

MPL Exon 10 Mutation Detection, Varies

## Overview

## **Useful For**

Aiding in the distinction between a reactive cytosis and a myeloproliferative neoplasm

### **Testing Algorithm**

For more information see: -<u>Myeloproliferative Neoplasm: A Diagnostic Approach to Bone Marrow Evaluation</u> -<u>Myeloproliferative Neoplasm: A Diagnostic Approach to Peripheral Blood Evaluation</u>

#### **Special Instructions**

- Myeloproliferative Neoplasm: A Diagnostic Approach to Peripheral Blood Evaluation
- Myeloproliferative Neoplasm: A Diagnostic Approach to Bone Marrow Evaluation
- Hematopathology Patient Information

### Method Name

Sanger Sequencing

#### **NY State Available**

Yes

# Specimen

Specimen Type

Varies

Specimen Required Submit only 1 of the following specimens:

Specimen Type: Peripheral blood
Container/Tube: Lavender top (EDTA) or yellow top (ACD)
Specimen Volume: 3 mL
Collections Instructions:

Invert several times to mix blood.
Send specimen in original tube. Do not aliquot.
Label specimen as blood.

Specimen Stability: Ambient (preferred)/Refrigerate

Specimen Type: Bone marrow Container/Tube: Lavender top (EDTA) or yellow top (ACD) Specimen Volume: 2 mL



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#### **Collections Instructions:**

1. Invert several times to mix bone marrow.

2. Send specimens in original tube. **Do not aliquot.** 

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 Information: Frozen (preferred)/Refrigerated/Ambient

### Forms

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

## **Specimen Minimum Volume**

Blood, Bone marrow: 0.5 mL; Extracted DNA: 50 mcL at 20 ng/mcL concentration

## **Reject Due To**

Gross	Reject
hemolysis	
Bone marrow	Reject
biopsies	
Slides	
paraffin	
shavings	
Moderately to	
severely	
clotted	

## **Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Varies	Varies	7 days	

## Clinical & Interpretive

## **Clinical Information**

DNA sequence variants in exon 10 of the myeloproliferative leukemia virus oncogene (*MPL*) have been detected in approximately 5% of patients with primary myelofibrosis (PMF) and essential thrombocythemia (ET), which are hematopoietic neoplasms classified within the broad category of myeloproliferative neoplasms. *MPL* codes for a



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transmembrane tyrosine kinase, and the most common *MPL* variants are single base pair substitutions at codon 515. These alterations have been shown to promote constitutive, cytokine-independent activation of the JAK/STAT signaling pathway and contribute to the oncogenic phenotype. At least 8 different *MPL* exon 10 variants have been identified in PMF and ET to date, and variants outside of exon 10 have not yet been reported. The vast majority of *MPL* variants have been found in specimens testing negative for the most common variant identified in myeloproliferative neoplasms, *JAK2* V716F, although a small number of cases with both types of variants have been reported. *MPL* variants have not been identified in patients with polycythemia vera, chronic myelogenous leukemia, or other myeloid neoplasms.

Identification of *MPL* variants can aid in the diagnosis of a myeloproliferative neoplasm and is highly suggestive of either PMF or ET.

## **Reference Values**

An interpretive report will be provided.

## Interpretation

The results will be reported as 1 of 2 states: -Negative for *MPL* exon 10 variant -Positive for *MPL* exon 10 variant If the result is positive, a description of the variant at the nucleotide level and the altered protein sequence is reported.

Positive variant status is highly suggestive of a myeloproliferative neoplasm but must be correlated with clinical and other laboratory features for a definitive diagnosis. Negative variant status does not exclude the presence of a myeloproliferative or other neoplasm.

# Cautions

A positive result is not specific for a particular diagnosis and clinicopathologic correlation is necessary in all cases.

A negative result does not exclude the presence of a myeloproliferative or other neoplasm.

# Supportive Data

Analytical sensitivity is approximately 20%, meaning there must be about 20% of the altered DNA in the specimen for reliable detection.

# **Clinical Reference**

1. Defour JP, Chachoua I, Pecquet C, Constantinescu SN. Oncogenic activation of MPL/thrombopoietin receptor by 17 mutations at W515: implications for myeloproliferative neoplasms. Leukemia. 2016;30(5):1214-1216. doi:10.1038/leu.2015.271

2. Pikman Y, Lee BH, Mercher T, et al. MPLW515L is a novel somatic activating mutation in myelofibrosis with myeloid metaplasia. PLoS Med. 2006;3(7):e270

3. Pardanani AD, Levine RL, Lasho T, et al. MPL515 mutations in myeloproliferative and other myeloid disorders: a study of 1182 patients. Blood. 2006;108(10):3472-3476

4. Kilpivaara O, Levine RL. JAK2 and MPL mutations in myeloproliferative neoplasms: discovery and science. Leukemia. 2008;22(10):1813-1817. doi:10.1038/leu.2008.229

# Performance



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### **Method Description**

Genomic DNA is extracted from the blood or bone marrow sample, and the *MPL* exon 10 amplified using standard polymerase chain reaction. The entire exon 10 sequence is obtained using Sanger sequencing with analysis on an automated genetic analyzer.(Unpublished Mayo method)

# PDF Report

No

Day(s) Performed Monday through Friday

Report Available 5 to 8 days

# Specimen Retention Time

Whole blood/Bone marrow: 2 weeks; Extracted DNA: 3 months

# **Performing Laboratory Location** Mayo Clinic Laboratories - Rochester Main Campus

## Fees & Codes

#### Fees

- Authorized users can sign in to <u>Test Prices</u> for detailed fee information.
- Clients without access to Test Prices can contact <u>Customer Service</u> 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**

81339-*MPL* (myeloproliferative leukemia virus oncogene, thrombopoietin receptor, TPOR) (eg, myeloproliferative disorder), exon 10 sequence

#### LOINC<sup>®</sup> Information

Test ID	Test Order Name	Order LOINC <sup>®</sup> Value
MPLVS	MPL Exon 10 Mutation Detection, V	62948-5

Result ID	Test Result Name	Result LOINC <sup>®</sup> Value
MP051	Specimen Type	31208-2
602600	Interpretation	69047-9



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602601	Signing Pathologist	19139-5
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