Wilms tumor 1 (WT1) expression analysis

CPT Code(s): 81479

Service Code (IU Health):

Ordering Recommendation: Monitoring of Wilms tumor 1(WT1) expression in acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL) patients to aid clinicians in determining follow up procedures and therapeutic strategies.

Synonyms: Gene expression, quantitative RT-PCR, quantitative real-time PCR, polymerase chain reaction, acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), Wilms tumor 1 gene, WT1

Methodology: Reverse transcription quantitative real-time PCR (RT-qPCR)

Performed: Weekly

 Reported: 7-10 days

Specimen Requirements

Patient Preparation: None required for whole blood/bone marrow

Collect: Lavender (EDTA) tubes

Specimen Volume: Blood: 1-3 mL of whole blood/bone marrow

 Storage/Transport: Refrigerated/room temperature and should arrive in laboratory ≤24 hours after collection

Unacceptable Conditions: Frozen, grossly hemolyzed, clotted, or arrive in the laboratory ≥48 hours after collection

Stability: 48 hours at 2°C to 8°C; one week at 2°C to 8°C after sample is mixed with 2X DNA/RNA Shield

Reference Interval: Upper limit for peripheral blood is <50 WT1 copies/-10,000 ABL1 copies. Upper limit for bone marrow is <250 WT1 copies/-10,000 ABL1 copies.

Interpretive Data

Characteristics: The Wilms tumor 1 (WT1) gene encodes a zinc finger transcription factor that has been demonstrated to perform both transcriptional activation and transcriptional repression, and possesses both oncogenic and tumor
suppressor properties. The WT1 gene is over-expressed in most patients with AML and ALL in comparison to unaffected individuals. Studies investigating WT1 as a marker of minimal residual disease have demonstrated that its expression is low in normal bone marrow, increased in AML patients at diagnosis, decreased after an effective treatment, and becomes elevated again prior to clinical relapse.

**Cause:** Over-expression of WT1 has been observed in most AML subtypes, independently from WT1 mutations. In this assay, WT1 is used as a universal marker of AML.

**Incidence:** AML has an incidence of approximately 4.2/100,000, and ALL has an incidence of approximately 1.7/100,000.

**Analytical sensitivity and specificity:** >99%

**Clinical sensitivity and specificity:** The inability to achieve a >-2-log (100-fold) reduction in WT1 RNA levels after AML induction therapy has been shown to potentially indicate a significantly poorer prognosis. Molecular relapse (*i.e.*, rising levels of WT1) usually precedes clinical relapse in a significant proportion of patients. The clinical utility of WT1 gene expression as a marker of minimal residual disease in AML depends on repeated sampling of follow-up specimens, either bone marrow or peripheral blood.

**Limitations:** The limit of detection of WT1 is 1-10 copies/10,000 ABL1. All results should be interpreted in the context of clinical findings, relevant history, and other laboratory data.

**References:**