

Epigenetic Therapies

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The discovery of DNA in 1953 marked a turning point in genetics. The completion of the “Human Genome Project” In 2003 allowed for the sequencing of approximately 3.3 billion nucleotides in the human genome. Following the project, genes could be sequenced and reveal which gene is responsible for which disease, thus making it possible to diagnose, treat, and prevent diseases from cancer to heart disease.

Other significant outcomes of discoveries was the emergence of epigenetics in 1942. Epigenetic marks such as DNA methylation, histone modifications, and non-coding RNAs play a central role in regulating gene expression without altering the DNA sequence. Beyond genetic variation, epigenetic mechanisms provide a regulatory layer linking environmental factors, cellular context, and disease susceptibility. Alterations in epigenetic marks can disrupt normal gene expression pattern, contributing to cancers, neurodegenerative, metabolic, and immune-mediated diseases.

From Kankaya S, Dincer Y. Epigenetic marks and promising epigenetic therapies. Academia Molecular biology & Genetics 2026; 3: 1-16. <https://doi.org/10.20935/AcadMolBioGen8132>.