Editorial

iMedPub Journals
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Journal of In Silico & In Vitro Pharmacology
ISSN 2469-6692

2021
Vol.7 No.1:2

Role of Pharmacogenomics in Drug Discovery and Development

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Received: January 01, 2021; **Accepted:** January 14, 2021; **Published:** January 21, 2021

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Citation: D'souza A (2021) Role of Pharmacogenomics in Drug Discovery and Development. In Silico In Vitro Pharmacol Vol.7 No.1:2

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Pharmacogenomics is a resource that collects curates and disseminates information about the impact of human genetic variation on drug responses. The best recognised examples are genetic polymorphism of drug-metabolising enzymes, which affect about 30% of all drugs. A major limitation that has heretofore moderate the use of pharmacogenetic testing in the clinical setting is the lack of prospective clinical trials demonstrating the testing can improve the benefit ratio of drug therapy. Adverse drug reactions are a significant cause of morbidity and mortality. In clinical studies pharmacogenetic can be used in stratification of patient based on their genotype, which correspond to their metabolizing capacity. This helps in prevention of various adverse drug reaction and better outcomes of clinical trials. At present the traditional method of selection of drug and dosage form is replaced by the pharmacogenetic method.

The various treatment therapies like cancer chemotherapy and oral-anticoagulant are now carried out with the help of pharmacogenetic status of patients, to minimize the toxicity and failure of the drug therapy. Many drugs that are currently available are "one size fits all", but they don't work the same way for everyone. It is difficult to predict who will benefit from a medication, who will not respond at all. With the knowledge gained from Human genome project researchers are learning how inherited difference in genes affects the body's response to medication. These genetic differences will be used to predict whether will be effective for a particular person and to help prevent adverse drug reaction.

Pharmacogenetic studies can use at various stages of drug development. The effect of drug target polymorphism on drug response can be assessed and identified. In current time though pharmacogenetic studies are being done extensively for research, its application for drug development needs to get started on a large scale. The major determinants of success of a new dry compound, *via* safety and efficacy, have become more predictable, with the advent of pharmacogenetic studies.

The ability to predict a patient's drug response on the basis of their genetic information is expected to decrease attrition during the development of new, innovative drugs, and reduce adverse events by being able to predict individual patients at risk. Most pharmacogenetic investigations have focused on drug-metabolism genes or candidate genes that are thought to be involved in specific diseases. New forms of effective and efficient collaboration between industry and academia that may enhance the systematic collection of pharmacogenetic data are necessary to establish genetic profiles related to drug response, confirm pharmacogenetic associations and expedite the development of new drugs and diagnostic tests. Pharmacogenomics will increase the number of new viable drug targets and decrease the risks associated with development. Incorporating pharmacogenomics into drug development will eliminate the unpredictable response of drug treatment due to genetic polymorphisms that affect metabolism, clearance and tolerance. The efficacy of new drugs will become more predictable as we correlate genetic changes in drug targets, receptors and transporters with associated patient response.