

Glioblastoma

Glioblastoma is defined as a **grade 4, IDH-wildtype diffuse astrocytic glioma** that occurs in adults and exhibits one or more of the following features:

- microvascular proliferation
- necrosis
- TERT promoter mutation
- EGFR gene amplification
- combined chromosome 7 gain / chromosome 10 loss (+7/-10)

see [Glioblastoma treatment](#)

Narrative reviews

Neuroimaging techniques, such as diffusion tensor imaging and magnetic resonance radiomics, provide noninvasive insights into tumor infiltration patterns and metabolic profiles, aiding in accurate diagnosis and prognostication. Machine learning algorithms further enhance glioblastoma characterization by identifying distinct imaging patterns and features, facilitating precise diagnoses and treatment planning. Integration of these technologies allows for the development of image-based biomarkers, potentially reducing the need for invasive biopsy procedures and enabling personalized therapy targeting specific pro-tumoral signaling pathways and resistance mechanisms. Although significant progress has been made, ongoing innovation is essential to address remaining challenges and further improve these methodologies. Future directions should focus on refining machine learning models, integrating emerging imaging techniques, and elucidating the complex interplay between imaging features and underlying molecular processes. This review highlights the pivotal role of neuroimaging and machine learning in glioblastoma research, offering invaluable noninvasive tools for diagnosis, prognosis prediction, and treatment planning, ultimately improving patient outcomes. These advances in the field promise to usher in a new era in the understanding and classification of IDH-wildtype glioblastoma ¹⁾.

¹⁾

Fares J, Wan Y, Mayrand R, Li Y, Mair R, Price SJ. Decoding Glioblastoma Heterogeneity: Neuroimaging Meets Machine Learning. *Neurosurgery*. 2025 Jun 1;96(6):1181-1192. doi: 10.1227/neu.0000000000003260. Epub 2024 Nov 21. PMID: 39570018; PMCID: PMC12052239.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

<https://neurosurgerywiki.com/wiki/doku.php?id=glioblastoma>

Last update: **2025/06/18 19:31**

