

عنوان مقاله:

Detailed study and understanding of the role of stem cells in the etiology and treatment of cancer

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خلاصه مقاله:

Stem cells are characterized by the capacity for self-renewal and the ability to differentiate into diverse specialized cell types. This concept has been extended from the embryonic stem cells (ESCs) and adult stem cells to cancer stem cells (CSCs) and induced pluripotent stem (IPS) cells. Through self-renewal, more stem cells are generated which maintain an undifferentiated status. Through differentiation, stem cells give rise to a mature cell type. Embryonic stem cells are capable of differentiating into all tissues during embryonic development. Adult stem cells play important roles in replenishing and repairing adult tissues. Cancer stem cells (CSCs) are subpopulations of cancer cells sharing similar characteristics as normal stem or progenitor cells such as self-renewal ability and multi-lineage differentiation to drive tumour growth and heterogeneity. The properties of cancer stem cells (CSCs) have recently gained attention as an avenue of intervention for cancer therapy. In this review, we highlight some of the key roles of CSCs in altering the cellular microenvironment in favor of cancer progression. We also report on various studies in this field which focus on transformative properties of CSCs and their influence on surrounding cells or targets through the release of cellular cargo in the form of extracellular vesicles. The findings from these studies encourage the development of novel interventional therapies that can target and prevent cancer through efficient, more effective methods. These methods include targeting immunosuppressive proteins and biomarkers, promoting immunization against tumors, exosome-mediated CSC conversion, and a focus on the quiescent properties of CSCs and their role in cancer progression. The resulting therapeutic benefit and transformative potential of these novel approaches to stem cell-based cancer therapy provide a new direction in cancer treatment, which can focus on nanoscale, molecular properties of the cellular microenvironment and establish a more precision medicine-oriented paradigm of treatment. Using approaches first applied in human leukemias, recent progress has been made in the identification of putative cancer stem cells in several different carcinomas and other solid cancers. Additional studies have suggested that cancer stem cells may be derived not only from transformation of quiescent, long-term stem cells but also from short-lived progenitors that then obtain the ability to undergo self-renewal. Therefore, the heterogeneity observed in many ... types of human cancers may reflect both the activation of

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