METHYLDETECT
DNA METHYLATION ASSAYS

Technical Guide: What Is DNA Methylation?

Introduction

Scientists refer to the enzymatic addition of methyl groups (CH3) to the DNA molecule as DNA methylation. In mammals, researchers almost exclusively add methyl groups to cytosines at CpG dinucleotides. Furthermore, specific genomic regions display a high density of these dinucleotides, which experts define as CpG islands (CGIs).

Figure 1: Diagram showing chemical structures, methyl groups (CH3), and CpG dinucleotide sequences on DNA strands.

How Does DNA Methylation Regulate Genes?

When CGIs sit within promoter regions, DNA methylation typically acts to repress gene transcription.

- Specifically, over 60% of human protein-coding genes contain a CGI in their promoter.
- Consequently, these genes can potentially undergo regulation by DNA methylation.

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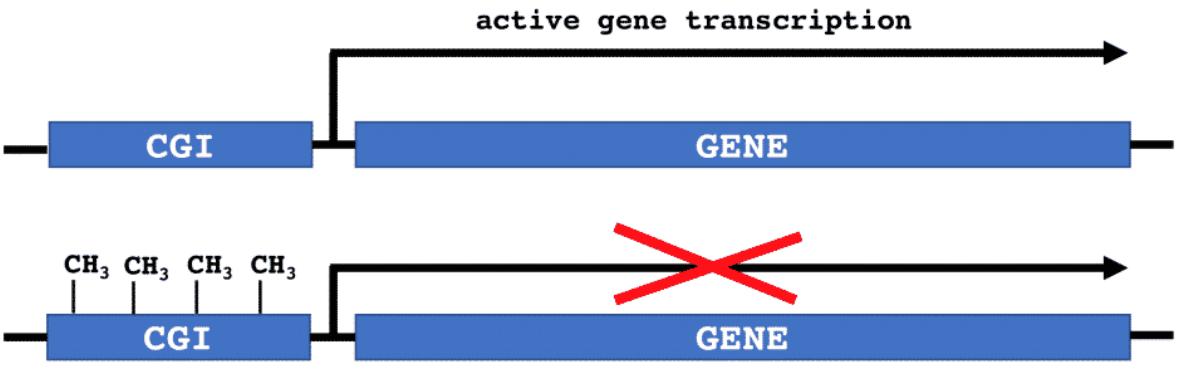

Figure 2: Schematic diagram showing active gene transcription with an unmethylated CGI versus transcriptional repression/silencing when methyl groups (CH3) are present on the CGI within the promoter region.

Biological Roles and Disease Relevance

DNA methylation actively regulates essential biological processes, including:

- Genomic imprinting
- X-chromosome inactivation
- Transcriptional repression of transposable elements
- Aging

Moreover, scientists have identified abnormal changes in DNA methylation patterns across many different conditions, such as:

- Cancer
- Inflammatory and autoimmune diseases
- Psychiatric and cardiovascular disorders
- Age-related diseases

Assay Support & Applications

Methyl Detect is dedicated to making MS-HRM technology accessible to clinical and academic researchers worldwide. We offer pre-validated, ready-to-use DNA methylation assays and reagents compatible with standard qPCR equipment.

For technical questions or to request an official quote for your laboratory, contact our team at info@methyldetect.com or visit www.methyldetect.com.

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