Biomarker Testing for Brain Cancer

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Traditionally, a brain cancer diagnosis was made by observing the appearance, cellular characteristics, and growth patterns of tumor cells under a microscope. Today, we know that molecular biomarkers (e.g., genes, gene expression patterns, mutations, proteins) are also highly relevant to brain tumor classification.

There are many different names for biomarker testing – "molecular testing," "genomic testing," "next generation sequencing," "DNA sequencing," "whole exome sequencing," etc. While there are nuances amongst the different names and types, all biomarker testing helps provide a deeper understanding of the tumor profile and may potentially inform targets for personalized treatment. Biomarker testing is encouraged by the National Comprehensive Cancer Network and becoming increasingly more common, but access to and utilization is still highly variable across institutions.

Accessibility and Challenges

The costs of molecular biomarker testing, as a relatively new technology, are high. Prices will vary depending on the sequencing technology used, extent of sequencing, geographical location, and other factors. A targeted gene panel may cost several hundred dollars, whereas more comprehensive testing (e.g., whole exome and transcriptome sequencing) may cost several thousand. If you are a brain tumor patient or caregiver, ask your care team if molecular testing can be covered by insurance, Medicare, a clinical trial budget, or by any other means. If coverage is not available, many testing companies offer financial assistance programs.

Exploring Testing Options

To aid patients, below is a non-exhaustive list of companies and academic institutions offering biomarker testing services for brain tumor patients:

FoundationOneCDx (Third-party commercial testing)
The FoundationOne CDx test uses comprehensive genomic profiling (CGP) to read a patient's cancer DNA. It can be used for all types of advanced solid cancer. The CGP, a type of biomarker testing, can help identify what is causing cancer to grow or spread. This information from this testing can be used to help identify how your tumor may respond to treatment. This test was approved by the FDA in 2011.
https://www.foundationmedicine.com/test/foundationone-cdx

CARIS Molecular Intelligence (Third-party commercial testing)
Caris molecular profiling performs molecular testing on DNA, RNA and proteins to identify the biomarkers driving a patient's tumor, and to compare the biomarkers with data from clinical studies around the world. Although not approved by the FDA, it is widely used and well accepted.
https://www.carislifesciences.com/products-and-services/molecular-profiling/tissue-profiling/

Tempus xt CDx (Third-party commercial testing)
Tempus performs comprehensive genomic testing with next-generation sequencing that can identify specific alterations that may drive the behavior of your cancer. The Tempus xT CDx is a 648-gene next-generation sequencing test for solid tumor profiling, which includes microsatellite instability status. This test was approved by the FDA in 2023.
https://www.tempus.com/patients/oncology/

BostonGene (Third-party commercial testing)
The BostonGene Tumor Portrait™ Test includes comprehensive genomic and transcriptomic analysis, and reveals critical drivers of each tumor, including immune microenvironment properties, actionable mutations, biomarkers of response to diverse therapies, and recommended therapies.
https://bostongene.com/patients/

Guardant360CDx (Third-party commercial testing)
Guardant360 CDx is a comprehensive genomic profiling (CGP) liquid biopsy that identifies an expanded panel of actionable biomarkers. It is used for advanced stage cancer patients, and it is the first FDA-approved liquid biopsy for comprehensive tumor mutation profiling across all solid cancers.
https://www.guardantcomplete.com/guardant-portfolio/cdx

MSK IMPACT (Memorial Sloan Kettering testing)
MSK-IMPACT is a targeted tumor-sequencing test available to MSK patients. The test can detect mutations and other critical changes in the genes of both rare and common cancers. With the MSK-IMPACT test, doctors can quickly find out whether a tumor has changes that make the cancer vulnerable to particular drugs. MSK patients can then be matched to the available therapies or clinical trials that will most benefit them.
https://www.mskcc.org/msk-impact

UCSF 500 Cancer Gene Panel test (University of California – San Francisco testing)
The UCSF 500 is a next-generation sequencing test available to UCSF patients. The test identifies genetic mutations in the DNA of a patient's cancer, which can help clinicians improve treatment by identifying targeted therapies, or appropriate clinical trials, or in some cases clarify the exact type of cancer a patient has.
https://genomics.ucsf.edu/UCSF500

NUSeq Core (Northwestern University testing)
NUSeq is a next-generation sequencing (NGS) core facility, focused on providing first-class NGS technology to the Northwestern research community. NUSeq has a fleet of NGS sequencers that spans all major Illumina sequencing technologies from MiSeq to HiSeq 4000. Thousands of sequencing libraries have been constructed and sequenced encompassing all major NGS applications, from RNA-seq to sequencing of CRISPR/Cas9 gene editing products.
https://www.cgm.northwestern.edu/cores/nuseq/services/next-generation-sequencing/index.html

CeGat Cancer Neo (Global commercial testing, based in Tubingen, Germany)
CeGat is a global provider of sequencing services for research, clinical studies, and human genetic diagnostics. The CeGaT CancerNeo test enables the analysis of a patient's tumor exome to detect tumor-specific mutations, identifies the HLA-types, and predicts neoantigens. The expression of these neoantigens is confirmed by whole RNA sequencing (transcriptome) from the same tumor sample.
https://cegat.com/diagnostics/tumor-diseases/cancerneo/#:~:text=CeGaT%20CancerNeo%C2%AE%20identifies%20somatic%20alterations%20through%20comparative%20analysis,the%20most%20accurate%20method%20for%20identifying%20somatic%20variants

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