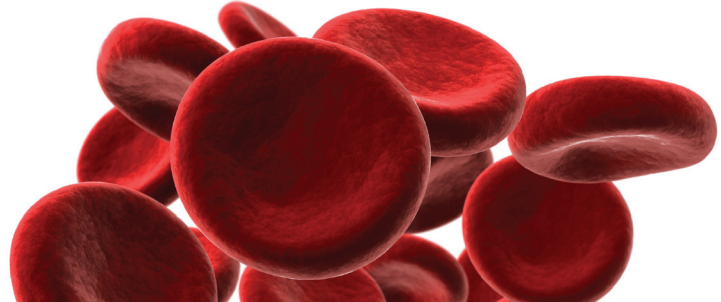


Oncology

JAK2

Gene Mutation &
Chronic Myeloproliferative Disorders



Test Code

P JAK2

Specimen Requirements

5mL peripheral blood or 3mL bone marrow,
EDTA or ACD

Storage and Handling

Ship at ambient temperature or cool

Do not freeze

Specimen Stability

18°–25°C for 72 hours

4°C for up to 7 days

CPT Codes

83891, 83896 x2

83898, 83912-26

Turnaround Time

3 days

Related Test Options:

Flow Cytometry

Cytogenetics

For more information, contact your local
representative, or call MPLN client services at
800.932.2943.

Innovative...Comprehensive...Consultative

StrataFLEX™, Molecular Pathology Laboratory Network, Inc.'s innovative health management strategy, delivers

- Rapid turnaround time
- Individual case management solving clinical problems
- Case review board ensuring quality assessment
- Streamlined ordering/reporting simplifying reflex testing
- One source for hematological oncology testing

PCR-Based Assay Detects V617F Mutation in JAK2 Gene

Management of patients with chronic myeloproliferative disease (CMPD) requires a rational approach to reduce treatment cost and provide effective therapy. JAK2 is one component of MPLN's StrataFLEX approach to evaluate patients with CMPD.

Utilizing real-time PCR on peripheral blood and bone marrow, genomic DNA is extracted and amplified with primers targeting exon 14 of the JAK2 gene localized to chromosome 9p. This test has an analytical sensitivity of 2.0%.

Studies

Case controlled studies with good correlation using varying techniques have established the frequency of the JAK2 mutation in cases of PV, ET and CIMF⁶. The highest frequency was observed in polycythemia vera¹⁻⁵. The following results are from Baxter et al.¹:

Subsets of Ph- CMPD	JAK2+	CBC
Polycythemia vera (PV)	97%	All blood counts increased, particularly RBC
Essential thrombocythemia (ET)	57%	Increased platelets
Chronic idiopathic Myelofibrosis (CIMF)	50%	Elevated WBC and platelets in peripheral blood with marrow displacement by fibrous tissue



Clinical Utility of JAK2 Mutation Analysis

The Philadelphia negative subsets in CMPD (PV, ET, CIMF) are more challenging to diagnose and require close correlation with morphology, clinical presentation and laboratory results. JAK2 testing, when utilized as a primary diagnostic test or as a reflex test in patients with a 9;22 / Philadelphia negative CMPD, will be useful for the confirmation and/or classification of the non-CML myeloproliferative disorders.

The American Society of Hematology and Association for Molecular Pathology along with the Canadian Academy of Pathology have recommended that screening for the JAK2 mutation be performed when a diagnosis of a myeloproliferative disorder is considered⁶.

In 2005, the identification of a single mutation in the tyrosine kinase gene (JAK2) was described as the most common molecular abnormality in Philadelphia negative CMPD. This unique valine to phenylalanine substitution (V617F) has been found to cause constitutive activation of the JAK2 tyrosine kinase, imparting a proliferation advantage for hematopoietic precursors².

CMPD represents a spectrum of clonal malignant hematological diseases characterized by proliferation of one or more myeloid cell lines. A chromosomal translocation t(9;22) has always been

pathognomonic of chronic myelogenous leukemia (CML) when present in association with characteristic morphologic and clinical findings and, until quite recently, was the only genetic/molecular marker associated with this broad category of diseases. The differential diagnosis in CMPD includes polycythemia vera (PV), essential thrombocythemia (ET) and chronic idiopathic myelofibrosis (CIMF). However, with the recent identification and association of a single acquired mutation (V617F) in the JAK2 gene in a large percentage of patients with PV, ET and CIMF, the classification and diagnosis of CMPD has become much more specific.

Reporting

Results are reported as V617F mutation detected or not detected; detection of the mutation is supportive of the presence of a clonal myeloproliferative disorder. Further clinical classification however, requires correlation with all available diagnostic testing and morphological findings. This acquired mutation has been found in ~97% of patients with polycythemia vera, ~57% of patients with essential thrombocythemia and ~50% of patients with chronic idiopathic myelofibrosis.

References

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