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ROLE OF PHARMACOGENETICS WITH CHANGING ASPECT IN BIOMEDICAL SCIENCE OR ITS FUTURE PROSPECTUS

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INTRODUCTION OF PHARMACOGENETICS

There is a lack of agreement about the precise terminology to describe how genetic information is related to individuals' responses to medicines. Various definitions of Pharmacogenetics and pharmacogenomics have been put forward and the terms are sometimes used interchangeably. There early examples, How a genetic component were identified through studies of families or ethnic populations, and careful testing of the phenotype. In common with many fields in the biomedical sciences, advances in molecular biology transformed pharmacogenetics. Therefore, that the focus is now on the specific gene and the sequence variability that is contributing to the variable drug response.

Pharmacogenetics: Isthe study of the effects of genetic differences between individuals in their response to medicines. Pharmacogenetics are inherited in the same way as "inborn errors of metabolism". However the condition may not be recognized until the individual is challenged with the drugs and exhibit s an abnormal response. These differences may or may not be related to the disease being treated. Research in pharmacogenetics involves comparing genetic data from individuals who have different responses to a medicine. Thus Pharmacogenetics is the study of how people respond to drug therapy. Although this science is still new, there have been many useful discoveries. It has long been known that genes influence the risk of developing certain diseases, or that genes could determine traits such as hair and eye color. Genes can also alter the risk of developing different diseases. It has long been known that people of African descent were more likely to have sickle cell anemia than people of other races. Some common example of pharmocogenetics disorder are listed below.

a) Abnormally low amount of enzyme or Defective protein.

b) Increases resistance to drugs.

C) Response related to drug metabolism.

d) Disorders of unknown Etiology with probable Genetics

CONCEPT OF PHARMACOGENETICS

The long term goal is to understand the mechanisms involved in drug dependence by identifying the choice of drug and dosage that will be most effective. Currently, pharmacogenetic investigations, particularly those focused on proteins other than the drug metabolizing enzymes, usually begin with an understanding of the sequence variability in a relevant gene, and then focus on how this genetic variability influences the drug response phenotype. For example, genetic differences in nicotine metabolism alter risk for smoking, amount smoked, ability to quit, and risk for cancer.

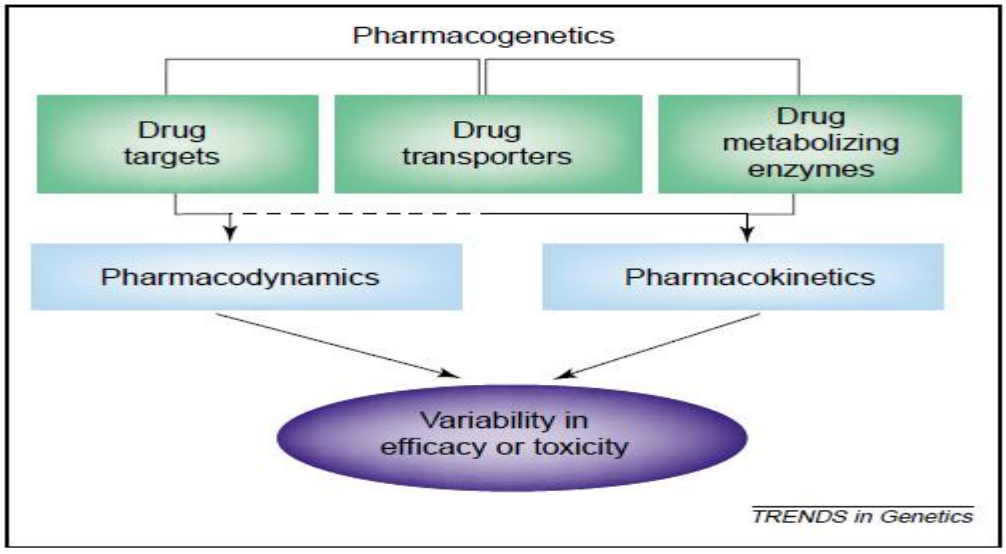

Figure 1. Key components in pharmacogenetics. There are two broad areas of

Clinical application of pharmacogenetics

Currently one of two general treatment approaches is typically employed in the pharmacological managementof disease. The first is a trial and error approach, employedfor drug treatment of diseases such as hypertension,diabetes, depression, schizophrenia, arrhythmias, esophagealreflux and others. For these diseases, there areseveral drugs that are reasonable first line therapy. In both scenarios, a certain percentage of patients will obtain no benefit from a given drug, or will experience serious adverse effects. Although reducing pharmacokinetic-related toxicities through pharmacogenetics is currently possible in some situations, reducing toxicities that are not predictably related to drug concentration might be more challenging. A genetic test can be defined as a test to detect the presence orAbsence of, or change in, a particular gene or chromosome. This can be done directly,

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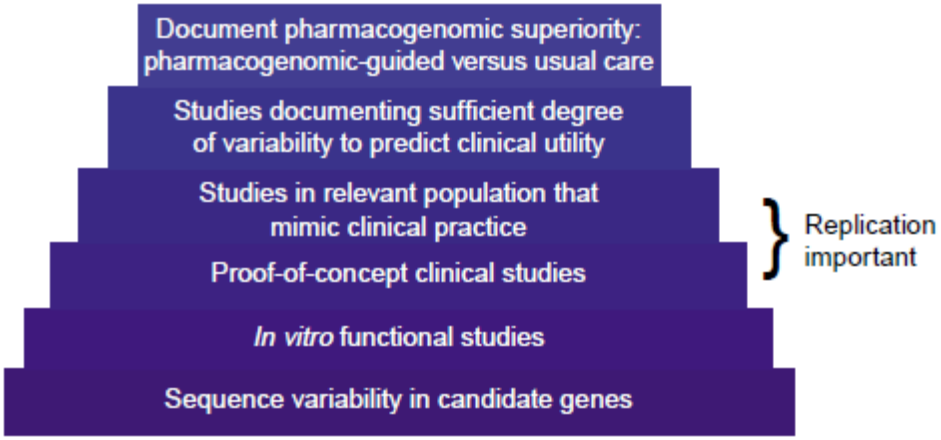
byAnalyzing the chromosomes or DNA of an individual, or indirectly, by examining the productsof their DNA, such as RNA or proteins .some cases, the presence or absence of particular genes can be determined by Consideration of the family history of an individual, or simply by clinical observation. In pharmacogenetics, the same types of direct or indirect tests for a gene sequence Or gene products are applied to test for response to a medicine. We use the termpharmacogenetic test to refer to both types of test. A pharmacogenetic test might examine inherited DNA or somatic mutations in DNA.

CURRENT STATUS OF PHARMACOGENETIC TESTING IN THE CLINICAL SETTING

Previous study highlights the potential clinical benefits associated with the use of genetic information in drug therapy and decision-making. In order for a pharmacogenetic test to be useful clinically, there must be enough evidence that the genetic information has sufficient predictive value to provide meaningful information to clinicians. In most cases, this is not yet the case. There seems to be two major reasons why genotyping of certain drug metabolism polymorphisms has reached the point of clinical utility, whereas the genotyping other pharmacogenetic markers have not, namely:
1) The type of mutation; and (ii) the relative contributionof the protein in question to the PK or action of the drug Sequencevariability in the genes for any of the downstream proteinsmight contribute to variable drug response. Therefore, it seems likely that for most drugs, pharmacogenetics has the greatest potential to be clinically useful if information on multiple genes is used to predict efficacy or risk of toxicity.

FUTURE PERCEPTIONS OF PHARMACOGENETICS

The past ten years have provided substantial evidence that genetic polymorphisms in drug metabolizingEnzymes, drug transporters and drug targets contribute to interpatient variability in drug efficacy and toxicity risk. An important goal for the next decade is to advance the field to the point that significantly more drugs might be individualized for patients based on their genetic information. There is currently very little information available regarding the attitude of patients towards pharmacogenetic testing, and research in this area would be welcome.



1) pharmacogenetic testing could lead to patients not receiving the best care. Even more serious is the possibility that a medicine may beadministered without an associated pharmacogenetic test, and result in a serious, predictable and avoidable adverse reaction.

2) pharmacogenetic tests may, on the onehand, enable the individual to know more about his or her condition, to feel more controlover the treatment, and ultimately to receive a better level of care.

3) Topic of pharmacogenetics because of its potential to improvepatient care substantially, by reducing the number of adverse reactions, improving efficacyof treatment and facilitating the development of new medicines. And it is timely topharmacogenetics, because it is a technology that is just beginning to findsignificant clinical application and whose range may accelerate in a period of just a fewyears, possibly more rapidly than other clinical applications of genetics.

The impact of pharmacogenetics

1) The application of pharmacogenetics to the development of new medicines and otherproducts such as vaccines has implications for the way in which basic research and clinicaltrials are designed and managed, and for the cost of undertaking clinical trials.

2) Pharmacogenetics could be of use inunderstanding features of diseases that may direct treatment, as in the case of Herceptin. The next stage involves identifying compounds that may be suitableas medicines. Many compounds will be identified, and pharmacogenetics may sometimes behelpful in eliminating those that are unlikely to be effective in large groups of people.

CONCLUSION

Pharmacogenetics blends important components of thedisciplines of genetics and pharmacology, and aims to describe the influence of inheritance of variable genetic polymorphisms that contribute. To variable drug response have expanded dramatically inthe past

decade. There is clear evidence that geneticpolymorphisms in drug metabolizing enzymes contributeto variable PK, and this is most dramatic for those patients who have inactivating mutations. There is also mounting evidence that sequence variability in the genes for drug transporters and drug targets contribute importantly to variable drug response. There is sufficiently strongevidence for a few drug metabolism examples, but most pharmacogenetic cases require additional research tobring them to the point of having sufficient predictive power. Although much work remains, it seems likelythat in the future the decision to use an increasing number of drugs will be made on the basis of the patient'sGenetic make-up

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