DICTIONARY OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

Second Edition

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J. STENESH

Professor of Chemistry
Western Michigan University

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PREFACE

This dictionary, first published in 1975, was written to provide scientists and students in the life sciences with a reference work on the terminology of biochemistry and molecular biology. The expansion of knowledge in these areas created the need for an extensive revision of the first edition. All of the original entries were checked and reworked, if necessary, in view of new information. This second edition contains approximately 16,000 entries, of which some 4,000 are new, representing an increase of about 30% over that of the first edition. The source material consulted for revision of existing terms and for addition of new terms consisted of over 300 textbooks and reference books of various kinds and of over 600 journal articles from the research literature, all of which have been published since 1975. All told, the dictionary entries are drawn from over 500 books and 1,000 articles, including the recommendations of the Commission on Biochemical Nomenclature of the International Union of Pure and Applied Chemistry and the International Union of Biochemistry. Throughout, an effort has been made to include terms recently introduced into the biochemical literature and to exclude obsolete ones, except for a few of historical interest.

The terminology of biochemistry has a number of characteristics that influenced the selection of entries. One of these is the extensive use of terms from other sciences, since biochemistry, by its very nature, draws heavily on allied sciences. For this reason, many terms from such sciences as chemistry, immunology, genetics, virology, biophysics, and microbiology have been included in the dictionary. A second characteristic is the widespread use of abbreviations, both standard and nonstandard. Many of these are included to aid the reader of biochemical literature and to provide for the likelihood that some of the nonstandard abbreviations will become standard ones in the future. A third characteristic is the extensive use of synonymous expressions, frequently differing from each other only by minor variations. Since the synonymous nature of one expression to another may not always be apparent to the reader, principal synonymous expressions are included and cross-referenced. A fourth characteristic is the widespread use of jargon, especially in the area of molecular biology. While some of these terms may subsequently drop out of usage, others will end up becoming part of the standard terminology. For this reason, a large number of such expressions that are currently used in biochemistry and molecular biology have been included in this dictionary.

This second edition differs from the first in two important aspects. One change involves the names of specific compounds and other substances. The number of such entries included in the dictionary has been substantially enlarged. At the same time, however, no attempt was made to be exhaustive in this respect.

The second change involves the scope of the definitions. While the concise nature of the definitions of the first edition has by and large been maintained, an effort has been made to provide some additional information when this was considered useful. Thus, many terms, both original and new ones, have been defined in a slightly expanded fashion. In some cases, even lengthier definitions were deemed desirable. This was the case, for example, for many of the physical-chemical techniques, hypotheses, theories, and models used in modern biochemistry, for which a brief definition would fail to convey the essence of the term to the reader and would fail to distinguish it clearly from other, related terms. In all cases, however, a comprehensive, encyclopedic treatment was purposely avoided.

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J. STENESH

Kalamazoo, Michigan
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EXPLANATORY NOTES

Arrangement of Entries The entries are arranged in alphabetical order, letter by letter; thus "acidimetry" precedes "acid number," and "waterfall sequence" precedes "water hydrate model." Identical alphabetical listings are entered so that lowercase letters precede capital ones and subscripts precede superscripts.

Chemical prefixes, in either abbreviated or unabbreviated form, are disregarded in alphabetizing when they are used in the ordinary sense of denoting structure of organic compounds. These include ortho-, meta-, para-, alpha-, beta-, gamma-, delta-, *cis-*, *trans-*, *N-*, *O-*, and *S-*. Such prefixes are, however, included in alphabetizing when they form integral parts of entries and are used in ways other than for the indication of structure of organic compounds, as in "alpha helix," "beta configuration," and "N-terminal." The prefixes mono-, di-, tri-, tetra-, and poly-, which form integral parts of entries, are included in alphabetizing, as in "monoglyceride" and "tetrahydrofolic acid."

All numbers are disregarded in alphabetizing; these include numbers denoting chemical structure, as in "glucose-6-phosphate dehydrogenase" and "5-HT," and numbers used for other purposes, as in "factor IV" and "S-100 fraction."

The letters D and L, denoting configuration, are omitted from names of terms as entered and are usually omitted from the definitions themselves.

Form of Entries All entries are direct entries so that, for example, "first law of cancer biochemistry" is entered as such and not as "cancer biochemistry, first law of." The entries are generally in the singular, with the plural indicated only when considered necessary. When several parts of speech of a term are in use, the term is generally entered in the noun form, and other parts of speech are entered only to the extent deemed useful. The different meanings of a term are numbered, chemical formulas are generally omitted, and the spelling is American.

Cross References Four types of cross-references are used in this dictionary; they are indicated by the use of *see*, *aka*, *see also*, all in italics, and by the use of words in small capital letters. The word *see* is used either in a directive sense, as in "coat—*see* spore coat; viral coat" and "hereditary code—*see* genetic code," or to indicate that the term is defined within the definition of another, separately entered term, as in "E_0'—*see* standard electrode potential" and "MIH—*see* melanocyte-stimulating hormone regulatory hormone." The abbreviation *aka* (also known as) is used at the end of a definition to indicate expressions that are synonymous to the entry; principal synonymous expressions are entered separately in the text. The phrase *see also* is used at the end of a definition where it is considered useful to point out to the reader comparable, contrasting, or other kinds of related entries. Small capital letters are used to indicate an expression that is synonymous to the entry and that is defined in its alphabetical place in the book. Thus, the definition of the entry "amphiphilic" by the word "AMPHIPATHIC," and the definition of the entry "pentose oxidation cycle" by the term "HEXOSE MONOPHOSPHATE SHUNT" indicate that the terms in small capital letters are expressions that are synonymous to the entries and that are themselves defined in their appropriate alphabetical places in the text.

Abbreviations and Symbols The following standard abbreviations and symbols are used in this dictionary:

A	ampere
Å	angstrom unit
abbr	abbreviation
adj	adjective
adv	adverb
aka	also known as
atm	atmosphere
°C	degree Celsius
cal	calorie
cc	cubic centimeter
cd	candela
cm	centimeter
cps	cycles per second
deg	degree
dm	decimeter
e.g.	for example
esu	electrostatic unit
g	gram
i.e.	that is
J	joule
kcal	kilocalorie
kg	kilogram
L	liter
lb	pound
lm	lumen

m	meter
mg	milligram
min	minute
mL	milliliter
mm	millimeter
mol	mole
MW	molecular weight
n	noun
nm	nanometer
pl	plural
rpm	revolutions per minute
s	second
sing	singular
sym	symbol
v	verb
var sp	variant spelling
%	percent
μ	micro
Ω	ohm

Abbreviations such as "DNA," "E. coli," and "mRNA" are used in the text of definitions only if the abbreviations themselves are defined at their appropriate places in the dictionary. Undefined abbreviations are not used in this book.

Various letters of the Greek alphabet are also used in this dictionary. For completeness, the entire Greek alphabet is listed below:

Capital	Lowercase	Name
A	α	alpha
B	β	beta
Γ	γ	gamma
Δ	δ, ∂	delta
E	ϵ	epsilon
Z	ζ	zeta
H	η	eta
Θ	θ, ϑ	theta
I	ι	iota
K	κ	kappa
Λ	λ	lambda
M	μ	mu
N	ν	nu
Ξ	ξ	xi
O	o	omicron
Π	π	pi
P	ρ	rho
Σ	σ, ς	sigma
T	τ	tau
Y	υ	upsilon
Φ	ϕ	phi
X	χ	chi
Ψ	ψ	psi
Ω	ω	omega

A

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 $_{ppp}$A 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 $\log I_o/I$, where I_o 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. *Also ka* 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 esterfied 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.

acetonyl-SCoA An inhibitory analog of acetyl coenzyme A; the compound $CH_3—CO—CH_2—SCoA$.

acetylation An acylation reaction in which an acetyl radical $CH_3CO—$ 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–SCoA from acetyl-SCoA 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 ϵ-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. Variously abbreviated as acetyl-SCoA, acetyl-CoA, CoASAc, AcSCoA, and AcCoA.

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

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

acetyl group The acyl group of acetic acid; the radical $CH_3CO—$. *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*-AMINOBENZOIC 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 Adrenocorticotropic 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 immunosuppresive 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-SCoA.

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* adenylyl 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.

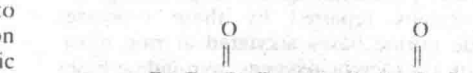
acylated tRNA A transfer RNA molecule to which an amino acid is linked; an aminoacyl-tRNA molecule; a charged tRNA molecule.

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 adrenocorticotropic, gonadotropic, lipotropic, somatotropic, and thyrotropic 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 adenyl cyclase. Cyclic AMP functions as a second messenger and mediates the effect of a large number of hormones. The hormones interact with the adenyl 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* adenyl 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.

adenylylation The transfer of a 5′-AMP group (5′-adenylyl group) from ATP; used specifically for the reaction catalyzed by the enzyme glutamine synthetase adenylyltransferase. 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 B_6.

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 proces 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.

adjuvanticity 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