# Pharmacogenetics testing offers way to reduce deaths from drug toxicity

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On average, a drug on the market works effectively for only 50% of the people who take it. Would you want to prevent a potential adverse drug effect or even toxicity through a simple test? It's not science fiction, but a reality. Pharmacogenetics (PGx) is the study of an individual's variation in DNA sequence related to drug response. The goal is to select the right drug at the right dose, and to avoid adverse drug reactions or ineffective treatment.

Dr. Tara Sander, Associate Professor of Pathology, Pediatric Pathology, Medical College of Wisconsin, and Scientific Director of Molecular Diagnostics, Children's Hospital of Wisconsin, is first author of a poster to be presented at Experimental Biology 2011 in Washington, DC, on Monday, April 11, in an American Society for Investigative Pathology session on "Better Research Through BioOmics." She led a study that aimed to develop a PGx test for forensics. The PGx test can be used on a living or deceased person; in cases of death, the test can help identify whether the drug toxicity was due to the person's genotype and therefore provide forensic evidence that supplements medical history, scene investigation, autopsy, and toxicology for death certification. Sander and colleagues looked at specific genetic variants to see if the selected assays detected the correct genotype in the samples. The results showed that ABI TaqMan Drug Metabolism Genotyping and Copy Number Variant assays detected the correct genotype in 52 of 54 samples with 96% accuracy.

Sander's clinical test refers to the promise of Personalized Medicine, a

term used frequently by former NIH Director Elias Zerhouni to define the use of information about an individual patient to select or optimize their medical care. More recently, the term Personalized Justice has been defined as using genotypic information to complement Personalized Medicine and to help explain drug-related toxicity, sensitivity, impaired performance, and behavioral changes. These two ideas complement each other and can lead to better drug therapy.

"Moving forward, pharmacogenetics testing is at the forefront of reducing adverse drug reactions and increasing drug effectiveness. Hopefully more physicians will apply this to their drug treatment plans and reduce toxic cases/deaths," said Sander. Patients would ideally be tested in advance to determine which medications would work best and at what dosage.

"There are still cases in which a person receives the wrong drug or the wrong dose. With knowledge of their genotype, this could be avoided," said Sander. Because insufficient genotype-phenotype associations still remain, research needs to be done to show a direct correlation between variation and side effect for specific drugs. Sander hopes that clinical studies will further elucidate the correlation between the genetic variation and the studied phenotypic side effect.

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