ABSTRACT

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Nanomedicines Targeting Glioma Stem Cells.

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Glioblastoma (GBM), classified as a grade IV glioma, is a rapidly growing, aggressive, and most commonly occurring tumor of the central nervous system. Despite the therapeutic advances, it carries an ominous prognosis, with a median survival of 14.6 months after diagnosis. Accumulating evidence suggests that cancer stem cells in GBM, termed glioma stem cells (GSCs), play a crucial role in tumor propagation, treatment resistance, and tumor recurrence. GSCs, possessing the capacity for self-renewal and multilineage differentiation, are responsible for tumor growth and heterogeneity, leading to primary obstacles to current cancer therapy. In this respect, increasing efforts have been devoted to the development of anti-GSC strategies based on targeting GSC surface markers, blockage of essential signaling pathways of GSCs, and manipulating the tumor microenvironment (GSC niches). In this review, we will discuss the research knowledge regarding GSC-based therapy and the underlying mechanisms for the treatment of GBM. Given the rapid progression in nanotechnology, innovative nanomedicines developed for GSC targeting will also be highlighted from the perspective of rationale, advantages, and limitations. The goal of this review is to provide broader understanding and key considerations toward the future direction of GSC-based nanotheranostics to fight against GBM.

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