

## SLIDESHOW

## New Classifications and Emerging Treatments in Brain Cancer

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## AUTHOR AND DISCLOSURE INFORMATION

[https://cdn.mdedge.com/files/s3fs-public/avaho\\_collaboration\\_4.png](https://cdn.mdedge.com/files/s3fs-public/avaho_collaboration_4.png)*Slideshow below.*

Brain cancer remains a tremendous challenge in oncology, often with the worst prognosis and fewest approved treatment options.<sup>1</sup> Classifying, treating, and identifying the causes in both the general population and in veterans have been challenging; but recently, there has been progress.<sup>2-4</sup> In 2021, the World Health Organization (WHO) updated the classification system for primary brain and spinal cord tumors.<sup>2</sup> Most importantly, the fifth edition of the WHO Classification of Tumors of the Central Nervous System (WHO CNS5) updates included the importance of molecular diagnostic techniques to ensure appropriate diagnoses.<sup>2</sup>

Along with the progress in tumor classification, treatment advances are also showing promise with the use of new targeted therapies.<sup>3</sup> A multi-site phase 3 clinical trial investigating an isocitrate dehydrogenase (IDH) inhibitor, vorasidenib, in patients with residual or recurrent IDH mutant low-grade glioma met its primary endpoint of PFS in March 2023.<sup>5,6</sup> In addition to brain-penetrant

targeted therapies, advances in drug administration and delivery have also emerged to circumvent the blood-brain barrier using nanotechnology, focused ultrasound, oncolytic viruses, vaccines, and CAR T-cell therapies.<sup>7-11</sup>

Many unanswered questions remain regarding the rates and outcomes for veterans with brain cancer. However, investigations and initiatives are ongoing to better understand the role of military service and exposures that may be associated with an increased risk of developing brain tumors.<sup>4,12,13</sup> In addition, efforts are in place to improve molecular characterization and personalized treatments for brain cancer through the Applied Proteogenomics Organizational Learning and Outcomes (APOLLO) and NPOP.<sup>14</sup> Despite the complexity of brain cancer, with its numerous challenges and unknowns, there have been recent advances in classification and potential treatments. Understanding the causes and improving treatments for brain cancer in the veteran population is paramount.

## 2021 WHO Classification of Tumors of Central Nervous System

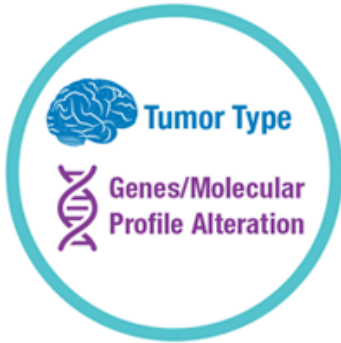


**Goals of the Meeting:** ✓ To incorporate molecular diagnostics in tumor classification based on histological and immunohistochemistry identification systems ✓ To update the tumor grades

### Key Diagnostic Genes and Molecular Signatures in Classifying Brain Cancer Types

**Astrocytoma, IDH-mutant**  
*IDH1, IDH2, ARTX, TP53, CDKN2A/B*

**Oligodendroglioma, IDH-mutant, and 1p/19q-codeleted**  
*IDH1, IDH2, 1p/19q, TERT promoter, CIC, FUBP1, NOTCH1*



**Glioblastoma, IDH-wildtype**  
*IDH-wildtype, TERT promoter, chromosomes 7/10, 17*

**Diffuse midline glioma, H3 K27me3-low**  
*H3 K27, TP53, ACVR1, EGFR, EZHIP*

**Meningioma**  
*NF2, AKT1, TRAF7, SMO, PIK3CA, KLF4, SMARCE1, BAP1 in subtypes, H3K27me3; TERT promoter, CDKN2A/B in CNS WHO grade 3*



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[Click to view more from Cancer Data Trends 2023 <https://www.mdedge.com/fedprac/article/262652/cancer-data-trends-2023>](https://www.mdedge.com/fedprac/article/262652/cancer-data-trends-2023).

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