Overview

Useful For

Detecting a neoplastic clone associated with the common chromosome abnormalities seen in patients with acute leukemia or other myeloid malignancies

Tracking known chromosome abnormalities and response to therapy in patients with myeloid malignancies

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,	No, (Bill Only)	No
_I099	Interphases, 25-99	No, (Bill Only)	No
_I300	Interphases, >=100	No, (Bill Only)	No

Testing Algorithm

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.

This assay includes testing for the following abnormalities using the probes listed:

ABL2 (1q25) rearrangement

FIP1L1/*CHIC2*/*PDGFRA* (4q12) rearrangement (*CHIC2* deletion)

PDGFRB (5q33) rearrangement

ABL1 (9q34) rearrangement

If an *ABL1* rearrangement is identified, reflex testing will be performed using the *BCR/ABL1* dual-color, double fusion FISH probe set to evaluate for the presence or absence of *BCR*/*ABL1* fusion.

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

Method Name

Fluorescence In Situ Hybridization (FISH)

NY State Available

Yes

Specimen

Specimen Type

Varies

Shipping Instructions

Advise Express Mail or equivalent if not on courier service.

Necessary Information

Provide a reason for referral with each specimen. The laboratory will not reject testing if this information is not provided, but appropriate testing and interpretation may be compromised or delayed.

Specimen Required

Submit only 1 of the following specimens:

Specimen Type: Whole blood

Container/Tube: Green top (sodium heparin)

Specimen Volume: 7-10 mL

Collection Instructions:

1. Invert several times to mix blood.

2. Other anticoagulants are not recommended and are harmful to the viability of the cells.

Specimen Type: Bone marrow

Container/Tube: Green top (sodium heparin)

Specimen Volume: 1-2 mL

Collection Instructions:

1. Invert several times to mix bone marrow.

2. Other anticoagulants are not recommended and are harmful to the viability of the cells.

Forms

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

Specimen Minimum Volume

Blood: 2 mL
Bone Marrow: 1 mL

Reject Due To

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

Specimen Stability Information

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

Clinical and Interpretive

Clinical Information

Myeloid neoplasms are primary disorders of the bone marrow cells. These malignancies encompass several entities with extremely varied clinical courses, including acute myeloid leukemias (AML), chronic myeloproliferative disorders (CMPD), and myelodysplastic syndromes. The underlying genetic mechanisms associated with these malignancies are varied and only a portion of the genetic abnormalities have targeted therapies clinically available.

One group of genes, including *ABL1* (Abelson murine leukemia viral oncogene homolog 1), *ABL2* (Abelson murine leukemia viral oncogene homolog 2), *PDGFRA* (platelet-derived growth factor receptor, alpha), and *PDGFRB* (platelet-derived growth factor receptor, beta) can be inappropriately activated via various genetic mechanisms and result in overexpression of their tyrosine kinase activity. Tyrosine kinase activity plays an important role in cellular signaling, division, and differentiation; overexpression may cause some cancers. The myeloid malignancies associated with these aberrantly expressed genes include AML, chronic myelogenous leukemia (CML), hypereosinophilic syndrome/systemic mast cell disease (HES/SMCD), and atypical CMPD. These translocations can also be seen in lymphoid neoplasms, including acute lymphoblastic leukemia (ALL) and lymphomas, and they can also possess a varied genetic etiology. Several clinical studies have demonstrated that the malignancies displaying overexpression of these genes are responsive to imatinib mesylate, a drug that specifically targets these genes.

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 cutoff for any given probe.

The presence of a positive clone supports a diagnosis of malignancy.

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

Cautions

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

Supportive Data

Each probe was independently tested and verified on unstimulated peripheral blood and bone marrow specimens.

Normal cutoffs were calculated based on the results of at least 20 normal specimens. For each probe set, a series of chromosomally abnormal specimens were evaluated to confirm that each probe set detected the abnormality it was designed to detect.

Clinical Reference

1. Trempat P, Villalva C, Laurent G, et al: Chronic myeloproliferative disorders with rearrangement of the platelet-derived growth factor alpha receptor; a new clinical target for STI571/Glivec. Oncogene 2003 Aug 28;22(36):5702-5706

2. Dave BJ, Wiggins M, Higgeins CM, et al: 9q34 rearrangements in BCR/ABL fusion-negative acute lymphoblastic leukemia. Cancer Genet Cytogenet 2005 Oct 1;162:30-37

3. Pardanani A, Reeder T, Porrata LF, et al: Imatinib therapy for hypereosinophilic syndrome and other eosinophilic disorders. Blood 2003 May 1;101(9):3391-3397

4. Pardanani A, Tefferi A: Imatinib targets other than bcr/abl and their clinical relevance in myeloid disorders. Blood 2004 Oct 1;104(7):1931-1939

Performance

Method Description

This test is performed using commercially available and laboratory-developed probes. Rearrangements involving *ABL2*, *ABL1*, or *PDGFRB* are detected using dual-color break-apart (BAP) strategy probes. *FIP1L1/ PRGFRA* fusion (with loss of the *CHIC2* locus), is detected using a tricolor rearrangement probe strategy. For each probe set, 2 technologists each analyze 100 interphase nuclei (200 total) with the results expressed as the percent abnormal nuclei.(Unpublished Mayo method)

PDF Report

No

Day(s) and Time(s) Test Performed

Samples processed Monday through Sunday.Results reported Monday through Friday, 8 a.m.-5 p.m. CST.

Analytic Time

7 days

Maximum Laboratory Time

10 days

Specimen Retention Time

4 weeks

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. 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 U.S. Food and Drug Administration.

CPT Code Information

88271 x 2, 88291-DNA probe, each (first probe set), Interpretation and report

88271 x 2-DNA probe, each; each additional probe set (if appropriate)

88271 x 1-DNA probe, each; coverage for sets containing 3 probes (if appropriate)

88271 x 2-DNA probe, each; coverage for sets containing 4 probes (if appropriate)

88271 x 3-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
IMRGF	Imatinib Mesylate Resp Genes, FISH	In Process

Result ID	Test Result Name	Result LOINC Value
51811	Result Summary	50397-9
51813	Interpretation	69965-2
51812	Result Table	93356-4
54532	Result	62356-1
CG659	Reason for Referral	42349-1
CG660	Specimen	31208-2
51814	Source	31208-2
51815	Method	49549-9
53430	Additional Information	48767-8
55276	Disclaimer	62364-5
51816	Released By	18771-6