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# Targeted therapy for pediatric glioma: RAF(t)ing in the molecular era

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## Abstract

**Background:** Pediatric gliomas are the most frequently occurring central nervous system tumors in children. While targeted therapies have been widely applied in the treatment of many adult cancers, their use in pediatric gliomas has lagged behind. However, recent advances in multiomics profiling of pediatric gliomas, coupled with the approval of inhibitors against Raf serine/threonine kinase (RAF), isocitrate dehydrogenase 1/2 (IDH1/2) and neurotrophic receptor tyrosine kinase (NTRK), have spurred significant progress in this field. In light of these developments, this review aims to provide a comprehensive overview of current advancements and the evolving landscape of targeted therapeutic strategies and approaches for pediatric gliomas.

**Data sources:** Data analyzed in this study were obtained from the literature from PubMed, as well as other online databases and websites, including ClinicalTrials.gov and the Pediatric Neuro-Oncology Consortium.

**Results:** Based on findings from multiomics profiling, significant insights have been gained into the genetic and molecular landscape of pediatric gliomas, enabling the identification of key mutations and potentially targetable lesions. These advancements provide rationales for the development of more precise treatment strategies and targeted therapies. Recent approvals of targeted therapies and ongoing clinical trials in pediatric gliomas are converging on the targeting of key signaling molecules and metabolic pathways.

**Conclusions:** In the molecular era, targeted therapies offer new hope for more effective and personalized treatment options for pediatric glioma patients. By developing and tailoring treatments to target specific molecular and metabolic vulnerabilities, targeted therapies have the potential to improve the clinical management of pediatric gliomas, ultimately enhancing both the treatment experience and overall prognosis of these patients.

**Keywords:** Glioma; Metabolism; Pediatric neuro-oncology; Signaling pathway; Targeted therapy.