IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 11, May 2025
Impact Factor: 7.67

Genetic Variations and their Impact on Drug Metabolism and Efficacy

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Abstract: *Patients vary widely in their response to drugs. Having an understanding of the pharmacokinetic and pharmacodynamic properties of various medications is important when assessing ethnic differences in drug response. Genetic factors can account for 20 to 95 percent of patient variability. Genetic polymorphisms for many drug-metabolizing enzymes and drug targets (e.g., receptors) have been identified. Although currently limited to a few pathways, pharmacogenetic testing may enable physicians to understand why patients react differently to various drugs and to make better decisions about therapy. Ultimately, this understanding may shift the medical paradigm to highly individualized therapeutic regimens. Although patient response to drugs varies widely and the reasons for this are diverse and complex, experts estimate that genetic factors account for 20 to 95 percent of patient variability in response to individual drugs. Genetic influences on drug metabolism interact with other intrinsic (i.e., physiologic) and extrinsic (i.e., cultural, behavioral, and environmental) characteristics of a person to determine the out*

Keywords: pharmacodynamic

DOI: 10.48175/IJARSCT-27251