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Perspective

Overview of Stem Cell and Gene Therapy

Jan Potempa*

Department of Microbiology, Kansai Medical University, Hirakata, Japan

DESCRIPTION

Gene therapy comprises of the incorporation of hereditary material into cells for a restorative reason which bring about the expression of missing protein to fix the hereditary defects or to improve their clinical status. This approach can likewise be applied to prevent disease by changing the pattern of gene expression in the host cells. The transfer of the normally functioning gene into the patient's cells is accomplished by utilizing non-viral or viral vectors.

Non-viral vectors are regarded as safe, unlike the viral vector; there is no chance of recombination and creation of virulent strains. Notwithstanding, they are substantially less efficient in transferring the target gene into the host cells. Non-viral gene therapy can be done by infusions of naked, for example, plasmids, liposomes-mediated gene transfer or propulsion of DNA-covered micro projectiles. Viral vectors are all the more regularly used technology in moving transferring exogenous hereditary material into the targeted cells. *Ex vivo* stem cell gene therapy is a procedure of isolating stem cells (hematopoietic and non-hematopoietic) from patients with hereditary disease, genetically remedying the stem cells, potentially extending them *ex vivo*, and transplanting them back into patients determined to deliver genetically corrected cells *in vivo*. Stem cells can be characterized functionally as cells that can persistently self-renew and can possibly produce intermediate and mature cells. Different stem cell populations could be confined to specific developmental stages or cell types. The underlying point of the field of gene therapy was the treatment of inherited hereditary diseases by giving a functional copy of the deficient gene. Stem cells are mostly applicable for the tissue repair. Both gene and stem cell therapies can be applied to the treatment of hereditary and acquired diseases.

Stem cells are primitive cells with the ability to self-restore and the capacity to differentiate into various cell types. The most primitive stem cells are Embryonic Stem (ES) cells that are main totipotent and can normally form a wide range of cells and tissues of an organism and hence they might have wide applications as they can differentiate into all cells that can emerge from the 3 germ layers. These cells are produced in the Inner Cell Mass (ICM) of the 5-day-old blastocyst in mammal's development. Pluripotent stem cells can transform into (or) differentiate into any cell inside a germ layer and multi-potent or adult stem cells confined in most adult tissues. Thusly, they are called multi-potent stem organisms. At last, progenitors are the unipotent stem cells that are resolved to create just a single explicit cell type.

CONCLUSION

The differentiation capacity of stem cells to different other tissue types is alluded to as plasticity that range from totipotency to pluripotency to multipotency to unipotency. Due to their ability of unlimited expansion and their plasticity, stem cells are likewise broadly utilized in regenerative medication. Autologous stem cells are acquired from one's own body for surgeries. Most adult stem cells are multipotent and are by and large alluded to by their tissue origin, for example, mesenchymal stem cell, adipose-derived stem cell, or neural stem cells.

Correspondence to: Jan Potempa, Department of Microbiology, Kansai Medical University, Hirakata, Japan, E-mail: potempajan@gmail.com

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