

# GLOSSARY

**1,25 dihydroxycholecalciferol**—the most potent form of vitamin D, which is a result of both hepatic and renal activation of a precursor. It enhances intestinal absorption of calcium, increases parathyroid hormone-induced bone resorption, and enhances calcium reabsorption in the proximal renal tubules. Overall, vitamin D is important for maintaining serum calcium levels in the normal range. Also known as *calcitriol*.

**5 $\alpha$ -reductase**—an intracellular enzyme that converts testosterone to the active metabolite dihydrotestosterone. Two types of 5 $\alpha$ -reductase exist. Type I is found mostly in the skin, liver, and sebaceous glands. Type II is found mostly in urogenital tissue, including the prostate, and hair follicles.

**6-acetylmorphine**—an active metabolite of heroin. When present at a concentration that meets or exceeds the federal cutoff in a urine drug test, it confirms that the patient was recently using heroin.

**Accuracy**—refers to how close the test result or mean measurement is to the true value of the analyte in a specimen or to the number or percentage of true results relative to the total number of samples tested. Also referred to as *bias*.

**Achiral**—a drug that exists in only one form such that the molecules are superimposable on their mirror images.

**Achlorhydria**—a disorder resulting in insufficient or absence of hydrochloric acid from gastric secretion. Among the conditions associated with achlorhydria is pernicious anemia.

**Acrodermatitis enteropathica**—a rare inherited disorder of infants and young children characterized by skin eruptions around the mouth and other body orifices, alopecia, and diarrhea. The disorder is caused by zinc deficiency.

**Acromegaly**—excessive pituitary gland production of growth hormone, which can lead to gigantism if it occurs in adolescents or to thickening of the skin and enlargement of hands and feet if it occurs after puberty.

**Action potential**—changes in electrical potential across muscle or nerve cell when triggered by an appropriate stimulus leading to muscle cell contraction or transmission of an electrical signal by a nerve cell.

**Acute-phase reactants**—a class of plasma proteins whose concentration increases in response to inflammatory stimuli, such as tissue injury or infection. Also known as *acute-phase proteins*.

**Addison disease**—a disorder caused by chronic insufficiency of adrenal cortisol and, sometimes, aldosterone. Symptoms include extreme weakness, dizziness on standing, nausea, vomiting, chronic diarrhea, weight loss, salt craving, slow sluggish movement, and development of dark patches on the skin. The disease is treated with exogenous administration of corticosteroid (e.g., prednisone, hydrocortisone) and aldosterone (e.g., fludrocortisone).

**Adipsia**—absence of thirst.

**ADME**—refers to absorption, distribution, metabolism, and excretion of drugs, which are all related to pharmacokinetic handling of drugs by the human body.

**Agglutination**—the clumping or aggregation of cells (e.g., erythrocytes) in a solution.

**Airway resistance**—this reflects the degree of ease with which air can pass through the airways. It is expressed as the change in pressure divided by the change in flow.

**Allele**—an alternate form of the gene that is located at a particular chromosomal location. One allele is inherited from the mother and one from the father.

**$\alpha$ -fetoprotein (AFP)**—a glycoprotein produced by the liver, gastrointestinal tract, and fetal yolk sac. Elevated serum levels may occur in patients with hepatocellular carcinoma, nonseminomatous germ cell tumors, and cancers of the pancreas, stomach, lung, and colon. For this reason, AFP is used as a tumor marker.

**$\alpha$ 1-acid glycoprotein**—an acute-phase reactant that is a protein produced by the liver. It circulates in the plasma, constitutes 1–3% of circulating plasma proteins, and serves as a carrier for basic drugs.

**Amenorrhea**—absence of menstrual bleeding, which may be primary or secondary.

**Amylin**—a peptide hormone, cosecreted with insulin, that slows gastric emptying after eating, decreases gastrointestinal glucose absorption, and promotes satiety. Amylin helps reduce postprandial increases in serum glucose levels.

**Analyte**—the substance measured by the laboratory assay.

**Androstenedione**—an androgen produced by the adrenal glands, testes, and ovary that is converted to estrone in both females and males. High androstenedione levels in men can result in feminization.

**Angiotensin II**—an octapeptide that has two physiologic effects: it is a potent arteriolar vasoconstrictor, and it also stimulates the release of aldosterone, which causes renal sodium retention. Angiotensin II also increases the release of antidiuretic hormone and adrenocorticotrophic hormone.

**Anion gap**—a calculated value that is used to identify potential causes of metabolic acidosis. The anion gap is estimated by subtracting the sum of serum chloride and venous bicarbonate concentrations from the serum sodium concentration.

**Anisocytosis**—variability in the size of erythrocytes (red blood cells).

**Antibiogram**—a cumulative report describing the in vitro antimicrobial susceptibility results of the most common bacterial strains isolated at a particular institution/healthcare setting during the time period of the report (usually annually).

**Anticitrullinated protein antibodies**—antibodies that bind to the nonstandard amino acid citrulline and are highly specific for rheumatoid arthritis when present in serum. Also known as *anti-citrulline antibody* or *citrulline antibody*.

**Antidiuretic hormone**—a hormone that regulates renal handling of free water and enhances reabsorption of water at the collecting duct portion of the renal tubule. It is secreted by the hypothalamus in response to hypovolemia, thirst, increased serum osmolality, and angiotensin II. Also known as *arginine vasopressin*.

**Antineutrophil cytoplasmic antibodies (ANCA)**s—antibodies that are directed against neutrophil cytoplasmic antigens. Testing for ANCA is important for diagnosis and classification of various forms of vasculitis.

**Antinuclear antibodies (ANA)**s—autoantibodies that are directed against components of the cell nucleus, such as DNA, RNA, and histones.

**Antiphospholipid antibodies**—antibodies that react with proteins in the blood bound to phospholipid. Antiphospholipid antibodies interfere with the normal function of blood vessels by causing narrowing and irregularity of the vessel, thrombocytopenia, and thrombosis. Examples of these antiphospholipid antibodies include lupus anticoagulant and anticardiolipin antibodies.

**Apophysis**—an offshoot.

**Apoptosis**—noninflammatory cell death via autolysis.

**Aquaporin**—a water channel in the collecting duct that facilitates water reabsorption from the tubular lumen back into the bloodstream. Formation is stimulated by antidiuretic hormone.

**Areflexia**—absence of reflexes, which usually indicates a neurologic problem.

**Arthrocentesis**—a procedure in which a sterile needle and syringe are used to aspirate fluid from a joint.

**Asherman syndrome**—the development of intrauterine scar tissue after intrauterine surgery, which can lead to amenorrhea.

**Atrial natriuretic factor**—a vasodilatory hormone synthesized and primarily released by the right atrium. It is secreted in response to plasma volume expansion as a result of increased atrial stretch and results in a global down regulation of renin, aldosterone, and antidiuretic hormone. A net increase in sodium excretion is achieved. Also known as *atrial natriuretic peptide*.

**B-RAF**—a protein that stimulates cell growth. Mutations of B-RAF proteins are associated with cancer and birth defects. Mutated B-RAF proteins have elevated kinase activity. Vemurafenib is a serine-threonine protein kinase B-RAF inhibitor indicated for patients with advanced melanoma harboring the B-RAF gene. B-RAF is made by a human gene known as BRAF. Also known as *serine-threonine protein kinase*.

**Bartter syndrome**—a syndrome that presents with hypokalemia, alkalosis, increased renin and aldosterone, and normal-to-low blood pressure. It is a cause of secondary hyperaldosteronism.

**Benzoylcegonine**—a major metabolite of cocaine.

**$\beta$ -lactamases**—enzymes produced by some bacteria that are capable of breaking of the chemical ring structure of, deactivating antibacterial properties, and mediating resistance to selected  $\beta$ -lactam antibiotics.

**Bias**—refers to how close the test result is to the true value of the analyte in a specimen or to the number or percentage of true results relative to the total number of samples tested. Also referred to as *accuracy*.

**Biomarker**—an objectively measured indicator of normal biological or pathogenic processes or pharmacologic responses used to diagnose and stage disease, assess disease progress, or assess response to therapeutic interventions.

**Biosensor system**—a bioreceptor molecule, which recognizes a target analyte and either generates a specific molecular species or results in a physicochemical change that can be measured by electrochemical methods.

**Blastoconidia**—a bud produced by asexual reproduction of fungus.

**Brain natriuretic peptide (BNP)**—a peptide that is principally produced and secreted by the ventricles of the brain. An increase in blood volume or pressure enhances BNP secretion, which increases natriuresis (renal sodium excretion) and to a lesser extent, diuresis. Also known as *B-type natriuretic peptide*.

**Bronchial alveolar lavage**—a procedure in which a bronchoscope is inserted into the lumen of the airways and sterile normal saline solution is flushed into the airways and then removed by aspiration. The solution is then sent for cellular and chemical analysis.

**Bulimia**—an illness characterized by periods of overeating or bingeing followed by purging and vomiting.

**C-peptide**—proinsulin, a precursor of insulin, is comprised of C-peptide and insulin. C-peptide must be cleaved from insulin for insulin to function. Elevated C-peptide levels in the blood stream are consistent with increased insulin levels.

**Cachectic**—a term used to describe a patient who has a wasting syndrome characterized by severe weight loss, muscle atrophy, and fatigue. The patient is unable to or does not want to eat. This is commonly used to describe patients with cancer, AIDS, or other chronic medical disorders.

**Calcidiol**—25-hydroxycholecalciferol, which is also known as *calcifediol*. This is a form of vitamin D with intermediate activity that has been activated by the liver but still needs to be activated by the kidneys to be most active.

**Calcitonin**—a hormone secreted by the C-cells of the thyroid gland. It inhibits osteoclastic activity, thereby inhibiting bone resorption. It also decreases calcium reabsorption in the renal proximal tubules.

**Calcitriol**—1,25 dihydroxycholecalciferol, which is the most active form of vitamin D. It has completed two activation steps: one by the liver and the other by the kidneys.

**Calcium-phosphorus product**—the multiplication product of serum calcium and phosphorus concentrations, expressed as mg/dL. Insoluble calcium-phosphorus precipitates are likely to be formed in soft tissues or as stones in the genitourinary tract when the product is high.

In patients with chronic kidney disease, dietary restriction and pharmacotherapy are used to maintain the calcium-phosphorus product at 50 or less.

**Capillary puncture**—blood sampling method for premature neonates, neonates, and young infants who have small or inaccessible veins. Blood sampling is done at the heel, fingertip, or great toe. Also known as *microcapillary puncture* or *skin puncture*.

**Carcinoembryonic antigen (CEA)**—a protein that is normally found in fetal intestine, pancreas, and liver. Elevated serum levels of CEA are found in patients with colon, breast, gastric, thyroid, or pancreatic cancer. For this reason, CEA is used as a tumor marker.

**Cast**—masses of glycoproteins that conform to the shape of the renal tubular lumen. Casts are detected by microscopic evaluation of the urine. The cellular composition of some casts are suggestive of the presence of various types of renal disorders.

**Central or centripetal obesity**—a term for when a patient has fat accumulation around the waist, abdomen, and hips.

**Chain-of-custody**—a process used to collect urine specimens that safeguards the specimen from purposeful adulteration or dilution of the specimen. A chain-of-custody ensures that the specimen is always in the custody of a person responsible for ensuring the integrity of the urine specimen.

**Cholestasis**—a deficiency of the excretory function of the liver.

**Cholesterol**—a substance of dietary origin or synthesized in the liver and intestines that serves as a structural component of cell wall membranes and is a precursor for the synthesis of steroid hormones and bile acids.

**Chromatography**—a common laboratory separation technique that identifies and quantifies the solutes in a solution based on their differential distribution between mobile and stationary phases. The mobile phase generally refers to the dissolution of the laboratory sample in a fluid. The stationary phase is a substance that is fixed in place during the separation procedure. The separation is based on the partition coefficient of the analyte. There are several types of chromatography, including thin layer, gas, and high-performance liquid.

**Chvostek sign**—a sign of hypocalcemia and tetany. Tapping the facial nerve on one side of the face results in a facial twitch or grimace on the same side.

**CKD-EPI collaboration equation**—an updated variation of the MDRD equation developed to better identify patients with chronic kidney disease that would benefit from the specialized care of a nephrologist.

**CLIA-waived test**—the U.S. Food and Drug Administration classifies these laboratory test procedures as having a low level of complexity to perform and a low potential risk to produce erroneous results or pose no reasonable risk of harm to the patient if performed incorrectly. These tests typically are performed in community pharmacies or ambulatory care clinics, which are not subject to regular inspections, personnel requirements, or proficiency tests once the latter have obtained a CLIA Certificate of Waiver from the Centers for Medicare & Medicaid Services.

**Cluster of differentiation**—refers to a molecule or antigen on a cell's surface to which a monoclonal antibody can bind. These are used as markers to distinguish one cell type from another.

**Coagulation**—process by which blood forms clots.

**Cobalamin**—vitamin B<sub>12</sub>. Cyanocobalamin is a synthetic type of cobalamin, which is a commercially available medication.

**Cockcroft-Gault equation**—an equation that is used to estimate creatinine clearance in patients with stable renal function. The equation requires that the patient's gender, age, total body weight, and serum creatinine be known.

**Codon**—three base pairs that specify an amino acid. Because of redundancy in the genetic code, a change in one base pair may or may not change the amino acid coded by the codon.

**Colonization**—the presence of microorganisms, including potential pathogens, at a body site (i.e., oropharynx, skin, colon, vagina, surfaces of wounds) that are not causing infection.

**Complement**—a cascade system of at least 60 different plasma proteins that interact to provide a defense mechanism against microbial invaders and serve as an adjunct or “complement” to humoral immunity. The complement cascade can be activated via the classical, alternative, or lectin pathways.

**Compliance (of the lung)**—the ability of the lungs to expand and fill with air during inhalation.

**Congenital adrenal hyperplasia**—a rare inherited disease of the adrenal glands in which cortisol and aldosterone production are impaired, but androgen production is excessive.

**Constitutive enzyme**—an enzyme that is produced continuously although it is not needed.

**Corpora cavernosa**—one of two channels on the dorsal side of the penis, which is comprised of sinusoidal tissues. During a penile erection, the sinuses fill with arterial blood. In the flaccid state, the sinuses are empty.

**Corpus luteum**—remnants of the ovarian follicle that result after the follicle expels the ovum into the fallopian tube.

**Corrected serum calcium concentration**—in patients with low plasma binding of calcium, often as a result of hypoalbuminemia, the “effective” serum calcium concentration must be assessed. The measured serum calcium concentration has to be corrected according to the serum albumin concentration. The corrected serum calcium concentration better reflects the amount of physiologically active calcium, which is the free (unbound) moiety.

**Costochondral junction**—the point where the ribs connect to the cartilage in the sternum (breast bone). Palpable enlargement of the costochondral junctions is called the rachitic rosary sign and is compatible with the diagnosis of rickets.

**Crack**—a freebase form of cocaine that produces an intense high when smoked. Also known as crack cocaine.

**C-reactive protein**—plasma protein associated with the acute-phase response to injury or infection. The precise physiologic function of

c-reactive protein is unknown, but it is known to participate in activation of the complement pathway and interact with cells in the immune system.

**Creatine kinase**—an enzyme found in skeletal muscle, heart muscle, and brain. It stimulates the transfer of high-energy phosphate groups and converts adenosine triphosphate to adenosine diphosphate, and vice versa. Elevated circulating levels are associated with musculoskeletal injury, intramuscular injections, or some medications. Creatine kinase is also known as *creatine phosphokinase*.

**Creatinine**—an endogenous substance produced by muscle cells. The production rate varies little day-to-day in patients with stable kidney function. Creatinine is freely filtered at the glomerulus with little reabsorbed or secreted. It is commonly used for assessing kidney function.

**Creatinine clearance**—a practical method of assessing kidney function to monitor kidney disease or dose medication. It can be derived by measuring creatinine concentration via a urine collection or by using the serum creatinine concentration in the Cockcroft-Gault equation, or some other validated equation.

**Crigler-Najjar syndrome**—a rare genetic disorder in which bilirubin cannot be conjugated by the liver. If not treated, bilirubin accumulates in the blood stream resulting in kernicterus.

**Critical value**—a result far enough out of the reference range that it indicates impending morbidity.

**Cryptorchidism**—the failure of one or both testicles to descend through the inguinal canal into the scrotum after birth. As a result, the undescended testicle is at high risk for twisting on its spermatic cord, decreasing spermatogenesis, and developing testicular cancer.

**Cyclooxygenase**—an enzyme found in platelets responsible for converting arachidonic acid to thromboxane (which is an arterial constrictor and causes platelet aggregation) and prostacyclin (which is a vasodilator and inhibits platelet aggregation).

**Cystatin C**—a protease inhibitor that is filtered by the glomerulus but not reabsorbed or secreted. Cystatin C serum concentrations are used in various formulae to estimate glomerular filtration rate.

**Cystic fibrosis**—a genetic disorder that primarily affects the lungs and gastrointestinal tract. Patients with cystic fibrosis produce very thick mucus that can clog the airways of the lungs and cause severe lung infections that can be life-threatening. The mucus also obstructs the outflow tract of the pancreas and stops pancreatic enzymes from breaking down food. The sweat of patients with cystic fibrosis contains a high amount of sodium chloride.

**D-dimer**—a neoantigen formed when plasmin digests fibrin. When present on blood testing, D-dimer indicates the presence of thrombosis.

**Dead space (of the alveoli)**—alveolar dead space results when there is a ventilation-perfusion mismatch. That is, alveoli are ventilated, but perfusion is absent or inadequate for effective gas exchange of oxygen and carbon dioxide. Alveolar dead space also may result when areas of the lung are well perfused but not ventilated.

**Dematiaceous fungi**—a type of fungi that produces darkly pigmented hyphae or spores.

**Depolarization**—an electrical phenomenon that represents the decrease in the differential ionic charges across muscle or nerve cell membranes from the resting state to the excited state. The intracellular space becomes more positively charged than the extracellular space leading to cellular activation and contraction.

**Dermatophytes**—a term for a group of fungi, including *Microsporum*, *Epidermophyton*, and *Trichophyton*, that cause skin infections.

**Diabetes insipidus**—a condition in which the kidneys are not able to reabsorb water (back into the body). Central diabetes insipidus is caused by a lack of pituitary secretion of antidiuretic hormone (ADH). Nephrogenic diabetes is caused by failure of the kidneys to respond to ADH. If the patient is unable to drink enough fluids to replace urinary water losses or is not treated for diabetes insipidus, the patient will become dehydrated.

**Diabetic ketoacidosis**—acute, severe, life-threatening presentation of insulin deficiency that is associated with dehydration, abdominal pain, tachycardia, orthostatic hypotension, lethargy, or coma. The patient has severe hyperglycemia, ketosis, and metabolic acidosis. Because of insulin deficiency, the body is unable to use glucose as an energy source and burns fat instead. The resulting ketosis is responsible for many of the resulting symptoms and signs of disease.

**Diffusion**—the process in which gases in the alveoli equilibrate from areas of high concentration to areas of low concentration.

**DiGeorge syndrome**—a genetic disorder associated with congenital heart disease, defects of the palate, learning disabilities, malfunctioning parathyroid glands, and thymus aplasia. Also known as *22q11.2 deletion syndrome*.

**Dihydropyrimidine dehydrogenase**—an enzyme that metabolizes 5-fluorouracil. A genetically-mediated enzyme deficiency is associated with increased 5-fluorouracil toxicity.

**Direct bilirubin**—formed when the liver conjugates bilirubin by linking it to glucuronic acid. This creates a water soluble form of bilirubin, which is excreted into bile and eliminated in feces. Direct bilirubin can also be excreted in urine.

**Disk diffusion method**—a widely used method to determine a bacteria's sensitivity to various antibiotics. Commercially prepared filter paper disks containing a fixed concentration of an antibiotic are placed on solid media agar plates inoculated with a standardized inoculum of the infecting organism. As antibiotic diffuses from the disk into the agar, it creates zones of inhibition that correlate with the minimum inhibitory concentrations of the antibiotics against certain organisms. Also known as the *Kirby Bauer method*.

**Dubin-Johnson syndrome**—an autosomal recessive disease in which hepatocytes fail to secrete conjugated bilirubin into bile. As a result, patients develop high serum levels of conjugated bilirubin and mild jaundice.

**Dynamic spirometry**—a pulmonary breathing test that is based on time and, therefore, is more dependent on flow and “forced.”

**Dysgeusia**—an impaired sense of taste.

**Dyslipidemia**—abnormal concentrations of any lipoprotein type.

**Dyspareunia**—painful intercourse.

**Eclampsia**—a condition that occurs in pregnant women when preeclampsia is not treated. In addition to the symptoms of preeclampsia, women may experience seizures and coma. Eclampsia is a serious condition, as death of the mother and baby may occur.

**EGFR-TKI**—epidermal growth factor receptor tyrosine kinase inhibitor. An example drug is erlotinib. Increased sensitivity to EGFR-TKIs has been linked to the presence of EGFR activating mutations in the tumor, mostly exons 18 and 21 of the EGFR gene. EGFR testing has been used for non-small-cell lung cancer and other tumors.

**Electrocardiography**—the recording of the electrical activity of the heart on an electrocardiogram.

**Electrophoresis**—a common laboratory technique involving separation of charged solutes or particles, which are based on size or shape in a solution or support medium (e.g., agarose or polyacrylamide gel). There are several types of electrophoresis, including gel, two-dimensional, capillary, and capillary zone.

**Enantiomer**—one of a pair of nonsuperimposable mirror image molecules. Enantiomers of a chiral drug may have different effects.

**Enterocutaneous fistula**—an abnormal connection between the stomach or intestine with the abdominal skin. As a result, contents of the gastrointestinal tract leak out through the skin. This is an example of an external fistula.

**Enterohepatic recycling**—a process by which medications or other substances are carried by bile into the intestine, then reabsorbed from the intestines and delivered to the liver for metabolism and secretion in bile, which is stored in the gall bladder. From there, the medication or other substances can be secreted back into the intestine through the biliary system.

**Enthesitis**—an inflammation of the sites where tendons or ligaments attach to bone.

**Enzyme-linked immunosorbent assay**—a type of enzyme immunoassay in which the antigen is complexed to an enzyme. After the antigen binds to the antibody in the sample, the assay measures the amount of enzyme activity that is used to quantitate the amount of antigen.

**Enzyme-multiplied immunoassay**—a type of enzyme immunoassay commonly used to measure the serum drug levels in a patient. It is based on adding a known quantity of antidrug antibody and drug bound to an enzyme to a patient's laboratory sample that contains free drug. The free drug and the enzyme-linked drug compete for binding with the antidrug antibody. When the antibody binds to the enzyme-linked drug, enzyme activity is inhibited. The serum drug concentration is determined from the amount of active enzyme remaining.

**Epidermal growth factor receptor**—a receptor that supports tumor growth when activated. The gene that encodes for EGFR is most commonly found in adenocarcinoma of the lungs in nonsmokers. Also known as *EGFR*, *HER1*, or *C-Erb B1*.

**Epigenetics**—modifications of the genome (e.g., DNA methylation or histone deacetylation) that may result in different genetic or phenotypic expressions. Epigenetic changes are due to external or environmental factors and are not associated with changes in the underlying DNA sequence of the organism.

**Epsilometer test**—a test that evaluates the activity of numerous concentrations of an antibiotic against bacteria, which is causing an infection. The results of the Etest are reported as the MIC of the antibiotic against the infecting bacteria, which are used with the Clinical and Laboratory Standards Institute established interpretative criteria to categorize the bacteria's response as sensitive, intermediate (sensitivity), or resistant. Also known as the *Etest*.

**Erythropoiesis**—a process of producing red blood cells.

**Esophageal varix**—an engorged, superficial vein in the lumen of the esophagus (plural is varices).

**Euvolemic**—refers to patients with normal plasma volume.

**Exon**—sequence of a gene that is translated into mRNA and protein.

**Extracellular water compartment**—consists of interstitial water and circulating plasma volume. The extracellular water compartment and intracellular water compartment comprise total body water.

**Extrahepatic cholestasis**—anatomic obstruction of macroscopic bile ducts.

**Fastidious**—an organism with complex or excessive nutritional requirements, which makes it difficult to grow it in the laboratory. Such an organism is generally referred to as fussy or demanding.

**FE<sub>NA</sub> or fractional excretion of sodium**—percent of filtered sodium that is ultimately excreted in the urine.

**Ferritin**—the intracellular form of stored iron. Iron is bound to a storage protein.

**Fibrinolysis**—a mechanism by which formed thrombi are lysed through the dissolution of fibrin to prevent excessive clot formation and vascular occlusion.

**Fibroids**—the most common benign tumor of the uterus.

**Fibromyalgia**—a syndrome of pain, fatigue, sleep disturbances, and other medical problems. According to the American College of Rheumatology, an individual must have a history of chronic widespread pain and tenderness at 11 or more of 18 specific tender-point sites on physician examination.

**Fingerstick**—a method of obtaining venous blood by pricking the fingertip with a lancet.

**First order absorption or elimination rate**—The absorption or elimination rate of a drug from the body proceeds at a rate that is dependent on the plasma drug concentration. For example, as the dose increases, plasma concentrations increase, and the rate of elimination increases.

**Fistula**—an abnormal communication, opening, or passage from one hollow organ or abscess to another organ or to the skin. This could be due to infection, congenital malformation, or other disease.

**Flow cytometry**—a laboratory technique that measures the properties of cells as they move or flow in a liquid suspension stream. A laser is used to count or sort thousands of cells per second.

**Fluorescence in situ hybridization (FISH)**—a laboratory technique used to look at genes or chromosomes in cells and tissues. Pieces of DNA that contain a fluorescent dye are made in the laboratory and

used as probes. These DNA probes light up when they bind to specific genes or chromosomes and are viewed under a microscope with ultraviolet light.

**Fluorophore**—a fluorescent molecule that can reemit light upon exposure to light. Fluorophores are often used as tracers or dyes for staining laboratory samples.

**Follicular phase**—early portion of the menstrual cycle during which the ovarian follicle matures.

**Forced vital capacity**—total volume of air measured in liters that is forcefully and rapidly exhaled in one breath.

**ft>MIC**—time that free serum antimicrobial concentrations are above the organism's minimum inhibitory concentration.

**Fusiform**—shaped like a spindle; wide in the middle and tapered at each end.

**Galactorrhea**—the secretion of a milky discharge from the breast other than when breastfeeding.

**γ-hydroxybutyrate**—an illicit substance that is a central nervous system depressant. Also known as *GHB* or the *date rape drug*.

**Gastroschisis**—a defect in the wall of the abdomen, which occurs during fetal development (i.e., a congenital malformation or birth defect). It allows the intestines (and sometimes other organs) to develop outside of the abdominal cavity. Having the internal organs outside of the abdominal wall will increase insensible water loss.

**Genotype**—the inherited genetic makeup of an organism.

**Geophagia**—the practice of eating dirt, earth, clay, or chalk.

**Gestational age**—the number of weeks from the first day of the mother's last menstrual period until the birth of the baby.

**Gestational diabetes**—the onset of diabetes mellitus during pregnancy.

**Gilbert syndrome**—a rare, hereditary deficiency of glucuronyltransferase, which normally conjugates bilirubin in the liver. As a result, patients develop high serum levels of unconjugated bilirubin and jaundice.

**Glabrous**—refers to hairless parts of the body, including palms of hands and soles of feet.

**Glucagon**—a peptide hormone secreted by the pancreas, which increases serum glucose concentration by stimulating gluconeogenesis and glycogenolysis in the liver.

**Gluconeogenesis**—the process when the liver produces glucose from protein or fat sources.

**Glycogenolysis**—the breakdown of glycogen in muscle and liver to glucose and glucose-1-phosphate.

**Glycosylated hemoglobin**—glucose combines irreversibly with hemoglobin in red blood cells to form glycosylated hemoglobin. Increased glycosylated hemoglobin serum levels are

indicative of poor long-term glucose control. Also known as *glycated hemoglobin*.

**Goitrogenic**—refers to a substance (e.g., food or medication) that suppresses thyroid gland function. As a result, TSH levels increase, which stimulates growth of the thyroid gland. If severe and untreated, the large goiter can cause obstruction of the trachea or esophagus.

**Granulocyte**—a category of white blood cell that has phagocytic activity. Granulocytes include neutrophils, eosinophils, and basophils. Also known as *polymorphonuclear leukocyte*.

**Granulosa cells**—in the ovarian follicle, these cells produce estradiol before ovulation and progesterone after ovulation.

**Haplotype**—a set of alleles from a single chromosome that tends to be inherited as a unit.

**Hapten**—a small molecule that can stimulate an immune response, usually when it is attached to a protein.

**Hashimoto thyroiditis**—a chronic progressive thyroid disease where functioning thyroid tissue is replaced by lymphoid or scar tissue. The patient may develop a goiter and has hypothyroidism.

**Heelstick**—capillary puncture of the heel; a blood drawing technique used in pediatric patients with small or inaccessible veins. It is the blood sampling method of choice for premature neonates, neonates, and young infants.

**Hemarthrosis**—bleeding into a joint space.

**Hematopoiesis**—a process by which bone marrow produces red blood cells, white blood cells, and platelets.

**Hemochromatosis**—an excessive accumulation of iron in the body, typically in the liver, heart, and endocrine glands.

**Hemoconcentration**—an abnormally high concentration of cells or other solutes due to a decreased amount of fluid in the bloodstream.

**Hemolysis**—the destruction of red blood cells with abnormal release of hemoglobin; can occur in vitro or in vivo.

**Hemosiderin**—a storage form of iron in macrophages. The iron in hemosiderin is poorly available for use by the human body.

**Hemostasis**—a complex relationship among substances that promotes clot formations, inhibits coagulation, and dissolves formed clots.

**Hepatic encephalopathy**—a diffuse metabolic dysfunction of the brain, which may occur in acute or chronic liver failure. Clinically, it ranges from subtle changes in personality to coma and death.

**Hepatitis**—a histologic pattern of inflammation of hepatocytes.

**Hepatojugular reflux**—a physical exam finding associated with congestive heart failure or tricuspid regurgitation. Gentle pressure on the liver causes distention of the jugular vein in the neck.

**HER2**—human epidermal growth factor receptor 2. The protein is overexpressed in approximately 25% of breast cancers. When

semiquantitative tests show that HER2 overexpression is present, the patient is more likely to respond to trastuzumab.

**Hirsutism**—an excess hair growth in women due to excessive androgen stimulation. Excessive hair may appear in sideburn area, chin, upper lip, periareolar area of breast, chest, lower abdominal midline, and thighs.

**Histone antibodies**—a type of antinuclear antibody that is directed at DNA-protein complexes comprising part of chromatin. Histone antibodies are present in virtually all cases of drug-induced lupus.

**Home testing**—patient-directed diagnostic and monitoring tests performed by the patient or family member at home.

**Human chorionic gonadotropin (hCG)**—a glycoprotein that is normally produced by the placenta during pregnancy. Also, elevated hCG levels are seen in patients with some tumors of the testes and ovaries. For this reason, serum levels of hCG are used as a tumor marker.

**Hydatidiform mole**—a benign uterine tumor that presents as a mass of cysts.

**Hyperosmolar hyperglycemic state**—a state in which patients have severe hyperglycemia, generally >600 mg/dL, but not ketosis. Hyperglycemia causes glycosuria and dehydration. Water shifts from the intracellular to vascular compartment to compensate. This commonly occurs in type 2 diabetes mellitus, when the patient is stressed by a concurrent medical illness (e.g., infection). Also known as *hyperosmolar hyperglycemia nonketotic state*.

**Hypha**—referring to fungi; this is a branching tube-like filament.

**Hypogeusia**—the diminished ability to taste food.

**Hyposmia**—a decreased sense of smell.

**Icterus**—yellow discoloration of the sclerae and skin associated with hyperbilirubinemia. Also known as *jaundice*.

**Ileus**—an obstruction of the bowel that leads to nausea, vomiting, and abdominal pain. It could be due to a physical obstruction or absence of peristalsis. Also known as *paralytic ileus*.

**Immunoassay**—a common laboratory technique based on a reaction between an antigenic determinant and a labeled antibody.

**Immunohistochemistry (IHC)**—the process of obtaining tissue from a biopsy and fixing it onto a glass slide. Antibodies to the antigen thought to be in the biopsy specimen are added and bind to the antigen. The antibodies that are bound to the antigen stain the biopsy and then are read by a pathologist to determine the amount of staining present in the biopsy specimen.

**Incretin**—gut hormones that enhance insulin secretion when serum glucose levels rise after meals. Two major incretins are glucagon-like peptide and glucose-dependent insulinotropic peptide.

**Indirect bilirubin**—unconjugated bilirubin that is water insoluble and must be converted to direct bilirubin by the liver in order to be excreted.

**Infant**—refers to a baby that is one month to one year of age.

**Infarction**—the death of part or whole of an organ secondary to obstruction of blood flow by a blood clot (thrombus) or an embolus in the supplying artery.

**Informatics**—the use of collected data for the purposes of problem solving and healthcare decision-making.

**Inotropic**—related to the contraction of heart muscle (e.g., positive inotropic agents increase the force of contractions of the heart muscle).

**Intermediate (I)**—interpretive category for in vitro susceptibility testing of bacteria where the resulting minimum inhibitory concentration (MIC) is equivocal (i.e., MIC is higher than those interpreted as susceptible but lower than those interpreted as resistant). The organism/infection may be eradicated if the antimicrobial agent achieves high concentrations at the site of infection or maximum doses of the antimicrobial agent are utilized.

**International normalized ratio (INR)**—the prothrombin time ratio that would result if the World Health Organization international reference for thromboplastin were used to test a blood sample.

**Intrahepatic cholestasis**—the disorders of hepatocytes and microscopic bile ducts.

**Intron**—the gene sequence between exons that is excised before mRNA is translated into protein. Introns are historically called “junk” DNA. However, it is increasingly being realized that introns contain gene sequences that do have functional importance.

**Inulin**—an inert carbohydrate that is filtered by the glomerulus but not reabsorbed or secreted by the renal tubule. It is used to measure glomerular filtration rate.

**Invasive test**—a test that examines fluids or other substance obtained by penetrating the skin or physically entering the body.

**In vitro (literally)**—this refers to a reaction or process that occurs inside a test tube.

**In vivo (literally)**—this refers to a reaction or process that occurs inside the body of a plant or animal or inside cells that are inside the body.

**Ischemia**—an inadequate blood flow to a part of the body secondary to constriction or blockage of the supplying artery.

**Jaundice**—yellow discoloration of skin and sclerae due to hyperbilirubinemia. Also known as *icterus*.

**Kallmann syndrome**—a rare genetic condition in which a male has one or more extra X chromosomes in each cell. This presents with absent or delayed puberty and an impaired sense of smell. In addition, some patients may also have renal agenesis, cleft lip, and cleft palate.

**Kernicterus**—hyperbilirubinemia-induced brain damage in infants.

**Ketonuria**—ketones in the urine, which can occur with severe insulin deficiency, starvation, high-fat diets, fever, and anesthesia. Ketones are metabolic products of fat metabolism. The two principal ketones are  $\beta$ -hydroxybutyric acid and acetoacetic acid. Ketonuria is abnormal.

**Klinefelter syndrome**—a genetic condition in males that presents with small testicles, low serum testosterone levels, decreased muscle mass, sparse body and facial hair, and enlarged breasts.

**K<sub>m</sub> (Michaelis constant)**—the concentration of substrate at which an enzymatic reaction rate is half its maximal value.

**KRAS**—when present, a gene that is strongly associated with primary resistance to the anti-EGFR monoclonal antibodies, panitumumab, and cetuximab.

**Lacrimal fluid tears**—ultrafiltrate of plasma that is secreted by lacrimal glands in the eye.

**Lanugo hair**—the down-like, fine, soft hair usually on the ears, forehead, or flank of adult humans.

**Laparoscopy**—a medical procedure that allows visualization of the abdominal and pelvic organs.

**Leukocyte esterase**—an enzyme that is released from white blood cells and can be detected in urine by dipstick testing. When present, it indicates the presence of white blood cells in the urine and suggests either infection or inflammation of the urinary tract.

**Lower urinary tract symptoms**—a term that refers to a collection of urinary obstructive and irritative voiding symptoms, which impacts negatively on a patient's quality of life. Also known as *LUTS*.

**Luteal phase**—the part of the menstrual cycle in which the secretion of progesterone, rather than estradiol, predominates.

**MDRD**—modification of diet in renal disease. The original MDRD study was undertaken to assess if reduction in protein intake had beneficial effects on progression of kidney disease. The study used iothalamate clearances to assess glomerular filtration rates. The data was used to develop alternative equations (the MDRD equations) to better identify and treat patients with chronic kidney disease.

**MDRD equation**—refers to the modification of diet in renal disease formula for estimating glomerular filtration rate in patients with chronic kidney failure. The patient's serum creatinine, age, African-American status, and gender are included in the formula. The MDRD equation tends to underestimate the level of renal function in those with normal or higher levels of renal function.

**Mean corpuscular hemoglobin concentration (MCHC)**—the average amount of hemoglobin in a red blood cell. A decreased MCHC value implies hypochromic red cells and suggests iron deficiency anemia.

**Mean corpuscular volume (MCV)**—the average volume of a red blood cell. If the MCV is high, the cells are known as *macrocytic*. This is associated with vitamin B<sub>12</sub> or folate deficiency. If the MCV is low, the cells are known as *microcytic*. This is associated with iron deficiency.

**Meconium**—the first discharge of intestinal waste products by a newborn human.

**MEK inhibitor**—a drug that inhibits mitogen-activated protein kinase. Overactivity of this enzyme is present in some tumors. For example, trametinib is a MEK inhibitor, which may be useful for treatment of BRAF-mutated melanoma.

**Menkes syndrome**—an X-linked disorder associated with defective copper absorption, which results in stunted growth, mental retardation, defective keratinization and pigmentation of hair, hypothermia,

and degenerative changes in the aortic elastin and neurons. Children with this genetic disorder are often deceased by age 3. Also known as *kinky-hair* or *steely-hair syndrome*.

**Menses**—the bloody discharge that occurs during menstrual cycles.

**Metabolic syndrome**—a syndrome characterized by abdominal obesity, insulin resistance, hypertension, low levels of high-density lipoprotein cholesterol, and elevations in triglycerides.

**Metabolomics**—study of metabolic products of cellular processes.

**Michaelis–Menten kinetics**—a behavior that describes a drug metabolism process that is saturable.

**Minimum bactericidal concentration (MBC)**—the lowest concentration of a specific antimicrobial agent that kills 99.9% of the inoculum of the organism under a standardized set of in vitro conditions.

**Minimum inhibitory concentration (MIC)**—the lowest concentration of a specific antimicrobial agent that prevents visible growth of the organism after 24 hours under a standardized set of in vitro conditions.

**Mittelschmerz**—a lower abdominal and pelvic pain that occurs midway through the menstrual cycle.

**Mutation**—a variation in genomic DNA that occurs in less than 1% of the population. Mutations may be rare or unique to an individual. The types of variation include single-base pair changes, insertions/deletions, repeats, and chromosomal arrangements.

**Myocardium**—the muscular tissue of the heart.

**Myoglobin**—low molecular weight heme protein found in cardiac and skeletal muscle.

**Myopathy**—elevations in creatine phosphokinase accompanied by muscle pain or tenderness.

**Nanotechnology**—the emerging clinical science involving the interactions of cellular and molecular components, specifically clusters of atoms, molecules, and molecular fragments.

**Natriuretic peptide**—a peptide that increases renal sodium excretion. There are three types: A, B, and C. Elevated brain natriuretic peptide is associated with congestive heart failure.

**Neonate**—a full term newborn of 0–28 days postnatal age or a premature neonate whose postmenstrual age is 41–46 weeks.

**Nephrogenesis**—development of the kidney.

**Nephrotic syndrome**—a condition caused by damage to the glomeruli of the kidneys and characterized by large amounts of protein in the urine (proteinuria), low amounts of protein in the blood (hypoalbuminemia), edema, and high amounts of cholesterol in the blood (hypercholesterolemia).

**Neural tube defect**—an abnormal intrauterine development of the spinal cord or brain results in a portion of the spinal cord exposed through the vertebrae (spina bifida), or part of the brain exposed through the skull in the newborn. Some neural tube defects are fatal.



**Noninvasive test**—a test that examines fluids or other substances obtained without penetrating the skin or physically entering the body.

**Nonlinear kinetics**—see *Michaelis–Menten*.

**Non-ST-segment elevation (myocardial ischemia)**—a classification for myocardial ischemia or acute myocardial infarction based on electrocardiogram findings. In this case, there is no ST-segment elevation; instead, there is T-wave inversion or ST depression, which indicates myocardial ischemia but not infarction. This is considered a less severe type of myocardial infarction than an ST-segment elevation myocardial infarction.

**Normal flora**—the natural colonization of several anatomic sites by bacteria that do not typically cause infection but may become pathogenic under certain circumstances. Normal flora colonization commonly provides defense against invasion by other bacterial or fungal organisms by occupying space, competing for nutrients, and stimulating antibody production.

**Oligoarthritis**—arthritis that affects one to four joints during the first six months of disease.

**Oligomenorrhea**—an infrequent or very light menstruation in women with previously normal periods.

**Omphalocele**—a defect in the wall of the abdomen at the umbilical ring, which occurs during fetal development (i.e., a congenital malformation or birth defect). It allows the intestines (and sometimes other organs) to protrude into the base of the umbilical cord. Thus, the intestines and other organs are outside of the abdominal cavity enclosed in a clear membranous sac. Having the internal organs outside of the abdominal wall will increase insensible water loss.

**Oncogene**—a gene that normally directs cell growth. If altered, an oncogene can promote or allow the uncontrolled growth of cancer. Alterations can be inherited or caused by an environmental exposure to carcinogens.

**Opisthotonus**—a spasm of the axial muscles of the spinal column results in this extrapyramidal movement in which the head, neck, and spine of the patient assume an arch-like or bridge-like position. This is a classic presentation of tetanus.

**Orchiectomy**—the surgical removal of the testes.

**Osmolality**—a measure of the number of dissolved particles per unit of water. As it pertains to serum, the osmolality is an estimate of the water-solute ratio in vascular fluid. The normal serum osmolality is 270–300 mOsm/kg water. As it pertains to urine, the osmolality is an estimate of the water-solute ratio in urine. The normal urine osmolality is 500–800 mOsm/L.

**Osmometry**—a process of measuring the osmotic strength of a fluid or substance, which is dependent on the total concentration of solute particles per kilogram.

**Osteomalacia**—a bone disorder in which bones are soft and weak due to deficiency of vitamin D, calcium, and phosphorus. In children, this is also known as *rickets*.

**P wave**—the electrocardiogram recording of the electrical activity of the heart leading to atrial depolarization and contraction.

**Paget disease**—a bone disorder associated with excessive bone resorption and excessive bone formation, which leads to thickened, softened bone. Also known as *osteitis deformans*.

**Panhypopituitarism**—a disease caused by absent or deficient anterior pituitary gland function, which results in deficiency in growth hormone, luteinizing hormone, follicle-stimulating hormone, adrenocorticotropic, and thyroid-stimulating hormone. A patient may present with clinical symptoms and signs due to one or more hormone deficiencies. This disorder may be due to a disorder of the hypothalamus or the pituitary gland.

**Pathogen**—a microorganism that is capable of damaging host tissues and eliciting specific host responses and symptoms consistent with an infectious process.

**Patient self-management**—for patients on chronic warfarin therapy; patients test their own INR and adjust their own therapy, usually based on an algorithm. This approach allows the patient to have more autonomy and control over their dosage regimen.

**Patient self-testing**—for patients on chronic warfarin therapy; a patient will test his or her own INR but relies on a clinician for interpretation of results and any modifications to the current regimen.

**Peak expiratory flow rate**—the maximum airflow rate on exhalation. It is measured using a hand-held peak flow meter. If the peak expiratory flow rate is low, it indicates large airway obstruction or that asthma is severe.

**Pelvic inflammatory disease**—disease of the female reproductive organs (ovary, fallopian tubes, uterus, cervix, vagina) commonly associated with chlamydia or gonorrhea infection; can lead to infertility or ectopic pregnancy.

**Perfusion**—the circulation of blood through an organ, or the movement of blood through a vascular bed of tissue.

**Perimenopause**—the period of waning ovarian function that occurs before menopause.

**Pharmacoenhancer**—a drug that, when coadministered with another drug, increases serum levels of the latter with the objective of increasing and prolonging its effect.

**Pharmacogenetics**—the translational science of correlating inter-individual genetic variation with variability in drug response. This science has the potential to provide personalized medicine selection and dosing to individual patients.

**Phenotype**—physical presentation of a genetic trait, e.g., hair or eye color, or CYP 450 enzyme capacity to metabolize a particular drug.

**Philadelphia (Ph) chromosome**—an abnormality of chromosome 22 in which part of chromosome 9 is translocated to it. Bone marrow cells that contain the Ph chromosome are often found in chronic myelogenous leukemia. See *translocation*.

**Photometry**—a method of laboratory testing in which the laboratory instrument measures the absorbance or emittance of light.

**Pica**—abnormal food craving.

**Plethysmography**—as it refers to pulmonary assessments, plethysmography measures lung volumes (or the amount of gas contained in the lungs) at various stages of inflation.

**Pluripotential stem cells**—embryonic cells that have the ability to differentiate into a variety of different types of specialized cells.

**Poikilocytosis**—the variability in the circular, biconcave shape of erythrocytes.

**Point-of-care testing**—the analysis of specimens, involving portable analyzers, that takes place in a physician's office, in emergency rooms, or at the bedside in a patient's home.

**Polycystic ovary syndrome**—a common endocrine disorder that causes infertility in women. Clinical manifestations include enlarged ovaries with fluid-filled follicular cysts, irregular menstrual cycles, excess body hair, acne, obesity, and elevated serum testosterone and luteinizing hormone levels.

**Polymerase chain reaction (PCR)**—a clinical laboratory technique involving the in vivo replication and amplification of DNA fragments.

**Polymorphism**—a variation in DNA that occurs in at least 1% of the population. Examples of types of polymorphisms include single nucleotide polymorphism (single base pair substitutions), insertion/deletions (In/Del; regions of the genome that are inserted or deleted), tandem repeats (a small number of base pairs that are repeated a variable number of times [e.g., TA repeat]), and copy number variants (large regions of the genome or whole genes that occur with variable repetition throughout the genome).

**Polyps**—small growths in the mucous membrane lining of the uterus, gastrointestinal tract, or nasal sinuses.

**Positron emission tomography (PET)**—nuclear imaging technique that measures blood flow and cellular metabolism in an organ.

**Postnatal age**—chronological age since birth.

**Prealbumin**—a plasma protein similar to albumin but with a shorter half-life. It is synthesized in the liver and is regarded as the best laboratory test of protein malnutrition.

**Preamalytic variable**—a substance present in the laboratory specimen that interferes with laboratory analytic methods. Examples of such substances include certain drugs, hemolyzed red blood cells, bilirubin, and high lipid concentrations.

**Precision**—assay reproducibility.

**Predictive value**—a value that assesses a test's reliability.

**Preeclampsia**—a condition that occurs in pregnant women characterized by hypertension, edema, and large amounts of protein in the urine. Preeclampsia may lead to eclampsia (an even more serious condition).

**Premature neonate**—a neonate born at less than 38 weeks gestational age.

**Prerenal azotemia**—kidney dysfunction caused by a reduced perfusion to the kidney, which could be due to volume depletion (diuretics), hypotension, heart failure, and emboli to the renal arteries. This is characterized by an abnormally high blood urea nitrogen:serum creatinine ratio.

**Primary biliary cirrhosis**—a chronic disease involving progressive destruction of small intrahepatic bile ducts leading to cholestasis and progressive fibrosis over a period of decades.

**Procalcitonin**—a precursor of calcitonin. Plasma procalcitonin levels may increase in the presence of acute or chronic inflammation, trauma, or infection.

**Prolactinoma**—a pituitary that secretes prolactin.

**Prostacyclin**—a protein that is produced by cells of blood vessel walls and inhibits platelet aggregation.

**Protected specimen brush**—refers to an invasive procedure to obtain sputum from the lung. A plastic tube that contains a retractable brush is inserted down the throat to the lungs to avoid contaminating the brush with bacteria in the mouth and throat.

**Proteinuria**—the loss of protein in the urine, which is usually characteristic of glomerular disease.

**Proteomics**—study of proteins that are produced by organisms.

**Pulmonary compliance**—the degree of elasticity or stiffness in the lung expressed as the change in volume divided by the change in pressure.

**QRS complex**—the electrocardiogram recording of the electrical activity of the heart leading to ventricular depolarization and contraction.

**Qualitative test**—a test whose results are reported as either positive or negative without further characterization of the degree of positivity or negativity.

**Quantitative test**—a test whose results are reported as an exact numeric measurement (usually a specific mass per unit measurement) and assessed in the context of a reference range.

**Red blood cell distribution width (RDW)**—a laboratory test that indicates the variability in the size of red blood cells. A high RDW indicates a large variability in size, which often occurs in nutritional anemias and thalassemias.

**Reference range**—a statistically-derived numerical range of values obtained by testing a sample of individuals assumed to be healthy; represents the range of values where 95% of individuals within the reference population fall.

**Renal tubular acidosis**—a condition in which the kidney tubules are not able to adequately remove acids from the blood and excrete them in the urine. This decreased ability of the kidney to excrete acids results in a buildup of acids in the blood (metabolic acidosis) and electrolyte imbalances.

**Repolarization**—an electrical phenomenon that represents the recovery of the resting state electrical potential across membranes of muscle or nerve cells. The intracellular space becomes more negatively charged than the extracellular space leading to cellular relaxation.

**Resistant (R)**—interpretive category for in vitro susceptibility testing of bacteria where the minimum inhibitory concentration (MIC) of the bacteria is high, and the organism is not likely to be inhibited or eradicated by standard doses of the antimicrobial because the MIC is higher than what can be achieved using maximum doses of the antibiotic.

**Reticulocyte**—premature red blood cell.

**Retrocollis**—a dystonia in which sustained muscle contraction causes the head to tilt backward.

**Rhabdomyolysis**—a condition characterized by breakdown of skeletal muscle tissue with release of myoglobin, enzymes, and electrolytes from cells.

**Rheumatoid factors**—immunoglobulins directed against the Fc region of immunoglobulin G that are found in the serum of patients with rheumatoid arthritis and other rheumatic diseases.

**Rickets**—a bone disease caused by chronic vitamin D deficiency and calcium deficiency. Bones become soft and weak.

**Rotor syndrome**—an autosomal recessive genetic disorder in which patients have increased levels of plasma conjugated and unconjugated bilirubin, icterus, and jaundice.

**RT-PCR**—reverse-transcriptase polymerase chain reaction. It is a very sensitive molecular genetic test for finding specific DNA sequences, such as those occurring in some cancers. The RNA strand is first reverse transcribed into complementary DNA, followed by amplification of the resulting DNA using a polymerase chain reaction.

**Rumack-Mathew nomogram**—a semilogarithmic plot of serum acetaminophen concentration versus time, which is used to determine whether there is a need to administer acetylcysteine to reduce the risk of toxicity.

**Sarcoidosis**—a systemic granulomatous disease affecting many organs. Small nodules of tissue composed of lymphocytes and macrophages appear in skin, lungs, joints, and lymph nodes. Patients may be asymptomatic or develop complications such as pericarditis or meningitis. The etiology is unknown. The disease may or may not be chronic. Also known as *sarcoid*.

**Sarcopenia**—gradual loss of muscle mass, strength, and function with aging.

**Semiquantitative test**—a test whose results are reported as either negative or with varying degrees of positivity but without exact quantification.

**Sensitivity**—when referring to a test, it is the ability of the test to show positive results in patients who actually have the disease (true positive rate). For a test with high sensitivity for a diagnosis of a disease, a patient with a negative test result probably does not have the disease.

**Septum**—a wall or separation between two compartments.

**Serology**—a branch of science that deals with measuring specific immunologic responses in the serum or blood to pathogens or foreign substances.

**Smith antibodies**—a type of antinuclear antibody that is directed at a series of nuclear proteins complexed with small nuclear RNAs. Smith antibodies have high specificity for systemic lupus erythematosus and are more commonly found in African American and Asian patients.

**Specificity**—the ability of the test to show negative results in patients who do not have the disease (true negative rate). For a test with high specificity for diagnosis of a disease, a patient with a positive test result has a high probability of having the disease.

**Specimen**—the sample used for laboratory analysis (e.g., whole blood, arterial blood, urine, stool).

**Spectrophotometry**—a method of laboratory testing in which analyzers measure the intensity of light as a function of wavelength as the light beam is transmitted or reflected through a solution or a see-through solid.

**Spirometry**—a type of pulmonary function test that measures the maximum amount of air that is exhaled by a patient after complete inhalation.

**Sporangiophore**—a threadlike structure of a fungus that has sporangia (asexual spores) at the tip.

**ST-segment elevation (myocardial infarction)**—a classification for myocardial ischemia or acute myocardial infarction based on electrocardiogram findings. In this case, there is ST-segment elevation, which signifies myocardial injury, likely reflecting a degree of cellular damage beyond that of mere ischemia. This is considered a more severe type of myocardial infarction than a non-ST-segment elevation myocardial infarction.

**Static spirometry**—a pulmonary breathing test that is volume-based and slow.

**Susceptible (S)**—interpretive category for in vitro susceptibility testing of bacteria where the organism is readily inhibited based on the minimum inhibitory concentration (MIC) of the antibiotic; the organism/infection will most likely be eradicated using standard dosing of the antimicrobial agent for that infection type since concentrations of the antibiotic in the serum and at the site of infection readily exceed the MIC.

**Syndrome of inappropriate antidiuretic hormone secretion (SIADH)**—patients with SIADH have excessively high levels of antidiuretic hormone, which results in increased water reabsorption and dilutional hyponatremia.

**Synovial fluid**—the joint fluid that lubricates and nourishes the articular cartilage.

**T wave**—the electrocardiogram recording of the electrical activity of the heart leading to ventricular repolarization and relaxation.

**Tachyzoites**—a rapidly reproducing stage of *Toxoplasma gondii*, associated with acute infections.

**Thalassemia**—a genetic hemoglobinopathy in which the patient has difficulty producing intact hemoglobin inside red blood cells. As a result, the red blood cell is degraded more rapidly and has a shorter lifespan than usual. Thalassemia results in anemia.

**Theca cells**—cells that produce androgens and progesterone in the ovarian follicle.

**Thiopurine methyltransferase (TPMT)**—an enzyme responsible for in vivo conversion of azathioprine and 6-mercaptopurine to inactive metabolites. Genetic variants to the TPMT gene can result in deficient or absent TPMT activity, which can lead to increased hematologic adverse effects of azathioprine or 6-mercaptopurine.

**Thrombocytopenia**—a reduction in the platelet count.

**Thrombocytosis**—an elevation in the platelet count.

**Thromboxane**—a protein produced by platelets that is essential for platelet aggregation.

**Thyrotoxicosis**—a condition due to excessive thyroid hormone also known as hyperthyroidism.

**Tissue plasminogen activator**—it converts plasminogen to plasmin, which can dissolve blood clots.

**Total body water**—it includes both extracellular water (in the vascular compartment and interstitial water) and intracellular water volumes.

**Toxicokinetics**—the pharmacokinetics of drugs and chemicals in the face of overdose.

**Transesophageal echocardiography**—a sonogram image that is produced from a transducer at the end of flexible endoscope, which is passed through the esophagus and positioned close to the heart.

**Transferrin**—an iron transporting protein in the blood stream. The percentage of iron-binding sites of transferrin, which are occupied by iron, is known as *transferrin saturation*. This is used as an indirect measure of circulating iron levels.

**Translocation**—movement of part of one chromosome that has broken off to another chromosome.

**Transposon**—refers to a portion of a gene that can change positions within a genome, which can result in bacterial resistance to antibiotics or other unexpected phenotypic presentations. Also known as a *disposable element*.

**Transthoracic echocardiography**—a sonogram image that is produced from a transducer, which is placed on the anterior chest wall.

**Transthyretin**—a plasma protein similar to albumin but with a shorter half-life. Also known as *prealbumin*.

**Transudate**—a solute or fluid that passes through a capillary membrane as a result of osmotic pressure or a hydrostatic pressure gradient. Transudates typically have low protein or cellular content.

**Triglycerides**—an esterified form of glycerol and fatty acids that constitute the main form of lipid storage in humans that is used as fuel for gluconeogenesis or for direct combustion as an energy source.

**Troponin**—a protein that regulates calcium-mediated interaction of actin and myosin, essential for contraction of cardiac muscle.

**Trousseau's sign**—a sign of latent tetany due to hypocalcemia. Carpal spasm is induced by inflating a blood pressure cuff on the ipsilateral arm for three minutes.

**Tumor marker**—substances produced by tumor cells or by other cells of the body in response to cancer. These substances can be found in the blood, urine, tumor tissue, or other tissues. Some tumor marker levels can also be altered in patients with noncancerous conditions, which limit their usefulness for cancer screening.

**Turbidimetry**—a technique for measuring the percent light absorbed as light passes through a solution. As turbidity increases, the intensity

of the light beam as it passes through the particles in the solution decreases.

**Tyrosine kinase**—an intracellular enzyme that transfers a phosphate group from adenosine triphosphate to a tyrosine residue in a protein. Phosphorylation of proteins by kinases is an important mechanism in signal transduction (and cell growth) and often becomes dysregulated in cancer.

**U-waves**—refers to a portion of an electrocardiograph tracing. U-waves normally follow T-waves and are in the same direction as T-waves. The U-wave represents repolarization of Purkinje fibers. U-waves are more often visible when the heart rate is <65 beats/minute or in the face of hypokalemia.

**Ultrafiltrate**—a solution that has passed through a semipermeable membrane with very small pores.

**Urethral stricture**—scarring of the urethra (due to infection, inflammation, or instrumentation) that results in narrowing of the urethral lumen. A patient will then have difficulty passing urine from the bladder through the narrowed urethral lumen.

**Uridine glucuronosyltransferase**—an enzyme responsible for conjugating bilirubin in the liver so that it can be excreted renally.

**Urobilinogen**—bilirubin that is metabolized by intestinal bacteria to urobilinogen. Although most urobilinogen undergoes hepatic recirculation, a small amount is normally excreted in urine. When urinary urobilinogen levels are high, it suggests excessive red blood cell turnover, as would occur with hemolytic anemia, or hepatic injury.

**Urokinase**—produced by the kidney and can convert plasminogen to plasmin, which can dissolve clots. It is used as a pharmaceutical agent. Also known as *urine plasminogen activator*.

**Vasopressin**—it enhances water reabsorption at the collecting duct portion of the renal tubule. Also known as *antidiuretic hormone*.

**Ventilation**—the movement of air in and out of the lungs.

**VKORC1**—a gene that encodes for vitamin K epoxide reductase complex subunit 1, the enzyme responsible for activating vitamin K. Various VKORC1 genotypes affect the daily dose of warfarin and potential of bleeding with warfarin in patients. Uncommonly, a VKORC1 genotype is associated with warfarin resistance.

$V_{\max}$ —the maximum rate of a drug's metabolism by a particular enzyme system in the liver.

**Von Willebrand factor**—a circulating protein that binds to other circulating proteins and is essential for platelet adhesion.

**Wilson disease**—an autosomal recessive disease of improper copper storage. It is associated with elevated urinary copper loss; low plasma ceruloplasmin; low copper concentrations; and copper deposition in the liver, brain, and cornea.

**Zero-order bioavailability or elimination rate**—The absorption or elimination rate of a drug from the body proceeds at a constant rate and is saturable. The rate of absorption or elimination is independent of plasma drug concentration.