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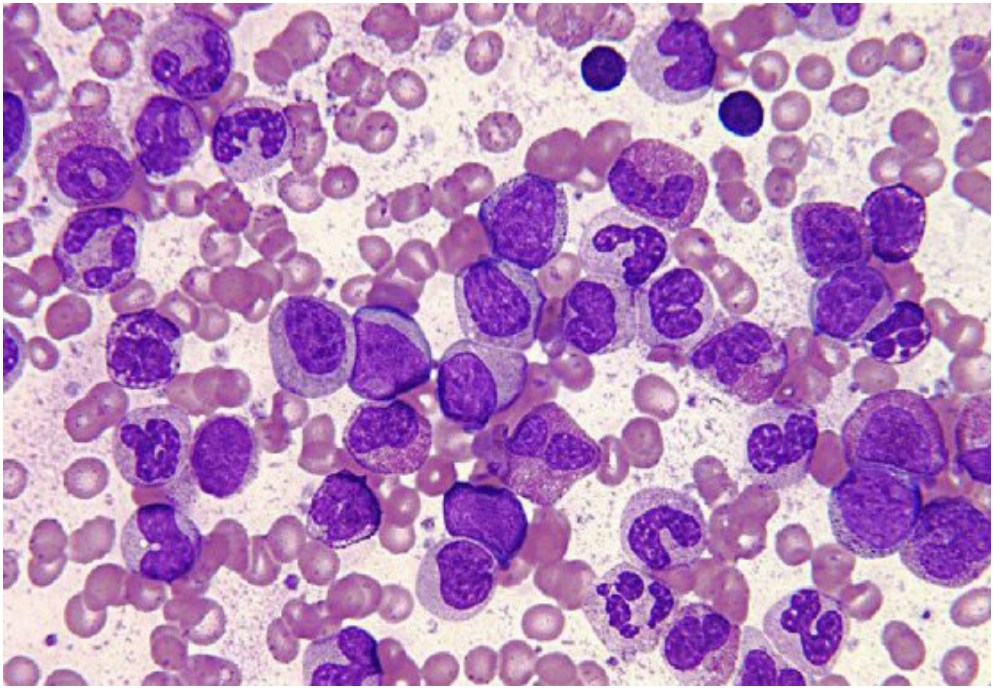
Minimal Residual Disease (MRD)
by Flowcytometry



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MRD IN ACUTE LEUKEMIA BY FLOWCYTOMETRY

- Minimal Residual Disease (MRD) refers to the presence of leukemic cells below the threshold of detection by conventional morphology. MRD analysis aims at estimating total burden of leukemic cells during remission.

Why should MRD be evaluated?

- Identify patients whose outcome with conventional chemotherapy treatment will be poor, despite having no other adverse prognostic factors.
- Identify patients with high risk ALL (by other criteria) who, by virtue of having a good treatment response will have a better than expected outcome.
- Providing sensitive monitoring post treatment of emergent disease is possible.

Why Oncquest is preferred for MRD testing?

- NABL& CAP accredited, state-of-the-art Super Specialty Clinical Diagnostics Laboratory.
- Only central Reference laboratory in private sector with NABL accreditation for MRD testing since 2012 and more than 1000 MRD cases being tested annually.
- Flowcytometry for MRD is considered high complexity testing that should be performed at specialized centres with expertise in MRD assay. It requires detailed knowledge of maturation patterns in normal and regenerating marrow. Incomplete understanding of range of variations in maturation patterns in regenerating marrows can cause confusion to the newly initiated.
- On the other hand, immunophenotypic shifts can occur during treatment so reliance on LAIPs (Leukemia-Associated Immunophenotypes) alone can be risky.
- A comprehensive diagnosis is reported by experts based on combination of LAIPs and maturation pattern study. Comparison with our extensive data base is maintained.
- Performed by high end triple laser 8 colour, Flowcytometer BD FACS CANTO II.
- Complete range of CD markers are run with backbone markers common in all tubes.
- Several lakh events are acquired and gated for reporting aberrant expression of scatter profiles with utmost precision.
- One to one interaction with referring doctor for all critical cancer.

Interpretation of Test Results to Predict Relapse

Standard Risk	High Risk	Very High Risk
MRD <0.01% at induction	0.01%-1%	MRD>1%

- Patients with ALL in morphological remission may still have upto 10^10 residual malignant cells. Detection of MRD at end of induction therapy allows better estimation of the leukemic burden and can help selection of appropriate therapeutic strategies
- Flowcytometry has emerged as the most promising methods for detection of sub microscopic levels of Leukemia. Prospective studies in large series of patients have demonstrated a strong correlation between MRD levels during clinical remission and treatment outcome.

As per NCCN guidelines for MRD evaluation in Acute Leukemia

- All studies have shown high prognostic value of MRD in assessing risk of relapse in ALL patients.
- There is a potential role of MRD monitoring in identifying patient subgroups who may benefit from treatment stratification.
- Timing of MRD evaluation should be on completion of Induction therapy, additional time points for MRD evaluation may be useful depending on the specific treatment protocol used.
- Minimal limit of assay sensitivity (Flowcytometry/PCR) to declare MRD negativity should be <0.01%.
- Panel strongly recommends that MRD assessments be performed at specialized centres with expertise in MRD assays.

Acute Myeloid Leukemia (AML) MRD by Flowcytometry

- Applicable to most of AML cases (except APML cases that should be followed up by RT PCR)
- Strong predictor of relapse
- AML MRD technically more challenging with heterogeneous marker expression, no definite LAIPs and unstable phenotypes
- Clinical sensitivity of 0.1%

Also available: Chronic Lymphocytic Leukemia (CLL), Chronic Myeloid Leukemia (BCR/ABL) MRD Panel, Multiple Myeloma MRD, PML/RaRa MRD, ALCP &MRD Panel

Test Information

Test Code	Test Name	Technique	Specimen	TAT / Reported on
SP10075	Acute Leukemia-MRD Panel (MRD & Relapse)	Flow Cytometry	3 - 4 ml. of heparinized bone marrow. Send immediately by courier at 20-25°C. do not freeze. Specify date & time of sample withdrawn & Initial diagnosis, immunophenotype, time point of MRD evaluation on TRF.	3rd working day
SP10108	CLL MRD panel	Flowcytometry	3-4 ml OF Heparinized Bone Marrow. Send immediately by courier at 20-25 C.	3rd working day
SP10104	Diagnostic ALCP & MRD Panel	Flow Cytometry	2-3ml Bone marrow in Heparin	3rd working day
SP10107	Multiple Myeloma MRD panel	Flowcytometry	3-4 ml OF Heparinized Bone Marrow. Send immediately by courier at 20-25 C.	3rd working day
SMO10014	BCR/ABL Quantitative RT PCR with Breakpoint Analysis (MRD)	Real Time PCR	2 ml Bone Marrow or 5 - 6 ml whole blood in 2 EDTA Vacutainers.	4th working Day
SMO10013	Translocation BCR/ABL Quant. RTPCR (MRD)	Real Time RT- PCR (Quantitative)	2 ml Bone Marrow or 5 - 6 ml whole blood in 2 EDTA Vacutainers. Send immediately by courier in cold gel packs	4th working Day
SMO10015	Translocation PML/RARa Quant. RTPCR (MRD)	Real Time RT- PCR (Quantitative)	2 ml Bone Marrow or 5 - 6 ml whole blood in 2 EDTA Vacutainers. Send immediately by courier in cold gel packs	4th working Day