



## Tissue Engineering is a Biomedical Engineering Method by using the Combinations of Material Methods

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Regenerative medicine is a wide field that involve tissue engineering but also incorporates research on self-healing – where the body uses its own systems, sometimes with help foreign biological material to recreate cells and rebuild tissues and organs. The terms “tissue engineering” and “regenerative medicine” have become widely replaceable, as the field hopes to focus on cures instead of treatments for complex, often chronic infections.

Tissue engineering has also been sharply defined as consciousness the expanding of tissue growth and tissue engineering is a Biomedical engineering method by using the combinations of material methods, biological cells components and biochemical factors to construct a portion or whole tissue in a controlled In vivo environment. The three main aspects to perform a tissue engineering is to Selection of a cell, constructing a Tissue scaffold and inducing growth factors for development of the cells into functional tissue. Basing upon the selection of cells they are classified into Autologous,

Allogeneic, Xenogeneic, Syngeneic and stem cells. Autologous cells are the self-cells from one’s own genetic lineage. Allogeneic these cells are obtained from same species with different individual Xenogeneic are obtained from different species while Syngeneic cells are obtained from either twin, clones of the same individual.

These listed cells have their own backdrops and limitations to perform. Whereas the stem cells are promising in this selection procedure. Embryonic stem cells and Adult stem cells are most favored and recommend cells from individual to Selection and performing a tissue engineering. After the Selection procedure of a cell is completed the material method for constructing a structural scaffold begins. Scaffold or Tissue scaffold is a Three-dimensional structure that supports and held the cells. These structural mimics the extracellular matrix of native tissue. The cells are seated in these structures allowing attachment and migration, delivery and retain of cells and also enable diffusion of vital cell nutrients. To achieve that feat in tissue reconstruction, scaffolds must meet some specific requirement like high porosity and adequate pore size necessary to cell seeding and Bio degradability. PLA polylactic acid is used as a material to construct the scaffold as they degrade much faster into body and converts to lactic acid which can be neutralize by body naturally. PGA PCL are also shown promising results with Faster and slower rate of degradation. Growth factors are critical signaling

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molecules that instruct cells during development, and one may achieve tissue regeneration in the adult by enabling control over growth factor delivery. These Growth factors are differentiated depend on the Tissue growth Like BMP- Bone morphogenetic protein, EGF- Epidermal growth Factor, NGF- Nerve growth factor, bFGF- basic fibroblast growth factor, Human bone morphogenetic protein 2(rhBMP-2).

Tissue engineering is the use of a combination of cells, engineering, and materials methods, and suitable biochemical and physicochemical factors to improve or replace biological tissues. Tissue engineering involves the use of a tissue scaffold for the formation of new viable tissue for a medical purpose. While it was once categorized as a sub-field of biomaterials, having grown in scope and importance it can be considered as a field in its own.

While most definitions of tissue engineering cover a broad range of applications, in practice the term is closely associated with applications that repair or replace portions of or whole tissues (i.e., bone, cartilage, blood vessels, bladder, skin, muscle etc.). Often, the tissues involved require certain mechanical and structural properties for proper functioning. The term has also been applied to efforts to perform specific biochemical functions using cells within an artificially-created support system (e.g. an artificial pancreas, or a bio artificial liver). The term regenerative medicine is often used synonymously with tissue engineering, although those involved in regenerative medicine place more emphasis on the use of stem cells or progenitor cells to produce tissues

The human body has a low regenerative potential as opposed to the urodele amphibians commonly referred to as salamanders. Globally, millions of people would benefit immensely if tissues and organs can be replaced on demand.

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