1p/19q Deletion by FISH

DETECTION OF 1P AND/OR 19Q DELETIONS BY FLUORESCENT IN SITU HYBRIDIZATION (FISH)

Disease Overview

- Malignant gliomas are the most common type of primary brain tumor. They have been histologically classified as astrocytomas, oligodendrogliomas, and mixed gliomas. The relative incidence of oligodendroglioma and astrocytoma varies widely between institutions, indicating that diagnostic criteria differ and/or are difficult to apply.
- Because differentiation of astrocytomas from oligodendrogliomas is of prognostic and therapeutic importance, reproducible and definitive criteria are needed to make this distinction. Multiple studies have shown that the loss of chromosomal arms 1p and 19q is characteristic of oligodendrogliomas. Moreover, loss of 1p may identify treatment-sensitive malignant gliomas, including subtypes of anaplastic oligodendroglioma.

Genetics

- Demonstration of the combined loss of the short arm of chromosome 1 (1p) and the long arm of chromosome 19 (19q) is considered diagnostic of oligodendrogliomas. While the presence of the combined loss of these chromosomal arms indicates the presence of an oligodendroglioma, not all oligodendrogliomas necessarily show these chromosomal changes.
- 1p loss appears to identify treatment-sensitive malignant gliomas, including rare glioblastomas. Unfortunately, 1p loss does not identify all chemosensitive anaplastic oligodendrogliomas and not all patients whose tumors show 1p loss have long survival. Patients with chromosome 1p and 19q loss appear to have a particularly favorable prognosis.

Indication for Ordering

Results of 1p and 19q FISH analysis are intended for use as a diagnostic and prognostic marker for oligodendroglioma.

Interpretation

- Tumors showing a 1p/1q ratio less than 0.88 are considered to be deleted for 1p, and tumors showing a 19q/19p ratio less than 0.74 are considered to be deleted for 19q.
- Patients whose tumors have 1p and 19q deletions have a better prognosis than tumors that do not contain these deletions.
- A combined loss of 1p and 19q establishes the diagnosis of oligodendroglioma. Absence of such loss does not exclude the diagnosis of oligodendroglioma.

Methodology

Fluorescent in situ hybridization (FISH) is a technique that utilizes fluorescently-labeled DNA probes to detect the numerical status of specific DNA sequences within the genome.

References

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2. Ino Y, et al. Molecular subtypes of anaplastic oligodendroglioma: implication for patient management at diagnosis. *Clinical Cancer Res* 2001;7:839–45.
3. Bromberg JE and van den Bent MJ. Oligodendrogliomas: molecular biology and treatment. *Oncologist* 2009;14:155-63.
4. Vysis LSI 1p36/LSI 1q25 and LSI 19q13/19p13 Dual Color Probe (package insert). Des Plains, IL: Abbott Molecular; 2010.

Test Information

0049360 1p/19q Deletion by FISH

For specific collection, transport, and testing information, refer to the ARUP website at www.aruplab.com.

For information on test selection, ordering, and interpretation, refer to ARUP Consult® at www.arupconsult.com.

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