

Glossary

A

Absorbed Dose

The amount of a substance that actually enters the body, usually expressed as milligrams of substance per kilogram of body weight (*mg/kg*).

Absorption

The process whereby a substance moves from outside the body into the body.

Acceptable Daily Intake (ADI)

The amount of a chemical to which a person can be exposed each day over a long period of time (*usually lifetime*) without suffering harmful effects.

Acetylcholine

An important chemical in the body having physiological functions, including the neurotransmission of electrical impulses across synapses of nerve endings.

Acetylcholinesterase

An enzyme present in nervous tissue, muscle, and red blood cells that catalyzes the hydrolysis of acetylcholine to choline and acetic acid.

Acetylcholinesterase Inhibitors

Chemicals that inhibit the enzyme acetylcholinesterase at neural synapses. This prevents the acetylcholinesterase from stopping the action of acetylcholine and allows for continued stimulation of the effector. The result is spasms and paralysis, which can cause paralysis and death. Some important

acetylcholinesterase inhibitors are organophosphate pesticides, carbamates, and some chemical warfare agents.

ACGIH®

Formerly called American Conference of Governmental Industrial Hygienists. ACGIH is a professional society for industrial hygienists that recommends safety and health guidelines.

Acid

A substance with one or more hydrogen atoms that are readily replaceable by electropositive atoms. It is a donor of protons. In aqueous solution, it will undergo dissociation with the formation of hydrogen ions. It has a pH of less than 7.0.

Action potential

A conducted change in the membrane potential of cells, initiated by an alteration of the membrane permeability to sodium ions, and subsequent propagation of an electrical impulse down an axon. Same as nerve impulse.

Active Transport

The movement of a substance across a membrane requiring energy. The substance moves against a concentration gradient, from a less concentrated region to a more concentrated region.

Acute Effect

An effect that occurs almost immediately (*seconds/minutes/hours/days*) after a single or brief exposure to a toxic agent. Generally, acute effects will be evident within 14 days.

Adenosine triphosphate (ATP)

An important high-energy compound located in the cytoplasm of cells, which serves as a source of cellular energy.

ADI

see Acceptable Daily Intake

Adsorption

The process of attracting and holding a substance to a surface. For example, a substance may adsorb onto a soil particle.

Aerosols

Airborne particulate which may be solids or liquid droplets.

Afferent nerve

A nerve that relays sensory information to the CNS.

Albumin

A simple protein soluble in water and distributed throughout body tissues. It is the most abundant plasma protein.

Allergy

An immune hypersensitivity reaction of body tissues to allergens that can affect the skin (*urticaria*), respiratory tract (*asthma*), and gastrointestinal tract (*vomiting and nausea*) or produce a systemic circulatory response (*anaphylactic response*).

Alveoli

The air sacs at the ends of the tracheobronchial tree in which gases are exchanged between inhaled air and the pulmonary capillary blood.

Ames Test

A test for mutagenesis using the bacterium *Salmonella typhimurium*.

Amyotrophic Lateral Sclerosis

A disease in which the myelin around nerves is lost causing paralysis and loss of sensory and motor function. Same as Lou Gehrig's disease.

Anaplasia

An alteration of cells from normal appearance to poorly-differentiated or undifferentiated morphology. They have irregular nuclei and cell structure with numerous mitotic figures. Anaplasia is frequently associated with malignancies and serves as one criterion for grading the aggressiveness of a cancer.

Anemia

A condition in which there is reduced or impaired red blood cells or hemoglobin resulting in an inadequate capacity of the blood to transport oxygen to body tissues.

Aneuploidy

Any deviation from an exact multiple of the haploid number of chromosomes. This may involve missing or extra chromosomes or parts of chromosomes.

Anoxia

An insufficient (*below normal*) supply of oxygen in the body tissues.

Antagonism

An interaction between two chemicals in which one decreases the expected toxic effect of the other.

Antibody

An antibody is a protein molecule (*immunoglobulin with a unique amino acid sequence*) that only interacts with a specific or closely related foreign substances (*antigen*). The antibody is

induced (*a response of the immune system*) as a result of prior exposure to the antigen.

Anticholinergic Effects

Neurological effects resulting from the blockage of acetylcholine, which transmits impulses across nerve junctions.

Antidote

A remedy for counteracting a poison.

Anxiety

A feeling of apprehension, uncertainty, and fear without apparent stimulus, and associated with tachycardia, sweating and tremors.

Apoptosis

Individual or single cell death by a process of self-destruction of the cell nucleus. In apoptosis, dying cells are not contiguous but are scattered throughout a tissue. Often referred to as "programmed cell death."

Aqueous

Of a watery nature. Prepared with water.

Asphyxiant

A substance, which in high concentrations in air, replaces or reduces the oxygen level such that a person inhaling the air mixture suffers hypoxia.

Astrocyte

A type of glial cell in the CNS. They are big cells that maintain the blood-brain barrier and provide rigidity to the brain structure.

Atrophy

A decrease in the size of cells. If a

sufficient number of cells are involved, the tissue or organ may also decrease in size.

Atropine

An anticholinergic drug that blocks acetylcholine receptors.

ATSDR

Agency for Toxic Substances and Disease Registry, a US federal agency responsible for emergency response to chemical spills and assessment of health effects of hazardous waste sites.

Autoimmunity

An immune response in which the constituents of the body's own cells are seen as foreign, resulting in hypersensitivity to its own tissues.

Autonomic Nervous System

The part of the nervous system involved in the unconscious regulation of visceral functions by transmitting motor information to smooth muscles, cardiac muscle, and various glands.

Axon

The elongation of a neuron that conducts an action potential. It may extend long distances from one part of the body to another.

B

Base

A substance that dissociates in water to yield a hydroxyl ion. A donator of electrons.

Batrachotoxin

A potent neurotoxin of some South American frogs that has been used as

arrow poisons.

Benign tumor

A tumor that grows only at the site of origin and does not invade adjacent tissues or metastasize. It is generally treatable.

Bias

Systematic error that may be introduced in sampling by selecting or encouraging one outcome over another.

Biliary

Pertaining to bile, an excretion produced by the liver, stored in the gall bladder, and released into the small intestine.

Bioactivation

The metabolic process whereby a parent substance is chemically changed to a daughter substance with enhanced biological activity.

Bioassay

A laboratory study used to determine the ability of a substance to produce a particular biological effect.

Bioavailability

The physical and/or biological state of a substance rendering it capable of being absorbed into the body.

Biological Half-Life

The time required to eliminate one-half the quantity of a substance from the body.

Biotransformation

Conversion of a chemical from one form to another by a biological organism.

Blood-Brain Barrier

The anatomical barrier that isolates the

CNS from the general circulation. The cell responsible is the astrocyte, which forms layers around capillaries and regulates diffusion of substances from the blood circulation to the neurons.

Body Burden

The concentration of a substance that has accumulated in the body.

Bone Marrow

The tissue within the internal open space of bones (*e.g., shaft of long bones*) in which the blood-forming elements exist.

Botulinum toxin

A potent neurotoxin that blocks the release of acetylcholine at neuromuscular junctions.

Bronchioles

The very small branches of the tracheobronchial tree of the respiratory tract which terminate in the alveoli.

C

Cancer

An uncontrolled growth of abnormal cells, creating a tumor that can invade surrounding tissues and may spread (*metastasize*) to distant organs.

Cancer Slope Factor

A key risk assessment parameter derived by the EPA. It is an estimate of the probability that an individual will develop cancer if exposed to a specified amount of chemical (*mg/kg*) every day for a lifetime.

Capillaries

The very small blood vessels that take blood from small arteries to small veins.

Carbohydrates

Organic compounds that serve as sources of energy for the body. They are converted to glucose, which in turn is used by the cells in cell respiration.

Carcinogen

A compound that is capable of causing cancer.

Carcinogenesis

A general term for production of any type of tumor.

Carcinogenic

The ability of a substance to cause cancer.

Carcinogenicity

The complex process whereby normal body cells are transformed into cancer cells.

Carcinoma

A malignant tumor arising in epithelium. It is the most common form of cancer and usually spreads via the lymphatic system.

Cardiovascular System

The organ system that transports oxygen and nutrients to tissues and removes waste products. The main components are the heart, blood, and blood vessels.

Case-Control Study

A type of study in which subjects that have a disease or outcome [cases] are compared to subjects that do not have the disease or outcome [controls]. In toxicology, a case-control study compares the exposure histories of humans who have a particular toxic effect with that of normal individuals

Catalyst

A substance that accelerates a reaction.

Cell

The smallest living unit in the body.

Cell membrane

The membrane composed of phospholipids, proteins, and cholesterol that form the outer boundary of a cell and regulates the movement of substances into and out of the cell.

Cell Proliferation

The process by which cells undergo mitosis and divide into similar cells.

Cell Transformation

The change of a cell from one form to another. The term is generally used to denote the change from normal to malignant.

Cellular Swelling

A pathologic condition of a cell that is associated with hypertrophy. It is due to cellular hypoxia, which damages the sodium-potassium membrane pump. This in turn changes the intracellular electrolyte balance causing an influx of fluids into the cell and resultant swelling.

Centrioles

Organelles composed of nine microtubule triplets that organize specific fibers of chromosomes and move the chromosomes during cell division. There are two centrioles, aligned at right angles to each other.

Cerebellum

A posterior portion of the brain that is responsible for voluntary and involuntary motor activities based on memory and sensory input.

Cerebrum

The largest portion of the brain that controls thought processes, intelligence, memory, sensations, and complex motor functions.

Chemicals

Atoms or molecules that are the building blocks of all matter.

Cholestasis

A liver condition in which excretion of bile salts via the bile duct is inhibited, resulting in bile salts backing up into liver cells.

Chromosome

One of a group of structures that form in the nucleus of a cell during cell division. Chromosomes bear DNA and carry an organism's genetic code.

Chromosome

Aberration

Changes in chromosome structure.

Chronic Effect

An effect that either shows up a long time after an exposure (*the latency period*) or an effect that results from a long-term (*chronic*) exposure.

Cilia

Thread-like projections of the outer layer of the cell membrane, which serve to move substances over the cell surface.

Cirrhosis

A chronic condition of the liver in which liver cells are replaced by fibrous cells.

CNS

The central nervous system consisting of the brain and spinal cord.

Compartment

As used in toxicokinetics, compartment is a hypothetical volume of a body system wherein a chemical acts homogeneously in transport and transformation. The body is composed of organs, tissues, cells, cell organelles, and fluids, any one or several of which may be referred to as a compartment.

Concentration

Gradient

The relative amounts of a substance on either side of a membrane. Diffusion occurs from a region of high concentration to a region of low concentration.

Cohort Study

A type of study in which a cohort (group) of individuals who have been exposed to a substance or had treatment for a disease and a cohort without that exposure or that treatment are followed over time to compare disease occurrence. In toxicology, a cohort (*group*) of individuals with exposure to a chemical and a cohort without exposure are followed over time to compare disease occurrence.

Conjugation

A metabolic process in which chemical groups are attached to foreign substances in the body, usually making the conjugated chemical more water soluble and easier to eliminate from the body.

Conjugate

A metabolite that results from the joining of a Phase II molecule with a xenobiotic. It is generally more water soluble than the original substance.

Connective Tissue

One of the four tissues of the body. It is specialized to provide support and hold the body tissues together (*i.e.*, they connect). It contains more intercellular substances than the other tissues. Bones, cartilage, and fat are types of connective tissue. The blood and lymph vessels are immersed in the connective tissue media of the body.

Control Group

A group of animals or humans in a study that are treated the same as the exposed groups but without receiving the specific exposure.

Cornea The transparent front surface of the eye.

Corrosion

Direct chemical action that results in irreversible damage at the site of contact. It is manifested by ulceration, necrosis, and scar formation.

Covalent Bond

The joining together of atoms that results from sharing electrons.

CPSC

Consumer Product Safety Commission. It is a US federal agency responsible for protecting the public from toxins and other hazards present in consumer products.

Cytochrome P-450

An iron-protein complex with a maximum absorbance of visible light at 450 nm that functions as a nonspecific enzyme system during Phase I biotransformation reactions.

Cytoplasm

The fluid matrix of a cell exclusive of the nucleus. Cytoplasm consists of a

continuous aqueous solution (cytosol) and the organelles and inclusions suspended in it. This is the site of most chemical activities within the cell.

Cytosol

The liquid medium of the cytoplasm, that is, cytoplasm without the organelles and non-membranous insoluble components.

D

Demyelination

The loss of the myelin sheath (*insulation*) around a nerve.

Dendrites

Sensory processes of a neuron that are specialized to receive incoming information and send it to the neuron cell body.

Dermal Toxicity

Toxicity of the skin, which can range from mild irritation to corrosivity, hypersensitivity, and skin cancer. It can result from direct contact or internal distribution of the xenobiotic to the skin.

Deoxyribonucleic Acid (DNA)

A nucleic acid known as the molecule of life that makes up the chromosomes. It is composed of a chain of nucleotides containing the sugar deoxyribose and the nitrogen bases, adenine, guanine, cytosine, and thymine wound in a double helix and held together by weak bonds between complementary nitrogen base pairs.

Depression

A clinical psychiatric condition in which a person has a dejected mood, psychomotor retardation, insomnia and

weight loss, sometimes associated with guilt feelings and often with delusional preoccupations.

Detoxification

A metabolic process whereby a parent substance is changed to a daughter product (*metabolite*) that has less toxicity.

Diencephalon

A portion of the brain that contains the thalamus, hypothalamus, and pituitary gland. It relays and processes sensory information; control of emotions, autonomic functions, and hormone production.

Diffusion

The spontaneous movement of a substance from a high concentration gradient to a lower concentration gradient.

Digestive System

The organ system that functions to process foods that are ingested, absorb nutrients into body, and provide metabolized nutrients to the body cells. Consists of the mouth, salivary glands, esophagus, stomach, intestinal tract, liver, and pancreas.

Disease

A malfunction of any component of the body that can result in an abnormal and undesirable physiological or anatomical change.

Disposition

The term used to describe the kinetics of a substance in the body. It encompasses absorption, distribution, metabolism, and elimination of a chemical.

Distal

Away from a point of reference. As used

in medicine, something distal is farther away from the main body. For example, the foot is distal to the knee.

Distribution

Movement of a substance from the site of entry to other parts of the body.

DNA (Deoxyribonucleic acid)

A nucleic acid known as the molecule of life that makes up the chromosomes. It is composed of a chain of nucleotides containing the sugar deoxyribose and the nitrogen bases, adenine, guanine, cytosine, and thymine wound in a double helix and held together by weak bonds between complementary nitrogen base pairs.

Dosage

The determination of quantity of a substance received, which incorporates the size, frequency, and duration of doses (e.g., 10 mg every 8 hours for 5 days).

Dose

The amount of a substance received at one time. Dose is usually expressed as administered or absorbed dose (e.g., milligrams material/kilogram of body weight).

Dose-Response Assessment

The relation between dose levels and associated effects.

Dose-Response Curve

A graphical representation of the quantitative relationship between doses of a substance and specific biological effects.

Draize Test

The test for eye irritation in which the test substance is placed on the eyes of white rabbits and observed for 72 hours.

Dying-back

Neuropathy

A neurological condition in which axons begin to die at the very distal end of the axon with necrosis slowly progressing toward the cell body.

Dysplasia

A condition of abnormal cell change or deranged cell growth in which the cells are structurally changed in size, shape, and appearance from the original cell type.

E

ED50

Effective dose 50%. The estimated dose that causes some specific effect (*usually desirable*) for 50% of the population.

ED99

Effective dose 99%. The estimated dose that causes some specific effect (*usually desirable*) for 99% of the population.

Effector

The body site where a response occurs which counters an initial stimulus and thus attempts to maintain homeostasis.

Efferent Nerve

A nerve that relays motor commands from the CNS to various muscles and glands.

Edema

Retention of fluid in an organ or in the

body.

Element

A chemical substance composed of only one atom, e.g., hydrogen, calcium, or singlet oxygen.

Elimination

The toxicokinetic process responsible for the removal or expulsion of a substance from the body.

Embryo

An early stage of the development of the unborn offspring in which cell differentiation proceeds rapidly along with the formation of major organs. In humans this stage occurs from about 3 weeks until 8 to 9 weeks after conception.

Embryotoxic

The harmful effects of a substance on the developing embryo.

Endocrine System

The organ system that regulates body functions by use of chemicals, known as hormones. Endocrine organs are the pituitary gland, parathyroid gland, thyroid gland, adrenal gland, thymus, pancreas, and gonads.

Endocytosis

The process whereby a substance is engulfed and taken into a cell by an inward folding of the cell membrane, which detaches and moves into the cytoplasm.

Endoplasmic Reticulum

A cell organelle, which provides an extensive network of membrane-like channels that, extends throughout the cytoplasm. It synthesizes secretory

products and is responsible for intracellular storage and transport.

Enterohepatic circulation

Also known as enterohepatic recirculation. The cycling of a substance from the blood into the liver, then into the bile and gastrointestinal tract. This is followed by re-uptake into the blood stream from the gastrointestinal tract, possibly after chemical or enzymatic breakdown.

Environmental Fate

The fate of a substance following its release into the environment. It includes the movement and persistence of the substance.

Enzyme

A protein formed in living cells that acts as a catalyst for chemical reactions in cells.

Enzyme Activation

The increase in levels of an enzyme as the result of stimulation by another chemical substance. Same as enzyme induction.

Enzyme Inhibitor

A substance which causes a decrease in levels of an enzyme.

Enzymes

A chemical (*protein*) that catalyzes (*accelerates*) specific biochemical reactions without themselves being permanently changed.

EPA

Environmental Protection Agency. A US federal agency responsible for regulation of most chemicals that can enter the environment. The EPA administers the

following acts: Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Toxic Substances Control Act (TSCA) which was amended in June 2016 by the Frank R. Lautenberg Chemical Safety for the 21st Century Act, the Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), Clean Air Act (CAA), and the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA) (Superfund Act).

Ependymal Cells

A type of glial cell in the CNS that produces a special fluid, known as the cerebral spinal fluid (CSF).

Epidemiology

The study of the relative characteristics of exposed and non-exposed human populations for the purpose of detecting harmful effects.

EpidermisThe outer layer of the skin.

Epithelial Tissue

One of the four types of tissue in the body that is specialized to protect, absorb and secrete substances, as well as detect sensations. It covers every exposed body surface, forms a barrier to the outside world, and controls absorption.

Equilibrium

A state of balance. Opposing forces exactly counteract each other.

Excretion

A process whereby substances (*or metabolites*) are eliminated from the body.

Exposure

Contact with a foreign substance, usually by inhalation, ingestion, or skin contact.

Exposure Assessment

Analysis or estimation of the intensity, frequency, and duration of human exposures to an agent.

Exposure Dose

The amount of a substance in the environment to which a person is subjected.

F

F0 Generation
(written as F^0)
The parent generation in a multigeneration reproduction study.

F1 Generation
(written as F^1)
The first filial generation (*offspring*) in a multigeneration reproduction study. It is produced by breeding individuals of the F0 generation.

F2 Generation
(written as F^2)
The second filial generation (*offspring*) in a multigeneration reproduction study. It is produced by breeding individuals of the F1 generation.

Facilitated diffusion

The passage of molecules and ions across a cell membrane with the aid of a specific carrier protein. It is dependent on concentration gradient.

Fatty Change

A toxic cellular change that occurs with severe cellular injury. The cell has become damaged and is unable to adequately metabolize fat, resulting in development of small vacuoles of fat that accumulate and become dispersed within the cytoplasm. It is usually observed in the liver.

FDA

Food and Drug Administration. A US federal agency responsible for evaluating the safety of drugs, cosmetics, food additives, and medical devices.

Feedback Mechanism

A part of the homeostasis in which the body regulates the degree of response to a stimulus. A negative feedback depresses the stimulus to shut off or reduce the effector response whereas a positive feedback has the effect of increasing the effector response.

Femtogram (fg)

An extremely minute quantity, 1×10^{-15} gram.

Fetus

The unborn offspring in the postembryonic period, after major structures have been outlined. In humans this occurs from 8 to 9 weeks after conception until birth.

Fibrosis

The formation of scar tissue in an organ, generally by replacement of functional organ cells with nonfunctional fibrous tissue.

FIFRA

Federal Insecticide, Fungicide, and Rodenticide Act. A US federal law administered by the EPA for evaluation

and registration of pesticides.

Filtrate

A substance that has passed through a filter. As used in toxicokinetics, it usually pertains to the material that has passed through the glomerular filter into the renal tubule.

Filtration

The passage of a solvent and dissolved substance through a membrane or filter. In excretion, a portion of the plasma and dissolved materials undergo filtration through the glomerular filter (*capillary bed*).

First-pass Effect

The biotransformation of a substance in the liver after absorption from the intestine and before it reaches the systemic circulation.

G

Gamma

Aminobutyric Acid (GABA)

A neurotransmitter of the CNS whose effects are usually inhibitory.

Gene

The smallest subunit of a chromosome that contains a genetic message.

Gene Mutation

A change in the DNA sequence within a gene.

Genetic Toxicity

Toxic effects that result from damage to DNA and altered genetic expression.

Germ Cell

Reproductive cells that give rise to sperm or ova.

Glial cells

The supporting cells of the neural tissue. They regulate the environment around the neurons and protect against foreign invaders. They are also known as neuroglia.

Glomerular filtration

The first step in urine formation in which blood enters the vascularized glomerulus where water and small molecules are forced by hydrostatic pressure across the glomerular filter and into the filtrate of the Bowman's capsule of the renal tubule.

Glomerulus

The highly vascular structure in the kidney where much of the fluid portion of the blood (*serum*) is filtered and passes into the kidney tubules, carrying with it toxins and many other materials present in the serum.

Glucuronidation

The process of adding glucuronide to a toxicant or Phase I metabolite during Phase II biotransformation.

Glucuronide

A glycosidic compound of glucuronic acid. Generally inactive. Constitutes the major portion of some metabolites.

Glutathione

The tripeptide glutamyl-cysteinyl-glycine. It is found in most tissue, especially the liver. It plays a major role in detoxication and cellular protection.

Golgi Apparatus

Cell organelles composed of stacks of

flattened membranes containing chambers. They synthesize, store, alter, and package secretory products and lysosomes.

H

Half-Life

The time required for a concentration of a substance in a body fluid (usually blood plasma) to decrease by half.

Hazard

The inherent adverse effect of a substance.

Hazard Identification

Characterization of the innate adverse toxic effects of an agent.

Hepatic Cancer

Cancer of the liver.

Hepatic Necrosis

Death of liver cells (*hepatocytes*).

Hepatitis

Inflammation of the liver

Hepatotoxicity

Toxicity of the liver and associated bile duct and gall bladder.

Hepatotoxin

A systemic poison whose target organ is the liver.

Heritable

Translocation Assay

A test for mutagenicity in which exposed male fruit flies (*Drosophila*) or mice are bred to non-exposed females. The offspring males (*F1 generation*) are then

bred to detect the presence of chromosomal translocations indicating this specific type of mutation.

Herpes Simplex Virus

A virus that causes a disease marked by vesicles of the skin, usually on the lips, nares, or genitals.

High Throughput Screening

Involves *in vitro* assays (often called High throughput assays), many of which use human proteins or cells (primary cells or cell lines). The automated methods allow for a large number of chemicals to be rapidly evaluated for a specific type of bioactivity at the molecular or cellular level. The assays can be run for a range of test chemical concentrations and produce concentration-response information representing the relationship between chemical concentration and bioactivity. For toxicity testing for human health effects, these assays primarily use human cells and focus on assessing disruptions to key biological pathways.

Human Dose Equivalent

A calculation of the dose in humans that produces a specific effect based on the dose that produces the effect in animals. A conversion formula comparing animal to human body weight or animal to human body surface is used.

Hydrolysis

The chemical process in which water is used to split a substance into smaller molecules. The hydrogen and hydroxyl parts of a water molecule bond to opposite locations on a chemical bond at the site where the split occurs.

Hydrophilic

Water loving. Substance that has strong polar groups that readily interacts with water.

Hyperplasia

An increase in the number of cells in a tissue. This generally results in an enlargement of tissue mass and organ size.

Hypersensitivity

A state of altered immune reactivity in which the body reacts with an exaggerated response to a foreign agent.

Hypertrophy

An increase in size of individual cells. This frequently results in an increase in the size of a tissue or organ.

Hypoxia

A partial reduction in the oxygen concentration supplied to cells or tissues.

IDLH

Immediately Dangerous to Life and Health. A National Institute of Occupational Safety and Health estimate for the maximum level of exposure from which a person could exit in 30 minutes without escape-impairing symptoms or irreversible health effects.

Immunotoxicity

Toxicity of the immune system. It may take several forms: hypersensitivity (*allergy and autoimmunity*), immunodeficiency, and uncontrolled proliferation (*leukemia and lymphoma*).

In Silico

Testing done via computer or computer simulation.

In Vitro

Testing done in a controlled environment outside of a living organism, for example, in a test tube.

In Vivo

Testing done using a whole living organism.

Inhibition

A reduction in the activity of a reaction. In toxicokinetics, it normally refers to enzyme inhibition.

Initiation Phase

The initial stage in the carcinogenesis process, which consists of the alteration of the DNA (*mutation*) of a normal cell. The initiated cell has thus developed a capacity for unregulated growth.

Inorganic Compounds

Simple molecules that usually consist of one or two different elements. For example, water (H_2O), carbon dioxide (CO_2), bimolecular oxygen (O_2), and sodium chloride ($NaCl$).

Integumentary System

The organ system that serves as a barrier to invading environmental organisms and chemicals and serves in temperature control. Organs include the skin, hair, nails, and exocrine glands.

Interactions

Refers to measures of effects of simultaneous exposure to two or more substances. The four types of interactions are additive, antagonistic, potentiation, and synergistic.

Interneurons

Interneurons are neurons located only in the CNS and provide connections between sensory and motor neurons. They can carry either sensory or motor impulses. They are involved in spinal reflexes, analysis of sensory input, and coordination of motor impulses. They play a major role in memory and the ability to think and learn. They are also known as association neurons.

Interstitial fluid

The fluid in the space between cells. Same as intercellular fluid.

Intracellular Fluid

The fluid within a cell. It is also known as the cytoplasm.

Ionized

Separated into ions. Normally, an ionized substance will dissolve in water.

Irritation

Local tissue reaction without involvement of an immunologic mechanism. It is a reversible inflammation.

J

K

Karyorrhexis

The rupture of the cell nucleus with the disintegration of the chromatin into granules which are extruded from the cell.

Kilogram (kg)

A measure of weight consisting of 1000 grams.

Kinetics

Refers to turnover, movement, or rate of change of a specific factor, e.g., chemical reaction. It is commonly expressed in units of amount per unit time.

L

Labile Cells

Body cells that have a limited lifespan and are capable of routine division and replacement. The squamous epithelium of skin, mouth, vagina and cervix, columnar epithelium of intestinal tract, transitional epithelium of urinary tract, and hematopoietic stem cells of the bone marrow are examples of labile cells.

Latency Period

The period of time between an exposure and onset of toxicity.

LC0

Lethal Concentration 0%. The calculated concentration of a gas at which none of the population is expected to die.

LC10

Lethal Concentration 10%. The calculated concentration of a gas at which 10% of the population is expected to die.

LC50

Lethal Concentration 50%. The calculated concentration of a gas at which 50% of the population is expected to die.

LC90

Lethal Concentration 90%. The calculated concentration of a gas at which 90% of the population is expected to die.

LD0

Lethal Dose 0%. The estimated dose at

which none of the population is expected to die.

LD10

Lethal Dose 10%. The estimated dose at which 10% of the population is expected to die.

LD50

Lethal Dose 50%. The estimated dose at which 50% of the population is expected to die.

LD90

Lethal Dose 90%. The estimated dose at which 90% of the population is expected to die.

Lethal Injury

Damage to a cell or the body so severe that death results.

Leukemia

Cancer of the hematopoietic system, the blood-forming organs.

Linearized Multistage Model

A conservative quantitative cancer assessment model used by the EPA. It assumes linear extrapolation with a zero dose threshold from the upper confidence level of the lowest dose that produced cancer in an animal test or in a human epidemiology study.

Lipid Soluble

Capable of being dissolved in fat or in solvents that dissolve fat. Usually nonionized compounds.

Lipid

A large and diverse group of organic compounds that contain primarily carbon

and hydrogen atoms with a lesser amount of oxygen. Most lipids are insoluble in water but will readily dissolve in other lipids and in organic solvents.

Lipids

Essential substances of all cells and a major energy reserve for the body. Lipids may be stored as fatty acids or as triglycerides.

Lipophilic

Having an affinity for fats or lipids. A substance that is lipophilic has high lipid solubility and can penetrate cell membranes by passive diffusion.

Lipophilicity

A term used to describe the ability of a substance to dissolve in, or associate with, fat and therefore living tissue. This usually applies to substances that are non-ionized or non-polar or have a non-polar portion. High lipid solubility usually implies low water solubility.

LOAEL

Lowest Observed Adverse Effect Level. The lowest dose in a study in which there was an observed toxic or adverse effect.

Lou Gehrig's Disease

A disease in which the myelin around nerves is lost causing paralysis and loss of sensory and motor function. Same as Amyotrophic Lateral Sclerosis.

Lymphatic System

An organ system that returns tissue fluid to blood and defends against foreign organisms. Organs include the spleen, lymph nodes, thymus, and the lymphatic vessels.

Lysosomes

Organelles that consist of vesicles that

contain strong digestive enzymes. Lysosomes are responsible for the intracellular removal of damaged organelles or pathogens.

M

Macrophage

Large phagocytic cells of the blood or lymph systems that can engulf particles or small organisms.

Malignant Cell

A cancer cell that has the potential to invade surrounding tissues or spread to other areas of the body (*metastasis*).

Malignant Tumor

A tumor that can invade surrounding tissues or metastasize to distant sites, resulting in life-threatening consequences.

Margin of Safety (MOS)

The ratio of the dose that is just within the lethal range (*LD01*) to the dose that is 99% effective (*ED99*), *LD01/ED99*. A ratio of greater than 1 gives comfort to the physician whereas a ratio of less than 1 denotes caution.

Mechanism of Action

The specific manner by which a substance causes a particular effect.

Medulla Oblongata

The segment of the brain that is attached to the spinal cord. It relays sensory information to the rest of the brain and regulates autonomic function, including heart rate and respiration.

Metabolism

The conversion of a chemical from one form to another. *Same as* Biotransformation.

Metabolite

A chemical produced when a substance is metabolized by a biological organism.

Metaplasia

The conversion from one type of mature cell to a different type of mature cell. It is a cellular replacement process. An example is cirrhosis of the liver.

Metastasis

The movement of diseased cells, in particular cancer cells, from the site of origin to another location in the body.

Metastatic Foci

Secondary tumors in an organ different from the original site of cancer development.

mg/kg

A commonly used dose that stands for mg of a substance per kg of body weight.

mg/kg/day

A commonly used dosage that stands for mg of a substance per kg of body weight on a daily basis.

mg/m³ (N.B. [^] indicates superscript)

An exposure unit used to express concentrations of particulates in the air, standing for milligrams of compound per cubic meter of air.

Microglia

A type of glial cell. The microglia are small, mobile, phagocytic cells that function in defense against invading

organisms and xenobiotics.

Microgram (μg)

A commonly used unit of weight consisting of 1 millionth (1×10^{-6}) of a gram. N.B. In 10^{-6} [^] indicates superscript.

Micronucleus Test

A test for mutagenicity in which bone marrow or peripheral blood cells are examined for the presence of micronuclei (*broken pieces of chromosomes surrounded by a nuclear membrane*).

Microsomes

The subcellular organelles that are a part of the smooth endoplasmic reticulum.

Midbrain

The area of the brain between the cerebrum and brain stem. It contains the centers that process auditory and visual data and generates involuntary motor responses.

Milligram (mg)

The most commonly used unit of measure in medicine and toxicity consisting of one thousandth of a gram (1×10^{-3} g). N.B. [^] indicates superscript.

Minimal Risk Levels (MRLs)

A risk level calculated by the ATSDR for noncancer end points. The MRL is an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse effects over a specified duration of exposure. MRLs are derived for acute (*14 days or less*), intermediate (*15-364 days*), and chronic (*365 days or more*) duration exposures for either inhalation or oral routes.

Mitochondria

Oval organelles bound by a double membrane with inner folds enclosing important metabolic enzymes. They produce nearly all (95%) of the ATP and energy required by the cell.

Monooxygenase

Enzyme system (*such as cytochrome P450*) involved in the oxidation of compounds.

Motor Neurons

The neurons that relay information from the CNS to other organs, terminating at the effectors. Motor neurons are the efferent neurons of both the somatic and autonomic nervous systems. They are also referred to as effector neurons.

Multiple Sclerosis

A disease in which the myelin around nerves is lost causing paralysis and loss of sensory and motor function.

Muscular System

The organ system involved with movement or locomotion and heat production. The main organs are the skeletal muscles and tendons.

Muscular Tissue

One of the four types of tissue. It is specialized for an ability to contract. Muscle cells are elongated and referred to as muscle fibers. When a stimulus is received at one end of a muscle cell, a wave of excitation is conducted through the entire cell so that all parts contract in harmony.

Mutagen

A substance that causes mutations (*genetic damage*).

Mutagenesis

The process whereby a substance damages DNA and produces alterations in or loss of genes or chromosomes.

Mutation

DNA damage resulting in genetic alterations ranging from changes in one or a few DNA base pairs (*gene mutations*) to gross changes in chromosomal structures (*chromosome aberrations*) or in chromosome number.

Myelin

Protein layers that surround neurons and serves like insulation. Myelinated neurons usually transmit impulses at high speed, such as needed in motor neurons. Loss of myelination allows interruption of the action potential (*like leakage*) and causes a dysfunction of these cells. This can cause paralysis and loss of sensory and motor function.

N

Nanogram (ng)

A unit of weight consisting of 1 billionth of a gram (1×10^{-9} g). N.B ^ indicates superscript

Necrosis

The death of a cell caused by a progressive failure of essential metabolic and structural cell components, usually in the cytoplasm. Necrosis generally involves a group of contiguous cells or occurs at the tissue level.

Neonates

Newborn animals.

Neoplasia

A new growth of tissue with abnormal and unregulated cellular proliferation.

There are two types of neoplasia, benign and malignant. Same as a tumor.

Neoplasm

An uncontrolled and progressive growth of cells which may be benign or malignant. *Same as Tumor.*

Neoplastic

Pertaining to or like a neoplasm or neoplasia (*tumor*).

Neoplastic Conversion

The second major step in the carcinogenesis process in which specific agents (*referred to as promoters*) enhance the further development of the initiated cells.

Nephron

The functional unit of the kidney that produces urine. The primary areas are the glomerulus, convoluted tubule, and collecting duct.

NephrotoxinA systemic poison whose target is the kidney.

Nervous System

The organ system that coordinates activities of other organ systems and responds to sensations. It is composed of the central nervous system and peripheral nervous system.

Nervous Tissue

One of the four body tissues that is specialized so as to be capable to conduct electrical impulses and convey information from one area of the body to another. Most of the nervous tissue (98%) is located in the central nervous system, the brain, and spinal cord.

Neural Synapse

The junction between the axon of one neuron and the dendrite of another neuron or an axon and a connection with a muscle cell (*neuromuscular junction*).

Neuroglia

Cells of the nervous system that provide physical support for the nervous tissue, control tissue fluids around the neurons, and help defend the neurons from invading organisms and xenobiotics. Same as glial cells.

Neurons

The functional nerve cells directly responsible for transmission of information to and from the CNS to other areas of the body.

Neurotoxicity

Toxicity to cells of the central nervous system (*brain and spinal cord*) and the peripheral nervous system (*nerves outside the CNS*).

Neurotoxin

A systemic poison whose target organ is the nervous system.

Neurotransmitters

These are chemicals that move information across a synapse by diffusing across the synaptic junction, binding to receptors on the postsynaptic membrane, and stimulating generation of an action potential.

New Drug Application (NDA)

The process by which a manufacturer of a new drug applies to the FDA for formal approval to market the drug.

NicotineA neurotoxin that binds to certain cholinergic receptors thus preventing normal neural function and stimulation.

NIOSH

National Institute of Occupational Safety and Health. It is an institute in the U.S. Department of Health & Human Services that conducts research on health hazards in the workplace.

NOAEL

No Observed Adverse Effect Level. The highest dose in a toxicity study at which there were no toxic or adverse effects observed.

Non-polar

A term used to describe a molecule, which is neutral or possesses neither a positive or negative charge.

Norepinephrine

A chemical neurotransmitter of adrenergic nerves of both the central and peripheral nervous systems. It is also produced by the adrenal medulla in response to stimulation. It is the same as noradrenaline.

Nucleic acids

These are large organic compounds inside virtually all body cells (*RBCs is an exception*) that store and process information at the molecular level.

Nucleolus

This is a dense region of the nucleus, which contains the RNA and DNA. It is the site for rRNA synthesis and assembly of the ribosome components.

Nucleus

A membrane-bound part of a cell that contains nucleotides, enzymes, and nucleoproteins. The nucleus controls metabolism, protein synthesis, and the storage and processing of genetic information.

O

Octanol/Water

Partition Coefficient

The ratio of the amount of a substance that will dissolve in octanol versus the amount that will dissolve in water. The higher the octanol/water partition coefficient the greater the tendency of substance to be stored in fatty tissues.

Odds Ratio (O/R)

A statistical calculation in a case-control study involving the ratio of risk of an exposed group to that of an unexposed group. An O/R=2 means that the exposed group has twice the risk of the non-exposed group.

Oligodendrocyte

A type of glial cell in the CNS that wraps itself around an axon to form myelin, which serves like insulation.

Oncogene

Altered or misdirected proto-oncogene which then has the ability to transform the normal cell into a neoplastic cell. Most oncogenes differ from their proto-oncogenes by a single point mutation.

Organ System

A group of organs that contribute to specific functions within the body.

Organelle

A subcellular structure such as the mitochondria or nucleus of a cell.

Organic Compound

A substance that contains covalently-bonded carbon and hydrogen and often other elements.

Organophosphate Chemical

Organic chemicals that contain a phosphate group. Many are highly toxic, as they are capable of inhibition of the enzyme acetylcholinesterase at neural synapses. Many pesticides and some warfare agents are organophosphate chemicals.

Organs

A group of tissues precisely arranged so that so they can work together to perform specific functions.

OSHA

Occupational Safety and Health Administration. The component of the U.S. Department of Labor responsible for ensuring safe working conditions.

Oxidation

A change in a chemical characterized by the loss of electrons. This is a primary Phase I type biotransformation reactions

P

p53 Gene

A normal suppressor gene that controls cell division and stimulation of repair enzymes to rebuild and restore damaged regions of the DNA. Damage or inactivation of the p53 gene is considered a contributing cause of most cancers.

Partition Coefficient

See Octanol/water partition coefficient.

Passive Transfer

The movement across a membrane by simple diffusion.

Pathology

The branch of medicine that involves the functional and structural changes in tissues and organs that are caused by disease.

PEL

Permissible Exposure Level. The standard stipulated by the Occupational Safety and Health Administration for the highest safe level of exposure to a chemical in the workplace.

Percutaneous absorption

The transfer of a substance from the outer surface of the skin through the corneum and outer layers and into the systemic circulation.

Peripheral Nervous System (PNS)

All nervous tissue outside the central nervous system.

Peripheral Neuropathy

Abnormal and detrimental changes to nervous tissue outside the brain or spinal cord.

Permanent Cells

Body cells that never divide and do not have the ability for replication even when stressed or when some cells die. Examples are neurons and muscle cells.

Peroxisomes

Very small, membrane-bound organelles which contain a large variety of enzymes that perform a diverse set of metabolic functions.

Phagocytosis

The engulfing of particles by certain cells of the circulatory and lymphatic systems, known as phagocytes. Phagocytosis is a primary cellular defense mechanism against foreign particles or organisms.

Pharmacokinetics

Quantitation of the time course of chemical absorption, distribution, metabolism, and elimination.

Pharmacology

The science that deals with the origin, nature, chemistry, effects and uses of drugs.

Phospholipids

Molecules containing phosphates and lipids found in the cell membrane. The phosphate head is hydrophilic, whereas the lipid tail is hydrophobic.

Physiological Adaptation

The ability of the body to adapt to changes or stresses so that the change is beneficial. Increase in muscle mass with exercise is an example of physiological adaptation.

Picogram (pg)

A unit of weight consisting of 1 quadrillionth of a gram (1×10^{-12} g). N.B ^ Indicates superscript.

Pinocytosis

The process whereby a liquid is engulfed and taken into a cell by an inward folding of the cell membrane, which detaches and moves into the cytoplasm.

Plasma membrane

The membrane composed of phospholipids, proteins, and cholesterol that forms the outer boundary of a cell

and regulates the movement of substances into and out of the cell. Same as cell membrane.

Plasma

The non-cellular, fluid portion of whole blood.

Point Mutation

A change in the DNA sequence in a gene.

Poison

A substance capable of causing toxicity when absorbed into the body in a relatively small quantity.

Polar

A term used to describe a molecule which is charged or ionized. Polar substances are usually the easiest for the body to excrete.

Polyplody

An increase in the normal number of chromosomes.

Pons

A section of the brain that functions as a relay center and assists in somatic and visceral motor control.

Poorly-differentiated

The change in a cell so that it has lost much of the normal appearance.

Portal circulation

The term applied to the venous circulation draining the tissues of the gastrointestinal tract into the liver.

Power of the Study

The statistical ability of a study to detect an effect.

PPB

Parts per billion. The number of units of a substance in 1 billion units. PPB is a common concentration unit for dilute samples of dissolved substances or airborne substances.

PPM

Parts per million - the number of units of a substance in a million units. PPM is a common concentration unit for dilute samples of dissolved substances or airborne substances.

Probit Model

A risk assessment model that assumes log normal distribution for tolerances of an exposed population. It is generally considered inappropriate for the assessment of cancer risk.

Progression Stage

The third recognized step in the carcinogenic process that is associated with the development of the initiated cell into a biologically malignant cell population.

Proliferation

The reproduction or multiplication of similar forms, especially cells.

Promotion Phase

The second step in the carcinogenesis process in which specific agents (*referred to as promoters*) enhance the further development of the initiated cells.

Prospective Cohort Study

An epidemiology study in which cohorts are identified according to current exposures. The cohort is followed over time for the development of specific effects, such as cancer.

Protein

A complex nitrogenous substance which constitutes the main building material in cells.

Proteins

The most diverse and abundant of organic compounds in the body. There are about 100000 different kinds of proteins that perform a large variety of important functions, such as the protein pores in cell membranes, keratin in skin and hair, collagen in ligaments and tendons, myosin in muscles, and hemoglobin in RBCs. The building blocks for proteins are the 20 amino acids.

Proto-oncogenes

Normal or good cellular genes that instruct the production of the regulatory proteins and growth factors within the cell or its membrane. Activation of a proto-oncogene can cause alteration in the normal growth and differentiation of cells, which leads to neoplasia.

Pulmonary Fibrosis

Changes in the lining of the pulmonary alveoli in which the normal epithelial cells are replaced by fibrous tissue. Gases poorly diffuse across the fibrous tissue and thus gas exchange is drastically reduced in the lungs.

Pyknosis

A degenerative change in a cell in which it thickens with a shrinking of the nucleus and the chromatin condenses to a solid, structureless mass or masses.

Q

R

Read-across

A testing method that uses known chemical endpoints to estimate or predict unknown endpoints for chemicals similar in structure or mechanism of action.

Receptor

The site within the body that detects or receives the stimulus, senses the change from normal, and sends signals to the control center.

Reduction

A change in a chemical characterized by the gain of electrons. This is one of the main Phase I biotransformation reactions.

Reference Dose (RfD)

The EPA estimate of a lifetime daily exposure level for humans that is likely to be without risk of harmful effects. RfDs are acceptable safety levels for chronic noncarcinogenic and developmental effects. The process used to derive an RfD is a modification of that used to derive an ADI.

Relative Risk (RR)

A statistical calculation of the ratio of disease in an exposed population to that of an unexposed population.

Reproductive System

The organ system that produces germ cells (*eggs and sperm*) and provides the environment for growth of the fetus (*women*). The main reproductive organs are the ovaries, uterus, mammary glands, testes, prostate gland, and the external genitalia.

Reproductive Toxicity

Toxicity of the male or female reproductive system. Toxic effects can include damage to the reproductive organs or offspring.

Respiratory System

The organ system responsible for oxygen and carbon dioxide exchange. The main organs are the lungs, trachea, larynx, nasal cavities, and pharynx.

Respiratory Toxicity

Toxicity of the upper (*nose, pharynx, larynx, and trachea*) or lower (*bronchi, bronchioles, and lung alveoli*) respiratory system.

Retrospective Cohort Study

An epidemiology study in which cohorts are identified according to past exposure conditions and follow-up proceeds forward in time.

Reversible Cell Damage

A type of cellular damage in which the response of the cell to toxic injury may be transient and once the stress has been removed or the compensatory cellular changes made, it returns to full capability.

RfD

see Reference Dose

Ribonucleic Acid (RNA)

A nucleic acid consisting of a chain of nucleotides that contain the sugar ribose and the nitrogen bases adenine, guanine, cytosine, and uracil.

Ribosomes

Very small cell organelles that consist of RNA and proteins, and function in protein synthesis.

Risk

The probability that a hazard or effect will occur at a specific level of exposure.

Risk Assessment

The process by which the probability that an adverse effect will occur at a defined exposure level is determined.

Risk Characterization

The final stage in the risk assessment process, which involves predicting the frequency and severity of effects in exposed populations.

Risk Management

The process of weighing policy alternatives and selecting the most appropriate regulatory action based on the results of risk assessment and social, economic, and political concerns.

S

Safety Factor

Factors used in the calculation of acceptable human or environmental exposures. They are applied to data from laboratory experiments or epidemiology studies. Factors of 10 are normally used to account for such uncertainties in the data on which risk assessments are made. Similar to uncertainty factors.

Sarcoma

A malignant tumor arising in connective or muscle tissue. They are usually spread by the blood stream and frequently metastasize to the lung.

Saxitoxin

A potent neurotoxin present in some shellfish poisoning that produces its effect by blocking sodium channels.

Schwann Cells

A very important glial cell present in the peripheral nervous system. They wrap themselves around all axons outside the CNS and form myelin, which serves like insulation.

Secretion

A process in which molecules are actively transported out of an organ.

Selection Bias

Systematic error that may be introduced in sampling by selecting one population over another.

Selective Toxicity

Differences in toxicity between two species simultaneously exposed to the same substance.

Sensitization

An immune capability that develops after an individual is exposed to a specific antigen. Subsequent exposure results in an immune reaction.

Sensitizer

A substance that causes an allergic immune response.

Sensory Neurons

Neurons that carry information from sensory receptors (*usually processes of the neuron*) to the CNS. They are also known as afferent neurons.

Sister Chromatid

Exchange (SCE)

A mutation test in which bone marrow cells or lymphocytes of exposed individuals are microscopically examined for complete chromosome breakage and errors in rejoining of chromatid fragments. Errors are detected by demonstrating that there has been an exchange in the sister chromatids during the rejoining process.

Skeletal System

The organ system that supports and moves the body, protects internal organs, provides for mineral storage, and provides for blood formation. The main organs are the bones, cartilage, ligaments, and bone marrow.

Slope of the Dose-Response Curve

Rate of buildup of toxic effects with increasing doses.

Solubility

Ability of a substance to be dissolved in a solvent. The solubility is expressed according to the solvent, such as water solubility or solubility in acetone.

Somatic Cell

A body cell other than a germ cell.

Somatic System

The part of the nervous system under voluntary control.

Stable Cells

Body cells that have a long lifespan with normally a low rate of division but the ability to rapidly divide upon demand. Examples are liver cells, alveolar cells of the lung, and kidney tubule cells.

Assay

Standard Deviation

The statistical calculation denoting the variability of responses to an exposure. One standard deviation incorporates 68% of the responses while two standard deviations incorporates 95% of the responses.

Steatosis

Lipid accumulation in hepatocytes.

Stimulus

A change in the environment, such as an irritant, loss of blood, or presence of a foreign chemical.

Strychnine

An extremely poisonous natural substance that inhibits the neurotransmitter glycine at postsynaptic sites, resulting in an increased level of neuronal excitability in the CNS.

Subchronic Toxicity

The adverse effects of a substance resulting from repeated exposure to a toxic agent over a period of several weeks or months.

Subclinical

Showing no, or undetectable, signs or symptoms of a disease or condition. Also, the period of time between exposure and onset of symptoms.

Substance

Physical material of which something is made. It may be element, compound, or a mixture of materials.

Substrate

A substance acted upon. It often refers to the chemical that undergoes reaction with an enzyme.

Synapse

The junction between the axon of one neuron and the dendrite of another neuron or an axon and a connection with a muscle cell (*neuromuscular junction*).

Systemic toxin

A toxin that affects the entire body or many organs.

T

Target Organ

An organ in which a xenobiotic exerts a toxic effect.

TD0

Toxic Dose 0%. The estimated dose at which none of the population is expected to exhibit toxic effects.

TD50

Toxic Dose 50%. The estimated dose at which 50% of the population exhibits toxic effects.

TD90

Toxic Dose 90%. The estimated dose at which 90% of the population exhibits toxic effects.

Teratogenesis

The process by which a substance causes abnormal development of tissues or organs in a developing fetus.

Teratogenicity

The development of birth defects as the result of exposure to a teratogenic toxicant.

Tetrodotoxin

A potent neurotoxin produced in some

species of frogs, puffer fish and other invertebrates.

Therapeutic Index (TI)

The ratio of the dose needed to produce the desired therapeutic response to the dose producing toxicity

Threshold Dose

The dose at which a toxic effect is first encountered.

Threshold Limit Value (TLV)

A recommendation by the ACGIH for the highest level of exposure to a chemical that is safe.

Tissue

A group of cells with similar structure and function. There are four types of tissues: epithelial tissue, connective tissue, muscle tissue, and nerve tissue.

TLV

see Threshold Limit Value

Tolerance

The ability to endure unusually large doses of a substance without ill effect. Toxic effects are decreased with continued exposure to the substance.

Total Dose

The sum of all individual doses which may be received over a period of time.

Toxicant

An agent that produces adverse effects when absorbed into the body.

Toxicokinetics

The pharmacokinetics of a toxic chemical.

Toxicologist

A person who studies harmful effects of chemicals including the mechanisms by which the effects are produced and the probability that the effects will occur under specific exposure conditions.

Toxicology

The study of the harmful interactions of chemicals on living organisms and biological systems.

Toxin

A specific protein produced by certain plants, animals and microorganisms that is highly toxic to other organisms (e.g., *snake venom*).

Tumor

see Neoplasm

Tumor Suppressor Gene

Genes present in normal cells that serve to prevent a cell with damaged DNA from proliferating and evolving into an uncontrolled growth. Sometimes referred to as anti-oncogenes. The p53 gene is a tumor suppressor gene.

U

Uncertainty Factors

Factors used in the calculation of acceptable human or environmental exposures, which are applied to data from laboratory experiments or epidemiology studies. Factors of 10 are normally used to account for uncertainties in the data on which risk assessments are made. Similar

to safety factors.

Unscheduled DNA Synthesis (UDS)

The synthesis of DNA outside the normal mitotic process, which is considered an indication of DNA damage and the first step in the process of mutagenesis. The most commonly used test for UDS measures uptake of tritium-labeled thymidine into the DNA of rat hepatocytes or human fibroblasts.

Urinary System

The organ system responsible for the elimination of wastes; regulation of pH and the volume of blood. The main organs are the kidneys, urinary bladder, and urethra.

V

Vapor Pressure

The pressure exerted when a solid or liquid is in equilibrium with its own vapor. The higher the vapor pressure the higher the volatility.

Volatility

The ability of a substance to change from liquid or solid form to a gaseous form.

Volume of distribution (VD)

The volume of body fluid in which a compound is apparently distributed. It may consist of plasma, interstitial fluid, and intercellular fluid.

W

Y

X

Z

Xenobiotic

A chemical foreign to the body.

 β

β -Bungarotoxin

A potent neurotoxin (*venom*) of elapid snakes that prevents the release of neurotransmitters, thus causing paralysis and death.