Elemental Analysis (Packed Erythrocytes)

GENOVA DIAGNOSTICS

63 Zillicoa Street
Asheville, NC 28801

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

Nutrient Elements

Element	Reference Range	Reference Range
Chromium	0.004	0.002-0.062 mcg/g
Copper	0.538	0.466-0.721 mcg/g
Magnesium	38.0	30.1-56.5 mcg/g
Manganese	0.009	0.007-0.038 mcg/g
Potassium	2,729	2,220-3,626 mcg/g
Selenium	0.25	0.25-0.76 mcg/g
Vanadium	0.003	0.001-0.014 mcg/g
Zinc	8.1	7.8-13.1 mcg/g

Toxic Elements

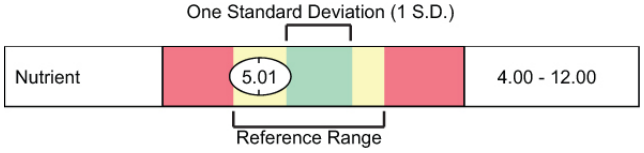
Element	Reference Range	Reference Range
Lead	0.057	<= 0.048 mcg/g
Mercury	0.0315	<= 0.0039 mcg/g
Antimony	0.002	<= 0.002 mcg/g
Arsenic	0.030	<= 0.071 mcg/g
Cadmium	0.000	<= 0.001 mcg/g
Thallium	<dl	<= 0.0000600 mcg/g
Tin	<dl	<= 0.0009 mcg/g

Commentary

This test has been developed and its performance characteristics determined by Genova Diagnostics, Inc. It has not been cleared or approved by the U.S. Food and Drug Administration.

Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or treatment recommendations. Diagnosis and treatment decisions are the responsibility of the practitioner.

The **Reference Range** is a statistical interval representing 95% or 2 Standard Deviations (2 S.D.) of the reference population. One Standard Deviation (1 S.D.) is a statistical interval representing 68% of the reference population. Values between 1 and 2 S.D. are not necessarily abnormal. Clinical correlation is suggested. (See example below)



Lead is above the reference range. This element has multiple toxic effects and many possible sources. Some

Commentary

sources are as follows: leaded or soldered joints in water systems, contaminated herbal preparations and teas, chips of old lead-containing paint, art supplies, colored glass kits, bullets, fishing sinkers, balance weights, radiation shields, lead-acid batteries, bearing alloys, babbitt metal, certain ceramic glazes or pigments, sewage sludge, and soils and vegetation along highways.

Calcium, zinc and/or iron deficiency conditions enhance uptake of ingested lead. In the body, absorbed lead soon leaves blood plasma and accumulates in erythrocytes where it binds to hemoglobin and thiols and also to the cell membrane. Within 24-hours of exposure, an equilibrium is reached such that over 90% of whole blood lead is bound to the erythrocytes. Less than 10% remains in blood plasma.

Eventually, lead leaves the blood and deposits primarily in bone tissue and also in the aorta, kidneys, and other organs. This element can bind to enzymes, proteins and membranes that present sulfhydryl, phosphate, amino and hydroxyl groups. Lead interferes with enzymes that form heme, shortens erythrocyte life span, disrupts iron transport in erythropoietic cells, affects renal transport of uric acid, reduces cytochrome P-450 activity in children, and is synergistically toxic with cadmium and mercury. In children, manifestations of lead excess may include encephalopathy with loss of IQ, and behavioral disorders. Adults and children may present with anorexia, metallic taste, insomnia, headaches, fatigue, anemia, reticulocytosis, and uricemia. Erythropoietic porphyria or porphyrinuria may occur.

Mercury is above the reference range. Possible sources of mercury (Hg) include: contaminated shellfish or seafood, contaminated water supplies, dental amalgams and/or recent dental work, laboratory equipment, barometers, thermometers, certain specially-formulated fungicides, old paint containing Hg fungicide and mining and smelting operations.

At least 90% of blood organic mercury rapidly distributes to erythrocytes, and at least 60% of elemental mercury may reside transiently in erythrocytes. Most inorganic mercury does not enter the erythrocyte. Mercury has strong affinity for sulfhydryl (-SH) sites on proteins and enzymes throughout the body and deposits in many tissues and organs. The kidneys eventually carry much of the body burden regardless of route of exposure or chemical form of the Hg. Elemental and inorganic Hg eventually distribute predominately to liver and kidney. Excretion is slow - kidney Hg via urine and liver Hg via feces. Elemental Hg vapor may be dissolved in blood, may enter erythrocytes, and can deposit in brain tissue. Organic Hg (methyl, ethyl) binds to enzymes, proteins and glutathione in blood and various tissues, circulates rather freely, and has a long retention half-time in the body (approximately two months). Hg interferes with catalase, monoamine oxidase, mixed-function oxidases and cytochrome P-450 in liver tissue, and stimulates thionein formation and is distributed there partly as mercury-metallothionein. In cell mitochondria, organic Hg, especially methyl mercury, disrupts respiration, decreases synthesis of RNA and can be mutagenic by altering chromosome structure.

Signs and symptoms consistent with Hg contamination are variable and may include: metallic taste, increased salivation, paresthesias with decreased senses of hearing touch and vision, hypertension, headaches, fatigue, insomnia, and fine muscle tremor possibly displayed as poor handwriting. A hallmark symptom is emotional disturbance, sometimes a bipolar depression but often a form of excitability and lack of ability for mental concentration.