

Review [Curr Neurol Neurosci Rep.](#) 2024 Aug 15. doi: 10.1007/s11910-024-01369-4.

Online ahead of print.

Advances in the Treatment of Pediatric Low-Grade Gliomas

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PMID: 39143379 DOI: [10.1007/s11910-024-01369-4](https://doi.org/10.1007/s11910-024-01369-4)

Abstract

Purpose of review: Pediatric low-grade gliomas (pLGGs) often result in significant long-term morbidities despite high overall survival rates. This review aims to consolidate the current understanding of pLGG biology and molecular features and provide an overview of current and emerging treatment strategies.

Recent findings: Surgical resection remains a primary treatment modality, supplemented by chemotherapy and radiotherapy in specific cases. However, recent advances have elucidated the molecular underpinnings of pLGGs, revealing key genetic abnormalities such as BRAF fusions and mutations and the involvement of the RAS/MAPK and mTOR pathways. Novel targeted therapies, including MEK, BRAF and pan-RAF inhibitors, have shown promise in clinical trials, demonstrating significant efficacy and manageable toxicity. Understanding of pLGGs has significantly improved, leading to more personalized treatment approaches. Targeted therapies have emerged as effective alternatives, potentially reducing long-term toxicities. Future research should focus on optimizing therapy sequences, understanding long-term impacts, and ensuring global accessibility to advanced treatments.

Keywords: BRAF inhibitors; Low-grade gliomas; MEK inhibitors; Molecular profiling; Pediatric; Targeted therapies.

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