

Biological Properties

Toxicity

The degree to which a material may permanently destroy or impair of any part of a biological organism.

Bioinert

The ability of a biomaterial to remain unchanged by a biological organism and to not elicit biological activity.

The biomaterial is typically surrounded by a fibrous capsule when implanted.

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Biocompatibility

Generally refers to the response of a biological organism to the presence of a material, not vice versa, with varied meaning.

(1) The ability of a biomaterial to perform its desired function with an appropriate host response in a specific application (D.F. Williams, *The Williams Dictionary of Biomaterials*, 1999).

(2) The ability of a biomaterial to perform its desired function with respect to a medical therapy, without eliciting any undesirable local or systemic effects in the recipient or beneficiary of that therapy, but generating the most appropriate beneficial cellular or tissue response in that specific situation, and optimizing the clinically relevant performance of that therapy (D.F. Williams, *Biomaterials*, 2008).

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Bioactivity

The ability of a biomaterial to elicit or modulate a favorable response (“activity”) from any part of a biological organism.

Biodegradability

The ability of a material to be broken down or decomposed by a biological organism.

Bioresorbability

The ability of a material to be gradually resorbed or dissolved by cellular and/or metabolic processes.

Bioabsorbability may be used to specify metabolism of the material, and bioerodibility may be used to specify surface erosion.

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- Osteoconductivity The ability of a biomaterial to passively allow the growth of pre-existing bone tissue onto its surface and/or into pores.
- Osteoinductivity The ability of a biomaterial to stimulate new bone formation (osteogenesis). Often evaluated by implantation in an ectopic site, such as muscle.
- Osteointegration The ability of a material to form a direct interface with bone without an intervening layer of fibrous tissue.
- Osseo- \equiv Osteo-