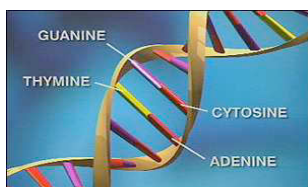


Pharmacogenomics

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Pharmacogenomics is the study of how a person's genetics affects their response to drugs administered to the body. The field is an intersection of pharmaceuticals and genetics as the name implies and aspires to one day be able to create drugs that are tailor made to an individual's genetic make-up.



Every year approximately 100,000 thousand American patients are possibly killed due to adverse drug reactions and over 2 million people have serious reactions to medication.

One of the earliest indications of this involved a muscle relaxant, suxamethonium chloride. One in 3500 Caucasians have a less efficient variant of the enzyme (butyrylcholinesterase) that metabolizes the muscle relaxant. Another noted case involved the enzyme thiopurine methyltransferase (TPMT) which metabolizes two drugs, (6-mercaptopurine and azathioprine), that are used in treatments for illnesses such as childhood leukemia or some autoimmune diseases. When the body doesn't have the proper enzyme to metabolize a drug it must resort to other method and pathways which can be potentially very harmful. In this particular case the metabolite produced is toxic and can lead to "bone marrow suppression" which is potentially fatal.

Many benefits are foreseen by the development of this field. Instead of doctors making a guess about a patient's dosage based on weight and age, they would be able to prescribe medication based on a patient's genetic profile. Potentially this could lead to advanced screening for disease so preventative measures could be taken as well as better vaccines and more effective drugs created.

Like all developing fields, though, pharmacogenomics has many obstacles yet to face. For one, the knowledge that a certain drug could harm an individual only limits the drug alternatives available to treat an illness. Also the pharmaceutical companies may have much to object to as designer drugs may be too costly at first for all to benefit. In addition the process of prescribing and dispensing drugs would be complicated.

All the technicalities aside, the biggest obstacle is probably the fact that Pharmacogenomics is still very much in the research stage and not a whole lot is known about single nucleotide polymorphisms.



Single nucleotide polymorphisms are DNA sequence variations that occur when a single nucleotide in the genome sequence is altered. Scientists believe SNP maps will help them identify the multiple genes associated with complex diseases such as cancer, diabetes, vascular disease, etc.

Sources:

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