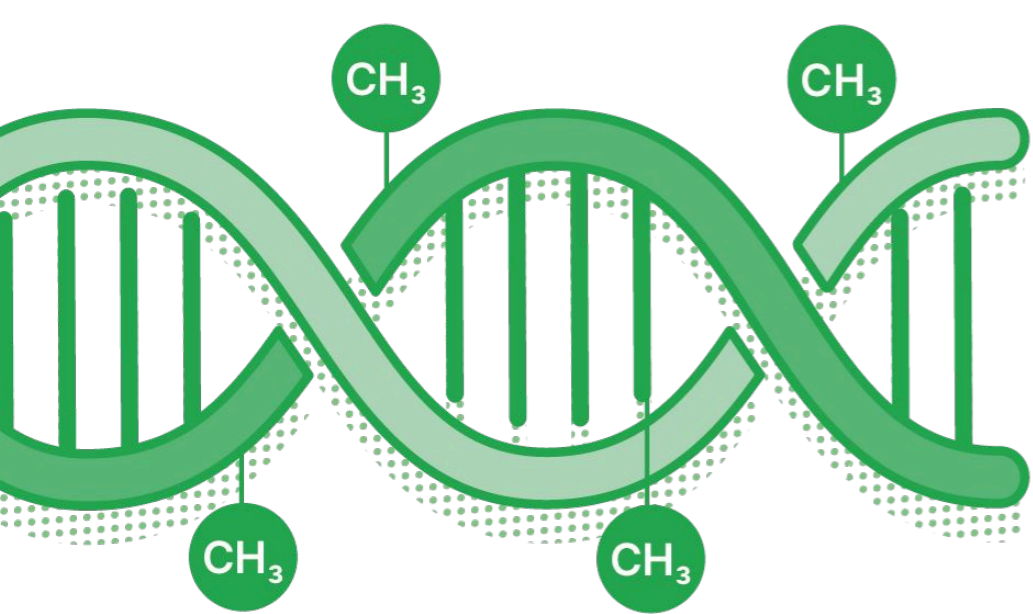


DNA Methylation in Oncology Research: Advancing Sensitive Detection of Epigenetic Changes in Research Settings

Why MSRE Analysis With ddPCR Technology Is an Alternative to Bisulfite Sequencing for DNA Methylation Studies

Why DNA Methylation Matters in Oncology Research^{1,2}



- DNA methylation regulates gene expression without altering DNA sequence
- Aberrant DNA methylation is a hallmark of cancer
- Methylation patterns are linked to gene regulation and can be explored in longitudinal research studies
- Methylation can be detected in both tissue samples and circulating tumor DNA (ctDNA) in research settings

Two Approaches to Detecting DNA Methylation in Oncology Research³⁻⁵

MSRE with ddPCR Technology

Measures methylation by enzyme digestion

- MSRE digestion** 1-2 hr
- Droplet generation** 30-45 min
- PCR amplification** 2-2.5 hr
- Droplet reading** 30-60 min
- Data analysis** 15-30 min

<1 day

Bisulfite Sequencing with NGS

Infers methylation state by sequencing

- Bisulfite conversion** 4-6 hr
- Library preparation** 6-8 hr
- Sequencing run** 12-48 hr
- Bioinformatics analysis** 1-2 days

3-6 days

NGS, next-generation sequencing; MSRE, methylation-sensitive restriction enzyme.

Method Comparison⁵

	Bisulfite-Based Sequencing	MSRE + ddPCR Technology
Detection	Chemical conversion	Enzyme digestion
Impact on DNA	Degradation	Preservation
Scope	Genome wide	Targeted loci
Quantification	Relative, inferred	Absolute
Sensitivity	High with depth	Very high per target
Time required	Moderate	Minimal
Workflow	Multi-step	Streamlined
Best for in research settings	Discovery, screening	Focused assays

Same biology. Different tools. Different questions.

Bisulfite-based sequencing for breadth and patterns in oncology research

- Discovery & signature development
- Broad methylation pattern analysis
- Multicancer analysis in research settings

MSRE + ddPCR technology for precision and sensitivity in oncology research

- Targeted biomarker validation in research samples
- Longitudinal sample analysis of epigenetic changes
- Low input, high-confidence quantification

References

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Visit [bio-rad.com/MSRE](https://www.bio-rad.com/MSRE) to explore expert-designed methylation assays to enhance your research.

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