**MGMT Promoter Methylation Detection**

**Indications for Ordering**

Individuals with gliomas being treated or considered for treatment with alkylating agents (e.g., Temozolomide)
- Recommended for WHO grade II-IV astrocytic, oligodendrogial, and gliosarcoma brain tumors

**Test Description**

Polymerase chain reaction/MassARRAY/MALDI-TOF

**Tests to Consider**

**Primary Test**

*MGMT Promoter Methylation Detection 2009310*
- Aids in therapeutic decisions in individuals with gliomas

**Related Tests**

*IDH1 and IDH2 Mutation Analysis, exon 4 2006444*
- Prognostic testing for individuals with glioma

*EGFR Gene Amplification by FISH 3001310*
- Aids in prognostication and therapeutic decisions for neoplasms where amplification has been demonstrated

**Disease Overview**

**Incidence**
- ~2-3/100,000 people – most European and North American countries
- Glioblastoma accounts for ~15% of all brain tumors

**Pathology**

May develop:
- De novo (primary)
- Progression from low-grade or anaplastic astrocytomas (secondary)

**Age of onset** – 45-70 years

**Prognostic/Treatment Issues**

*MGMT* promoter methylation associated with significantly increased overall and progression-free survival
- Nonelderly individuals – testing is prognostic
- Elderly individuals – testing is prognostic and can guide treatment decisions

**Genetics**

*Gene* – *MGMT* (O\(^6\)-methylguanine-DNA methyltransferase)

*Area of interest* – promoter region

*Function* – DNA repair

**Test Interpretation**

**Sensitivity/Specificity**
- Analytical sensitivity – limit of detection is methylation levels ≥ 1%
- Analytical specificity – 100%

**Results**
- Positive – *MGMT* promoter methylation detected
  - Associated with improved survival in individuals with glioma and in those treated with alkylating agents
- Not detected – *MGMT* promoter methylation not detected

**Limitations**
- Methylation at locations other than those covered by the primers and probes not detected
- Results of this test must always be interpreted within the clinical context and other relevant data
- Results should not be used as a sole determinant of alkylating chemotherapy in standard clinical practice