Chemotherapy resistance

Chemotherapy resistance occurs when cancers that have been responding to a therapy suddenly begin to grow. In other words, the cancer cells are resisting the effects of the chemotherapy. You may hear statements like the “cancer chemotherapy failed.” When this occurs, the drugs will need to be changed.

Glioma is resistant to the apoptotic effects of chemotherapy and the mechanism underlying its chemoresistance is not currently understood.

Chemotherapy is an adjuvant treatment for glioblastomas, however, chemotherapy remains palliative because of the development of multidrug resistance (MDR).

see MDR glioblastoma cell line

Following prolonged chemotherapy, MDR protein 1 (MDR1) and CD133 increase in Glioblastoma recurrences. CD133 positive (CD133+) glioma cancer stem-like cells (GCSCs) markedly promote drug resistance and exhibit increased DNA damage repair capability; thus they have a key role in determining tumor chemosensitivity.

At present, although drugs such as temozolomide, cisplatin, and bevacizumab, are effective in improving the overall survival of patients with Glioblastoma, most patients eventually develop drug resistance, leading to poor clinical prognosis. The development of multidrug resistance has therefore become a major obstacle to improving the effectiveness of chemotherapy for Glioblastoma. The ability to fully understand the underlying mechanisms of chemotherapy resistance and to develop novel therapeutic targets to overcome resistance is critical to improving the prognosis of patients with Glioblastoma. Of note, growing evidence indicates that a large number of abnormally expressed noncoding RNAs (ncRNAs) have a central role in glioma chemoresistance and may target various mechanisms to modulate chemosensitivity. noncoding RNAs is a research direction for tumor drug resistance mechanisms and targeted therapies, which not only provides novel perspectives for reversing glioma drug resistance but may also promote the development of precision medicine for clinical diagnosis and treatment [1)].

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Zeng Z, Chen Y, Geng X, Zhang Y, Wen X, Yan Q, Wang T, Ling C, Xu Y, Duan J, Zheng K, Sun Z. NcRNAs: Multi-angle participation in the regulation of glioma chemotherapy resistance (Review). Int J Oncol. 2022 Jun;60(6):76. doi: 10.3892/ijo.2022.5366. Epub 2022 May 4. PMID: 35506469.