Abstract

PURPOSE OF REVIEW: Recent advances in the role of cancer stem cells (CSCs) in glioblastoma will be reviewed.

RECENT FINDINGS: In the decade since the description of brain tumor CSCs, the potential significance of these cells in tumor growth, therapeutic resistance, and spread has become evident. Most recently, the interplay between CSCs, tumor genetics, and the microenvironment has offered potential nodes of fragility under therapeutic development. The CSC phenotype is informed by specific receptor signaling, and study of the regulation of stem cell genes by transcription factors and microRNAs has identified a number of new targets amenable to treatment. Like normal stem cells, CSCs display specific epigenetic landscapes and metabolic profiles.

SUMMARY: Brain cancers activate core stem cell regulatory pathways to empower self-renewal, maintenance of an organ system (albeit an aberrant one), and survival under stress that collectively permits tumor growth, therapeutic resistance, invasion, and angiogenesis. These properties have implicated CSCs as contributors in GBM progression and recurrence, spurring a search for anti-CSC therapies that do not disrupt normal stem cell maintenance. The last year has witnessed a rapid evolution in the understanding of CSC biology to inform preclinical targeting.

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