

# 1p/19q Deletion (FISH) in Oligodendrogliomas

## Indications for Ordering

- Diagnose oligodendroglioma brain tumors
  - Indicated in both low-grade and high-grade (anaplastic) oligodendrogliomas
- Predict response to therapy in oligodendrogliomas

## Test Description

Fluorescent in situ hybridization (FISH)

## Tests to Consider

### [1p/19q Deletion by FISH 2008604](#)

- Use when oligodendrogliomas are suspected

### [IDH1 R132 by Immunohistochemistry 2005857](#)

- Use when morphology indicates tumor may be a glioma
- Use to differentiate tumor from reactive gliosis

### [IDH1 R132H Point Mutation with Interpretation by Immunohistochemistry 2007357](#)

- Includes pathologist interpretation

## Disease Overview

### Prevalence

- 2<sup>nd</sup> most common glioma in adults
- Accounts for 2% of central nervous system (CNS) tumors

### Diagnostic issues

- Malignant gliomas are the most common type of primary brain tumors (>70% of all CNS tumors)
  - Subtypes – astrocytoma, oligodendroglioma, mixed glioma
- Differentiating astrocytoma from oligodendroglioma is crucial
  - Treatment and prognosis differ between tumors
  - Combined loss of chromosomal arms 1p and 19q is characteristic of oligodendrogliomas
  - Gain of chromosome 19 supports diagnosis of high-grade astrocytoma (glioblastoma multiforme)
  - Loss of 1p may identify treatment-sensitive high grade oligodendroglioma (for both chemotherapy and radiotherapy)
    - Prognostic relevance in low-grade tumors less well characterized

## Genetics

**Gene** – chromosomes 1 and 19 involved

### Structure/function

Deletion is short arm of 1p and long arm of 19q

- Results in loss of mediators of resistance to therapy

### Variants

- 1p/19q codeletion is mutually exclusive for *TP53* and *EGFR* amplification
- 1p/19q codeletion is frequently associated with *IDH1* or *IDH2* variants

## Test Interpretation

### Results

- Positive
  - Tumors with 1p/19q ratio <0.88 are deemed deleted for 1p
  - Tumors with 19q/19p ratio <0.74 are deemed deleted for 19q
  - Both deletions are associated with a better prognosis
    - Codeletion has better prognosis than single deletion
  - Presence of codeletion establishes diagnosis of oligodendroglioma
- Negative
  - Does not exclude diagnosis of oligodendroglioma

### Limitations

Test should not be used alone for the diagnosis of malignancy