VibrantWellness

Environmental Toxins

Key Clinical Messages

What is the Environmental Toxins Test?

Vibrant's Environmental Toxins test measures urinary excretion of environmental toxins, providing insight into environmental toxin exposure.

Environmental toxins are ubiquitous. In 1994, the US released over 2 billion pounds of environmental toxins, which grew to nearly 5 billion pounds in 2002[1]. While the US released 3 billion pounds of chemicals in 2020, this represents a 27% decrease since 2011.[2] The decrease is attributed to 34% reduction in air pollution from 2011 to 2020, driven by reduced air emissions from electric utilities.[2]

The EPA inventory contains roughly 84,000 chemical substances that are in commerce, many of which have limited testing for their effects on humans or the environment[3]. Chemicals no longer authorized for use in the U.S. (e.g., DDT) continue to persist in the environment as persistent organic pollutants. Although the EPA is working to decrease levels, environmental toxins remain a serious problem.

Why Order the Environmental Toxins Test?

Toxin exposures have been associated with several medical conditions and diseases. Individual risk varies based on the quantity of toxicant exposure, exposure time, genetic susceptibility, synergistic effects with other toxicants, and factors that influence detoxification pathways.

Common areas of concern include cancer, cardiovascular disease, neurological disorders, immune dysfunction, developmental disorders, negative reproductive effects, hormonal imbalances, and a host of relevant symptoms and negative health outcomes.

It is believed that most people are dealing with a toxic burden at some level—it's just a matter of how much that toxic burden is contributing to somebody's current symptoms or disease state. Understanding the potential risks associated with environmental toxins allows individuals to be proactive with their health. Here are the basic steps to reduce toxin burden.

- **Step 1:** Identify exposure
- **Step 2:** Reduce exposure
- **Step 3:** Support biotransformation and detoxification pathways
- **Step 4:** Support excretion pathways

Steps 3 and 4 may be done simultaneously. Or in the event of impaired excretion, excretion pathways should be supported prior to biotransformation and detoxification

References:

1. Liska, PhD, D., Lyon, MD, M. and Jones, MD, D., 2010. Textbook of functional medicine. Gig Harbor, WA.: Institute for Functional Medicine, pp.275-294.
2. Environmental Protection Agency (EPA). 2020 Toxics Release Inventory (TRI) National Analysis. Available from: https://awsgispub.epa.gov/trina2020/execsum/#releases
3. Roundtable on Environmental Health Sciences, Research, and Medicine; Board on Population Health and Public Health Practice; Institute of Medicine. Identifying and Reducing Environmental Health Risks of Chemicals in Our Society: Workshop Summary. Washington (DC): National Academies Press (US); 2014 Oct 2. 2, The Challenge: Chemicals in Today's Society. Available from: https://www.ncbi.nlm.nih.gov/books/NBK268889/

Which Patients Benefit from This Test?

Conditions, signs, and risks associated with environmental toxicity include:

- Fatigue and weakness
- Heightened sensitivity to chemicals and foods
- Neurological dysfunction
- Depression and/or anxiety
- Loss of balance
- Dizziness
- Mood swings
- Slower reaction time
- Poor memory, difficulty finding words
- Difficulty concentrating
- Unusual skin sensations, tingling, and numbness
- Vision changes
- Headache, light sensitivity
- Hearing loss
- Irregular heartbeat
- Abdominal pain, diarrhea, and/or bloating
- Gastrointestinal dysfunction
- Mucosal irritation
- Chronic burning in the throat and nasal passages
- Tearing, disorientation, metallic taste in mouth
- Coughing, wheezing, and shortness of breath
- Eye irritation
- Endocrine imbalances
- Increased urinary frequency or increased thirst
- Autoimmune disease
- Morning stiffness and/or joint pain
- Muscle weakness
- Skin rashes
- Reproductive dysfunction
- Sleep problems
- Cancer

Test Prep

Collection: One (1) urine specimen tube.

Fasting: Not required. However, fasting for 24 hours may increase the excretion of toxic chemicals from the adipose tissue.

Diet: No restrictions.

Supplements: No restrictions.

Medications: No restrictions.

Reference Ranges

Vibrant uses two different reference ranges for the Environmental Toxins test, based on available NHANES data or internally validated reference ranges for each analyte. NHANES is a nationally representative data set of Americans' exposure to environmental toxins and heavy metals. For analytes without NHANES population data, Vibrant established reference ranges through an internal validation study using a sample population of healthy adults. The results are reported as **GREEN:** 0-75th percentile, **YELLOW:** 75th-95th percentile, and **RED:** >95th percentile. Additional test methodology or reference range information may be found in the Environmental Toxins Validation Report, Certificate of Quality Report, and the Vibrant Wellness Help Desk FAQ section.

Provocation

The Environmental Toxins test reference ranges were validated in unprovoked populations, for both the NHANES population as well as the internally validated sample population. Provoked levels cannot be inferred from unprovoked levels (i.e., “How different would the results be if I used provocation?”). Likewise, unprovoked levels cannot be inferred from provoked levels (i.e., “How different would the results be if I had not used provocation?”).

Why Vibrant?

Lab Methodology

Vibrant uses the **tandem LC-mass spectrometer**, which can detect compounds at the pg/ml level. Vibrant is a CLIA-certified and CAP-accredited lab.

Methodology

The Environmental Toxins test uses **liquid chromatography (LC-MS/MS)**. The mass spectrum of the sample determines the concentration of each analyte measured. The analyte results are expressed by normalizing to the quantity of creatinine measured to account for urine dilution variations.

Which Tests Pair Well with the Environmental Toxins Test?

- **Heavy Metals** – to investigate (and reduce) total toxic burden.
- **Mycotoxin** – to investigate (and reduce) total toxic burden.
- **Gut Zoomer** – to investigate microbial overgrowth burden, intestinal hyperpermeability and/or elevated beta-glucuronidase impacting detoxification and elimination.
- **Micronutrients** – to assess intracellular and extracellular levels of commonly affected nutrients as many environmental toxins deplete critical nutrients such as antioxidants and minerals, and to assess for adequacy in micronutrients required for Phase 1 and 2 detoxification pathways.
- **Hepatic Function Panel** – to investigate liver function impacting detoxification and elimination.
- **Renal Function Panel** – to investigate kidney function impacting detoxification and elimination.
- **Hormones (Serum, Saliva, Urine)** – to investigate environmental toxin impact on endocrine and reproductive hormones.
- **Inflammation** – to investigate the effects of environmental toxins on systemic inflammation.

What Markers Are Included in Environmental Toxins?

Vibrant's Environmental Toxins test includes 38 environmental toxins.

Environmental Phenols
4-Nonylphenol
Bisphenol A (BPA)
Triclosan (TCS)

Herbicides
2,4-Dichlorophenoxyacetic Acid (2,4-D)
Atrazine
Atrazine mercapturate
Glyphosate

Other Markers	
Aryl Phosphate	Diphenyl Phosphate (DPP)
Acrylamide	N-acetyl-S-(2-carbamoylethyl)-cysteine (NAE)
Perchlorate (PERC)	

Mitochondrial Marker
Tiglylglycine (TG)
Parabens
Butylparaben
Ethylparaben
Methylparaben
Propylparaben

Pesticides		
Organochlorine Pesticide	**Organophosphate Pesticides**	
2,2-bis(4-Chlorophenyl) acetic acid (DDA)	Diethyl phosphate (DEP)	Dimethyl phosphate (DMP)
Pyrethroid Pesticide	Diethyldithiophosphate (DEDTP)	Dimethyldithiophosphate (DMDTP)
3-Phenoxybenzoic Acid (3PBA)	Diethylthiophosphate (DETP)	Dimethylthiophosphate (DMTP)

Phthalates
Mono-ethyl phthalate (MEP)
mono-2-ethylhexyl phthalate (MEHP)
mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)
mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)

Volatile Organic Compounds		
Xylene	**Benzene**	**1,3-Butadiene**
2-Methylhippuric Acid (2MHA)	N-acetyl phenyl cysteine (NAP)	N-Acetyl (3,4-Dihydroxybutyl) Cysteine (NADB)
3-Methylhippuric Acid (3MHA)	**1-Bromopropane**	**Acrylonitrile**
4-Methylhippuric Acid (4MHA)	N-Acetyl (Propyl) Cysteine (NAPR)	N-Acetyl (2-Cyanoethyl) Cysteine (NACE)
Styrene	**Propylene Oxide**	**Acrylonitrile, Ethylene Oxide**
Phenyl glyoxylic Acid (PGO)	N-Acetyl (2,Hydroxypropyl) Cysteine (NAHP)	2-Hydroxyethyl Mercapturic Acid (HEMA)
Methyl-tertiary-butyl ether (MTBE)	2-Hydroxyisobutyric Acid (2HIB)	

Regulatory Statement:
This test has been laboratory developed and their performance characteristics determined by Vibrant America LLC, a CLIA-certified laboratory performing the test CLIA#:05D2078809. The test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). Although FDA does not currently clear or approve laboratory-developed tests in the U.S., certification of the laboratory is required under CLIA to ensure the quality and validity of the tests.

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