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Regenerative medicine - Use of stem cells as therapeutic options to treat degenerative conditions mediated by inflammation and aging

Personalized medicine encompasses many different components one of which is regenerative medicine. Regenerative medicine is a branch of translational research in tissue engineering and molecular biology, which deals with the process of replacing, engineering or regenerating human cells, tissues or organs to restore or establish normal function. This field holds the promise of engineering damaged tissues and organs by stimulating the body's own repair mechanisms to functionally heal previously irreparable tissues or organs. Regenerative medicine also includes the possibility of growing tissues and organs in the laboratory and implanting them when the body cannot heal itself. If a regenerated organ's cells would be derived from the patient's own tissue or cells, this would potentially solve the problem of the shortage of organs available for donation, and the problem of organ transplant rejection. Many of the biomedical approaches within the field of regenerative medicine may involve the use of stem cells. Examples include the injection of stem cells or progenitor cells obtained through directed differentiation (cell therapies); the induction of regeneration by biologically active molecules administered alone or as a secretion by infused cells (immunomodulation therapy); and transplantation of in vitro grown organs and tissues (tissue engineering). Though use of cord blood beyond blood and immunological disorders is speculative, research has been done in other areas. Any such potential beyond blood and immunological use is limited by the fact that cord cells are hematopoietic stem cells (which can differentiate only into blood cells), and are not pluripotential stem cells, as embryonic stem cells, which can differentiate into any type of tissue, they can be induced to "dedifferentiate" as induced pluripotential stem cells. Cord blood has been studied as a treatment for diabetes. However, apart from blood disorders, the use of cord blood for other diseases is not a routine clinical modality and remains a major challenge for the stem cell community. Along with amniotic tissue, adipose tissue, cord blood, chord lining, and Wharton's jelly, have been explored as sources of mesenchymal stem cells (MSC) in order to treat conditions mediated as a function of aging and inflammation. MSC have been studied in vitro, in animal models, and in early stage clinical trials for cardiovascular diseases, as well as in osteoarthritic conditions, neurological deficits, liver diseases, immune system diseases, diabetes, lung injury, kidney injury, and leukaemia. This presentation will review the use of MSCs in these clinical indications.

Biography

Vincent S Gallicchio received his PhD in Haematology from New York University and his Diploma in Medicine from the University of Arad, Romania. He performed Post-doctoral studies at the University of Connecticut Medical Center and conducted his Fellowship in Haematology from the Memorial Sloan Kettering Cancer Center. He has published more than 150 research articles in peer-reviewed journals on topics focused on stem cells and haematology, seven books, many book chapters, and has been awarded with eleven United States and one international patent for developmental therapeutics of AIDS and cancer. He currently serves as Director of stem cell therapy for outpatient clinical use.

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