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Promotion of Cell-Based Therapy: Special Focus on the Cooperation of Mesenchymal Stem Cell Therapy and Gene Therapy for Clinical Trial Studies

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Abstract

Regenerative medicine (RM) is a promising new field of medicine that has mobilized several new tools to repair or replace lost or damaged cells or tissues by stimulating natural regenerative mechanisms nearby cell and tissue-based therapy approaches. However, mesenchymal stem cell (MSC) based therapy has been shown to be safe and effective to a certain degree in multiple clinical trial studies (CTSs) of several diseases, in most MSC CTSs the efficacy of treatment has been reported low. Therefore, researchers have focused on efficacy enhancing of MSC to improve migratory and homing, survival, stemness, differentiation and other therapeutic applicable properties by using different approaches. Gene therapy is one of the experimental technique tools that uses genes to change cells for therapeutic and investigation purposes. In this study has been focused on genetically modified MSCs for use in RM with an emphasis on CTSs. We highlight the basic concept of genetic modifications and also discuss recent clinical studies aspects. Recently reviewed studies show that MSC therapy with assistant gene therapy can be used in cancer therapy, heart diseases, Fanconi anemia and several other diseases.

Keywords

Cell therapy · Clinical trial studies · Gene therapy · Mesenchymal stem cell

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Abbreviations

MSCs	Mesenchymal stem cells
GEMSC	Gene engineering of mesenchymal stem cells
ISCT	International Society for Cellular Therapy