Glossary

**Bidirectional signaling** is the transmission of information in both directions across the plasma membrane.

**Biocompatibility** is the function of a material to trigger an appropriate host response without causing undesired local and systemic effects.

**Cellular adhesion** is the process by which cells form contacts with each other or with their substrate through specialized protein complexes.

**ChemoTopoChip** is a novel combinatorial chemistry-topography screening platform to assess the suitability of biomaterials to be used in tissue engineering.

**“Click” chemistry** is a class of biocompatible small molecule reactions commonly used in bioconjugation, allowing the joining of substrates of choice with specific biomolecules.

**Contact guidance** refers to a phenomenon for which the orientation of cells and stress fibers is influenced by geometrical patterns such as nano/microgrooves on substrates, or collagen fibers in gels and soft tissues.

**Cross reactivity** is the binding of a (protein) molecule to chemically or structurally similar ligands to the cognate ligand.

**Dynamic chemistry** is when surface chemistry of a material is triggered to change in response to stimuli such as light, changes in pH or temperature.

**Focal adhesion kinase** is a signaling protein in the focal adhesion complex

**Focal adhesions** are large macromolecular assemblies through which mechanical force and regulatory signals are transmitted between the extracellular matrix and an interacting cell.

**Focal complexes** are a collection of integrin adhesion complexes in a cluster at an adhesion site, typically found at the cell front.

**Hydrophilic(ity)** is the physical property of a molecule or surface that is seemingly attracted to a mass of water.

**Hydrophobic(ity)** is the physical property of a molecule or surface that is seemingly repelled from a mass of water.

**Inside-out signaling** is when intracellular signals act on integrin cytoplasmic domains, inducing conformational changes in integrin extracellular domains, resulting in increased affinity for ligand at the cell surface.

**Integrin adhesion complex** **(IAC)** is a protein complex formed by direct linkage of extracellular matrix, integrins, the cytoskeleton and associated signaling/structural proteins.

**Integrin clustering** is the assembly of several integrins at the plasma membrane.

**Intracellular tension** is the force produced by contraction of actin and myosin-based cytoskeleton.

**Ligand spacing** is the physical space between two ECM-bound ligands.

**Mechanobiology** is a field of study that focuses on how physical forces and changes in the mechanical properties of cells and tissues contribute to development, cell differentiation, physiology, and disease.

**Mechanotransduction** is the processes through which cells sense and respond to mechanical stimuli by converting them to biochemical signals.

**Medical devices** areany device intended to be used for medical purposes.

**Microenvironments** are comprised of micro and nanoscale properties of distinctly specialized and effectively isolated biophysical environments.

**Motifs** are specific combinations of amino acids in proteins that form a functional unit.

**Outside-in signaling** occurs when an extracellular ligand binds to the extracellular domain of a protein and initiates intracellular signaling events.

**Self-assembled monolayers** are molecular assemblies formed spontaneously on surfaces by adsorption and are organized into smaller or larger ordered domains.

**Shear forces** are mechanical frictional forces, parallel to the blood flow exerted on the endothelial wall of the vessel. These forces are maximum at the inner surfaces of a vessel and almost zero at the center of the blood vessel.

**Solid-state interactions** are the interactions between the structure and chemistry of a material and cells/tissue defined. These interactions can confer effects through physical distortion, chemical signaling, adhesion points, or a combination of these.

**Surface roughness** is a component of surface texture quantified by the deviations in the direction of the normal vector of a surface from its ideal form. If these deviations are large, the surface is rough; if they are small, the surface is smooth.

**Topography** is the architectural landscape of the surface of a (bio)material.

**Traction forces** are mechanical forces exerted by the cells to perform various tasks, including maintaining cell shape, migrating within tissues, reorganizing ECM, and communicating with neighboring cells.

**Water contact angles** are the angles formed when the water interface meets a solid surface. It is used to quantify the wettability of a solid surface.

**Young’s modulus** (or the modulus of elasticity) is a mechanical property that measures the tensile or compressive stiffness of a solid material when the force is applied lengthwise.

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