

Stem cells and cancer stem cells: therapeutic applications in disease and injury; Vol. 5

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Abstrak

It is pointed out that a cancer stem cell is a type within a tumor that possesses the capacity of self-renewal and can give rise to the heterogeneous lineages of cancer cells, which comprise the tumor. It is emphasized that a unique feature of cancer stem cells is that, although conventional chemotherapy kills most cells in a tumor, cancer stem cells remain intact. Vast applications of the following specific stem cells in disease and tissue injury are discussed: embryonic stem cells, human mesenchymal stem cells, cancer stem cells, arterial stem cells, neural stem cells, cardiac stem cells, dental stem cells, limbal stem cells, and hematopoietic stem cells. Because human embryonic stem cells possess the potential to produce unlimited quantities of any human cell type, considerable focus is placed on their therapeutic potential in this volume. These cells are used in tissue engineering, regenerative medicine, pharmacological and toxicological studies, and fundamental studies of cell differentiation. It is pointed out that the formation of embryoid bodies, which are three-dimensional aggregates of embryonic cells, is the initial step in the differentiation of these cells. Therapeutic implications of signalling pathways in cancer stem cells are pointed out. Targeting self-renewal pathways in cancer stem cells are also included. Application of mesenchymal stem cells for treating ischemic brain injury is explained. Neural stem cells proliferation into the surrounding area of the traumatic brain injury is explained.