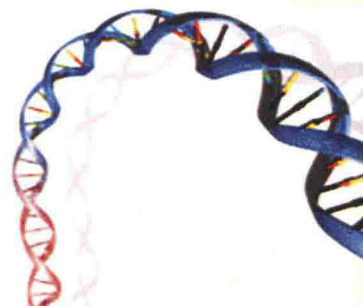
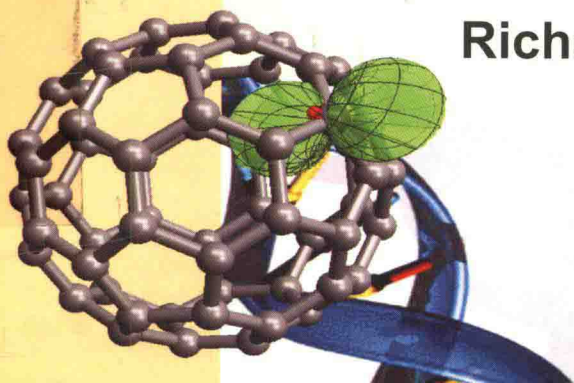




DICTIONARY OF BIOSCIENCES

Er. H. Rocky Singh
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DICTIONARY
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PREFACE

The popularity of Biosciences subject is increasing day-by-day and innumerable scientific research in this subject are re-defining the evolution of man and other species. Biosciences students are curious to know more, but there is scarcity of in-depth biosciences dictionary which can give answers to their inquisitive minds.

Biosciences in all its manifestations is one of the major scientific areas of public interest at the beginning of new millennium. Although in its present sense, the word itself has been used only for the past two decades or so, the practice of biosciences from antiquity has been an integral part of human culture for the preparation of food, drink and some common products. Biosciences is a general term used in a very broad field of study.

The swiftness of change in the sector means that terminology is constantly evolving and yesterday's buzzword is today's jargon and might be tomorrow's mainstream term. The rate of evolution of terminology has been such that it has been very difficult to remain abreast of current usages.

This dictionary is an attempt to present an up-to-date list of terms currently in use in biosciences and its related research work. It is intended to provide a convenient reference source for researchers, students and technicians.

The dictionary has been prepared with minute details in response to an expressed need. Many of the terms listed in this book are carefully selected by the experts and scholars. The terms included have been selected by examination of books, dictionaries, journals and abstracts dealing entirely or in part with biosciences and related fields.

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ABO blood group (blood type, blood typing):

A system of describing the oligosaccharide antigens found on the surface of human blood cells. According to the type of antigen present, a person may be assigned a blood type of A, B, AB or O. A second type of antigen, the Rh factor, renders a "positive" or "negative" blood type. The ABO blood group system is important because it determines who can donate blood to or accept blood from whom. Type A or AB blood will cause an immune reaction in people with type B blood, and type B and AB blood will cause a reaction in people with type A blood. Conversely, type O blood has no A or B antigens, so people with type O blood are "universal donors." And since AB blood already produces both antigens, people who are type AB can accept any of the other blood types without suffering an immune reaction. The ABO system is also important because it can be used in paternity suits to rule out whether a man is the father of a certain child or not.

Abomasum: The fourth stomach of the cow. The abomasums of suckling calves are used as a source of rennet, a rennin-containing commercial enzyme preparation used to make cheese.

Abortifacient: A drug or compound that induces the expulsion of an embryo or fetus.

Abortion: The expulsion or removal of an embryo or fetus from the mother prematurely; this can be done as an artificial procedure, but it often happens naturally when the mother's body expels the embryo/fetus because it has died, has genetic or developmental defects, or because of infection or illness in the mother. Natural abortions are typically called "mis-carriages". Medically-induced

abortions, which can be completed with surgery or with hormone drugs, are done because the embryo/fetus is unwanted, deformed, not likely to live, or endangers the mother's life or health.

Abrin (agglutinin, toxalbumin): A highly poisonous protein found in the seeds of *Abrus precatorius*, the rosary pea. Abrin is toxic because it inhibits protein synthesis, causing symptoms such as internal bleeding, intestinal upset, and the irritation of mucous membranes. It was formerly used to treat some chronic eye disorders and it is currently being researched as a potential chemotherapy drug.

Abruptio placentae: This is the premature separation of the placenta, i.e. separation of the placenta from the site of implantation on the uterus before the delivery of the fetus. It is a life threatening condition for the fetus and occurs about 1 in 500 to 750 deliveries.

Abscess: A localized accumulation of pus due to infection.

Abscisic acid (ABA, abscisin): A lipid hormone that inhibits cell growth in plants; it is associated with fruit drop, leaf death and seed dormancy. It is synthesized in the plastids from carotenoids. This hormone helps plants deal with water loss, and its effects can be reversed with gibberellins.

Abscission: The normal shedding from a plant of an organ that is mature or aged, e.g. a ripe fruit, an old leaf. adj. abscissile.

Absolute configuration: The three-dimensional arrangement of the atoms around the chiral center of a molecule.

Absolute filter: A fine-pored, steam-sterilizable filter that is used to trap airborne microorganisms. The filter's pores are about 2 micrometers in diameter, smaller than the particles it is designed to remove.

Absolute gravity: In chemistry, the value that denotes the density (specific gravity) at standard conditions (for gases, these conditions are standard atmospheric pressure at 0 C?).

Absolute risk: The excess risk due to exposure to a specific hazard like, disease, injury, etc.

Absolute time: One of the two types of geologic time (relative time being the other), with a definite age date established mostly by the decay of radioactive elements, although ages may also be obtained by counting tree rings, decay of a specific type of atom, or annual sedimentary layers (such as varves in lakes or layers in a glacier). The term is in some disfavor because it suggests an exactness that may not be possible to obtain.

Absolute zero: This is the lowest possible temperature (0 Kelvin, -273.15° Celsius, -459.67° Fahrenheit). At this temperature, all molecular motion stops.

Absorb: To take up liquid or other matter; see absorption.

Absorbance (optical density): This is a measure of the amount of light absorbed by a suspension of bacterial cells or a solution of an organic molecule; it is measured by a colorimeter or spectrophotometer. Absorbance values are used to plot the growth of bacteria in suspension cultures and to gauge the purity and concentration of molecules (such as proteins) in solution. Absorbance is defined as a logarithmic function of the per cent

transmission of a wavelength of light through a liquid.

Absorption: The process of absorbing; specifically: In physiology, it refers to the movement of liquids and solutes into cells by way of diffusion or osmosis. In chemistry, it refers to the drawing of a gas or liquid into the pores of a permeable solid. In immunology, it refers to a process in which an antigen or antibody is used to pull an analogous antigen or antibody out of a solution.

Absorption spectroscopy: This is the use of a spectrophotometer to measure the ability of particles (solutes) in a solution to absorb light through a range of specific wavelengths. Every compound absorbs light differently, so absorption spectra can be used to identify compounds, measure concentrations, and determine reaction rates.

Absorption spectrum: A graph of the amount of light a substance absorbs, plotted as a function of energy, frequency or wavelength.

Absorptive feeders: Animals such as tapeworms that ingest food through the body wall.

Abzyme (pl. abzymes): An antibody with catalytic activity.

Acanthocephala (spiny-headed worms): A phylum of parasitic organisms, from one of three general classes, generally referred to as spiny-headed worms. They are notable for their lack of a digestive tract.

Acaulescent: Describes a plant that lacks or seems to lack a stem.

Acceleration phase: A period of increasing growth before the log phase in a culture of microbes. After the culture is started on a

medium, at first there is no growth (the lag phase), and then the microbes start to gradually grow (acceleration phase) until they reach a constant maximum rate of growth (log phase).

Acceptable daily intake (ADI): This is an estimate of the amount of a substance in food that can be ingested daily over a lifetime by humans without appreciable health risk. The concept of the ADI has been developed principally by WHO and FAO and is relevant to chemicals such as additives to foods, residues of pesticides and veterinary drugs in foods. ADIs are derived from laboratory toxicity data, and from human experiences of such chemicals when this is available, and incorporate a safety factor. The ADI is thus an estimate of the amount of a substance in food that can be ingested over a lifetime by humans without significant risk to health (for contaminants in food and drinking water, tolerable intakes—daily or weekly—are used).

Acceptable risk: This relates to the potential for suffering disease or injury that will be tolerated by an individual, group, or society in exchange for the benefits of using a substance or process that will cause such disease or injury. Acceptability of risk depends on scientific data, social, economic, and political factors, and on the perceived benefits arising from a chemical or process that creates the risk(s) in question.

Acceptor control: The regulation of the respiration rate, governed by ADP's ability to be a phosphate group acceptor.

Accessory flower parts: Sepal and petal organs found on flowers. The sepals and petals are not essential for pollination but may help in attracting insects or other organisms.

Accessory fruit: A fruit, or group of fruits derived from one flower, in which the conspicuous, fleshy portion develops from the receptacle and is shed with the true fruit(s) attached.

Accessory pigments: Light-absorbing pigments such as carotenoids and phycobilins that serve as complements to chlorophyll in plants, algae and bacteria by trapping light energy for photosynthesis.

Acclimatization (adaptation): The physiological process through which an organism grows accustomed to a new environment. In microbial cultures, this can involve enzymatic changes that allow it to use a new nutrient source for energy.

Accrescent: Increasing in size with age, as the calyx of some plants after flowering.

Accretion: A gradual growth through accumulation of more units. For example, the collection of cells on a filter would be an accretion of the cells.

Accumbent: In botany terminology, describes the orientation of an embryo, with the radicle lying against the edges of the two cotyledons.

Accumulation: Repeated exposures to a chemical may result in the progressive increase of its concentration in an organism, organ or tissue; illness or other effects may increase with successive doses. Factors involved in accumulation include selective binding of the chemical to tissue molecules, concentration of fat soluble chemicals in body fat, absent or slow metabolism of the chemical, and slow excretion of the chemical. It is a mass balance effect where input exceeds output.

ACE Inhibitor: A type of drug used to lower blood pressure. Studies indicate that it

may also help prevent or slow the progression of kidney disease in people with diabetes.

Acellular vaccine: Vaccine consisting of antigenic parts of cells.

Acellular: Describes any organism or tissue that is a mass of protoplasm which is not divided into cells, such as the plasmodium of some slime molds and the hyphae of some fungi.

Acentric: This term refers to a chromosome or chromatid that lacks a centromere; this condition can result during crossing over in which the normal, centromere-containing segment is replaced by an inverted segment that lacks a centromere.

Acervulus: A flat, often round mass of hyphae which carry spore-bearing parts called conidophores; acervuli are found in fungi belonging to the order Melanconiales.

Acesulfames: A class of artificial sweeteners derived from oxathiazinone; some varieties are over a hundred times sweeter than tea sugar (sucrose).

Acetabulum: A cuplike socket in the pelvis into which the head of the thigh bone (femur) fits. Also, in entomology, the leg socket on an insect's abdomen or thorax.

Acetaminophen (Tylenol, Panadol, acetylamino-phenol): This white, somewhat-water-soluble chemical is most widely known as an over-the-counter painkiller (analgesic) and fever reducer, but it is also used to make azo dyes and photographic chemicals. Acetaminophen melts at 168°C and can cause liver damage in high overdoses.

Acetarsone: An arsenic-containing compound administered to treat infections of the parasite protozoa *Entamoeba histolytica* in the intestine or genitourinary tract.

Acetate: A salt or ester of acetic acid; specifically, a synthetic textile fiber made from partially hydrolyzed cellulose acetate, or a plastic-like film made from cellulose triacetate.

Acetic acid (ethanoic acid): The acid most commonly associated with vinegar; it is the most commercially important organic acid and is used to manufacture a wide range of chemical products, such as plastics and insecticides. It is produced naturally by *Acetobacter* but, except for making vinegar, is usually made through synthetic processes.

Acetic fermentation: A type of fermentation conducted by certain microbes in which organic materials are broken down into acetic acid to generate ATP for energy.

Acetin (monoacetin): A thick, colorless, water-attracting liquid which is used as a food additive and dye solvent and in explosives manufacture and leather tanning. It is created by heating and then distilling a mixture of acetic acid and glycerol.

Acetobacter: *Acetobacter* is a genus of rod-shaped, flagellated or nonmotile Gram-negative bacteria that oxidize ethanol to acetic acid. These bacteria are commonly found in fruits and vegetables, and although they are used commercially to produce vinegar (especially *Acetobacter aceti*), they're considered pests by brewers and vintners.

Acetoclastis: The process of splitting acetate into methane and carbon dioxide by some methanogens.

Acetogenic bacteria: Bacteria that convert carbon dioxide into acetic acid or turn sugars into acetate.

Acetohexamide (Dymelor): A pill taken to lower the level of glucose in the blood. Only

some people with non insulin -dependent diabetes take these pills.

Acetone (2-propanone): A colorless, flammable liquid which is used as a solvent (it is most familiar as the solvent in nail polish remover). The simplest ketone, it mixes with water, ethyl alcohol, and most oils. It melts at -95.4°C . and boils at 56.2°C . It is naturally found in very tiny quantities in the body fluids and tissues of healthy people and in somewhat larger amounts in people suffering from diabetes or starvation.

Acetone-butanol fermentation: The formation of acetone and butanol through the anaerobic fermentation of glucose by *Clostridium acetobutylicum*. However, most industrial plants make acetone and butanol through synthetic processes that use petrochemicals.

Acetyl: $\text{CH}_3\text{CO}-$ This is the radical of acetic acid; it contains a carbonyl and a methyl group.

Acetyl coA synthase: This enzyme is found in bacteria and plants; it catalyzes the reaction in which acetate enters metabolic pathways and forms acetyl coenzyme A.

Acetyl CoA: An intermediate compound formed during the breakdown of glucose by adding a two-carbon fragment to a carrier molecule (Coenzyme A or CoA).

Acetyl coenzyme A (acetyl CoA): This coenzyme plays a huge role in intermediary metabolism, in which cells synthesize, breakdown or use nutrient molecules for energy production, growth, etc.

Acetyl group: A $\text{CH}_3\text{CO}-$ group on a larger molecule, where the $-\text{CH}_3$ (a methyl group) is single-bonded to the carbon, an oxygen is single-bonded to the carbon, and the

carbon has two other bonds to the rest of the molecule.

Acetyl reduction assay (acetylene reduction assay): A technique for measuring the nitrogen fixation activity in photosynthetic organisms. It uses a flame ionization detector and a gas chromatography apparatus to determine the reduction of acetylene to ethylene by the enzyme nitrogenase.

Acetylcholine: A chemical released at neuromuscular junctions that binds to receptors on the surface of the plasma membrane of muscle cells, causing an electrical impulse to be transmitted. The impulse ultimately leads to muscle contraction.

Acetylcholinesterase: An enzyme that breaks down unused acetylcholine in the synaptic cleft (the space between neurons); this enzyme is necessary to restore the synaptic cleft so it is ready to transmit the next nerve impulse.

Acetyl-CoA pathway: A pathway of autotrophic carbon dioxide fixation commonly happened in obligate anaerobes such as methanogens, homo-acetogens, and sulfate reducing bacteria.

Acetylsalicylic acid (aspirin): An odorless, white, slightly bitter drug used to reduce pain, fever, inflammation and sometimes to prevent blood clotting. Some people cannot tolerate it because it can cause stomach bleeding, however. It is soluble in both water and alcohol and melts at $132-136^{\circ}\text{C}$.

Acetylserotonin: An acetylated (has a $\text{CH}_3\text{CO}-$ group attached) form of the hormone serotonin. Along with serotonin and the hormone melatonin, it is produced in the pineal gland in the brain.

Achalasia of the cardia: A medical term describing the inability to relax the sphincter muscle separating the esophagus and stomach while swallowing.

Achalasia: Inability to relax the muscles of the stomach and intestines. This is a disorder of esophageal peristalsis characterized by degeneration of the ganglion cells of the lower esophagus. This results in the failure of the relaxation of the cardiac sphincter during the passage of food. There is a potential of developing carcinoma of the esophagus in 5 to 10 % of such patients.

Achene: A dry, closed (indehiscent) fruit which contains a single seed.

Achiasmatic: Undergoing meiosis, a process where the cell's nucleus divides, without reaching the stage at which homologous chromatids pair to exchange genetic material (called chiasmata).

Achiral: A term used to describe a molecule which, in a given configuration, is superimposable on its mirror image. This is in contrast to chiral molecules which cannot be superimposed on their mirror images.

Acholia (acholic): Absence of or failure to secrete bile.

Acholuria: Medical term describing the absence of bile pigment in the urine; usually in the context of describing a type of jaundice characterized by this.

Acicular: In botany terminology, describes a plant part which is needle-shaped and stiff. Resembling a needle (typically used to describe the leaf of a plant).

Aciculate: In botany terminology, describes a plant part which is finely scored on the surface, as if scratched by a pin.

Acid: A substance that increases the number of hydrogen ions in a solution.

Acid (adj. acidic) (Arrhenius acid, Lewis acid, Bronsted acid): A fundamental category of many compounds whose water-based solutions have a sour taste, turn blue litmus paper red, and can combine with metals to form salts. Acids have a pH lower than 7 (strong acids have a pH of less than 3). Specific types of acids include: Arrhenius acid: any chemical that increases the number of free hydrogen ions (H^+) when they're added to a water-based solution. The more free hydrogens produced, the stronger the acid. Bronsted or Bronsted-Lowry acid: any chemical that acts as a proton donor in a chemical reaction. Lewis acid: any chemical that accepts two electrons to form a covalent bond during a chemical reaction.

Acid dissociation constant (acid ionization constant): This is the equilibrium constant for the breaking apart of a weak acid into its hydrogen and conjugate base in a water solution.

Acid mine drainage: The process to draw off acidic water from a natural mine rich in sulfide minerals which have been oxidized to sulfuric acid by microbial actions.

Acid phosphatase: This is an enzyme produced by cells in the prostate (a gland that surrounds the urethra in the base of the penis). It is used to diagnose and follow the progression of prostate cancer. Its level is elevated in prostate cancer, multiple myeloma, bony metastasis of cancers, and is falsely elevated after prostate surgery or examination (Normal range: range 0.11-0.6 IU/L).

Acid proteases: Any of many protein-hydrolyzing enzymes that work best in an

acidic solution (usually in a pH range of 2-6). Such proteases include the stomach enzymes pepsin and rennin. Similar proteases produced by fungi such as *Aspergillus oryzae* are used in the manufacture of flour and soy sauce.

Acid rain: This is rain which has turned acidic due to presence of sulphur or nitrogen oxides (both created from burning coal and other fossil fuels) in the atmosphere. Acid rain is a serious environmental problem; it can kill trees and harm biodiversity, plants and animals in lakes and ponds.

Acid-fast stain: A staining technique used to determine the cell wall property of a microorganism. After stained with dye such as hot carbol fuchsin, an acid-fast organism, (e.g. *Mycobacterium* species) will retain the color in its cell wall after being washed with acid-alcohol.

Acidic anhydride: A substance (such as the oxide of a nonmetallic element) that will react with water to form an acid.

Acidogenic fermentation: Any fermentation that produces a weak acid, such as lactic acid.

Acidophile: Describes any microorganism that can or must live in an acidic environment (pH below 6).

Acidosis: A metabolic illness that occurs when the body's ability to buffer free hydrogen ions in the blood is compromised, which usually causes the pH of the blood to drop (the blood gets more acidic).

Acidulants: Food additives that are used to impart a sharp flavor. The most common acidulant is citric acid (produced by the fermentation of molasses or other sugars by the fungus *Aspergillus niger*). Malic acid and fumaric acid are also frequently used.

Acne: This is a skin disease of the face, back and shoulders. It involves overactive sebaceous glands with plugged hair follicles inside which there is growth of an acne bacteria.

Acoelomate: A triploblastic organism which does not have an internal body cavity other than the gut. The area between the gut and the organism's outer body wall is completely filled with tissue derived from the mesoderm. The term is used to classify multicellular animals by developmental pattern.

Acoustic neuroma: This is a tumor of Schwann cells in the cerebellopontine angle.

Acquired immunodeficiency syndrome (AIDS): A collection of disorders that develop as a result of infection by the human immunodeficiency virus (HIV), which attacks helper T cells, crippling the immune system and greatly reducing the body's ability to fight infection; results in premature death brought about by various diseases that overwhelm the compromised immune system.

Acre-foot-of-water: The amount of water needed to cover one acre to a depth of one foot. It consists of 326,000 gallons of water.

Acridine orange: 3,6-bis (dimethylamino) acridinium chloride. A toxic, fluorescing dye that stains DNA and RNA and is typically used to identify cancerous tumor cells. When it binds to double-stranded DNA, it fluoresces green; when it binds with the phosphate groups of single-stranded DNA or, it fluoresces orange. The chemical also causes frameshift mutations.

Acroblast: A granule within the young sperm cell (a spermatid) that eventually becomes

the acrosome or caplike frontal portion of the mature sperm cell.

Acrocentric: A chromosome or chromatids with a non-centrally-located centromere, producing chromosome arms with unequal lengths.

Acromegaly: Acromegaly is a hormonal disorder in which there is excessive secretion of the growth hormone resulting in enlargement of hands, feet, face, tongue, jaws and internal organs. The cause is usually a benign pituitary adenoma.

Acropetal: In botany terminology, describes a plant part which is arising or developing in a longitudinal sequence beginning at the base and proceeding towards the apex.

Acrosin: An enzyme found in sperm cells which is thought to help the sperm penetrate the tough outer surface of the ovum.

Acrosome: Anterior membrane-bound compartment covering the sperm head that contains lytic enzymes, which help the sperm digest through the tough outer surface of the egg. The compartment is secreted by the Golgi apparatus of the spermatid (young sperm cell).

Acrosome reaction: A chemical change that enables a sperm to penetrate an egg.

Acrostichoid: Of sporangia, densely covering the abaxial surface of the fertile frond, i.e. not in distinct groups; of ferns, having the sporangia arranged as above.

Acrosyndesis: A type of pairing that occurs during meiosis, a process where the cell's nucleus divides, which involves the terminal portions of homologous chromosomes.

Acrylonitrile: A colorless liquid which will mix somewhat with water, mixes well with

all common organic solvents, and is toxic, carcinogenic (cancer-causing), and a fire hazard. Freezing point: -83 Co. Boiling point: 77.5-77.9 Co. It is used as a monomer for acrylic fibers and acrylic rubber and other industrial purposes.

Actin: One of two proteins involved in muscle contraction (see also myosin). The protein from which microfilaments are composed; forms the contractile filaments of sarcomeres in muscle cells. Actin is found in both smooth and striated muscle and also serves as an important structural molecule for the cytoskeletons of many eukaryotic cells.

Actinide (actinoid): Any element in the periodic table which has an atomic number between 89 and 103.

Actinomorphic: Of flowers: symmetrical about more than one vertical plane.

Actinomycetes: Gram-positive bacteria that can form branching filaments. They may form true mycelia or produce conidiospores.

Actinomycin D: A relatively toxic antibiotic produced by the fungus-like bacterium *Streptomyces parvullum*. It inhibits RNA transcription in eukaryotes and has antitumor properties, so it is often used in conjunction with other drugs in chemotherapy.

Action potential: A reversal of the electrical potential in the plasma membrane of a neuron that occurs when a nerve cell is stimulated; caused by rapid changes in membrane permeability to sodium and potassium.

Activated carbon (activated charcoal): A type of carbon produced through exposing a

source material such as wood or bone to very high temperatures in the presence of steam, air, or carbon monoxide. Activated carbon is very good at removing (adsorbing) contaminants and is used in water filters, to decolor solutions, and is sometimes administered to poisoning victims.

Activated sludge process: A method of treating sewage and wastewater through microbial oxidation. Sewage previously treated in settling tanks is aerated to encourage the growth of nonpathogenic aerobic microorganisms (bacteria, yeasts, molds and protozoans) which break the organic matter down into carbon dioxide, water, and simple salts. After this activated sludge is produced, the wastewater undergoes further processing through anaerobic digestion, filtering, and chlorination.

Activation energy (G, ΔG): The amount of energy (expressed in joules) that is needed to convert all the molecules in one mole of a reacting substance from a ground state to the transition state.

Activator: In biochemistry: A DNA-binding protein that regulates one or more genes by increasing the rate of transcription. A metabolite that positively modulates an allosteric enzyme.

Active biomass: The amount of a given culture that is actively growing.

Active immunity (active immunization): An organism's resistance to disease or infection, developed because the organism's immune system has produced antibodies after an infection or inoculation.

Active metal: Any very reactive metal, such as magnesium or sodium; most are located

in the first two columns of the periodic table.

Active site (binding site): A specific region of an enzyme where a substrate binds and catalysis takes place.

Active transport: Transport of ions, nutrients or other molecules into a cell against a concentration gradient; this requires the expenditure of energy through ATP hydrolysis.

Activity: The potential or true thermodynamic activity of a substance, as opposed to its molar concentration.

Activity coefficient: The factor by which the value of a concentration of a solute must be multiplied to determine its true thermodynamic activity.

Acuity: This is the clarity of hearing or sight. e.g. visual acuity.

Aculeate: Prickly.

Aculeus (pl. aculei): A prickle growing from bark.

Acumen: The point of an acuminate leaf.

Acuminate: Describes a leaf that tapers abruptly to a sharp point. Drawn out into a long point; tapering point.

Acute: Used to describe a short-term infection or disease which is characterized by dramatic onset and rapid recovery.

Acute toxicity: Illness resulting from a single dose or exposure to a toxic substance. Adverse effects occurring within a short time of administration of a single dose of a chemical, or immediately following short or continuous exposure, or multiple doses over 24 hours or less.

Acute tubular necrosis (ATN): This is renal failure characterized by sudden drop in urinary output and the steady increase of

serum urea nitrogen and creatinine levels. Common causes of ATN are hypotension, sepsis, burns, and eclampsia. The urine specific gravity is 1.010 or less (loss of ability to concentrate). In the recovery phase, high output failure (low specific gravity, large volume, and lack of ability to excrete nitrogen or potassium) is often the case.

Acycloguanosine (acyclovir): An antiviral medication used to treat herpesvirus infections; it works by inhibiting viral DNA synthesis.

Acyl carrier protein (ACP): A small (77 peptides long) protein which binds six other enzymes involved in fatty acid synthesis. It was first isolated in *E. coli* bacteria.

Ad: A Latin term, which is frequently used in medicine, means "to" or "up to".

Ad libitum (ad lib.): A Latin term, which is frequently used in medicine, means "at pleasure".

Adams-Stokes syndrome (Stokes-Adams syndrome): Adams-Stokes syndrome is the recurrent episodes of near loss or loss of consciousness associated with transient or permanent problems in the conduction of electrical activity between the atrium and the ventricles of the heart.

Adaptation: Tendency of an organism to suit its environment; one of the major points of Charles Darwin's theory of evolution by natural selection: organisms adapt to their environment. Those organisms best adapted will have a greater chance of surviving and passing their genes on to the next generation.

Adaptive radiation: The development of a variety of species from a single ancestral

form; occurs when a new habitat becomes available to a population. Evolutionary pattern of divergence of a great many taxa from a common ancestral species as a result of novel adaptations or a recent mass extinction. Examples: mammals during the Cenozoic Era after the extinction of dinosaurs at the close of the Mesozoic Era flowering plants during the Cretaceous Period diversified because of their reproductive advantages over gymnosperm and non-seed plants that dominated the floras of the world at that time.

Adaptors: Short synthetic oligonucleotide strands that have one sticky end and one blunt end; the blunt ends join to the blunt end of a DNA fragment, forming a new fragment with two sticky ends that can be more easily spliced into a vector.

Adaxial: Facing towards the axis.

Adde: A Latin term, which is frequently used in medicine, means "add".

Addiction (substance abuse): This is the state of being physically or psychologically dependent on some substance. Common abused substances include: ethyl alcohol (grain alcohol) opioids (opium, heroin, hydrocodone, hydromorphone, oxycodone, meperidine [Demerol]) hallucinogens (LSD, psilocybin, DMT, morning glory seeds) mescaline, MDA, PMA, STP amphetamines cocaine inhalants (solvents and aerosols)

Addison's disease: This is a disease of the adrenal gland. The usual symptoms are weakness, easily feeling tired, loss of appetite, and sparse hair growth in some areas. Cortisol levels in the blood is low or absent.

Addition polymer: A polymer which is formed from the fusion of two monomers

which join completely without losing any small molecules.

Addition reaction: Any reaction in which two chemicals combine to form a single chemical.

Additive effect: An additive effect is the overall biological effect two chemicals acting together and which is the simple sum of the effects of the chemicals acting independently.

Additive genetic variance: The proportion of genetic variation that is the summation of the effect of all individual genes influencing a trait.

Adduct: A compound formed by the fusion of two molecules (or, less often, atoms) which are then held together by a coordinate covalent bond.

Adenine: One of the four nitrogen-containing bases occurring in nucleotides, the building blocks of the organic macromolecule group known as nucleic acids (DNA and RNA). Adenine is also the base in the energy carrying molecule ATP (adenosine triphosphate) which is the energy coin of the cell.

Adenocarcinoma: A cancerous tumor originating in glandular tissue.

Adenoids: A mass of lymphatic tissue at the back of the throat and behind the nose. "The adenoids" is a popular term for the swelling or enlargement of this tissue, which sometimes occurs in children and which makes breathing difficult.

Adenoma: A benign tumor that develops from glandular tissue.

Adenomatosis: Abnormal formation of glandular tumors, usually in more than one gland.

Adenosine: A ribonucleoside which consists of the nitrogenous base adenine linked to the sugar ribose.

Adenosine deaminase deficiency (ADA): Inherited disorder caused by insufficient adenosine deaminase activity, resulting in a compromised immune system.

Adenosine diphosphate (ADP): ADP is a molecule which consists of the nitrogenous base adenine linked to the sugar ribose and which has a chain of two phosphate groups attached to the ribose in a linear fashion. ADP is used as an intermediate throughout glycolysis. ATP hydrolyzes to produce ADP and free energy.

Adenosine triphosphate (ATP): A common form in which energy is stored in living systems; consists of a nucleotide (with ribose sugar) with three phosphate groups. The energy coin of the cell. ATP is a molecule which consists of the nitrogenous base adenine linked to the sugar ribose and which has a chain of three phosphate groups attached to the ribose in a linear fashion. ATP is present in all living cells and serves as an energy source for many metabolic processes; energy is released when ATP is hydrolyzed into ADP. ATP is required for RNA synthesis since it is a direct precursor. It is the single most important molecule in all living things since it serves as the currency for energy in biological systems.

Adenovirus: An icosahedral (20-sided) virus that contains DNA (as opposed to RNA); there are over 40 different adenovirus varieties, some of which cause the common cold.

Adenylate cyclase: This is an enzyme responsible for the catalysis of cAMP from ATP.

Adfluvial: Migrating between lakes and rivers or streams.

Adherence: Refers to the ability of bacteria adhere (stick) to host surfaces.

Adhering junction (desmosome): A type of junction between cells forming tissues that are subjected to stretching and pulling, such as the skin. This type of junction provides very tight contact between adjacent cells and allows the cells to function as a unit. Belt desmosomes are attachment sites that circle the cell, and spot desmosomes are small points of attachment across the cell's surface.

Adhesion: The union of adjacent organs by scar tissue. The ability of molecules of one substance to adhere to a different substance.

Adipocyte (fat cell): An animal cell that stores fat.

Adipose tissue: Connective tissue that has been specialized to store fat.

Adjacent wetlands: The term adjacent means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes, and the like are adjacent wetlands.

Adjuvant: In pharmacology, a substance that, when added to a medicine, speeds or improves its action. In immunology, a substance that is added to a vaccine to improve the immune response so that less vaccine is needed to produce more antibodies. Such adjuvants apparently work by speeding the division of lymphocytes and by keeping the antigen in the area where the immune response is

taking place. In research with humans, aluminum phosphate and aluminum hydroxide gel are commonly used; in research involving lab animals, Freund's adjuvant is used.

Adjuvant therapy: Cancer treatment that involves surgery followed by additional treatment with chemotherapy drugs and/or radiation to reduce the risk that the cancer will return.

Adnate: In botany terminology, describes a plant part which is fused to an organ of a different kind, e.g. a stamen fused to a petal.

Adoptive immunity: Immunity to disease or infection conferred on a previously non-immune individual by transferring lymphocytes from a previously immune individual to the non-immune individual.

Adoral: An adoral location indicates proximity to an organism's mouth. The adoral side of an organism is the side where the mouth is located.

Adrenal cortex: This is the outer portion of the adrenal gland; it secretes hormones such as hydrocortisone (a glucocorticoid) and aldosterone (a mineralocorticoid). Glucocorticoids help cells synthesize glucose, catabolize proteins, mobilize free fatty acids, and inhibit inflammation in allergic responses. Mineralocorticoids regulate the levels of minerals such as sodium and potassium in the blood.

Adrenal gland: This gland is found above each kidney, and it made up of an outer wall (cortex) that secretes important steroid hormones and an inner portion (medulla) that produces adrenaline (epinephrine) and noradrenaline (norepinephrine).