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Pharmacogenetics / Pharmacogenomics: An Overview

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Interindividual differences in response to drug: Pharmacogenetics / Pharmacogenomics. Vogel in 1959 first proposed the term "*Pharmacogenetics*". Over 50 years down the lane examples of exaggerated responses to drugs, novel drug effects, or lack of effectiveness of drugs as a manifestation of inherited individual traits have been observed. Genetic factors influence a drug's action by affecting pharmacokinetic and pharmacodynamic properties. Unexpected, uncommon, or "abnormal" effects of drugs may be associated with certain genetically transmitted disorders. Under these circumstances, the modified drug response may have both diagnostic and therapeutic implications. These interindividual differences in response to drug are determined by combination of different factors; Physiological factors (sex, age), Pathological factors (liver disease, renal disease), Environmental factors (other drugs, diet, smoking), Genetic factors. How important each of these factors is, varies from drug to drug and individual to individual. So, pharmacogenetics explores the genetically determined alterations in the drugs usual metabolic pathways and these alterations are associated with the accumulations and toxicity of a drug and shifts to different pathways that have toxic intermediates. The extent to which genetic factor determine drug responsiveness is investigated by the means of population, family and twin studies. Goal of Pharmacogenetics; to understand how someone's genetic make up determines how well a medicine works in body, what side effects are likely to occur, thus making it a field of growing interest in medicine and pharmaceutical industry? The method of "genomics" have been increasingly applied to pharmacogenetics research as it emphasis on molecular structure and functions of genes. A relatively recent addition to the discipline is the field of "ecogenetics", which concerned with dynamic interaction between an individual genotype and environmental agents. Benefits; Pharmacogenetics studies have a vital role to play in every step involved in; Drug Discovery; Pathway Identification, Target Identification, Selection, Screening, Characterization, Validations. Drug Development; Preclinical studies, Clinical studies, Safety of the product launched in a population can be predicted with the availability of pharmacogenetic profile of drug, Marketing aspect of the drug.