How powerful is CD133 as a cancer stem cell marker in brain tumors?

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Cancer stem cells (CSCs) have been identified in a growing number of hematopoietic and solid tissue malignancies and are typically recognized by virtue of the expression of cell surface markers. CD133, a stem cell marker, is now extensively used as a surface marker to identify and isolate brain tumor stem cells (BTSCs) in malignant brain tumors. However, CD133 as the marker to sort BTSCs suffered some controversies. In this review, we reviewed the rise of CD133, analyzed the efficiency of CD133 on identification and isolation of BTSCs, explained some controversial study results and summed up the role of CD133 and other effective CSCs markers in sorting CSCs in other tumors. We analyzed current limited reports and found that the expression of CD133 was correlated with poor clinical prognosis in brain tumors. Finally, we summarized the mechanisms of chemo- and radio- resistance of CD133+ brain tumor cell, especially emphasized that the aberrant activation of development pathways in BTSCs can be potential targets to BTSCs, and outlined current preclinical studies on killing BTSCs or sensitizing BTSCs to chemo- and radio-therapies.

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