Micro Trace Minerals Laboratory

environmental & clinical laboratory

Röhrenstrasse 20, 91217 Hersbruck, Germany
P.O.Box 4613; Boulder, CO 80306-4613, USA

MINERAL ANALYSIS — Hair

		Lab Number		1H230735	
Doctor/Clinic	Hanko Medico			Test Date	03-03-2020
Patient Name	Anne Have	Sex	f	D.O.B.	14-09-1966
Clinical Information	Sr confirmed			Page	1/5

	Acceptable Range	Test Value		
Essential Trace Elements (ppm = mg/kg = mcg/g)				
Chromium (Cr)	0,020 --- 0,210	0,024		
Cobalt (Co)	0,010 --- 0,300	0,193		
Copper (Cu)	10,000 --- 41,000	68,425	↑	
Iodine (I)	0,050 --- 5,000	0,094		
Iron (Fe)	4,600 --- 17,700	5,402		
Manganese (Mn)	0,050 --- 0,920	0,233		
Molybdenum (Mo)	0,030 --- 1,100	0,024	↓	
Selenium (Se)	0,400 --- 1,700	1,025		
Vanadium (V)	0,010 --- 0,200	0,006	↓	
Zinc (Zn)	150,000 --- 272,000	192,829		
Essential Macroelements (ppm = mg/kg = mcg/g)				
Calcium (Ca)	220,000 --- 1.600,000	1.999,431	↑	
Magnesium (Mg)	20,000 --- 130,000	92,057		
Nonessential Trace Elements (ppm = mg/kg = mcg/g)				
Boron (B)	< 0,840	0,292		
Germanium (Ge)	< 1,650	0,004		
Lithium (Li)	< 0,300	0,003		
Strontium (Sr)	0,650 --- 6,900	97,977	↑	
Tungsten (W)	< 0,010	0,001		
Potentially Toxic Elements (ppm = mg/kg = mcg/g)				
Aluminum (Al)	< 8,000	1,510		
Antimony (Sb)	< 0,300	0,011		

n.n. = not detected, < x = below Detection Limit
Quality control: Dipl. Ing. Friedle, Accreditation: DIN EN ISO 17025; Validation: Dr. E. Blaurock-Busch PhD

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	Acceptable Range	Test Value
Potentially Toxic Elements (ppm = mg/kg = mcg/g)		
Arsenic-total (As)	< 0,200	0,017
Barium (Ba)	< 4,640	2,911
Beryllium (Be)	< 0,100	< 0,010
Bismuth (Bi)	< 0,200	< 0,010
Cadmium (Cd)	< 0,200	0,014
Cerium (Ce)	< 0,100	0,004
Cesium (Cs)	< 0,010	< 0,005
Dysprosium (Dy)	< 0,006	< 0,001
Erbium (Er)	< 0,005	< 0,001
Europium (Eu)	< 0,005	< 0,001
Gadolinium (Gd)	< 0,100	< 0,001
Gallium (Ga)	< 0,200	< 0,001
Iridium (Ir)	< 0,006	n.n.
Lanthanum (La)	< 0,032	0,002
Lead (Pb)	< 3,000	1,437
Lutetium (Lu)	< 0,010	< 0,001
Mercury (Hg)	< 0,600	0,020
Nickel (Ni)	< 1,000	0,314
Palladium (Pd)	< 0,100	< 0,050
Platinum (Pt)	< 0,010	< 0,005
Praseodymium (Pr)	< 0,013	< 0,005
Rhenium (Re)	< 0,005	n.n.
Rhodium (Rh)	< 0,007	< 0,005

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	Acceptable Range	Test Value	
Potentially Toxic Elements (ppm = mg/kg = mcg/g)			
Ruthenium (Ru)	< 0,100	< 0,001	
Samarium (Sm)	< 0,011	< 0,001	
Silver (Ag)	< 1,000	0,053	
Tantalum (Ta)	< 0,011	< 0,001	
Tellurium (Te)	< 0,010	n.n.	
Thallium (Tl)	< 0,010	< 0,001	
Thorium (Th)	< 0,010	< 0,010	
Thulium (Tm)	< 0,002	< 0,001	
Tin (Sn)	< 0,700	0,012	
Titanium (Ti)	< 1,500	0,074	
Uranium (U)	< 0,100	0,017	
Ytterbium (Yb)	< 0,010	< 0,001	
Zirconium (Zr)	< 0,500	< 0,050	

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Your Analysis Determined The Following Mineral Deficiencies And Excesses. Since it is difficult to distinguish treated samples from untreated ones, it is assumed that the spectroanalytical analysis was performed on chemically untreated hair as requested in our laboratory brochure. Chemically treated hair does not provide reliable results and TMI does not assume responsibility for data obtained from treated hair. 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.

CALCIUM (Ca):
High tissue levels of chemically untreated hair reflect malabsorption problems and a masked deficiency, which is caused by calcium being drawn from bones and redistributed into other tissues such as hair. Thus, high hair levels reflect bone withdrawal and osteoporotic tendency. Calcium deficiency symptoms such as unhealthy hair, nail and teeth, muscle cramping at night, insomnia, menstrual problems, nervousness and irritability may be present. When such deficiency symptoms are present, moderate calcium supplementation is recommended in combination with a low fat diet and increased activity level. To further support the calcium absorption and to normalize tissue levels, digestive aids and an increased intake of lecithin are recommended.

COPPER (Cu):
Brain and liver are the main storage sites, while the liver is the main organ for excretion. High hair levels of copper suggest elevated liver storage, and the body's inability to complex copper with amino acids such as histidine, threonine and glutamine. This insufficient complexing prevents the transport of copper between the liver and various peripheral tissues. High hair copper levels have been linked to headache, dizziness, depression and mood disorders, migraines, an increased sensitivity to pain, collagen disease, leukemia's and other malignancies. Symptoms include nausea, diarrhea, vomiting, and discoloration of skin. High copper levels are often accompanied by zinc deficiency. High copper levels increase the toxic effect of selenium and suppress iron absorption.
SOURCES: Shellfish, nuts, organ meats, eggs, cocoa, chocolate, Brewer's yeast and copper-rich drinking water.
THERAPEUTIC CONSIDERATION: To normalize levels, evaluate iron, manganese, zinc and molybdenum levels. These trace elements are natural antagonists of copper, and deficiency in one of those elements may cause increased absorption of the others. Vitamin C increases the copper excretion, especially when used with amino acids and vitamin B6. In cases of chronic copper intoxication, chelation may be recommended.

MOLYBDENUM (Mo):
Molybdenum deficiency has been linked to gout. Low levels in heavy meat eaters reflect digestive disorder, the need for digestive enzymes and dietary changes. Such patients should avoid pork, beef, whole grain and rather eat poultry, fish and other light proteins. Vegetarians should either add some meat to their diet or take molybdenum chelate with B-vitamins, which aid the absorption of molybdenum. Dietary molybdenum is readily absorbed by the intestine and is excreted in the urine and bile.
SOURCES: Whole grains, legumes, leafy vegetables and organ meats. The recommended daily intake is 0.15 - 0.5 mg/day, depending on age and status. Acute deficiency symptoms are unknown in humans. Excess intake of copper, zinc, and sulfates can depress Mo-update, causing disturbances in the uric acid cycle. Low molybdenum levels have been associated with impotency, increased cancer susceptibility, gout, dental caries, defects in the metabolism of sulfur-containing amino acids, and asthma.

STRONTIUM (Sr):
Strontium possesses physiological and chemical properties similar to calcium. Strontium is poorly absorbed by humans, and the intestinal uptake lies between 5-25%. Of that, about 99% is found in bone and teeth. People living in areas where high levels are found in the water supply, show higher tissue levels. The daily intake varies considerably from 1 mg/day to 4.7 mg/day, according to geography. Strontium can interfere with the calcium metabolism, leading to bone disorders, incl. rickets.
THERAPEUTIC CONSIDERATION: Strontium may compete with the calcium absorption and storage in bone and teeth and when high hair strontium levels are followed by high hair calcium level, the need for an increased calcium supply is indicated. Algae and fibrous cellulose reduce strontium and calcium utilization.

VANADIUM (V):
The biological function of this trace element has not been substantiated and deficiency symptoms have not been established; however there is evidence that this trace element influences the glucose metabolism, the sodium/potassium transport and the adrenal catecholamine metabolism. Vanadium appears to catalyze the oxidation of catecholamine's and inhibit cholesterol synthesis and lower phospholipid levels. It may have anti-diabetic, weight-reducing function and anti-caries effects.
SOURCE: Fiber-rich foods, dill seeds, parsley and black pepper. Vanadium is highly concentrated in vegetable oils.
THERAPEUTIC CONSIDERATION: High fiber diet, use of vegetable oil instead of animal fats.

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The following nutritional program is aimed at providing optimum health. The program is suitable for patients 12 years and older. It is recommeded for 3-4 months, after which a repeat analysis is recommended. A follow-up test would evaluate and determine your body's ability to digest and absorb nutrients. If any questions or problems arise, consult your medical doctor or health care provider.

Calcium (Ca)

To improve calcium utilization, reduce consumption of dairy products. Avoid fatty foods and increase intake of fiber foods. Add digestive enzymes to improve digestive function and check your vitamin D level in blood. Physical activity greatly supports the utilization of calcium.

Copper (Cu)

To check extend of exposure, check blood and/or urine levels.
To normalize copper levels, support liver function and check for inflammatory processes.
Check zinc status. Zinc intake can depress copper utilization. Increase intake of B-vitamins and antioxidants. Avoid chocolate, meat, oysters and other copper-rich foods. Check drinking water for copper content, especially when drinking water flows in copper pipes. Avoid cooking in copper appliances.

Molybdenum (Mo)

Molybdenum deficiency is extremely rare and low hair values generally signify a chronically low dietary intake, which can be improved by increasing the intake of molybdenum-rich foods such as beans and other legumes, whole grains and leafy vegetables. The daily requirement for people 14 to 18 years: 43mcg, 19+ years: 45mcg. Women who are pregnant or breastfeeding: 50mcg. B-vitamins improve the molybdenum absorption. Check copper and iron status. High copper and/or iron intake can decrease molybdenum absorption.

Strontium (Sr)

To check extend of exposure, check blood and/or urine levels. Water and soil can be a source of strontium, depending on the area’s geology. Strontium and calcium are handled similarly by the human body and when strontium exposure is high, calcium will be replaced in developing bone. Hence calcium deficiency increases strontium absorption. Check calcium status and Vitamin D level. An increased intake of vitamin D3 and calcium, vegetable fiber, and seaweed can normalize strontium levels.

Vanadium (V)

A daily intake of 0.5 to 1.0mg is recommended for adults, and is achieved through a normal diet. Good vanadium sources are black pepper, dill seed, peanut butter, cod fish, scallops, egg yolk, chicken breast, mushrooms, olives and vegetable oils.

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