METHYLDETECT
DNA METHYLATION ASSAYS

Technical Guide: What is Epigenetics?

Introduction

Epigenetics is the study of heritable gene expression changes that do not involve alterations in the underlying DNA sequence. The prefix *epi-* signifies "on top of" or "in addition to", meaning epigenetic mechanisms function as a regulatory layer on top of genetics to control gene expression.

Primary Epigenetic Mechanisms

Gene expression regulation is primarily mediated through three distinct cellular mechanisms:

- **DNA Base Modification:** Covalent modification of DNA bases. Among these, **DNA Methylation** is the most widely studied mechanism leading to direct gene silencing and transcription regulation.
- **Histone Modification:** Genomic DNA inside the nucleus exists within a chromatin complex bound to histone proteins. Post-translational covalent modifications of these histones regulate physical access of the transcriptional machinery to the DNA strand.
- **Non-Coding RNA Regulation:** Post-transcriptional gene expression control mediated by functional non-coding RNA molecules, including microRNAs (miRNA) and small interfering RNAs (siRNA).

Assay Support & Applications

MethylDetect specializes in high-sensitivity EpiMelt MS-HRM assays designed for locus-specific DNA methylation profiling.

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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