

## Overview

### Useful For

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

### Testing Algorithm

For more information see:

- [Myeloproliferative Neoplasm: A Diagnostic Approach to Bone Marrow Evaluation](#)
- [Myeloproliferative Neoplasm: A Diagnostic Approach to Peripheral Blood Evaluation](#)

### 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:**

1. Invert several times to mix blood.
2. Send specimen in original tube. **Do not aliquot.**
3. 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

**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 [Hematopathology/Cytogenetics Test Request](#) (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 hemolysis	Reject
Bone marrow biopsies Slides paraffin shavings Moderately to severely clotted	Reject

**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

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

**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 [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**

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

**LOINC® Information**

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

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

602601

Signing Pathologist

19139-5