Regenerative Therapies

Jaime Garzon-Serrano

Department of Anesthesia, Henry Ford Hospital, Detroit, MI 48202, USA

Regenerative medicine has the potential to heal or replace tissues and organs damaged by age, disease, or trauma, also on normalize congenital defects. Promising preclinical and clinical data so far support the likelihood for treating both chronic diseases and acute insults, and for regenerative medicine to abet maladies occurring across a good array of organ systems and contexts, including dermal wounds, cardiovascular diseases and traumas, treatments surely sorts of cancer, and more . The current therapy of transplantation of intact organs and tissues to treat organ and tissue failures and loss suffers from limited donor supply and sometimes severe immune complications, but these obstacles may potentially be bypassed through the utilization of regenerative medicine strategies.

The field of regenerative medicine encompasses numerous strategies, including the utilization of materials and de novo generated cells, also as various combinations thereof, to require the place of missing tissue, effectively replacing it both structurally and functionally, or to contribute to tissue healing .The body's innate healing response may also be leveraged to promote regeneration, although adult humans possess limited regenerative capacity in comparison with lower vertebrates .This review will first discuss regenerative medicine therapies that have reached the market. Preclinical and early clinical work to change the physiological environment of the patient by the introduction of materials, living cells, or growth factors either to exchange lost tissue or to enhance the body's innate healing and repair mechanisms will then be reviewed. Strategies for improving the structural sophistication of implantable grafts and effectively using recently developed cell sources also are going to be discussed. Finally, potential future directions within the field are going to be proposed. Due to the considerable overlap in how researchers use the terms regenerative medicine and tissue engineering, we group these activities together during this review under the heading of regenerative medicine.

Current Effective Therapies

Since tissue engineering and regenerative medicine emerged as an industry about 20 years ago, variety of therapies have received Food and Drug Administration (FDA) clearance or approval and are commercially available .The delivery of therapeutic cells that directly contribute to the structure and performance of latest tissues is a principle paradigm of regenerative medicine to date The cells utilized in these therapies are either autologous or allogeneic and are typically differentiated cells that also maintain .proliferative capacity. For example, Carticel, the primary FDA-approved biologic product within the orthopedic field, uses autologous chondrocytes for the treatment of focal articular cartilage defects.Here, autologous chondrocytes are harvested from articular cartilage, expanded ex vivo, and implanted at the location of injury, leading to recovery comparable that observed using microfracture and mosaicplasty techniques. Other examples include laViv, which involves the injection of autologous fibroblasts to reinforce the looks of nasolabial fold wrinkles; Celution, a medical device that extracts cells from fat derived from liposuction; Epicel, autologous keratinocytes for severe burn wounds; and thus the harvest of cord blood to urge hematopoietic progenitor and stem cells.

Autologous cells require harvest of a patient's tissue, typically creating a replacement wound site, and their use often necessitates a delay before treatment because the cells are culture-expanded. Allogeneic cell sources with low antigenicity for example, human foreskin fibroblasts utilized within the fabrication of wound-healing grafts allow off-the-shelf tissues to be mass produced, while also diminishing the risk of an adverse immune reaction.

REGENERATIVE MEDICINE FDA-APPROVED PRODUCTS

1. Category Name Biological agent Approved use
2. Biologics laViv Autologous fibroblasts Improving nasolabial fold appearance
3. Carticel Autologous chondrocytes Cartilage defects from acute or repetitive trauma
4. Apligraf, GINTUIT Allogeneic cultured keratinocytes and fibroblasts in bovine collagen Topical mucogingival conditions, leg and diabetic foot ulcers
5. Cord blood Hematopoietic stem and progenitor cells Hematopoietic and immunological reconstitution after myeloablative treatment
6. Cell-based medical devices Derma graft Allogeneic fibroblasts Diabetic foot ulcer
7. Celution Cell extraction Transfer of autologous adipose stem cells

***Correspondence to:**
Jaime Garzon-Serrano
Department of Anesthesia,
Critical Care and Pain Medicine,
Massachusetts General Hospital,
Boston,
USA Tel: + 617-643-2729
E-mail:Jaime_serrano222@partners.org