

Therapeutic and Research Potential of Human Stem Cells

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INTRODUCTION: There has been significant interest in the therapeutic and scientific potential of stem cells since reconstitution of the haematopoietic system was first realized by bone marrow transplantation in the 1960s. The isolation of tissue-specific, multipotent stem cells from adult organs and the derivation of pluripotent human embryonic stem cells offer the potential for regeneration of a number of different tissues and organs susceptible to age-related degenerative conditions and traumatic injury. In the not-too-distant future, it will be possible to repair heart tissue damaged by myocardial infarction, to replace neuronal cells lost in Parkinson's and Alzheimer's diseases, to transplant new insulin producing cells for diabetics and myelinating cells for individuals afflicted with multiple sclerosis, and to replace bone and cartilage lost through aging and inflammatory disease. In addition, the generation of specific populations of defined subtypes of human cells has tremendous potential to revolutionize the fields of drug discovery and investigation into the cellular bases of human disease. The newly emerging field of Regenerative Medicine will fundamentally alter clinical medicine and significantly influence our perceptions of aging, health and disease, with a myriad of consequences for society at large.

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