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Prostate-Specific Membrane Antigen Use in Glioma Management: Past, Present, and Future

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Abstract

Background: Prostate-specific membrane antigen (PSMA) is a membrane-bound metallopeptidase highly expressed in the neovasculature of many solid tumors including gliomas. It is a particularly enticing therapeutic target due to its ability to internalize, thereby delivering radioligands or pharmaceuticals to the intracellular compartment. Targeting the neovasculature of gliomas using PSMA for diagnosis and management has been a recent area of increased study and promise. The purpose of this review is to synthesize the current state and future directions of PSMA use in the histopathologic study, imaging, and treatment of gliomas.

Methods: PubMed and Scopus databases were used to conduct a literature review on PSMA use in gliomas in June 2023. Terms searched included "PSMA," "Prostate-Specific Membrane Antigen" OR "PSMA" OR "PSMA PET" AND "glioma" OR "high grade glioma" OR "glioblastoma" OR "GBM."

Results: Ninety-four publications were screened for relevance with 61 studies, case reports, and reviews being read to provide comprehensive context for the historical, contemporary, and prospective use of PSMA in glioma management.

Conclusions: PSMA PET imaging is currently a promising and accurate radiographic tool for the diagnosis and management of gliomas. PSMA histopathology likely represents a viable tool for helping predict glioma behavior. More studies are needed to investigate the role of PSMA-targeted therapeutics in glioma management, but preliminary reports have indicated its potential usefulness in treatment.

Trial registration: [ClinicalTrials.gov NCT05644080](https://clinicaltrials.gov/ct2/show/study/NCT05644080) [NCT03903419](https://clinicaltrials.gov/ct2/show/study/NCT03903419) [NCT04588454](https://clinicaltrials.gov/ct2/show/study/NCT04588454) [NCT02410577](https://clinicaltrials.gov/ct2/show/study/NCT02410577).

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