Elemental Analysis (Packed Erythrocytes)

Genova Diagnostics®
Innovative Testing for Optimal Health

PATIENT: Number 53
SEX: Female
AGE: 9
Location: Los Altos, CA, USA

63 Zillicoa Street
Asheville, NC 28801

Toxic Elements

Element	Reference Range	Reference Range
Lead	0.011	<= 0.048 mcg/g
Mercury	<dl	<= 0.0039 mcg/g
Antimony	0.003	<= 0.002 mcg/g
Arsenic	0.004	<= 0.029 mcg/g
Cadmium	0.000	<= 0.001 mcg/g
Thallium	<dl	<= 0.0000600 mcg/g
Tin	<dl	<= 0.0009 mcg/g

Nutrient Elements

Element	Reference Range	Reference Range
Chromium	0.028	0.002-0.062 mcg/g
Copper	0.548	0.509-0.776 mcg/g
Magnesium	51.5	30.1-56.5 mcg/g
Manganese	0.037	0.007-0.038 mcg/g
Potassium	3,394	2,220-3,626 mcg/g
Selenium	0.83	0.25-0.76 mcg/g
Vanadium	0.004	0.001-0.014 mcg/g
Zinc	10.0	7.8-13.1 mcg/g

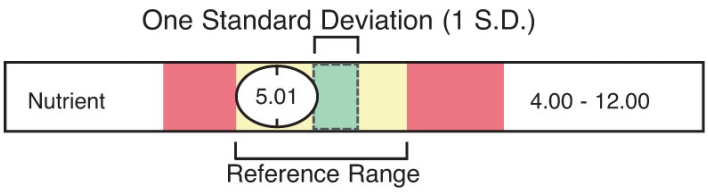
Commentary

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.

Commentary

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)



Antimony is above the reference range. Antimony is a toxic element widely used in alloys to increase hardness or strength. Possible sources of this element include: solders, metal type (printing), antifriction alloys (bearings, babbitt metal), ammunition and powders lead batteries, paints, enamels, glass and pottery glazes, flame-proofing/retardants for textiles, mordant for textiles and leather dyes, vulcanizing and colorizing agent for rubber, tobacco (100 micrograms Sb/kilogram), and mines/smelting operations.

Antimony (Sb) has two oxidation states, Sb+3 and Sb+5. Erythrocyte antimony is virtually all Sb+3 which is the form that is also deposited in the liver and is excreted mostly via bile and feces. Antimony inhibits the phosphofructokinase enzyme, may disrupt purine metabolism and lead to elevated uric acid, ammonia, inosine or hypoxanthine. It may also inhibit monoamine oxidase, disrupting adrenal catecholamine metabolism. Antimony interferes with cellular metabolism by combining with sulfhydryl groups (-SH) on enzymes. Conditions consistent with chronic Sb toxicity are variable and may include: metallic taste, anorexia, fatigue, myopathy, gout-like symptoms, MAO dysfunction, hypotension, erythrocyte fragility, and angina. "Antimony spots" may result from skin contact with Sb compounds; inhalation of Sb may result in nosebleeds, rhinitis, and pneumonitis.

Selenium (Se) is above the reference range. This element activates glutathione peroxidase which facilitates glutathione 's oxidant function, and it activates prohormone iodothyronine deiodinase which helps to balance levels of thyroid hormone. Of whole blood selenium, approximately one-third is carried in serum (bound to alpha2 and beta1 globulins) and two thirds resides inside the erythrocytes bound to glutathione peroxidase and to other proteins. Mild elevations of selenium usually are of no clinical significance. Very excessive selenium can have toxic effects, but intake typically needs to exceed 100X normal-essential intake before toxic effects appear. At such high doses, selenium, which is chemically similar to sulfur, interferes with methionine metabolism and transsulfuration. Selenium detoxication is by methylation (from S-adenosylmethionine), and by conjugation with glutathione and other thiols. Urinary excretion predominates over biliary and fecal excretion; sweat may contain significant amounts.

Selenites are more toxic than selenates. Sources include: contaminated drinking water and electronic components including photovoltaic cells, batteries and semiconductors. Some inorganic pigments and glazes and vulcanized rubber contain the element as do metal blueing solutions (gun blues). Dithiocarbamate insecticides and insect repellents may contain selenium. Incorrectly formulated nutritional supplements have caused selenium poisoning. Symptoms consistent with selenium excess include: fatigue, lassitude, garlic-like breath, metallic taste, yellowish to pink-red discoloration of nails, skin, teeth and eyelids, unstable blood pressure, irregular menses, hair loss, anorexia, and lymphocytosis. Acute selenium poisoning may produce headaches and irritation of contacted tissue with pulmonary edema for inhalation or sore throat, nausea and vomiting for ingestion.