Overview

Useful For
A prognostic indicator in some acute myeloid leukemia patients

Testing Algorithm
The following algorithms are available in Special Instructions:

- [Acute Myeloid Leukemia: Testing Algorithm]
- [Acute Myeloid Leukemia: Relapsed with Previous Remission Testing Algorithm]

Special Instructions
Hematopathology Patient Information

Acute Myeloid Leukemia: Testing Algorithm
Acute Myeloid Leukemia: Relapsed with Previous Remission Testing Algorithm

Method Name
Polymerase Chain Reaction (PCR)/Capillary Electrophoresis

NY State Available
Yes

Specimen

Specimen Type
Varies

Advisory Information
This test is intended to be used as a prognostic test at diagnosis and should not be used to monitor residual disease following treatment.

Shipping Instructions
Specimen must arrive within 7 days of collection.

Necessary Information
The following information is required:

1. Pertinent clinical history
2. Clinical or morphologic suspicion
3. Date and time of collection
4. Specimen source

Specimen Required
Submit only 1 of the following specimens:
Specimen Type: Peripheral blood

Container/Tube: EDTA (lavender top) or ACD (yellow top)

Specimen Volume: 3 mL

Collections Instructions:
1. Invert several times to mix blood.
2. Send specimen in original tube.
3. Label specimen as blood.

Specimen Stability: Ambient (preferred)/Refrigerate

Specimen Type: Bone marrow

Container/Tube: EDTA (lavender top) or ACD (yellow top)

Specimen Volume: 2 mL

Collections Instructions:
1. Invert several times to mix bone marrow.
2. Send specimens in original tube.
3. Label specimen as bone marrow.

Specimen Stability: Ambient (preferred)/Refrigerate

Specimen Type: Extracted DNA from blood or bone marrow

Container/Tube: 1.5- to 2-mL tube

Specimen Volume: Entire specimen

Collection Instructions: Label specimen as extracted DNA from blood or bone marrow and provide indication of volume and concentration of DNA.

Specimen Stability: Frozen (preferred)/Refrigerate/Ambient

Forms
1. Hematopathology Patient Information (T676) in Special Instructions

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

Specimen Minimum Volume
Blood, Bone Marrow: 0.5 mL
**Test Definition: FLT**

FLT3 Mutation Analysis, V

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### Reject Due To

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
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<tbody>
<tr>
<td>Other</td>
<td>Bone marrow biopsies, slides, paraffin shavings</td>
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<tr>
<td></td>
<td>Heparinized samples</td>
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<tr>
<td></td>
<td>Moderately to severely clotted</td>
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</table>

### Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
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<tbody>
<tr>
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### Clinical and Interpretive

#### Clinical Information

The FMS-like tyrosine gene (*FLT3*) codes for a transmembrane receptor/signaling protein (FLT3) of the tyrosine kinase group. Binding of FLT3 ligand to the FLT3 receptor ultimately leads to production of proteins that cause cell growth and inhibit cell death through apoptosis. Recently, mutations in *FLT3* have been found in some hematopoietic neoplasms, and are particularly common in adult acute myeloid leukemia (AML) with an overall incidence of approximately 20% to 30%. The highest mutation rates are seen in adult patients with AML and normal- or intermediate-risk cytogenetics, and patients with acute promyelocytic leukemia.

The most common *FLT3* mutation consists of internal tandem duplication (ITD) of DNA sequences found in exons 14 or 15. In some subgroups of adults with AML, the presence of an *FLT3* ITD mutation has been found to be an adverse prognostic indicator. The second most common mutation is a point mutation in the codon for an aspartate residue (D835) that resides in the activation loop of the FLT3 protein. D835 mutations have been identified in approximately 7% of AML cases but, at this time, it is not clear if the presence of this mutation has any prognostic significance. It is thought that both types of *FLT3* mutations lead to constitutive (always present, independent of internal or external stimuli) *FLT3* activation.

Identification of an *FLT3* mutation in AML is clinically useful not only because of the prognostic information it provides, but also because FLT3-inhibitory drugs have shown promise as useful therapeutic agents.

#### Reference Values

An interpretive report will be provided.

#### Interpretation

An interpretive report will be issued indicating whether the *FLT3* internal tandem duplication or D835 mutation, or both, were detected.

Mutation status will be indicated as positive or negative. If internal tandem duplication (ITD) positive, an allelic ratio will be reported.

#### Cautions

This test is not designed for monitoring residual disease following treatment and the following should be noted: the sensitivity of the test is less than other methods designed for residual disease testing and there have been several reports of *FLT3* mutations being lost or gained in neoplastic cells following treatment.
Clinical Reference

Performance

Method Description
This PCR-based assay is designed to detect the presence of 2 separate mutations in FLT3: 1) internal tandem duplication (ITD) of coding sequence for the intracellular juxtamembrane domain and 2) point mutations in the codon for Asp835 (D835). Genomic DNA is extracted from nucleated cells in the sample. A multiplex PCR is then performed using 2 sets of primers. One primer in each set is labeled with a fluorescent dye to aid in PCR-fragment analysis. The PCR products are then analyzed using capillary electrophoresis.(Unpublished Mayo method)

PDF Report
No

Day(s) and Time(s) Test Performed
Monday through Saturday

Analytic Time
3 days

Maximum Laboratory Time
6 days

Specimen Retention Time
DNA: 3 months

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 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 U.S. Food and Drug Administration.

CPT Code Information
81245-FLT3 ITD mutation detection. CPT Code Description: FLT3 (fms-related tyrosine kinase) (eg, acute myeloid leukemia), gene analysis, internal tandem duplication (ITD) variants (ie, exons 14, 15)

81246-FLT3 (fms-related tyrosine kinase 3) (eg, acute myeloid leukemia), gene analysis; tyrosine kinase domain
(TKD) variants (eg, D835, I836)

LOINC® Information

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<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
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