Glioma metabolism

Gliomas are the most common type of malignant brain tumors. Despite significant medical advances, gliomas remain incurable and are associated with high mortality. Although numerous glioma biomarkers of diagnostic value have been identified and significant progress in the prognosis of the glioma outcome has been made, the glioma treatment has not been parallelly improved during the last three decades.

A review of Guo et al. summarizes and discusses three aspects of recent discoveries related to glioma, with the objective to highlight the advantages of glioma-specific drugs targeting the cell of origin, microenvironment, and glioma metabolism. Given the heterogeneous nature of gliomas, various cell populations have been implicated as likely sources of the tumor. Depending on the mutation(s) acquired by the cells, it is believed that neuronal stem/progenitor cells, oligodendrocyte progenitor cells, mature neurons, and glial cells can initiate cell transformation into a malignant phenotype. The level of tumorigenicity appears to be inversely correlated with the maturation of a given cell population. The glioma microenvironment includes non-cancer cells such as immune cells, fibroblasts, and cells of blood vessels, as well as secreted molecules and the extracellular matrix, and all these components play a vital role during tumor initiation and progression. They discussed in detail how the glioma microenvironment can stimulate and drive the transformation of non-tumor cell populations into tumor-supporting cells or glioma cells. Metabolic reprogramming is a key feature of gliomas and is thought to reflect the adaptation to the increased nutritional requirements of tumor cell proliferation, growth, and survival. Mutations in the IDH gene can shape metabolic reprogramming and may generate some vulnerabilities in glioma cells, such as abnormal lipid metabolism and sensitivity to endoplasmic reticulum stress (ERS). They analyzed the prominent metabolic features of malignant gliomas and the key pathways regulating glioma metabolism [1)]

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Guo X, Wang T, Huang G, Li R, Da Costa C, Li H, Lv S, Li N. Rediscovering potential molecular targets for glioma therapy through the analysis of the cell of origin, microenvironment, and metabolism. Curr Cancer Drug Targets. 2021 May 3. doi: 10.2174/1568009621666210504091722. Epub ahead of print. PMID: 33949933.