receptor.

curve fitting 1. The process of describing (approximating) an observed frequency distribution by means of a mathematically specified distribution. 2. The process of fitting a curve to points representing paired data.

curvilinear Consisting of, or bounded by, curved lines.

curvilinear correlation A nonlinear relation between two or more variables.

curvilinear regression *See* regression line.

Cushing's disease A disease characterized by an overproduction of adrenocorticotropin and caused by either overactivity or a tumor of the adrenal cortex.

cut A break in both strands of a double-stranded nucleic acid. *See also* nick.

cut and patch repair EXCISION REPAIR.

cutaneous Of, or pertaining to, the skin.

cutaneous anaphylaxis The anaphylactic reaction that is produced in an animal organism by intradermal injections; cutaneous anaphylaxis can be of the active, the passive, or the reverse passive type.

cuvette A small container for a liquid sample that is to be subjected to optical measurements. Typical cuvettes used in spectrophotometry are rectangular containers, constructed of either Pyrex or quartz, that have a light path of 1 cm. Cuvettes selected to have a specific tolerance with respect to their light transmitting properties are referred to as matched cuvettes. *Var sp* cuvet.

CV 1. Coefficient of variation. 2. Cyclic voltammetry.

C value The mass of DNA (expressed, for ex-

ample, in picograms per cell) in the haploid genome of a species.

C value paradox The phenomenon that, frequently, C values do not correlate with the evolutionary complexity of species; they are large in some small organisms. This is presumably due to the fact that sizeable portions of the DNA do not code for proteins and either have other regulatory functions or are functionless.

C virus *See* oncornavirus; C-type particle.

cyanide The radical CN^- that is a strong poison due to its inhibition of the enzyme cytochrome oxidase at the terminal step of the electron transport system.

cyanobacteria A heterogeneous group of prokaryotic photosynthetic organisms that contain chlorophyll, evolve oxygen, and use water as the electron donor; many are also able to fix atmospheric nitrogen. Cyanobacteria were originally classified as plants (and referred to as blue-green algae) on the basis of their capacity for photosynthesis, but are now considered to be bacteria. *Aka* blue-green algae; cyanophyta; cyanophyceae.

cyanocobalamin *See* cobalamin.

cyanogen bromide reaction The hydrolysis by cyanogen bromide of those peptide bonds in which the carbonyl function is contributed by methionine.

cyanogenic glycoside A glycoside that is a plant toxin containing a residue of hydrocyanic acid.

cyanoguanidine DICYANAMIDE.

cyanohemoglobin A derivative of hemoglobin in which the sixth coordination position of the iron atom is occupied by cyanide.

cyanophage A virus whose host is a blue-green alga (cyanobacterium). All cyanophages appear to contain double-stranded DNA and most are virulent, producing host cell lysis.

cyanophyceae CYANOBACTERIA.

cyanophycin granule A storage granule of cyanobacteria that contains a copolymer of arginine and aspartic acid.

cyanophyta CYANOBACTERIA.

cyanopsin A visual pigment in freshwater fish that consists of opsin and retinal₂ and that has an absorption maximum at 620 nm.

cyanosis The bluish coloration of the skin that is caused by insufficient oxygenation of the blood.

cyanosome A phycobilisome of cyanobacteria.

cybernetics The comparative study of the automatic control system formed by the nervous system and the brain on the one hand and that formed by mechanical-electrical communication systems and devices (computers, thermostats, etc.) on the other hand.

cybotactic Of, or pertaining to, cybotaxis.

cybotaxis The spatial arrangement of solute molecules in a liquid, particularly of long-chain molecules, such that there is an equilibrium between molecules that have crystal-like orientations and molecules that have random orientations.

cybrid A hybrid formed by the fusion of cytoplasts of one parent line with cells of the other parent.

cyclamate A synthetic sweetener that is 30 times as sweet as sugar; sodium cyclohexylsulfamate. The compound is carcinogenic in animals and has now been banned from prepared foods.

cycle 1. A closed sequence of metabolic reactions, such as the citric acid cycle, in which an end product serves as a reactant for the initiation of the sequence, and in which most of the intermediates serve likewise as both reactants and products. 2. A closed sequence of large-scale processes, such as the nitrogen cycle, that describes the nutritional interdependence of plants, animals, and microorganisms.

cyclic 1. Of, or pertaining to, a cycle; circular. 2. Of, or pertaining to, a ring.

cyclic adenylic acid ADENOSINE-3',5'-CYCLIC MONOPHOSPHATE.

cyclic AMP ADENOSINE-3',5'-CYCLIC MONOPHOSPHATE.

cyclic AMP receptor protein A protein in *E. coli* that binds to, and is activated by, cyclic AMP and that is necessary for the efficient transcription of certain operons which are subject to catabolite repression. *Abbr* CAP.

cyclic electron flow The movement of electrons that is limited to photosystem I of chloroplasts and to its associated electron carriers; cyclic electron flow can lead to the synthesis of ATP but does not lead to an accumulation of NADPH.

cyclic GMP GUANOSINE-3',5'-CYCLIC MONOPHOSPHATE.

cyclic metabolic pathway CYCLE (1).

cyclic peptide A peptide that consists of a closed chain and that is devoid of a free alpha amino group and a free alpha carboxyl group.

cyclic permutation CIRCULAR PERMUTATION.

cyclic photophosphorylation The synthesis of ATP that is coupled to the cyclic electron flow of photosynthesis.

cyclic symmetry ROTATIONAL SYMMETRY.

cyclic voltammetry A technique for observing the redox state of a substance over a wide range of potentials. It consists of cycling the potential of an electrode, which is immersed in an unstirred solution, and measuring the resulting current at the electrode. A plot of current as a function of potential yields a voltammogram. Cyclic voltammetry can be used to follow both fast and slow reactions and is

a powerful probe to monitor reactive redox species.

cyclin A stable, cell cycle-regulated, nuclear protein that is synthesized mainly in the S-phase of the cell cycle and is believed to be a key component in DNA replication and cell division. Cyclin is absent or present in very low amounts in nondividing cells, but is synthesized by proliferating cells of both normal and transformed origin. Moreover, the rate of cyclin synthesis correlates with the proliferative state of normal cultured cells and tissues. *Aka* PCNA; auxiliary protein of DNA polymerase δ .

cyclitol A cyclic polyhydroxy alcohol.

cyclitol antibiotic An antibiotic that contains a cyclitol; the aminoglycoside antibiotics are an example.

cyclization The formation of a ring.

cycloaddition reaction A chemical reaction that involves the addition of one reactant to another to form a cyclic product.

cyclodepsipeptide *See* depsipeptide antibiotics.

cyclodextrins A class of naturally occurring macrocyclic polymers of glucopyranose. Cyclodextrins have interior cavities that make them useful as hosts in host-guest systems. Many inorganic and organic compounds have been shown to bind within cyclodextrin cavities.

cycloheximide An antibiotic, produced by *Streptomyces griseus*, that blocks protein synthesis by inhibiting peptidyl transferase in eukaryotic systems. *Aka* actidione.

cyclol hypothesis An early, and now discarded, hypothesis of protein structure. According to this hypothesis, all proteins had a unit architecture, composed of interlocking hexagons, with each hexagon (cyclol) formed by linking together two amino acid residues.

cyclooxygenase A key enzyme in the biosynthesis of prostaglandins; it catalyzes the first reaction of the cyclooxygenase pathway whereby arachidonic acid is oxidized to endoperoxide which is then converted to prostaglandins, prostacyclin, and thromboxanes.

cyclophilin A protein, present in the cytoplasm of T lymphocytes and in the brain, that has strong binding affinity for cyclosporin.

cyclophorase system A mitochondrial preparation from either kidney or liver that catalyzes the reactions of the citric acid cycle and of beta oxidation.

cyclophosphamide An immunosuppressive drug.

cycloserine An antibiotic, produced by *Streptomyces orchidaceus*, that inhibits the biosynthesis of the peptidoglycan component of bacterial cell walls; it is used in the treatment of tuberculosis.

cyclosporin One of a group of cyclic peptides produced by certain fungi; cyclosporin A is an immunosuppressive agent used to control the rejection of transplanted tissues.

cyclotron An accelerator designed to impart high kinetic energy to particles, such as protons and deuterons, by means of an oscillating electric field and a fixed magnetic field; the particles move in a circular path.

cyclum An automatic system that permits various column chromatographic separations to be repeated precisely a large number of times. Parameters can be adjusted during the operation and the system is applicable to both analytical and preparative separations.

Cyd Cytidine.

cylindrical axis of symmetry An axis of rotational symmetry such that $n = \infty$. *Sym* C_{∞} .
See also axis of rotational symmetry.

kymograph Variant spelling of kymograph.

Cys 1. Cysteine. 2. CysteinyI.

CySH 1. Cysteine. 2. CysteinyI.

CySO₃H Cysteic acid. 2. Cysteyl.

CYSSOR Cysteine-specific scission by organic reagents; one of a group of reagents that produce cleavage at the amino terminal side of cysteine in peptides containing cysteine residues.

cystathionine A nonprotein alpha amino acid that is an intermediate in the mammalian biosynthesis of cysteine from methionine.

cystathioninuria A genetically inherited metabolic defect in humans that is characterized by an accumulation of cystathionine in the plasma and by mental retardation. It is due to a deficiency of the enzyme γ -cystathionase (cystathionine- γ -lyase) which catalyzes the hydrolysis of cystathionine to cysteine and α -ketobutyrate.

cystatins A group of proteins that act as competitive inhibitors of cysteine peptidases. Type I cystatins (sometimes called stefins) contain about 100 amino acid residues, no disulfide bonds, and no carbohydrates; type II cystatins contain about 115 amino acid residues and two disulfide bonds; type III cystatins, the kininogens, contain about 355 amino acid residues, a number of disulfide bonds, and are glycosylated.

cysteamine β -MERCAPTOETHYLAMINE.

cysteic acid A sulfonic acid that is obtained by oxidation of the sulhydryl group of cysteine to $-\text{SO}_3\text{H}$. *Sym* CySO_3H .

cysteine An aliphatic, polar alpha amino acid that contains a sulhydryl group. *Abbr* Cys; CySH; C.

cysteine peptidases A group of proteolytic enzymes (endopeptidases or exopeptidases) that contain a sulhydryl group of cysteine in their active sites.

cystic fibrosis A hereditary disease in humans that is characterized by the functional failure of mucus-secreting glands and the resultant presence of an unusual glycoprotein in the mucus that causes the mucus to have an abnormal viscosity. A generalized dysfunction of the exocrine glands that leads to a progressive blocking of various ducts. Frequently, the exocrine glands of the pancreas are also affected, leading to a deficiency of pancreatic enzymes.

cystine The dimer formed from two cysteine residues, linked by means of a disulfide bond.

cystinosis A pathological condition, characterized by the deposition of cystine in the lysosomes of many cells; may result from defects in glutathione metabolism and may lead to crystal formations in the kidney.

cystinuria A genetically inherited metabolic defect in humans that is characterized by the presence of excessive amounts of cystine, lysine, and arginine in the urine.

cyt 1. Cytosine. 2. Cytochrome.

cytidine The ribonucleoside of cytosine. Cytidine mono-, di-, and triphosphate are abbreviated, respectively, as CMP, CDP, and CTP. The abbreviations refer to the 5'-nucleoside phosphates unless otherwise indicated. *Abbr* Cyd; C.

cytidylic acid The ribonucleotide of cytosine.

cyto- Prefix meaning cell.

cytochalasins A group of metabolites, excreted by various species of molds, that paralyze many types of vertebrate cell movement (locomotion, phagocytosis, cytokinesis, etc.) by binding specifically to one end of actin filaments.

cytochemistry The science that deals with the chemistry of cellular components.

cytochrome A hemoprotein that contains an iron-porphyrin complex as a prosthetic group. Cytochromes function as electron carriers by virtue of the reversible valence change that the heme iron can undergo; they are classified into four groups, designated *a*, *b*, *c*, and *d*.

cytochrome a A cytochrome in which the heme prosthetic group contains a formyl side chain; a cytochrome that contains heme A. *Aka* type *a* cytochrome; class *a* cytochrome.

cytochrome b A cytochrome that contains protoheme or a related heme (without a formyl group) as its prosthetic group and in which the prosthetic group is not bound covalently to the protein. *Aka* type *b* cytochrome; class *b* cytochrome.

cytochrome c A cytochrome in which there are covalent linkages between the side chains of the heme and the protein. *Aka* type *c* cytochrome; class *c* cytochrome.

cytochrome c' RHP CYTOCHROME.

cytochrome c oxidase complex COMPLEX IV.

cytochrome c: oxygen oxidoreductase COMPLEX IV.

cytochrome d A cytochrome with a tetrapyrrolic chelate of iron as a prosthetic group in which the degree of conjugation of double bonds is less than that in porphyrin; dihydroporphyrin (chlorin) is an example. *Aka* type *d* cytochrome; class *d* cytochrome.

cytochrome oxidase The enzyme that catalyzes the terminal reaction in the electron transport system in which molecular oxygen is reduced to water.

cytochrome P₄₅₀ One of a class of enzymes that are heme proteins in which the iron of the heme is linked to the sulfur of an SH group of cysteine in the polypeptide chain. They form carbon monoxide complexes that have a major absorption band at 450 nm. The enzymes are widely distributed in animal tissues, plants, and microorganisms, and catalyze the monooxygenation of a vast variety of hydrophobic substances; they play an important role in the detoxification of drugs, mutagens, and carcinogens.

cytochromoid c RHP CYTOCHROME.

cytotoxic Capable of killing cells.

cyto-differentiator A drug that renders a malignant cell benign instead of killing it.

cytoduction The physical or genetic transfer of cytoplasmic, specifically mitochondrial, genomes for the purpose of constructing new strains.

cytoflav An impure preparation of riboflavin from heart muscle.

cytogenetic disease A disease, such as mongolism, that is due to a chromosome abnormality.

cytogenetic map A genetic map that shows the location of the genes in a chromosome.

cytogenetics The science that deals with cellular changes that are related to hereditary phenomena; combines the methods of both cytology and genetics.

cytohemim Heme A; the prosthetic group of cytochrome a.

cytokines A group of substances, formed by an animal in response to infection. They are similar to hormones in their function; they are produced in one cell and stimulate a response in another cell. They are biological response modifiers (BRM) and include such substances as interferon, interleukin, and tumor necrosis factor. *See also* lymphokines.

cytokinesin A plant growth-regulating substance that affects cell division and that apparently acts synergistically with auxins.

cytokinesis The division of the cytoplasm that follows both mitosis and meiosis.

cytokinins A group of N-substituted deriva-

tives of adenine that function as plant hormones; they promote cell division and stimulate plant metabolism, particularly RNA and protein synthesis.

cytolipin A cytoside; cytolipin H, or ceramide lactoside, can function as a hapten under certain conditions; cytolipin K is probably identical with globoside.

cytological hybridization IN SITU HYBRIDIZATION.

cytological map A representation of the location of genes at specific sites on the chromosome, especially of genes at sites on polytene or human mitotic chromosomes.

cytology The branch of biology that deals with the origin, the structure, the function, and the life history of cells.

cytotoxic An antibody that can lead to the lysis of cells.

cytolysis The lysis of cells.

cytolysosome A membrane-bound cytoplasmic region which is formed during intracellular digestion and which is subsequently digested.

cytolytic Of, or pertaining to, cytolysis.

cytomegalovirus A virus of the herpes virus group that can cause diseases of the salivary glands and may cause degeneration of the central nervous system in the newborn. *Abbr* CMV.

cytomembrane A bacterial membranous system or structure that occurs in the cytoplasm and that may or may not be continuous with the cell membrane; mesosomes and chlorosomes are two examples.

cytopathic Causing either injury or disease to cells.

cytohilic antibody An antibody that can adhere specifically to macrophages.

cytophotometry A technique for the quantitative determination of substances by the combined use of microscopy and spectrophotometry; based on measurements of the light absorbed by cellular components that either have or have not been treated with specific stains.

cytoplasm The protoplasm of a cell, excluding the nucleus or the nuclear zone.

cytoplasmic gene A nonnuclear gene, such as a gene of mitochondria or chloroplasts.

cytoplasmic inheritance The non-Mendelian hereditary transmission that depends on replicating cytoplasmic organelles such as mitochondria, viruses, and plastids, rather than on nuclear genes.

cytoplasmic membrane CELL MEMBRANE.

cytoplasmion The total extranuclear genetic information of a eukaryotic cell excluding that in the mitochondria and the plastids.

cytoplasm The intact cytoplasmic contents, as distinguished from the nuclear contents, of a

- cell; the structural and functional unit of a eukaryotic cell that is formed by a network of cytoskeletal proteins to which the cytoplasmic organelles are linked.
- cytoribosome** A cytoplasmic ribosome, as distinct from a nuclear or a mitochondrial ribosome.
- cytosegresome** An intracellular, membrane-bound, vacuole that is formed during intracellular self-digestion (autophagy) and that has enclosed some of the cell's own constituents.
- cytoside** A diglycosyl derivative of a ceramide that contains only simple sugars.
- cytosine** The pyrimidine 2-oxy-4-amino-pyrimidine that occurs in both RNA and DNA. *Abbr* C; Cyt.
- cytosine arabinoside** An antitumor agent. The compound, by itself, is inactive but, after intracellular conversion to the nucleoside triphosphate, functions as a competitive inhibitor (with respect to dCTP) of DNA polymerase. *Abbr* ara c.
- cytosis** Combining form meaning an increase in the number of cells.
- cytoskeleton** The filamentous, flexible, and dynamic framework in the cytoplasm of eukaryotic cells. Its major components are microtubules, microfilaments, and intermediate filaments; these are interconnected by the microtrabecular network. The cytoskeleton gives cells their characteristic shape and is responsible for changes in shape as in locomotion, cell division, and phagocytosis. It provides attachment sites for organelles and provides for communication between different parts of the cell.
- cytosol** The soluble portion of the cytoplasm that includes dissolved solutes but that excludes the particulate matter. *Aka* cell sap.
- cytosome** 1. A cytoplasmic organelle (vacuole) of unknown function frequently found in eukaryotic organisms. 2. CYTOPLASM.
- cytostatic agent** An agent that suppresses cell multiplication and cell growth.
- cytotaxin** A compound that has the capacity of promoting chemotaxis.
- cytotaxis** The attraction or repulsion of cells for one another that leads to the ordering and arranging of new cell structures under the influence of preexisting ones.
- cytotoxic** Causing cell death.
- cytotoxic anaphylaxis** The anaphylactic reaction that takes place when an animal organism is injected with antibodies which are specific for cell surfaces.
- cytotoxic antibody** An antibody that damages antigen-bearing cells, particularly in the presence of complement.
- cytotoxic T cells** A group of T cells that specifically kill foreign or virus-infected vertebrate cells. *Aka* cytotoxic T lymphocytes.
- cytotropic anaphylaxis** The anaphylactic reaction that is mediated by cytotropic antibodies.
- cytotropic antibody** An antibody that binds to target cells, particularly mast cells, thereby sensitizing the animal for anaphylaxis. It

D

- d** 1. Deoxy. 2. Dextrorotatory. 3. Deci. 4. Dalton.
- D** 1. *D* configuration 2. Deuterium. 3. Dielectric constant. 4. Translational diffusion coefficient. 5. Aspartic acid. 6. Dihydrouridine. 7. Dalton.
- 2,4-D** 2,4-Dichlorophenoxyacetic acid; a synthetic auxin.
- D₁₀** Decimal reduction time.
- D_{20,w}⁰** Standard diffusion coefficient.
- da** Deca.
- Da** Dalton.
- DABITC** 4-Dimethylaminoazobenzene-4'-isothiocyanate. A reagent that reacts with the alpha amino groups of amino acids and that can be used in the Edman degradation of proteins; it yields highly fluorescent derivatives that are easily identified by thin layer chromatography.
- dactinomycin** ACTINOMYCIN D.
- DALA** δ -Aminolevulinic acid.
- dalton** A unit of mass equal to one-twelfth the mass of one atom of the carbon isotope ¹²C; equal to 1.661×10^{-24} g and identical to the officially defined atomic mass unit (amu). *Sym* Da, D, d.
- dampening of charge effects** The decrease of various electrostatic effects in solution, resulting from the presence of charged groups on macromolecules, that is brought about by an increase in the ionic strength of the solution. The presence of large amounts of other ions tends to minimize electrostatic interactions between the charged macromolecules.
- Dane particle** A particle that contains the Australia antigen, and that is now known to represent the infectious virion, responsible for type B hepatitis. *See also* hepatitis.
- Danielli-Davson model** An early model for the structure of biological membranes which postulated a lipid bilayer, with lipid material separating the two layers, and with proteins located on the outside of the lipid bilayer. *See also* unit membrane hypothesis; fluid mosaic model.
- Danielli-Davson-Robertson model** UNIT MEMBRANE HYPOTHESIS.
- dansyl amino acid** An amino acid derivative formed by the reaction of 1-dimethylaminonaphthalene-5-sulfonyl chloride with the alpha amino group of an amino acid. Dansyl amino acids are fluorescent and are used for the measurement of amino acids by fluorometry.
- dansylation** The introduction of a dansyl group into an organic compound.
- Danysz phenomenon** The phenomenon that the extent of formation and dissociation of an antigen-antibody complex depends on whether the antigen is added all at once, or in small doses.
- DAP pathway** Diaminopimelate pathway.
- dapsone** *See* sulfone.
- dark adaptation** The time required for the rods in the retina of an animal, previously placed in bright light, to become fully responsive to dim light.
- dark current** The current that is obtained in a photoelectric instrument, such as a spectrophotometer or a scintillation counter, in the absence of radiation and that is caused by thermionic emissions of the photomultiplier tube.
- dark field illumination** The illumination of a specimen with rays directed from the side so that only scattered light enters the microscope lenses.
- dark field microscope** A microscope in which dark field illumination is used so that objects appear bright on a dark background as a result of the light scattered by the objects.
- dark reaction** The photosynthetic reaction or reaction sequence that can occur in the absence of light; the fixation of carbon dioxide by plant chloroplasts is an example.
- dark reactivation** The enzymatic repair of DNA, previously damaged by exposure to a mutagen, that does not require light; applies specifically to repair of thymine dimers, produced by exposure of DNA to ultraviolet light. Thymine dimers can be repaired by means of three distinct mechanisms: (a) excision repair; (b) recombination repair; and (c) SOS repair. *See also* photoreactivation.
- dark recovery** DARK REACTIVATION.
- dark repair** DARK REACTIVATION.
- D arm** *See* arm.
- Darwinian evolution** The cumulative changes, including mutation and selection, that occur through successive generations in organisms that are related by descent. *See also* natural selection.
- Darwinian selection** NATURAL SELECTION.
- d-assay** The construction of a thermal de-

- naturation profile by measurements of the system at various ambient conditions; the assay measures the extent of the transition. *See also* i-assay.
- data bank** A computer library; an electronic storehouse of information.
- data base** A collection of related data that can be retrieved by a computer.
- dative bond** COORDINATE COVALENT BOND.
- dative covalent bond** COORDINATE COVALENT BOND.
- datum** (*pl* data). An experimental finding; a fact; a measurement.
- dauermodification** An environmentally induced, phenotypic change that appears to be inherited and survives through one or more generations but that eventually disappears.
- daughter** 1. One of the two cells formed from a parent cell by cell division. 2. The DNA molecule or the chromosome formed from either parental molecules or chromosomes by replication. 3. The nuclide formed from a parent nuclide by radioactive decay.
- daughter-strand gap repair** RECOMBINATION REPAIR.
- Davie and Ratnoff theory** A theory of blood clotting that is based on a cascade mechanism.
- Davis U-tube** A U-tube that contains a porous filter in its lower portion so that bacterial cultures may be placed in either one or both arms of the tube. The filter prevents the passage of bacteria but allows the passage of small, diffusible substances.
- (dA)_x** Deoxyadenylic acid; a homopolynucleotide strand of deoxyriboadenylic acid containing about *x* residues.
- day vision** The capacity to see in bright light; due to the cones in the retina.
- DBM paper** Diazobenzoyloxymethyl paper; an impregnated paper, used in some blotting experiments, that binds single-stranded DNA, RNA, and proteins. These polymers become linked covalently via the diazonium groups in the paper.
- DCC; DCCD** Dicyclohexylcarbodiimide.
- DCMU** Dichlorophenyl dimethylurea.
- D-configuration** The relative configuration of a molecule that is based upon its stereochemical relation to D-glyceraldehyde.
- DDS** *See* sulfone.
- DDT** Dichlorodiphenyltrichloroethane; 1,1,1-trichloro-2,2-bis (*p*-chlorophenyl)ethane; an insecticide.
- deacylase** An enzyme that catalyzes a deacylation reaction.
- deacylated tRNA** A transfer RNA molecule from which either a previously bound aminoacyl group or a previously bound peptidyl group has been removed.
- deacylation** 1. The removal of an acyl group from a compound. 2. The formation of acetoacetyl coenzyme A and coenzyme A from two molecules of acetyl coenzyme A.
- deadaptation** The changes that occur in an inducible system in the time interval between the point at which the inducer is removed and the point at which synthesis of the inducible enzyme stops.
- dead-end complex** A complex of enzyme and substrate, or enzyme and product, that is catalytically inactive and, therefore, ties up the enzyme in a useless form. As an example, in linear noncompetitive inhibition, the ternary ESI (enzyme-substrate-inhibitor) complex does not break down to yield products; it is, therefore, a dead-end complex.
- dead-end inhibitor** A competitive inhibitor that forms an enzyme-inhibitor complex that cannot react further and that cannot lead to the formation of products until the inhibitor dissociates from the complex.
- dead time** 1. COINCIDENCE TIME. 2. The period of time between effective mixing and the start of observations in a rapid-flow or stopped-flow experiment.
- dead-time loss** COINCIDENCE LOSS.
- dead vaccine** KILLED VACCINE.
- dead volume** 1. VOID VOLUME. 2. Any section of a chromatographic flow system between the inlet or injection port and the detector outlet in which solute and mobile phase are mixed but are not passing over the stationary phase.
- DEAE-cellulose** *O*-(Diethylaminoethyl)cellulose; an anion exchanger.
- DEAE-Sephadex** *O*-(Diethylaminoethyl)Sephadex; an anion exchanger that contains the grouping $-C_2H_4N^+(C_2H_5)_2H$ linked via ether bonds to the Sephadex.
- deamination** The removal of an amino group from an organic compound.
- Dean and Webb method** A method for determining the equivalence zone of a precipitin reaction by mixing a constant amount of anti-serum with varying dilutions of antigen and taking the tube in which precipitation occurs most rapidly to be indicative of the equivalence zone. *See also* method of optimal proportions; Ramon method.
- death phase** The phase of growth of a bacterial culture that follows the stationary phase and during which there is a decrease in the number (or the mass) of the cells.
- debranching enzyme** An enzyme that catalyzes the hydrolysis of branch points in a polymer.
- de Broglie wavelength** The wavelength associated with a moving particle; it is given by the de Broglie relationship $\lambda = h/mv$, where λ is the de Broglie wavelength, *h* is Planck's con-

- stant, m is the mass of the moving particle (electron, proton, etc.), and v is the velocity of the particle.
- debye** A unit of dipole moment; equal to the dipole moment of two charges, of 4.8×10^{-10} esu each, that are separated by 1 Å.
- Debye-Hueckel limiting law** See mean ionic activity coefficient.
- Debye-Hueckel theory** The theory that relates the activity coefficients of ions in solution to the electrostatic interactions between the ions and to the diameter of the ion atmosphere around each ion.
- Debye length** The thickness of the ion atmosphere surrounding a central ion according to the Debye-Hueckel theory; the most probable distance from the central ion to a counterion. *Aka* Debye radius.
- deca-** Combining form meaning 10 and used with metric units of measurement. *Var sp* deka. *Sym* da.
- decade scaler** A scaler that produces one output pulse for every 10 input pulses.
- decamer** An oligomer that consists of 10 monomers.
- decamethonium** A 16-carbon compound containing two quaternary nitrogen atoms; a divalent cation which binds noncovalently to muscarinic receptors of acetylcholine. It blocks the binding of acetylcholine at the postsynaptic cell and locks the ion channel of the receptor in the open state, thereby leading to constant depolarization of the postsynaptic membrane. Referred to as an agonist of the cholinergic system since it mimics the action of acetylcholine.
- decant** To pour off the liquid layer that is above sedimented material or above a precipitate.
- decapitate** To cut off the head.
- decapsidate** To remove the viral capsid.
- decarboxylase** CARBOXY-LYASE.
- decarboxylation** The removal or the loss of a molecule of carbon dioxide from the carboxyl group of an organic compound.
- decatenation** The conversion of a catenane to two separate circular molecules.
- decay** 1. The decomposition of organic matter through the action of microorganisms. 2. RADIOACTIVE DECAY.
- decay chain** RADIOACTIVE SERIES.
- decay constant** The fraction of radioactive atoms that are decaying per unit time; the constant λ in the equation $N = N_0 e^{-\lambda t}$, where N is the number of radioactive atoms present at time t , N_0 is the number present at time zero, and e is the base of natural logarithms. The term $e^{-\lambda t}$ is known as the decay factor.
- decay factor** See decay constant.
- decay series** RADIOACTIVE SERIES.
- deci-** Combining form meaning one tenth and used with metric units of measurement. *Sym* d.
- decile** One of the 9 values of a statistical variable which divide the total frequency distribution into 9 equal parts. The first, second, . . . , ninth decile are values at, or below which, fall the lowest 10, 20, . . . , 90% of a set of data.
- decimal reduction time** The time required, at a given temperature, to heat inactivate (kill) 90% of a given population of viable bacterial cells or spores. See also *F* value.
- deciphering of the code** The experimental determination of the nucleotide composition and the nucleotide sequence of the codons of the genetic code.
- decline phase** DEATH PHASE.
- decoding site** AMINOACYL SITE.
- decomplementation** Any process that removes complement activity from a serum; treatment of the serum with heat or antigen-antibody complexes are two examples.
- decomposition** The breakup of a chemical substance into two or more simpler substances.
- decontamination** The removal of a contamination particularly a radioactive one.
- dedifferentiation** The loss of differentiation, as that due to anaplasia.
- deduction** A conclusion arrived at by reasoning from generals to particulars.
- deep groove** MAJOR GROOVE.
- defective lysogenic strain** A strain of mutant bacterial cells that have incorporated a prophage that cannot replicate upon induction and that cannot give rise to intact phage particles.
- defective organism** AUXOTROPH.
- defective prophage** A prophage that cannot replicate upon induction and that cannot give rise to intact phage particles.
- defective virus** A virus that cannot synthesize one or more of its structural proteins and that can form intact particles in the host cell only when it is in the presence of a helper virus. See also deficient virus.
- defibrinated blood** Blood from which fibrin has been removed.
- deficiency** DELETION.
- deficiency disease** A disease that results from the deficiency of a nutrient, as that resulting from either a vitamin or a mineral deficiency.
- deficiency mutant** AUXOTROPH.
- deficient virus** A virus that cannot synthesize one or more of its functional proteins so that its nucleic acid cannot be replicated autonomously. See also defective virus.
- defined medium** A synthetic medium, containing only known chemical ingredients at known concentrations.
- deformation vibration** The vibration of a mole-

cule in which there is a change in a bond angle.

deformylase A prokaryotic enzyme that catalyzes the removal of the formyl group from *N*-formylmethionine at the N-terminal of the polypeptide chain in protein biosynthesis.

deg Degree.

degassing The removal of air bubbles from a chromatographic support, particularly a gel; readily done by placing a suspension of the support in a suction flask and connecting the latter to a water aspirator.

degeneracy 1. The existence of two or more synonym codons for a given amino acid. The degeneracy is termed complete or partial depending on whether all, or only some, of all the possible codons code for amino acids; the degeneracy is termed regular if it follows certain rules as distinct from one that is entirely random. 2. The existence of two or more atomic or molecular levels of equal energy; thus an atom may have two or more orbitals of equal energy, and a molecule may exist in two or more conformational states of equal energy.

degenerate Possessing degeneracy.

degenerate codon SYNONYM CODON.

degradation The gradual and stepwise breakdown of a macromolecule to smaller fragments that proceeds by the breaking of covalent bonds.

degree See absolute temperature scale; Celsius temperature scale; Fahrenheit temperature scale.

degree of inhibition The extent of inhibition of an enzyme; specifically, $i = (v_o - v_i)/v_o$ where i is the degree of inhibition, v_o and v_i are the initial velocities of the uninhibited and inhibited reaction, respectively. Noncompetitive inhibition exists if i is unaffected by the substrate concentration; competitive inhibition exists if i is decreased as the substrate concentration is increased; and uncompetitive inhibition exists if i is increased as the substrate concentration is increased.

degree of ionization The concentration of ions divided by the total concentration; for a weak acid ($HA \rightleftharpoons H^+ + A^-$), the degree of ionization is given by $[A^-]/([HA] + [A^-])$. The degree of hydrolysis and the degree of dissociation are defined in a similar manner.

degree of polymerization The number of monomers in a polymer.

degrees of freedom 1. The total number of variables that can be varied arbitrarily without causing the disappearance of a phase. See also phase rule. 2. The total number of coordinates along which the velocity of a molecule has either a translational, or a rotational, component. 3. The total number of items,

such as observations, deviations, and means, that can vary independently in the light of restrictions imposed on the calculations. *Abbr* df; D/F.

degrowth The decrease in the mass of an organism that occurs at the end of a period of growth.

dehydrase DEHYDRATASE.

dehydratase An enzyme that catalyzes a dehydration reaction.

dehydrated food Food from which water has been removed.

dehydration 1. The removal of water from a compound. 2. The loss of body water.

dehydroascorbic acid The oxidized form of ascorbic acid.

dehydrogenase An enzyme that catalyzes the removal of hydrogen from a substrate using a compound other than molecular oxygen as an acceptor.

dehydrogenase-type mechanism The mechanism of an enzyme reaction that resembles that of pyridine-linked dehydrogenases. For the latter enzymes, NAD^+ and $NADP^+$ function as cosubstrates, and the mechanism of the reaction is generally an ordered sequential one.

dehydrogenation The removal of hydrogen from an organic compound.

deinhibitor A substance that counteracts or eliminates the effect of an inhibitor.

deionized water Water from which ions have been removed; usually done by passing water through an ion-exchange resin, particularly a mixed-bed demineralizer that removes both anions and cations.

deionizer A device for removing ions from water or from other fluids, usually by means of ion-exchange resins.

deka Variant spelling of deca.

delayed-type hypersensitivity An allergic response that occurs a few hours or a few days after the administration of an antigen. The response depends on the sensitization of certain cells, especially lymphocytes, rather than on circulating antibodies.

deletion 1. A point mutation in either RNA or DNA in which one or more nucleotides are removed from a polynucleotide strand. In double-stranded nucleic acid this also leads to the removal of the complementary nucleotide from the second strand so that an entire base pair is ultimately deleted from the nucleic acid. 2. A chromosomal aberration in which there is a loss of genetic material from the chromosome. The portion lost may be either a nucleotide or a larger fragment, consisting of one or several genes.

deletion hypothesis A hypothesis according to which cancer is due to the loss of one or more

specific enzymes or other proteins. *See also* catabolic deletion hypothesis.

deletion loop The loop formed in a DNA strand that is hybridized with a complementary DNA strand that has a deletion; a region of noncomplementarity in only one strand. *See also* substitution loop.

deletion mapping A method for locating the position of a gene on a genetic map by means of overlapping deletions.

deletion method A method for isolating specific mRNA molecules by hybridizing them with DNA molecules that contain deletions.

deletion-substitution particle A transducing bacteriophage in which deleted phage genes have been replaced by bacterial genes.

deliberate immunization The purposeful introduction of antigens, antibodies, or lymphocytes into an organism to either stimulate the production of antibodies by the organism or provide the organism with antibodies.

delipidation The removal of lipid from a biological sample.

delipidized protein A lipoprotein from which part or all of the lipid has been removed.

deliquescence The uptake of moisture from the air by a substance under ordinary conditions of temperature and pressure.

delocalization of electrons The distribution of electrons over a number of nuclei, rather than their being located between two specific nuclei. Electron delocalization leads to lower energy orbitals and greater stability.

delocalized bond A bond involving more than two atoms.

delocalized orbital A molecular orbital that is spread over two or more bonding atoms or even over an entire molecule.

delta 1. Denoting a small difference between two values. *Sym* Δ . 2. Denoting the fourth carbon atom from the carbon atom that carries the principal functional group of the molecule. *Sym* δ .

delta chain 1. The heavy chain of the IgD immunoglobulins. 2. One of the polypeptide chains of a minor hemoglobin component in normal human adults.

delta ray A beam of high-energy secondary electrons that have energies above 100 eV.

delta scale A scale used for nuclear magnetic resonance measurements. One delta (δ) unit is equal to 1 ppm of the spectrometer frequency. Thus, if an instrument is operated at 60 MHz, one delta unit equals 60 Hz. *See also* chemical shift.

demineralizer DEIONIZER.

demyelination *See* multiple sclerosis.

denaturant DENATURING AGENT.

denaturation Any change in the native conformation of a protein or of a nucleic acid

other than the breaking of the primary chemical bonds that join either the amino acids or the nucleotides in the chain. Denaturation may involve the breaking of noncovalent bonds such as hydrogen bonds, and the breaking of covalent bonds such as disulfide bonds; it may be partial or complete, reversible or irreversible. Denaturation leads to changes in one or more of the characteristic chemical, biological, or physical properties of the protein or of the nucleic acid.

denaturation loop *See* denaturation mapping.

denaturation mapping An electron microscopic method for locating AT-rich regions in double-stranded DNA; involves heating the DNA to a point at which melting is just detected, and then stabilizing the denaturation loops by treatment with formaldehyde.

denatured Having undergone denaturation.

denaturing agent A physical or a chemical agent that can bring about denaturation.

dendrite A short, and usually branched, process of a nerve cell that conducts impulses to the cell body.

dendritic evolution An evolutionary pattern that, when diagramed, resembles a tree. Such phylogenetic trees are characteristic of the evolutionary patterns of animal species.

dengue viruses A virus group of four distinct serotypes that belong to the family of *Flaviviridae*. They are transmitted to humans by mosquitoes (*Aedes aegypti*) and usually cause a benign syndrome (dengue fever), characterized by fever, headache, and joint and muscle pains. In cases when the syndrome becomes severe it is associated with hemorrhage and increased vascular permeability (dengue hemorrhagic fever, DHF, or dengue shock syndrome, DSS).

Denhart's solution A solution that contains ficoll, polyvinylpyrrolidone, and bovine serum albumin; used to treat filters containing bound nucleic acids to prevent the binding of single-stranded DNA probes.

denitrification The formation of molecular nitrogen from nitrate by way of nitrite. *See also* nitrate respiration.

denitrifying bacteria The bacteria that carry out denitrification.

de novo initiation The initiation of DNA replication in which the leading strand is started afresh, being joined to an RNA primer; involves formation of a D-loop.

de novo synthesis The synthesis of a molecule, particularly a macromolecule, from simple precursors as distinct from its formation by way of anabolism, catabolism, or modification of other macromolecules. Thus, the de novo synthesis of a protein refers to its synthesis from the amino acid level and not to (a) its

synthesis from the peptide or polypeptide level, (b) its formation by the addition of amino acids to other proteins, or (c) its formation by the breakdown of other proteins. *See also* salvage pathway.

densitometer 1. An instrument for measuring either absorbed or reflected light in materials other than solutions. Densitometers are used for the scanning of chromatograms and electropherograms, and for measuring the blackening of photographic films. 2. An instrument for measuring the density or the specific gravity of a gas or a liquid.

density 1. Weight per unit volume. 2. The degree of blackening of a photographic film.

density-dependent growth CONTACT INHIBITION.

density gradient The change of density with distance; refers particularly to a solution in which there is such a change from one end of the tube or the cell that holds the solution to the other. A density gradient may be set up in an ultracentrifuge cell by virtue of the variation of the centrifugal force with distance from the center of rotation, so that the density increases from the meniscus to the bottom of the cell; solutions of cesium chloride are commonly used for such experiments. A density gradient may also be set up in a centrifuge tube by layering solutions of different densities above each other so that the density increases from the top to the bottom of the tube; solutions of sucrose are commonly used for such experiments.

density gradient centrifugation The centrifugation of macromolecules through a density gradient for either preparative or analytical purposes. *See also* band sedimentation.

density gradient sedimentation equilibrium Density gradient centrifugation that is typically performed in an analytical ultracentrifuge and that permits the separation of macromolecules which differ only slightly in their densities. The technique involves centrifuging a concentrated salt solution that contains macromolecules, such as a cesium chloride solution, until the salt achieves its equilibrium distribution and thereby produces a density gradient in the cell; the macromolecules band in this density gradient at positions where their densities equal those of the gradient. Also referred to as isopycnic ("having the same density") gradient centrifugation since separation of the molecules is based on their differences in buoyant density.

density gradient sedimentation velocity Density gradient centrifugation that is typically performed in a preparative ultracentrifuge and that is used for the fractionation of macromolecules, coupled with a variety of assay techniques for detection of the various com-

ponents. The technique involves layering a solution of macromolecules on top of a preformed density gradient and centrifuging the gradient in a swinging bucket rotor. The macromolecules sediment through the gradient as bands and are separated on the basis of their differences in sedimentation rates.

density gradient zonal centrifugation DENSITY GRADIENT SEDIMENTATION VELOCITY.

density inhibition CONTACT INHIBITION.

-dentate Combining form indicating the number of groups in a molecule that coordinate with a metal ion to form a complex; used with mono-, bi-, tri-, tetra-, etc.

dentine The major calcified tissue of teeth; it is covered by either enamel or cementum depending on whether the portion of the tooth is exposed or submerged.

deoxy- 1. Combining form indicating a compound that contains 2-deoxy-D-ribose. 2. Combining form indicating a compound that contains less oxygen than the parent compound.

deoxyadenosine The deoxyribonucleoside of adenine.

5'-deoxyadenosylcobalamin COBAMIDE.

deoxyadenylic acid The deoxyribonucleotide of adenine.

deoxycholic acid A bile acid that is derived from cholic acid by the loss of an oxygen atom. *Abbr* DOC.

deoxycorticosterone A mineralocorticoid that regulates the excretion and retention of minerals by the kidney, particularly with respect to sodium and potassium. *Abbr* DOC.

deoxycytidine The deoxyribonucleoside of cytosine.

deoxycytidylic acid The deoxyribonucleotide of cytosine.

deoxyguanosine The deoxyribonucleoside of guanine.

deoxyguanylic acid The deoxyribonucleotide of guanine.

deoxyhemoglobin Hemoglobin uncombined with molecular oxygen.

deoxymyoglobin Myoglobin uncombined with molecular oxygen.

deoxynojirimycin An antibiotic, synthesized by some *Bacillus* species, that is a potent inhibitor of α -glucosidases; it is a glucose analogue (5-amino-1,5-dideoxy-D-glucose) in which an NH group substitutes for the oxygen atom in the pyranose ring. Deoxynojirimycin is the reduced form of nojirimycin and does not carry a hydroxyl group at the anomeric carbon.

deoxyribofuranose Deoxyribose that has a 5-membered ring structure resembling that of the compound furan.

deoxyribonuclease An endonuclease that

- catalyzes the hydrolysis of DNA. *Abbr* DNase; DNAase.
- deoxyribonuclease I** A deoxyribonuclease that catalyzes the hydrolysis of DNA to mono- and oligonucleotides consisting of, or terminating in, a 5'-nucleotide. *Abbr* DNase I; DNAase I.
- deoxyribonuclease II** A deoxyribonuclease that catalyzes the hydrolysis of DNA to mono- and oligonucleotides consisting of, or terminating in, a 3'-nucleotide. *Abbr* DNase II; DNAase II.
- deoxyribonucleic acid** The nucleic acid (*abbr* DNA) that constitutes the genetic material in most organisms and that is composed of the genes; together with histones it makes up the chromosomes of higher organisms. DNA is a polynucleotide that is characterized by its content of 2-deoxy-D-ribose and the pyrimidines cytosine and thymine. *See also* DNA forms; Watson-Crick model.
- deoxyribonucleoprotein** A conjugated protein that contains DNA as the nonprotein portion. *Abbr* DNP.
- deoxyribonucleoside** A nucleoside of 2-deoxy-D-ribose.
- deoxyribonucleotide** A nucleotide of 2-deoxy-D-ribose.
- deoxyribose** The five-carbon aldose, 2-deoxy-D-ribose, that is the carbohydrate component of deoxyribonucleic acid. *Abbr* dRib; deRib.
- deoxyribose nucleic acid** DEOXYRIBONUCLEIC ACID.
- deoxyriboside** A glycoside of deoxyribose.
- deoxyribotide** A deoxyribonucleotide.
- deoxysugar** A monosaccharide in which one or more hydroxyl groups have been replaced by hydrogen atoms.
- deoxythymidine** THYMIDINE.
- deoxythymidylic acid** THYMIDYLIC ACID.
- deoxyuridine** The deoxyribonucleoside of uracil.
- deoxyuridylic acid** The deoxyribonucleotide of uracil.
- depancreatize** To surgically remove the pancreas.
- dependent form** The phosphorylated form of the enzyme glycogen synthase that is a regulatory enzyme for which glucose-6-phosphate is a positive effector. *Abbr* D-form.
- dependent variable** A quantity that is a mathematical function of one or more independent variables; the value of a dependent variable is fixed once the values for the related independent variables are chosen.
- depolarization** The elimination of polarization, as that occurring in a muscle or a nerve membrane upon electrical stimulation. A decrease in membrane potential; the membrane potential becomes less negative than it is in the normal resting state.
- depolarization fluorescence** *See* fluorescence depolarization.
- depolymerization** The degradation of a polymer to oligomers and/or monomers.
- depolymerizing enzyme** An enzyme that catalyzes the hydrolysis of a biopolymer to oligomers and/or monomers.
- depot fat** The fat that is stored in an organism. *Aka* adipose tissue.
- deproteinization** The removal of protein from a biological sample.
- despide** A natural or synthetic ester formed by condensation of phenol carboxylic acids; despides occur in lichens and tannins.
- depsipeptide antibiotics** A group of peptide-like antibiotics, produced by *Fusaria* fungi. They consist of alternating amino acid and hydroxy acid residues, with the residues being linked by alternating peptide and ester bonds. Depsipeptide antibiotics are frequently cyclic and are then referred to as cyclodepsipeptides, peptolides, or enniatins. Cyclic depsipeptides act as ionophores.
- depurination** The removal of purines from a nucleic acid.
- depyrimidination** The removal of pyrimidines from a nucleic acid.
- derepression** Any modification that eliminates the repression of a gene and permits the synthesis of the gene product. Possible modifications include a decrease in the repressor concentration produced by starving the organism of a required nutrient, a reaction of the inducer with the repressor, a mutation of the regulator gene, or a mutation of the operator gene.
- deRib** Deoxyribose.
- derivative** A compound, usually an organic one, that is obtained by modification of a parent compound as a result of one or more chemical reactions.
- derivative spectroscopy** A method for analyzing spectroscopic measurements by plotting the first-, second-, or higher-order derivatives of a spectrum with respect to the wavelength.
- derivatize** To synthesize a derivative.
- derived carbohydrate** A derivative of a simple sugar, such as a sugar acid or an amino sugar.
- derived lipid** A lipid obtained by hydrolysis of a naturally occurring lipid.
- derived protein** A product obtained by treatment of a protein with heat, acid, base, enzymes, or other agents. Primary derived proteins, such as proteins and metaproteins, are proteins that have been altered only slightly; secondary derived proteins, such as proteoses and peptones, are proteins that have been altered more extensively.
- dermal** Of, or pertaining to, the skin, especially the true skin.

dermatan sulfate A heterogeneous glycosaminoglycan that contains disaccharide repeat units consisting of *N*-acetyl-D-galactosamine and D-glucuronic acid and disaccharide repeat units consisting of *N*-acetyl-D-galactosamine and L-iduronic acid. The uronic acids are present with variable degrees of sulfation. Dermatan sulfate is found in skin, blood vessels, and heart valves.

dermotropic virus A virus, the target organ of which is the skin.

des Prefix, describing a specific lack; an example is a protein or a peptide from which the N-terminal amino acid has been removed, such as des-his-glucagon or des-asp-angiotensin I.

DES Diethylstilbestrol.

desalanine insulin Insulin from which the alanine residue at the carboxyl end of the B chain has been removed by the action of trypsin.

desalting The removal of inorganic salt ions from a sample; techniques used include electrodialysis, ion-exchange chromatography, gel filtration, and electrophoresis.

desaspidin A toxic substance occurring in some ferns that is an uncoupler of both oxidative and photosynthetic phosphorylation.

desaturase An enzyme that catalyzes a desaturation reaction.

desaturation A reaction, or a reaction sequence, whereby a saturated compound is converted to an unsaturated one; the introduction of double (or triple) bonds into a molecule.

descending boundary The electrophoretic boundary that moves downward in one of the arms of a Tiselius electrophoresis cell. *See also* Tiselius apparatus.

descending chromatography A chromatographic technique in which the mobile phase moves downward along the support.

desensitization 1. The modification of an allosteric enzyme by either mutation or chemical means that results in an enzyme that has retained its catalytic activity but has lost the capacity to respond to effectors. 2. The attempt to minimize the response of an individual suffering from immediate-type hypersensitivity upon subsequent exposure to an allergen. Common methods include either the repeated injection of small doses of the allergen to form protective blocking antibodies, or the depletion of the individual's tissue stores of histamine and serotonin. 3. The loss of the ability of target cells to respond to a signaling ligand (such as a hormone); often occurs after prolonged exposure of the cells to the ligand and may be due to a decrease in the number or activity of cell-surface receptors (resulting from an inactiva-

tion of these receptors) or due to other factors. Desensitization may be homologous or heterologous. Two major mechanisms of desensitization are down regulation and uncoupling. *Aka* adaptation; refractoriness, tolerance.

desensitized enzyme An allosteric enzyme that has been so altered by either mutation or chemical modification that, while it is still catalytically active, it no longer responds to an effector.

desert *See* NMR desert.

deshielded nucleus An atomic nucleus in a molecule that is surrounded by a relatively smaller electron density than another nucleus. In nuclear magnetic resonance, such a nucleus will absorb radio frequencies of lower energy (downfield) than the other nucleus.

desiccant A substance that absorbs water and that is used to dry air or another substance.

desiccate To dry by means of a desiccant.

desiccator A closed container that holds a desiccant and that is evacuated and used for the removal of moisture from a substance and for maintaining the substance in the dry state.

desmin A protein that is closely related to vimentin and that, together with vimentin, occurs in intermediate filaments of muscle.

desmoenzyme PARTICULATE ENZYME.

desmolase The enzyme complex, composed of a mixed function oxidase and cytochrome P₄₅₀, that catalyzes the removal of the side chain from cholesterol; cholesterol is thereby converted to pregnenolone, a precursor of the steroid hormones.

desmosine An unusual amino acid that is formed enzymatically from four lysine residues; it is found only in elastin where it cross-links the polypeptide chains. While desmosine could theoretically cross-link four different polypeptide chains, current models of elastin suggest that it cross-links only two chains.

desmosome An intercellular junction; a thickened zone in the cell membranes of adjoining eukaryotic cells; believed to function in cell adhesion. *See also* cell junction.

desmotubule *See* plasmodesmata.

desorb To remove adsorbed molecules from the surface of a solid.

desorption 1. The removal of adsorbed molecules from the surface of a solid. 2. ELUTION. 3. Any one of a variety of loosely related techniques that result in the release of ions from surfaces; used in conjunction with mass spectrometry.

desoxy- DEOXY-

destain To remove the excess dye that has not been utilized in staining the materials of interest.

destructive interference See interference (1).

destructive metabolism CATABOLISM.

desulfurase See desulfurification.

desulfuration DESULFURIZATION.

desulfuricants Anaerobic bacteria of the genera *Desulfovibrio* and *Desulfotomaculum* that utilize sulfate respiration, yielding hydrogen sulfide. The most important species of these bacteria is *Desulfovibrio desulfuricans*.

desulfurification 1. The anaerobic degradation of sulfur-containing organic compounds to inorganic sulfur. These processes include the removal of SH groups from proteins to yield H₂S, a reaction catalyzed by enzymes known as desulfurases. 2. The formation of H₂S by desulfuricants.

desulfurization The removal of sulfur from a compound. Cysteine, for example, can be desulfurized to yield alanine by treating it with Raney nickel. *Aka* desulfuration.

detachment PROPHAGE EXCISION.

detailed balancing PRINCIPLE OF MICROSCOPIC REVERSIBILITY.

detector 1. A device for detecting the presence of the organic compounds that come off a column in gas chromatography. 2. A device for detecting the presence of radioactive radiation that is given off by a sample in a radiation counter.

detergent A synthetic, or a naturally occurring, surface-active agent. Detergents are used for cleaning and, in cell fractionations, to lyse cells and solubilize membranes. Detergents may be grouped into three classes: ionic detergents (such as sodium dodecyl sulfate), nonionic detergents (such as Triton), and bile salts.

detergent builder Any additive to a detergent (surfactant) that makes the latter more effective. An example is phosphate derivatives, such as tripolyphosphate, that chelate metal ions present in hard water. As a result, a detergent, containing phosphate, will be more effective in hard water than a detergent without phosphate.

detergent degradation See biodegradable.

determinant 1. EFFECTOR. 2. ANTIGENIC DETERMINANT. 3. A square array of numbers, called elements, symbolizing certain mathematical operations. The number of rows (or column is called the order of the determinant. For example, the determinant $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ is a second-order determinant and has the value of $(a \times d - b \times c)$.

determinate error An error in a measurement that can be accounted for and that can be avoided, at least in principle; an error due to methodology, instruments, etc.

determination The establishment of a specific course of development by a part of an embryo

that will be pursued regardless of subsequent situations.

deterpenation The removal of terpenes from essential oils.

detoxification The enzymatic reactions in an organism whereby foreign compounds, produced within the organism or introduced into it, are converted to less harmful forms and to more readily excretable products; the foreign compounds are either chemically altered or conjugated to normally occurring metabolites of the organism. *Aka* detoxication.

deuridylic acid An RNA molecule from which uracil residues have been removed by treatment with hydroxylamine.

deuterated Labeled with deuterium.

deuteri- Proposed prefix for the ²H isotope. See also proti-, proto-; deuterio-.

deuterium The stable, heavy isotope of hydrogen that contains one proton and one neutron in the nucleus. *Sym* D.

deuterium exchange A technique for studying the conformation of a protein by measuring the rate of exchange of the hydrogen (or deuterium) atoms in the protein with the deuterium (or hydrogen) atoms in the medium. The hydrogen (or deuterium) atoms that are in direct contact with the solvent exchange more rapidly than those that are located in the interior of the molecule or those that participate in hydrogen bonding.

deutero- 1. Combining form indicating a compound that contains deuterium. 2. Proposed prefix for the ²H isotope. See also deuteri-.

deuteron The deuterium nucleus that consists of one proton and one neutron.

developer A chemical reducing agent that converts exposed silver halide grains to metallic silver and thereby renders an image visible on a photographic film.

development 1. The process whereby a mixture, which has been applied to a chromatographic support, is separated into individual components by treatment with a mobile phase. 2. The process whereby an image is rendered visible on a photographic film by means of a developer. 3. The series of orderly changes by which a mature cell, tissue, organ, organ system, or organism comes into existence.

deviation The difference between a measured value and a reference value, usually the mean.

devolution Retrograde evolution; degeneration.

Devoret test A bioassay for detecting carcinogenic compounds; based upon the induction of lysis of phage λ in lysogenic *E. coli* cells.

dex Dextrorotatory.

dextran One of a group of branched-chain polysaccharides of D-glucose found in yeast

and bacteria. They serve as storage materials and as components of bacterial capsules.

dextrin One of a group of polysaccharides of intermediate chain length that are formed during the hydrolysis of starch.

dextrinogenic amylase ALPHA AMYLASE.

dextrorotatory Having the property of rotating the plane of plane-polarized light to the right, or clockwise, as one looks toward the light source. *Abbr* dex; d.

dextrose D-Glucose; a dextrorotatory monosaccharide.

df Degrees of freedom; also abbreviated D/F.

DF Dissociation factor.

D-form Dependent form.

DFP Diisopropylfluorophosphate.

DFP peptide A peptide that contains a serine residue that has been linked to diisopropylfluorophosphate; obtained by treatment of a protein with diisopropylfluorophosphate, followed by partial hydrolysis. DFP peptides provide information about the amino acid sequence near the active site of those enzymes that possess a serine residue at or near the active site.

D genes Genes coding for segments of the hypervariable regions of immunoglobulin molecules; so called because they add to the diversity of antibodies. *Aka* diversity genes.

DHF Dihydrofolic acid.

DHU Dihydrouridine; the nucleoside of dihydrouracil.

DHU arm The base-paired segment in the cloverleaf model of transfer RNA to which the loop, containing dihydrouracil, is attached. *See also* arm.

di- Combining form meaning two or twice.

diabetes *See* diabetes innocens; diabetes insipidus; diabetes mellitus; renal diabetes; starvation diabetes; steroid diabetes; brittle diabetes; bronzed diabetes.

diabetes innocens RENAL GLUCOSURIA.

diabetes insipidus A disease caused by vasopressin insufficiency and characterized by the excretion of large volumes of hypotonic urine.

diabetes mellitus A complex disease characterized by derangements of carbohydrate, lipid, and protein metabolism; the primary symptom is the presence of excessive amounts of glucose in the blood. Two types are recognized clinically: juvenile onset (or insulin-dependent) diabetes and adult onset (insulin-independent or maturity onset) diabetes. The former usually appears in childhood and is due to a deficiency of insulin which may be caused by inadequate proinsulin production by the pancreas, by an accelerated destruction of insulin, or by insulin antagonists and inhibitors. Uncontrolled, it is characterized by

hyperglycemia, hyperlipoproteinemia (VLDL and chylomicra), and ketoacidosis. Adult onset diabetes usually occurs in middle-aged individuals whose insulin is present at near normal or even elevated levels. The defect in these individuals may be at the level of insulin receptors located on the cell membrane. Obesity appears to be a major contributing factor to the development of this disease. It is characterized by hyperglycemia and hyperlipoproteinemia (VLDL) but not by ketoacidosis.

diabetogenic Having a tendency or capacity to enhance diabetes.

diabetogenic hormone The hormone hydrocortisone or one of the other 11-oxysteroids that are secreted by the adrenal cortex and that stimulate gluconeogenesis.

diacylglycerol An acylglycerol (glyceride) formed by the esterification of one molecule of glycerol with two fatty acid molecules.

diacytosis The discharge of an empty pinocytotic vesicle from a cell after it has transported its contents into the cell.

diafiltration A modification of ultrafiltration in which there is repeated or continuous dilution with fresh solvent in conjunction with the filtration; as a result, the rate of desalting is increased.

diagonal method A two-dimensional electrophoretic or chromatographic technique for mixtures of peptides in which both dimensions are carried out under identical conditions and a chemical reaction is performed on the paper or gel between the two separations. Peptides that have not been modified by the chemical treatment will behave in the second dimension exactly as they did during the first and, as a result, will form a diagonal pattern. Peptides that have been modified by the chemical treatment will not fall on the line and can be identified. The method can be used, for example, to identify the position of disulfide bonds in a protein. In this case, a partial hydrolysate of the protein, after the first dimension, is exposed to formic acid vapors which oxidize disulfide bonds to cysteic acid groups.

dialysate 1. The solution containing the material that has diffused through a dialysis membrane. 2. The solution containing the material that has not diffused through a dialysis membrane; to avoid confusion, the term retentate has been proposed to describe the material retained by a semipermeable membrane. *Var sp* dialyzate.

dialysis The separation of macromolecules from ions and low molecular weight compounds by means of a semipermeable membrane that is impermeable to colloidal macromolecules but is freely permeable to

crystalloids and water. *See also* forced dialysis; reverse dialysis.

dialysis equilibrium *See* equilibrium dialysis.

dialyzate DIALYSATE.

dialyze To process by means of dialysis.

dialyzer An apparatus for performing dialysis that consists of one or more compartments separated by membranes.

diamagnetic Descriptive of a substance that has paired electrons and has no magnetic dipole moment; when such a substance is placed in a magnetic field, a magnetic dipole is induced in the substance which opposes the applied field and tends to move the substance out of it.

diameters A measure of optical magnification; a measure of 20,000 diameters means that the diameter of the object has been magnified 20,000 times when viewed through a microscope.

diaminopimelate pathway A pathway for the biosynthesis of lysine that proceeds by way of diaminopimelic acid and occurs in bacteria and higher plants. *Abbr* DAP pathway.

2,6-diaminopurine A purine analogue that is a mutagen.

diamond code An early version of the genetic code according to which the R groups of the amino acids fit into the diamond-shaped pockets that are present in Watson-Crick type double-helical DNA.

diapause The period of rest, cessation of growth, and decreased level of metabolism that occurs in the life cycle of insects.

diaphorase One of a group of enzymes that catalyze the reduction of an artificial electron acceptor, such as a dye, ferricyanide, or a quinone, by either reduced nicotinamide adenine dinucleotide or by reduced nicotinamide adenine dinucleotide phosphate. Such enzymes were originally thought to function in the reduction of metabolites in the electron transport system between NADH and the cytochromes, but this need not be the case. One preparation of diaphorase has been shown to be identical with lipoamide dehydrogenase.

diasolysis The separation of solutes by diffusion across a membrane that is somewhat related to dialysis but in which the solubility of the solute in the membrane has a major influence on its diffusion rate.

diastase AMYLASE.

diastatic Of, or pertaining to, amylase.

diastatic index A measure of amylase activity that is equal to the number of milliliters of 0.1% (w/v) starch solution, the starch of which is hydrolyzed by the enzyme present in 1.0 mL of a sample at 37°C in 30 min.

diastereomer One of two or more optical isom-

ers of a compound that are not enantiomers. *Aka* diastereoisomer.

diastereomorph DIASTEREOMER.

diastereotopic Descriptive of either atoms or groups of atoms in a molecule that bear a diastereomeric relation to each other. *See also* enantiotopic.

diatomaceous earth A material that is composed principally of the siliceous skeletons of diatoms and that is used as an aid in filtration and as an adsorbent in column chromatography.

diauxic Of, or pertaining to, diauxie.

diauxie The biphasic growth curve that is obtained when an organism is exposed to two substrates that are utilized by the organism in such a fashion that one of the substrates is metabolized by constitutive enzymes while the other substrate is metabolized by inducible enzymes. The substrate requiring the constitutive enzymes is utilized first and represses the induction of the enzymes required for the utilization of the second substrate. Only after the first substrate is used up, can the enzymes be induced by the second substrate which is then metabolized. *Var sp* diauxy.

diazotate The ion $R-N=N-O^-$ formed from a diazonium salt.

diazobenzoyloxymethyl paper *See* DBM paper.

diazo compound A compound containing the diazo group and having the general formula $R_2C=N=N$.

diazo group The grouping $=\overset{+}{N}=\overset{-}{N}$.

diazonium compound DIAZONIUM SALT.

diazonium group The grouping $-\overset{+}{N}=\overset{-}{N}$.

diazonium salt The salt of a compound that contains a diazonium group; used specifically for a compound that is a true ionic salt and that is prepared by the reaction of nitrous acid with a primary aromatic amine.

diazotization The formation of a diazonium salt.

dibasic Descriptive of a compound that contains two hydrogen atoms replaceable by a metal (such as KH_2PO_4) or an acid that can furnish two hydrogen ions (such as H_2SO_4).

dicarboxylic acid cycle GLYOXYLATE CYCLE.

2,4-dichlorophenoxyacetic acid A plant hormone used as a weed killer.

2,6-dichlorophenoxyacetic acid An antiauxin.

dichlorophenyl dimethyl urea A herbicide that blocks electron transport between photosystem I and II by preventing the oxidation of water to oxygen. *Abbr* DCMU. *Aka* Diuron.

dichroic Of, or pertaining to, dichroism.

dichroic ratio The absorbance of plane-polarized light by a polymer in a direction that is parallel to the axis of the polymer divided by the absorbance in a direction that is perpendicular to that axis.

dichroism The directional effect in the absorption of light that results from the relative orientations of the absorbing chromophoric groups and the direction of polarization of the light. Thus, the absorption of light may be limited either to atoms that vibrate in a specific direction or to a component of the light that is polarized in a specific direction.

dicoumarol Variant spelling of dicumarol.

dictionary See genetic code dictionary.

dictyosome 1. The Golgi apparatus of plant cells. 2. A vacuole formed by fusion of Golgi vesicles with a vacuolar membrane. 3. Golgi stack. 4. A structure in the motile spore of uniflagellate fungi which may be the site for anchoring the base of the flagellum.

dicumarol A polycyclic aromatic compound, formed from a natural constituent of clover, that is an uncoupler of oxidative phosphorylation. It is an analogue of vitamin K and is used clinically to reduce the blood clotting tendency of an individual.

dicyanamide A dimer of cyanamide, used as a condensing agent for amino acids.

dicyclohexylcarbodiimide A compound used as a condensing agent for either amino acids or nucleotides; in this reaction, water is split out between the two condensing molecules and then reacts with the reagent, converting it to dicyclohexylurea. Dicyclohexylcarbodiimide is also an inhibitor of ATPase. *Abbr* DCC.

2',3'-dideoxynucleoside triphosphate See chain terminator.

dideoxyribonucleotide sequencing SANGER-COULSON METHOD.

dielectric An insulating material that does not conduct an electric current.

dielectric constant A measure of the polarizability of a medium that is equal to the ratio of the electrostatic force, given by Coulomb's law, in a vacuum to that in the medium. The dielectric constant increases with an increase in the dipole moment of the molecules in the medium. *Sym* D.

dielectric dispersion The variation of the dielectric constant as a function of the frequency of the electric field.

dielectric increment The rate of change of the dielectric constant as a function of the solute concentration.

dielectrophoresis The migration of dipolar molecules toward the region of maximum field strength when placed in an inhomogeneous electric field; a concentration gradient is established when an equilibrium is achieved between dielectrophoretic migration and diffusion.

diesterase See phosphodiesterase.

diet 1. The eating pattern of an organism. 2. The daily food intake of an organism.

dietary deficiency Undernutrition that is due to the inadequate intake of one or more essential nutrients even though the diet as a whole may be quantitatively unrestricted.

dietary fiber That part of plant food that is not digested in the small intestine and, therefore, reaches the large intestine relatively intact; consists primarily of cellulose and other non-digestible cell-wall polymers such as pectins and lignins. Some of the components of dietary fiber are broken down to varying degrees by bacterial action in the large intestine. Dietary fiber aids motility of the intestine and is thought to have protective value against a number of pathological conditions. *See also* antipromoter.

diethylpyrocarbonate Ethoxyformic anhydride; diethyl oxydiformate. A ribonuclease inhibitor used in the extraction of nucleic acids.

diethylstilbestrol A synthetic compound that has high estrogenic activity; a diethyl derivative of 4,4'-dihydroxystilbene (stilbestrol). *Abbr* DES.

difference matrix A tabular representation of the amino acid differences in a given protein isolated from various organisms. Both the columns and rows of the table list the organisms and any number entered in the table represents the number of amino acid differences between any two organisms. The table can also be constructed using the number of base differences of the corresponding amino acid codons. Difference matrices are used to construct phylogenetic trees.

difference spectrophotometry A technique for measuring small changes in absorbance by determining the absorbance of one test solution directly against that of another test solution rather than against that of a reference solution. The two test solutions contain the same solute of interest, and the solute is present in both solutions at the same concentration but under slightly modified conditions. The technique may be used, for example, to measure the absorbance of a solution containing a denatured protein against that of a solution containing the native protein, or to measure the absorbance of a solution containing a protein plus ligand against that of solutions containing the protein and ligand separately.

differential boundary The boundary formed between two solutions that contain the same components but at different concentrations.

differential centrifugation The centrifugation of a solution at various speeds so that particles of different sizes can be separated and collected.

differential counting The counting of pulses in a scintillation counter that fall within a range determined by two preselected levels of in-

tensity. The range of intensities covered is called a window or a channel, and the pulses are selected by means of a pulse height analyzer which consists of two discriminators that reject pulses which are above or below the selected range of intensities.

differential dialysis. The separation of molecules by dialysis through a membrane that has known and specific permeability properties.

differential discrimination The selection of pulses that takes place in differential counting.

differential flotation centrifugation Interface centrifugation, used for tissue culture cells, in which particles are separated according to their densities.

differential labeling A method for investigating the structure of the antigen binding site of an antibody. The antibody is first allowed to bind a hapten and is then reacted with an unlabeled reagent that binds covalently to regions of the antibody that are not protected by the bound hapten. After removal of the hapten, the antibody is reacted with a labeled compound that reacts with those amino acids that had previously been protected by the hapten.

differential medium A medium that aids in the identification of bacteria by revealing specific properties of the organism grown on or in it; different types of organisms may be distinguished by their different forms of growth.

differential method A method for determining the order of a reaction by varying the concentration of each reactant and measuring the resultant rate of the reaction.

differential refractometer A refractometer for measuring the difference between two refractive indices.

differential scanning calorimetry A variation of the differential thermal analysis method in which the temperature of both the sample and the reference are maintained either at an equal level or at a fixed differential throughout the analysis. The variation in heat flow to the sample that is required to maintain this level during a transition is then measured. *Abbr* DSC.

differential sedimentation coefficient The sedimentation coefficient that corresponds to the movement of a differential boundary.

differential thermal analysis An analytical technique for studying temperature-induced transitions in a sample. The sample and an inert reference are heated or cooled at the same rate, and the difference in temperature between them is recorded. This difference is either zero or constant until a point is reached where a thermal reaction occurs in the sample. The course of this reaction shows up as a

peak in a plot of differential temperature versus either time or temperature. The direction of the peak indicates whether the transition was endothermic or exothermic. *Abbr* DTA.

differentiating circuit An electronic circuit for counting the discontinuous ionizations and the discontinuous electrical currents that are produced in an ionization chamber. *See also* integrating circuit.

differentiation The process whereby the structures and functions of the cells of a developing organism are progressively changed, thereby giving rise to specialized cells and structures.

differentiation antigen A cell surface antigen that is expressed only while the embryo undergoes a specific type of differentiation.

diffraction The modification that radiation undergoes when it passes the edge of an opaque body, passes through small apertures or slits, or is reflected from ruled surfaces or from atomic planes in a crystal.

diffraction grating A device that serves to separate light into wavelengths and that is used as a monochromator in some spectrophotometers. A diffraction grating consists of a large number of small grooves that are cut into it at such angles that each groove behaves like a prism, so that light is either reflected from, or transmitted through, the grating.

diffraction spots The spots produced on a photographic film in x-ray diffraction; they are referred to as first, second, third order, etc., corresponding to values of n equal to 1, 2, 3, etc., in the Bragg equation.

diffusate 1. The material that passes through a dialysis bag. 2. DIALYSATE.

diffusible Capable of diffusing.

diffusing factor HYALURONIDASE.

diffusion 1. The process whereby molecules, as a result of their random Brownian motion, either change their orientation, resulting in rotational diffusion, or move from a region of higher to one of lower concentration, resulting in translational diffusion. 2. TRANSLATIONAL DIFFUSION.

diffusion chamber A chamber with porous walls that allows the diffusion of dissolved substances but does not allow the passage of cells; may be used for studies of substances released by cells.

diffusion coefficient *See* rotational diffusion coefficient; translational diffusion coefficient.

diffusion constant DIFFUSION COEFFICIENT.

diffusion current The polarographic current caused by the diffusion of ions toward the electrode.

diffusion-limited reaction Descriptive of a reac-

tion in which the rate of the reaction depends solely on the frequency of molecular encounters as a result of diffusion; as soon as two molecules collide, due to random movement by diffusion, they undergo reaction (ligand binding, enzyme-substrate complex formation, and so on). No additional adjustments of the structure of one or both of the colliding molecules are required for the reaction to proceed. *Aka* diffusion-controlled reaction.

diffusion potential The membrane potential that arises from the diffusion of ions across the membrane.

DIFP Diisopropylfluorophosphate.

digest 1. *n* The mixture of compounds obtained by enzymatic or chemical hydrolysis of macromolecules. 2. *v* To subject macromolecules to enzymatic or chemical hydrolysis either in vivo, as in the digestive tract, or in vitro.

digestion 1. The process whereby the macromolecules of food are hydrolyzed in the digestive tract to smaller molecules that are absorbed across the intestinal wall and pass into the circulation. 2. Any chemical or enzymatic hydrolysis of macromolecules.

digestive Of, or pertaining to, digestion.

digestive enzyme A hydrolytic enzyme that functions in the breakdown of nutrient macromolecules in the digestive tract.

digestive juice One of the four secretions (salivary, gastric, pancreatic, and intestinal juices) that contain the digestive enzymes. Frequently, bile is included among the digestive juices. While bile aids in the digestion of fats by emulsifying them, it does not contain digestive enzymes and hence, strictly speaking, is not a digestive juice. *Aka* digestive fluid.

digestive system The digestive tract together with the related organs.

digestive tract The passage in animals that serves for the digestion of food, the absorption of nutrients, and the elimination of waste products.

digestive vacuole A secondary lysosome formed by phagocytosis of large particles, such as bacteria.

digital computer A computer that receives information in the form of discrete and discontinuous data, usually in the form of bits, and processes it by performing a series of arithmetic and logical operations on the data.

digitalis A plant toxin that is active as a cardiac glycoside.

digitalis glycosides A group of cardiac glycosides that belong to the class of cardenolides and that occur in the leaves of the foxglove plant, *Digitalis*. These compounds are cardiotonic steroids which are used for treatment

of heart weakness and defective heart valves.
digitonin A steroid glycoside, derived from the purple foxglove plant, *Digitalis purpurea*. A saponin, that is used for the fractional precipitation and determination of steroids, for solubilization of the outer mitochondrial membrane, and for extraction of rhodopsin from the retina.

diglyceride DIACYLGLYCEROL.

dihedral angle TORSION ANGLE.

dihedral symmetry Descriptive of a body that has at least one twofold rotational axis perpendicular to another *n*-fold rotational axis; that is, a structure that has two different axes of symmetry. For a structure containing subunits, the oligomer will consist of a minimum of 2*n* subunits.

dihydrobiopterin See biopterin.

dihydrofolate reductase The enzyme that catalyzes the reduction of dihydrofolic acid to tetrahydrofolic acid and that is competitively inhibited by aminopterin and amethopterin.

dihydro-U arm See arm.

dihydrouracil The minor base 5,6-dihydrouracil that occurs in tRNA; its nucleoside is dihydrouridine and its nucleotide is dihydrouridylic acid. *Abbr* DiHU.

dihydroxyacetonephosphate One of the two triose phosphates formed by cleavage of fructose-1,6-bisphosphate in glycolysis.

dihydroxyacetonephosphate shuttle GLYCEROL PHOSPHATE SHUTTLE.

1,25-dihydroxycholecalciferol The active form of vitamin D in humans; a steroid derivative, made by the combined action of the skin, the liver, and the kidneys, that functions as a hormone. It stimulates the absorption of Ca²⁺ and inorganic phosphate across the intestinal wall, leads to an increase in the serum concentrations of Ca²⁺ and inorganic phosphate, and is required for the calcification of bone. See also vitamin D.

2,5-dihydroxyphenylacetic acid HOMOGENITIC ACID.

dihydroxyphenylalanine DOPA.

diisopropylfluorophosphate A reagent that reacts with the hydroxyl group of serine in proteins. The occurrence of this reaction with the enzyme acetylcholinesterase accounts for the reagent being a component of nerve gas. *Abbr* DIFP; DFPF; DFP; DIPFP.

diisopropylphosphofluoridate DIISOPROPYLFLUOROPHOSPHATE.

dilatation An enlargement or expansion, as that of a volume. *Aka* dilation.

dilatometry The measurement of small volume changes, particularly those of liquids, that are produced by either chemical or physical reactions.

dllauid A semisynthetic, narcotic drug made

by converting morphine to dihydromorphine.

diluent The solvent or the solution that is added to another solution for purposes of dilution.

dilute solution A solution that contains a small amount of solute.

dilution 1. The lowering of the concentration of a solution. 2. A solution having a lower concentration than another solution.

dilution end point method A method for determining the antibody titer of an antiserum by titrating a given amount of antigen with various dilutions of the antiserum. The highest dilution of antiserum that produces a detectable precipitin reaction is taken as the antibody titer.

dilution quenching The quenching in liquid scintillation counting that is caused by the dilution of the fluor with the sample so that the probability of exciting the fluor is decreased.

dilution value of a buffer The change in the pH of a buffer that occurs when the buffer is diluted with an equal volume of water; the dilution value is positive or negative depending on whether the pH increases or decreases.

dimensional analysis A check for the validity of an equation that is made by ascertaining that all the separate terms have the same units.

dimer 1. An oligomer consisting of two monomers. 2. The condensation product of either two identical or two similar molecules.

dimerization The formation of a dimer.

dimethyl sulfate protection A method for identifying specific protein-binding regions in DNA; based on the principle that dimethyl sulfate cannot methylate the adenines and guanines in the protein-binding region of the DNA if these bases are in close contact with the bound protein. These sites of contact can be identified by determining the positions of nonmethylated adenines and guanines in the endonuclease protected region with or without bound protein. *See also* DNase protection; footprinting.

dimorphism The occurrence of two forms. *See also* polymorphism.

dim vision NIGHT VISION.

dinitrofluorobenzene SANGER REAGENT.

2,4-dinitrophenol An uncoupler of oxidative phosphorylation. *Abbr* DNP.

dinitrophenyl amino acid An intensely colored amino acid derivative formed by the reaction of 1-fluoro-2,4-dinitrobenzene with the free alpha amino group of amino acids, peptides, or proteins; used for end group analysis of N-terminal amino acids and for chromatographic detection and quantitative estimation of amino acids. *Abbr* DNP-amino acid. *See*

also Sanger reaction.

dinucleotide 1. A compound consisting of two nucleotides linked by means of a phosphodiester bond. 2. A compound, such as NAD⁺ or FAD, that is structurally related to a compound formed from two nucleotides and that contains two phosphate groups.

dinucleotide fold A characteristic protein-binding structure that consists of two Rossman folds (two mononucleotide-binding domains).

diol lipid A lipid that is a derivative of a dihydroxyalcohol (rather than of the trihydroxyalcohol, glycerol). These compounds include derivatives of ethylene glycol, propanediol, butanediol, and pentanediol.

dionin A semisynthetic, narcotic drug made by converting morphine to ethylmorphine.

dioscin *See* Marker synthesis.

diose DISACCHARIDE.

diosgenin *See* Marker synthesis.

dioxin One of a family of compounds in which two benzene rings are linked by means of two oxygen atoms. The compounds are highly toxic in animals but their effect in humans is not as well established. Substitution of chlorine atoms for the hydrogen atoms on the rings produces chlorinated dioxins. One such compound, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) is a by-product of the manufacture of trichlorophenol. The latter is used for the production of a herbicide (2,4,5-trichlorophenol, or 2,4,5-T, one of the ingredients of Agent Orange) and an antibacterial agent (hexachlorophene).

dioxygen Molecular oxygen; O₂.

dioxygenase OXYGENASE.

dipalmitoylphosphatidylcholine *See* lung surfactant.

dipeptide A peptide consisting of two amino acids linked via one peptide bond.

DIPF; DIPFP Diisopropylphosphofluoridate.

diphenylamine reaction A colorimetric reaction for deoxypentoses that is based on the production of a blue color upon treatment of the sample with an acidic solution of diphenylamine; used for the determination of DNA.

1,3-diphosphoglyceric acid *See* 1,3-bisphosphoglycerate.

2,3-diphosphoglyceric acid *See* 2,3-bisphosphoglycerate.

diphosphopyridine nucleotide NICOTINAMIDE ADENINE DINUCLEOTIDE.

diphosphoribulose carboxylase RIBULOSE-1,5-BISPHOSPHATE CARBOXYLASE.

diphosphothiamine THIAMINE PYROPHOSPHATE.

diphthamide An unusual amino acid, derived by post-translational modification of histidine, that is found in the eukaryotic elongation factor eEF₂ at the site at which the factor becom-

- es modified as a result of ADP-ribosylation by diphtheria toxin.
- diphtheria toxin** A bacterial protein of high toxicity, secreted by *Corynebacterium diphtheriae*; an acidic, single-chain protein (MW 62,000) that inhibits eukaryotic protein synthesis by inactivating elongation factor EF-2 (translocase; eEF₂). *See also* ADP-ribosylation; diphthamide.
- dipicolinic acid** The compound, pyridine-2,6-dicarboxylic acid, that is present in large concentrations in spores and that is related to the heat resistance of the spores.
- diplochromosome** A chromosome resulting from an abnormal duplication in which the centromere fails to divide and the daughter chromosomes fail to move apart; the resulting structure contains four chromatids.
- diploid state** The chromosome state in which each of the various chromosomes, except the sex chromosome, is represented twice. *Aka* diploidy.
- diplornavirus** A term used by some to include viruses of the genera orbivirus and reovirus.
- dipolar ion** A molecule, the dipole of which is due to two or more ionized groups.
- dipolar potential** The membrane potential that arises from both the orientation of polar molecules at the surface of the membrane and the ionic double layer of the membrane.
- dipole** An atom or a molecule that possesses an asymmetric charge distribution so that the center of its positive charges does not coincide with the center of its negative charges. The charges may arise from ionizations and/or from polar bonds, and the degree of charge separation is measured by the dipole moment.
- dipole-dipole interaction** The attractive or repulsive electrical force between two molecules that have permanent dipoles; the energy of such interactions is proportional to r^{-6} , where r is the distance between the dipoles.
- dipole flip** A sudden change in the orientation of a dipole.
- dipole-induced dipole interaction** The attractive electrical force between a molecule that has a permanent dipole and the dipole that is induced by this molecule in a neighboring atom or molecule. The energy of such interactions is proportional to r^{-6} , where r is the distance between the permanent dipole and the induced dipole.
- dipole interactions** *See* van der Waals interactions.
- dipole moment** A measure of the tendency of an atom or a molecule to orient itself in an electric field as a result of the separation of its charges; equal to the product of one of the two separated charges and the distance between the two charges.
- dipole strength** A measure of absorption intensity in absorption spectroscopy that is analogous to the rotational strength in circular dichroism.
- diprotic acid** An acid containing two dissociable protons.
- direct-acting bilirubin** The water-soluble conjugated form of bilirubin, bilirubin diglucuronide, that gives an immediate reaction with diazotized sulfanilic acid to yield a diazo dye. *See also* indirect-acting bilirubin.
- direct calorimetry** A method for determining the basal metabolic rate of an animal from the heat produced by the animal when it is placed in an insulated chamber. *See also* indirect calorimetry.
- direct Coombs' test** A Coombs' test in which the red blood cells have been coated with antibody in vivo. *See also* indirect Coombs' test.
- direct effect** The change, such as an excitation or an ionization, that is produced in a molecule as a result of its direct interaction with radiation. *See also* indirect effect.
- direct fluorescent antibody technique** A fluorescent antibody technique in which either the antigen or the antibody of interest is reacted directly with the corresponding antibody or antigen that has been labeled with a fluorochrome. *See also* indirect fluorescent antibody technique.
- directionality of replication** *See* bidirectional replication; unidirectional replication.
- direct isotope dilution analysis** A technique for determining the amount of an unlabeled compound by the addition of a known amount of the same, but labeled compound. The mixture of labeled and unlabeled compounds is then isolated and its specific activity is determined.
- direct mutagenesis** *See* mutagenesis.
- direct oxidation pathway** HEXOSE MONOPHOSPHATE SHUNT.
- direct plot** A plot of Y as a function of X ; *see also* reciprocal plot.
- direct repeats** Identical or closely related DNA sequences, occurring in the same molecule and in the same orientation (running in the same direction); they may be adjacent or they may be separated by another segment of DNA.
- direct transfer** CHANNELING.
- disaccharidase** An enzyme that catalyzes the hydrolysis of a disaccharide; sucrase, maltase, and lactase are examples.
- disaccharide** A carbohydrate composed of two monosaccharide units linked by means of a glycosidic bond. Disaccharides are divided into two groups on the basis of the glycosidic bond between the two units. One group (trehalose type) consists of nonreducing sugars

such as sucrose and trehalose; the other group (maltose type) consists of reducing sugars such as maltose and lactose.

disassembly The stepwise removal of ribosomal proteins from ribosomes, as that achieved with concentrated salt solutions.

disassociation DISSOCIATION (2).

disc gel electrophoresis An electrophoretic technique in which discontinuities of pH, ionic strength, buffer composition, and gel concentration are purposely built into the gel system. Used particularly for a zone electrophoretic technique that permits high-resolution analysis of small samples and that is performed in a polyacrylamide gel; the gel consists of three portions which differ in their composition and in their pH and which are loaded in three stages into open-ended cylindrical glass tubes. The topmost layer is called the sample gel; the middle layer, in which proteins are stacked in the form of thin bands, is called the spacer or stacking gel; and the lower layer, in which the protein bands are separated, is called the running, resolving, or separation gel. *Var sp* disk gel electrophoresis.

Dische reaction DIPHENYLAMINE REACTION.

discontinuous assay An assay in which a reaction mixture is analyzed by some sampling technique; aliquots of the reaction mixture are withdrawn at certain time intervals, the reaction is stopped in the aliquots and they are then analyzed. *Aka* fixed-time assay.

discontinuous density gradient A density gradient in which the density changes in a stepwise fashion from one end of the gradient to the other.

discontinuous distribution A set of experimental data in which the variable being measured cannot vary continuously and is expressed as a whole number; the number of amino acids per protein in a group of proteins is an example.

discontinuous replication 1. The currently accepted mechanisms of DNA replication. 2. The replication of the lagging strand in the currently accepted mechanism of DNA replication. *See* DNA replication.

discriminator An electronic device that is capable of either rejecting or accepting a pulse depending on the intensity of the pulse. *See also* differential counting; integral counting.

discriminator hypothesis The hypothesis that there is one site that is identical in a given group of isoacceptor tRNA molecules, and that this site is a factor, though not necessarily the only one, in the recognition of the isoacceptor tRNA molecules by the corresponding aminoacyl-tRNA synthetase.

disease A disturbance in the structure and/or the function of an organ, a tissue, or an

organism, as that produced by either a viral or a bacterial infection.

disease of regulation A disease that is characterized by the abnormality of an otherwise normal bodily function and that is caused by a disturbance of the equilibria that control the bodily function; high blood pressure is an example.

disequilibrium ratio A measure that describes how far from, or how close to, equilibrium a given reaction is; equal to the concentration term for the actual (not equilibrium) conditions divided by the equilibrium constant. Thus, for the reaction $A \rightleftharpoons D$, the disequilibrium ratio Γ is given by $\Gamma = ([D]/[A])/K_{eq}$.

disinfectant A chemical substance used for disinfection.

disinfection The destruction of viable and harmful bacteria, or the destruction of the toxins and the vectors of these bacteria.

disintegration The spontaneous transformation of a radioactive nuclide into another nuclide, generally with the emission of radioactive radiation.

disintegration constant DECAY CONSTANT.

disk A round and flat piece of magnetic coated material used to store computer data with greater density, speed, and reliability than is possible with cassette tape. Disks can be of rigid metal (hard) or of flexible plastic (floppy). *Aka* diskette.

dismutation reaction A chemical reaction in which a single compound serves as both an oxidizing and a reducing agent and gives rise to two or more compounds by gain and loss of electrons. An example is the conversion of two molecules of pyruvate plus a molecule of water to one molecule each of lactate, acetate, and carbon dioxide. The reaction catalyzed by superoxide dismutase is another example. *See also* disproportionation reaction.

dispensable amino acid NONESSENTIAL AMINO ACID.

dispensable enzyme NONESSENTIAL ENZYME.

dispensable gene NONESSENTIAL GENE.

dispersed phase The solute particles of a colloidal dispersion.

dispersion *See* dispersion medium; colloidal dispersion.

dispersion effect DISPERSION FORCES.

dispersion forces The attractive electrical forces between atoms and/or nonpolar molecules that result from the formation of small, transient, induced dipoles. The motions of the electrons in one atom or molecule lead to the formation of a small, instantaneous, and transient dipole that induces a corresponding dipole in a neighboring atom or molecule. The energy of such interactions is proportion-

al to r^{-6} , where r is the distance between the instantaneous dipoles. *Aka* London dispersion forces.

dispersion medium The solvent of a colloidal dispersion.

dispersive replication A mode of replication for double-stranded DNA (now considered obsolete) in which the parental strands are broken into segments that are incorporated equally, together with newly formed segments, into the two daughter DNA molecules.

displacement analysis *See* displacement chromatography; displacement electrophoresis; radioimmunoassay.

displacement chromatography A chromatographic technique, useful for preparative separations, in which a compound is applied to a chromatographic column and is then displaced from the column by elution with a solution containing a second compound.

displacement development DISPLACEMENT CHROMATOGRAPHY.

displacement electrophoresis ISOTACHOPHORESIS.

displacement loop D-LOOP.

displacement reaction A chemical reaction in which a group is displaced from a carbon atom by the attack of a nucleophile. *See also* S_N1 mechanism; S_N2 mechanism.

displacer The eluent used in displacement analysis.

disproportionation reaction A chemical reaction in which a single compound gives rise to two or more different compounds; an example is the reaction $2AB \rightarrow AB_2 + A$, where AB is a copolymer. *See also* dismutation reaction.

disseminated infection A viral or a bacterial infection in which the infecting agent spreads from the site of entry to other parts of the body.

dissimilation CATABOLISM.

dissimilatory reduction 1. NITRATE RESPIRATION
2. SULFATE RESPIRATION.

dissociation 1. The breakdown of a compound into smaller components, such as the dissociation of an acid to a proton and an anion. 2. The breakdown of a molecular complex, particularly one of macromolecules, such as the dissociation of an enzyme-substrate complex. 3. The appearance of a novel bacterial colony as a result of mutation and selection.

dissociation constant The equilibrium constant for dissociation (1,2).

dissociation factor *See* ribosome dissociation factor.

dissolved carbon dioxide The equilibrium mixture of CO_2 and H_2CO_3 that exists in solution, particularly in blood, plasma, or serum.

dissymmetric Descriptive of a molecule that lacks overall molecular symmetry but that

possesses elements of symmetry within the molecule.

dissymmetry constant FRICTIONAL RATIO.

dissymmetry of scattering The ratio of the intensity of light scattered by a solution at the angle θ to that scattered at the angle $(180 - \theta)$.

dissymmetry ratio 1. The ratio of the intensity of light scattered by a solution at an angle of 45° to that scattered at an angle of 135° . 2. ASYMMETRY RATIO. 3. FRICTIONAL RATIO.

distal Remote from a particular location or from a point of attachment.

distance map CONTACT MAP.

distillate The liquid produced by the condensation of its vapor during distillation.

distillation The process whereby a liquid is purified by boiling and the vapors are condensed and collected.

distilled water Water that is purified and collected by distillation.

distorted bond model A model for the structure of water according to which the water structure is an altered ice lattice that is produced by the bending and the distorting, but not the breaking, of the hydrogen bonds in ice.

distribution coefficient PARTITION COEFFICIENT.

distribution equation One of a set of equations that describe the distribution of an enzyme among various possible forms; such forms may include EI or EP, where E is the enzyme, I is an inhibitor, and P is a product. Each equation provides an expression for a ratio such as $[EI]/[E_i]$ or $[EP]/E_i$ in terms of kinetic constants, equilibrium constants, and concentrations of components; $[E_i]$ is the total enzyme concentration.

distribution isotherm PARTITION COEFFICIENT.

distribution law PARTITION LAW.

distribution potential The membrane potential that arises from the unequal distribution of ions on both sides of the membrane.

distribution ratio PARTITION COEFFICIENT.

disulfide A compound containing a disulfide (S-S) bond.

disulfide bond The covalent bond formed between two sulfur atoms, particularly that formed in peptides and proteins between two sulphydryl groups of two cysteine residues.

disulfide bridge DISULFIDE BOND.

disulfide interchange A chemical reaction in which there is an interchange between the groups attached to two or more disulfide bonds, as in the reaction $R_1-S-S-R_2 + R_3-S-S-R_4 \rightleftharpoons R_1-S-S-R_3 + R_2-S-S-R_4$.

disulfide link DISULFIDE BOND.

DIT Diiodotyrosine.

dithioerythritol *See* Cleland's reagent.

dithiothreitol See Cleland's reagent.

diuresis An increase in the excretion of urine.

diuretic 1. *n* An agent that increases the excretion of urine. 2. *adj* Of, or pertaining to, diuresis.

diurnal 1. Pertaining to the daytime. 2. Occurring daily.

diuron Dichlorophenyldimethylurea.

divergence 1. The difference, in percent, between the nucleotide (base) sequences of two nucleic acid strands. 2. The difference, in percent, between the amino acid sequences of two polypeptide chains.

divergent evolution An evolutionary pattern in which the lines of development for more recent species branch out from earlier species; such a pattern can be depicted as one network branching out from a common origin.

divergent transcription Transcription in which sections of DNA that are being transcribed have opposite orientations relative to a central region.

diversity genes D GENES.

Dixon plot A graphical method for determining the inhibitor constant of either competitive or noncompetitive inhibition of an enzymatic reaction; consists of plotting the reciprocal of the velocity of the reaction as a function of the inhibitor concentration at a constant substrate concentration.

dizygotic twins Twins that are formed from two separate eggs which were fertilized by separate sperms in the same maternal organism.

D-loop A structure formed early in the replication of double-stranded (linear or circular) DNA. It consists of one double-stranded branch (one parental strand paired with the leading strand) and one single-stranded branch (the so-far unreplicated second parental strand). Since the leading strand displaces this unreplicated strand, the structure is known as a displacement loop, or D-loop.

D-loop synthesis The replication mechanism of double-stranded circular mitochondrial DNA. Synthesis of one strand begins at one origin and proceeds unidirectionally around the circle. Synthesis of the other strand begins from a second origin which becomes activated when the displacement loop passes it.

d,l-pair A pair of enantiomers.

DME Dropping mercury electrode.

DMSO Dimethyl sulfoxide.

DNA Deoxyribonucleic acid.

DNA-agar technique A technique for measuring the extent of hybridization between nucleic acid molecules. Nucleic acid fragments from one source are trapped in an agar gel and are allowed to hybridize with radioactively labeled nucleic acid fragments from a

second source. The amount of radioactivity in the agar is then determined.

DNA-arrest mutant A phage mutant that initiates the synthesis of DNA in normal fashion but stops the synthesis soon thereafter.

DNAase Deoxyribonuclease.

DNAase protection method See DNase protection.

DNA binding protein SINGLE STRAND BINDING PROTEIN.

DNA-cellulose chromatography Affinity chromatography in which the column material consists of cellulose to which DNA molecules have been either adsorbed noncovalently or linked covalently.

DNA chimera CHIMERIC DNA.

DNA clone A DNA segment that has been inserted as a passenger into a plasmid or a viral vector, and that has been subsequently replicated along with the vector in a host to form many copies per cell.

DNA cloning RECOMBINANT DNA TECHNOLOGY.

DNA complexity See complexity.

DNA-delay mutant A phage mutant that initiates the synthesis of DNA after a delay of several minutes.

DNA-dependent (directed) DNA polymerase See DNA polymerase.

DNA-dependent (directed) RNA polymerase See RNA polymerase.

DNA dot blot See dot blot assay.

DNA-driven hybridization A hybridization reaction, used in reassociation kinetics, in which DNA is hybridized with radioactive RNA, and the DNA is present in large excess. Used in the construction of cot curves for determining the degree of repetitiveness of the nucleotide sequences in the DNA.

DNA duplex A double-stranded DNA molecule; a double helix of DNA.

DNA duplicase DNA POLYMERASE.

DNA forms The configurations of DNA that are a function of the relative humidity and the type of positive counterions present. The A, B, and C forms of DNA are right-handed, double-stranded helices which, in fibrous form, are stable at intermediate, high, and low relative humidities, respectively, and have 11, 10, and 9.3 base pairs per turn of double helix. The B form is considered to be the biologically most important form. DNA maintains its B form in solution but with slightly altered helix parameters (10.4 base pairs per turn instead of 10.0). The C form is very similar to the B form, while the A form differs from the B form in having the base pairs tilted at 20°, rather than being perpendicular, to the helix axis. At high salt concentrations, the B form can be converted to a left-handed helix in which the sugar-phosphate backbone fol-

lows a zigzag path. Hence, this DNA is referred to as Z-DNA. It contains 12 base pairs per turn of double helix and has only a single groove as opposed to B-DNA which has two (a major and a minor one). It is believed that left-handed helical regions of Z-type DNA exist *in vivo* and possibly have regulatory functions.

DNA glycosylase One of a number of enzymes that cleave *N*-glycosidic bonds at specific sites in the DNA. The enzymes remove mutated or altered bases, thereby forming apurinic or apyrimidinic sites (AP sites); the reaction is a step in the course of DNA repair.

dna G protein The product of the *dna G* gene in *E. coli*; the enzyme primase.

DNA groove See major groove; minor groove.

DNA gyrase A topoisomerase of Type II that functions in the discontinuous replication of DNA. It removes the positive superhelicity produced during replication by introducing negative twists ahead of the advancing replicating fork.

DNA helicase See helicase.

DNA library GENE LIBRARY.

DNA ligase An enzyme that catalyzes the formation of a phosphodiester bond between a 3'-hydroxyl group and a 5'-phosphate group in DNA; the enzyme catalyzes the joining together of two single-stranded DNA segments which may be either parts of the same duplex or parts of different duplexes. The enzyme functions in DNA replication and in DNA repair by linking DNA fragments together.

DNA-like RNA An RNA molecule that resembles DNA in its overall base composition and base ratios; the RNA is generally rich in adenine and uracil and has an adenine/uracil ratio of approximately 1.0. This RNA is not part of ribosomal and transfer RNA and much of it has a high molecular weight and a short half-life. *Abbr* dRNA; DRNA.

DNA-melting protein SINGLE-STRAND BINDING PROTEIN.

DNA methylase An enzyme that catalyzes the methylation of the bases in DNA; the methylation occurs subsequent to, rather than prior to, the incorporation of the bases into the polynucleotide strand.

DNA modification POSTREPLICATIVE MODIFICATION.

DNA modification and restriction See restriction-modification system.

DNA-negative mutant A phage mutant that is unable to initiate the synthesis of DNA.

DNA nucleotidyl transferase DNA POLYMERASE.

DNA packing ratio See packing ratio.

DNA phage A DNA-containing phage.

DNA polymerase An enzyme that catalyzes the

synthesis of DNA from the deoxyribonucleoside triphosphates, using either single- or double-stranded DNA as a template; referred to as DNA-dependent (directed) DNA polymerase to distinguish it from RNA-dependent (directed) DNA polymerase which uses an RNA template for the synthesis of DNA.

DNA polymerase I A DNA-dependent DNA polymerase, originally thought to be the major enzyme in prokaryotic DNA replication. While it does play a role in DNA replication, its major function is now believed to be in the repair-synthesis of DNA. The enzyme catalyzes the synthesis of DNA in the 5' to 3' sense and has associated with it two other enzymatic activities, a proofreading function (3' → 5' exonuclease) and a 5' → 3' exonuclease. *Abbr* pol I. *Aka* Kornberg enzyme. *See also* proofreading function; 5' → 3' exonuclease.

DNA polymerase II A DNA-dependent DNA polymerase that occurs in prokaryotes and that catalyzes the synthesis of DNA in the 5' to 3' sense; it has a proofreading function (3' → 5' exonuclease) but no 5' → 3' exonuclease activity. It is believed to function in DNA repair. *Abbr* pol II.

DNA polymerase III A DNA-dependent DNA polymerase that occurs in prokaryotes and that catalyzes the synthesis of DNA in the 5' to 3' sense; it has both a proofreading function (3' → 5' exonuclease) and a 5' → 3' exonuclease activity. It is the major synthetic enzyme in the replication of DNA. *Abbr* pol III.

DNA polymerase α A eukaryotic DNA-dependent DNA polymerase that catalyzes the synthesis of DNA in the 5' to 3' sense. It is located in the nucleus and is responsible for the replication of chromosomal DNA. It lacks both the 3' → 5' and the 5' → 3' exonuclease activities. *Abbr* pol α .

DNA polymerase β A eukaryotic DNA-dependent DNA polymerase that catalyzes the synthesis of DNA in the 5' to 3' sense. It is located in the nucleus and its function is unknown. *Abbr* pol β .

DNA polymerase γ A eukaryotic DNA-dependent DNA polymerase that catalyzes the synthesis of DNA in the 5' to 3' sense. It is located both in the nucleus and in mitochondria and is believed to function solely in the replication of mitochondrial DNA. *Abbr* pol γ .

DNA polymerase chain reaction See polymerase chain reaction.

DNA polymorphism See restriction fragment length polymorphism.

DNA primase See primase.

DNA primer A single strand of DNA onto

which are added deoxyribonucleotides by DNA polymerase I during DNA replication.
See also primer.

DNA probe *See* probe.

DNA puff CHROMOSOME PUFF.

DNA-relaxing enzyme *See* topoisomerase.

DNA repair *See* cut and patch repair; excision repair; patch and cut repair; SOS repair.

DNA replicase system REPLISOME.

DNA replication The process whereby new DNA is synthesized from parental DNA. The major, currently accepted, mechanism is known as discontinuous (or, more precisely, semidiscontinuous) replication. It entails the local unwinding of the two strands of DNA by the action of helicase to form a Y-fork (replicating fork). Single-strand binding proteins (SSB) bind to the single strands and prevent their coming back together and annealing. Replication of both strands proceeds by the addition of complementary nucleotides in the 5' to 3' sense. One newly synthesized strand grows largely continuously; it grows in the direction of fork movement and is known as the leading strand. The other newly synthesized strand grows discontinuously and in the opposite direction; it is known as the lagging strand. Synthesis of the lagging strand entails binding of the primosome to the complementary parental strand, synthesis of RNA primers by the primase of the primosome, and synthesis of DNA fragments (Okazaki fragments), linked to the RNA primers, by DNA polymerase III. The Okazaki fragments are then extended, and the RNA primers excised, by the action of DNA polymerase I. Lastly, the extended Okazaki fragments are linked together by the action of DNA ligase. *See also* primosome; DNA gyrase; replication (1); conservative replication; dispersive replication; end-to-end conservative replication; semiconservative replication.

DNA restriction enzyme *See* restriction enzyme.

DNA-RNA hybrid A double helix composed of a single strand of DNA which is hydrogen-bonded to a single strand of a complementary RNA.

DNA-RNA virus *See* retrovirus.

DNase Deoxyribonuclease.

DNase protection A method for determining the size of a specific protein-binding region in DNA; based on the principle that such a region is protected by the bound protein against endonuclease action. The DNA is allowed to bind the specific protein and is then subjected to endonuclease action which degrades most of the DNA outside the protected region to mono- and dinucleotides; the section of DNA in close contact with the protein remains in-

tact. This fragment can then be isolated and characterized. The method can be used, for example, to study the binding of RNA polymerase to the promoter region of DNA. *See also* footprinting; dimethyl sulfate protection.

DNA sequencing *See* Maxam-Gilbert method; Sanger-Coulson method.

DNA splicing *See* recombinant DNA technology.

DNA swivelase *See* topoisomerase.

DNA synaptase An enzyme, isolated from *E. coli*, that catalyzes the fusion of double-stranded DNA molecules at a region of homology and that may play a role in genetic recombination.

DNA synthesizer An automated setup for the chemical synthesis of oligonucleotide segments of DNA. *See also* gene machine.

DNA topoisomerase *See* topoisomerase.

DNA transcriptase DNA-DEPENDENT RNA POLYMERASE.

DNA unwinding protein SINGLE-STRAND BINDING PROTEIN.

DNA vector VECTOR (3).

DNA virus A DNA-containing virus.

DNFB Dinitrofluorobenzene.

DNP 1. 2,4-Dinitrophenyl group. 2. Deoxyribonucleoprotein. 3. 2,4-Dinitrophenol.

DNP-amino acid Dinitrophenyl amino acid.

Dns-amino acid Dansyl amino acid.

dNTP Deoxynucleoside triphosphate.

DOC 1. Deoxycorticosterone. 2. Deoxycholic acid.

DOCA Deoxycorticosterone acetate.

docking protein A protein that serves to remove the block of protein synthesis exerted by the signal recognition protein (SRP) after the ribosome-SRP complex has become bound to the membrane of the rough endoplasmic reticulum. The docking protein functions in or on the endoplasmic reticulum. *Aka* SRP-receptor.

doctrine of monomorphism The belief that microorganisms show constancy with respect to their morphological form and their physiological function. *See also* doctrine of pleomorphism.

doctrine of original antigenic sin The phenomenon that antibodies formed in a secondary response that is elicited by an immunogen related to, but not identical with, the immunogen that elicited the primary response react more strongly with the primary, than with the secondary, immunogen.

doctrine of pleomorphism The belief that microorganisms have great capacity for variation with respect to their morphological form and their physiological function. *See also* doctrine of monomorphism.

doctrine of uniformitarianism The assumption that the chemical and physical laws have remained unchanged from the time of the formation of the earth, throughout the development of life, and up to the present time.

dol Dolichol.

dolichol One of a group of long-chain lipids, containing 16–22 isoprene units, that serve as carriers (in the form of dolichol phosphates) of carbohydrates in the biosynthesis of glycoproteins in animals. *Abbr* dol. *See also* glycosylation; undecaprenol.

dolichol phosphate A lipid carrier of oligosaccharides that functions in glycoprotein synthesis; an isoprenoid phosphate which, in vertebrates, contains 18–20 isoprene units. Dolichol phosphate transfers the oligosaccharide to protein in the biosynthesis of N-linked oligosaccharides. *Abbr* dol-p.

dol-p Dolichol phosphate.

domain 1. An independently folded, and relatively globular, region of a polypeptide chain; a region that is spatially isolated and that could be physically separated from other parts of the molecule by a suitable cut, or cuts, in the polypeptide chain. Domains may interact slightly or extensively with each other, they may be associated with specific functions, and they vary in size from about 40 to 400 amino acid residues. 2. A region of homology in an immunoglobulin molecule; anyone of the various segments of the light and heavy chains. 3. A region in the chromosome in which supercoiling is independent of that in other regions. 4. An extensive region of DNA which includes an expressed gene that is very sensitive to degradation by DNase I.

dominant 1. DOMINANT GENE 2. The trait produced by a dominant gene.

dominant gene A gene that is fully expressed in a heterozygote. A dominant gene may partially or entirely suppress the expression of another allelic gene (recessive gene). *Aka* dominant allele.

donation The transfer, to a recipient cell, of a nonconjugative plasmid via the effective contact provided by a different, conjugative plasmid.

Donnan equilibrium GIBBS-DONNAN EQUILIBRIUM.

Donnan potential The membrane potential that arises from the unequal distribution of ions which is produced by the establishment of a Gibbs-Donnan equilibrium.

Donnan ratio The ratio of the concentration of a diffusible cation on one side of the membrane to the concentration of the same ion on the other side of the membrane in a Gibbs-Donnan equilibrium. For an anion, the ratio

of the two concentration terms is reversed. Thus, if r is the Donnan ratio and A and B denote the two sides of the membrane, then $r = [Na^+]_A/[Na^+]_B = [Cl^-]_B/[Cl^-]_A$.

Donnan term A measure of the ionic distributions attained in a Gibbs-Donnan equilibrium; equal to the difference between the sum of the concentrations of the diffusible ions on that side of the membrane that contains nondiffusible ions, and the sum of the concentrations of the diffusible ions on the other side.

donor The atom that donates a hydrogen in the formation of a hydrogen bond.

donor junction *See* splicing junctions.

donor site PEPTIDYL SITE.

donor splicing site *See* splicing junctions.

DOPA 3,4-Dihydroxyphenylalanine; an intermediate both in the conversion of tyrosine to melanin pigments and in the synthesis of epinephrine and norepinephrine from tyrosine; used in the treatment of Parkinson's disease.

dopamine 3,4-Dihydroxyphenylethylamine or hydroxytyramine; a neurotransmitter catecholamine formed by decarboxylation of L-dopa. A deficiency of dopamine is one of the characteristics of Parkinson's disease. Dopamine is also an intermediate in tyrosine metabolism.

dopamine adrenergic receptor *See* adrenergic receptor.

dormancy The inactive state of a spore.

dormant infection A bacterial infection that does not produce overt disease symptoms but in which the bacteria can be detected by the use of proper techniques. *See also* latent infection.

dormin ABSCISIC ACID.

Dorn effect SEDIMENTATION POTENTIAL.

dosage 1. A specified dose. 2. The administration of a dose.

dosage repetition The occurrence of a given gene in multiple copies per nucleus; due to the fact that the cell requires a large amount of the particular gene product per unit time, which a single copy could not produce. The genes coding for ribosomal and transfer RNA exhibit dosage repetition.

dose A measured quantity of a chemical, a microorganism, a virus, or radiation that is administered to an organism.

dose-action curve DOSE-RESPONSE CURVE.

dose-effect curve DOSE-RESPONSE CURVE.

dose fractionation The exposure of an object or an organism to small doses of radiation, administered at regular intervals.

dose meter DOSIMETER.

dose rate The dose of radiation received per unit time.

dose-response curve A curve that describes the relation between the dose that is administered

to organisms and either the number or the percentage of organisms that show a response. Examples of kinds of doses are those of carcinogens, drugs, poisons, viruses, and radiation; examples of kinds of responses are tumor development, recovery from a disease, and death. *Abbr* DRC.

dosimeter A instrument for measuring the cumulative dose of radiation to which an organism or an object has been exposed. *Aka* dose meter.

dosimetry The measurement of doses of radiation, microorganisms, viruses, or chemicals.

dot blot assay A quantitative method for the estimation of specific nucleic acid sequences (DNA or RNA) by means of a blotting technique.

double beam in space spectrophotometer A spectrophotometer in which the original light beam is split into two beams that pass through two identical optical systems at the same time; one beam passes through the sample solution while the other passes through a reference solution.

double beam in time spectrophotometer A spectrophotometer in which the original light beam is made to pass, at any given time, either through the sample solution or through a reference solution; commonly achieved by means of a light chopper.

double-beam spectrophotometer A spectrophotometer in which a light beam passes through both the sample solution and a reference solution so that a direct measurement of the difference in absorbance between the two solutions can be made. *See also* double beam in space spectrophotometer; double beam in time spectrophotometer.

double-blind technique A technique for testing either a substance or a procedure in which neither the subject nor the experimenter know the identity of the samples and the expected results; used in the testing of drugs, vaccines, etc., particularly in conjunction with the use of placebos. *See also* blind test.

double bond A covalent bond that consists of two pairs of electrons, shared by two atoms.

double carbon dioxide fixation The conversion of two molecules of carbon dioxide to organic compounds by means of two different reactions, as that occurring in *Chromatium*.

double-chain length A crystalline form of glycerides in which two acyl groups form a unit structure.

double diffusion A technique of immunodiffusion in which both the antigen and the antibody are allowed to diffuse through a gel; can be used for either one-dimensional or two-dimensional diffusion.

double-displacement mechanism PING-PONG MECHANISM.

double helix *See* Watson-Crick model.

double infection The infection of a bacterial cell with two different phage particles.

double irradiation SPIN DECOUPLING.

double isotope dilution analysis A technique for determining the amount of a labeled compound of unknown specific activity by treating two aliquots of the labeled compound with different and known amounts of the same, but unlabeled, compound. The mixtures of labeled and unlabeled compounds are then isolated and their specific activities are measured.

double-label experiment An experiment based on the use of either one compound labeled with two different isotopes, or two compounds, each labeled with a different isotope.

double-label method HANDLE METHOD.

double layer *See* ionic double layer; bilayer.

double lysogeny The phenomenon in which a bacterium is infected twice with the same temperate phage, the two prophages of which are inserted in tandem into the host bacterial DNA.

double-reciprocal plot A plot of $1/Y$ versus $1/X$, where Y and X are two variables; a Lineweaver-Burk plot is an example.

double refraction BIREFRINGENCE.

double refraction of flow FLOW BIREFRINGENCE.

double resonance *See* electron-electron double resonance; electron-nuclear double resonance.

double-sector cell An analytical ultracentrifuge cell that is divided into two compartments; useful, for example, for simultaneous analysis of the sedimentation behavior of two solutions.

double-sieve mechanism A model proposed to explain the low frequency of misacylation (mischarging) of amino acids to tRNA in protein synthesis. According to this model, the active site of an aminoacyl-tRNA synthetase is too small for amino acids that are larger than the correct amino acid. Thus, the active site serves as a first sieve with the result that amino acids larger than the correct one are not activated. Additionally, the hydrolytic site of the enzyme is presumed to be too small for the correct amino acid. This site, therefore, serves as a second sieve with the result that amino acids smaller than the correct one are removed by hydrolysis.

double strand break CUT.

double-stranded Descriptive of a nucleic acid molecule that consists of two polynucleotide chains. *Abbr* ds.

doublet 1. A sequence of two adjacent nuc-

leotides in a polynucleotide strand. 2. A double peak, as that obtained in nuclear magnetic resonance.

double-tailed test TWO-SIDED TEST.

doublet code A genetic code in which an amino acid is specified by two adjacent nucleotides in mRNA; thought to have been a forerunner of the present genetic code.

double transformation COTRANSFORMATION.

double-well technique An immunoelectrophoretic procedure for determining the common precipitin arcs produced by two mixtures.

doubling dilution Serial dilution such that the dilution in each tube is twice that in the preceding tube.

doubling dose The dose of ionizing radiation that results in a doubling of the spontaneous mutation rate for a given species.

doubling time The observed time required for a cell population to double in either the number of cells or the cell mass; it is equal to the generation time only if all the cells in the population are capable of doubling, have the same generation time, and do not undergo lysis. *Sym* t_D .

doubly lysogenic strain A bacterial strain in which the cells carry two prophages per genome.

doughnut model A model of the conformational changes produced in a cell membrane by the action of complement. According to this model, complement brings about the formation of a rigid, stable channel that stretches across the phospholipid bilayer of the membrane; the outside of this channel is hydrophobic, but the hollow inside core is hydrophilic and permits the free passage of water molecules and ions. *See also* leaky patch model.

Dowex Trademark for a group of ion-exchange resins.

downfield Describing a peak in nuclear magnetic resonance that is on the low magnetic field side of the spectrum. *See also* deshielded nucleus.

downhill reaction EXERGONIC REACTION.

down promoter mutation *See* promoter down mutation.

down regulation The decrease in receptor activity of cell membranes for a specific ligand that is brought about by incubating the cells, or stimulating them repeatedly, with the ligand; observed for many polypeptide hormones such as epidermal growth factor and insulin. Thus, incubation of cells with insulin leads to a decrease in the binding of insulin by the cells. Down regulation involves receptor internalization and degradation via coated pits

and receptosomes. *See also* coated pit; receptosome.

downshift The transfer of a bacterial culture from a growth medium in which growth is rapid to one in which growth is slow.

Down's syndrome MONGOLISM.

downstream Describing a location or a sequence of units in the direction in which a process occurs: (a) during transcription, the location or sequence of deoxyribonucleotides on the transcribed strand of DNA from the 3'- to the 5'-end; (b) during translation, the location or the sequence of ribonucleotides on the mRNA from the 5'- to the 3'-end; (c) during replication, the location in the direction of replicating fork movement; (d) in a polypeptide chain, the sequence of amino acids in the direction in which they are linked together, from the N- to the C-terminal; (e) in the electron transport system, the sequence of electron carriers in the direction in which the electrons flow, from metabolite to oxygen. *See also* upstream.

DPFP Diisopropylfluorophosphate.

DPG 2,3-Diphosphoglycerate.

dpm Disintegrations per minute; the number of radioactive disintegrations per minute.

DPN⁺ Diphosphopyridine nucleotide. The preferred abbreviation is NAD⁺.

DPNH Reduced diphosphopyridine nucleotide. The preferred abbreviation is NADH.

dps Disintegrations per second; the number of radioactive disintegrations per second.

DPT Diphosphothiamine.

drag effect SOLVENT DRAG.

Draper's law FIRST LAW OF PHOTOCHEMISTRY.

DRC Dose-response curve.

Dreiding model A framework model in which a bond length is proportional to the internuclear distance between a hydrogen atom and the respective atom; these bond lengths are based on a scale of $0.4 \text{ \AA}/1.0 \text{ cm}$.

dRib Deoxyribose.

Drierite A brand of anhydrous calcium sulfate used as a desiccant.

drift *See* genetic drift.

driving force The source of free energy and/or the conditions and factors that are responsible for causing a reaction to proceed in a given direction; frequently refers to the mechanism by which the free energy of activation of the transition state is lowered.

dRNA DNA-like RNA; also abbreviated DRNA.

droplet sedimentation The phenomenon that may occur in density gradient sedimentation velocity when a solution of macromolecules is layered over a density gradient that contains a highly diffusible low molecular weight solute;

the unequal diffusion of this solute and of the macromolecules may lead to a density inversion and to convection at the interface between the solution of the density gradient and that of the macromolecules.

dropping mercury electrode An electrode, used in polarography, in which mercury drops from a reservoir through a capillary into the solution that is being studied; the capillary is mounted vertically below the reservoir. *Abbr* DME.

Drosophila The genus of the fruit fly; an organism used in genetic research.

Drude equation An equation that describes the variation of optical rotation with wavelength; specifically $[m'] = a_0 \lambda_0^2 / (\lambda^2 - \lambda_0^2)$, where $[m']$ is the reduced mean residue rotation, λ is the wavelength, and a_0 and λ_0 are constants.

Drude term The expression $a_0 \lambda_0^2 / (\lambda^2 - \lambda_0^2)$ that is part of the Drude equation and that is also the first term in the Moffit-Yang equation.

drug-detoxication enzyme DRUG-METABOLIZING ENZYME.

drug-induced apnea A genetically inherited metabolic defect in humans that is due to a deficiency of the enzyme pseudocholinesterase.

drug-metabolizing enzyme A mammalian enzyme that acts on drugs and other foreign chemicals but that is not known to act on any metabolite normally occurring within the same organism. *See also* normal enzyme.

drug resistance The relative resistance of mutant microorganisms to the action of drugs.

drug-resistance plasmid R PLASMID.

dry application A method of sample application in electrophoresis in which the sample is applied to a dry support, such as filter paper, and this is followed by wetting of the support with buffer.

dry box A moisture-free enclosure.

dry column chromatography A chromatographic technique in which an adsorbent is packed in a solvent-free, dry column. The mixture to be separated is placed on top of the column and this is followed by addition of a developing solvent. When the solvent reaches the bottom of the column, the separation is complete, and fractions can be removed from the column and collected by various techniques.

dry ice Solid carbon dioxide.

drying agent DESICCANT.

drying oil A highly unsaturated oil that tends to undergo autooxidation.

dry weight The weight of a sample from which the water has been removed.

ds Double-stranded.

DSC Differential scanning calorimetry.

dsDNA Double-stranded DNA.

D-site Donor site.

dsRNA Double-stranded RNA.

DTA Differential thermal analysis.

dTDP 1. Thymidine diphosphate. 2. Thymidine-5'-diphosphate; the 5'-diphosphate of 2'-deoxyribosyl thymine.

DTE *see* Cleland's reagents.

dTMP 1. Thymidine monophosphate; thymidylic acid. 2. Thymidine-5'-monophosphate; 5'-thymidylic acid; the 5'-phosphate of 2'-deoxyribosyl thymine.

DTNB 5,5'-Dithiobis (2-nitrobenzoic acid); Ellman's reagent.

DTT *See* Cleland's reagents.

dTTP 1. Thymidine triphosphate. 2. Thymidine-5'-triphosphate; the 5'-triphosphate of 2'-deoxyribosyl thymine.

dual-bed chromatography COUPLED-LAYER CHROMATOGRAPHY.

dual-effect mutant A mutant possessing a polar mutation; a polarity mutant.

dual recognition A model of associative recognition in which a T lymphocyte is assumed to have two receptor sites, both of which must simultaneously bind one of two different ligands to activate the cell. One of these ligands is an antigen, the other is a self molecule coded for by the major histocompatibility complex.

dual signal hypothesis *See* synarchy.

ductless gland ENDOCRINE GLAND.

Du Nouy ring tensiometer An instrument for measuring surface tension and interfacial tension by a determination of the force required to detach a platinum ring from a surface.

duocrinin The gastrointestinal hormone that controls the secretion from Brunner's gland, located in the duodenum.

duplex 1. *n* A double helix. 2. *adj* Double-helical; double-stranded.

duplex DNA The double helix of the Watson-Crick model of DNA.

duplicase DNA-DEPENDENT DNA POLYMERASE.

duplicate gene One of the multiple copies of a gene, produced by gene duplication.

duplication A chromosomal aberration in which a chromosome bears two identical groups, each composed of one or several genes.

Duponol Trademark for a group of detergents composed of sulfate esters of alcohols that are derived from long-chain fatty acids.

D value DECIMAL REDUCTION TIME.

dwarfism A condition of being undersized that results from the premature arrest of skeletal growth and that may be caused by insufficient secretion of growth hormone.

dyad symmetry The symmetry of a body that exists when identical structures are produced

when the body is rotated by 180° ; used to describe double-helical DNA regions containing palindromes. When such a segment is rotated by 180° , the same base sequence is obtained.

dye A compound that strongly absorbs light in the visible region and that can be firmly attached to a surface as a result of chemical and/or physical interactions.

dye-sensitized photooxidation The oxidation of a biologically important molecule that occurs in the absence of oxygen but in the presence of a photosensitizing dye and an appropriate electron and/or hydrogen acceptor. *See also* photosensitization.

dynamic capacitor electrometer VIBRATING REED ELECTROMETER.

dynamic equilibrium 1. EQUILIBRIUM. 2. STEADY STATE.

dynamic osmometer An osmometer, the operation of which is based on the application of hydrostatic pressure sufficient to just prevent osmosis from occurring.

dynamic viscosity The viscosity of a liquid that has not been corrected for the density of the liquid. The unit of dynamic viscosity is the

poise. *See also* kinematic viscosity.

dyne A unit of force equal to the force that, when applied to a mass of one gram, will impart to it an acceleration of 1 cm/s^2 .

dynein A protein that forms the "arms" in the axoneme structure of cilia and flagella. Dynein is a very large protein (MW about 5×10^5) and an ATPase, requiring either Ca^{2+} or Mg^{2+} for activity.

dynorphin An opioid (endorphin) that has great potency and contains the Leu-enkephalin amino acid sequence at its N-terminal; it is derived from prodynorphin.

dysfunction An impairment of normal function; a malfunction.

dysgammaglobulinemia A condition in which there is an imbalance in the relative amounts of the various types of immunoglobulins in an individual.

dysgenic Genetically harmful or injurious; detrimental to the genetic qualities of a race or a breed. *See also* eugenic.

dysmyelination The formation of a myelin that has a faulty structure.

dystrophy Defective nutrition.