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**Review**

# Pharmacoeugenetics: a new approach to predicting individual drug responses and targeting new drugs

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**Abstract:**

Epigenetics is the study of heritable changes in genes and gene expression that do not involve DNA nucleotide sequences. Epigenetic modifications include DNA methylation, several forms of histone modifications, and microRNA expression. Because of its dynamic nature, epigenetics provides a link between the genome and the environment and fills the gap between DNA and proteins. Advances in epigenetics and epigenomics (the study of epigenetics on a genome-wide basis) have influenced pharmacology, leading to the development of a new specialty, pharmacoeugenetics, the study of the epigenetic basis for variations in drug response. Many genes encoding enzymes, drug transporters, nuclear receptors, and drug targets are under epigenetic control. This review describes the known epigenetic regulation of drug-metabolizing enzymes and other proteins that might affect drug response and compounds that modify the epigenetic status.

**Key words:**

epigenetics, DNA methylation, histone modification, microRNA, pharmacoeugenetics, epigenetic drugs and chemopreventive agents

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