

# Medical Botany

## 1: Basic Pharmacology

### Terminology

& Introduction to Medical Botany  
Veterinary Medicine



## Lectures to be thought in veterinary medical botany

### Subject

Introduction to the lecture, number of plants, structure and plant derived compounds

Synthesis-metabolism in plants, storage of herbal substance, similarities between plant and mammalian metabolism/synthesis, role of active compounds in plants, protection mechanisms in plants, communication in plants, effects of herbal compounds in organism, classification-nomenclature of plants

Active compound groups- Active compounds

Active compound groups- Active compounds (Continuation of the previous lecture)

Preparation of drugs, herbal medicinal products, some applications, dosage, stability/shelf life, distribution/labelling, herbal medicinal product production, herbal medicinal products in veterinary medicine, main effects of herbal drugs/ therapeutic efficacy, safety of herbal medicinal products, pro/co's of herbal medicinal products, quality assurance/properties documents of herbal medicinal products

Some important plants, plant derived compounds and their usage in veterinary medicine

Herbal medicines used in human medicine with known doses that have a potential in veterinary medicine

Common terms in pharmacology would be used throughout the lecture when defining the effects of the herbal medicinal plants or the active compounds.

The following slides related to common terminology would be presented through the web site below:

| [pharmafactz.com/common-terms-in-pharmacology/](http://pharmafactz.com/common-terms-in-pharmacology/)

<b>abortifacient</b>	Substance that induces abortion.
<b>absence seizure</b>	Generalized seizure that does not involve motor convulsions; also referred to as petit mal.
<b>absorption</b>	The uptake of nutrients and drugs from the GI tract.
<b>acetate</b>	Compound that contains acetic acid.
<b>acetylcholine (ACH)</b>	Neurotransmitter of parasympathetic (cholinergic) nerves; stimulates the cholinergic receptor; excitatory neurotransmitter in the basal ganglia.
<b>acetylcholinesterase</b>	An enzyme that inactivates acetylcholine.
<b>acid rebound</b>	Effect in which a great volume of acid is secreted by the stomach in response to the reduced acid environment caused by antacid neutralization.
<b>acidification</b>	Process that alters the pH to less than 7.
<b>acidosis</b>	pH less than 7.45 or a condition in which the tissues have relatively more acid or acid waste than normal; disturbance of acid-base balance; when the pH of the blood is below 7.35.
<b>acquired immunity</b>	Protection from viral reinfection in the form of antibodies produced during an infection (active) or produced after exposure to a vaccine (passive).

<b>addiction</b>	A chronic neurobiologic disease in which genetic, psychosocial, and environmental factors induce changes in the individual's behavior to compulsively use drugs despite the harm that may result.
<b>ADH (antidiuretic hormone)</b>	Polypeptide substance synthesized by the hypothalamus and released from the posterior pituitary gland that regulates water balance in the body by altering urine volume at the collecting ducts.
<b>adipose tissue</b>	Tissue containing fat cells; fat.
<b>adrenergic neuronal blocker</b>	Drug that acts at the neuronal nerve endings to reduce the formation or release of NE.
<b>adrenergic receptor</b>	Receptor located on internal organs that responds to norepinephrine and epinephrine.
<b>adsorbent</b>	Substance that has the ability to attach other substances to its surface.

<b>adverse effect</b>	General term for undesirable and potentially harmful drug effect.
<b>afferent nerve</b>	Transmits sensory information from peripheral organs to the brain and spinal cord (central nervous system).
<b>afterload</b>	A measure of the vascular resistance that the left ventricle must overcome in order to eject blood during contraction.
<b>agonist</b>	Drug that attaches to a receptor and initiates an action; drug that binds to a receptor and activates a physiologic response or drug action.
<b>agranulocytosis</b>	Acute condition in which there is a reduction in the number of white blood cells (WBCs), specifically polymorphonuclear cells (granulocytes); condition in which the number of white blood cells, in particular the granulocytes, is less than normal.
<b>akathisia</b>	Continuous body movement in which an individual is restless or constantly paces about.
<b>akinesia</b>	Loss of voluntary muscle movement; restless leg movement.
<b>albuminuria</b>	The presence of the plasma protein albumin in the urine.
<b>aldosterone</b>	Hormone released from adrenal cortex that causes the retention of sodium from the kidneys.
<b>alkalosis</b>	pH greater than 7.45 or a condition in which the tissues have less acid than normal; disturbance of acid-base balance; when the pH of the blood is above 7.5.
<b>alkylation</b>	Irreversible chemical bond that some cancer drugs form with nucleic acids and DNA.

<b>allergen</b>	A substance capable of producing an allergic reaction.
<b>alopecia</b>	Baldness or hair loss.
<b>alpha adrenergic drug</b>	Drug that stimulates the alpha adrenergic receptors.
<b>alpha-1 adrenergic blocker</b>	Drug that blocks the alpha-1 effects of NE and EPI.
<b>alpha-1 adrenergic receptor</b>	Receptor located on smooth muscle that mediates smooth muscle contraction.
<b>alpha-2 adrenergic receptor</b>	Receptor located on adrenergic nerve endings that reduces the release of NE.
<b>amenorrhea</b>	Condition in which monthly menstruation (menses) no longer occurs.
<b>amide local anesthetic</b>	Anesthetic class that includes lidocaine, bupivacaine, and mepivacaine and has a moderate to long duration of action because metabolism occurs in the liver.
<b>amylin</b>	Peptide of 37 amino acids that is secreted by the pancreas beta cells along with insulin in response to increasing blood glucose levels.
<b>anabolism</b>	Process that converts or incorporates nutritional substances into tissue; usually associated with conversion of proteins into muscle mass.
<b>analgesia</b>	Decreased response to pain; condition in which painful stimuli are not consciously interpreted (perceived) as hurting; relief from pain: inhibition of the perception of pain.

<b>analgesic</b>	Substance (synthetic or naturally occurring) that inhibits the body's reaction to painful stimuli or perception of pain.
<b>anaphylaxis</b>	Condition in which the body develops a severe allergic response; this is a medical emergency.
<b>androgen</b>	Male sex hormone responsible for the development of male characteristics.
<b>anemia</b>	Condition in which the number of red blood cells or the amount of hemoglobin (the oxygen-carrying substance) inside the red blood cells is less than normal; condition in which the oxygen-carrying function of the red blood cells to the tissues is decreased.
<b>aneurysm</b>	An abnormal widening or ballooning of a portion of an artery due to weakness in the wall of the blood vessel.
<b>angina</b>	Chest pain or discomfort that occurs when the heart muscle does not get enough blood and oxygen.
<b>angina pectoris</b>	Chest pain due to decreased blood flow (ischemia) to the heart; caused by insufficient blood flow to the heart.
<b>angioedema</b>	Edema and swelling beneath the skin.
<b>angiotensin-converting enzyme inhibitor (ACE)</b>	Treat high blood pressure and other conditions.
<b>(ACEI)</b>	Drug that inhibits the enzymatic conversion of angiotensin I to angiotensin II.
<b>angiotensin receptor blocker (ARB)</b>	Drug that blocks the receptors for angiotensin II.

<b>angiotensin II</b>	Potent vasoconstrictor that also stimulates release of aldosterone and antidiuretic hormone.
<b>anion</b>	Negatively charged ion.
<b>antacid</b>	Drug that neutralizes hydrochloric acid (HCl) secreted by the stomach.
<b>antagonist</b>	Drug that attaches to a receptor, does not initiate an action, but blocks an agonist from producing an effect; drug that binds to a receptor and interferes with other drugs or substances from producing a drug effect.
<b>antagonistic</b>	Counteract; oppose.
<b>antiallergic</b>	Drug that prevents mast cells from releasing histamine and other vasoactive substances.
<b>antianxiety drug</b>	Drug used to treat anxiety; these drugs are also referred to as anxiolytics.
<b>antiarrhythmic drug</b>	Drug used to restore normal cardiac rhythm.
<b>anti-atherogenic</b>	The ability to prevent or stop atherosclerosis, the deposition of lipid-containing plaques on the innermost layers of the arteries.
<b>antibacterial spectrum</b>	Bacteria that are susceptible to the antibacterial actions of a particular drug.
<b>antibiotic</b>	Antibacterial drug obtained from other microorganisms.
<b>antibiotic susceptibility</b>	Identification of the antibiotics, by bacterial culture and sensitivity testing, that will be effective against specific bacteria.

<b>antibody</b>	A specialized protein (immunoglobulin) that recognizes the antigen that triggered its production; a protein (immunoglobulin) produced naturally or induced by a foreign protein that provides immune protection against infectious organisms and foreign substances; normally produced when a foreign substance such as a pathogen enters the body.
<b>anticholinergic</b>	Refers to drugs or effects that reduce the activity of the parasympathetic nervous system.
<b>anticonvulsant</b>	Drug usually administered IV that stops a convulsive seizure.
<b>antidiuretic hormone (ADH)</b>	Polypeptide substance synthesized by the hypothalamus and released from the posterior pituitary gland that regulates water balance in the body by altering urine volume at the collecting ducts; hormone from the posterior pituitary gland that causes retention of water from the kidneys; substance produced in the hypothalamus and secreted by the pituitary gland that modulates urine production and allows the kidneys to reabsorb water in order to conserve body water.
<b>antiepileptic drug</b>	Drug usually administered orally to prevent epileptic seizures.
<b>antilipemic drug</b>	A drug that reduces the level of fats in the blood.
<b>antigen</b>	Substance, usually protein or carbohydrate, that is capable of stimulating an immune response; any substance that stimulates an immune response, i.e., production of an antibody.
<b>antigenic drift and antigenic shift</b>	The ability of viruses to change the composition or structure of their surface proteins (viral coat) that are responsible for producing disease (pathogenicity).
<b>antihistaminic</b>	Drug that blocks the action of histamine at the target organ.

<b>antiinflammatory</b>	Minimizing or stopping the response to tissue injury by reducing the pain, localized swelling, and chemical substances released at the site of injury.
<b>antimetabolite</b>	A drug that is very similar to natural chemicals in a normal biochemical reaction in cells but different enough to interfere with the normal division and functions of cells; drug whose chemical structure is similar to that of normal body metabolites and that inhibits normal cell function.
<b>antimicrobial</b>	Antibacterial drugs obtained by chemical synthesis and not from other microorganisms.
<b>antineoplastic</b>	Drug that inhibits the growth and proliferation of cancer cells.
<b>antipsychotic drug</b>	Drug used to treat schizophrenia and other psychotic conditions.
<b>antipyresis</b>	Reducing an elevated body temperature.
<b>antisecretory</b>	Substance that inhibits secretion of digestive enzymes, hormones, or acid.
<b>antiseptic</b>	Substance that inhibits the growth of microorganisms on living tissue.
<b>antitussive</b>	A drug that suppresses coughing.
<b>anuria</b>	Condition in which no urine is produced.
<b>anxiety</b>	A state of anxiousness and hyperemotionalism that occurs with uncertainty, stress, and fearful situations.

<b>apoprotein</b>	A protein that is attached to a second molecule that is not a protein.
<b>apoptosis</b>	Cell death, due to either programmed cell death or other physiological events.
<b>aquaporins</b>	Specialized proteins that form pores (channels) in the cell membrane that allow water to pass through but not small molecules like ions.
<b>aquaresis</b>	Renal excretion of water without electrolytes.
<b>aqueous humor</b>	Ocular fluid; watery substance that is located behind the cornea of the eye and in front of the lens.
<b>argyria</b>	Permanent black discoloration of skin and mucous membranes caused by prolonged use of silver protein solutions.
<b>arrhythmia</b>	Disorder of cardiac conduction and electrical impulse formation.
<b>arteriosclerosis</b>	Hardening or fibrosis of the arteries; accumulation of fatty deposits in the walls of arteries.
<b>arthralgia</b>	Joint pain.
<b>arthritis</b>	Inflammation of the joints.
<b>ascites</b>	Excess fluid in the space between the tissues lining the abdomen and abdominal organs (the peritoneal cavity), usually associated with organ failure.
<b>asthma</b>	Inflammation of the bronchioles associated with constriction of smooth muscle, wheezing, and edema; respiratory disease characterized by bronchoconstriction, shortness of breath, and wheezing.

<b>asymptomatic</b>	Condition in which there is no outward evidence (symptom) that an infection is present.
<b>atherogenic</b>	The ability to start or accelerate the deposition of fats and calcium in the walls of arteries, called atherosclerosis.
<b>atherosclerosis</b>	Fatty degeneration of arteries due to accumulation of cholesterol plaques; accumulation of fatty deposits in the walls of arteries.
<b>atonic seizure</b>	Generalized-type seizure characterized by a sudden loss of muscle tone.
<b>autoantibody</b>	An antibody produced by the immune system against one's own cells; antibodies normally are produced when a foreign substance such as a pathogen enters the body.
<b>autoimmune disease</b>	Condition in which an individual's tissues are damaged by his or her own immune mechanisms.
<b>automatism</b>	Drug-induced confusion that can cause increased drug consumption.
<b>autonomic nervous system (ANS)</b>	System of nerves that innervate smooth and cardiac muscle (involuntary) of the internal organs and glands.
<b>AV</b>	Atrioventricular, as in the AV node.
<b>avitaminosis</b>	Chronic or long-term vitamin deficiency caused by lack in diet or defect in metabolic conversion in body resulting in a vitamin-specific condition such as beri-beri.



<b>bacteria</b>	Single-celled microorganisms, some of which cause disease.
<b>bacterial resistance</b>	Ability of some bacteria to resist the actions of antibiotics.
<b>bactericidal</b>	Antibiotic that kills bacteria; chemical that kills or destroys bacteria.
<b>bacteriostatic</b>	Chemical that inhibits growth or reproduction of bacteria but does not kill bacteria; antibiotic that inhibits the growth of, but does not kill, bacteria.
<b>barbiturate</b>	CNS depressant drug possessing the barbituric acid ring structure.
<b>basal ganglia</b>	A group of cell bodies (gray matter) within the white matter of the cerebrum that helps control body movement; involved in regulation of skeletal muscle tone and body movement.
<b>benzodiazepine</b>	Class of drugs used to treat anxiety and sleep disorders.
<b>beta-lactamases</b>	Bacterial enzymes that inactivate betalactam antibiotics; bacterial enzymes that inactivate penicillin and cephalosporin antibiotics.
<b>beta-1 adrenergic receptor</b>	Receptor located on the heart that increases heart rate and force of contraction.
<b>beta-2 adrenergic receptor</b>	Receptor located on smooth muscle that relaxes smooth muscle when stimulated.
<b>bioavailability</b>	Percentage of the drug dosage that is absorbed.
<b>biphasic</b>	Two different amounts of estrogen hormone are released during the cycle.

<b>blood pressure (BP)</b>	The pressure of the blood within the arteries; depends primarily on the cardiac output and the peripheral resistance.
<b>bone density</b>	A quantitative measurement of the mineral content of bone; used as an indicator of the structural strength of the bone.
<b>bone mass</b>	A measure of the amount of minerals (mostly calcium and phosphorus) contained in a certain volume of bone.
<b>bone mineral density</b>	Amount of calcium and phosphorus deposited in bone matrix.
<b>bradykinesia</b>	Slowed body movements.
<b>broad-spectrum</b>	Drug that is effective against a wide variety of both gram-positive and gram-negative pathogenic bacteria.
<b>bronchodilator</b>	Drug that relaxes bronchial smooth muscle and dilates the lower respiratory passages.
<b>buccal absorption</b>	Absorption of drug through the mucous membranes lining the oral cavity.

<b>calorigenic</b>	Producing heat.
<b>cancer</b>	Disease that involves the development and reproduction of abnormal cells.
<b>candidemia</b>	Infection in the blood caused by the yeast <i>Candida</i> .
<b>candidiasis</b>	Infection caused by the yeast <i>Candida</i> ; also known as moniliasis.
<b>cannabinoid</b>	Pharmacologically active substance obtained from the marijuana plant.
<b>carcinogenic</b>	Causing cancer.
<b>carcinoid tumor</b>	A slow-growing type of cancer that can arise in the gastrointestinal tract, lungs, ovaries, and testes.
<b>cardiac arrhythmia</b>	Variation in the normal rhythm (motion) of the heart.
<b>cardiac glycoside</b>	Drug obtained from plants of the genus <i>Digitalis</i> .
<b>cardiac output (CO)</b>	The amount of blood pumped per minute by the heart.
<b>catabolism</b>	Process in which complex compounds are broken down into simpler molecules; usually associated with energy release.
<b>catecholamine</b>	Refers to norepinephrine, epinephrine, and other sympathomimetic compounds that possess the catechol structure.
<b>cathartic</b>	Pharmacological substance that stimulates defecation.

<b>cation</b>	Positively charged ion.
<b>caudal anesthesia</b>	Injection of a local anesthetic into the caudal or subcaudal spinal canal.
<b>cell-cycle nonspecific (CCNS)</b>	Refers to cancer drugs that act in all phases of the cell cycle.
<b>cell-cycle specific (CCS)</b>	Refers to cancer drugs that only act when the cell is actively dividing.
<b>centrally acting skeletal muscle relaxant</b>	Drug that inhibits skeletal muscle contraction by blocking conduction within the spinal cord.
<b>cephalosporinases</b>	Bacterial enzymes that inactivate cephalosporin antibiotics.
<b>CERA</b>	Stands for continuous erythropoietin receptor activator.
<b>cerebellum</b>	Part of the brain that coordinates body movements and posture and helps maintain body equilibrium.
<b>cerebral cortex</b>	Uppermost layers of the cerebrum involved in sensory perception, voluntary motor control, and all higher intellectual abilities.
<b>cerebrum</b>	Largest and uppermost part of the brain that is divided into right and left cerebral hemispheres.
<b>chelate</b>	Chemical action of a substance to bond permanently to a metal ion.
<b>chemical mediator</b>	Substance released from mast cells and white blood cells during inflammatory and allergic reactions.

<b>chemical name</b>	Name that defines the chemical composition of a drug.
<b>chemoprophylaxis</b>	Use of antibiotics to prevent infection, usually before a surgical procedure or in patients at risk for infection.
<b>chemotherapy</b>	Use of drugs to inhibit the growth of or to destroy infectious organisms or cancer cells; use of drugs to kill or inhibit the growth of infectious organisms or cancer cells.
<b>chloride channel activators</b>	A novel class of drugs that stimulate pore-forming receptors in the intestine, causing chloride ions to cross membranes.
<b>cholesterol</b>	A fat (lipid) normally synthesized by the liver; essential for the structure and function of cells.
<b>cholinergic</b>	Refers to the nerves and receptors of the parasympathetic nervous system; also refers to the drugs that stimulate this system.
<b>cholinergic receptor</b>	Receptor located on internal organs and glands that responds to acetylcholine.
<b>-chromic</b>	Suffix meaning color.
<b>chronic</b>	Condition of long duration, usually months or years.

<b>chylomicron</b>	One of the microscopic particles of emulsified fat found in the blood and lymph and formed during the digestion of fats.
<b>chyme</b>	Partially digested food and gastric secretions that moves into the duodenum from the stomach by peristalsis.
<b>-cidal</b>	Suffix denoting killing, as of microorganisms.
<b>cinchonism</b>	Pattern of characteristic symptoms (central nervous system [CNS] stimulation and headache) associated with the use of cinchona alkaloids (chemicals extracted from the bark of the cinchona tree); quinidine toxicity, which is characterized by ringing in the ears (tinnitus), dizziness, and headache.
<b>circadian rhythm</b>	Internal biological clock; a repeatable 24-hour cycle of physiological activity.
<b>clonic</b>	Convulsive muscle contraction in which rigidity and relaxation alternate in rapid succession.
<b>coagulation</b>	Process by which the blood changes from a liquid to a solid "plug" as a reaction to local tissue injury; normal blood clot formation.
<b>cold sterilization</b>	Destruction of microorganisms at room temperature without the use of heat or ionizing radiation.
<b>conduction system</b>	Specialized cardiac tissue that transmits electrical impulses and regulates the activity of the heart.
<b>constipation</b>	A decrease in stool frequency.
<b>contraception</b>	Preventing pregnancy by preventing either conception (joining of egg and sperm) or implantation in the uterus.

<b>contraindications</b>	Situations or conditions when a certain drug should not be administered.
<b>controlled substance</b>	Drug that has the potential for abuse and thus is regulated by law.
<b>convoluted</b>	Coiled or folded back on itself.
<b>convulsion</b>	Involuntary muscle contraction that is either tonic or clonic.
<b>COPD</b>	Chronic obstructive pulmonary disease, usually caused by emphysema and chronic bronchitis.
<b>coronary artery</b>	Artery that supplies blood flow to the heart.
<b>coronary artery disease (CAD)</b>	Disease of the coronary arteries that decreases blood flow to the heart; narrowing of small arteries that supply blood and oxygen to the heart; condition due to atherosclerosis and insufficient blood flow to the heart.
<b>COX</b>	Cyclooxygenase, a family of enzymes that produce prostaglandins.
<b>C-reactive protein (CRP)</b>	A protein produced by the liver but only found in the blood in conditions of acute inflammation; an inflammation marker.
<b>creatinine</b>	A metabolite of muscle metabolism that is excreted in the urine in proportion to renal function.
<b>creatinine clearance</b>	A measure of renal creatinine excretion that is used to evaluate renal function.

<b>CRP (C-reactive protein)</b>	A protein produced by the liver but only found in the blood in conditions of acute inflammation; an inflammation marker.
<b>cryoanesthesia</b>	Removing the sensation of touch or pain by applying extreme cold to the nerve endings.

<b>cutaneous</b>	Pertaining to the skin.
<b>-cytic</b>	Suffix meaning cells.

<b>DCT (distal convoluted tubule)</b>	Part of the nephron that is closest to the collecting duct.
<b>decimal</b>	Another way to write a fraction when the denominator is 10, 100, 1000, and so on.
<b>decubitis ulcer</b>	Bedsore.
<b>deep vein thrombosis (DVT)</b>	A blood clot that forms in a vein deep inside the body.
<b>defecation</b>	Process of discharging the contents of the intestines as feces.
<b>dehiscence</b>	Bursting open or separation of a wound, usually along sutured line.
<b>denaturing</b>	Causing destruction of bacterial protein function; also adulteration of alcohol, rendering it unfit for drinking.
<b>dendritic cell</b>	An antigen-presenting white blood cell that is found in the skin, mucosa, and lymphoid tissues and that initiates a primary immune response.
<b>denominator</b>	Bottom number of a fraction; shows the number of parts in a whole.
<b>dependency</b>	Requirement of repeated drug consumption in order to prevent onset of withdrawal symptoms.
<b>depolarization</b>	The decrease in electric potential across a cell membrane that results in excitation and generation of an action potential.
<b>depolarizing blocker</b>	Produces paralysis by first causing nerve transmission, followed by inhibition of nerve transmission.

<b>depression</b>	Mental state characterized by depressed mood, with feelings of frustration and hopelessness.
<b>dermatitis</b>	Inflammatory condition of the skin associated with itching, burning, and edematous vesicular formations.
<b>dermatophytic</b>	Infection of the skin, hair, or nails caused by a fungus.
<b>designer drug</b>	Chemically altered form of an approved drug that produces similar effects and that is sold illegally.
<b>diabetes insipidus</b>	Chronic condition caused by inadequate secretion of antidiuretic hormone (ADH), in which individuals are extremely thirsty and produce very large amounts of pale urine.
<b>diabetic neuropathy</b>	Nerve disorders caused by diabetes resulting in numbness, pain, and weakness in hands and feet.
<b>diarrhea</b>	Abnormal looseness of the stool or watery stool, which may be accompanied by a change in stool frequency or volume.
<b>digestion</b>	Mechanical and chemical breakdown of foods into smaller units.
<b>digitalization</b>	Method of dosage with cardiac glycosides that rapidly produces effective drug levels.
<b>diplopia</b>	Condition in which a single object is seen (perceived) as two objects; double vision.
<b>disinfectant</b>	Substance that kills disease-causing microorganisms on nonliving surfaces.

<b>dissociative anesthesia</b>	Form of general anesthesia in which patients do not appear to be unconscious.
<b>distal convoluted tubule (DCT)</b>	Part of the nephron that is closest to the collecting duct.
<b>disulfiram-like reaction</b>	Reaction to alcohol ingestion characterized by intense nausea as a result of drug-induced accumulation of acetaldehyde, similar to that produced by disulfiram ( <i>Antabuse</i> ).
<b>diuresis</b>	Condition that causes urine to be excreted; usually associated with large volumes of urine.
<b>DM</b>	Diabetes mellitus.
<b>dopamine</b>	Inhibitory neurotransmitter in the basal ganglia.
<b>dose</b>	A measurement of the amount of drug that is administered.
<b>drug</b>	Chemical substance that produces a change in body function.
<b>drug absorption</b>	Entrance of a drug into the bloodstream from its site of administration.
<b>drug addiction</b>	Condition of drug abuse and drug dependence that is characterized by compulsive drug behavior.
<b>drug compliance</b>	Following drug prescription directions exactly as written.
<b>drug dependence</b>	Condition of reliance on the use of a particular drug, characterized as physical and/or psychological dependence.
<b>drug distribution</b>	Passage of a drug from the blood to the tissues and organs of the body.

<b>drug excretion</b>	Elimination of the drug from the body.
<b>drug indications</b>	Intended or indicated uses for any drug.
<b>drug metabolism</b>	The enzymatic biotransformation of a drug into metabolites.
<b>drug microsomal metabolizing system (DMMS)</b>	Group of enzymes located primarily in the liver that function to metabolize (biotransformation) drugs.
<b>drug resistance</b>	Lack of responsiveness of cancer cells to chemotherapy.
<b>drug tolerance</b>	Requirement of larger doses to be consumed in order to obtain the desired effects; decreased drug effect occurring after repeated drug administration.
<b>ductless glands</b>	Containing no duct; endocrine glands that secrete hormones directly into the blood or lymph without going through a duct.
<b>DVT (deep vein thrombosis)</b>	A blood clot that forms in a vein deep inside the body.
<b>dwarfism</b>	Inadequate secretion of growth hormone during childhood, characterized by abnormally short stature and normal body proportions.
<b>dysentery</b>	Condition characterized by frequent watery stools (usually containing blood and mucus), tenesmus, fever, and dehydration.
<b>dysgeusia</b>	A persistent abnormal sense of taste.
<b>dyskinesia</b>	Distortion in voluntary muscle movement, spastic; uncontrollable, abnormal involuntary repetitive body movements.

<b>dysmenorrhea</b>	Difficult or painful menstruation; condition that is associated with painful and difficult menstruation.
<b>dyspepsia</b>	Indigestion.
<b>dysphoria</b>	Feeling of discomfort or unpleasantness.
<b>dystonia</b>	Muscle spasms, facial grimacing, and other involuntary movements and postures.
<b>dystonic reaction</b>	Reaction characterized by muscle spasms, twitching, facial grimacing, or torticollis.

<b>ECL (enterochromaffin-like cells)</b>	Cells that synthesize and release histamine.
<b>ectopic beat</b>	Extra heartbeat, a type of cardiac arrhythmia.
<b>ectopic focus</b>	Area of the heart from which abnormal impulses originate.
<b>eczematoid dermatitis</b>	Condition in which lesions on the skin ooze and develop scaly crusts.
<b>edema</b>	Swelling caused by fluid in body tissue.
<b>ED50</b>	Effective dose 50, or dose that will produce an effect that is half of the maximal response.
<b>efferent nerve</b>	Carries the appropriate motor response from the brain and spinal cord to the peripheral organs.
<b>electrocardiogram (ECG)</b>	Recording of the electrical activity of the heart.
<b>electroencephalogram (EEG)</b>	A surface recording of the electrical activity of the brain.
<b>electrolyte</b>	Ion in solution, such as sodium, potassium, or chloride, that is capable of mediating conduction (passing impulses in the tissues); dissolved mineral that can conduct an electrical current and that exists as an ion.
<b>emesis</b>	Vomiting.
<b>emetogenic</b>	A substance that causes vomiting.
<b>emollient</b>	Substance that is soothing to mucous membranes or skin.

<b>emphysema</b>	Disease process causing destruction of the walls of the alveoli.
<b>endemic</b>	Present continually in a particular geographic region, often in spite of control measures.
<b>endocrine</b>	Pertaining to glands that secrete substances directly into the blood.
<b>endocytosis</b>	Process by which cells absorb molecules (such as proteins) from outside the cell by engulfing them with their cell membrane.
<b>endogenous</b>	Naturally occurring within the body; originating or produced within an organism, tissue, or cell.
<b>endometrium</b>	Lining of the uterus.
<b>endorphins</b>	Neuropeptides produced within the CNS that interact with opioid receptors to produce analgesia.
<b>enteric-coated</b>	Type of tablet or pill with a coating that enables it to pass through the stomach without being dissolved, so the stomach lining will not be irritated; the drug is then released in the intestine.
<b>enterochromaffin-like cells (ECL)</b>	Cells that synthesize and release histamine.
<b>enterohepatic recycling</b>	The process whereby drug is eliminated from the liver/biliary tract into the GI tract and then reabsorbed from the GI tract back to the liver.
<b>enzyme induction</b>	Increase in the amount of drug-metabolizing enzymes after repeated administration of certain drugs.
<b>enzyme inhibition</b>	Inhibition of drug-metabolizing enzymes by certain drugs.

<b>epidural anesthesia</b>	Injection of a local anesthetic into the extradural (outermost part of the spinal canal) space.
<b>epilepsy</b>	CNS disorder characterized by uncontrolled nerve cell discharges and manifested by recurring, spontaneous seizures of any type.
<b>epinephrine (EPI)</b>	Hormone from adrenal medulla that stimulates adrenergic receptors, especially during stress.
<b>equipotent</b>	When drugs (substances) produce the same intensity or spectrum of activity; usually, the absolute amount of drug (for example, 5, 10 mg) that produces the response is different for each substance, but the response generated is the same.
<b>erythema</b>	Redness of the skin, often a result of capillary dilation; abnormal redness of the skin, caused by capillary congestion.
<b>erythropoiesis</b>	Process through which red blood cells are produced.
<b>ESA</b>	Stands for erythropoietin stimulating agent.
<b>eschar</b>	Thick crust or scab that develops after skin is burned.
<b>essential amino acids and fatty acids</b>	Substances that are required for critical body function to sustain life and are not produced by the body.
<b>essential hypertension</b>	Major form of hypertension for which the cause is unknown.
<b>ester local anesthetic</b>	Anesthetic class that includes procaine, cocaine, benzocaine, and tetracaine; metabolism is primarily by plasma cholinesterases.
<b>euphoria</b>	Feeling of well-being or elation; feeling good.



<b>euthyroid</b>	Having normal thyroid gland function.
<b>euvolemia</b>	State of normal body fluid volume.
<b>evacuation</b>	Process of removal of waste material from the bowel.
<b>excoriation</b>	An abrasion of the epidermis (skin) usually from a mechanical (not chemical) cause; a scratch.
<b>exertional angina</b>	Angina pectoris caused by increased physical exertion.
<b>exocytosis</b>	The discharge of substances contained in vesicles by fusion of the vesicular membrane with the outer cell membrane.
<b>exogenous</b>	Originating or produced outside the organism or body; originating outside the body, or administered into the body from outside.
<b>exogenous, or reactive, depression</b>	Depression caused by external factors or life events.
<b>exophthalmos</b>	Protruding eyeballs out of the socket.
<b>expectorant</b>	Substance that causes the removal (expulsion) of mucous secretions from the respiratory system; drug that helps clear the lungs of respiratory secretions.
<b>expectorate</b>	Eject from the mouth; spit.
<b>extracellular</b>	Area outside the cell.
<b>extrapyramidal syndrome (EPS)</b>	Movement disorders such as akathisia, dystonia, and parkinsonism caused by antipsychotic drug therapy.

<b>false transmitter</b>	Substance formed in nerve endings that mimics and interferes with the actions of the normal transmitter.
<b>fasciculation</b>	Twitchings of muscle fiber groups.
<b>fertility drug</b>	Drug that stimulates ovulation.
<b>fibrocystic breast disease</b>	Condition in which cystic lesions form within the connective tissue of the breasts.
<b>fight or flight reaction</b>	Response of the body to intense stress; caused by activation of the sympathetic division of the ANS.
<b>first-pass metabolism</b>	Drug metabolism that occurs in the intestines and liver during oral absorption of drugs into the systemic circulation.
<b>flashback</b>	Phenomenon occurring long after the use of LSD in which the hallucinogenic effects are relived in some type of memory flash.
<b>foam cells</b>	A type of cell formed after macrophages in the artery wall digest LDL cholesterol; a transformed macrophage.
<b>fraction</b>	Part of a whole.
<b>FSH</b>	Follicle stimulating hormone. In the female stimulates the development of the follicles, and in the male stimulates spermatogenesis.
<b>fungicidal</b>	Substance, chemical solution, or drug that kills fungi; chemical that kills or destroys fungi.
<b>fungistatic</b>	Inhibits the growth of fungi but does not kill off the fungi; chemical that inhibits growth or reproduction of fungi but does not kill fungi.
<b>fungus (fungi)</b>	A group of microorganisms with a membrane-bound nucleus that includes yeasts and molds.

<b>GABA</b>	Gamma-aminobutyric acid, an inhibitory neurotransmitter in the CNS.
<b>gametocyte</b>	Organism in an immature stage of development.
<b>ganglionic blocker</b>	Drug that blocks the nicotinic-neural (Nn) receptors and reduces the activity of the autonomic nervous system.
<b>ganglionic stimulant</b>	Drug that stimulates the nicotinicneural (Nn) receptors to increase autonomic nervous system activity.
<b>gastric lavage</b>	Flushing of the stomach.
<b>gastroparesis</b>	Condition, also called delayed gastric emptying, in which the stomach muscles do not function properly.
<b>general anesthesia</b>	Deep state of unconsciousness in which there is no response to stimuli, including painful stimuli.
<b>general anesthetic</b>	Drug that abolishes the response to pain by depressing the central nervous system (CNS) and producing loss of consciousness.
<b>generalized seizure</b>	Seizure originating and involving both cerebral hemispheres that may be either convulsive or nonconvulsive.
<b>generic name</b>	Nonproprietary name of a drug.
<b>GERD</b>	Gastroesophageal reflux disease.
<b>geriatrics</b>	Medical specialty that deals with individuals over 65 years of age.
<b>germ cells</b>	Cells that become the reproductive cells eggs (in ovary) or sperm (in testes).

<b>germicidal</b>	Substance, chemical solution, or drug that kills microorganisms.
<b>gigantism</b>	Increased secretion of growth hormone in childhood, causing excessive growth and height.
<b>GIP</b>	Glucose-dependent insulinotropic peptide, also known as gastric inhibitory peptide.
<b>GLP-1</b>	Glucagon-like peptide-1.
<b>glucagon</b>	Hormone released by the alpha cells of the pancreas to increase plasma glucose concentration.
<b>glucocorticoid</b>	Steroid produced within the adrenal cortex (or a synthetic drug) that directly influences carbohydrate metabolism and inhibits the inflammatory process.
<b>gluconeogenesis</b>	The synthesis of glucose from molecules that are not carbohydrates, such as amino and fatty acids or glycerol.
<b>GLUT</b>	Glucose transport proteins.
<b>glycated hemoglobin</b>	Form of hemoglobin that is produced when glucose attaches to hemoglobin in the RBC.
<b>glycogen</b>	The storage form of glucose in humans and animals.
<b>glycogenolysis</b>	Hydrolysis of glycogen to yield free glucose.
<b>glycosuria</b>	Presence of glucose in the urine.
<b>GnRH</b>	Gonadotropin releasing hormone (also called luteinizing releasing hormone); hormone released by the hypothalamus that stimulates the anterior pituitary to secrete LH and FSH.

<b>goiter</b>	Condition in which the thyroid is enlarged, but not as a result of a tumor.
<b>gonads</b>	Organs that produce male (testes) or female (ovaries) sex cells, sperm or ova.
<b>gram negative</b>	Bacteria that retain only the red stain in a gram stain.
<b>gram positive</b>	Bacteria that retain only the purple stain in a gram stain.
<b>gram stain</b>	Method of staining and identifying bacteria using crystal violet (purple) and safranin (red) stains.
<b>grand mal</b>	Older term for a generalized seizure characterized by full-body tonic and clonic motor convulsions.

<b>half-life</b>	Time required for the body to reduce the amount of drug in the plasma by one-half.
<b>hallucinogenic drug</b>	A drug or plant substance that produces psychotomimetic effects and sensory distortions.
<b>halogenated hydrocarbon</b>	Compound that contains halogen (chlorine, fluorine, bromine, iodine) combined with hydrogen and carbon.
<b>hashish</b>	Resin from the marijuana plant that contains higher levels of THC.
<b>hCG</b>	Human chorionic gonadotropin. A glycoprotein hormone produced in pregnancy to maintain progesterone production.
<b>heart rate (HR)</b>	Number of heartbeats per minute.
<b>heartburn (acid indigestion)</b>	A painful burning feeling behind the sternum that occurs when stomach acid backs up into the esophagus.
<b>hematinic</b>	Medications containing iron compounds, used to increase hemoglobin production.
<b>hematuria</b>	Appearance of blood or red blood cells in the urine.
<b>hemoglobin</b>	Protein in red blood cells that transports oxygen to all tissues of the body.
<b>hemorrhage</b>	Loss of blood from blood vessels.
<b>hemozoin</b>	Crystalline disposal product from the digestion of blood from blood-feeding parasites.

<b>hepatic microsomal metabolism</b>	Specific enzymes in the liver (P450 family) that metabolize some drugs and can be increased (stimulated) by some medications or decreased (inhibited) by other medications so that therapeutic drug blood levels are altered.
<b>hernia</b>	Protrusion of an organ through the tissue usually containing it; for example, intestinal tissue pushing outside the abdominal cavity, or stomach pushing into the diaphragm (hiatal hernia).
<b>high-density lipoprotein (HDL)</b>	One of the forms of cholesterol transported in the blood with lipoprotein; known as “good” cholesterol.
<b>hirsutism</b>	Condition usually in women in which body and facial hair is excessive.
<b>histamine</b>	Substance that interacts with tissues to produce most of the symptoms of allergy.
<b>HIV</b>	Human immunodeficiency virus, responsible for producing AIDS.
<b>hives</b>	A skin condition characterized by intensely itching wheals caused by an allergic reaction; also called urticaria.
<b>homeostasis</b>	Normal state of balance among the body's internal organs.
<b>H1N1</b>	subtype of the influenza type A virus; also referred to as swine flu or pig flu
<b>hormone</b>	Substance produced within one organ and secreted directly into the circulation to exert its effects at a distant location.
<b>hyperacidity</b>	Abnormally high degree of acidity (for example, pH less than 1) in the stomach.

<b>hyperalgesia</b>	An abnormally painful response to a stimulus.
<b>hypercalcemia</b>	Unusually high concentration of calcium in the blood; high serum calcium; elevated concentration of calcium ions in the circulating blood.
<b>hyperchloremia</b>	Abnormally high level of chloride ions circulating in the blood.
<b>hyperchlorhydria</b>	Excess hydrochloric acid in the stomach.
<b>hyperemia</b>	Increased blood flow to a body part like the eye; engorgement.
<b>hyperglycemia</b>	Higher than normal level of glucose in the blood; fasting blood glucose higher than 126 mg/dl.
<b>hyperinsulinemia</b>	High levels of insulin in the blood often associated with type 2 diabetes mellitus and insulin resistance.
<b>hyperkalemia</b>	High serum potassium.
<b>hyperlipidemia</b>	Abnormally high fat (lipid) levels in the plasma.
<b>hypermotility</b>	Increase in muscle tone or contractions causing faster clearance of substances through the GI tract.
<b>hyperpolarized</b>	An increase in the amount of electrical charge on either side of a cell membrane so that there is an increase in the electric potential across the membrane usually due to an outflow of potassium ions or an inflow of chloride ions. A change in the cell membrane potential that makes the inside of the cell even more negative, so it can't respond to stimulation.
<b>hypersensitivity</b>	Exaggerated response such as rash, edema, or anaphylaxis that develops following exposure to certain drugs or chemicals.
<b>hypertension</b>	Abnormally high blood pressure.

<b>hyperthermia</b>	Abnormally high body temperature.
<b>hypertonic</b>	A condition where the concentration of salt (sodium, electrolytes) is greater than that found inside the cells.
<b>hypervitaminosis</b>	The accumulation of vitamins (fat soluble) in storage tissues that creates a deleterious condition related to the excess substance.
<b>hypnotic</b>	Drug used to induce and maintain sleep.
<b>hypochloremia</b>	Abnormally low level of chloride ions circulating in the blood.
<b>hypochromic</b>	Condition in which the color of red blood cells is less than the normal index.
<b>hypoglycemia</b>	Lower than the normal range of plasma glucose concentration in the blood; fasting blood glucose below 40 mg/dl in women or 50 mg/dl in men accompanied by symptoms of diabetes.
<b>hypokalemia</b>	Abnormally low level of potassium ions circulating in the blood; low serum potassium; decrease in the normal concentration of potassium in the blood.
<b>hypolipidemic drug</b>	Drug used to lower plasma lipid levels, also referred to as an antilipemic drug.
<b>hyponatremia</b>	Abnormally low level of sodium ions circulating in the blood.
<b>hypophosphatemia</b>	Abnormally low concentrations of phosphate in the circulating blood.

<b>hypophosphatemia</b>	Abnormally low concentrations of phosphate in the circulating blood.
<b>hypothalamus</b>	Part of the brainstem that regulates functions such as body temperature, water balance, appetite, and the pituitary gland; center of the brain that influences mood, motivation, and the perception of pain.
<b>hypotonic</b>	A condition where the concentration of salt (sodium, electrolytes) is less than that found inside the cells.
<b>hypoxia</b>	Reduction of oxygen supply to tissues below the amount required for normal physiological function.

<b>IA (intra-articular)</b>	Joint space into which drug is injected.
<b>IBS (irritable bowel syndrome)</b>	A functional disorder of the colon with abdominal pain, cramping, bloating, diarrhea, and/or constipation.
<b>IGF (insulin-like growth factor)</b>	A stimulator of cell growth and proliferation.
<b>immunity</b>	Condition that causes individuals to resist acquiring or developing a disease or infection.
<b>immunomodulation</b>	Ability to stimulate and increase immune function.
<b>immunopharmacology</b>	Study of drugs with immunosuppressive and immunomodulating actions.
<b>immunosuppressed</b>	Having inhibition of the body's immune response (ability to fight infection), usually induced by drugs or viruses.
<b>immunosuppression</b>	Ability to reduce the activity of the immune system.
<b>improper fraction</b>	Fraction that has a value equal to or greater than 1.
<b>incompatibility</b>	Undesirable interaction of drugs not suitable for combination or administration together.
<b>incretins</b>	A group of gastrointestinal hormones that increase the amount of insulin released.
<b>individual variation</b>	Difference in the effects of drugs and drug dosages from one person to another.
<b>induction of general anesthesia</b>	Time required to take a patient from consciousness to Stage III of anesthesia.

<b>infarction</b>	Area of tissue that has died because of a sudden lack of blood supply.
<b>infiltration anesthesia</b>	Injection of a local anesthetic directly into the tissue.
<b>inflammation</b>	Condition in which tissues have been damaged, characterized by swelling, pain, heat, and sometimes redness.
<b>insulin</b>	Hormone secreted by the beta cells of the pancreas to facilitate glucose entry into the cell.
<b>insulin-like growth factor (IGF)</b>	A stimulator of cell growth and proliferation.
<b>interferon</b>	Chemical mediator produced by immune cells that increases immune function.
<b>interleukin</b>	Chemical mediator produced by immune cells that helps regulate and increase immune function.
<b>intermittent claudication</b>	Severe pain in the calf muscles that occurs while walking, but subsides with rest.
<b>intolerant</b>	Not able to continue drug therapy usually because of extreme sensitivity to the side effects.
<b>intoxication</b>	State in which a substance has accumulated to potentially harmful levels in the body.
<b>intra-articular (IA)</b>	Joint space into which drug is injected.
<b>intra-dermal anesthesia</b>	Injection of a local anesthetic into the part of the skin called the dermis.

<b>intramuscular (IM) injection</b>	Route of drug administration; drug is injected into gluteal or deltoid muscles.
<b>intrathecal</b>	Space around the brain and spinal cord that contains the cerebrospinal fluid.
<b>intravenous (IV) injection</b>	Route of drug administration; drug is injected directly into a vein.
<b>intrinsic factor</b>	Protein necessary for intestinal absorption of vitamin B12; lack of intrinsic factor leads to pernicious anemia.
<b>iodophor</b>	Compound containing iodine.
<b>irrigation</b>	Washing (lavage) of a wound or cavity with large volumes of fluid.
<b>irritable bowel syndrome (IBS)</b>	A functional disorder of the colon with abdominal pain, cramping, bloating, diarrhea, and/or constipation.
<b>ischemia</b>	Insufficient blood supply (and oxygen) to meet the needs of the tissue or organ; condition of insufficient tissue blood flow; reduction in blood supply and oxygen to localized area of the body or tissue insufficient blood flow to a tissue.
<b>islets</b>	Group or island of cells.
<b>isotonic</b>	Normal salt concentration of most body fluids; a salt concentration of 0.9 percent.
<b>IV fluid therapy</b>	The infusion of large amounts of fluid into a vein to increase blood volume or supply nourishment.

<b>keratinized</b>	Composed of a protein substance largely found in hair and nails.
<b>kerion</b>	An inflammation of the hair follicles of the beard or scalp caused by ringworm with swelling and pus.
<b>ketosis</b>	Condition associated with an increased production of ketone bodies as a result of fat metabolism.

<b>lactation</b>	Production of milk in female breasts.
<b>lavage</b>	Washing with fluids or flushing of a cavity such as the stomach.
<b>laxative</b>	A substance that promotes bowel movements.
<b>LD50</b>	Lethal dose 50, or dose that will kill 50 percent of the laboratory animals tested.
<b>leucopenia (leukopenia)</b>	An abnormal decrease (less than normal) in the number of circulating white blood cells; condition in which the total number of white blood cells circulating in the blood is less than normal.
<b>leukotrienes</b>	Chemical mediators involved in inflammation and asthma.
<b>LH</b>	Luteinizing hormone in the female stimulates ovulation, and in the male stimulates testosterone synthesis and release; in the male also called ISCH (interstitial cell stimulating hormone).
<b>limbic system</b>	Neural pathway connecting different brain areas involved in regulation of behavior and emotion.
<b>lipodystrophy</b>	Defective metabolism of fat.
<b>lipoprotein</b>	A molecule that contains a protein and a lipid (fat).
<b>lithium</b>	An element similar to sodium that is used in the treatment of mania and bipolar mood disorder.
<b>loading dose</b>	Initial drug dose administered to rapidly achieve therapeutic drug concentrations.
<b>local anesthetic</b>	Drug that reduces response to pain by affecting nerve conduction. The action can be limited to an area of the body according to the site of administration.

<b>low-density lipoprotein (LDL)</b>	One of the forms of cholesterol transported in the blood with lipoprotein; known as "bad" cholesterol.
<b>lymphokine</b>	A substance secreted by T cells that signals other immune cells like macrophages to aggregate.
<b>lymphopenia</b>	Decrease in the number of circulating lymphocytes.
<b>lyse</b>	To disintegrate or dissolve.
<b>lysosome</b>	Part of a cell that contains enzymes capable of digesting or destroying tissue/proteins.



<b>maintenance dose</b>	Dose administered to maintain drug blood levels in the therapeutic range; daily dosage of cardiac glycoside that maintains effective drug levels in the blood.
<b>maintenance of general anesthesia</b>	Ability to keep a patient safely in Stage III of anesthesia.
<b>major depressive disorder (MDD)</b>	Depression that arises from within an individual and requires psychotherapy and drug treatment.
<b>malabsorption</b>	Inadequate ability to take in nutrients through the intestine.
<b>malaria</b>	Protozoal infection characterized by attacks of chills, fever, and sweating.
<b>malignant</b>	Life-threatening; refers to growth of a cancerous tumor.
<b>malignant hypertension</b>	Condition of hypertensive crisis where the high BP is causing vascular inflammation and necrosis of the blood vessels; hypertensive crisis associated with inflammation and vascular damage.
<b>malignant hyperthermia</b>	Condition in susceptible individuals resulting in a life-threatening elevation in body temperature.
<b>mania</b>	Mental state of excitement, hyperactivity, and excessive elevation of mood.
<b>mechanism of action</b>	Explanation of how a drug produces its effects.
<b>medulla oblongata</b>	Lower part of the brainstem that controls cardiac, vasomotor, and respiratory functions.
<b>medullary depression</b>	Inhibition of automatic responses controlled by the medulla, such as breathing or cardiac function.

<b>medullary paralysis</b>	Condition in which overdose of anesthetic shuts down cardiovascular and respiratory centers in the medulla, causing death.
<b>mega-</b>	Prefix meaning large.
<b>megaloblast</b>	Large, immature cell that cannot yet function as a mature red blood cell (RBC).
<b>megaloblastic anemia</b>	Condition in which there is a large, immature form of the red blood cell, which does not function as efficiently as the mature form.
<b>meiosis</b>	Type of cell division where diploid parent cells (46 chromosomes) divide, producing haploid cells (23 chromosomes); occurs only during gamete production.
<b>menarche</b>	First menstruation (endometrial tissue sloughing) during puberty.
<b>menopause</b>	Condition in which menstruation no longer occurs, either because of the normal aging process in women (45 years of age and older) or because the ovaries have been surgically removed (any age); the clinical effects of menopause are a direct result of little or no estrogen secretion.
<b>menstruation</b>	shedding of endometrial tissue with accompanying bleeding; the first day of the menstrual cycle.
<b>metabolic waste products</b>	Substances formed through the chemical processes that enable cells to function; usually, these substances are excreted by the body.
<b>metastasis</b>	Spread of cancer cells throughout the body, from primary to secondary sites.

<b>methemoglobin</b>	An altered hemoglobin that can no longer carry oxygen due to a change (oxidation) in iron from ferrous (Fe <sup>2+</sup> ) to ferric state (Fe <sup>3+</sup> ).
<b>micro-</b>	Prefix meaning small.
<b>microcilia</b>	Tiny hairs that line the respiratory tract and continuously move, pushing secretions toward the mouth.
<b>microfilaments</b>	Minute fibers located throughout the cytoplasm of cells, composed of the protein actin, that maintain the structural integrity of a cell.
<b>mineralocorticoid</b>	Steroid produced within the adrenal cortex that directly influences sodium and potassium metabolism.
<b>miotic</b>	A substance that causes constriction of the pupil or miosis.
<b>mitochondria</b>	Normal structures responsible for energy production in cells.
<b>mitosis</b>	Cell division in which two daughter cells receive the same number of chromosomes (46) as the parent cell; the process in cell division by which the nucleus divides.
<b>mixed-function oxidase system</b>	Drug microsomal metabolizing enzymes (DMMS) that decrease with age and slow the rate of drug oxidation and metabolism.
<b>mixed number</b>	Number written with both a whole number and a fraction.
<b>moniliasis</b>	Fungal infection previously called monilia, now known to be <i>Candida albicans</i> .

<b>monoamine oxidase (MAO)</b>	Enzyme that inactivates norepinephrine and serotonin.
<b>Monoamine Theory of Mental Depression</b>	Theory that mental depression is caused by low brain levels of norepinephrine and serotonin (monoamines).
<b>monophasic</b>	A fixed amount (nonchanging) of estrogen is released during the cycle.
<b>morphology</b>	Shape or structure of a cell.
<b>mucolytic</b>	Drug that liquefies bronchial secretions.
<b>mucopolysaccharide</b>	Naturally occurring substance formed by the combination of protein with carbohydrates (saccharides).
<b>mu-opioid receptor antagonist</b>	Drugs that block the mu protein receptor for opioids.
<b>muscarinic receptor</b>	An older but more specific term for the cholinergic receptor on smooth and cardiac muscle.
<b>mutagenic</b>	Having the ability to cause mutations.
<b>myalgia</b>	Pain associated with muscle injury.
<b>mycosis</b>	Any disease caused by a fungus.
<b>myelin</b>	The fatty substance that covers and protects nerves and allows efficient conduction of action potentials down the axon.
<b>myelosuppression</b>	Suppression of bone marrow activity that interferes with the production of all blood cells; causes anemia, increased infections, and bleeding problems.

<b>myocardial infarction (MI)</b>	Sudden death of an area of heart muscle, commonly referred to as a heart attack.
<b>myocardium</b>	The muscular layer of the heart.
<b>myoclonic</b>	Generalized seizures that are usually brief and often confined to one part of the body.
<b>myxedema</b>	Condition associated with a decrease in thyroid function, caused by removal of thyroid tissue or loss of tissue function because of damage to cells; also associated with subcutaneous edema and slowed metabolism.

<b>Na/K adenosine triphosphatase (Na/K ATPase)</b>	Enzyme that energizes the sodium/potassium pump and is inhibited by cardiac glycosides.
<b>native</b>	Natural substance in the body.
<b>nephritis</b>	Inflammation of the glomeruli often following a streptococcus infection.
<b>nephrosis</b>	A degenerative disease of the kidneys, characterized by generalized edema, protein in the urine, and an increase in serum cholesterol.
<b>nerve conduction</b>	Transfer of impulses along a nerve by the movement of sodium and potassium ions.
<b>neuroleptanalgesia</b>	Condition in which a patient is quiet and calm and has no response to pain after the combined administration of an opioid analgesic (fentanyl) and a tranquilizer (droperidol).
<b>neuroleptanesthesia</b>	State of unconsciousness plus neuroleptanalgesia produced by the combined administration of nitrous oxide, fentanyl, and droperidol.
<b>neuroleptic malignant syndrome (NMS)</b>	Toxic syndrome associated with the use of antipsychotic drugs.
<b>neuromuscular junction (NMJ)</b>	Space (synapse) between a motor nerve ending and a skeletal muscle membrane that contains acetylcholine (ACH) receptors.
<b>neuropathic pain</b>	Pain resulting from a damaged nervous system or damaged nerve cells.

<b>neurotransmitter</b>	Substance that stimulates internal organs to produce characteristic changes associated with sympathetic and parasympathetic divisions.
<b>neurotransmitter-gated ion channel</b>	Ion channels that open or close when a neurotransmitter binds to a receptor.
<b>neutropenia</b>	An abnormally low number of neutrophils (white blood cells).
<b>nicotine</b>	Alkaloid drug in tobacco that stimulates ganglionic receptors.
<b>nicotinic-muscle (Nm) receptor</b>	Cholinergic receptor located at the neuromuscular junction of skeletal muscle.
<b>nicotinic-neural (Nn) receptor</b>	Cholinergic receptor at the autonomic ganglia; cholinergic receptor located on both sympathetic and parasympathetic ganglia.
<b>NMJ (neuromuscular junction)</b>	Space (synapse) between a motor nerve ending and a skeletal muscle membrane that contains acetylcholine (ACH) receptors.
<b>nociceptor</b>	Specialized peripheral nerve cells sensitive to tissue injury that transmit pain signals to the brain for interpretation of pain.
<b>nonbarbiturate</b>	Refers to sedative-hypnotic drugs that do not possess the barbituric acid structure, such as benzodiazepines and related drugs.
<b>nondepolarizing blocker</b>	Produces paralysis by inhibiting nerve transmission.

<b>nonopioid analgesic</b>	Formerly known as nonnarcotic analgesics, such as NSAIDs and COX-2 inhibitors.
<b>nonprescription, over-the-counter (OTC) drug</b>	Drug that can be purchased without the services of a physician.
<b>nonselective</b>	Interacts with any subtype receptor.
<b>nonselective beta-adrenergic blocker</b>	Drug that blocks both beta-1 and beta-2 adrenergic receptors.
<b>nonselective beta-adrenergic drug</b>	Drug that stimulates both beta-1 and beta-2 receptors.
<b>norepinephrine (NE)</b>	Neurotransmitter of sympathetic (adrenergic) nerves that stimulates the adrenergic receptors.
<b>normocytic anemia</b>	Anemia in which RBCs are normal size and usually contain normal hemoglobin but are insufficient to carry adequate oxygen to the tissues; low RBC count.
<b>nosocomial</b>	Infection acquired as a result of being in a hospital.
<b>NREM sleep</b>	Stages of sleep characterized by nonrapid eye movement (NREM).
<b>nucleoside</b>	Molecule that contains purine or pyrimidine bases in combination with sugar (ribose or deoxyribose linkage).
<b>numerator</b>	Top number of a fraction; shows the part.

<b>oligospermia</b>	Reduced sperm count.
<b>oliguria</b>	Condition in which very small amounts of urine are produced.
<b>on-off phenomenon</b>	Alternating periods of movement mobility and immobility.
<b>onychomycosis</b>	A fungus infection of the nail; <i>onycho-</i> : pertaining to a claw or nail.
<b>oocyst</b>	A thick-walled structure in which parasitic protozoal sex cells develop for transfer to new hosts.
<b>oocyte</b>	the immature female reproductive cell prior to fertilization.
<b>oogenesis</b>	Formation of ova.
<b>opiate</b>	Drug derived from opium and producing the same pharmacological effects as opium.
<b>opioid</b>	Drug that produces the same pharmacological effects as opium and its family of drugs or the neuropeptides (enkephalin, endorphin) produced by the body.
<b>opioid analgesics</b>	Chemically related to morphine or opium and used to relieve pain.
<b>opioid antagonist</b>	A drug that attaches to opioid receptors and displaces the opioid analgesic or opioid neuropeptide.
<b>opportunistic organism</b>	Microorganism capable of causing disease only when the resistance (immunocompetence) of the host is impaired.
<b>oral administration</b>	Route of drug administration by way of the mouth through swallowing.

<b>osmolality</b>	The concentration of particles dissolved in a fluid.
<b>osmolarity</b>	A measure of hydration status; the amount of solute (ions, salts) per liter of solution (blood, plasma).
<b>osmoreceptors</b>	Specialized cells in the hypothalamus that respond to changes in sodium concentration (osmolarity) in the blood.
<b>osmosis</b>	Process in which water moves across membranes following the movement of sodium ions.
<b>osteoblasts</b>	Synthesize bone matrix proteins and promote crystal nucleation; contain receptors for PTH, vitamin D3, and estrogen.
<b>osteoclasts</b>	Responsible for bone resorption by binding to bone matrix proteins and releasing enzymes to break down bone.
<b>osteoporosis</b>	Condition associated with a decrease in bone density so that the bones are thin and fracture easily; decrease in the bone mineral density, usually in the elderly, that results in areas predisposed to fracture.
<b>ova</b>	Mature eggs, also termed oogonia. <i>Ovum</i> is singular; <i>ova</i> is plural.
<b>ovulation</b>	Release of an egg from the ovary.
<b>oxyntic (parietal) cell</b>	Cell that synthesizes and releases hydrochloric acid (HCl) into the stomach lumen.
<b>oxytocin</b>	Polypeptide substance released within the brain that has specific functions during and after pregnancy, specifically relating to the uterus and the mammary glands.

<b>parasympathetic</b>	Refers to nerves of the ANS that originate in the brain and sacral portion of the spinal cord; they are active when the body is at rest or trying to restore body energy and function.
<b>parasympatholytic</b>	Refers to drugs (anticholinergic) that decrease activity of the parasympathetic nervous system.
<b>parasympathomimetic</b>	Refers to drugs (cholinergic) that mimic stimulation of the parasympathetic nervous system.
<b>parenteral administration</b>	Route of drug administration that does not involve the gastrointestinal (GI) tract.
<b>parietal (oxyntic) cell</b>	Cell that synthesizes and releases hydrochloric acid (HCl) into the stomach lumen.
<b>parkinsonism</b>	Symptoms of Parkinson's disease, which include resting tremor, muscle rigidity, and disturbances of movement and postural balance; disease or drug-induced condition characterized by muscular rigidity, tremors, and disturbances of movement.
<b>Parkinson's disease</b>	Movement disorder of the basal ganglia caused by a deficiency of dopamine.
<b>partial seizure</b>	Seizure originating in one area of the brain that may spread to other areas.
<b>pathogen(ic)</b>	Type of bacteria that cause disease; a microorganism that causes disease.
<b>PCT (proximal convoluted tubule)</b>	Part of the nephron that is closest to the glomerulus.
<b>penicillinase</b>	Bacterial enzymes that inactivate penicillin antibiotics.

<b>pepsin</b>	Enzyme that digests protein in the stomach.
<b>percent</b>	Decimal fraction with a denominator of 100.
<b>percent composition</b>	Common measure of solution concentration; refers to grams of solute per 100 ml of solution.
<b>perforation</b>	Opening in a hollow organ, such as a break in the intestinal wall.
<b>perimenopause</b>	Two to ten years before complete cessation of a menstrual period.
<b>peripheral artery disease (PAD)</b>	Any disease caused by the obstruction of blood flow in the large arteries of the arms and legs; usually a narrowing and hardening of these arteries that supply the legs and feet.
<b>peripheral nerve</b>	Part of the nervous system that is outside the central nervous system (the brain or spinal cord), usually near the surface of the tissue fibers or skin.
<b>peripheral resistance (PR)</b>	Resistance generated by the flow of blood through the arteries.
<b>peripheral skeletal muscle relaxant</b>	Drug that inhibits muscle contraction at the neuromuscular junction or within the contractile process.
<b>peristalsis</b>	Movement characteristic of the intestines, in which circular contraction and relaxation propel the contents toward the rectum.
<b>permissive</b>	Enables another hormone to fully function.
<b>pernicious</b>	Disease of severe symptoms, which could be fatal if left untreated.

<b>petechia</b>	Small area of the skin or mucous membranes that is discolored because of localized hemorrhages.
<b>phagocyte</b>	Circulating cell (such as a leukocyte) that ingests waste products or bacteria in order to remove them from the body.
<b>pharmacokinetics</b>	Describes the processes of drug absorption, drug distribution, drug metabolism, and drug excretion.
<b>pharmacology</b>	Study of drugs.
<b>phlebitis</b>	Inflammation of a vein.
<b>phlegm</b>	Secretion from the respiratory tract; usually called mucus.
<b>physical dependence</b>	Condition in which the body requires a substance (drug) not normally found in the body in order to avoid symptoms associated with withdrawal, or the abstinence syndrome.
<b>plaque</b>	Substance containing cholesterol, dead cell products, and calcium that accumulates in the innermost layer of the arteries.
<b>pluripotent</b>	Ability of a substance to produce many different biological responses.
<b>polydipsia</b>	Excessive thirst; increased thirst.
<b>polypeptide</b>	Substance, usually large, composed of an indefinite number of amino acids.
<b>polyphagia</b>	Excessive hunger.
<b>polypharmacy</b>	The situation in patients whose treatment involves multiple drug prescriptions.

<b>polyuria</b>	Excessive urine production; increased urination.
<b>pons</b>	Part of the brainstem that serves as a relay station for nerve fibers traveling to other brain areas; also involved in sensory and motor functions.
<b>porphyria (acute)</b>	A genetic disease associated with excessive liver production of delta-aminolevulonic acid and characterized by intermittent hypertension, abdominal cramps, and psychosis.
<b>postpartum</b>	After childbirth.
<b>postprandial</b>	After a meal.
<b>potency</b>	Measure of the strength, or concentration, of a drug required to produce a specific effect.
<b>potentiates</b>	Produces an action that is greater than either of the components can produce alone; synergy.
<b>preferred anesthetic</b>	Produces adequate anesthesia with minimal side effects.
<b>preload</b>	Refers to venous return, the amount of blood returning to the heart that must be pumped.
<b>premature atrial contraction (PAC)</b>	Premature contraction of the atria, usually caused by an ectopic focus.
<b>premature ventricular contraction (PVC)</b>	Premature contraction of the ventricles, usually caused by an ectopic focus.

<b>prescription drug</b>	Drug for which dispensing requires a written or phone order that can only be issued by or under the direction of a licensed physician.
<b>pressor</b>	Tending to increase blood pressure.
<b>proarrhythmia</b>	An arrhythmia caused by administration of an antiarrhythmic drug.
<b>prodrug</b>	An inactive precursor of a drug, converted into its active form in the body by normal metabolic processes.
<b>prohormone (anabolic androgen)</b>	After ingestion is converted to the hormone testosterone.
<b>proinflammatory</b>	Tending to cause inflammation.
<b>proper fraction</b>	Fraction that has a value less than 1.
<b>prophylactic</b>	Process or drug that prevents the onset of symptoms (or disease) as a result of exposure before the reactive process can take place.
<b>prophylaxis</b>	Treatment or drug given to prevent a condition or disease; procedure or medication to prevent a disease, rather than to treat an existing disease.
<b>proportion</b>	A mathematical equation that expresses the equality between two ratios.
<b>prostaglandin</b>	Substance naturally found in certain tissues of the body; can stimulate uterine and intestinal muscle contractions and may cause pain by stimulating nerve endings; chemical mediators released from mast and other cells involved in inflammatory and allergic conditions.

<b>proteolytic</b>	Action that causes the decomposition or destruction of proteins.
<b>protozoacidal</b>	A substance, chemical solution, or drug that kills protozoa.
<b>protozoan</b>	Single-celled organism belonging to the genus <i>Protozoa</i> .
<b>proximal convoluted tubule (PCT)</b>	Part of the nephron that is closest to the glomerulus.
<b>psychomotor stimulant</b>	Amphetamine or related drug that increases mental and physical activity.
<b>psychosis</b>	Form of mental illness that produces bizarre behavior and deterioration of the personality.
<b>psychotomimetic drug</b>	Drug or substance that can induce psychic and behavioral patterns characteristic of a psychosis.
<b>puberty</b>	Sequence of physiological changes associated with the expression of sexual characteristics and reproductive function that occur when a child progresses into young adulthood, usually at 12 to 14 years of age.



<b>radical cure</b>	Arresting of malaria, in which protozoal parasites are eliminated from all tissues.
<b>ratio</b>	The relationship of one number to another expressed by whole numbers (1:5) or as a fraction (1/5).
<b>RBC</b>	Red blood cell.
<b>receptor</b>	Specific cellular structure that a drug binds to and that produces a physiologic effect.
<b>recombinant</b>	Genetically engineered DNA.
<b>referred pain</b>	Origin of the pain is in a different location than where the individual feels the pain.
<b>refractory</b>	Unable to produce an increased response even though the stimulation or amount of drug has been increased.
<b>regional nerve block</b>	Also called nerve block; the injection of a local anesthetic near the nerve root.
<b>REM sleep</b>	Stage of sleep characterized by rapid eye movement (REM) and dreaming.
<b>remission</b>	Period when cancer cells are not increasing in number.
<b>renin</b>	Enzyme released by the kidneys that converts angiotensinogen into angiotensin I.
<b>replacement therapy</b>	Administration of a naturally occurring substance that the body is not able to produce in adequate amounts to maintain normal function.

<b>repolarization</b>	Return of the electric potential across a cell membrane to its resting state following depolarization.
<b>repository preparation</b>	Preparation of a drug, usually for intramuscular or subcutaneous injection, that is intended to leach out from the site of injection slowly so that the duration of drug action is prolonged.
<b>reticular formation</b>	Network of nerve fibers that travel throughout the central nervous system that regulates the level of wakefulness.
<b>Reye's syndrome</b>	A potentially fatal illness characterized by vomiting, an enlarged liver, convulsions, and coma, in children and adolescents; linked to the use of salicylates in the management of influenza, usually type B, or chickenpox.
<b>rhabdomyolysis</b>	The rapid breakdown of skeletal muscle (rhabdomyon) due to muscle injury.
<b>rheumatic fever</b>	Condition in which pain and inflammation of the joints or muscles are accompanied by elevated body temperature usually a complication of untreated Strep throat.
<b>rigidity</b>	A stiffness and inflexibility of movement.

<b>SA</b>	Sinoatrial, as in the SA node.
<b>salicylism</b>	Condition in which toxic doses of salicylates are ingested, resulting in nausea, tinnitus, and delirium.
<b>sarcolemma</b>	A thin membrane enclosing a striated (skeletal) muscle fiber.
<b>sarcoplasm</b>	The cytoplasm of a striated (skeletal) muscle fiber.
<b>sarcoplasmic reticulum</b>	Specialized organelle in the muscle cell that releases calcium ions during muscle contraction and absorbs calcium ions during relaxation.
<b>schizophrenia</b>	Major form of psychosis; behavior is inappropriate.
<b>Schwann cell</b>	Any cell that covers the axons in the peripheral nervous system and forms the myelin sheath.
<b>sebum</b>	A lipid substance secreted by glands in the skin to lubricate the skin everywhere but the palms and soles.
<b>secondary hypertension</b>	Form of hypertension in which the cause is known.
<b>sedative</b>	Drug used to produce mental relaxation and to reduce the desire for physical activity.
<b>seizure</b>	Abnormal discharge of brain neurons that causes alteration of behavior and/or motor activity.
<b>selective</b>	Interacts with one subtype of receptor over others.
<b>selective beta-1 adrenergic blocker</b>	Drug that blocks only beta-1 receptors.

<b>selective beta-2 adrenergic drug</b>	Drug that stimulates only beta-2 receptors at therapeutic doses.
<b>selective COX-2 inhibitors</b>	Drugs that only interact with one of the enzymes in the cyclooxygenase family.
<b>sensitize</b>	To induce or develop a reaction to naturally occurring substances (allergens) as a result of repeated exposure.
<b>side effect</b>	Drug effect other than the therapeutic effect that is usually undesirable but not harmful.
<b>site of action</b>	Location within the body where a drug exerts its therapeutic effect, often a specific drug receptor.
<b>solute</b>	Substance dissolved in a solvent; usually present in a lesser amount.
<b>solution</b>	Homogeneous mixture of two or more substances.
<b>solvent</b>	Liquid portion of a solution that is capable of dissolving another substance.
<b>somatomedins</b>	Peptides in the plasma that stimulate cellular growth and have insulin-like activity.
<b>somatostatin</b>	An inhibitory hormone that blocks the release of somatotropin (GH) and thyroid-stimulating hormone (TSH).
<b>somatotropin</b>	Another term for growth hormone (GH).
<b>spasmogenic</b>	Causing a muscle to contract intermittently, resulting in a state of spasms.
<b>spasmolytics</b>	Drugs that relieve, interrupt, or prevent muscle spasms (intermittent muscle contractions often associated with pain).

<b>spermatogenesis</b>	Formation of spermatozoa.
<b>spermatogonia</b>	Intermediary kind of male germ cell in the production of spermatozoa.
<b>spermatozoa</b>	Mature sperm cells (singular <i>spermatozoon</i> ).
<b>spinal anesthesia</b>	Injection of a local anesthetic into the subarachnoid space.
<b>SSRIs</b>	Selective serotonin reuptake inhibitors, a class of antidepressant drugs.
<b>stable plaque</b>	Plaque formed in the artery wall that remains in the wall.
<b>-static</b>	Suffix denoting the inhibition of, as of microorganisms.
<b>status epilepticus</b>	Continuous series of generalized tonic and clonic seizures, a medical emergency requiring immediate treatment.
<b>sterilization</b>	Process that results in destruction of all microorganisms.
<b>steroid</b>	Member of a large family of chemical substances (hormones, drugs) containing a structure similar to cortisone (tetracyclic cyclopenta-a-phenanthrene).
<b>stroke</b>	Loss of brain function due to a loss of blood supply.
<b>stroke volume (SV)</b>	Amount of blood pumped per heartbeat.
<b>suppression therapy</b>	Taking the drug daily even when there are no observable acute symptoms.
<b>supraventricular arrhythmia</b>	Arrhythmia that originates above the AV node in the atria.

<b>suspension</b>	Preparation in which undissolved solids are dispersed within a liquid.
<b>sympathetic</b>	Refers to nerves of the ANS that originate from the thoracolumbar portion of the spinal cord; they are active when the body is under stress or when it is exerting energy.
<b>sympatholytic</b>	Refers to the action of an adrenergic blocking drug or an action that decreases sympathetic activity.
<b>sympathomimetic</b>	Refers to the action of an adrenergic drug or an action that increases sympathetic activity.
<b>synaptic knob</b>	Contains vesicles that store and release neurotransmitters.
<b>synaptic vesicles</b>	A small membrane-bound structure in the axon terminals of nerve cells that contains neurotransmitters and releases them when an action potential reaches the terminal.
<b>synergistic</b>	Complementary or additive.
<b>synergism</b>	When the action resulting from a combination of drugs is greater than the sum of their individual drug effects.
<b>synesthesia</b>	Distortion of sensory perception; usually associated with the use of LSD.
<b>synthetic drug</b>	Drug produced by a chemical process outside the body.
<b>systemic</b>	Occurring in the general circulation, resulting in distribution to most organs.

<b>T3 and T4</b>	Hormones (triiodothyronine and thyroxine, respectively) synthesized and released by the thyroid gland. Synthesized T4 must be converted to T3 to be utilized by the cell.
<b>tardive dyskinesia</b>	Drug-induced involuntary movements of the lips, jaw, tongue, and extremities.
<b>target organ</b>	Specific tissue where a hormone exerts its action.
<b>TCAs</b>	Tricyclic antidepressants, a class of antidepressant drugs.
<b>tenesmus</b>	A painful spasm of the anal sphincter, causing an urgent desire to defecate although little or no material is passed.
<b>teratogenic</b>	Capable of causing birth defects or fetal abnormalities or development; capable of causing abnormal development.
<b>tetany</b>	A strong sustained muscle contraction.
<b>tetrahydrocannabinol (THC)</b>	Active ingredient of the marijuana plant.
<b>thalamus</b>	Uppermost part of the brainstem that regulates sensory and motor impulses traveling to and from the cerebral cortex.
<b>therapeutic dose</b>	The amount (dose) of drug required to produce the desired change in the disease or condition.
<b>therapeutic effect</b>	Desired drug effect to alleviate some condition or symptom of disease.
<b>therapeutic index (TI)</b>	Ratio of the LD50 to the ED50 in animal studies.
<b>thrombocyte</b>	Cell in the blood, commonly called a platelet, that is necessary for coagulation.

<b>thrombocytopenia</b>	An abnormal decrease in the number of circulating platelets.
<b>thromboembolism</b>	Clots that jam a blood vessel; formed by the action of platelets and other coagulation factors in the blood.
<b>thrombophlebitis</b>	Inflammation of the walls of the veins, associated with clot formation.
<b>thrombus</b>	Clot formed by the action of coagulation factors and circulating blood cells.
<b>thrush</b>	Term used for <i>Candida</i> infection in the mucous membranes of the mouth and pharynx.
<b>thyrotoxic crisis</b>	Condition caused by excessive quantities of thyroid hormone, from either a natural source of hypersecretion or exogenous administration of a drug.
<b>thyroxine (T4)</b>	Hormone synthesized and released by the thyroid gland.
<b>TIA (transient ischemic attack)</b>	An interruption of blood flow to the brain for a short period of time; a ministroke that produces stroke-like symptoms but no lasting damage.
<b>tolerance</b>	Ability of the body to alter its response (to adapt) to drug effects so that the effects are minimized over time.
<b>tonic</b>	Convulsive muscle contraction characterized by sustained muscular contractions.
<b>tonic-clonic</b>	Generalized seizure characterized by fullbody tonic and clonic motor convulsions and loss of consciousness.
<b>topical application</b>	Placing a drug on the surface of the skin or a mucous membrane (for example, mouth, rectum).

<b>toxic effect</b>	Undesirable drug effect that implies drug poisoning; can be very harmful or life-threatening.
<b>TPN</b>	Total parenteral nutrition; a combination of nutrients that may include amino acids, carbohydrates, vitamins, and minerals (electrolytes) that is infused into patients who cannot absorb these substances from the gastrointestinal tract because of condition or disease; the combination and concentration of nutrients vary according to patient need.
<b>trade name</b>	Patented proprietary name of drug sold by a specific drug manufacturer; also referred to as the brand name.
<b>transdermal absorption</b>	Absorption of drug (substance) through the skin, usually associated with the application of drug-loaded patches.
<b>transient ischemic attack (TIA)</b>	An interruption of blood flow to the brain for a short period of time; a ministroke that produces stroke-like symptoms but no lasting damage.
<b>transit time</b>	Amount of time it takes for food to travel from the mouth to the anus.
<b>tremor</b>	A trembling and involuntary rhythmic movement.
<b>TRH</b>	Thyroid-releasing hormone, secreted by the hypothalamus.
<b>trichomoniasis</b>	Infection caused by the <i>Trichomonas</i> organism; a sexually transmitted disease.
<b>triglyceride</b>	A fat formed by three fatty acids into one molecule that supplies energy to muscle cells.
<b>triiodothyronine (T3)</b>	Hormone synthesized and released by the thyroid gland.

<b>triphasic</b>	The estrogen and progestin amounts released may vary during the cycle.
<b>tropic</b>	Having an affinity for the designated organ; for example, adrenotropic.
<b>tropic hormone</b>	Hormone secreted by the anterior pituitary that binds to a receptor on another endocrine gland.
<b>TSH</b>	Thyroid-stimulating hormone, secreted by the anterior pituitary.
<b>tubular reabsorption</b>	Process in which the nephrons return to the blood substances (ions, nutrients) that were filtered out of the blood at the glomerulus.
<b>tubular secretion</b>	Process in which the nephrons produce and release substances (ions, acids, and bases) that facilitate sodium ion reabsorption and maintain acid-base balance.
<b>tumor</b>	Uncontrolled growth of abnormal cells that form a solid mass; also called a neoplasm.

<b>ulcer</b>	Open sore in the mucous membranes or mucosal linings of the body.
<b>ulcerogenic</b>	Capable of producing minor irritation or lesions to an integral break in the mucosal lining (ulcer).
<b>unstable plaque</b>	Plaque formed in the artery wall that can break away and obstruct blood flow or form a clot.
<b>uremia</b>	Accumulation of nitrogen waste materials (for example, urea) in the blood.
<b>urticaria</b>	Intensely itching raised areas of skin caused by an allergic reaction; hives.

<b>vagolytic action</b>	Inhibition of the vagus nerve to the heart, causing the heart rate to increase (counteraction to vagal tone that causes bradycardia).
<b>variant or Prinzmetal angina</b>	Angina pectoris caused by vasospasm of the coronary arteries.
<b>vasoconstriction</b>	Tightening or contraction of muscles (sphincters) in the blood vessels, which decreases blood flow through the vessels.
<b>vasodilation</b>	Relaxation of the muscles (sphincters) controlling blood vessel tone, which increases blood flow through the vessels.
<b>vasodilator</b>	Substance that relaxes the muscles (sphincters) controlling blood vessels, leading to increased blood flow.
<b>vasopressin</b>	Man-made form of ADH. Because of ADH's fluid reabsorption and vasoconstrictive properties, can elevate blood pressure at higher doses.
<b>ventricular fibrillation</b>	The most serious arrhythmia; usually a terminal event where ventricular contractions are no longer able to effectively pump blood.
<b>very-low-density lipoprotein (VLDL)</b>	Molecules made of cholesterol, triglycerides, and protein that carry cholesterol from the liver to organs and tissues; also serves as a precursor to low density lipoproteins (LDL).
<b>virilization</b>	Development of masculine body (hair, muscle) characteristics in females.
<b>virucidal</b>	Substance, chemical solution, or drug that kills viruses; chemical that kills or destroys viruses.

- The use of medicinal plants is found in almost all cultures. In some, many types of plants are used. Some are efficacious and others are not.
- The science of botany originated in the study of medicinal plants. Chemistry, botany, and medicine were all considered one field until the 1700's.



# Basic Terminology

- *Alternative medicine* refers to treatments or therapies that are outside accepted conventional medicine
- *Complementary medicine* refers to the use of alternative therapies with or in addition to conventional treatment





# Definition

- According to the World Health Organization (WHO) Guidelines, herbal medicines are considered to be:
  - Plant-derived materials or products with therapeutic or other human health benefits which contain either raw or processed ingredients from one or more plants.
- In some traditions materials of inorganic or animal origin may also be present.

# Definition

- The European Directive defines a herbal medicine thus:

A substance or combination of substances of herbal origin presented for treating or preventing disease or with a view to making a medical diagnosis or to restoring, correcting or modifying physiological functions.

- • Medical botanism can be defined as *Materia Medika* (Medical Curriculum), which deals with medicinal plants and herbal substances.
- O Medical Curriculum; Refers to the sources, physical and chemical properties of drugs, including plants / herbal substances.
- • Your interest is essential;
- O Medical plants,
- O Parts used,
- O Active substances / substance groups,
- O Influences on living organisms (human, animal) or tissue / organ systems.

- • Instead of Medical Botany, today, with little or no difference in terms of meaning and scope, today;
  - O Medical Plants,
  - O Herbal Medicine,
  - O Herbal Medicine,
  - O terms such as herbal remedies are used more often.
- 
- • The terms herb medicine and herbal medicine have been described in the historical process in almost every country's own culture (as remedies / remedies) and as folk medicine.

- • The terms Medical Plants and / or Plant Therapy are used more often today with scientific developments in this field (especially with the development of up-to-date chemical and pharmaceutical methods, increased number of well-characterized medicinal plants).
  - ○ These terms are current; To protect against disease or to support treatment;
  - ☐ From medical plants and / or
  - ☐ from the parts carrying the active substances or
  - ☐ refers to the use of standardized drug forms (such as capsules, tablets, tinctures) prepared from products obtained by an operation.
- 
- • Medical botany is closely related to botany (Plant Science).
  - ○ Environmental science is also closely related to the branches of science such as traditional medicine, pharmacognosy, pharmacology.
  - ○ The plant;
  - ☐ Synthesis and chemistry of primary and secondary materials,
  - ☐ Complementary and / or alternative medicine,
  - ☐ Topics such as traditional / cultured medical plants are the main areas of interest / research.

- • Plant biology will not be included in this course. But;
  - O Similar or separate aspects of plant and animal cells,
  - O Parts of the plant cell,
  - O Some important physiological / biochemical events will be briefly reviewed.
- 
- O Vegetable raw and active ingredients,
  - O For herbal medicinal products,
  - O The preparation and use of medicinal products will be extensively addressed.

- • Plants and herbal ingredients are used for thousands of years for medical purposes as well as for nutrition.
- • In humans / societies there is the same relationship between consuming vegetable substances and beneficial effects.
- Especially with some diseases (such as cancer, cardiovascular diseases, heart attack) with consumption of plants and / or fruits (such as broccoli, spinach, red cabbage, garlic, onion, sugar beet) containing antioxidant substances (phenolics such as flavonoids, tannins) The frequency / risk of encounter can be significantly reduced.
- O Hard mustard (Brussels sprouts, black pepper, cabbage, turnip, etc.) is a protective effect against various cancers, especially lung cancer.
- O Onion (*Allium cepa*) and Garlic (*Allium sativum*) reduce the risk of stomach cancer.
- O Tomato (*Lycopersicon esculentum*) reduces the risk of prostate cancer.
- O Plants containing phytosterol (such as  $\beta$ -sitosterol, campesterol, stigmasterol) are protective against cancer, especially breast, colon, prostate cancer.

- Definitions
- Herbal substances used in medicinal botanical treatment; Herbal medicine, herbal drug, herbal drug preparation, herbal medicinal product.
  
- Herbal medicine / lar
  - Herbal medicines / supplements by the World Health Organization (WHO); Plants;
  - O Parts such as flower, shell (fruit-root-body shell), root, fruit, seed, leaf (herbal drugs) or
  - O Extracts prepared from these parts (such as water-extract, alcohol-extract) or
  - O The substances (such as balsam, oleoresin, resin, fixed oil, volatile oil) obtained from plants by various processes (such as scouring, distillation) are defined.
  
- • Medicinal preparations (such as capsules, powders, tablets) prepared with plant extracts, raw or purified extracts are included in the herbal medicine;
- • The substances (atropine, digoxin, ephedrine, galantamine, caffeine, morphine, strychnine, taxol, veratrine, vinblastine, etc.) obtained from plants and purified by various processes are out of this definition.



- Herbal drug / lar
- • Plant-derived raw materials.
- • Herbal drugs; Used for the treatment of a medical plant;
- O Unprocessed parts (such as flower, bark, root, fruit, seed, leaf, lump)
- O Includes unspecified secretions (such as balsam, latex, oleoresin, sap, resin, fixed oil).
- • Plant parts; Fresh, mostly dried, whole, cut or shredded.

- Herbal preparation / lar
  - Includes crumbled or powdered herbal medicinal products (such as sap, extract, fixed oil, tincture, powder, essential oil) obtained from herbal droplets by various processes (distillation, infusion, maceration, extraction, purification, squeezing, dusting, condensation).
  
- Herbal medicinal products / s
  - Active ingredients;
  - O a mixture of one or more herbal drugs or herbal drug preparations,
  - O Prepared in suitable pharmaceutical form for a specific use,
  - O medicinal products used at an appropriate dosage.
  
- •

- Herbal medicines are also included in this scope.
- • medicinal products covered by herbal medicine;
- O Content and effects (laboratory and clinic) are scientifically demonstrated,
- O Dose-effect relationship has been established,
- O Interactions with traditional medicines have been identified,
- O Standardized
- Use was offered.

- Traditional herbal medicinal products / s
- • Before the application date of the medicinal plants in its composition (registration application);
- O for at least 15 years in Turkey or in EU countries,
- O Bibliographically proven that it has been used in other countries for 30 years,
- O For composition and intended use, the physician should be supervised for diagnosis or used without prescription or treatment,
- O Where there are special places of use suitable for traditional medicinal products,
- O Medicinal products used either orally or by inhalation, exclusively in accordance with the specific dosage.
- O Clinical trials are not required for these products; Because they have been used for many years to ensure the safety and reliability of these plants.

- Phytopharmaceuticals (Phytopharmaceuticals)
- • are herbal medicines and / or standardized extracts registered in official drug books, medicinal products prepared in a suitable pharmaceutical form for a certain use area and used at a certain dosage.
- • The medicinal plants or herbal drugs prepared for these products have been examined clinically sufficiently.
- • They are called "Herbal Medicinal Products" in the EU registers.

- Phytotherapeutics
- • are herbal medicines and / or standardized extracts registered in official drug books, oral medicinal products prepared in a suitable pharmaceutical form for a small use and at a certain dosage.
- • There is not a sufficient number of clinical studies found with medicinal plants and / or drugs prepared by these products.
- • For this reason, the use of phytotherapeutics is based on traditional medicine.

- Supplementary food (Supplementary Foods Regulation (OJ dated 2.5.2013, OJ No 28635), Definitions - Article 4 / h)
- • To supplement normal feeding;
- O Food items such as vitamins, minerals, proteins, carbohydrates, fibers, fatty acids, amino acids or
- O Other than these, concentrates or extracts of substances such as plants, herbal and animal substances, bioactive substances, which have nutritive or physiological effects, alone or in mixtures,
- O Products that are prepared for daily intake and prepared in capsules, tablets, lozenges, disposable powder packets, liquid ampoules, dropper bottles and other similar liquid or powder forms.

- Number of plants
- • There are about 1,000,000 plant species in the world with 500,000 defined.
- • Turkey is one of the richest countries in the world in terms of plant diversity and number.
- O There are about 12,000 plant species in Turkey; Of which about 3900 are grown only in our country (endemic plant).
- ? The end number is close to 4,000.
- O A plant is called an endemic plant (indigenous plant) if its borders show a narrow, narrow area (a country with a few square meters, but usually a regional or narrower area).
- O Approximately 12,000 plant species are growing on the entire European continent.



- • Plants and herbal materials are used as food, spices, paint, odor, medicine; It also contains most toxic / harmful substance (s).
- It is believed that between 20,000 and 70,000 in the world and about 500 in Turkey are used for food, spices and medical purposes.
- O In Turkish Pharmacopoeia (TK-1974) 35-40 medicinal plants and herbal products are defined.
- O The World Health Organization (WHO) has stated that 70% of the world's population uses herbal medicinal products.
  
- • There are also a large number of raw drugs (drugs) or active substances that are used as medicines in many plants throughout the plants.
- • Plant-derived drug substances are found in or derived from, or derived from, plants, such as root, tuber, leaf, flower, seed, fruit, shell,
- • Active ingredients in plants are used after being obtained in pure form by distillation, brewing, wetting, extraction, squeezing, consumption from plant parts.
- • Some drugs are prepared in the form of galenic preparations such as tea, envase, powder, extract, masse, infusion, calf, tincture, medical oil etc.

- Plant cell and structure
- • There are important differences between animal and plant cells as well as their similarities.
- • In all animal and plant cells, there are intracellular organelles such as the cytoplasmic membrane, nucleus, mitochondria, ribosome, peroxisome, endoplasmic reticulum,
- • Cell walls, plastids and vacuoles are the most important structures that separate plants from animal cells.
- •

- One of the most important differences that separates plant cells from animal cells is the presence of cell walls outside the cytoplasmic membrane.
- O The cell wall is rich in cellulose, hemicellulose, glycoprotein, lignin, pectin.
- Lignin (made of phenylpropanoid polymers) gives strength and strength to the cell wall.
  
- Plastids are the second most important difference of plant cells.
- O Plant cells have three types of plastids (chloroplast, chromoplast, amyloplast).
- O Chloroplasts are the sites where photosynthesis and many secondary substances (amino acids, phytol, monoterpenes, diterpenes, tetraterpenes, "carotenoids", ubiquinones, fatty acids) are prepared.
- O Chromoplasts are places where color materials are shaped in the plant.
- O Amyloplasts (leukoplasts) are responsible for the formation of starch in storage tissues like roots.
- O Chloroplasts and mitochondria have both genetic codes and synthesis systems (both functional and secondary products).
- Carotenoids protect the membrane proteins from oxidation / damage during chloroplasts during photosynthesis.

- • Vacuols are found only in plant cells; They are enveloped with a membrane (tonoplast) and occupy a considerable volume in the cell.
  - O Vakuoller is filled with cell liquid (especially water).
  - O Water soluble substances such as anthocyanidins, alkaloids, amines, phenols, flavonoids, glycosides, glucosinolates, saponins, cyanogens, tannins, some primary products are stored.
- 
- • Plant cells communicate with each other through channels (plasmodesmata).
  - It acts as a pathway for the transport of substances such as RNA, typing factors, viruses, etc. between cells.

- Herbal materials (primary and secondary products)
- • The substances (metabolites, products) prepared in the plants are divided into two as primary and secondary substances.
- • Plants; (Primary products) such as carbohydrates, amino acids, proteins, fats using basic substances such as light, water, nitrogen, phosphorus, sulfur; They are important for nutrition.
- • Substances such as alkaloids, phenols, flavonoids, glycosides, saponins, sterols, tannins, terpenoids, essential oils prepared by these movements are also known as secondary substances (secondary products, metabolites).
- O Many of these substances help people and animals maintain and normalize the body's normal functioning.
- Many of the secondary substances (such as ascorbic acid, carotenoids, sulphurous substances, tocopherols), especially phenolic substances (flavonoids, tannins, etc.)
- ☐ Prevents oxidation and cancer,
- ☐ Protects tissues and organs, slows down their wasting, prolongs their life.

- • Once the plant materials are prepared, they are usually transported and stored in the plant's storage areas.
- • It is believed that the plants have prepared > 100,000 secondary materials.
- O Approximately 30,000 of them have been separated from the environment, have been identified / defined and their characteristics are determined.
- O As numbers, the active substances in the plants have terpenoids in the first and alkaloids in the second.
- ▪ On the basis of carbohydrates, most of the secondary substances are prepared by 3-4-main route; The main of which are given below and in Figure 2a.
- • Amino acids (prepared from acetyl-CoA and shikimic acid)
- • Acetate (acetyl-CoA, formed by oxidative decarboxylation of the pyruvic acid)
- • Mevalonic acid (isoprene, consisting of three molecules of acetyl-CoA)
- • Cinnamic acid (composed of amino acids such as L-phenylalanine, L-tyrosine)
- • Shikimic acid (a fusion product of D-erythrose 4-phosphate from the glucone dissociation intermediate product phosphoenolpyruvate and the pentose phosphate pathway)

- The main groups of secondary substances formed according to main roads / starting materials are as follows.
- O Acetyl-CoA: Amino acids, such as lipids
- O Mevalonic acid pathway: Phytosterols, saponins, terpenoids
- O Cinnamic acid pathway: Various phenolic materials (flavonoids, condensed tannins, lignans, coumarins, etc.)
- O Shikimic acid pathway: Soluble tannins, cinnamic acid derivatives, lignans, alkaloids
- O Amino acids (especially phenylalanine, lysine, ornithine, tyrosine, tryptophan): Alkaloids.
- ? L-phenylalanine from amino acids, aromatic amino acids such as L-tyrosine, L-tryptophan,
- ? L-lysine, L-methionine, L-ornithine-like glycolysis and Krebs cycle intermediates are prepared.

- • Alkaloids are prepared from amino acids in many ways; Some amino acids and prepared alkaloid groups / examples are as follows.
- O Tryptofan
- ☒ Indole alkaloids (such as physostigmine, reserpine, tryptamine, yohimbine)
- ☒ Quinoline alkaloids (such as quinine, quinidine)
- Ergot alkaloids (such as ergotamine)
- O Tyrosine
- ☒ Isoquinoline alkaloids (such as anhalamine, colchicine, currants, salsolinol)
- ☒ Phenylethylamine derivatives (such as hordenine, mescaline)
- O Ornithine
- ☒ Pyrrolidine and tropane alkaloids (such as atropine, hiocin)
- O Lysine
- ☒ Piperidine (such as lobelin, pelletierin)
- ☒ Quinolizidin (such as lupine, sophorin)
- ☒ Indolizidine alkaloids (such as slaframine)
- O Histidine
- Imidazole alkaloids (such as histamine, pilocarpine)



# Types of Alternative and Complementary Medicine



- Veterinary acupuncture and acutherapy
  - Examination and stimulation of body points by use of acupuncture needles, injections, and other techniques for the diagnosis and treatment of conditions
- Veterinary chiropractic
  - Examination, diagnosis, and treatment of animals through manipulation and adjustments
- Veterinary physical therapy
  - Use of noninvasive techniques for rehabilitation
- Veterinary homeopathy
  - Treatment by administration of substances that are capable of producing clinical signs in healthy animals



# Types of Alternative and Complementary Medicine

- Veterinary botanical medicine
  - Uses plants and plant derivatives as therapeutic agents
- Nutraceutical medicine
  - Uses micronutrients, macronutrients, and other nutritional supplements as therapeutic agents
- Holistic veterinary medicine
  - Comprehensive approach to health care using both alternative and conventional diagnostic techniques and therapeutic approaches

# Western vs. Chinese Herbal Medicine

- Western herbal medicine
  - Holds that individuals have an inner force that works to maintain physical, emotional, and mental health
  - Teaches that many diseases occur because an individual's inner force or natural immune system is out of balance
- Chinese traditional herbal medicine
  - Based on a holistic philosophy of life that emphasizes the relationship among the mental, emotional, and physical components of each individual; also stresses the importance of harmony among individuals, their social groups, and the greater population
  - Attempts to restore health through correction of imbalances within a patient's body or between the patient and natural order

# Herbal Supplements

- Herbal supplements are one of the fastest growing segments of the dietary supplement market in Turkey
  - One reason may be the desire for a more holistic approach to health care
  - Another reason may be that people believe conventional treatments have real or perceived limitations
  - Another reason may be that people believe natural products do not have side effects
  - Herbs have been used for a long time
  - Advertising methods have influenced people's buying behavior

