# Glossary

**Adjuvant** is a substance that enhances the immune system's response to the presence of an antigen.

**Antigen**is a molecule or molecular structure that can bind to a specific antibody or T-cell receptor. The presence of antigens in the body may trigger an immune response.

**Autograft** is a transplanted tissue from the same individual.

**Biomolecule immobilization** is a process of attaching a bioactive molecule to the surface of a biomaterial.

**Block copolymer** comprise two or more homopolymer subunits linked by covalent bonds.

**Chemokines** are a family of signaling proteins secreted by cells that induce directional movement of leukocytes, as well as other cell types, including endothelial and epithelial cells.

**Closed and controlled herds** are a large group of animals without contact with other animals, controlled by humans.

**Composite polymer systems** are multi-phase materials in which biomolecules are integrated within a polymer matrix, resulting in synergistic biomechanical properties that cannot be achieved from either component alone.

**Controlled release** refers to the concept ofdrug release from a source over a sustained period at a nearly constant rate.

**Cooperative interactions** refers to interaction of amino acid residues in a protein where the effects of chemical or physical perturbations to any given residue is propagated to other residues by an intricate network of interactions.

**Cryogels** are a type of hydrogel fabricated at subzero temperatures resulting in a biomaterial with a macroporous network.

**Cytokines** are a broad and loose category of small proteins (~5–20 kDa) important in cell signaling.

**Denaturation** is a process in which proteins or nucleic acids lose the quaternary structure, tertiary structure, and secondary structure which is present in their native state.

**Diffusion coefficient** is a proportionality constant between the molar flux due to molecular diffusion and the gradient in the concentration of the molecular species.

**Diffusion-controlled release** is the most common method of release of molecules to the surrounding environment by a process of simple diffusion.

**Extracellular domains** are part of a receptor protein that resides outside of the resident membrane, mainly used for interaction with other proteins.

**Glass transition temperature** is the temperature range at which increased molecular mobility in a polymer results in changes in thermal properties, the polymer changes from hard, solid, glassy state to a soft, not melted state.

**Glycosylated** refers to the state in which a carbohydrate (glycosyl donor) is attached to a hydroxyl or other functional group of another molecule (a glycosyl acceptor) in order to form a glycoconjugate.

**Growth factor-binding domain** is the region contained in proteins of the extracellular matrix that binds growth factors to regulate various biochemical processes in its microenvironment.

**Growth factors** are naturally occurring substances capable of stimulating cell proliferation, wound healing, and occasionally cellular differentiation.

**High-affinity interaction** are molecular interactions where a relatively low concentration of an interacting molecule is adequate to maximally occupy its binding site.

**Homogeneous degradation** is a process where degradation occurs throughout the material and the drug release ensues from the entire material.

**Hydrogels** are crosslinked hydrophilic polymers that do not dissolve in water. They are highly absorbent yet maintain well defined structures.

**Hydrolysis** is any chemical reaction in which a molecule of water breaks one or more chemical bonds.

**Immunoengineering** is an interdisciplinary area that integrates engineering tools and principles of immunology to harnesses the power of the immune system.

**Immunogenic** is the property of a foreign substance to induce an immune response in the body.

**Isoforms** are two or more functionally similar proteins that have a similar but not identical amino acid sequence.

**Lyophilization** is a process in which water is removed from a product after it is frozen and placed in vacuum, allowing the ice to change directly from solid to vapor without passing through a liquid phase.

**Macroporous** is a material containing pores larger than 50µm.

**Matrix** is a nanoporous, continuous material used to provide support in a scaffold.

**Micronizing** is reducing the average diameter of a solid particle by milling or grinding

**Molecular mobility** is the ability of chains from one microparticle of a polymer to diffuse into the surface of neighboring microparticles.

**Morphogens** are substances whose non-uniform distribution governs the pattern of tissue development in the process of morphogenesis or pattern formation.

**Nanoporous** materials exhibitpore diameters of 100 nanometers (nm) or smaller.

**Pancarpal Arthrodesis** is a surgical procedure to induce fusion of the carpus (cluster of bones in the wrist between radius and ulna).

**Pore size** is the distance between two opposite walls of a pore.

**RGD** is the tripeptide that consists of Arginine (R), Glycine (G), and Aspartate (D) and is the amino acid sequence within many extracellular matrix proteins that mediates cell attachment.

**Scaffold** is a material that has been engineered to cause desirable cellular interactions to contribute to the formation of new functional tissues for medical purpose.

**Solid solution** is a family of materials which have a range of compositions (e.g. AxB1−x) and a single crystal structure.

**Spatiotemporal delivery** is a precision delivery system that controls both the quantity/amount and time of the release.

**Spinal fusion cages** are made of metal, used to aid bone fusion in a variety of spine disorders.

**Splice variants** are mRNA transcripts produced as a result of joining the exons of a gene of different combinations.

**Supraphysiological** (**concentration**) refers to a substance in concentrations higher than normally found in the body.

**Surface degradation** is a process where degradation of the material occurs only at the surface and the rate of degradation is proportional to the surface area.

**Synergistic signaling** is a form of cell signaling where the effect of a combined signal is greater than the sum of separate cell signals.

**Systemic** is relating to or affecting the whole body.

**Therapeutic window** is a quantitative concentration range of the relative safety of a drug in the body.

**Tibial non-unions** are fractures that will not unite without additional surgical or nonsurgical intervention (usually by 6-9 months).

**Transmembrane receptors** are proteins at the cell membrane, containing an intracellular and extracellular domain for signal acquisition and transduction.

**Zero-order release** is a release system in which a drug is released at a constant rate, independent of the concentration of the drug.

© Jan de Boer. All glossaries can be found at [www.jandeboerlab.com/TissueEngineering](http://www.jandeboerlab.com/TissueEngineering).

Some of this definitions were freely obtained and paraphrased from Wikipedia and Google.