Glossary

Acidosis/alkalosis The condition when the pH of the blood falls/rises outside the normal acceptable limits.
Acid rain The deposition of acids (sulphuric and nitric) in rain and also the dry deposition of sulphur dioxide and nitrogen oxides.
Acute Short term exposure or response.
Additive When the toxic effect of a mixture is equal to the sum of the toxicities of the components.
ADI The Acceptable Daily Intake. 'The daily intake of a chemical which during an entire lifetime appears to be without appreciable risk on the basis of all the known facts at the time.'
Aerobic/anaerobic A process carried out in the presence/absence of air.
Aerosol A colloidal system with a gas as the dispersion medium (such as a fog or mist of droplets or particles).
Allergic reaction A reaction to a foreign agent giving rise to a hypersensitive state, mediated via an immunological mechanism and resulting in a particular series of responses.
Anaphylactic reaction A type I immunological response.
Anoxia Absence of oxygen in the tissues.
Antagonism When the toxic effect of a mixture is less than the sum of the toxicities of the components.
Antibody A protein produced by lymphoid tissue in response to, and specific for, a foreign substance or antigen.
Anticoagulant A substance which inhibits the normal process of blood clotting.
Antidote A substance which specifically blocks or reduces the action of a poison.
Antigen A protein or other macromolecule which is recognized as foreign by the immune system in an animal.
Antiport Membrane carrier system in which two substances are transported in opposite directions.
Asbestosis Damage to the lungs caused specifically by exposure to, and inhalation of, asbestos fibres.
Ataxia Failure of muscular coordination.

AUC Area under the curve when the plasma (blood) concentration of a substance is plotted against time.

β-adrenoceptors An autonomic receptor of which there are two types, β_1 and β_2.
Bioaccumulation The accumulation of a substance in a biological organism, usually due to its lipophilicity (q.v.).
Biomagnification The process whereby the concentration of a pollutant in organisms in a food chain increases towards the top of that chain. Thus the predator at the top of the food chain will have the highest concentration of pollutant.
Biomarker Indicator of exposure to or biological effect of a chemical substance in a living system.
Blood-brain barrier A description of the inability of many substances to pass from the blood to the tissues of the brain.
BOD Biochemical Oxygen Demand. This measurement indicates the ability of micro-organisms to metabolize an organic substance in the presence of oxygen and therefore the potential for depletion of oxygen by the substance.
Bronchocarcinoma Cancer of the lung.
Bronchoconstriction Constriction of the airways in the lungs due to exposure to irritant chemicals or to an immunological reaction involving release of inflammatory mediators.

Carcinogen/carcinogenic A substance/property of a substance which causes cancer when administered to an organism.
Cardiac arrythmias Abnormal beating rhythms in the heart.
Cardiac output The volume of blood pumped by the heart in one cycle.
Cerebral palsy A motor disorder due to damage to the brain.
Cholinergic stimulation Stimulation of the nerve fibres utilizing acetylcholine as a neurotransmitter.
Chronic (lifetime) Long-term exposure or response.
Cirrhosis Liver disease characterized by loss of the normal microscopic lobular structure with fibrosis and nodular regeneration. Usually the result of chronic injury to tissue.
Clearance The volume of plasma cleared of a substance in unit time.
Clinical trials The initial studies carried out with a drug in human subjects.
COD Chemical Oxygen Demand. The amount of oxygen required to oxidize the substance chemically.
COD/BOD The ratio of COD to BOD gives an indication of the biodegradability of the substance.
Collagen A fibrous protein.
Complement A series of proteins found in extracellular fluids and involved in certain immunological reactions.
Cyanosis The pathological condition where there is an excessive concentration of reduced haemoglobin in the blood.
Cytochrome a_3 A haem-containing enzyme which is part of the cytochrome c oxidase complex, the terminal cytochrome in the mitochondrial electron transport chain.

Cytological examination Examination of cells or examination for the presence of cells in urine.
Cytosol The internal part of the cell excluding the organelles.

Delaney Amendment Amendment to the Food, Drug and Cosmetic Act of the Food and Drug Administration of the United States. The amendment states that food additives which cause cancer in humans or animals at any level shall not be considered safe and are, therefore, prohibited.
Dermatitis Inflammation of the skin.
Detritivore food chain An animal which uses decaying organic matter as a food source, after the initial breakdown of the material by decomposers such as bacteria and fungi is known as a 'detritivore.' The type of food chain which relies on decaying organic matter for its primary energy source is known as a 'detritivore food chain.'
Dinoflagellates Single-celled marine algae possessing two flagella.
Disulphide bridge A sulphur-sulphur bond (S-S) such as occurs commonly in proteins.
Dominant lethal assay A test designed to detect the effects of substances on the germ cells of male animals which are exposed and then mated with untreated females. The number of dead implantations or preimplantation losses in the pregnant females are then determined. The effects are usually due to chromosome damage.

ED_{50} The dose which is pharmacologically effective for 50 per cent of the population exposed to the substance *or* a 50 per cent response in a biological system which is exposed to the substance.
Electrophilic A chemical description of a substance which seeks out a group or molecular position which has a preponderance of electrons and so is negatively charged.
Encephalopathy A degenerative disease of the brain.
Endogenous Part of the internal environment of a living organism.
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 bloodstream from the gastrointestinal tract possibly after chemical or enzymatic breakdown.
Epidemiology The study of diseases in populations.
Epigenetic When used as a description of a carcinogen or of mechanisms of carcinogenesis this means that interaction with genetic material, such as to yield a mutation, is not involved.
ER Endoplasmic reticulum. This may be divided into rough ER with attendant ribosomes involved with protein synthesis and smooth ER where cytochrome P-450 and many other drug metabolizing enzymes are located.
Eutrophication Increased nutrient concentration in water resulting in the over-growth of plants such as algae giving rise to a depletion of oxygen. This is followed by death and decay of all the aerobic organisms in the aqueous environment with the subsequent growth of anaerobic bacteria leading to the accumulation of toxins.

Exanthema An eruptive disease or fever.

Fatty acid An organic acid with a long aliphatic chain which may be saturated or unsaturated.
Fibrosis The formation of fibrous tissue which may be a response of tissue to injury resulting in increased amounts of collagen fibres.
Ficks Law At constant temperature the rate of diffusion of a substance across a cell membrane is proportional to the concentration gradient and the surface area.
First order process The rate of the process is proportional to the concentration of the substance.
First-pass metabolism Metabolism of a drug or other chemical during the absorption process. Typically occurs in the liver or gastrointestinal tract after oral dosing.
Food chain An imaginary chain of organisms existing in the environment in which each link of the chain feeds upon the one below and is eaten by the one above. At the bottom of the food chain are plants and bacteria, at the top are carnivores.
Free radical An atom or molecule which has an unpaired electron. They may be uncharged or charged depending on the numbers of electrons. Free radicals are usually chemically very reactive.

Genotoxic Toxic to the genetic material of an organism.
Glomerulus A functional unit of the vertebrate kidney consisting of a small bunch of capillaries projecting into a capsule (Bowmans capsule) which serves to collect the filtrate from the blood of those capillaries and direct it into the kidney tubule.
Glutathione (GSH) The tripeptide glutamyl-cysteinyl-glycine. Found in most tissue, especially the liver. Plays a major role in detoxication and cellular protection.
Glycoprotein A protein containing a carbohydrate moiety.
Good Laboratory Practice (GLP) A system of protocols (standard operating procedures) recommended to be followed so as to avoid the production of unreliable and erroneous data. Accurate record keeping and careful fore-thought in the design of the study are important aspects of GLP.
GSH/GSSG Reduced/oxidized glutathione.

Haemodialysis The process by which a foreign substance is removed from the blood of a poisoned patient by allowing it to diffuse across a semi-permeable membrane while the blood is pumped through a special machine.
Haemoglobinuria The presence of haemoglobin in the urine.
Haemolytic anaemia The pathological condition where red blood cells undergo uncontrolled destruction.
Haemoperfusion The process by which a foreign substance is removed from the blood of a poisoned patient by allowing it to be absorbed by activated charcoal or a resin while the blood is pumped through a special machine.
Haemorrhage The escape of blood from blood vessels.
Haemorrhagic necrosis Necrosis accompanied by bleeding.

Half-life The time taken for the concentration of a compound in a body fluid to decrease by half.
Hapten A molecule which becomes attached to a protein or other macromolecule and so renders it antigenic.
Henderson-Hasselbach equation $pH=pKa+\log A^- /HA$.
Histamine A mediator of inflammatory reactions in the body which may be part of an allergic reaction.
HLA type Histocompatability antigens on the surface of nucleated cells.
Hydrophobic/hydrophilic A substance which repels/attracts water.
Hyperkinesis Hyper activity.
Hypoglycaemia The physiological state where there is a low blood glucose concentration.
Hypoxia The physiological state where there is a low oxygen concentration in the tissues.

Idiosyncratic In toxicology this is an adverse reaction to a chemical which occurs in a single or small number of individuals as a result of an abnormality in that individual.
Immune complex A complex of antibody(ies) and antigen(s) which may lead to pathological consequences such as inflammation or blockage of a vessel.
Initiation The first stage in the multi-stage process of carcinogenesis in which there is thought to be a chemical reaction between the carcinogen and DNA.
Interferon A macromolecule produced by the body in response to a stimulus such as an infection.
Intraperitoneal/i.p. A route of administration of a compound to an animal by direct injection into the peritoneal cavity.
Irritation/irritancy Direct injury to tissue such as the skin.
Ischaemia The condition where there is a reduced or blocked blood flow to a tissue which will lead to ischaemic tissue damage.
Isozyme/isoenzyme One of several forms of an enzyme where the different forms usually catalyze similar but distinct reactions.

Keratin A tough, fibrous protein found in the skin.
Killer lymphocyte A particular type of white blood cell involved in Type IV immunological reactions.

LD_{50} The lethal dose of a compound for 50 per cent of the population of organisms exposed.
Lipid peroxidation Oxidative breakdown of lipids usually involving a free radical mechanism or active oxygen species and giving rise to reactive products which may be responsible for cellular damage.
Lipid solubility see lipophilicity.
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 compounds which are non-ionized or non-polar or have a non-polar portion. Therefore high lipid solubility usually implies low water solubility.
Local toxicity Toxicity which affects only the site of application or exposure.

Macromolecule A very large molecule having a polymeric structure such as a protein or nucleic acid.
Macrophage Large phagocytic cells which are components of the reticuloendothelial system.
Maximally Tolerated Dose (MTD) The dose of a substance which causes no more than a 10 per cent weight decrease and does not cause death or any clinical signs of toxicity which would shorten the life span of an animal exposed for 90 days.
MEL Maximum Exposure Level; maximum level of occupational exposure of workers to a chemical; term used in UK.
Mesothelioma A rare form of cancer mainly affecting the pleura and caused exclusively by exposure to certain forms of asbestos.
Methaemoglobin/methaemoglobinaemia Oxidized haemoglobin/the syndrome in which a significant amount of the haemoglobin in the blood is oxidized.
Microflora/microfauna The bacteria and other organisms inhabiting the gastrointestinal tract.
Micronucleus test A test for mutagenicity (q.v.) using red blood cell stem cells from mice. The mice are exposed to the chemical and after a suitable time period the bone marrow examined for an increase in the number of micronuclei. These are chromosome fragments resulting from spindle or centromere dysfunction.
Microsomes/microsomal The subcellular fraction containing the fragments of the smooth endoplasmic reticulum (ER) after ultracentrifugation of a homogenate of the cell.
Mitochondria The intracellular organelle in which respiration and other important metabolic reactions take place.
Monooxygenase Enzyme system (such as cytochrome P_{450}) involved in the oxidation of compounds.
Mutagen/mutagenic A substance/a property of a substance which causes some type of mutation in the genetic material of an organism exposed to it.
Myocardium The middle and thickest layer of cardiac muscle in the heart wall.

NADH The coenzyme reduced nicotinamide adenine dinucleotide.
NADPH The coenzyme reduced nicotinamide adenine dinucleotide phosphate.
Narcosis Unconsciousness induced by exposure to a solvent or volatile liquid.
Necrosis The process of cell death within a living organism and the end result of irreversible changes following cellular injury.
Nephritis Inflammation of the kidney.
Nephron The functional unit of the kidney which produces urine. It consists of a long tubule divided into sections in which reabsorption into the bloodstream of certain solutes filtered by the glomerulus from the blood takes place.
NOAEL No Observed Adverse Effect Level. The dose or exposure level at which no adverse effect is detected in the organism.

Occlusion Constriction or blockage as of a blood vessel.

Organelle A subcellular structure such as the mitochondrion or nucleus of a cell.
Osteomalacia Softening of the bones due to impaired mineralization.

Paresthesias Abnormal sensations such as tingling.
Peripheral neuropathy Damage to nerves of the peripheral, rather than central, nervous system.
Peroxidases Enzymes which catalyze oxidation utilizing hydrogen peroxide. Found in many tissues including certain types of white blood cells (neutrophils).
Persistence When applied to a chemical substance meaning its ability to remain unchanged in the environment.
Pesticide An agent used to exterminate pests of various types. Includes insecticides, herbicides and fungicides.
Phago/pinocytosis The uptake of a solid substance (phago) or solution (pino) into a cell by invagination of the cell membrane eventually forming a vesicle inside the cell.
Pharmacodynamic Relating to the effects of drugs on living systems.
Phase 1 The term applied to the first stage of drug metabolism, commonly involving either oxidation, reduction or hydrolysis of the molecule.
Phase 2 The term applied to the second stage of drug metabolism usually involving conjugation of a functional group with a moiety available endogenously and conferring water solubility on the molecule.
Phase 3 Further metabolism of a metabolic product of a phase 2 reaction such as a glutathione conjugate.
Phenotype The expression of the genotype or genetic make-up of an organism.
Phocomelia The syndrome of having foreshortened arms and legs due to an adverse effect on the embryo such as caused by thalidomide.
Phospholipid A lipid in which one of the hydroxyl groups of glycerol or sphingosine is esterified with a phosphorylated alcohol.
pH Partition Theory This states that a foreign compound in the non-ionized state will pass across a cell membrane by passive diffusion down a concentration gradient.
Plasma Blood from which the cells have been removed by centrifugation but distinct from serum in which the blood is first allowed to clot.
Pneumonitis Inflammation of the lungs.
Polar A term used to describe a molecule which is charged or has a tendency to become polarized.
Polychlorinated biphenyls A group of compounds used industrially in which a biphenyl nucleus is substituted with various numbers of chlorine atoms.
Polypeptide A chain of amino acids joined by peptide bonds.
Portal The term applied to the venous circulation draining the tissues of the gastrointestinal tract into the liver.
Potentiation When the toxic effect of a compound is increased by a non-toxic compound.
ppb Parts per billion.

ppm Parts per million. A measure of concentration of a substance in which the units of the substance are one millionth of the units of the solvent, eg μg per g.
Prescribed disease An industrial disease which is recognized as such for the purposes of compensation.
Promotion The second stage in the multi-stage process of carcinogenesis which must normally follow initiation in order for a tumour to develop.
Psychoactive drugs Drugs which produce behavioural changes.
Ptaquiloside Glucoside of a three ring compound found naturally in bracken which yields a carcinogenic product.
Pulmonary oedema The accumulation of tissue fluid in the air spaces in the lungs.

Quantal response. A response which is all-or-none rather than graded.

Rainout Removal of acids from the atmosphere by rain.
Raynauds phenomenon Changes in the blood supply to the fingers and toes which when caused by vinyl chloride results from degeneration of small blood vessels leading to occlusion of capillaries and arterioles.
Reaginic Relating to reagin, an antibody of the IgE type.
Renal elimination Excretion of a substance through the kidneys.
Rhinitis Inflammation of the mucous membranes of the nose.
Ribosomes The intracellular organelles attached to the endoplasmic reticulum which are involved with protein synthesis.
Risk 'Risk is a measure of the probability that an adverse effect will occur'. This may be absolute risk which is the excess risk due to exposure, or relative risk which is the ratio of risk in the exposed to the unexposed population.

Saturated A term applied to a molecule where all the bonds of the carbon atoms are utilized and there are no double or triple bonds.
Silicosis Damage to the lungs caused by exposure to substances such as silica or coal dust.
Singlet Oxygen Oxygen in the singlet, excited state and therefore highly reactive.
Sinusoids Spaces filled with blood which in the liver are a continuation of the capillaries.
Skink Australian reptile.
Smog The term originally used to describe the combination of *smoke* and *fog* which is now termed reducing smog. Photochemical (oxidant) smog is the result of interaction between the pollution caused mainly by car exhausts and sunlight.
Sub-acute (28 or 90-day) An exposure of duration intermediate between acute and chronic.
Superoxide (O_2^-) The oxygen molecule with an extra and unpaired electron. It is thus a charged free radical.
Symport Membrane carrier system in which two substances are transported in the same direction.

Synergism/synergistic when toxic effect of a mixture is greater than the sum of the toxicities of the components.
Systemic toxicity Toxicity which affects a system in the organism other than and probably distant from the site of application or exposure.

TD_{50} The dose which is toxic to 50 per cent of the population of organisms exposed to the substance *or* a 50 per cent toxic response in a biological system exposed to the substance.
Teratogen/teratogenicity A substance/property of a substance causing abnormalities in the embryo or foetus when administered to the maternal organism.
Therapeutic index The ratio of ED_{50} to TD_{50}.
Thiol SH or sulphydryl group.
TLV Threshold Limit Value. Upper permissive limits of airborne concentrations of substances.
Tolerance When repeated administration of or dosing with a compound leads to a decrease in the potency in the biological activity of that compound.

Uniport Membrane carrier system in which one substance is transported in the one direction.
Unsaturated A term applied to molecules which contain double or triple carbon-carbon bonds.
Urticaria A vascular reaction of the skin marked by the appearance of weals and which may be caused by direct or indirect exposure to a toxic substance. Also known as hives.

Vascularized When relating to tissue meaning that it is supplied with vessels such as arteries or veins.
Vasculitis Inflammation of the vessels of the vascular system.
Vasodilation/vascular dilatation Dilation of blood vessels.
Veno-occlusive disease A particular type of liver damage where the blood vessels and sinusoids of the liver are damaged so that new vessels grow.
Volume of distribution (V

D) The volume of body fluid in which a compound is apparently distributed when administered to an animal.

Washout Removal of acids from clouds by rain.

Zero order process The rate of the process is independent of the concentration of the substance.

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