MAYO CLINIC LABORATORIES

Test Definition: BLYM

B-Cell Lymphoma, FISH, Tissue

Overview

Useful For

Detecting a neoplastic clone associated with the common chromosome abnormalities seen in patients with various B-cell lymphomas

Tracking known chromosome abnormalities and response to therapy in patients with B-cell lymphomas

Reflex Tests

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

Testing Algorithm

Depending on the lymphoma subtype suspected, the most appropriate probes to order are listed in the table: Common Chromosome Abnormalities in B-cell Lymphomas in Clinical Information.

If the patient is being tracked for known abnormalities, indicate which probes should be used.

A charge and CPT code is applied for each probe set hybridized, analyzed, and reported.

If, based on testing algorithms, results of the initial probe sets require reflex testing, complete results will be available within 10 days.

The following algorithms are available:
-Aggressive B-cell Lymphoma Diagnostic Algorithm
-Gastric MALT Lymphoma Diagnostic Algorithm
-Gastric MALT Posttherapy Follow-up Algorithm

Special Instructions

- Aggressive B-cell Lymphoma Diagnostic Algorithm
- Gastric MALT Posttherapy Follow-up Algorithm
- Gastric MALT Lymphoma Diagnostic 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 desired, PATHC / Pathology Consultation should be ordered and the appropriate fluorescence in situ hybridization (FISH) test will be ordered 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 FISH results in context of specific case, when applicable) phases.

This assay detects chromosome abnormalities observed in paraffin-embedded tissue samples of patients with B-cell lymphoma. If a blood or bone marrow specimen is submitted, the test will be canceled and BLPMF / B-Cell Lymphoma, Specified FISH, Varies will be added and performed as the appropriate test.

If either the break-apart MYC or the MYC/IGH D-FISH probe sets are requested in isolation, both probe sets will be performed concurrently to optimize the detection of MYC rearrangements.

Shipping Instructions
Advise Express Mail or equivalent if not on courier service.

Necessary Information
1. A reason for testing and pathology report are required for testing to be performed. Send information with specimen. Acceptable pathology reports include working drafts, preliminary pathology or surgical pathology reports. The laboratory will not reject testing if a reason for testing is not provided; however, appropriate testing and interpretation may be compromised or delayed. If not provided, an appropriate indication for testing may be entered by Mayo Clinic Laboratories.
2. If the patient is being tracked for known abnormalities, an indication of which probes should be used is required for testing to be performed. See Table in Clinical Information.

Specimen Required
Submit only 1 of the following specimens:

Specimen Type: Tissue
Preferred: Tissue block
Collection Instructions: Submit a formalin-fixed, paraffin-embedded (FFPE) tumor tissue block. Blocks prepared with alternative fixation methods may be acceptable; provide fixation method used.
Additional Information:
1. Paraffin embedded specimens can be from any anatomic location (skin, soft tissue, lymph node, etc).
2. Bone specimens that have been decalcified will be attempted for testing, but the success rate is approximately 50%.

Acceptable: Tissue slides
Collection Instructions: For each probe set ordered, 2 consecutive, unstained, 5 micron-thick sections placed on

positively charged slides. Include 1 hematoxylin and eosin-stained slide for the entire test order.

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

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

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Mature B-cell lymphoma can be low grade, intermediate grade, or high grade, and the prognosis and clinical course are highly variable. Genetic abnormalities have emerged as one of the most important prognostic markers in B-cell lymphomas and can aid in diagnosis. Several chromosome abnormalities and variants of these abnormalities have been associated with various lymphoma subtypes (see Table). Fluorescence in situ hybridization (FISH) permits the detection of recurrent gene rearrangements associated with various chromosome translocations and inversions in B-cell lymphoma. FISH is available for the specific B-cell lymphoma subtypes; see Table.

Table. **Common Chromosome Abnormalities in B-cell Lymphomas**

Lymphoma type	Chromosome abnormality	FISH probe
Burkitt (pediatric, < or =18 years old)	8q24.1 rearrangement	5'/3' MYC
	t(2;8)(p12;q24.1)	IGK/MYC
	t(8;14)(q24.1;q32)	MYC/IGH
	t(8;22)(q24.1;q11.2)	MYC/IGL
	3q27 rearrangement	3'/5' BCL6
	18q21 rearrangement	3'/5' BCL2
Diffuse large B-cell, "double-hit"	8q24.1 rearrangement	5'/3' MYC
	t(8;14)(q24.1;q32)	MYC/IGH
	----**Reflex**: t(8;22)(q24.1;q11.2)	MYC/IGL
	----**Reflex:** t(2;8)(p12;q24.1)	IGK/MYC
	----**Reflex**: 3q27 rearrangement	3'/5' BCL6
	----**Reflex**: 18q21 rearrangement	3'/5' BCL2
Large BCL IRF4 rearranged	6p24.3 rearrangement	5’/3' IRF4
	18q21 rearrangement	3'/5' BCL2

	3q27 rearrangement	3'/5' BCL6
Follicular	18q21 rearrangement	3'/5' BCL2
	3q27 rearrangement	3'/5' BCL6
	Predominantly diffuse subtype only: deletion of 1p36	TNFRSF14/1q22
Mantle cell	t(11;14)(q13;q32)	CCND1/IGH
	11q13 rearrangement	5'/3' CCND1
	Blastoid subtype only: deletion of 17p	TP53/D17Z1
	Blastoid subtype only: 8q24.1 rearrangement	5'/3' MYC
	Cyclin D1-negative subtype only: 12p13.32 rearrangement	5'/3' CCND2
MALT	18q21 rearrangement	5'/3' MALT1
Splenic marginal zone	Deletion of 7q	D7Z1/7q32
	Deletion of 17p	TP53/D17Z1

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.

Detection of an abnormal clone is supportive of a diagnosis of a B-cell lymphoma. The specific abnormality detected may help subtype the neoplasm.

The absence of an abnormal clone does not rule out the presence of a neoplastic disorder.

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

Fixatives other than formalin (eg, Prefer, Bouin) may not be successful for fluorescence in situ hybridization assays.

Bone specimens that have been decalcified will be attempted for testing, but the success rate is approximately 50%.

Supportive Data
Each probe was independently tested on a set of formalin-fixed, paraffin-embedded tissue specimens from patients diagnosed with a B-cell lymphoma and noncancerous lymph node specimens. Normal cutoffs were calculated based on the results from 25 normal specimens. For each probe set, a series of chromosomally abnormal specimens were evaluated to confirm each probe set detected the anomaly it was designed to detect.

Clinical Reference
Swerdlow SH, Campo E, Harris NL, eds, et al: WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. IARC; 2017. WHO Classification of Tumours. Vol 2

Performance

Method Description

This test is performed using either commercially available or laboratory-developed probes. Rearrangements involving *MYC, BCL2, BCL6, CCND1, CCND2, IRF4,* or *MALT1* are detected using dual-color break-apart (BAP) strategy probes, translocations involving *MYC,* or *CCND1* are identified using dual-color, dual-fusion (D-FISH) strategy probes, and deletions (7q32, TNFRSF14 (1p36), and *TP53*) using enumeration strategy probes.

IGH/BCL2 is detected using a dual color, dual fusion probe set. At the laboratory's discretion, the IGH/BCL2 probe will be performed when necessary to resolve or confirm *BCL2* rearrangement concerns.

Formalin-fixed, paraffin-embedded tissues are cut at 5 microns and mounted on positively charged glass slides. The selection of tissue and the 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 abnormal nuclei.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

4 to 10 days

Specimen Retention Time

Slides and H and E used for analysis are retained by the laboratory in accordance with 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

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 using an analyte specific reagent. Its performance characteristics were 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

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)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
BLYM	B-cell Lymphoma, FISH, Tissue	101651-8

Result ID	Test Result Name	Result LOINC® Value
603063	Result Summary	50397-9
603064	Interpretation	69965-2
603065	Result Table	93356-4
603066	Result	62356-1
GC026	Reason for Referral	42349-1
603067	Specimen	31208-2
603068	Source	85298-8
603069	Tissue ID	80398-1
603070	Method	85069-3
603071	Additional Information	48767-8
603072	Disclaimer	62364-5
603073	Released By	18771-6