Test Definition: FGFR2

FGFR2 (10q26.1), FISH, Ts

Overview

Useful For

Providing prognostic information and guiding treatment for patients with cholangiocarcinomas and other tumor types including bladder, thyroid, oral cavity, and brain

Testing Algorithm

This test does not include a pathology consult. If a pathology consultation is requested, PATHC / Pathology Consultation should be ordered and the appropriate FISH test will be ordered and performed at an additional charge.

This test includes a charge for application of the first probe set (2 FISH probes) and professional interpretation of results. Additional charges will be incurred for all reflex probes performed. Analysis charges will be incurred based on the number of cells analyzed per probe set. If no cells are available for analysis, no analysis charges will be incurred.

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
_PBCT	Probe, +2	No, (Bill Only)	No
_PADD	Probe, +1	No, (Bill Only)	No
_PB02	Probe, +2	No, (Bill Only)	No
_PB03	Probe, +3	No, (Bill Only)	No
_IL25	Interphases, <25	No, (Bill Only)	No
_I099	Interphases, 25-99	No, (Bill Only)	No
_I300	Interphases, >=100	No, (Bill Only)	No

Method Name

Fluorescence In Situ Hybridization (FISH)

NY State Available

Yes

Specimen

Specimen Type

Tissue

Necessary Information

1. A pathology report is required in order for testing to be performed. Acceptable pathology reports include working drafts, preliminary pathology or surgical pathology reports.

2. A reason for testing must be provided. If this information is not provided, an appropriate indication for testing may be entered by Mayo Clinic Laboratories.

Specimen Required

Submit only 1 of the following specimens:

Specimen Type: Tissue

Container/Tube: Formalin-fixed, paraffin-embedded tumor tissue block

Specimen Type: Slides

Specimen Volume: Four consecutive, unstained, 5-micron thick sections placed on positively charged slides and 1 hematoxylin and eosin-stained slide

Forms

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

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Minimum Volume

Two consecutive, unstained, 5- micron- thick sections placed on positively charged slides, and 1 hematoxylin and eosin-stained slide.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Tissue	Ambient (preferred)		
	Refrigerated		

Clinical & Interpretive

Clinical Information

Cholangiocarcinoma is a malignancy arising from the biliary tract epithelium. These tumors are often clinically advanced at the time of presentation and the prognosis is very poor with a short overall survival. Treatment is generally limited to surgical resection, which is associated with a high degree of morbidity, and palliative chemotherapy regimens. Therefore, additional treatment options are eagerly sought.

Rearrangement of the *FGFR2* gene region has been identified in a subset of cholangiocarcinomas. These rearrangements result in overexpression of FGFR2, which offers the possibility of using targeted FGFR2-inhibitor therapy for treatment. *FGFR2* rearrangement has been identified in a number of other cancers including those of the bladder, thyroid, oral cavity, and brain. In the future, it is likely that the presence of *FGFR2* rearrangements will be exploited in the treatment of these cancers as well.

Reference Values

An interpretive report will be provided.

Interpretation

A positive result is detected when the percent of cells with an abnormality exceeds the normal cutoff for the probe set.

A positive result suggests rearrangement of the *FGFR2* locus and a tumor that may be responsive to targeted FGFR2-inhibitor therapy.

A negative result suggests no rearrangement of the *FGFR2* gene region at 10q26.1.

Cautions

This test is not approved by the US Food and Drug Administration, and it is best used as an adjunct to existing clinical and pathologic information.

Fixatives other than formalin (eg, Prefer, Bouin) may not be successful for FISH assays; however, nonformalin fixed samples will not be rejected.

Paraffin-embedded tissues that have been decalcified are generally unsuccessful for FISH analysis. The pathologist reviewing the hematoxylin and eosin-stained slide may find it necessary to cancel testing.

Supportive Data

FISH analysis was performed on 38 paraffin-embedded tissue samples and 25 noncancerous lymph node control specimens. Rearrangement of *FGFR2* was identified in 13 cholangiocarcinoma tumors. The normal controls were used to generate a normal cutoff for this assay.

Clinical Reference

1. Mitesh BJ, Champion MD, Egan JB, et al: Integrated Genomic Characterization Reveals Novel, Therapeutically Relevant Drug Targets in FGFR and EGFR Pathways in Sporadic Intrahepatic Cholangiocarcinoma. PLOS Genetics 2014

Feb;10(2):e1004135

2. Graham RP, Barr Fritcher EG, Pestova E, et al: Fibroblast growth factor receptor 2 translocations in intrahepatic cholangiocarcinoma. Hum Pathol 2014 Aug;45(8):1630-1638

3. Arai Y, Totoki Y, Hosoda F, et al: Fibroblast growth factor receptor 2 tyrosine kinase fusions define a unique molecular subtype of cholangiocarcinoma. Hepatology 2014;59:1427-1434

4. Wu YM, Su F, Kalyana-Sundaram S, et al: Identification of targetable FGFR gene fusions in diverse cancers. Cancer Discov June 2013;3(6):636-647

Performance

Method Description

The test is performed using a laboratory-developed *FGFR2* (10q26.1) dual-color break-apart strategy probe (BAP). Formalin-fixed, paraffin-embedded tissues are cut at 5 microns and mounted on positively charged glass slides. The selection of tissue and the identification of target areas on the hematoxylin and eosin (H and E)-stained slide is performed by a pathologist. Using the H and E-stained slide as a reference, target areas are etched with a diamond-tipped etcher on the back of the unstained slide to be assayed. The probe set is hybridized to the appropriate target areas and 2 technologists each analyze 50 interphase nuclei (100 total) with the results expressed as the percent of abnormal nuclei.(Unpublished Mayo method)

PDF Report

No

Specimen Retention Time

Slides and H&E used for analysis are retained by the laboratory in accordance to CAP and NYS requirements. Client provided paraffin blocks and extra unstained slides (if provided) will be returned after testing is complete.

Performing Laboratory Location

Rochester

Fees & Codes

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 US Food and Drug Administration.

CPT Code Information

88271x2, 88291 - DNA probe, each (first probe set), Interpretation and report

88271x2 - DNA probe, each; each additional probe set (if appropriate)

88271x1 - DNA probe, each; coverage for sets containing 3 probes (if appropriate)

88271x2 - DNA probe, each; coverage for sets containing 4 probes (if appropriate)

88271x3 - DNA probe, each; coverage for sets containing 5 probes (if appropriate)

88274 w/modifier 52 - Interphase in situ hybridization, <25 cells, each probe set (if appropriate)

88274 - Interphase in situ hybridization, 25 to 99 cells, each probe set (if appropriate)

88275 - Interphase in situ hybridization, 100 to 300 cells, each probe set (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
FGFR2	FGFR2 (10q26.1), FISH, Ts	95784-5

Result ID	Reporting Name	LOINC®
38094	Result Summary	50397-9
38095	Interpretation	69965-2
38096	Result	62356-1
38097	Reason For Referral	42349-1
38098	Specimen	31208-2
38099	Source	31208-2
38100	Tissue ID	80398-1
38101	Method	85069-3
38102	Additional Information	48767-8
38103	Disclaimer	62364-5
38104	Released By	18771-6