JAK2 V617F Mutation Analysis

The presence of the somatic V617F mutation (c.1849G>T) in the Janus Kinase 2 (JAK2) gene serves as a clonal marker and a WHO major criterion for diagnosis of myeloproliferative neoplasms including polycythemia vera (PV), essential thrombocythemia (ET), and primary myelofibrosis (PMF). The V617F variant is found in approximately 95% of patients with PV, and 50% of patients with ET and PMF. In addition, JAK2 V617F is found in up to 60% of patients who fall within the provisional WHO category of refractory anemia with ring sideroblasts associated with marked thrombocytosis (RARS-T), and in some patients within the WHO category of myeloproliferative neoplasms, unclassifiable.

JAK2 is located on chromosome 9q24 and encodes for "Tyrosine-protein kinase JAK2" (JAK-2), an intracellular tyrosine kinase associated with the cytoplasmic domains of type 1 and type 2 cytokine receptors. The V617F mutation results in constitutive activation of JAK-2 and its downstream cell signaling pathways.

JAK2 V617F Mutation Analysis can be ordered separately or as part of our myeloproliferative neoplasm suite of tests. When ordered as part of a reflex panel, if PV is suspected, patients in whom JAK2 V617F mutations are not detected will automatically undergo JAK2 Exon 12. If ET or PMF are suspected, patients in whom JAK2 V617F mutations are not detected will automatically undergo CALR. If CALR mutations are not detected, they will automatically undergo MPL Exon 10.

Indications for testing:

- Diagnosis of polycythemia vera, essential thrombocythemia and primary myelofibrosis.

Test method:

The JAK2 V617F variant is detected by PCR-hybridization probes.

Assay sensitivity and limitations:

The lower limit of detection of the assay is approximately 1% (allele burden). The assay is expected to detect >99% of JAK2 V617F variants that are present at a level of 1% or greater with >99% specificity.

Reporting of results:

JAK2 V617F mutations are reported as mutation detected or not detected.

Specimen requirements:

3-5 ml EDTA (lavender top) whole blood or EDTA bone marrow or DNA, high quality, ≥ 500ng at 25ng/ul.

SHIP

Shipping requirements:

Place the room temperature specimen and requisition in plastic bags, seal and insert in a Styrofoam container. Seal the Styrofoam container, place in a sturdy cardboard box and tape securely. Ship the package in compliance with your overnight carrier guidelines.

Send to:

Versiti Client Services/ Molecular Oncology Laboratory
638 N.18th St.
Milwaukee, WI 53233
800-245-3117, ext. 6250

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ORDER

Required forms:

Please complete all pages of the requisition form.

CPT Codes/Billing/Turnaround time:

Turnaround Time: 5-7 days

CPT Codes: For recommended CPT codes, visit the versiti.org/test-catalog

Reflex Ordering:

MPN (Myeloproliferative Neoplasms) Reflex - PV (Order# 4621)

JAK2 V617F Mutation Analysis
Turnaround Time: 5-7 days

JAK2 Exon 12 Mutation Analysis (if indicated)
Turnaround Time: additional 5-10 days

MPN (Myeloproliferative Neoplasms) Reflex - ET/PMF (Order# 4644)

JAK2 V617F Mutation Analysis
Turnaround Time: 5-7 days

CALR Mutation Analysis (if indicated)
Turnaround Time: additional 5-7 days

MPL Exon 10 Mutation Analysis (if indicated)
Turnaround Time: additional 5-10 days

References:

1. Baxter E, Scott LM, Campbell PJ, et al. Acquired mutation of the tyrosine kinase JAK2 in human myeloproliferative disorders. Lancet 2005;365:1054-1061.
2. James C, Ugo V, Le Couedic J-P, et al. A unique clonal JAK2 mutation leading to constitutive signaling causes polycythaemia vera. Nature 2005;434:1144-1148.
3. Kralovics R, Passamonti F, Buser AS, et al. A Gain-of-Function Mutation of JAK2 in Myeloproliferative Disorders. N Engl J Med 2005;352:1779-1790.
4. Levine RL, Wadleigh M, Cools J, et al. Activating mutation in the tyrosine kinase JAK2 in polycythemia vera, essential thrombocythemia, and myeloid metaplasia with myelofibrosis. Cancer Cell 2005;7:387-97.
5. Levine RL, Gilliland GD. Myeloproliferative disorders. Blood 2008;112:2190-2198.
6. Thiele J, Kvasnicka HM, Orazi A, et al. Polycythemia vera. In: Swerdlow SH, Campo E, Harris NL, et al. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. Lyon, France: WHO Press, 2008:40-43.
7. Thiele J, Kvasnicka HM, Teff eri A, et al. Primary myelofi brosis. In: Swerdlow SH, Campo E, Harris NL, et al. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. Lyon, France: WHO Press, 2008:44-47.
8. Thiele J, Kvasnicka HM, Orazi A, et al. Essential thrombocythaemia. In: Swerdlow SH, Campo E, Harris NL, et al. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. Lyon, France: WHO Press, 2008:48-50.
9. Vardiman JW, Bennett JM, Bain BJ, et al. Myelodysplastic/ myeloproliferative neoplasm, unclassifi able. In: Swerdlow SH, Campo E, Harris NL, et al. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. 4th ed. Lyon, France: WHO Press, 2008:85-86.

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