

### **Pharmacogenomics - a new approach towards personalized medicine**

Madam, "One size does not fit all." This statement holds true from everyday life in case of drug therapy also. Different patients respond differently to the same dose of a drug. The inter individual variability in drug efficacy and toxicity is related to several factors such as age, sex, race and inherited differences in the genes that control drug disposition and effects in humans.<sup>1</sup> Pharmacogenomics refers to the entire spectrum of genes that determine drug safety and efficacy whereas pharmacogenetics refers to monogenic variants that affect drug response.<sup>2</sup>

Genetic variations can influence drug action in many ways. Commonly it may affect the drug metabolizing enzyme (CYP450), the site of drug action (receptors), and the drug transporters (p-glycoprotein).<sup>3</sup> The safety and efficacy of many commonly prescribed drugs like aspirin, isoniazid, omeprazole, warfarin, hydralazine etc are affected by the genetic makeup of individuals. There may be a lack of therapeutic efficacy for a drug or may predispose the individual to be more susceptible to adverse drug reactions, a major cause of morbidity and mortality with drug therapy.<sup>4</sup> The pharmacotherapy of diseases like asthma, hypertension, depression is also influenced by genetic variations.

Personalized medicine deals with the prescription of specific therapeutic agent best suited for an individual based on the pharmacogenetic and pharmacogenomic information.<sup>5</sup> By understanding the genetic variations in an individual, it becomes easy for a clinician to select the appropriate drug in an adequate dose best suited for the individual.

In the future, pharmacogenomics can offer benefits like proper determination of drug dosage, and production of better vaccines and can definitely reduce the healthcare costs and helps to enable drug safety by understanding the genetic profile of an individual.

Since, pharmacogenomics deals with the genetic information of the individual, the ethical issues gain importance. The integration of pharmacogenomic information into clinical practice will also require clinical trials to assess their clinical usefulness, affordability, ease of application, and ease of interpreting the results.

Though there are many limitations associated with the extrapolation of pharmacogenomic data to clinical practice, the day is not far away when a clinician will change his/her decision about a drug considered for the patient because the patient's genetic profile indicates that he/she could suffer serious adverse effects due to the medication.

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