

世界最新 英汉双解生物化学词典

The Facts On File
Dictionary of Biochemistry

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John Daintith

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序

本词典是涵盖自然科学重要分支中术语和概念的系列丛书之一。该系列世界最新英汉双解词典包括《生物学词典》、《细胞与分子生物学词典》、《生物化学词典》、《植物学词典》、《生物技术与遗传工程词典》、《化学词典》、《有机化学词典》和《无机化学词典》。

《世界最新英汉双解生物化学词典》涵盖了整个现代生物化学领域：包括基础有机化学和物理化学、化合物的分类、基础细胞学和组织学、营养学和代谢、细胞的新陈代谢和信号以及天然药物化学。为使词条内释义更详尽、易懂，我们尽可能地提供了一些有辅助作用的图表和例子。词典的词条也涉及一些短小的传记性条目，对曾在该领域作出重要贡献的人物进行了介绍。本词典的附录包括氨基酸的结构式、遗传密码及化学元素，同时还附加了大量的参考书目和网页列表。

生物化学是一门充满活力和不断拓展的学科，它是与其他许多生物科学分支和医学相互交叉的研究领域。我们已尽可能用地用准确、全面的内容去阐述它。希望能为相关的学习人员提供帮助。在此感谢所有为此书的出版而付出努力的人们。

译者序

本词典是一本专业工具书。主要供生物学、细胞生物学、微生物学、遗传学、生物化学和分子生物学等学科的专业人员使用。

本词典主要收录的词条内容涵盖生物学、细胞生物学、微生物学、遗传学、生物化学和分子生物学中的基础术语和概念。本词典正文采用英汉对照形式编排,我们在翻译过程中,尽量做到全书的可读性、实用性和统一性,尽量按照原文本意翻译但也有些必要的改动。

另外在本书翻译过程中,白永权教授、吕社民教授、黄辰副教授、李信民副教授等同志提出了不少宝贵的意见和建议,在此表示由衷的感谢。

由于我们水平有限,难免有所失误,恳请广大读者批评指正。

周劲松

2007年10月

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致 谢

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A

ABA See abscisic acid.

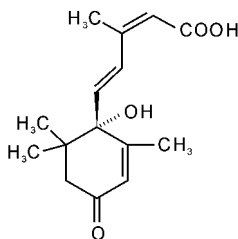
abiogenesis The development of living from nonliving matter, as in the origin of life. The term is sometimes used for the now discredited doctrine of spontaneous generation.

abscisic acid (ABA) A PLANT HORMONE once thought to be responsible for the shedding (abscission) of flowers and fruit and for the onset of dormancy in buds (hence its early name, *dormin*). The compound is associated with the closing of pores (stoma) in the leaves of plants deprived of water.

脱落酸 参阅 abscisic acid.

无生源说 指生命起源时由无生命物质到有生命物质的发展过程。有时指现已被摒弃的自然发生学说。

脱落酸 (ABA) 一种植物激素, 曾被认为负责花和果实的脱落 (abscission) 及启动芽的休眠 (因此早期称休眠素)。该化合物与植物缺水时叶片气孔 (植物气孔) 的关闭有关。



Abscisic acid

脱落酸

absorption 1. The uptake of liquid by cells. Most digested food is absorbed in the small intestine; the liquid products of digestion are absorbed into the blood and

吸收 1. 指细胞摄取液体的一种方式。大多数消化的食物在小肠被吸收, 食物消化后的液体产物被吸收随后进入血液和淋巴系统。在植

lymphatic systems. In plants, water and mineral salts are absorbed mainly by the root hairs, just behind the root tips.

2. The conversion of electromagnetic radiation into other forms of energy in a medium.

absorption spectrum A plot of the amount of absorption by a substance of radiation at different wavelengths, usually of ultraviolet, visible, or infrared radiation. An absorption spectrum can give information about the identity or quantity of a substance. It can also give information about the way photosensitive compounds interact with radiation. Chlorophylls, for example, have absorption peaks in the red and blue (and therefore reflect green light).

abzyme An antibody that has enzyme activity.

accessory pigment See photosynthetic pigments.

acentric Denoting a chromosome or fragment of a chromosome that lacks a centromere.

acetal A type of organic compound formed by addition of an alcohol to an aldehyde. Addition of one alcohol molecule gives a *hemiacetal*. Further addition yields the full acetal. Similar reactions occur with ketones to produce hemiketals and ketals.

acetaldehyde See ethanal.

acetate(ethanoate) A salt or ester of acetic

物,水和无机盐主要被植物根尖后的根毛所吸收。

2. 指电磁辐射在某介质中转变为其他形式能量的一种方式。

吸收光谱 某物质在不同的波长,通常在紫外光、可见光和红外光下的吸收量曲线。吸收光谱能定性、定量的给出某物质的信息,同样也能给出某种光敏物质与放射线相互作用方式的信息。例如,叶绿素在红光和蓝光处有吸收高峰(因此能反射绿光)。

抗体酶 具有酶活性的一种抗体。

辅助色素 参阅 photosynthetic pigments。

无着丝粒的(染色体) 指缺乏着丝粒的染色体或染色体片段。

醛缩醇 醇与醛加成生成的一种有机化合物。一个醇分子与醛的加成作用产生半缩醛,继续反应则生成缩醛。类似的反应可出现在酮生成半缩酮和缩酮时。

乙醛 参阅 ethanal。

醋酸盐(或酯)(乙酸盐或酯)

acid. Acetates contain the ion CH_3COO^- or the group $\text{CH}_3\text{COO}-$.

acetate - CoA ligase An ENZYME that catalyzes the reaction between acetate, CoA and ATP to form AMP and ACETYL CoA. It is important in organisms that use acetate as a carbon source (e. g. *E. coli*, algae, and many fungi).

acetazolamide A compound used as an inhibitor of carbonic anhydrase. It has been used as a diuretic but its main use is in treating glaucoma (by reducing the formation of fluid in the eye).

acetic acid (ethanoic acid) A carboxylic acid, CH_3COOH , obtained by the oxidation of ethyl alcohol. Acetic acid is a component of vinegar (which is obtained by bacterial oxidation of wine waste).

acetic anhydride The ACID ANHYDRIDE of acetic acid, $\text{CH}_3\text{COOCOH}_3$; commonly used in acetylation reactions.

acetone (dimethylketone) A KETONE, CH_3COCH_3 , commonly used as a solvent.

acetone body See ketone body.

acetylation A reaction in which an acetyl group, $\text{CH}_3\text{CO}-$ is introduced into a compound. See also acylation.

acetylcholine (ACh) A NEUROTRANSMITTER found at the majority of synapses, which occur where one nerve cell meets

醋酸的盐或酯,含 CH_3COO^- 离子或 $\text{CH}_3\text{COO}-$ 基团。

乙酸-辅酶 A 连接酶 催化乙酸、辅酶 A 和 ATP 生成 AMP 和乙酰辅酶 A 的一种酶。在以乙酸盐为碳源的有机体(例如,大肠杆菌、藻类和多种真菌)中起重要作用。

醋唑磺胺 碳酸酐酶抑制剂,可作为利尿剂,但主要用于治疗青光眼(通过减少眼内液体的形成)。

乙酸(冰醋酸) 乙醇氧化后的羧基酸, CH_3COOH 。乙酸是食醋的成分(通过醋酸杆菌发酵酒精得来)。

醋酸酐 乙酸的酸酐, $\text{CH}_3\text{COOCOH}_3$; 通常用于乙酰化反应中。

丙酮(二甲酮) 一种酮类, CH_3COCH_3 ; 通常用作有机溶剂。

酮体 参阅 ketone body。

乙酰化作用 将乙酰基即 $\text{CH}_3\text{CO}-$ 引入某化合物的反应。参阅 acylation。

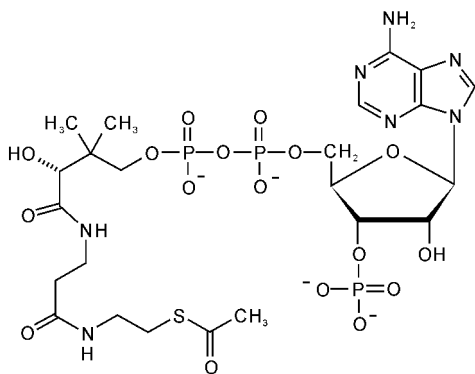
乙酰胆碱(ACh) 一种神经递质,可见于大多数突触(神经细胞之间的连接)。产生乙酰胆碱的神经称

another. Nerves that produce acetylcholine are called *cholinergic nerves*; they form the parasympathetic nervous system and also supply the voluntary muscles.

acetylcholinesterase An ENZYME that catalyzes the hydrolysis of ACETYLCHOLINE to give choline (and acetate). It occurs in spinal fluid and cholinergic neurons. The ester is inhibited by a number of compounds. A class of drugs (*acetylcholinesterase inhibitors*) act by inhibiting the action of the enzyme, so increasing the amount of acetylcholine available to transmit nerve impulses. These are used in the treatment of Alzheimer's disease.

为胆碱能神经,它构成副交感神经系统同时可支配随意肌。

乙酰胆碱酯酶 催化乙酰胆碱水解生成胆碱(和乙酸)的酶。存在于脑脊液和胆碱能神经元中。酯可被众多化合物抑制。乙酰胆碱酯酶抑制剂类药物能通过抑制该酶,增加乙酰胆碱的数量来传导神经冲动,因此被用于阿尔茨海默病的治疗。



Acetyl CoA
乙酰辅酶 A

acetyl CoA (acetyl coenzyme A) An important intermediate in cell metabolism, particularly in the oxidation of sugars, fatty acids, and amino acids, and in certain biosynthetic pathways. It is formed by the

乙酰辅酶 A 细胞代谢,尤其是糖、脂肪酸、氨基酸的氧化和某些生物合成途径中的一种重要中间产物。由丙酮酸盐(糖酵解产物)和辅酶 A 经丙酮酸脱氢酶催化形成。乙酰辅酶 A 的乙酰基随即进入三羧酸

reaction between pyruvate (from GLYCOLYSIS) and COENZYME A, catalyzed by the enzyme pyruvate dehydrogenase. The acetyl group of acetyl CoA is subsequently oxidized in the KREBS CYCLE, to yield reduced coenzymes and carbon dioxide. Acetyl CoA is also produced in the initial oxidation of fatty acids and some amino acids. Other key roles for acetyl CoA include the provision of acetyl groups in biosynthesis of fatty acids, terpenoids, and other substances.

ACh See acetylcholine.

acid A substance that gives rise to hydrogen ions (or H_3O^+) when dissolved in water. An acid in solution will have a pH below 7. This definition does not take into account the competitive behavior of acids in solvents and it refers only to aqueous systems. The *Lowry-Bronsted theory* defines an acid as a substance that exhibits a tendency to release a proton, and a base as a substance that tends to accept a proton. Thus, when an acid releases a proton, the ion formed is the *conjugate base* of the acid. Strong acids (e. g. HNO_3) react completely with water to give H_3O^+ , i. e. HNO_3 is stronger than H_3O^+ and the conjugate base NO_3^- is weak. Weak acids (e. g. CH_3COOH and C_6H_5COOH) are only partly dissociated because H_3O^+ is a stronger acid than the free acids and the ions CH_3COO^- and $C_6H_5COO^-$ are moderately strong bases. The *Lewis theory* defines an

循环被彻底氧化,产生还原型辅酶和二氧化碳。脂肪酸和某些氨基酸起始氧化也会产生乙酰辅酶 A。此外乙酰辅酶 A 也是合成脂肪酸、萜类化合物和其他物质的乙酰基的供体。

乙酰胆碱 参阅 acetylcholine.

酸 溶于水后电离产生氢离子(或 H_3O^+)的物质,酸性溶液的 pH 值 < 7 。该定义没有考虑到溶剂中酸的竞争性行为,单指水溶剂体系。Lowry-Bronsted 理论定义:酸是有释放质子倾向的物质,碱是有接受质子倾向的物质。因而当酸释放质子,形成的离子是该酸的共轭碱。强酸(如 HNO_3)溶于水全部生成 H_3O^+ ,例如硝酸比 H_3O^+ 强,其共轭碱 NO_3^- 很弱。弱酸(例如乙酸和苯甲酸)只有部分解离,因为 H_3O^+ 是比这些游离酸更强的酸,而 CH_3COO^- 和 $C_6H_5COO^-$ 是较强碱。Lewis 理论中酸的定义为能接受来自碱的一对电子的物质。

acid as a substance capable of accepting a pair of electrons from a base.

acid anhydride A chemical compound that produces an acid when added to water. For example, sulfur trioxide is the acid anhydride of sulfuric acid: $\text{SO}_3 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_4$

Organic acid anhydrides are derived by removing the elements of water (i. e. two hydrogen atoms and one oxygen) from two acidic groups. A simple example is acetic anhydride from acetic acid:



acid - base balance Maintenance of the optimum pH of body fluids by regulating the acid:base ratio. This usually involves a buffer system (see buffer). For example, mammalian blood must be maintained at a pH of 7.4, which requires a ratio of carbonic acid to bicarbonate of 1 : 20; any serious deviation would result in the conditions of acidosis or alkalosis. The optimum pH for higher plants is around 6.7, and they tend to be somewhat more tolerant to pH changes.

acidic hydrogen A hydrogen atom in a molecule that enters into a dissociation equilibrium when the molecule is dissolved in a solvent. For example, in acetic acid (CH_3COOH) the acidic hydrogen is the one on the carboxyl group, $-\text{COOH}$.

acidic stain See staining.

酸酐 加入水中能产生酸的一种化合物。例如,三氧化硫是硫酸的酸酐。 $\text{SO}_3 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_4$ 。有机酸酐则是两个酸性基团(即两个氢原子和一个氧原子)脱水后的衍生物。例如,乙酸酐是两个乙酸脱水的产物: $\text{CH}_3\text{COOH} + \text{HOOCCH}_3 \longrightarrow \text{CH}_3\text{COOCOCH}_3 + \text{H}_2\text{O}$ 。

酸碱平衡 通过调整酸碱比例维持体液的最佳 pH 值。通常涉及缓冲系统(参阅 buffer),例如,哺乳动物血液的 pH 值保持在 7.4,要求碳酸和重碳酸盐的比例为 1 : 20。各种严重的酸碱平衡偏离均会导致酸中毒或碱中毒。高等植物的最适 pH 值约为 6.7,它们对 pH 值变化的耐受性比较强。

酸性氢 当溶质分子溶解在溶剂中达解离平衡时,进入溶剂分子的氢原子。例如,乙酸中的酸性氢在羧基基团 $-\text{COOH}$ 中。

酸性染色 参阅 staining。

acid value (acid number) The number of milligrams of potassium hydroxide (KOH) required to neutralize the free fatty acids in one gram of a given fat. It is used as a measure of free acid.

acquired immune deficiency syndrome See AIDS.

acridine An aromatic heterocyclic compound found in coal tar. It is the parent compound of a number of effective mutagens.

ACTH See corticotropin.

actin A protein that is a major constituent of muscle and is heavily involved with the process of muscle contraction. It is also found in the microfilaments (part of the CYTOSKELETON) present in almost all eukaryote cells, where it accounts for 1–5% of the total protein. Actin has two forms. *G-actin* consists of globular monomers. At higher ionic strengths it polymerizes into *F-actin*, which is a fibrous form with a double-stranded helix structure. In muscles, there are overlapping alternating sets of thin actin and thick myosin filaments. When muscles contract the actin and myosin produce a complex, called ACTOMYOSIN.

actin-binding protein Any of a number of proteins that bind to ACTIN and modify its properties. Examples are dystrophin, filamin, caldesmon, and the myosins.

酸值 中和给定 1g 脂肪中游离脂肪酸所需要的氢氧化钾的毫克数, 酸值被用来度量脂肪中的游离酸。

获得性免疫缺陷综合征 参阅 AIDS。

吡啶 (吡啶氮葱) 煤焦油中的芳香族杂环化合物。是许多有效诱变剂的母体化合物。

促肾上腺皮质激素 参阅 corticotropin。

肌动蛋白 一种肌组织的主要组分, 与肌肉收缩过程密切相关。肌动蛋白也存在于微丝中, 后者是几乎所有真核细胞中的细胞骨架成分, 肌动蛋白大约占其中总蛋白量的 1%~5%。肌动蛋白有两种存在形式, *G-actin* 包含球状单体, 在高离子强度下, 其聚合为具有双股螺旋状的 *F-actin*。肌组织中, 有重叠、交替排列的细肌动蛋白丝和粗肌球蛋白丝。肌肉收缩时肌动蛋白和肌球蛋白形成肌动球蛋白复合物。

肌动蛋白结合蛋白 任何可以结合肌动蛋白并且修饰其特性的一系列蛋白质。如, 肌营养不良蛋白、丝蛋白、钙调蛋白和肌球蛋白。

actinomycetes (filamentous bacteria) A group of bacteria characterized by a mycelial fungus-like growth habit and belonging to the phylum Actinobacteria. They are numerous in the topsoil and are important in soil fertility. Some may cause infections in animals and humans. Most of the antibiotics (e. g. streptomycin, actinomycin, and tetracycline) are obtained from actinomycetes.

actinomycin Any of a number of antibiotics produced by certain bacteria. The main one, *actinomycin D* (or *dactinomycin*), can bind between neighbouring base pairs in DNA, preventing RNA synthesis. It is used in the treatment of some cancers.

action potential The transitory change in electrical potential that occurs across the membrane of a nerve or muscle fiber during the passage of a nervous impulse. The degree of change is independent of the strength of the impulse; it either occurs or does not. In the absence of an impulse a *resting potential* of about -70 mV exists across the membrane (inside negative) as a result of the unequal distribution of ions between the intracellular and extracellular media (*see* sodium). However, during the passage of an impulse the resistance of the membrane falls and allows an inward current of sodium ions, which makes the inside less negative and eventually alters the membrane potential to about $+30$ mV (inside positive). An outward flow of potassium ions follows shortly afterwards and re-

放线菌(丝状细菌) 一组具有菌丝样真菌生长习性的细菌,属放线菌门。放线菌大量存在于表层土壤,对土壤肥力有重要作用,某些放线菌能导致动物和人感染。多数抗生素(例如链霉素、放线菌素和四环素)从放线菌获得。

放线菌素 放线菌产生的一系列抗生素。主要如放线菌素 D(或称更生霉素),能够结合 DNA 上的相邻碱基对,阻止 RNA 合成,用于某些癌症的治疗。

动作电位 神经冲动传导至神经和肌纤维时,细胞膜表面出现的瞬时电位。动作电位的幅度与神经冲动的强度无关,呈“全或无”的特点。由于细胞膜内外基质中的离子(参阅 sodium)分布不均,在无神经冲动时,细胞膜两侧的静息电位为 -70 mV(膜内为负)。而在神经冲动传导时,膜阻力降低,允许钠离子内流,使膜内的负电荷逐渐降低,并最终使膜电位翻转至 $+30$ mV(膜内为正)。随后钾离子外流,逐渐恢复静息电位。动作电位前的局部电流会依次形成新的动作电位。依靠这种方式,神经冲动在膜上传播。参阅 ion channel。

stores the resting potential. Local currents flow ahead of the action potential that in turn give rise to further action potentials. In this way a wave of activity is propagated along the membrane to produce the impulse. *See also* ion channel.

action spectrum A graph showing the effect of different wavelengths of radiation, usually light, on a given process. It is often similar to the ABSORPTION SPECTRUM of the substance that absorbs the radiation and can therefore be helpful in identifying that substance. For example, the action spectrum of photosynthesis is similar to the absorption spectrum of chlorophyll.

activated complex The partially bonded system of atoms in the transition state of a chemical reaction.

activation energy Symbol: E_a The minimum energy a particle, molecule, etc., must acquire before it can react; i. e. the energy required to *initiate* a reaction regardless of whether the reaction is exothermic or endothermic. Activation energy corresponds to an energy barrier that must be overcome if a reaction is to take place. *See* Arrhenius equation.

active site The region of an ENZYME molecule that combines with and acts on the substrate. It consists of catalytic amino acids arranged in a configuration specific to a particular substrate or type of substrate.

作用(光)谱 显示不同波长的射线(通常为可见光)在指定过程中其作用效应的曲线图。通常与某种物质的吸收光谱相似,通过吸收光谱可以识别该物质。例如,光合作用的作用光谱与叶绿素的吸收光谱相似。

活化复合体 一种化学反应中的过渡状态下原子局部结合的体系。

活化能 符号: E_a 。粒子、分子等发生反应时所需的最小能量。即无论反应是放热还是吸热,启动反应时所需的能量。活化能与化学反应发生时所必须克服的能障一致。参阅 Arrhenius equation。

活性部位 酶分子结合并作用于底物的部位。活性位点中包括对某种特异底物,或者某类型底物构型特异性的催化氨基酸。这些直接与底物结合的氨基酸为接触氨基酸。其他的氨基酸位置较远,但是仍然

The ones that are in direct combination are the *contact amino acids*. Other amino acids may be further away but still play a role in the action of the enzyme. These are *auxiliary amino acids*. Binding of a regulatory compound to a separate site, known as the ALLOSTERIC SITE, on the enzyme molecule may change this configuration and hence the efficiency of the enzyme activity.

active transport The transport of molecules or ions across a cell membrane against a concentration gradient, with the expenditure of energy; it is probably an attribute of all cells. Anything that interferes with the provision of energy will interfere with active transport. The mechanism typically involves a carrier protein (a transporter) that spans the cell membrane and transfers substances in or out of the cell by changing shape. *Compare* facilitated diffusion.

actomyosin A protein complex found in muscle, formed between molecules of ACTIN and MYOSIN present in adjacent thick and thin muscle filaments. These actomyosin complexes are involved in the process of muscle contraction; their formation is important in the concerted mechanism that pulls the thin filaments past the thick ones. The complex can also be formed by mixing actin with myosin *in vitro*.

acylation A chemical reaction in which an acyl group is introduced into a compound.

可能在酶促反应时发挥作用,是附属氨基酸。调控物通常结合在酸分子上的所谓变构位点上,使酶的活性位点构型变化,并因此导致酶活性效力发生变化。

主动转运 逆浓度梯度跨细胞膜转运分子或者离子的一种方式,是耗能的主动过程,该过程也许是所有细胞的特性。任何干扰能量供给的物质都能够干扰细胞的主动运输。主动运输机制需要载体蛋白质(载体)的协助,载体蛋白横跨细胞膜,能够通过改变自身的形状转运物质进、出细胞。比较 facilitated diffusion。

肌动凝蛋白 肌肉中的一种蛋白质复合物,在相邻粗、细肌丝间的肌动蛋白和肌球蛋白处形成。肌动凝蛋白复合物与肌收缩过程有关,其形成与细肌丝滑过粗肌丝的机制有关。体外混合肌动蛋白和肌球蛋白也能形成该复合物。

酰化作用 将酰基导入某化合物的一种化学反应。