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Opinion Article

Strategies of Regenerative Medicine in Tissue Engineering

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DESCRIPTION

A branch of biomedical engineering known as tissue engineering makes use of cells, engineering, materials science, and appropriate biochemical and physicochemical elements to replace, improve, or repair various biological tissue types. Creating functional constructions that repair, preserve, or enhance damaged tissues or entire organs is the aim of tissue engineering. Artificial skin and cartilage are two examples of synthetic tissues that have received FDA approval; nevertheless,their use to human patients is currently limited.

Strategies of regenerative medicine

Research into self-healing, during the body employs its own mechanisms, occasionally with assistance from foreign biological material, to reproduce cells and reconstruct tissues and organs, is also included in the vast topic of regenerative medicine. As the profession strives to concentrate on cures rather than treatments for complicated, frequently chronic diseases, the phrases "tissue engineering" and "regenerative medicine" have mainly come to be used interchangeably.

It is well known that using natural remedies has health benefits, including preventing conditions like headaches and the common cold. The majority of medicinal plant extracts are taken as cocktails, and the interaction of various phytochemicals with various pathological conditions is thought to have an additive or synergistic effect. The components used in regenerative medicine strategies must be able to replace the damaged tissue and function as the original tissue or be able to promote the regeneration of the original tissue in order for them to be effective. These components are typically combinations of scaffolds, growth factors, and stem cells. Tissue engineering and regenerative medicine use both autologous (from the same patient) and allogeneic (from a different person) sources of cells (allogeneic). Furthermore, xenogeneic cells from animals can be used in regenerative medicine techniques. Stem cells, fibroblasts, chondrocytes, and keratinocytes have all been used thus far.

Allogeneic cells may cause an immunological response, although this can be reduced by giving patients immunosuppressant's to take. Some regenerative medicines techniques can use and speed up the body's own natural healing process, depending on the patient's age. These tactics are designed to improve and speed up the body's natural healing processes by altering the tissue environment through the addition of exogenous materials and biological components. Extracellular matrix materials and bio mimics have been in use for a while and do more than only provide the physical framework.

Materials and bio mimetics have the ability to induce regeneration on their own, but they can also be used to deliver biomolecules like growth factors to encourage cell proliferation. The biomaterial or scaffold, which was once believed to be required to provide physical support for cells, can now integrate biological cues or signals to enhance or promote tissue regeneration and function. Because different tissues have different capacity for regeneration, some tissues may just need biomaterial and biologics, not cells, whilst other tissues have lessened capacities and need both the biomaterial and cells in order to regenerate. The cornea and cartilage are two tissues and organs that have little to no ability to regenerate, but the liver and the lungs have significant regeneration rates. Inflammation is reduced, new tissues are created, and scar tissue is less likely to form thanks to regenerative therapies. Together, these processes effectively reduce pain to the point where platelets and stem cells, in the form of Platelet-Rich Plasma (PRP), can be employed as the sole method of pain management.

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