

## Biological therapies in regenerative medicine.

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**Background.** Regenerative medicine is a relatively new field of medicine that aims to repair or replace damaged tissues and organs using advanced techniques such as stem cell therapy, tissue engineering and biomaterials/scaffolds.

**Objective of the study.** Highlighting the main biological therapies in regenerative medicine and their applicability.

**Material and Methods.** This summary is based on the analysis of international bibliographic sources published in electronic databases such as PubMed, Frontiers and ACS.

**Results.** The potential therapeutic strategies of tissue engineering and regenerative medicine can be divided in three broad categories: (1) recapitulating organ and tissue structure via scaffold fabrication (that mimics the extracellular matrix of the target tissue), 3D bioprinting (using bioinks mixed with living cells), and self-assembly (with special cues for guiding cells to organize themselves into the desired tissue); (2) integrating grafts into the host via vascularization and innervation either through the use of growth factors or by creating microchannels within the scaffold and using co-culture models; and (3) altering the host environment to induce therapeutic responses through cell infusion and modulating the immune system by suppressing it to prevent rejection of a graft, engineering the responses of immune cells or changing the properties of the implanted scaffolds. Most of these methods have successfully passed the preclinical stage of studies and currently are in clinical testing.

**Conclusions.** All of these techniques have the potential to revolutionize the field of regenerative medicine by providing replacement tissues and organs for patients with tissue damage or organ failure. They are justly considered cost-efficient personalized strategies of treatment with quick palpable results. However more research is needed to fully understand all the possibilities and limitations of these techniques in order to ensure their safety and efficacy in clinical applications.

**Keywords:** Regenerative medicine, tissue engineering, scaffold, 3D bioprinting, growth factors.