Regenerative medicine strategies to serve Primary Immunodeficiencies

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Introduction / Giriş

An up-ward progressive trend of regenerative medicine acts as a precursor in order to translate promising technologies from the benchtop to the clinic. In fact, gene and cell therapy as well as tissue engineering strategies would be impressive in promoting the cure of immunodeficiency. The immune system is composed of highly specialized cells, tissues, organs and soluble factors that interact in a complex way to ensure an organism's immune defense.

According to the current definition, Primary Immunodeficiencies are thus a group of diseases, which are caused by heritable DNA sequence alterations that impair the quantitative or qualitative function of cellular or humoral components of the adaptive or innate immune system. Many of the patient populations benefiting from drug delivery and tissue engineering-based devices to enhance wound healing also have significant underlying immunodeficiency. Specifically, patients suffering from diabetes, malignancy, human immunodeficiency virus, post organ transplantation, and other compromised states have significant pleotropic immune defects that affect wound healing.

Methods / Metod

The immune system plays a key role in both resisting infection as well as wound healing and tissue regeneration. Inevitably, nearly all drug delivery vehicles and scaffolds for tissue engineering purposes will elicit a response from the host immune system in vivo. While this response may range from a general foreign body reaction to an antigen-specific cell activation, the interactions between immune system and biomaterials can significantly alter the success of any implanted therapeutic device.

Results / Sonuç

In immunodeficient hosts, drug delivery strategies can be utilized to recruit immune cells, alter cell phenotype, or replace certain functions of deficient immune cells in order to augment wound healing. Given the role of the immune system in wound healing and the specific challenges associated in tissue regeneration in the immunocompromised host, this area is of active interest to researchers working in the fields of drug delivery and regenerative medicine.

Conclusions / Sonuçlar

Licensing of gene therapies, use of gene corrected autologous T cells as an alternative strategy for some primary immunodeficiencies and the potential of targeted gene correction using various gene editing platforms could be considered as salient examples of recent regenerative medicine strategies' developments. Regarding the promising results of recent clinical trials, it is predicted that autologous gene therapies will become standard of care for a number of devastating diseases in the near future.

Reference / Kaynak

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