

## **PHARMACOGENOMICS: BASICS AND ITS APPLICATIONS**

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Pharmacogenomics is an emerging discipline that focuses on genetic determinants of drug response at the levels of entire human genome. It promises to improve the therapeutic drug response and reduce the adverse reactions to drugs. Polymorphism in the genes concerned with drug metabolism, transport and response are reported in different ethnic populations. Each drug is likely to interact in the body with numerous proteins, such as carrier proteins, transporters, metabolizing enzymes, and multiple types of receptors. These proteins determine the absorption, distribution, excretion, targeting to the site of action, and pharmacological response of drugs. Hence presence of multiple polymorphisms in these genes could affect the drug levels which in turn affect the drug response.

Various studies have shown that pharmacogenomics helps in reducing the ADRs, as it aims to predict which patients are likely to respond to a particular drug and which patients are likely to have significant ADRs . It is necessary to establish the frequency of mutation in different population /ethnic groups because a particular drug which may be a serious threat to one population (due to high frequency of mutant gene) may not be so serious to another population (due to low frequency of mutant gene), as genetic constitution varies between populations. Besides the drug therapy, genetic factors seem to have some role in susceptibility to diseases like cancer, hypertension, psychiatric illnesses etc.

Bioinformatics is an essential tool for pharmacogenomics research. It helps in identifying the mutation sequences, design of primers, selection of restriction enzymes and validating the sequence results.