Overview

Useful For
Assisting in central nervous system tumor classification

Additional Tests

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIRV</td>
<td>Slide Review in MG</td>
<td>No, (Bill Only)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Testing Algorithm
When this test is ordered, slide review will always be performed at an additional charge.

Method Name
Polymerase Chain Reaction (PCR)-Based Next-Generation Sequencing

NY State Available
Yes

Specimen

Specimen Type
Varies

Advisory Information
At least 20% tumor is required for this assay. The amount of tissue needed is dependent on a variety of preanalytical factors (eg, cellularity, ischemic time, fixation). In general, the minimum specimen adequacy for this test is approximately a 6 mm² area of tissue (can be over multiple slides from 1 tissue block) or 5,000 total cells (5,000 total nucleated cells if using cytology slides).

Necessary Information
Pathology report must accompany specimen in order for testing to be performed.

Specimen Required
Preferred

Specimen Type: Tissue block

Collection Instructions: Submit a formalin-fixed, paraffin-embedded tissue block

Acceptable

Slides: 1 stained and 10 unstained slides

Collection Instructions: Submit 1 slide stained with hematoxylin and eosin and 10 unstained slides (nonbaked, charged slides preferred) with 5-micron thick sections of the tumor tissue.
**Test Definition: TERT**

**TERT Promoter Analysis, Tumor**

**Specimen Type:** Cytology slide (Direct smears or ThinPrep)

**Slides:** 1-2 slides

**Collection Instructions:** Submit 1-2 slides stained and coverslipped with at least 5,000 total nucleated cells

**Additional Information:** Cytology slides will not be returned.

**Forms**

If not ordering electronically, complete, print, and send an [Oncology Test Request](#) (T729) with the specimen.

**Specimen Minimum Volume**

Formalin-fixed, paraffin-embedded tissue block (preferred) or 1 slide stained with hematoxylin and eosin and 10 unstained, non-baked slides with 5-microns thick sections of the tumor tissue with at least 6 mm(2) area of tissue (can be over multiple slides from one tissue block) and at least 20% tumor cells

**Reject Due To**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemolysis</td>
<td>NA</td>
</tr>
<tr>
<td>Lipemia</td>
<td>NA</td>
</tr>
<tr>
<td>Icterus</td>
<td>NA</td>
</tr>
<tr>
<td>Other</td>
<td>Specimens that have been decalcified (all methods); specimens that have not been formalin-fixed, paraffin-embedded; bone marrow in EDTA</td>
</tr>
</tbody>
</table>

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>Varies</td>
<td>Ambient (preferred)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
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<td>Refrigerated</td>
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**Clinical and Interpretive**

**Clinical Information**

*TERT* gene encodes the catalytic subunit of telomerase, an enzyme complex that regulates telomere length. *TERT* promoter mutations in 2 hotspots (C228T and C250T) have been shown to increase telomerase activity and contribute to tumorigenesis by allowing cancer cells to overcome cellular senescence. Among central nervous system tumors, *TERT* promoter mutations have primarily been identified in adults, with highest frequencies in oligodendroglioma, primary glioblastoma, solitary fibrous tumor, and medulloblastoma. Although less frequent, *TERT* promoter mutations have also been observed in lower-grade infiltrating (diffuse and anaplastic) astrocytomas and ependymoma, and are rare or absent in other central nervous system tumor types. The presence of *TERT* promoter mutations have been associated with a less favorable prognosis in lower-grade (grade II/III) diffuse gliomas that lack IDH1/2 mutations and have intact 1p/19q ("IDH-wildtype astrocytomas"), and with a more favorable prognosis in prognosis in grade II/III IDH1/2-mutant and 1p/19q-codeleted diffuse gliomas ("IDH-mutant and 1p/19q codeleted oligodendroglomas"). Assessment of *TERT* promoter mutation status in central nervous system tumors may assist in tumor classification and provide prognostically relevant information for subgroups of patients with lower-grade diffuse...
gliomas.

*TERT* gene mutations are also observed in a variety of non-central nervous system (CNS) tumor types. In hepatocellular neoplasms *TERT* promoter mutations occur frequently in hepatocellular carcinomas and are believed to be an early step in hepatocarcinogenesis. However, *TERT* promoter mutations are not specific to hepatocellular carcinoma and have been reported as a key alteration in the rare progression of hepatocellular adenomas to hepatocellular carcinomas. As such, identification of a *TERT* promoter mutation suggests a hepatocellular neoplasm with an increased risk for aggressive behavior.

**Reference Values**

An interpretative report will be provided.

**Interpretation**

An interpretative report will be provided.

**Cautions**

This test cannot differentiate between somatic and germline alterations. Additional testing may be necessary to clarify the significance of results if there is a potential hereditary risk.

This test is not intended for use for hematological malignancies.

DNA variants of uncertain significance may be identified.

A negative (wild-type) result does not rule out the presence of a mutation that may be present but below the limits of detection of this assay.

Point mutations and small insertion/deletion mutations will be detected with in the promoter region of the *TERT* gene only.

This test does not detect structural variants, genomic copy number variants, or large single or multiexon deletions or duplications in the *TERT* gene.

Rare polymorphisms may be present that could lead to false-negative or false-positive results. Test results should be interpreted in the context of clinical findings, tumor sampling, and other laboratory data. If results obtained do not match other clinical or laboratory findings, contact the laboratory for updated interpretation. Misinterpretation of results may occur if the information provided is inaccurate or incomplete.

Reliable results are dependent on adequate specimen collection and processing. This test has been validated on cytology slides and formalin-fixed, paraffin-embedded tissues; other types of fixatives are discouraged. Improper treatment of tissues, such as decalcification, may cause PCR failure.

**Supportive Data**

We have developed a next-generation sequencing assay to detect somatic mutations that can be used to assist in the classification and prognostication of central nervous system tumors.

This assay has been shown to be very reproducible, having a 100% concordance for intra- and interassay reproducibility experiments. All somatic mutations that had been previously identified by various other molecular methods were detected by this assay during accuracy studies. No pathogenic variants were detected in known mutation negative samples.

**Clinical Reference**


Performance

Method Description

Targeted next-generation sequencing is performed to test for the presence of a mutation in the promoter region of the TERT gene. (Unpublished Mayo method)

<table>
<thead>
<tr>
<th>Gene</th>
<th>GenBank Accession Number</th>
<th>Nucleotide Start</th>
<th>Nucleotide End</th>
<th>Chromosome</th>
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<tr>
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<td>NM_198253</td>
<td>1295170</td>
<td>1295296</td>
<td>Chromosome 5</td>
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Test Definition: TERT
TERT Promoter Analysis, Tumor

No

Day(s) and Time(s) Test Performed
Monday through Friday; Varies

Analytic Time
12 days

Maximum Laboratory Time
20 days

Performing Laboratory Location
Rochester

Fees and Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information
81345
88381

LOINC® Information

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<td>TERT</td>
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