MAYO CLINIC LABORATORIES

Test Definition: TLYM

T-Cell Lymphoma, FISH, Tissue

Overview

Useful For

Detecting, at diagnosis, recurrent common chromosome abnormalities in various T-cell lymphomas in paraffin-embedded tissue specimens

Providing prognostic information in patients with documented systemic ALK-negative anaplastic large cell lymphoma

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
_PRAH	Probe, Each Additional (TLYM)	No, (Bill Only)	No

Testing Algorithm

This test includes a charge for the probe application, analysis, and professional interpretation of results for one probe set (2 individual fluorescence in situ hybridization [FISH] probes). Additional charges will be incurred for all reflex or additional probe sets performed. No analysis charges will be incurred if an insufficient number of representative cells are available for analysis.

This FISH test allows different combinations of probes to be utilized based on the suspected lymphoma subtype, patient's age, and clinical question. The most appropriate probes to order are listed in the Common Chromosome Abnormalities in T-cell Lymphomas table in Clinical Information. Both the break apart TCL1A and TRAD FISH probes are performed concurrently and will not be performed in isolation. The TBL1XR1/TP63 FISH probe set will only be performed, at the laboratory's discretion, to resolve or confirm *TP63* rearrangement concerns.

Appropriate ancillary probes may be performed at consultant discretion to render comprehensive assessment. Any additional probes will have the results included within the final report and will be performed at an additional charge.

For information see Anaplastic Large Cell Lymphoma Evaluation Algorithm.

Special Instructions

- Anaplastic Large Cell Lymphoma Evaluation Algorithm

Method Name

Fluorescence In Situ Hybridization (FISH)

NY State Available

Yes

Specimen

Specimen Type

Tissue

Ordering Guidance

This test does not include a pathology consultation. If a pathology consultation is requested, order PATHC / Pathology Consultation, and appropriate testing will be added at the discretion of the pathologist and performed at an additional charge.

Mayo Hematopathology Consultants are involved in both the pre-analytic (tissue adequacy and probe selection, when applicable) and post-analytic (interpretation of fluorescence in situ hybridization [FISH] results in context of specific case, when applicable) phases.

This assay detects chromosome abnormalities observed in paraffin-embedded tissue samples of patients with T-cell lymphoma. If a non-paraffin embedded bone marrow or blood sample is received for this test, the test will be canceled, and TLPMF / T-Cell Lymphoma, Specified FISH, Varies will be added and performed as the appropriate test.

For patients with B-cell lymphoma, order BLYM / B-Cell Lymphoma, FISH, Tissue.

Shipping Instructions

Advise Express Mail or equivalent if not on courier service.

Necessary Information

1. A pathology report is required for testing to be performed. If not provided, appropriate testing and/or interpretation may be compromised or delayed. Acceptable pathology reports include working drafts, preliminary pathology, or surgical pathology reports.

2. The following information must be included in the report provided:

-Patient name
-Block number - must be on all blocks, slides, and paperwork
-Date of collection
-Tissue source

3. 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.

4. A list of probes is required if select probes are necessary or if the patient is being tracked for known abnormalities. See Table in Clinical Information.

Specimen Required

Submit only 1 of the following specimens:

Preferred:

Specimen Type: Tissue block (fresh tissue is **not acceptable**)

Collection Instructions:

1. Submit a formalin-fixed, paraffin-embedded tumor tissue block.
2. Blocks prepared with alternative fixation methods (eg, Prefer, Bouin's) will be attempted but are less favorable for successful results. Provide fixation method used.

Additional Information:

1. Paraffin-embedded specimens can be from any anatomic location (skin, soft tissue, lymph node, etc).

2. Decalcified paraffin-embedded specimens will have testing attempted; however, the success rate is approximately 50%. **Testing may be canceled** if sufficient tumor tissue is not present.
3. **Submitted fresh tissue specimens will be canceled upon receipt**. If only fresh tissue is available, embed in paraffin prior to sending.

Acceptable:
Specimen Type: Tissue slides
Slides: 1 Hematoxylin and eosin-stained and 2 unstained for each probe set
Collection Instructions:
1. Include 1 hematoxylin and eosin-stained slide for the entire test order.
2. For each probe set ordered, 2 consecutive, unstained, 5 micron-thick sections placed on positively charged slides.
3. If ordering TCL1A or TRA, 4 unstained slides are necessary; the break-apart TCL1A and TRA break-apart probe sets are performed simultaneously.
Additional Information: Broken or cracked unstained slides will be rejected. Stained slides that were broken and repaired (ie, double mounted) at the client site will not be rejected, as, in most cases, they can still be reviewed under the microscope. However, due to the double mounting, digital scanning cannot be performed.

Forms

If not ordering electronically, complete, print, and send a Hematopathology/Cytogenetics Test Request (T726) with the specimen.

Specimen Minimum Volume

See Specimen Required

Reject Due To

Broken or cracked unstained slides	Reject
Broken or cracked stained slides that cannot be repaired	Reject

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

T-cell malignancies account for approximately 10% of all non-Hodgkin lymphomas and there are numerous subtypes with diagnostic and prognostic genetic abnormalities that can be evaluated by fluorescence in situ hybridization (FISH) testing. FISH is available for specific abnormalities in T-cell lymphoma subtypes; see the Table below.

Table. Common Chromosome Abnormalities in T-cell Lymphomas

Lymphoma type	Chromosome abnormality	FISH probe
Anaplastic large cell lymphoma	2p23 rearrangement	3'/5' ALK
	3q28 rearrangement	5'/3' TP63
	6p25.3 rearrangement	5'/3' DUSP22
	9p24.1 rearrangement	5'/3' JAK2
T-cell prolymphocytic leukemia	inv(14)(q11.2q32.1)/ t(14;14)(q11.2;q32.1)	5'/3' TRA 5'/3' TCL1A
Hepatosplenic T-cell lymphoma	Isochromosome 7q	D7Z1/ D7S486
	Trisomy 8	D8Z2/MYC

Reference Values

An interpretive report will be provided.

Interpretation

A neoplastic clone is detected when the percent of cells with an abnormality exceeds the normal reference range for any given probe set.

A positive result is supportive of a diagnosis of a T-cell lymphoma. The specific abnormality detected may help determine a T-cell lymphoma subtype and/or contribute to the prognosis.

The absence of an abnormal clone, or negative result, does not rule out the presence of a neoplastic disorder or change the pathologic diagnosis.

Cautions

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

Fixatives other than formalin (eg, Prefer, Bouin's) may not be successful for fluorescence in situ hybridization (FISH) assays. Non-formalin fixed specimens will not be rejected.

Paraffin-embedded tissues that have been decalcified may not be successful for FISH analysis. The success rate of FISH studies on decalcified tissue is approximately 50%.

Fluorescence in situ hybridization studies will be attempted if sufficient tumor is present for analysis. The pathologist reviewing the hematoxylin and eosin-stained slide may find it necessary to cancel testing if insufficient tissue/tumor is available for testing.

If no FISH signals are observed post-hybridization, the case will be released indicating a lack of FISH results.

Broken or cracked unstained slides are not compatible with the instrumentation used in our performing laboratories and will be rejected. Additional material may be requested.

Attempts will be made to repair broken or cracked stained slides; however, if they are unable to be repaired (ie, shattered in transit), they will be rejected and discarded due to safety concerns.

Clinical Reference

1. Swerdlow SH, Campo E, Harris NL, et al, eds. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. IARC Press; 2017. WHO Classification of Tumours. Vol 2.
2. Feldman AL, Law M, Remstein ED, et al. Recurrent translocations involving the IRF4 oncogene locus in peripheral T-cell lymphomas. Leukemia. 2009;23(3):574-580
3. Feldman AL, Dogan A, Smith DI, et al. Discovery of recurrent t(6:7)(p25.3;q32.3) translocations in ALK-negative anaplastic large cell lymphomas by massively parallel genomics sequencing. Blood. 2011;117(3):915-919
4. Parilla Castellar ER, Jaffe ES, Said JW, et al. ALK-negative anaplastic large cell lymphoma is a genetically heterogeneous disease with widely disparate clinical outcomes. Blood. 2014;124(9):1473-1480
5. Vasmatzis G, Johnson SH, Knudson RA, et al. Genomics-wide analysis reveals recurrent structural abnormalities of TP63 and other p53-releated genes in peripheral T-cell lymphomas. Blood. 2012;120(11):2280-2289

Performance

Method Description

This test is performed using commercially available and laboratory-developed probes. Trisomy of chromosome 8 and isochromosome 7q are detected using enumeration strategy probe sets. Rearrangements involving *ALK*, *TP63, DUSP22, JAK2*, *TCL1A,* and *TRA* are detected using dual-color break-apart (BAP) strategy probe sets.

At the laboratory's discretion, the TBL1XR1/TP63 FISH probe set will be performed, when necessary, to resolve or confirm *TP63* rearrangement concerns. *TBL1XR1::TP63* fusion is detected using a dual color, dual fusion probe set.

Paraffin-embedded tissue samples 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 are performed by a pathologist. Using the H and E-stained slide as a reference, target areas are etched with a diamond-tipped engraving tool on the back of the unstained slide to be assayed. Each probe set is hybridized to the appropriate target areas, as indicated on the H and E, and 100 interphase nuclei are scored within the targeted areas. The results are expressed as the percent of abnormal nuclei.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

7 to 10 days

Specimen Retention Time

Slides used for analysis are retained by the laboratory in accordance with regulatory requirements. Client provided paraffin blocks and extra unstained slides (if provided) will be returned after testing is complete.

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

Fees & 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 account representative. 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. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

88377 (if 1 probe set)
88377 x 2 (if 2 probe sets)
88377 x 3 (if 3 probe sets)
88377 x 4 (if 4 probe sets)
88377 x 5 (if 5 probe sets)
88377 x 6 (if 6 probe sets)
88377 x 7 (if 7 probe sets)
88377 x 8 (if 8 probe sets)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
TLYM	T-cell Lymphoma, FISH, Tissue	101682-3

Result ID	Test Result Name	Result LOINC® Value
603140	Result Summary	50397-9
603141	Interpretation	69965-2
603142	Result Table	93356-4
603143	Result	62356-1
GC040	Reason for Referral	42349-1
603144	Specimen	31208-2
603145	Source	31208-2
603146	Tissue ID	80398-1
603147	Method	85069-3

603148	Additional Information	48767-8
603149	Disclaimer	62364-5
603150	Released By	18771-6