GENETICS AND CHEMICAL ILLNESS

Genetic impairment in detoxification ability occurs in the majority of Americans, but the types of impairment differ between individuals. This affects/impairs the ability to tolerate drugs and other chemicals. Researchers Dr. Schnakenberg and others documented that detoxification impairment is common in people with chemical sensitivity and chemical illness. (Environmental Health Feb. 10, 2007.)

Genetic Testing

Genetic (also called genomic) testing is performed in the United States by Genova Diagnostics (laboratory) (800-522-4762), as well as certain other laboratories, e.g. Mayo, etc. Genova has specialized testing for chemical illness (Detoxigenomic testing). The results correspond well with what I have seen in my own patients.

Genetic testing can show whether a person has inherited specific differences from one or from both parents. Genova Diagnostics has a broad test panel called a detoxigenomic panel. They also provide the patient with a list of drugs that they will have more difficulty with, and other ways to improve health, for each impaired detoxification pathway. They only test genetic changes that are both common and treatable.

Actually, genetic limitations in detoxification are very common in the general population, perhaps because before wide use of chemicals and drugs. These changes did not affect survival.

Because detoxification impairments are common, people in general need far better protection from unnecessary use of chemicals and drugs.

This testing may not be covered by insurance and could lead to insurance discrimination. However, it only has to be done once in a lifetime.

Genetic Changes in Patients with Chemical Illness

I discuss below detoxigenomic test results on all 16 patients tested in my practice: they all had chronic symptoms and effects of various forms of chemical injury. All 16 consecutively tested chemically ill patients had four or more specific types of detoxification impairment, but the individual patterns differed sufficiently to make genomic testing clinically useful.

Cytochromes are used for the first detoxifying step for many substances. Fifteen of 16 had multiple impairments in cytochrome pathways. However the specific cytochrome(s) (also called cytochrome P450 system) impaired were not the same. The most commonly affected was cytochrome 1B1 (13 of 16), the second was 2C9 (7 of 16) and third was 1A1 (4 of 16). Some of these cytochromes are also drug detoxification pathways and impair or affect drug dosage and side effects.

Glutathione is a major detoxifying pathway for chemicals, toxic metals and some drugs. Fourteen had impairment in glutathione conjugation, with the vast majority (11) having homozygous (from both parents) impairment in GSTM 1, 4 impaired with GSTP1, two with both and only one having normal glutathione function.

SOD (superoxide dismutase) is an essential protective enzyme from “free radical” damage. Eleven of 16 tested had impairment in SOD function in “extracellular” tissue like blood, lymph, and fluid between cells. This allows higher levels of the free radical called superoxide.

Superoxide combines with nitric oxide from chemical exposure to form damaging peroxynitrite. This change makes people more susceptible to become chemically sensitive.

Acetylation is another very important pathway of detoxification. Of the 16 patients tested, 15 were slow acetylators (NAT) for some NAT functions, but 11 were "fast acetylators" for other functions. They can convert some substances to a more toxic form faster than the body can handle.

COMT is essential in processing estrogens to a non-cancer substance, thus helping protect women from breast cancer and men from prostrate cancer.

COMT enzyme (catechol-o-methyl transferase) is also needed to normally process (methylation)/ adrenalin and also detoxification of various toxins and drugs. COMT was impaired in 12 of 16 tested, with total impairment (both parents) in 4.

Folic Acid Impairment

Bioactive folic acid (MTHF) is a vital "methyl donor" for many body processes, including brain function and DNA repair. Some insurers will reimburse testing for the genetic ability to convert folic acid into the bioactive form (MTHF or methyl tetrahydrofolate). There are two genes involved: C677T and A1298C. Either can be affected partly (one parent) or completely (both parents). With significant impairment, that person needs a MTHF supplement (about 1mg daily).

Quest, Genova Diagnostics and some other labs test MTHF genetic changes. SpectraCell Laboratories testing measures whether the amount of bioactive folate is ample.

Folic acid (not the MTHF form) has been reported to help reduce effects from exposures to aldehydes. It can also help to calm the autonomic nervous system, and this approach is beginning to be used clinically.

Confidentiality

Genova Diagnostics does not allow reimbursement through insurers to avoid the problem of insurance discrimination. We know that such discrimination is illegal, but proving discrimination is difficult. Thus, not running it through the insurer helps prevent discrimination.

We all know that corporations are legally allowed to have trade secrets. This protection is even extended in certain situations where the trade secret ingredient is a cancer agent or otherwise hazardous substance. We also know that the law does not require the fragrance industry to disclose any of the ingredients of their products even though labs can determine ingredients through specialized testing. Even physicians are not legally allowed to obtain "trade secret" ingredient information on scented products from the manufacturer!

It would seem that if corporations are legally permitted to have trade secrets regarding hazardous chemicals, (and since insurance or other discrimination based on genetic differences is illegal), then protecting confidentiality on genetic test results seems medically and ethically reasonable.

Why be tested?

There are many other reasons why individuals may want to know if they have specific genetic changes. For drugs that are involved, they may wish to either avoid the drug or use it at lower doses if the detoxification pathway is slower or impaired. Genova Diagnostics provides a fairly detailed listing of such drugs and lists some other protective measures with the test report to the patient.

The effects of many of these changes can be reduced by ingredients in the neural protocol. See www.chemicalinjury.net under New Treatment for more information about specific ingredients and their functions.

I also provide additional information to patients about other protective steps that they can take, based upon their specific genetic results. Because this information is individualized according to the patient circumstances, it is not on this website. Some of the common features apply, but may not be feasible for all patients.

Do genetics "cause" chemical Illness?

No! Detoxification changes are common in the general public. Most chemical illness in patients I see is occupational in origin. People "tough it out" until they are disabled because they need the income and/or do not know the chemical cause/seriousness until it is too late. More genetically susceptible may get sick sooner, others later, but most continue working until disabled.

The same is true for home contamination: the person is sick and needs housing. Susceptible people may leave/correct their home sooner, others later, but only if they know the home is making them sick.

The answer is LESS TOXINS. Some impaired detoxification affects the vast majority of people in the general public: our bodies are not designed for the greatly polluted workplaces and schools.

Chemical Injury without Early Warning

Chemically exposed people who do not get early warning symptoms can go on to later develop Lupus, other autoimmune disease, Parkinson's disease, Alzheimers, ALS, chronic fatigue, many other chronic inflammatory and degenerative diseases, increased cancer (especially brain, lymphatic, breast, etc. Chemicals are a major factor in our growing cancer epidemic.

These people did not get or notice early warnings. Both nontoxic/less toxic controls and genomic testing help prevent these diseases.

Summary

My patient data as well as the Environmental Health article of Feb. 10, 2007 both confirm that **patients with chemical illness appear likely to have multiple genetic detoxification impairments**. This has helped patients who have been tested to be taken more seriously by their other treating physicians, family members, etc.

In addition, it allows a person who has been tested, when provided proper information, to know what steps to take to improve their health despite genetic challenge.