Glossary

Abiotic factors - Non living; moisture, soil, nutrients, fire, wind, temperature, climate

Absorption- Movement of ions and water into as organism as a result of metabolic processes, frequently against an electrochemical potential gradient (active) or as a result of diffusion along an activity gradient (passive).

Acetogenic bacterium- Prokaryotic organism that uses carbonate as a terminal electron acceptor and produces acetic acid as a waste product.

Acidophile- Organism that grows best under acid conditions (down to a pH of 1).

Acid soil- Soil with a pH value < 6.6.

Actinomycete- Nontaxonomic term applied to a group of high G + C base composition, Gram-positive bacteria that have a superficial resemblance to fungi. Includes many but not all organisms belonging to the order Actinomycetales.

Actinorhizae - associations between actinomycetes and plant roots

Activated sludge - Sludge particles produced in raw or settled wastewater (primary effluent) by the growth of organisms (including zoogleal bacteria) in aeration tanks in the presence of dissolved oxygen. The term "activated" comes from the fact that the particles are teeming with fungi, bacteria, and protozoa. Activated sludge is different from primary sludge in that the sludge particles contain many living organisms which can feed on the incoming wastewater.

Activation energy- Amount of energy required to bring all molecules in one mole of a substance to their reactive state at a given temperature

Active carrier - An individual who has an overt clinical case of a disease and who can transmit the infection to others.

Active site- Region of an enzyme where substrates bind.

Active transport - The transport of solute molecules across a membrane against an electrochemical gradient; it requires a carrier protein and the input of energy

Adenosine triphosphate (ATP)- Common energy-donating molecule in biochemical reactions. Also an important compound in transfer of phosphate groups.

Adjuvant - Material added to an antigen to increase its immunogenicity. Common examples are alum, killed *Bordetella pertussis*, and an oil emulsion of the antigen, either alone (Freund's incomplete adjuvant) or with killed mycobacteria (Freund's complete adjuvant).

Aerobic- (i) Having molecular oxygen as a part of the environment. (ii) Growing only in the presence of molecular oxygen, as in aerobic organisms. (iii) Occurring only in the presence of molecular oxygen, as in certain chemical or biochemical processes such as aerobic respiration.

Aerotolerant anaerobes- Microbes that grow under both aerobic and anaerobic conditions, but do not shift from one mode of metabolism to another as conditions change. They obtain energy exclusively by fermentation.

Aetiology- study of disease causing organisms

Aflatoxin -A polyketide secondary fungal metabolite that can cause cancer

Agar- Complex polysaccharide derived from certain marine algae that is a gelling agent for solid or semisolid microbiological media. Agar consists of about 70% agarose and 30% agaropectin. Agar can be melted at temperature above 100ºC; gelling temperature is 40-50ºC.

Agglutinates - The visible aggregates or clumps formed by an agglutination reaction

Agglutination reaction- The formation of an insoluble immune complex by the cross-linking of cells or particles

Airborne transmission- The type of infectious organism transmission in which the pathogen is truly suspended in the air and travels over a meter or more from the source to the host.

Alga (plural, algae)- Phototrophic eukaryotic microorganism. Algae could be unicellular or multicellular. Blue-green algae are not true algae; they belong to a group of bacteria called cyanobacteria.

Alcoholic fermentation - A fermentation process that produces ethanol and CO_2 from sugars.

Aliphatic- Organic compound in which the main carbon structure is a straight chain.

Alkaline soil- Soil having a pH value >7.3.

Allosteric site- Site on the enzyme other than the active site to which a nonsubstate compound binds. This may result in a conformational change at the active site so that the normal substrate cannot bind to it.

Amino acid activation - The initial stage of protein synthesis in which amino acids are attached to transfer RNA molecules.

Amino group- An --NH_2 group attached to a carbon skeleton as in the amines and amino acids.

Aminoglycoside antibiotics - A group of antibiotics synthesized by Streptomyces and Micromonospora, which contain a cyclohexane ring and amino sugars; all aminoglycoside antibiotics bind to the small ribosomal subunit and inhibit protein synthesis.

Ammonia oxidation - test drawn during manufacturing process to evaluate the ammonia oxidation rate for the nitrifiers.

Ammonification- Liberation of ammonium (ammonia) from organic nitrogenous compounds by the action of microorganisms.

Amoeba (plural, amoebae)- Protozoa that can alter their cell shape, usually by the extrusion of one or more pseudopodia.

Amoeboid movement - Moving by means of cytoplasmic flow and the formation of pseudopodia (temporary cytoplasmic protrusions of the cytoplasm)

Anabolism- Metabolic processes involved in the synthesis of cell constituents from simpler molecules. An anabolic process usually requires energy.

Anaerobic- (i) Absence of molecular oxygen. (ii) Growing in the absence of molecular oxygen, such as anaerobic bacteria. (iii) Occurring in the absence of molecular oxygen, as a biochemical process.

Annotation - The process of determining the location of specific genes in a genome map after it has been produced by nucleic acid sequencing.

Anoxic- Literally "without oxygen." An adjective describing a microbial habitat devoid of oxygen.

Antheridium - A male gamete-producing organ, which may be unicellular or multicellular

Anthrax An infectious disease of animals caused by ingesting Bacillus anthracis spores. Can also occur in humans and is sometimes called woolsorter's disease.

Antagonist- Biological agent that reduces the number or disease-producing activities of a pathogen.

Anthropogenic- Derived from human activities.

Antibiosis- Inhibition or lysis of an organism mediated by metabolic products of the antagonist; these products include lytic agents, enzymes, volatile compounds, and other toxic substances.

Antibiotic- Organic substance produced by one species of organism that in low concentrations will kill or inhibit growth of certain other organisms.

Antibody- Protein that is produced by animals in response to the presence of an antigen and that can combine specifically with that antigen.A glycoprotein produced in response to the introduction of an antigen; it has the ability to combine with the antigen that stimulated its production. Also known as an immunoglobulin (Ig).

Antibody-dependent cell-mediated cytotoxicity (ADCC) - The killing of antibody-coated target cells by cells with Fc receptors that recognize the Fc region of the bound antibody. Most ADCC is mediated by NK cells that have the Fc receptor or CD16 on their surface.

Anticodon triplet - The base triplet on a tRNA that is complementary to the triplet codon on mRNA.

Antigen- Substance that can incite the production of a specific antibody and that can combine with that antibody. .A foreign (nonself) substance (such as a protein, nucleoprotein, polysaccharide, or sometimes a glycolipid) to which lymphocytes respond; also known as an immunogen because it induces the immune response.

Antimetabolite - A compound that blocks metabolic pathway function by competitively inhibiting a key enzyme's use of a metabolite because it closely resembles the normal enzyme substrate.

Antimicrobial agent- An agent that kills microorganisms or inhibits their growth

Antiseptic- Agent that kills or inhibits microbial growth but is not harmful to human tissue.

ApoenzymeThe protein part of an enzyme that also has a nonprotein component.

Archaebacteria- Older term for the Archaea.

Aromatic- Organic compounds which contain a benzene ring, or a ring with similar chemical characteristics**.**

Arthropod- Invertebrate with jointed body and limbs (includes insects, arachnids, and crustaceans).

Artificially acquired active immunity - The type of immunity that results from immunizing an animal with a vaccine. The immunized animal now produces its own antibodies and activated lymphocytes.

Artificially acquired passive immunity - The type of immunity that results from introducing into an animal antibodies that have been produced either in another animal or by in vitro methods. Immunity is only temporary.

Aseptic technique- Manipulating sterile instruments or culture media in such a way as to maintain sterility.

Associative symbiosis- Close but relatively casual interaction between two dissimilar organisms or biological systems. The association may be mutually beneficial but is not required for accomplishment of a particular function.

Autogenous infection - An infection that results from a patient's own microbiota, regardless of whether the infecting organism became part of the patient's microbiota subsequent to admission to a clinical care facility

Autoimmune disease - A disease produced by the immune system attacking self-antigens. Autoimmune disease results from the activation of self-reactive T and B cells that damage tissues after stimulation by genetic or environmental triggers.

Autoimmunity - Autoimmunity is a condition characterized by the presence of serum autoantibodies and self-reactive lymphocytes. It may be benign or pathogenic. Autoimmunity is a normal consequence of aging; is readily inducible by infectious agents, organisms, or drugs; and is potentially reversible in that it disappears when the offending "agent" is removed or eradicated.

Autolysis- Spontaneous lysis.

β-oxidation pathway - The major pathway of fatty acid oxidation to produce NADH, FADH2, and acetyl coenzyme A

Bacillus- Bacterium with an elongated, rod shape.

Bacteremia- The presence of viable bacteria in the blood.

Bacteria- All prokaryotes that are not members of the domain Archaea.The domain that contains procaryotic cells with primarily diacyl glycerol diesters in their membranes and with bacterial rRNA. Bacteria also is a general term for organisms that are composed of procaryotic cells and are not multicellular

Bactericide - An agent that kills bacteria

Bacteriophage- Virus that infects bacteria, often with destruction or lysis of the host cell.

Bacteriostatic - Inhibiting the growth and reproduction of bacteria.

B cell, also known as a B lymphocyte - A type of lymphocyte derived from bone marrow stem cells that matures into an immunologically competent cell under the influence of the bursa of Fabricius in the chicken and bone marrow in nonavian species. Following interaction with antigen, it becomes a plasma cell, which synthesizes and secretes antibody molecules involved in humoral immunity.

Benthic zone - the sediment

βeta hemolysis- A zone of complete clearing around a bacterial colony growing on blood agar. The zone does not change significantly in color.

Binary fission- Division of one cell into two cells by the formation of a septum. It is the most common form of cell division in bacteria.

Binomial nomenclature- System of having two names, genus and specific epithet, for each organism.

Bioaccumulation- Intracellular accumulation of environmental pollutants such as organic materials by living organisms. Accumulation of a chemical substance in living tissue.

Bioaugmentation - The addition to the environment of microorganisms that can metabolize and grow on specific organic compounds.

Bioavailability - The availability of chemicals to potentially biodegradative microorganisms.

Biochemical oxygen demand (BOD)- Amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter. In particular: - The requirement for molecular oxygen by microbes during oxidation of biological substances in sewage. The BOD test measures the oxygen consumed (in mg/L) over 5 days at 20 degrees C

Biodegradation - The breakdown of organic substances by microorganisms

Biodegradable- Substance capable of being decomposed by biological processes.

Bioinsecticide - A pathogen that is used to kill or disable unwanted insect pests. Bacteria, fungi, or viruses are used, either directly or after manipulation, to control insect populations.

Biologic transmission - A type of vector-borne transmission in which a pathogen goes through some morphological or physiological change within the vector.

Bioluminescence- The production of light by living cells, often through the oxidation of molecules by the enzyme luciferase

Biomagnification- Increase in the concentration of a chemical substance as it is progresses to higher trophic levels of a food chain.

Biosphere- Zone incorporating all forms of life on earth. The biosphere extends from deep in sediment below the ocean to several thousand meters elevation in high mountains.

Biosynthesis- Production of needed cellular constituents from other, usually simpler, molecules.

Biotechnology- Use of living organisms to carry out defined physiochemical processes having industrial or other practical application.

BOD - Biochemical Oxygen Demand - the rate at which microorganisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. In decomposition, organic matter serves as food for the bacteria and energy results from this oxidation.

Budding- Asexual reproduction (usually for yeast) beginning as a protuberance from the parent cell that grows and detaches to form a smaller, daughter cell.

Capsid- Protein coat of a virus.

Capsomere - An individual protein subunit of the virus capsid

Capsule- Compact layer of polysaccharide exterior to the cell wall in some bacteria.

Carbohydrate - Any chemical compound which consists of only carbon (C), oxygen (O), and hydrogen (H) elements, for examples, sugars, starches, and cellulose are carbohydrates. Also the ratio of hydrogen to oxygen atoms in carbohydrates is usually 2:1.

Carbon cycle- Sequence where carbon dioxide is converted to organic forms by photosynthesis or chemosynthesis, recycled through the biosphere, with partial incorporation into sediments, and ultimately returned to its original state through respiration or combustion.

Carbon fixation- Conversion of carbon dioxide or other single-carbon compounds to organic forms such as carbohydrates.

Carboxyl group- A --COOH group attached to a carbon skeleton as in the carboxylic acids and fatty acids.

Carcinogen- Substance which causes the initiation of tumor formation. Frequently a mutagen.

Catabolism- Biochemical processes involved in the breakdown of organic compounds, usually leading to the production of energy.

Catalyst- Substance that promotes a chemical reaction by lowering the activation energy without itself being changed in the end. Enzymes are a type of catalyst

Cell- Fundamental unit of living matter.

Cell-mediated immunity - The type of immunity that results from T cells coming into close contact with foreign cells or infected cells to destroy them; it can be transferred to a nonimmune individual by the transfer of cells.

Cell wall- Layer or structure that lies outside the cytoplasmic membrane; it supports and protects the membrane and gives the cell shape.

Chemoautotroph- Organism that obtains energy from the oxidation of chemical, generally inorganic, compounds and carbon from carbon dioxide.

Chitin - A tough, resistant, nitrogen-containing polysaccharide forming the walls of certain fungi, the exoskeleton of arthropods, and the epidermal cuticle of other surface structures of certain protists and animals.

Chlamydiae - Members of the genus Chlamydia: gram-negative, coccoid cells that reproduce only within the cytoplasmic vesicles of host cells using a life cycle that alternates between elementary bodies and reticulate bodies.

Chlamydospore- Thick-walled resting structure that forms from the cell wall of a fungal hypha; usually formed under conditions where the hypha is no longer able to function optimally.

Chromosomes - The bodies that have most or all of the cell's DNA and contain most of its genetic information (mitochondria and chloroplasts also contain DNA and genes).

Chromatography- Any technique used to separate different species of molecules (or ions) by subjecting them to two different carrier phases: mobile and stationary phases.

Chromosome- Genetic element carrying information essential to cellular metabolism. Prokaryotes have a single chromosome, consisting of a circular DNA molecule. Eukaryotes contain more than one chromosome, each containing a linear DNA molecule complexed with specific proteins.

Cilia - Threadlike appendages extending from the surface of some protozoa that beat rhythmically to propel them; cilia are membrane-bound cylinders with a complex internal array of microtubules, usually in a 9 1 2 pattern.

Ciliate- Protozoan that moves by means of cilia on the surface of the cell.

Classification- (i) Arrangement of organisms into groups based on mutual similarity or evolutionary relatedness. (ii) Systematic arrangement of soils into groups or categories on the basis of their characteristics.

Climax- Most advanced successional community of plants capable of development under, and in dynamic equilibrium with, the prevailing environment.

Clone- (i) Population of cells all descended from a single cell. (ii) Number of copies of a DNA fragment to be replicated by a phage or plasmid.

Coagulants - Chemicals which cause very fine particles to clump (floc) together into larger particles. This makes it easier to separate the solids from the water by settling, skimming, draining, or filtering.

Coccus- Spherical bacterial cells.

COD - Chemical oxygen demand - the amount of oxygen in mg/l required to oxidize both organic and oxidizable inorganic compounds

Codon - A sequence of three nucleotides in mRNA that directs the incorporation of an amino acid during protein synthesis or signals the start or stop of translation.

Coenocytic- Fungal hypha without crosswalls (septa), so that the nuclei present in the cytoplasm are free-floating and mobile.

Coenzyme- Low-molecular-weight chemical which participates in an enzymatic reaction by accepting and donating electrons or functional groups.

Cofactor - The nonprotein component of an enzyme; it is required for catalytic activity.

Coliform- Gram-negative, nonspore-forming facultative rod that ferments lactose with gas formation with 48 hours at 35ºC. Often an indicator organism for fecal contamination of water supplies. *Escherichia coli* and *Enterobacter* are important members.

Colonization- Establishment of a community of microorganisms at a specific site or ecosystem.

Colony- Clone of bacterial cells on a solid medium that is visible to the naked eye.

Commensalism- Interaction between organisms where one organism benefits from the association while the second organism remains unaffected.

Common-source epidemic - An epidemic that is characterized by a sharp rise to a peak and then a rapid, but not as pronounced, decline in the number of individuals infected; it usually involves a single contaminated source from which individuals are infected.

Common vehicle transmission - The transmission of a pathogen to a host by means of an inanimate medium or vehicle.

Community- All organisms that occupy a common habitat and interact with one another.

Competent- In a genetic sense, the ability to take up DNA.

Competitive exclusion principle - Two competing organisms overlap in resource use, which leads to the exclusion of one of the organisms.

Complex viruses - Viruses with capsids having a complex symmetry that is neither icosahedral nor helical.

Competition- Rivalry between two or more species for a limiting factor in the environment that usually results in reduced growth of participating organisms.

Constitutive enzyme- Enzyme always synthesized by the cell regardless of environmental conditions.

Consortium - A two- (or more) membered bacterial culture (or natural assemblage) in which each organism benefits from the other.

Cosmid - A plasmid vector with lambda phage cos sites that can be packaged in a phage capsid; it is useful for cloning large DNA fragments.

Culture- Population of microorganisms cultivated in an artificial growth medium. A pure culture is grown from a single cell; a mixed culture consists of two or more microbial species or strains growing together.

Cyanobacterium- Prokaryotic, oxygenic phototrophic bacterium containing chlorophyll *a* and phycobilins, formerly the "blue-green algae."

Cyst- Resting stage formed by some bacteria, nematodes, and protozoa in which the whole cell is surrounded by a protective layer; not the same as endospore.

Cyclic photophosphorylation - The formation of ATP when light energy is used to move electrons cyclically through an electron transport chain during photosynthesis; only photosystem I participates.

Cytochrome- Iron-containing porphyrin ring (e.g., haeme) complexed with proteins which act as electron carriers in an electron-transport chain.

Cytokine - A general term for non antibody proteins, released by a cell in response to inducing stimuli, which are mediators that influence other cells. They are produced by lymphocytes, monocytes, macrophages, and other cells.

Cytoplasm- Cellular contents inside the cell membrane, excluding the nucleus.

Cytoplasmic membrane- Selectively permeable membrane surrounding the cell's cytoplasm.

Degradation- Process whereby a compound is usually transformed into simpler compounds.

Denaturation- Process where double-stranded DNA unwinds and dissociates into two single strands. The reverse of DNA-DNA hybridization.

Denitrification- Reduction of nitrate or nitrite to molecular nitrogen or nitrogen oxides by microbial activity (dissimilatory nitrate reduction) or by chemical reactions involving nitrite (chemical denitrification).

Deoxyribonucleic acid (DNA) - Polymer of nucleotides connected via a phosphate-deoxyribose sugar backbone; the genetic material of the cell.

Diatom- Alga with siliceous cell walls that persist as a skeleton after death. Any of the microscopic unicellular or colonial alga constituting the class Bacillariophyceae.

Diatomaceous earth-Geologic deposit of fine, grayish siliceous material composed chiefly or wholly of the remains of diatoms. It may occur as a powder or as a porous, rigid material.

Dilution plate count method- Method for estimating the viable numbers of microorganisms in a sample. The sample is diluted serially and then transferred to agar plates to permit growth and quantification of colony-forming units.

Diploid- In eukaryotes, an organism or cell with two chromosome complements, one derived from each haploid gamete.

Direct count- Method of estimating the total number of microorganisms in a given mass of soil by direct microscopic examination.

Disinfectant- Agent that kills microorganisms.

Ecology- Science which studies the interrelations among organisms and between organisms and their environment.

Ecosystem- Community of organisms and the environment in which they live.

Electron-transport chain- Final sequence of reactions in biological oxidations composed of a series of oxidizing agents arranged in order of increasing strength and terminating in oxygen.

ELISA - Enzyme-linked immunosorbent assay. An immunoassay that uses specific antibodies to detect antigens or antibodies in body fluids. The antibody-containing complexes are visualized through enzyme coupled to

the antibody. Addition of substrate to the enzyme-antibody-antigen complex results in a colored product.

Embden-Meyerhof-Parnas pathway (Embden-Meyerhof pathway; EMP pathway)- A biochemical pathway that degrades glucose to pyruvate; the six-carbon stage converts glucose to fructose-1,6-bisphosphate, and the three-carbon stage produces ATP while changing glyceraldehyde-3-phosphate to pyruvate.

Emulsion - A liquid mixture of two or more liquid substances not normally dissolved in one another, one liquid held in suspension in the other

Endergonic reaction- Chemical reaction that proceeds with the consumption of energy.

Enteric bacteria- General term for a group of bacteria that inhabit the intestinal tract of humans and other animals. Among this group are pathogenic bacteria such as Salmonella and Shigella.

Enzyme- Protein within or derived from a living organism that functions as a catalyst to promote specific reactions.

Enzyme-linked immunosorbent assay (ELISA)- Immunoassay that uses specific antibodies to detect antigens or antibodies. The antibody-containing complexes are visualized through an enzyme coupled to the antibody. Addition of substrate to the enzyme-antibody-antigen complex results in a colored product.

Epidemiology- study of the natural history and characteristics of a disease

Eubacteria-Old term for the Bacteria.

Eukaryote- Organism having a unit membrane-bound nucleus and usually other organelles.

Extracellular- Outside the cell.

Exudate- Low molecular weight metabolites that leak from plant roots into soil.

Facultative organism- Organism that can carry out both options of a mutually exclusive process (e.g., aerobic and anaerobic metabolism).

Feedback inhibition- Inhibition by an end product of the biosynthetic pathway involved in its synthesis.

Fermentation- Metabolic process in which organic compounds serve as both electron donors and electron acceptors.

Fertilizer- Any organic or inorganic material of natural or synthetic origin (other than liming materials) added to a soil to supply one or more elements essential to plant growth.

Fission- Type of cell division in which overall cell growth is followed by formation of a crosswall which typically divides the fully grown cell into two similar or identical cells.

Flagellate- protozoan that moves by means of one to several flagella.

Flagellum (plural, flagella)- Whiplike tubular structure attached to a microbial cell responsible for motility.

Free energy- Intrinsic energy contained in a given substance that is available to do work, particularly with respect to chemical transformations; designated D G.

Fruiting body- Macroscopic reproductive structure produced by some fungi, such as mushrooms, and some bacteria, including myxobacteria. Fruiting bodies are distinctive in size, shape, and coloration for each species.

Fungistasis- Suppression of germination of fungal spores or other resting structures in natural soils as a result of competition for available nutrients, presence of inhibitory compounds, or both.

Fungus (plural, fungi)- Nonphototrophic, eukaryotic microorganisms that contain rigid cell walls.

Fusiform- Spindle-shaped; tapered at both ends.

Gamete- In eukaryotes, the haploid cell analogous to sperm and egg, which results from meiosis.

Gene- Unit of heredity; a segment of DNA specifying a particular protein or polypeptide chain, a tRNA or an mRNA.

Gene cloning- Isolation of a desired gene from one organism and its incorporation into a suitable vector for the production of large amounts of the gene.

Genetic code- Information for the synthesis of proteins contained in the nucleotide sequence of a DNA molecule (or in certain viruses, of an RNA molecule).

Generation time- Time needed for a population to double in number or biomass.

Genetic engineering- In vitro techniques for the isolation, manipulation, recombination, and expression of DNA.

Genome- Complete set of genes present in an organism.

Genotype- Precise genetic constitution of an organism.

Genus (plural, genera)- The first name of the scientific name (binomial); the taxon between family and species.

Glycolysis- Reactions of the Embden-Meyerhof (glycolytic) pathway in which glucose is oxidized to pyruvate.

Glycosidase- Enzyme that hydrolyzes a glucosidic linkage between two sugar molecules.

Gram stain- Differential stain that divides bacteria into two groups, Gram-positive and Gram-negative, based on the ability to retain crystal violet when decolorized with an organic solvent such as ethanol. The cell wall of Gram-positive bacteria consists chiefly of peptidoglycan and lacks the outer membrane of Gram-negative cells.

Growth- In microbiology, an increase in both cell number and cellular constituents.

Growth factor- Organic compound necessary for growth because it is an essential cell component or precursor of such components and cannot be synthesized by the organism itself. Usually required in trace amounts.

Growth rate- The rate at which growth occurs, usually expressed as the generation time.

Habitat- Place where an organism lives.

Haploid- In eukaryotes, an organism or cell containing one chromosome complement and the same number of chromosomes as the gametes.

Hapten - A substance not inducing antibody formation but able to combine with a specific antibody.

Heterotroph- Organism capable of deriving carbon and energy for growth and cell synthesis from organic compounds; generally also obtain energy and reducing power equivalents from organic compounds.

Host- Organism capable of supporting the growth of a virus or other parasite.

Hybridization- Natural formation or artificial construction of a duplex nucleic acid molecule by complementary base pairing between two nucleic acid strands derived from different sources.

Hyperparasite-Parasite that feeds on another parasite.

Immunity- The ability of a human or animal body to resist infection by microorganisms or their harmful products such as toxins.

Immunoglobulin -Antibody.

Immunogen- Substance which is capable of eliciting immune response. An immunogen usually has a fairly high molecular weight (usually greater than 10,000), thus, a variety of macromolecules such as proteins, lipoprotein, polysaccharides, and some nucleic acids can act as immunogens.

Infection- Growth of an organism within another living organism.

Inhibition- Prevention of growth or function.

Inoculate- To treat with microorganisms for the purpose of creating a favorable response. For example, treatment of legume seeds with rhizobia to stimulate N_2 fixation.

Inoculum- Material used to introduce a microorganism into a suitable situation for growth.

Intracellular- Inside the cell.

in vitro- Literally "in glass"; it describes whatever happens in a test tube or other receptacle, as opposed to in vivo. When a study or an experiment is done outside the living organism, in test tube, it is done in vitro.

in vivo- In the body, in a living organism, as opposed to in vitro; when a study or an experiment is done in the living organism, it is done in vivo.

Isoenzyme (isozyme)- When two different enzymes catalyze the same reaction(s), they are isoenzymes of each other. Isoenzymes could differ from each other in their primary structure or electrophoretic mobility.

Leaching- (i) Removal of valuable metals from ores by microbial action. (ii) The removal of materials in solution from the soil.

Lysis- Rupture of a cell, resulting in loss of cell contents.

Lysogeny- An association where a prokaryote contains a prophage and the virus genome is replicated in synchrony with the host chromosome.

Lysosome- Cell organelle containing digestive enzymes.

Macromolecule- Large molecule formed from the connection of a number of small molecules.

Medium (plural, media)- Any liquid or solid material prepared for the growth, maintenance, or storage of microorganisms.

Mmeiosis- In eukaryotes, reduction division, the process by which the change from diploid to haploid occurs.

messenger RNA (mRNA)- RNA molecule transcribed from DNA, which contains the information to direct the synthesis of a particular protein.

Metabolism- All biochemical reactions in a cell, both anabolic and catabolic.

Microbial biomass- Total mass of microorganism alive in a given volume or mass of soil.

Microbiology- Study of microorganisms.

Microorganism (microbe)- Living organism too small to be seen with the naked eye (< 0.1 mm); includes bacteria, fungi, protozoans, microscopic algae, and viruses.

Mitochondrion (plural, mitochondria)- Eukaryotic organelle responsible for processes of respiration and oxidative phosphorylation.

Mitosis- Highly ordered process by which the nucleus divides in eukaryotes.

Motility- Movement of a cell under its own power.

Mutualism- Interaction between organisms where both organisms benefit from the association.

Mycelium (plural, mycelia)- Mass of hyphae that form the vegetative body of many fungal organisms.

Mycobacterium - A genus of aerobic bacteria found in soil and water that are capable of biodegrading multi-ring compounds such as PAHs.

Mycophagous- Organisms that consume fungi, such as mycophagous nematodes.

Necrosis- Damage of living tissues because of infection or injury.

Nematode- Multicellular eukaryote defined as an unsegmented, usually microscopic roundworm. Various species feed on plants, animals, fungi, and bacteria.

Neutralism- Lack of interaction between two organisms in the same habitat.

Niche- Functional role of a given organism within its habitat.

Nicotinamide adenine dinucleotide (NAD^+)- Important coenzyme, functioning as a hydrogen and electron carrier in a wide range of redox reactions; the oxidized form of the coenzyme is written NAD^+, the reduced form as NADH.

Nicotinamide adenine dinucleotide phosphate ($NADP^+$)- Important coenzyme, functioning as a hydrogen and electron carrier in a wide range of redox reactions; the oxidized form of the coenzyme is written $NADP^+$, the reduced form as NADPH.

Nomenclature- System of naming organisms.

Nucleus- Membrane-enclosed structure containing the genetic material (DNA) organized in chromosomes.

Nutrient- Substance taken by a cell from its environment and used in catabolic or anabolic reactions.

Obligate- (i) Adjective referring to an environmental factor (for example, oxygen) that is always required for growth. (ii) Organism that can grow and reproduce only by obtaining carbon and other nutrients from a living host, such as obligate symbiont.

Organelle- Membrane-enclosed body specialized for carrying out certain functions; found only in eukaryotic cells.

Parasitism- Feeding by one organism on the cells of a second organism, which is usually larger than the first. The parasite is, to some extent, dependent on the host at whose expense it is maintained.

Pathogen- Organism able to inflict damage on a host it infects.

Pathogenicity- Ability of a parasite to inflict damage on the host.

pH- Negative logarithm of the hydrogen ion activity. The degree of acidity (or alkalinity) of a soil as determined by means of a glass or other suitable electrode or indicator at a specified moisture content or soil-water ratio, and expressed in terms of the pH scale.

Phenotype- Observable properties of an organism.

Phylogeny- Ordering of species into higher taxa and the construction of evolutionary trees based on evolutionary (genetic) relationships.

Plaque- Localized area of lysis or cell inhibition caused by virus infection on a lawn of cells.

Polyclonal antiserum- Mixture of antibodies to a variety of antigens or to a variety of determinants on a single antigen.

Polymer- Large molecule formed by polymerization of monomeric units.

Polymerase chain reaction (PCR)- Method for amplifying DNA in vitro, involving the use of oligonucleotide primers complementary to nucleotide sequences in target genes and the copying of the target sequences by the action of DNA polymerase.

Polysaccharide- Long chain of monosaccharides (sugars) linked by glycosidic bonds.

Predation- Relationship between two organisms whereby one organism (predator) engulfs or captures and digests the second organism (prey).

Prokaryote- Organism lacking a unit membrane-bound nucleus and other organelles, usually having its DNA in a single circular molecule.

Prosthetic group- Tightly bound, nonprotein portion of an enzyme; not the same as coenzyme.

Protoplasm- Complete cellular contents, cytoplasmic membrane, cytoplasm, and nucleus; usually considered the living portion of the cell, thus excluding those layers peripheral to the cell membrane.

Protista-Old taxonomic term referring to algae, fungi, and protozoa (collectively, the eukaryotic protists), and the prokaryotes.

Protozoan (plural, protozoa)- Unicellular eukaryotic microorganisms that move by either protoplasmic flow (amoebae), flagella (flagellates) or, cilia (ciliates). Most species feed on bacteria, fungi, or detrital particles

Pseudopodium (plural, pseudopodia)- Protrusion of an amoeboid cell formed by the extrusion or streaming of the cytoplasm (but still enclosed in the membrane) for the purpose of movement or feeding.

Replication-Conversion of one double-stranded DNA molecule into two identical double-stranded DNA molecules.

Respiration- Catabolic reactions producing ATP in which either organic or inorganic compounds are primary electron donors and exogenous compounds are the ultimate electron acceptors.

Retrovirus- Virus containing single-stranded RNA as its genetic material and producing a complementary DNA by action of the enzyme reverse transcriptase.

Reverse transcription- Process of copying information found in RNA into DNA.

Ribonucleic acid (RNA)- Polymer of nucleotides connected via a phosphate-ribose backbone, involved in protein synthesis.

ribosomal RNA (rRNA)- Types of RNA found in the ribosome; some participate actively in the process of protein synthesis.

Sanitization- Elimination of pathogenic or deleterious organisms, insect larvae, intestinal parasites, and weed seeds.

Saprophyte- Nonparasitic nutritional mechanism by which an organism obtains its food exclusively from the degradation of nonliving organic material.

Serial dilution- Series of stepwise dilutions (usually in sterile water) performed to reduce the populations of microorganisms in a sample to manageable numbers.

Serology- Study of antigen-antibody reactions in vitro.

Species- In microbiology, a collection of closely related strains sufficiently different from all other strains to be recognized as a distinct unit.

Specific epithet- Designation of a particular organism in the binomial nomenclature system. For example, coli is the specific epithet of Escherichia coli.

Spores- Specialized reproductive cell. Asexual spores germinate without uniting with other cells, whereas sexual spores of opposite mating types unite to form a zygote before germination occurs.

Sterilization- Rendering an object or substance free of viable microbes.

Strain- Population of cells all descended from a single pure isolate.

Symbiosis- Living together in intimate association of two dissimilar organisms. The interactions between the organisms can be commensal or mutualistic.

Synergism- Association between organisms that is mutually beneficial. Both populations are capable of surviving in their natural environment on

their own although, when formed, the association offers mutual advantages.

Systemic-Not localized in a particular place of the body; an infection disseminated widely through the body is said to be systemic.
Taxon (plural, taxa)- A group into which related organisms are classified.
Taxonomy- Study of scientific classification and nomenclature.
Toxin- Microbial substance able to induce host damage.
Transcription- Synthesis of an RNA molecule complementary to one of the two strands of a DNA double-stranded molecule.
transfer RNA (tRNA)- Type of RNA that carries amino acids to the ribosome during translation.
Translation- Synthesis of proteins using the genetic information in mRNA as a template.
Tricarboxylic acid cycle (TCA cycle, citric acid cycle, Krebs cycle)- Series of metabolic reactions by which pyruvate is oxidized completely to carbon dioxide, also forming NADH, which allows ATP production.
Trophic level- Describes the residence of nutrients in various organisms along a food chain ranging from the primary nutrient assimilating autotrophs to the predatory carnivorous animals.
Vector- (i) Plasmid or virus used in genetic engineering to insert genes into a cell. (ii) Agent, usually an insect or other animal, able to carry pathogens from one host to another.
Viable- Alive; able to reproduce.
Vibrio- (i) Curved, rod-shaped bacterial cell. (ii) Bacterium of the genus *Vibrio*.
Virion- Virus particle; the virus nucleic acid surrounded by protein coat and in some cases other material.
Virulence- Degree of pathogenicity of a parasite.
Virus- Any of a large group of submicroscopic infective agents that typically contain a protein coat surrounding a nucleic acid core and are capable of growth only in a living cell.
Zygote- In eukaryotes, the single diploid cell resulting from the union (fusion) of two haploid gametes**.**