

# Glossary

**Activation energy.** The amount of energy required by the reacting molecules to form an activated complex when they collide and thus begin a chemical reaction. If two colliding molecules do not possess enough energy, they bounce apart again and the collision does not result in a reaction.

**Adrenergic.** A nerve in which the neurotransmitter is norepinephrine (noradrenaline).

**Anaemia (anemia).** A diseased state characterized by an inadequate supply of haemoglobin.

**Angina.** Narrowing of coronary arteries due to atherosclerosis, restricting the supply of oxygen to the heart.

**Antibonding orbital.** A molecular orbital higher in energy than any of the atomic orbitals from which it is derived. When an antibonding orbital is populated with electrons, the molecule becomes less stable.

**Aorta.** A major blood vessel from the heart.

**Apoptosis.** Cell death in which cells are programmed to die.

**Bond order.** A theoretical index of the degree of bonding between two atoms, relative to a two-electron covalent bond, *e.g.* C–H.

**Calmodulin.** A calcium ion containing protein essential for the action of NOS.

**Carcinogen.** A substance that can provoke the growth of cancerous cells.

**Cholinergic.** A nerve in which the neurotransmitter is acetylcholine.

**Cyclic guanosine-3, 5-monophosphate (cGMP).** Substance formed as muscles relax, Scheme 1.1.

**Cytokine.** A substance that stimulates the immune system.

- Dipole moment.** An expression of the degree of polarity in a molecule.
- Disproportionation.** Any chemical reaction whereby two molecules of one chemical react together to form two different chemical species, *i.e.*  $A + A \rightarrow B + C$ .
- Electrophile.** Any species that is attracted to a negative centre.
- Endothelial cells.** Cells forming the endothelium (see below).
- Endothelium.** A single layer of thin plate-like cells lining the inside of a blood vessel.
- Endothelium-derived relaxing factor (EDRF).** Messenger molecule that stimulates vascular muscle to relax.
- Entropy.** A measure of randomness or disorder within a system, usually denoted by the letter *S*.
- Enzyme.** A very large molecule (generally a protein) that catalyses vitally important chemical reactions occurring in living systems.
- Glial cells.** Cells in the brain that support the nerve cells.
- Glyceryl trinitrate.** Drug used for the treatment of angina (Formula 1.1).
- Ground state.** The lowest stable energy state of a system, such as a molecule or atom.
- Guanosine-5-triphosphate (GTP).** Substance consumed as muscles relax, Scheme 1.1.
- Guanylate cyclase (sGC).** Enzyme responsible for, *inter alia*, muscle relaxation.
- Half-life.** The time taken for the concentration of one reactant in a reaction to fall to half its original value.
- Hybrid orbital.** An electron orbital formed *via* combination of two or more orbitals of different shapes, *e.g.* s and p orbitals on an atom.
- Hydrophobic.** Molecules or parts of molecules that are insoluble in water. Such molecules and groups tend to be non-polar.
- Immune system.** The body's defence against foreign substances.
- In vitro.** A reaction occurring outside a living system (*lit.* in glassware).
- In vivo.** A reaction occurring in a living system.
- Ionization potential.** A measure of the tendency of an atom or molecule to form a positive species *via* loss of an electron.

**Isoform.** One member of a family of enzymes.

**Ligand.** In inorganic chemistry a ligand is an atom or group of atoms bound to a central atom. In biochemistry the term has been used more widely; wherever a group of atoms may be regarded as a central unit, any atom or group of atoms bound to it may be referred to as a ligand.

**Lumen.** The hollow part of a blood vessel.

**Macrophage.** A mobile scavenger cell, part of the immune system. Protects the body against invading microbes.

**Mass spectrometry.** A very sensitive technique for measuring the relative molecular mass (molecular weight) of a chemical species.

**Micro-organism.** Any organism that can be viewed only with the aid of a microscope. Micro-organisms include bacteria and viruses amongst others.

**Mitochondrion.** A rod-like structure within a cell. It controls certain activities of the cell, particularly respiration.

**Necrosis.** Cell death induced by toxic chemicals.

**Neurotransmitter.** Chemical that carries a signal from one nerve cell to another across a synapse.

**Nitregic.** A nerve in which one of the neurotransmitters is NO.

**Nitric oxide synthase (NOS).** A family of very large enzymes that bring about the production of NO from the naturally occurring amino acid arginine. There are at least three members of the family, named eNOS, nNOS and iNOS.

**Nucleophile.** Any species that is attracted to a positive centre.

**Peroxynitrite.** A highly reactive ion formed by the reaction of NO and superoxide. It rapidly isomerizes to nitrate.

**Phagocytosis.** A process of engulfing and destroying bacteria by cells of the immune system.

**Platelet.** Subcellular structure found in blood, important in the formation of clots.

**Platelet aggregation.** Clumping of platelets to form a plug.

**Postsynaptic.** The nerve cell coming after the synapse.

**Presynaptic.** The nerve cell coming before the synapse.

- Prostaglandins.** A group of physiologically active substances with a range of functions, including the prevention of platelet aggregation.
- Psoriasis.** Chronic inflammatory skin disease affecting almost 2% of the population.
- Respiration.** The metabolic process in animals and plants in which organic substances are broken down into simpler molecules with the release of energy. This usually (but not exclusively) requires oxygen.
- Shear stress.** The mechanical stress caused as blood flows over the inner surface of a blood vessel.
- Smog.** An unpleasant, acrid form of fog caused by industrial pollution.
- Smooth muscle.** A type of muscle found throughout the bodies of many animals, called smooth because of its appearance under the microscope. It is the major component of the walls of blood vessels.
- Stenosis.** An unnatural narrowing of any passage in the body, particularly blood vessels.
- Stent.** A surgical device to keep open a passage that has undergone stenosis.
- Synapse.** The anatomical relationship of one nerve cell to another.
- Tumour.** Strictly any swelling but generally restricted to swellings due to uncontrolled cell growth.
- Valence shell.** The outermost electron shell of an atom containing electrons in the ground state.
- Valency.** The bond-forming capacity of an atom, expressed either as the number of single bonds it can form with other atoms or the number of electrons an atom gives up or accepts when forming a bond.
- Vasculature.** The system of vessels conducting blood through the body.