

[Pain Management](#)

Could genetic testing help doctors treat pain more effectively?

By Dr. Anita Gupta. Published August 06, 2013 [FoxNews.com](#)

Approximately \$300 billion is wasted each year on drugs that do not work in people who carry certain genes, according to experts. These people never receive the full benefit from these drugs, while others experience dangerous side effects.

In order to treat individuals who have had many failures with drugs, some doctors are turning towards personalized medicine - which provides a method by which doctors can customize medication regimens so that they are effective from the start.

What role does genetics have in pain?

Research shows that genetic factors account for a substantial proportion of all elements contributing to a patient's response to drugs (others include age, sex, weight, general health and liver function).

Genes provide your body with instructions for making enzymes, which help break down drugs in your system, allowing your body to benefit from the medicine. Differences in your enzymes can affect how your body metabolizes a drug and how long the drug stays your body - and thus, how well drugs may work in an individual.

In particular, common pain medications require activation by an enzyme called CYP2D6 to become effective. Approximately half of patients have genes that alter the function of CYP2D6. Testing for these gene alterations allows for changes to dosage regimens in order to compensate for altered metabolisms - and optimizes the safety and efficacy of pain medications.

Without knowing an individual's specific genetic code, physicians may often need to go through months of trial-and-error prescribing to find the right drug and dose. Physicians are often baffled when a drug will work for one person but not for another with the same diagnosis. The fact of the matter is that physicians really do not know how to predict drug effectiveness or toxicity because everyone is different. Genetic testing helps assess drug responsiveness. An individual's genes can be a map that serves as a guide for physicians.

What is Pharmacogenetic Testing (PGT)?

A simple saliva test can evaluate an individual's ability to metabolize or process drugs. Pain medications such as hydrocodone, oxycodone, diazepam and morphine utilize the CYP2D6 enzyme in order to metabolize the drug. As a drug gets metabolized, it is broken down into harmless pieces and eventually cleared. The activity of your clearance system is based on your genetic code. Once tested, this knowledge about an individual's unique drug metabolizing system can help guide physicians.

What is the purpose of PGT?

Physicians would like to be able to anticipate how one may respond to a drug instead of relying on a trial-and-error process. By knowing the specific way one may break-down drugs, a physician can tailor treatment according to an individual's unique metabolism and immediately find the right drug. Not only will this information help physicians predict which drug will best treat pain, a physician will also be able to predict the effective dose and potential for toxicity. In theory, this knowledge has the potential to save time, money and lives.

Pharmacogenetic testing (PGT), specifically, is exceedingly important for the proper management of pain because finding the precise drug and dose for each patient is so critically important. The groundbreaking development of PGT testing provides more individualized drug treatment for patients while also reducing adverse effects.

What if someone is an ultra-rapid metabolizer?

Ultra-rapid metabolizers break down medications really fast. Individuals who often receive medications that do not work or frequently need double doses of medication in order to relieve pain may be ultra-rapid metabolizers.

What if someone is a poor metabolizer?

Poor metabolizers tend to have severe side effects at low doses. Instead of going through one medication trial after another only to get sick every time, this test allows physicians to determine whether or not someone is a poor metabolizer, and act accordingly.

When is testing appropriate?

Undergoing genetic testing is a once in-a-lifetime experience because your genes do not change over time. Since many drugs are metabolized by one enzyme, you may only need one test. Once you are tested, you can keep your genetic test results for the rest of your life and share them with future care professionals. If one uses several medications (polypharmacy) and/or if several medications have failed to work properly, PGT may be appropriate to consider.

The Bottom Line:

Pharmacogenetic testing is now available with most physician pain specialists. The results of these genetic tests may help doctors: adjust the dose of medications more efficiently, prescribe medications that will work properly and give the patient the full benefit of the drug. It can also help people avoid medications that may be more likely to cause dangerous side effects and will often save money for patients in the long run. Drug responses don't have to be a mystery now that treatments can be tailored to custom fit an individual's specific genetic code.

Dr. Anita Gupta is an Award Winning Johns Hopkins Trained Anesthesiologist, Pain Specialist, Pharmacist & Editor. She currently is Associate Professor & Medical Director at Drexel University-College of Medicine in Philadelphia, PA. She has completed the Wharton Total Leadership Program, is an active member of the World Health Organization, founder of Women in Medicine, and has been featured on Fox News, NBC, and HealthTime TV as a international medical expert.