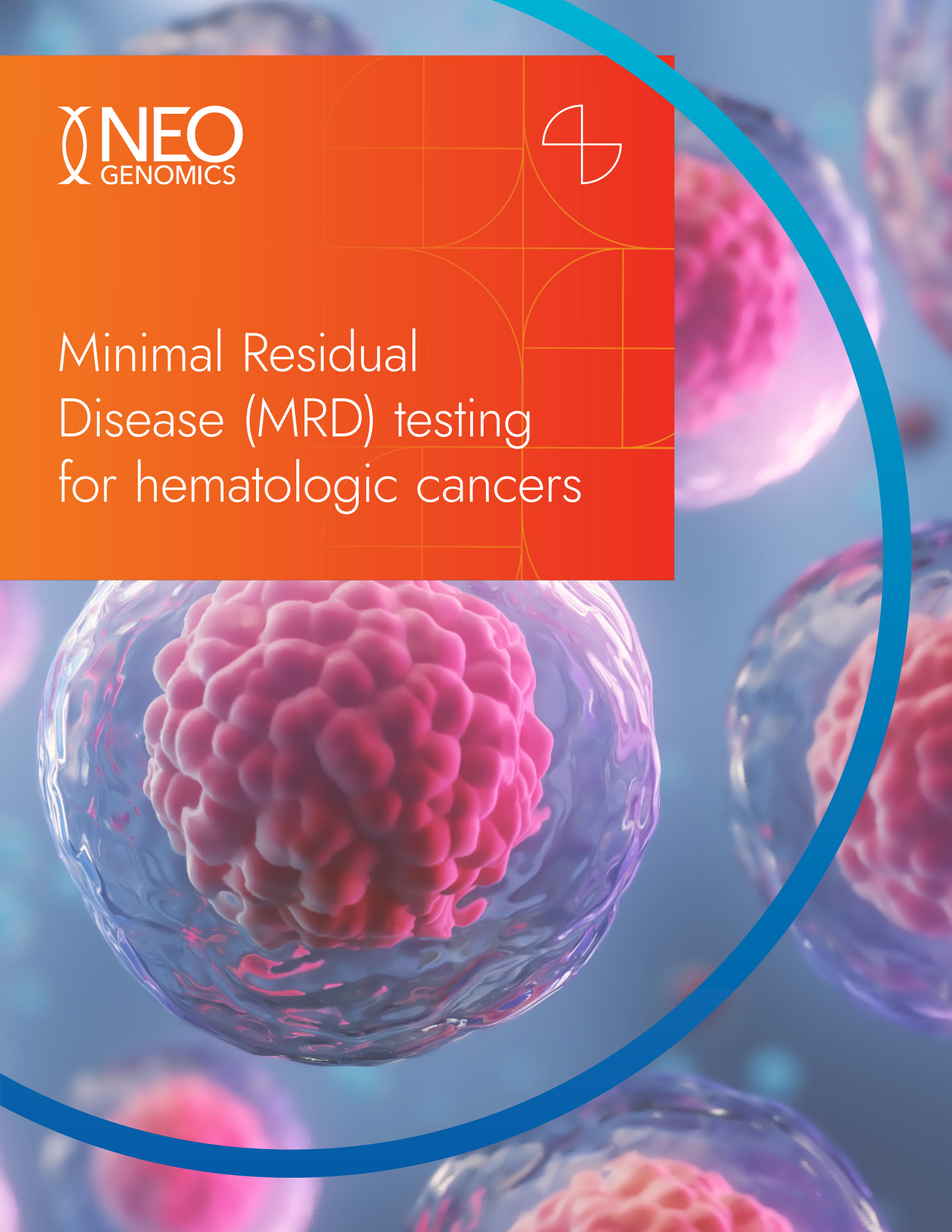
NEO GENOMICS

Minimal Residual Disease (MRD) testing for hematologic cancers



Why test for MRD?

With over 60% of current clinical trials assessing minimal residual disease (MRD) as an outcome measurement, MRD detection has become a fundamental factor in the management of hematologic diseases.

MRD TESTING HAS SHOWN TO BE USEFUL FOR:

- Assessing initial treatment response
- Early detection of relapse
- Monitoring disease burden after stem cell transplantation

MRD NEGATIVITY IS ASSOCIATED WITH MANY FAVORABLE OUTCOMES INCLUDING:

- Reduced risk of progression
- Improved relapse-free survival
- Improved overall survival

NeoGenomics meets your testing needs

MRD testing uses highly sensitive methods. The most widely used tests are flow cytometry, polymerase chain reaction (PCR), and next-generation sequencing (NGS).

NeoGenomics offers both flow cytometry and PCR for MRD measurement of some of the most prevalent hematologic cancers. Results are fast and reliable to allow for effective monitoring of disease status as well as timely therapeutic interventions if necessary.

	MRD by Flow	MRD by PCR
Available tests	B-ALL MRD Panel CLL MRD Panel Myeloma MRD Panel	NPM1 MRD Analysis BCR-ABL1 Standard p210, p190 PML-RARA Translocation, t(15;17) RUNX1-RUNX1T1 (AML1-ETO) Translocation, t(8;21)
Detection limit	0.01%	0.001% - 0.5%
Target	Immunophenotypes	Immunoglobulin gene arrangements
Specimen requirements	**Bone Marrow:** 2–3 mL (EDTA or Sodium Heparin) **Peripheral Blood:** 5–6 mL (EDTA or Sodium Heparin)	**Bone Marrow:** 2 mL (EDTA or Sodium Heparin) **Peripheral Blood:** 5 mL (EDTA or Sodium Heparin) **FFPE Tissue:** Paraffin block. Alternatively, send 1 H&E slide plus 5-10 unstained slides cut at 5 or more microns. Positively-charged slides and 10% NBF fixative. No zinc fixatives.
	For bone marrow aspirate, the first pull of the aspirate after the needle is introduced is most recommended. Avoid hemodilution of bone marrow samples. Transport at controlled room temperature is recommended.	
Turnaround time (TAT)	1-2 days	7 days
Associated diseases	Acute lymphoblastic leukemia (ALL) Chronic lymphocytic leukemia (CLL) Multiple myeloma (MM)	Acute myeloid leukemia (AML) Acute lymphoblastic leukemia (ALL) Chronic myeloid leukemia (CML)

MRD testing by Flow

B-ALL MRD Flow Panel

In patients with B-lymphoblastic leukemia, a combination of morphology and flow cytometry testing for MRD is recommended when assessing response to therapy. In both adult and pediatric patients with acute lymphoblastic leukemia (ALL), MRD during standard ALL chemotherapy is the strongest overall prognostic indicator and has therefore been used for refining initial treatment stratification. MRD positivity after the maintenance phase of treatment, pre-transplant or post-stem cell transplantation also provides prognostic information that may help guide therapeutic interventions.

CLL MRD Flow Panel

Monitoring of MRD in chronic lymphocytic leukemia (CLL) has become increasingly important as treatments improve. This panel follows the strategy developed by the European Research Initiative in CLL (ERIC). Detection of MRD above 0.01% is reported to be an independent predictor of progression-free survival and overall survival in CLL patients treated with chemoimmunotherapy.

Myeloma (MM) MRD Flow Panel

The outcome of multiple myeloma (MM) patients has improved significantly with unprecedented rates of complete remission and prolonged survival. In studies, MRD is the most relevant prognostic factor. The longer an MRD-negative status can be sustained, the higher impact it has in reducing the risk of progression and prolonging survival in MM patients. This panel evaluates for the presence of MRD in patients with previously diagnosed and treated MM.

Biomarker selection for MRD Flow panels

Panel	Tube name	Antibodies							
		FITC	PE	PC5.5	PC7	APC	APCA 750	BV421	V500
B-ALL MRD	#1	CD38	CD19	7-AAD	CD34	CD22	CD10	CD123	CD45
	#2	CD58	CD19	7-AAD	CD34	CD13+ CD33	CD10	CD20	CD45
	#3	CD66c	CD19	7-AAD	CD34	CD9	CD10	CD38	CD45
Panel	Tube name	Antibodies							
		FITC	PE	PC5.5	PC7	APC	APC-H7	BV421	V500
CLL MRD	CLL MRD	CD81	CD79b	CD22	CD19	CD43	CD20	CD5	CD3
MM MRD	#1	cLambda	cKappa	CD117	CD56	CD138	CD19	CD38	CD45
	#2	CD81	CD27	None	None	CD138	CD20	CD38	CD45

See next page for molecular tests. >

MRD testing by PCR

BCR-ABL1 Standard p210, p190

Ph+ CML and ALL share the t(9;22) translocation as the common pathogenetic alteration. BCR-ABL positive AML was included as a provisional entity in the 2016 World Health Organization classification. Quantitative detection of t(9;22) BCR-ABL1 fusion transcripts that result in major p210 or minor p190 fusion proteins is useful for monitoring MRD for CML, Ph+ ALL, or AML.

NPM1 MRD Analysis

Acute myeloid leukemia with mutated NPM1 (NPM-AML) is a distinct entity in the 2016 World Health Organization classification. High-sensitivity testing to detect residual NPM1 mutation in AML may be useful for further refining prognosis and for early detection of relapse.

PML-RARA Translocation, t(15;17)

The (15;17) translocation occurs in nearly all cases of acute promyelocytic leukemia (APL, or AML subtype M3). Presence of PML-RARA translocation following therapy is a strong predictor of relapse.

RUNX1-RUNX1T1 (AML1-ETO) Translocation, t(8;21)

The (8;21) translocation occurs in approximately 5% of AML. These cases are usually considered core-binding factor AML (CBF-AML). Presence of RUNX1-RUNX1T1 translocation following therapy is a strong predictor of relapse.

References:

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NeoGenomics Laboratories is a specialized oncology reference laboratory providing the latest technologies, testing, partnership opportunities, and interactive education to the oncology and pathology communities. We offer the complete spectrum of diagnostic services in molecular testing, FISH, cytogenetics, flow cytometry, and immunohistochemistry through our nationwide network of CAP-accredited, CLIA-certified laboratories.

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