Micro Trace Minerals Laboratory

environmental & clinical laboratory

Röhrenstrasse 20, 91217 Hersbruck, Germany
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MINERAL ANALYSIS — Whole Blood

		Lab Number		1W285000	
Doctor/Clinic				Test Date	10/7/2024
Patient Name	Alessia	Sex	f	Age	33
Clinical Information				Page	1/5

	Acceptable Range	Test Value		
Essential Trace Elements (mcg/l)				
Chromium (Cr)	< 2.000	< 1.000		
Cobalt (Co)	< 1.500	0.173		
Iodine (I)	15.000 --- 132.000	40.665		
Manganese (Mn)	7.100 --- 20.000	13.101		
Molybdenum (Mo)	0.300 --- 1.800	0.351		
Selenium (Se)	60.000 --- 120.000	153.556	↑	
Vanadium (V)	< 0.800	0.194		
Essential Macro- & Trace elements (mg/l)				
Copper (Cu)	0.756 --- 1.500	0.648	↓	
Magnesium (Mg)	30.000 --- 55.000	36.080		
Zinc (Zn)	4.000 --- 7.500	7.744	↑	
Potentially Toxic Elements (mcg/l)				
Aluminum (Al)	< 30.000	< 10.000		
Antimony (Sb)	< 3.500	12.405	↑	
Arsenic-total (As)	< 10.000	1.148		
Beryllium (Be)	< 0.400	n.n.		
Bismuth (Bi)	< 1.000	< 0.125		
Cadmium (Cd)	< 1.100	< 0.500		
Lead (Pb)	< 30.000	9.993		
Mercury (Hg)	< 2.000	3.922	↑	
Nickel (Ni)	< 2.000	2.040	↑	
Platinum (Pt)	< 0.400	n.n.		

n.n. = not detected, < x = below Detection Limit
Quality control: Dipl. Ing. Friedle, Accreditation: DIN EN ISO 17025; Validation: Dr. E. Blaurock-Busch PhD;
Analytical method: ICP-MS with collision cell technique

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MINERAL ANALYSIS — Whole Blood

Patient Name	Alessia	Lab Number	1W285000	Page	2/5

	Acceptable Range	Test Value		
Potentially Toxic Elements (mcg/l)				
Silver (Ag)	< 0.600	< 0.200		
Thallium (Tl)	< 0.600	< 0.125		
Tin (Sn)	< 1.300	2.895	↑	
Uranium (U)	< 0.100	< 0.075		
Zirconium (Zr)	< 3.000	< 1.875		

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Patient Name	Alessia	Lab Number	1W285000	Page	3/5

Blood is a transport medium and the concentrations of essential elements found in blood reflect the body's immediate nutritional status, and factors influencing uptake and distribution. The presence of toxic metals in blood suggests immediate exposure and indicates the need for medical attention. The information contained in this elemental analysis report is designed as an interpretive adjunct to normally conducted diagnostic procedures. The findings are best viewed in the context of a medical examination and history.
Reference ranges listed are obtained, if available, from the CDC (Center for Disease Control), the WHO (World Health Organisation) and Environmental Agencies and are updated accordingly. If a reference range is not given by those agencies, general laboratory procedures are utilized to obtain a statistical reference range in the 95percentile.
For more information, please contact us: info@microtraceminerals.com or https://microtraceminerals.com

COPPER (Cu):
Copper is an essential metalloenzyme needed for hemoglobin synthesis. It readily complexes with L-amino acids, which facilitate its absorption from the stomach and duodenum. There are three distinct syndromes of deficiency: The first is characterized by anemia and hypoprotenemia and is easily corrected with combined copper and iron supplementation. The second occurs in malnourished infants, receiving high-calorie, low copper diets. Neutropenia, anemia, diarrhea, bone changes and hypocupremia respond to copper therapy. The third is the genetic defect, Menke's syndrome, in which copper is not absorbed from the intestinal mucosa. Results are low blood, liver and hair copper levels.
DEFICIENCY SYMPTOMS: reduced hemoglobin synthesis, impaired iron metabolism, hypochromia, microcytic anemia, Kwashiorkor, heart and liver disease, poor growth and development, infertility, pancreatic dysfunction, progressive mental deterioration and defective keratinization of hair.
RECOMMENDED DAILY ALLOWANCE (USA) : Adults (18 years and older):
900mcg for adults; 1000mcg for pregnant women; 1300mcg for nursing women; 890mcg for adolescents 14-18 years old. Surveys suggest that most Americans consume less than the RDA for copper each day. Vegan diets appear to provide adequate amounts of copper.
SOURCES: liver, shellfish, kidneys, egg yolk, legumes and nuts.
THERAPEUTIC CONSIDERATION: deficiency may be due to a lack of metalloenzymes in the liver. Tyramine (tyrosine + amine) increases copper absorption. Citrus fruits increase the absorption in the small intestine, and glutamine increases copper transport into blood and tissues.

MERCURY (Hg):
Blood mercury levels reflect immediate exposure. The health effects depend on a number of factors including the amount and form of mercury, route and length of exposure, and age. All forms of mercury can affect the nervous system and the kidneys. Workers exposed to elemental mercury vapor and people who eat foods with high levels of methylmercury experienced tremors, incoordination, impaired vision, impaired learning and memory, and mood changes. Some children born in communities that ate food with high levels of organic mercury had learning, sensory, and movement problems. In people exposed to high levels of methylmercury in their diets, birth defects have occurred. Some humans and animals that ate mercury compounds had high blood pressure and alterations in their immune systems. The U.S. Environmental Protection Agency (EPA) has determined that mercuric chloride (inorganic mercury salt) and methylmercury (organic mercury compound) are possible human carcinogens (cause cancer). The EPA did not classify the potential of elemental mercury to cause cancer in humans.
ATSDR Recommendation: avoid eating fish containing high levels of methylmercury. State health advisories provide information about the safety of water, soil and food. Stay away from areas near hazardous waste sites to avoid coming in contact with mercury.
Mercury can also be measured in urine, hair, or nails.
Information provided by: ATSDR Toxicological Profile for Mercury, retrieved July 2023

Additional Information: High levels confirm immediate exposure. Contaminated seafood, petroleum products, and improper disposal of broken mercury thermometers and other apparatuses that use mercury including button cells and tube lights may be the cause of mercury exposure.
RECOMMENDATION: Consult your physician.

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NICKEL (Ni):
The function of nickel is not totally clear, however nickel contact allergies are well known, generally resulting in skin reactions and eczemas. Exposure has been associated with dermatitis and an increased cancer risk.
COMMON SOURCES: Nickel-cadmium batteries, jewelry, cold wave permanents, welding, and smoke. Nickel carbonyl found in cigarette and cigar smoke is a strong carcinogen. Smokers and children of smokers often exhibit higher nickel tissue levels than nonsmokers. Other sources are chromium/nickel/steel cookware (Cromargan), unglazed pottery, and dental braces. Burning fossil materials (coal, oil) releases nickel and other toxic metals into the air.
SYMPTOMS OF NICKEL OVEREXPOSURE: Early symptoms are apathy, diarrhea, skin problems, insomnia, vertigo, injury to cerebral blood vessels, and vomiting. Toxicity symptoms include frontal headaches, gastroenteritis, eczema, cancer of the lung and nasal cavity.
THERAPEUTIC CONSIDERATION: Sulfur-bearing amino acids, pectin and antioxidants support natural elimination of nickel; in more severe cases of overexposure, chelation therapy may be recommended.

ANTIMONY (Sb):
Antimony has no known function in living organisms and is not highly toxic. It is found in hair tissue and other organs, with the highest concentration in lymph nodes, lungs, skin and adrenals. Environmental exposure and illness affect the antimony concentration of some tissue. Hair and lung tissue of smelter workers contained high amounts of this trace element and uremic patients have also shown high Sb-levels. Food stored in enamel vessels and cans may contain appreciable antimony concentration. New research indicates that PET (Polyethylenterephthalat) bottles contain appreciable amounts of Sb, and the antimony concentration of mineral water stored in such bottles has been found to increase over time i.e. mineral water takes up Sb from PET. Trivalent antimony is more toxic than the pentavalent form; however there is no evidence that this element is carcinogenic.
THERAPEUTIC CONSIDERATION: Increase vitamin C and B-complex intake.

SELENIUM (Se):
Selenium is an essential constituent of the enzyme glutathione peroxidase and is known for its antioxidant properties. It is linked to cysteine as selenocysteine, an enzyme found in blood, liver and other tissues. In humans, toxicity is rare, but excessive intake results in alkali disease, characterized by liver and neuromuscular disorders. Long-term exposure or excess supplementation can cause toxicity symptoms including alopecia, arthritis, atrophic, brittle nails, prevailing garlic breath and body odor, GI disorders, irritability, kidney impairment, metallic taste and yellowish skin.
THERAPEUTIC CONSIDERATION: Sulfates and sulfur-containing amino acids reduce selenium absorption and toxicity. Methionine detoxifies excess selenium.

TIN (Sn):
High levels of tin in blood indicate immediate exposure, which may be through drink, food, or environmental exposure.
To locate the source of exposure, water testing may be useful to rule out the presence of excessive tin in drinking water. The analysis of urine can also detect if an immediate intake often in-containing food or drink, or an immediate environmental exposure is a problem. Saliva testing may be considered to determine if dental materials are a source of exposure. Hair, nails or other body tissue provide information about past and long-term, chronic exposure.
Tin is a soft, white, silvery metal that is insoluble in water. Tin compounds are found in small amounts in the earth's crust and are present in the air, water, soil, and landfills. Thus, tin is found in many plants and animals. Tin is also present in body tissue, but there is no evidence that this metal is essential for humans. Humans are usually exposed to tin at far less than 1 ppm from air and water. The amounts in air and water near hazardous waste sites could be higher.
Tin is present in in brass, bronze, pewter, and some soldering materials. Tin is also used in toothpaste, perfumes, soaps, coloring agents, food additives, and dyes.
Exposure to organic tin compounds (mainly butyl tin compounds) may result from eating seafood from coastal waters or from contact with household products that contain organotin compounds, (polyurethane, plastic polymers, and silicon-coated baking parchment paper). Organic tin compounds have been detected in drinking water that flow in polyvinyl chloride (PVC) water pipes, which contain organic tin compounds. Tin is poorly absorbed, but may be stored in bones. Tin is excreted via feces, some via the urine.
Research indicates that humans who swallowed large amounts of inorganic tin suffered stomachaches, anemia, and liver and kidney problems. Inhalation, oral intake or dermal exposure to some organotin compounds has been shown to cause harmful effects in humans, but the main effect will depend on the particular organotin compound. There have been reports of skin and eye irritation, respiratory irritation, gastrointestinal effects, and neurological problems in humans exposed for a short period of time to high amounts of certain organotin compounds. Some neurological problems have persisted for years after the poisoning occurred. There is no evidence that inorganic tin compounds affect reproductive functions, produce birth defects, or cause genetic changes. The carcinogenicity of tin has not been established.

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ZINC (Zn):
Zinc is an important metalloenzyme that is needed for enzyme function and insulin synthesis. It is a co-factor in the absorption and metabolism of many vitamins, is needed for the production of sex and growth hormones, wound and burn healing, and DNA and RNA synthesis. Absorption of dietary zinc occurs mainly in the small intestine, and zinc uptake can be competitive with that of iron and copper. Zinc is excreted in feces, urine and sweat. Copper or iron deficiency, anemia, bone and joint pathology, loss of hair color may be present. The RDA is 3-30 mg/day, depending on age and status. Zinc poisoning are rarely seldom. Long-term use of oral zinc supplementation or environmental exposure near smelter sites can contribute to zinc overload.
THERAPEUTIC CONSIDERATION: Haemolysis raises zinc levels. Symptoms of zinc overload are similar to zinc deficiency symptoms, causing immune dysfunction. Check iron, copper and manganese levels. Due to the circadian rhythm, zinc levels are higher in the morning and lower in the evening.

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