Overview

Useful For
Prognostication of newly diagnosed glioblastomas

Identifying newly diagnosed glioblastomas that may respond to alkylating chemotherapy (ie, temozolomide)

Guiding therapy decision making for newly diagnosed glioblastomas in elderly patients (>60 years)

Highlights

*MGMT* promoter methylation status has prognostic and predictive value for glioblastoma patients

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

Methylation-Specific Polymerase Chain Reaction (PCR) Analysis

NY State Available

Yes

Specimen

Specimen Type

Varies

Necessary Information

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

Specimen Required

Preferred:

Specimen Type: Tissue

Container/Tube: Tissue block

Collection Instructions: Submit a formalin-fixed, paraffin-embedded tissue block. At least 40% tumor is required for this assay. In general, a 6 mm x 3 mm area of tissue cut at 5-micron thickness is the minimum amount of tissue needed; this could be collected over multiple slides.

Acceptable:
Specimen Type: Tissue sections

Slides: 1 stained and 5 unstained

Collection Instructions: Submit 1 slide stained with hematoxylin and eosin and 5 unstained, nonbaked 5-micron thick sections of the tumor. At least 40% tumor is required for this assay. In general, a 6 mm x 3 mm area of tissue cut at 5 micron thickness is the minimum amount of tissue needed; this could be collected over multiple slides.

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

Specimen Minimum Volume
5 unstained slides at 5-microns thickness

Reject Due To

<table>
<thead>
<tr>
<th>Reject Cause</th>
<th>Reject Reason</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>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varies</td>
<td>Ambient (preferred)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clinical and Interpretive

Clinical Information
Glioblastoma (WHO grade IV astrocytoma) is the most frequent malignant primary central nervous system tumor in adults. It has a very poor prognosis, with median survival of less than a year. Current standard of care consists of surgical resection followed by radiotherapy in addition to alkylating chemotherapy with temozolomide.

MGMT (O[6]-methylguanine-DNA methyltransferase) is a DNA repair enzyme. This enzyme rescues tumor cells from alkylating agent-induced damage, and this leads to resistance to chemotherapy with alkylating agents. Epigenetic silencing of the MGMT gene by promoter methylation results in decreased MGMT protein expression, reduced DNA repair activity, and potential increased sensitivity to therapy. MGMT promoter methylation status has been most widely evaluated by methylation-specific PCR method, which is both sensitive and specific.

In newly diagnosed glioblastomas, the presence of MGMT promoter methylation has been shown to be an independent favorable prognostic factor and a strong predictor of responsiveness to alkylating chemotherapy (ie, temozolomide). This is particularly relevant for elderly patients (>60 years), who usually have decreased tolerance for combined aggressive chemoradiation. For this group of patients, recent clinical trials have provided strong
evidence supporting an alternative therapeutic strategy consisting of monotherapy with the alkylating agent temozolomide for patients whose tumors show *MGMT* promoter methylation and radiotherapy alone for patients whose tumors lack *MGMT* promoter methylation. Thus, in addition to the significant prognostic and predictive value, *MGMT* methylation status has emerged as a valuable biomarker to guide therapy decision making for newly diagnosed glioblastoma in elderly patients, preventing unnecessary treatment toxicities and costs.

*MGMT* promoter methylation has been reported to high rates in oligodendrogliomas and astrocytomas of lower grade, in which they variably correlate with 1p19q codeletion and *IDH* mutations. Prognostic and predictive significance of *MGMT* promoter methylation status in these tumors has been shown in some studies, but not in others.

**Reference Values**

An interpretive report will be provided.

**Interpretation**

An interpretive report will be provided.

**Cautions**

Not all patients whose tumors have *MGMT* promoter methylation will respond to alkylating chemotherapy.

*MGMT* promoter methylation status should not be used as the sole determinant of alkylating therapy eligibility.

Test results should be interpreted in 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 possible interpretation. Misinterpretation of results may occur if the information provided is inaccurate or incomplete.

**Clinical Reference**


**Method Description**

Test Definition: MGMT
MGMT Promoter Methylation, Tumor

PDF Report
No

Day(s) and Time(s) Test Performed
Weekly; Varies

Analytic Time
7 days

Maximum Laboratory Time
10 days

Specimen Retention Time
Unused portions of blocks will be returned.; Extracted (at Mayo) DNA: 3 months.; Slides are stored indefinitely.

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
81287
Slide Review

88381

LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT</td>
<td>MGMT Promoter Methylation, Tumor</td>
<td>60252-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>36734</td>
<td>Result Summary</td>
<td>50397-9</td>
</tr>
<tr>
<td>36735</td>
<td>Result</td>
<td>60252-4</td>
</tr>
<tr>
<td>36736</td>
<td>Interpretation</td>
<td>69047-9</td>
</tr>
<tr>
<td>36737</td>
<td>Additional Information</td>
<td>48767-8</td>
</tr>
<tr>
<td>Result ID</td>
<td>Test Result Name</td>
<td>Result LOINC Value</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>36738</td>
<td>Specimen</td>
<td>31208-2</td>
</tr>
<tr>
<td>36739</td>
<td>Source</td>
<td>31208-2</td>
</tr>
<tr>
<td>36740</td>
<td>Tissue ID</td>
<td>80398-1</td>
</tr>
<tr>
<td>36741</td>
<td>Released by</td>
<td>18771-6</td>
</tr>
</tbody>
</table>