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The Role of Cancer Stem Cells (CD133+) in Malignant Gliomas.



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Abstract

Malignant gliomas, particularly glioblastoma multiforme (GBM) tumors, are very difficult to treat by conventional approaches. Although most of the tumor mass can be removed by surgical resection, radiotherapy, and chemotherapy, it eventually recurs. There is growing evidence that cancer stem cells (CSCs) play an important role in tumor recurrence. These stem cells are radioresistant and chemoresistant. The most common used tumor marker for CSCs is CD133. The amount of CSC component is closely correlated with tumor malignancy grading. Isolating, identifying, and treating CSCs as the target is crucial for treating malignant gliomas. Cancer stem cell-associated vascular endothelial growth factor (VEGF) promotes tumor angiogenesis, tumor hemorrhage, and tumor infiltration. Micro-RNA (miR) plays a role in CSC gene expression which may regulate oncogenesis or suppression to influence tumor development or progression. The antigenesis of CSCs and normal stem cells may be different. The CSCs may escape the T-cell immune response. Identifying a new specific antigen from CSCs for vaccine treatment is a key point for immunotherapy. On the other hand, augmented treatment with radiosensitizer or chemosensitizer may lead to reduction of CSCs and lead to CSCs being vulnerable to radiotherapy and chemotherapy. The control of signaling pathway and cell differentiation to CSC growth is another new hope for treatment of malignant gliomas. Although the many physiological behavioral differences between CSCs and normal stem cells are unclear, the more we know about these differences the better we will be able to treat CSCs effectively.

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