

Leukemia/Lymphoma Phenotyping Evaluation by Flow Cytometry

Leukemia and lymphoma analysis by flow cytometry aids in identifying the tumor lineage, which in most cases is identified as T cell, B cell, or myeloid. Lineage identification can provide a confirmatory diagnosis or differential diagnosis, prognosis, and treatment options.

Disease Overview

Diagnosis/Treatment Issues

- Phenotyping by flow cytometry can aid in evaluation of hematopoietic neoplasms
 - Specimens include bone marrow, whole blood, tissue, or fluid
- Phenotyping may aid in monitoring response to therapy in individuals with an established diagnosis of hematopoietic neoplasms

Test Interpretation

- Markers analyzed as needed, based on clinical evidence, to fully characterize any abnormalities identified by the screening panel.
 - Additional markers selected based on pathologist interpretation of the screening panel results.
- Antigens included:
 - T cell: CD1a, CD2, CD3, CD4, CD5, CD7, CD8, TCR γ - δ , cytoplasmic CD3
 - B cell: CD10, CD19, CD20, CD22, CD23, CD103, CD200, kappa, lambda, cytoplasmic kappa, cytoplasmic lambda
 - Myeloid/monocyte: CD11b, CD13, CD14 (Mo2), CD14 (MY4), CD15, CD33, CD64, CD117, myeloperoxidase
- Miscellaneous: CD11c, CD16, CD25, CD30, CD34, CD38, CD41, CD42b, CD45, CD56, CD57, CD61, HLA-DR, glycophorin, TdT, bcl-2, ALK-1, CD123, CD138, CD200, CD26, CD45, CRLF-2

Clinical Sensitivity

Limit of detection is 0.01-1.0% depending on phenotype and disease.

Results

- Antigens will be reported as positive or negative.
- Interpretive comments that further characterize intensity patterns are included.
 - Dim, bright, variable, or partial may be reported.
- Light-chain expression may be reported as polytypic/polyclonal or restricted/monotypic/monoclonal.
 - May include kappa/lambda ratio.
- Pattern of CD antigen testing will be interpreted with recommendations for further testing, if indicated.

Limitations

- Some hematopoietic neoplasms do not show phenotypic abnormalities, and may not be detected by flow cytometry.
- Poor cell viability may adversely affect antigens and impede the ability to properly identify neoplastic cells.
- Flow results cannot be used alone to diagnose malignancy.
 - Results should be interpreted in conjunction with morphology, clinical information, and other necessary ancillary tests for a definitive diagnosis.

Tests to Consider

[Leukemia/Lymphoma Phenotyping Evaluation by Flow Cytometry 3001780](#)

Method: Flow Cytometry

See [Related Tests](#) for tests associated with the following:

- Acute leukemia diagnosis
- Follicular, Burkitt, or diffuse large B-cell lymphoma diagnosis
- Mantle cell lymphoma diagnosis
- Chronic lymphocytic leukemia prognostication
- Hairy cell leukemia diagnosis

Related Tests

Acute leukemia diagnosis

- Acute Lymphoblastic Leukemia (ALL) Panel by FISH, Adult 2002647
- Acute Lymphoblastic Leukemia (ALL) Panel by FISH, Pediatric 2002719
- Acute Myelogenous Leukemia (AML) with Myelodysplastic Syndrome (MDS) or Therapy-Related AML, by FISH 2002653
- Acute Myeloid Leukemia Panel by FISH 2011132
- B-Lymphoblastic Leukemia (B-ALL) Minimum Residual Disease Detection by Flow Cytometry 3000724
- *CBFB-MYH11* inv(16) Detection, Quantitative 2011114
- Chromosome FISH, Interphase 2002298
- Cytogenomic SNP Microarray - Oncology 2006325
- Myeloid Malignancies Mutation Panel by Next Generation Sequencing 2011117
- *PML-RARA* Translocation by FISH 2002363
- *PML-RARA* Detection by RT-PCR, Quantitative 2002871
- *RUNX1-RUNX1T1 (AML1-ETO)* t(8;21) Detection, Quantitative 2010138

Follicular, Burkitt, or diffuse large B-cell lymphoma diagnosis

- Aggressive B-Cell Lymphoma Reflex Panel by FISH, Tissue 3001495
- B-Cell Clonality Screening (IgH and IgK) by PCR 2006193
- *BCL6* (3q27) Gene Rearrangement by FISH 3001311
- *BCR-ABL1*, Minor (p190), Quantitative 2005016
- *CEBPA* Mutation Detection 2004247
- Chromosome FISH, Interphase 2002298
- Diagnostic Qualitative *BCR-ABL1* Assay with Reflex to p190 or p210 Quantitative Assays 3005839
- *FLT3* ITD and TKD Mutation Detection 3001161
- *IDH1* and *IDH2* Mutation Analysis, exon 4 2006444
- *IGH-BCL2* Fusion, t(14;18) by FISH 3001298
- *IGH-MYC* Fusion t(8;14) by FISH 3001299
- *IRF4/DUSP22* (6p25) Gene Rearrangement by FISH 3001568
- *KIT* Mutations in AML by Fragment Analysis and Sequencing 2002437
- Lymphoma (Aggressive) Panel by FISH 2002650
- *MYC* (8q24) Gene Rearrangement by FISH 3001300
- *NPM1* Mutation Detection by RT-PCR, Quantitative 3000066
- Ph-Like Acute Lymphoblastic Leukemia (ALL) Panel by FISH 3000455

Mantle cell lymphoma diagnosis

- B-Cell Clonality Screening (IgH and IgK) by PCR 2006193
- *BCR-ABL1*, Minor (p190), Quantitative 2005016
- *CEBPA* Mutation Detection 2004247
- Chromosome FISH, Interphase 2002298
- Cyclin D1, SP4 by Immunohistochemistry 2003842
- Diagnostic Qualitative *BCR-ABL1* Assay with Reflex to p190 or p210 Quantitative Assays 3005839
- *FLT3* ITD and TKD Mutation Detection 3001161
- *IDH1* and *IDH2* Mutation Analysis, exon 4 2006444
- *IGH-CCND1* Fusion, t(11;14) by FISH 3001306
- *KIT* Mutations in AML by Fragment Analysis and Sequencing 2002437
- *NPM1* Mutation Detection by RT-PCR, Quantitative 3000066
- Ph-Like Acute Lymphocytic Leukemia (ALL) Panel by FISH 3000455
- *SOX11* by Immunohistochemistry 2012561

Chronic lymphocytic leukemia prognostication

- *BCR-ABL1*, Minor (p190), Quantitative 2005016
- *CEBPA* Mutation Detection 2004247
- Chromosome FISH, CLL Panel 2002295
- Chromosome FISH, Interphase 2002298
- Cytogenomic SNP Microarray - Oncology 2006325

- Diagnostic Qualitative *BCR-ABL1* Assay with Reflex to p190 or p210 Quantitative Assays 3005839
- *FLT3* ITD and TKD Mutation Detection 3001161
- *IDH1* and *IDH2* Mutation Analysis, exon 4 2006444
- *IGHV* Mutation Analysis by Sequencing 0040227
- *KIT* Mutations in AML by Fragment Analysis and Sequencing 2002437
- *NPM1* Mutation Detection by RT-PCR, Quantitative 3000066
- Ph-Like Acute Lymphocytic Leukemia (ALL) Panel by FISH 3000455

Hairy cell leukemia diagnosis

- B-Cell Clonality Screening (IgH and IgK) by PCR 2006193
- *BCR-ABL1*, Minor (p190), Quantitative 2005016
- *BRAF* V600E Mutation Detection in Hairy Cell Leukemia by Real-Time PCR, Quantitative 2007132
- *CEBPA* Mutation Detection 2004247
- Diagnostic Qualitative *BCR-ABL1* Assay with Reflex to p190 or p210 Quantitative Assays 3005839
- *FLT3* ITD and TKD Mutation Detection 3001161
- *IDH1* and *IDH2* Mutation Analysis, exon 4 2006444
- *KIT* Mutations in AML by Fragment Analysis and Sequencing 2002437
- *NPM1* Mutation Detection by RT-PCR, Quantitative 3000066
- Ph-Like Acute Lymphocytic Leukemia (ALL) Panel by FISH 3000455

Related Information

[Acute Lymphoblastic Leukemia - ALL](#)
[Acute Myeloid Leukemia - AML](#)
[Mature B-Cell Lymphomas](#)

ARUP Laboratories is a nonprofit enterprise of the University of Utah and its Department of Pathology. 500 Chipeta Way, Salt Lake City, UT 84108
(800) 522-2787 | (801) 583-2787 | aruplab.com | arupconsult.com
Content Review June 2019 | Last Update November 2022