HHS Public Access

Author manuscript

Biomark Med. Author manuscript; available in PMC 2019 January 16.

Published in final edited form as:

Biomark Med. 2010 February ; 4(1): 127–128.

Cancer stem cells as a prognostic indicator for glioblastoma multiforme

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Cancer stem cells have important roles in tumor formation, growth and resistance to standard cancer therapies, including chemotherapy and radiation. Although it is somewhat controversial, Prominin-1 (CD133) has been identified as an important marker for glioma stem cells. This study examined the prognostic value of CD133 expression, both alone and in combination with the proliferation marker Ki67, in resected glioblastoma multiforme tumor specimens. In addition, the study examined the correlation between clinical outcome and the ability of resected tumor specimens to form cancer stem cells in tissue culture.

There was a statistically significant decrease in both overall survival and progression-free survival when evaluating the above parameters in a sample size of 44 patients, who were all treated with postoperative radiation and temozolomide. Specifically, there was a decrease in survival when tumor specimens contained cells that coexpressed CD133 and Ki67. In addition, there was a decrease in survival if 2% or more of the tumor cells expressed CD133. Finally, patients had a worse prognosis if tumor specimens formed neurosphere cell lines in tissue culture, a characteristic that is indicative of cancer stem cells. Correspondingly, faster formation of neurospheres correlated with a decrease in survival.

Although the sample size is small, this study underscores the importance of using CD133 as a biomarker for cancer stem cells, which may be important for the patho genesis and clinical progression of glioblastoma multiforme. The poor clinical outcomes may be due to an increase of potentially treatment-resistant cancer stem cells. Thus, drugs that target cancer stem cells may improve patient survival. Furthermore, these results indicate the potential clinical value of testing tumor specimens for CD133 and Ki67 expression. These biomarkers, which can easily be adapted to standard clinical practice through

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Evaluation of: Pallini R, Ricci-Vitiani L, Banna GL *et al.*: Cancer stem cell ana lysis and clinical outcome in patients with glioblastoma multiforme. *Clin. Cancer Res.* 14(24), 8205–8212 (2008).

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

immunohistochemistry of tumor samples, may be informative concerning a patient's prognosis and regarding the optimal treatment strategy.