Lab Dept: Flow and Immunology

Test Name: LEUKEMIA/LYMPHOMA PANEL

General Information

Lab Order Codes: LLP

Synonyms: Immunophenotyping based on CD45 gating; Cell markers

CPT Codes: 88184 – Flow cytometry, cell surface, cytoplasmic or nuclear marker, technical component only; first marker
88185 – Flow cytometry, cell surface, cytoplasmic, or nuclear marker, technical component; each additional marker
88187 – Professional interpretation; 2 to 8 markers
88188 – Professional interpretation; 9 to 15 markers
88189 – Professional interpretation; 16 or more markers

Test Includes: The flow cytometric analysis of a specimen includes the use of a selected panel of leukocyte-associated antibodies to determine the lineage of a malignant or abnormal population of leukocytes. Analysis is based on a CD45 gating strategy. Results are reported in percentages and relative intensities, and are evaluated by a pathologist. Additional markers may be added based upon the results of the initial antibody panel and/or clinical information, specimen type, specimen volume, and morphologic review.

Minimum Antibody Panel

CD2	CD20
CD3	CD22
CD4	CD33
CD5	CD34
CD7	CD52
CD8	CD56
CD10	TdT
CD13	HLA-DR
CD19	CD117

	Additional markers may include antibodies to help identify the cell lineage of myeloid cells, erythroid precursors, megakaryocytic precursors, as well as T-cell markers and light chain expression on B-cells.

Logistics

Test Indications:	Assignment of cellular lineage of malignant or abnormal cell population. Analysis of cellular maturity and heterogeneity within malignant or abnormal cell population. Analysis of clonality of malignant or abnormal cell population.
Lab Testing Sections:	Flow Cytometry
Phone Numbers:	MIN Lab: 612-813-6711 STP Lab: 651-220-6560
Test Availability:	Daily, 24 hours
Turnaround Time:	Performed Monday – Friday
Special Instructions:	Specimens collected after noon on Friday including the following weekend will be done with prior approval of pathology. For bone marrow specimens, staff is on-call on Friday evenings through Monday mornings.

Specimen

Specimen Type:	Submit only one of the following: Bone Marrow Peripheral Blood Body Fluid Tissue or Lymph Node
Container:	**Bone Marrow**: Heparinized syringe **Peripheral Blood:** Lavender top (EDTA) tube **Body Fluid***: Red top (plain) tube **or** any plain, sterile container * If the fluid is grossly bloody an anticoagulated container described above may be used to prevent clotting. **Tissue or Lymph Node:** Tubes containing Flow Cytometry Holding media can be obtained from Pathology Department.

Draw Volume:	**Bone Marrow:** 2-5 mL **Peripheral Blood:** 2-5 mL. The tube type selected must be filled to its intended or recommended volume to ensure optimal cell preservation. Minimum volume accepted is 2 mL (in a 2 mL EDTA tube). In exceptional cases, an EDTA Microtainer™ filled with 0.5 mL whole blood may be submitted after consulting Flow Lab (651-220-6556). **Body Fluid:** The volume of body fluid necessary to immunophenotype the leukocytes in it, depends upon the leukocyte count in the specimen. Usually 10 mL of body fluid is sufficient. Smaller volumes can be used if there is a high cell count in the fluid. **Tissue or Lymph Node:** 5 mm^3 or larger biopsy
Processed Volume:	Dependant upon cell count of specimen.
Collection:	**Bone Marrow:** Expel all excess heparin from syringe before performing aspirate. Keep at room temperature and forward promptly to the lab. **Peripheral Blood:** Venipuncture or line draw. Tube must be filled to its intended or recommended volume to ensure proper anticoagulant/ blood ratio for optimal cell preservation. Keep at room temperature and forward promptly to the lab. **Body Fluid:** Aseptically place fluid in sterile container and forward promptly to the laboratory. If processing will be delayed, refrigerate specimen. If fluid is grossly bloody, an anticoagulated container may be used or 1U/mL heparin may be added to prevent clotting. CSF must be sent to the Flow Cytometry Lab immediately. **Tissue or Lymph Node:** Place intact tissue in Flow Cytometry Holding media (available from the Pathology Department or Flow Cytometry Lab). Keep at room temperature and forward promptly to the lab.
Special Processing:	Lab Staff: CSF specimens should be processed within 2 hours of collection. All other specimens should be processed within 24 hours of collection. All specimens must have date and time of collection and specimen source on the specimen label along with the patient's name and MR number. Specimens must be shipped to St. Paul, Flow Cytometry by the next available courier. All specimens must be sent the same day of collection. If necessary, call Quicksilver.
Patient Preparation:	None
Sample Rejection:	Improperly filled tubes; incomplete or mislabeled specimen; improper collection or handling of specimen resulting in poor cell viability or insufficient quantity. Anything submitted in Lithium heparin will not be accepted.

Interpretive

Reference Range:	An interpretation of the immunophenotypic findings will be provided by a pathologist who will correlate the flow cytometry results with clinical, morphologic and other pertinent laboratory findings.
Critical Values:	See Reference Range
Limitations:	Flow cytometric analysis is limited by factors such as hypocellularity and poor cell viability due to necrosis or improper specimen collection and handling
Methodology:	4-color direct immunofluorescence and flow cytometry using a CD45 gating strategy. This test was developed and its performance characteristics determined by Children's Hospitals and Clinics. It has not been cleared or approved by the U.S. Food and Drug Administration. Analyte Specific Reagents (ASR's) are used in many laboratory tests necessary for standard medical care and generally do not require FDA approval.
Contraindications:	Flow cytometric studies are not indicated as a means of screening for myelodysplastic disorders, for determining blast percentage in bone marrow, or in the absence of morphologic abnormalities.
References:	Cytometry, Volume 30, Number 5, October 15,1997 U.S. – Canadian Consensus Recommendations on the Immunophenotypic Analysis of Hematologic Neoplasia by Flow Cytometry: Selection of Antibody Combinations, pp231-235 U.S. – Canadian Consensus Recommendations on the Immunophenotypic Analysis of Hematologic Neoplasia by Flow Cytometry: Data Analysis and Interpretation, pp236-244 U.S. – Canadian Consensus Recommendations on the Immunophenotypic Analysis of Hematologic Neoplasia by Flow Cytometry: Data Reporting, pp245-248 U.S. – Canadian Consensus Recommendations on the Immunophenotypic Analysis of Hematologic Neoplasia by Flow Cytometry: Medical Indications, pp249-263
Updates:	7/27/2023: Updated specimen volumes.