Environmental Exposure and Detoxification

Gauge the Body’s Ability to Eliminate Toxins

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Environmental Exposure and Detoxification

Environmental chemical exposure has never been more pervasive with thousands of chemicals in use around the world. Many chemicals are integrated into our food supply, the air we breathe and the water we drink. Every day, we ingest tiny amounts of these chemicals and our bodies cannot metabolize and clear all of them. Chemicals not metabolized are stored in the fat cells throughout our bodies, where they continue to accumulate.

As these chemicals build up they alter our metabolism, cause enzyme dysfunction and nutritional deficiencies, create hormonal imbalances, damage brain chemistry and can cause cancer. Because the chemicals accumulate in different parts of the body—at different rates and in different combinations—there are many different chronic illnesses that can result.

Doctor’s Data offers a spectrum of tests designed to evaluate the exposure to environmental toxins and markers of the body’s capacity for endogenous detoxification.

The World Health Organization (WHO) estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to environmental pollution.
DNA Oxidative Damage

Oxidative stress has been associated with many diseases, including bladder and prostate cancer, cystic fibrosis, atopic dermatitis, rheumatoid arthritis, and a wide range of neurological conditions, including Parkinson’s disease, Alzheimer’s disease and Huntington’s disease. It has also been correlated with the severity of diabetic retinopathy and neuropathy.

Oxidation of DNA occurs readily at the guanosine bases, so measurement of 8-hydroxy-2'-Deoxyguanosine (8-OHdG) in urine provides a quantitative assessment of ongoing oxidative damage or stress in the body.

When 8-OHdG levels are elevated, it’s important to identify the sources of oxidative stress and assess the primary intracellular antioxidant glutathione. Taking steps to reduce oxidative stress is valuable in optimizing health and longevity. This non-invasive test requires a single first morning void urine collection.

Results are presented in a clear, easy-to-understand report.
Glutathione, Erythrocytes

Glutathione (GSH) is the most abundant and important intracellular antioxidant, and GSH levels in erythrocytes can be used to effectively gauge overall health of cells and of the ability to endure toxic challenges.

Low levels of GSH have been reported in cardiovascular disease, cancer, AIDS, autism, alcoholism and debilitating neurodegenerative diseases such as Alzheimer’s disease and Parkinson’s disease. It has also been associated with chronic retention of many potential toxic elements, chemicals and some drugs. Assessment and support of erythrocyte GSH can contribute to healthy aging and effective detoxification of toxic metals and chemicals.

Glutathione (GSH) is a tripeptide (L-glutamyl-cysteinyl-glycine) synthesized in most cells. The level of GSH in erythrocytes is a sensitive indicator of intracellular GSH status, the overall health of cells, and of the ability to endure toxic challenges. GSH is the most abundant non-protein thiol in mammalian cells. It is involved in many biological processes including detoxification of xenobiotics, removal of oxygen-reactive species, regulation of the redox state of cells and the oxidative state of important protein sulfhydryl groups, and regulation of immune function. GSH levels are thousands of times higher in cells than in plasma. Plasma GSH represents primarily that which has been synthesized by cells outside of the liver. Reduced GSH (gGSH) is the active form of the tripeptide and the ratio of gGSH to oxidized GSH (GSSG) is normally about 9:1. Once a blood sample is obtained, Erythrocyte gGSH is very susceptible to oxidation and the gGSH/GSSG ratio drops rapidly. Specimen handling to prevent the ex vivo oxidation of gGSH is impractical and direct measurement of gGSH in vivo is not feasible outside of a research setting. However, research clearly indicates that undesirable ratios of gGSH/GSSG are equally associated with abnormally low levels of total cellular GSH. Therefore, it is clinically meaningful to assess the level of total erythrocyte GSH as an indicator of GSH status and metabolism.

Low levels of GSH have been reported in cardiovascular disease, cancer, AIDS, autism, alcoholism, debilitating neurodegenerative diseases such as Alzheimer’s and Parkinson’s, and chronic retention of potential toxic elements (mercury, lead, arsenic, cadmium, manganese, iron), chemicals, and some drugs. Intracellular GSH biosynthesis and intracellular levels can be upregulated as a protective mechanism. Some factors that result in increased biosynthesis and “high normal” erythrocyte GSH levels include, but are not limited to, moderate alcohol consumption, smoking, regular physical exercise, and acute exposure to toxic metals. Under such conditions it is essential to provide the body with the key nutrients involved in GSH synthesis in order to sustain functionally appropriate levels of GSH. Magnesium and potassium are required for both energy dependent enzymatic steps in GSH synthesis; cysteine is the rate limiting amino acid. Nutritional products that have been documented to increase erythrocyte GSH/GSH biosynthesis include high quality whey protein preparations, α-lipoic acid, curcumin, oral liposomal GSH, n-bulized GSH, and to a lesser extent, N-acetyl-L-cysteine.

Assessing and supporting appropriately high levels of erythrocyte GSH is important towards protecting cells, overall health and longevity, and contributes significantly to safe and effective metal detoxification.
Hepatic Detox Profile

The body continually attempts to eliminate chemical toxins through enzymatic processes in the liver. Urinary D-glucaric acid, a byproduct of Phase I detoxification, can indicate chemical exposure to over 200 chemicals. Urinary mercapturic acids are excreted end products of Phase II detoxification. Together, assessment of these two analytes provides valuable information about exposure to xenobiotics, liver disease and the ability of the liver to eliminate toxins. This non-invasive test requires a single first morning void urine collection.

Results are presented in a clear, easy-to-understand report which graphically illustrates target ranges and areas of concern.
Urine Porphyrins

Abnormal levels of urinary porphyrins, oxidized metabolites of heme biosynthesis, are associated with genetic disorders, metabolic disturbances and diseases, anemias and oxidative stress, as well as exposure to toxic chemicals or metals. Specific urine porphyrin profiles are associated with high-level exposure to mercury, arsenic, lead and some chemicals and drugs. Precoproporphyrins, associated with mercury, are reported separately and per unit of uroporphyrin to increase detection even when heme biosynthesis is low. This non-invasive test requires a single first morning void or 24-hour urine collection.

Abbreviated Porphyrinogen/Heme Metabolism

Results are presented in a clear, easy-to-understand report which graphically illustrates target ranges and porphyrinogen/heme metabolism.

For more information about all available tests, clinical information and sample reports, visit doctorsdata.com.
DNA Methylation Profile

The DNA Methylation Profile allows clinicians to screen patients for a variety of genetic variants—single nucleotide polymorphisms, or SNPs—that may impact the function of important biochemical processes such as methionine metabolism, detoxification, hormone balance and vitamin D function. The presence or absence of SNPs may modify disease risk. The risks may be reduced by lifestyle changes, and inefficient biochemical processes can be supported by diet and nutritional supplements to maximize the functions of metabolic pathways.

Identifying single nucleotide polymorphisms (SNPs) that may influence health and rise for diseases facilitates clinical support for patients. The Doctor’s Data DNA Methylation Profile includes a variety of SNPs known to influence many aspects of health including:

- Insulin sensitivity
- Bone health
- Cancer risks
- Cardiovascular health
- Detoxification processes
- Fertility
- Mitochondrial function and metabolism
- Methylation
- Neurotransmitter balance

The SNPs affecting detoxification and methylation become even more important if a patient has been exposed to toxicants such as mercury, lead or bisphenol A (BPA). Lead and BPA inhibit the function of methyltransferases, and mercury inhibits methionine synthase, an important enzyme in the re-methylation of homocysteine. Methylation is an essential step in the detoxification and elimination of arsenic and other xenobiotics. Normal methionine metabolism is a critical component of Phase II detoxification processes—the B-12 and folate-dependent transmethylation and B-6 dependent transsulfuration pathways convert homocysteine to cysteine. Cysteine is an important precursor in glutathione biosynthesis.

The greatest difficulty in interpreting SNP results is determining the extent to which a DNA genotype is phenotypically expressed. Functional tests combined with evaluation of the patient’s symptoms and responses to intervention are necessary to assess the influence of known SNPs on the phenotype. The Doctor’s Data Plasma Methylation Profile is one such test—it provides a direct assessment of several major metabolites that indicate genetic and epigenetic affects. The Plasma Methylation Profile is a functional follow-up test when SNPs affecting methionine metabolism are identified.

Results are presented in a clear, easy-to-understand report that graphically illustrates target ranges and areas of concern. Result-specific commentary is provided.
OUR MISSION:

To research, develop and offer innovative specialty tests that help doctors identify health risks and improve outcomes for patients with chronic conditions.

To educate and support healthcare professionals.

To improve lives through science.

About Doctor’s Data

Doctor’s Data, Inc. has provided innovative specialty testing to healthcare practitioners around the world from our advanced, CLIA-licensed clinical laboratory since 1972.

A specialist and pioneer in essential and toxic elemental testing, the laboratory provides a wide array of functional testing to aid in decision making and better patient outcomes. Choose Doctor’s Data to help you assess and treat heavy metal burden, nutritional deficiencies, gastrointestinal function, hormone status, cardiovascular risk, liver and metabolic abnormalities, and more.