Combating Malignant Astrocytes: Strategies Mitigating Tumor Invasion.

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Malignant gliomas are glial-derived, primary brain tumors that carry poor prognosis. Existing therapeutics are largely ineffective and dramatically affect quality of life. The standard of care details a taxing combination of surgical resection, radiation of the resection cavity, and temozolomide (TMZ) chemotherapy, with treatment extending life by only an average of months (Maher et al., 2001; Stupp et al., 2005). Despite scientific and technological advancement, surgery remains the most important treatment modality. Therapeutic obstacles include xenobiotic protection conveyed by the blood-brain barrier (Zhang et al., 2015), invasiveness and therapeutic resistance of tumor cell populations (Bao et al., 2006), and distinctive attributes of secondary glioma occurrence (Ohgaki and Kleihues, 2013). While these brain malignancies can be classified by grade or grouped by molecular subclass, each tumor presents itself as its own complication. Based on all of these obstacles, new therapeutic approaches are urgently needed. These will likely emerge from numerous exciting studies of glioma biology that are ongoing and reviewed here. These show unexpected roles for ion channels, amino-acid transporters, and connexin gap junctions in supporting the invasive growth of gliomas. These studies have identified a number of proteins that may be targeted for therapy in the future.

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