



The Great Plains Laboratory, LLC



GPL-TOX Profile (Toxic Non-Metal Chemicals)

Non-Metal Toxic Chemicals and Their Effects on Health

GENERAL DESCRIPTION

Every day, we are exposed to hundreds of toxic chemicals through products like pharmaceuticals, pesticides, packaged foods, household products, and environmental pollution. As we have become more exposed to chemical-laden products and to toxic chemicals in food, air, and water, we have been confronted with an accelerating rate of chronic illnesses like cancer, heart disease, chronic fatigue syndrome, chemical sensitivity, Autism Spectrum Disorders, ADD/AD(H)D, autoimmune disorders, Parkinson's disease, and Alzheimer's disease.

Because exposure to environmental pollutants has been linked to many chronic diseases, The Great Plains Laboratory has created GPL-TOX, a toxic non-metal chemical profile that screens for the presence of 173 different toxic chemicals including organophosphate pesticides, phthalates, benzene, xylene, vinyl chloride, pyrethroid insecticides, acrylamide, perchlorate, diphenyl phosphate, ethylene oxide, acrylonitrile, and more. This profile also includes Tiglylglycine (TG), a marker for mitochondrial disorders resulting from mutations of mitochondrial DNA. These mutations can be caused by exposure to toxic chemicals, infections, inflammation, and nutritional deficiencies.

ENVIRONMENTAL POLLUTANTS TESTED

Phthalates

Perhaps the most widespread group of toxic chemicals found in our environment. Phthalates are commonly found in after shave lotions, aspirin, cosmetics, detergents, foods microwaved with plastic covers, oral pharmaceutical drugs, intravenous products prepared in plastic bags, hair sprays, insecticides, insect repellents, nail polish, nail polish remover, skin care products, adhesives, explosives, lacquer, janitorial products, perfumes, paper coatings, printing inks, safety glass, and varnishes. Phthalates have been implicated in reproductive damage, depressed leukocyte function, and cancer. Phthalates have also been found to impede blood coagulation, lower testosterone, and alter sexual development in children. Low levels of phthalates can feminize the male brain of the fetus, while high levels can hyper-masculinize the developing male brain.

Vinyl Chloride

Vinyl chloride is an intermediate in the synthesis of several commercial chemicals, including polyvinyl chloride (PVC). Exposure to vinyl chloride may cause central nervous system depression, nausea, headache, dizziness, liver damage, degenerative bone changes, thrombocytopenia, enlargement of the spleen, and death.

Pyrethrins

Pyrethrins are widely used as insecticides. Exposure during pregnancy doubles the likelihood of autism. Pyrethrins may affect neurological development, disrupt hormones, induce cancer, and suppress the immune system.

CLINICAL USEFULNESS

- GPL-TOX screens for 173 different environmental pollutants using 18 different metabolites, all from a single urine sample.
- GPL-TOX uses the power of advanced mass spectrometry (MS/MS), which is necessary to detect lower levels of certain genetic, mitochondrial, and toxic chemical markers that conventional mass spectrometry often misses.
- GPL-TOX also includes Tiglylglycine, a marker for mitochondrial damage, which is often seen in chronic toxic chemical exposure.
- GPL-TOX pairs perfectly with our Organic Acids Test (OAT) and our Glyphosate Test in the ENVIROtox Panel. This panel offers you comprehensive testing to assess exposure to common environmental toxins and the damage that can be caused by this exposure, and at a great value – all from one urine sample.

SPECIMEN REQUIREMENTS

10 mL of the first morning urine before food or drink is suggested. Fasting for 24 hours may increase the excretion of toxic chemicals from the adipose tissue.

Xylenes

Xylenes (dimethylbenzenes) are solvents found not only in common products such as paints, lacquers, pesticides, cleaning fluids, fuel and exhaust fumes, but also in perfumes and insect repellents. Xylenes are oxidized in the liver and bound to glycine before eliminated in urine. High xylene levels may be due to the use of certain perfumes and insect repellents. High exposures to xylene create an increase in oxidative stress, causing symptoms such as nausea, vomiting, dizziness, central nervous system depression, and death. Occupational exposure is often found in pathology laboratories where xylene is used for tissue processing.

N-acetyl-S-(3-hydroxypropyl)-L-cysteine (3-HPMA)

3-HPMA is the main urinary metabolite of acrolein. Acrolein is an environmental pollutant, commonly used as an herbicide and in many different chemical industries. Acrolein is also present in the burning of cigarettes, gasoline, and oil. Certain bacteria produce acrolein, such as Clostridium. Acrolein metabolites are associated with diabetes and insulin resistance.

Styrene

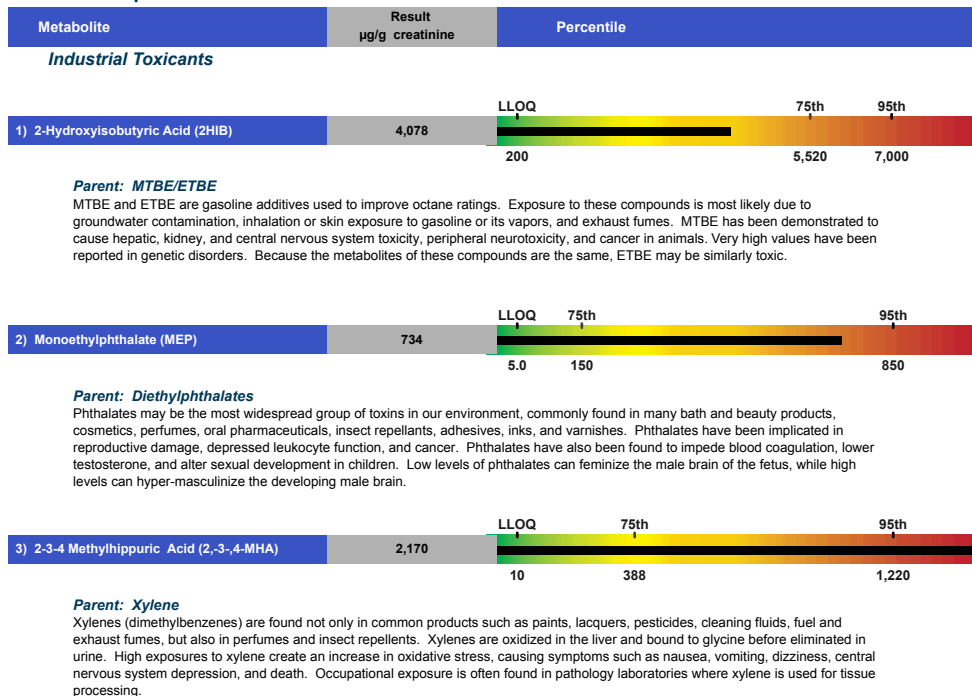
Styrene is used in the manufacturing of plastics, in building materials, and is found in car exhaust fumes. Polystyrene and its copolymers are widely used as food-packaging materials. The ability of styrene monomer to leach from polystyrene packaging to food has been reported. Occupational exposure due to inhalation of large amounts of styrene adversely impacts the central nervous system, causes concentration problems, muscle weakness, tiredness and nausea, and irritates the mucous membranes of the eyes, nose, and throat.

Organophosphates

Organophosphates are one of the most toxic groups of substances used throughout the world. They are often used as biochemical weapons and terrorist agents, but are most commonly used in pesticide formulations. Organophosphates are inhibitors of cholinesterase enzymes, leading to overstimulation of nerve cells, causing sweating, salivation, diarrhea, abnormal behavior, including aggression and depression. Children exposed to organophosphates have more than twice the risk of developing pervasive developmental disorder (PDD), an autism spectrum disorder. A study done in the San Francisco Bay area found that in California agricultural areas, children born to mothers living within 500 meters of fields where organochlorine pesticides were used were more than 6 times more likely to develop autism than children whose mothers did not live near such fields. ASD risk increased with the poundage of organochlorines applied and decreased with distance from field sites. Maternal organophosphate exposure has been associated with various adverse outcomes including having shorter pregnancies and children with impaired reflexes.

View the full list of environmental pollutants at www.greatplainslaboratory.com/tox-analyte

Toxic Compounds



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