

# Micro Trace Minerals Laboratory

environmental & clinical laboratory

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

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Facsimile: +49 (0) 9151/2306  
<http://www.microtrace.de>  
service@microtrace.de



MINERAL ANALYSIS			Childs' Hair		
			Lab Number	1KH151792	
Doctor	Hanko Medico		Test Date	28-10-2014	
Patient Name	Mr.Test	Sex	m	D.O.B.	23-09-2007
Clinical Information				Page	1/6
	Acceptable Range	Test Value			
<b>Essential Trace Elements (ppm = mg/kg = mcg/g)</b>					
Chromium	0,02 --- 0,15	0,03			
Cobalt	< 0,15	< 0,01			
Copper	6,70 --- 37,00	14,30			
Iodine	0,15 --- 3,50	0,13	↓		
Iron	7,70 --- 15,00	4,77	↓		
Manganese	0,07 --- 0,50	< 0,05			
Molybdenum	0,02 --- 1,00	0,05			
Selenium	0,40 --- 1,40	0,58			
Vanadium	0,01 --- 0,15	0,00	↓		
Zinc	110,00 --- 227,00	155,93			
<b>Essential Macroelements (ppm = mg/kg = mcg/g)</b>					
Calcium	200,00 --- 850,00	99,36	↓		
Magnesium	20,00 --- 115,00	9,01	↓		
<b>Nonessential Trace Elements (ppm = mg/kg = mcg/g)</b>					
Boron	< 2,00	< 0,25			
Germanium	< 0,50	< 0,00			
Lithium	< 0,20	0,00			
Strontium	0,11 --- 4,28	0,79			
Tungsten	< 0,02	0,00			
<b>Potentially Toxic Elements (ppm = mg/kg = mcg/g)</b>					
Aluminum	< 8,00	2,96			
Antimony	< 0,20	0,01			

n.n. = not detected

Accreditation: DIN EN ISO 17025; Quality control: Dipl. Ing. Friedle, Ing. J. Merz, Dr. Rauland; Validation: Dr. E.Blaurock-Busch PhD, Laboratory physician: Dr. med. A. Schönberger

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Patient Name	Mr. Test	Lab Number	1KH151792	Page	2/6
	Acceptable Range	Test Value			
<b>Potentially Toxic Elements (ppm = mg/kg = mcg/g)</b>					
Arsenic-total	< 0,20	0,03			
Barium	< 2,65	0,06			
Beryllium	< 0,03	< 0,01			
Bismuth	< 0,18	0,17			
Cadmium	< 0,20	0,00			
Cerium	< 0,05	0,00			
Cesium	< 0,01	< 0,01			
Dysprosium	< 0,01	< 0,00			
Erbium	< 0,01	< 0,00			
Europium	< 0,01	< 0,00			
Gadolinium	< 0,01	< 0,00			
Gallium	< 0,07	0,00			
Iridium	< 0,01	n.n.			
Lanthanum	< 0,02	0,00			
Lead	< 3,00	0,56			
Lutetium	< 0,01	< 0,00			
Mercury	< 0,30	0,14			
Nickel	< 0,85	0,18			
Palladium	< 0,10	n.n.			
Platinum	< 0,07	n.n.			
Praseodymium	< 0,01	< 0,01			
Rhenium	< 0,01	< 0,01			
Rhodium	< 0,01	n.n.			

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MINERAL ANALYSIS			Childs' HaJr		
Patient Name	Mr. Test	Lab Number	1KH151792	Page	3/6
	Acceptable Range	Test Value			
<b>Potentially Toxic Elements (ppm = mg/kg = mcg/g)</b>					
Ruthenium	< 0,32	n.n.			
Samarium	< 0,01	< 0,00			
Silver	< 1,00	0,03			
Tantalum	< 0,01	n.n.			
Tellurium	< 0,01	< 0,01			
Thallium	< 0,01	< 0,00			
Thorium	< 0,01	< 0,01			
Thulium	< 0,01	< 0,00			
Tin	< 0,93	0,04			
Titanium	< 0,65	0,12			
Uranium	< 0,10	0,02			
Ytterbium	< 0,01	< 0,00			
Zirconium	< 1,47	< 0,05			

n.n. = not detected

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## MINERAL ANALYSIS

## Childs' Hair

Patient Name	Mr. Test	Lab Number	1KH151792	Pa	4/6
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**This 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 MTM 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 data and information provided here is based on information related to the health of children. The findings are best viewed in the context of a medical examination and history.**

**CALCIUM (Ca)** is essential for bone and teeth growth, muscle and nerve functions, and is involved in immune responses. Deficiency symptoms are muscle cramps, musculoskeletal pain, and periodontal disease. The minimum daily intake is 500mg/day for children up to 1 year of age; 600mg age 1-3; 700mg age 4-6; 800mg age 7-9; and 900-1000 age 10-14, depending on the child's condition. The ability of the body to absorb calcium depends on the gastric ability and decreased body activity levels. Active children absorb calcium better than inactive ones or those bound to bedrest. **GOOD CALCIUM SOURCES:** low fat dairy products, green leafy vegetables, citrus fruits, molasses and fish with edible bones. **THERAPEUTIC CONSIDERATION:** if low calcium tissue levels are found in individuals who consume moderate to high amounts of dairy products, digestive problems and an intolerance towards dairy products may be present. Additionally, a high fat consumption blocks the absorption of calcium. Supplementatin of vitamin D, the amino acid lysine and digestive enzymes, containing pepsin and lactobacillus acidophilus assists intestinal absorption.

**IRON (Fe)** is essential for the oxygen transport and utilization. Iron is regulated in the body primarily by absorption rather than by excretion. The most common sign of deficiency is anemia. Symptoms include pallor and extreme fatigue, dizziness, decreased immune function, shortness of breath and poor appetite. Children with iron deficiency show signs of hyperactivity, decreased attention span and in severe cases a reduced IQ. Behavioral changes manifest prior to a diagnosis of iron deficiency (based on blood tests) and disappear with iron administration. Unusual cravings are common in iron deficiency. An appetite for ice, clay, starch and other nonfood items has been associated with iron deficiency, a condition that has been named "pica" and which responds more rapidly to iron therapy than do changes in red blood cells. Less than 10 percent of dietary iron is absorbed, and the absorption rate increases when blood iron levels are low. Children have a better rate of absorption than adults, but this absorption depends on an adequate stomach acid supply. Adding ascorbic acid can enhance iron absorption, while antacids (which reduce stomach acidity) counteract the effects of ascorbic acid and predispose the user to iron-deficiency anemia. Sulfur-containing amino acids such as methionine also enhance iron absorption. Antibiotics, phosphates, carbonates (such as calcium carbonate) and phytates inhibit iron absorption. Aspirin plays a secondary role in iron loss because of blood lost through low-grade gastrointestinal bleeding. Other predisposing factors to iron deficiency may be excessive intake of copper, manganese, zinc, oxalates, colas and coffee, or heavy metal exposure. Excessive blood loss can cause iron deficiency. **IRON-RICH FOODS ARE:** liver, beef and other meats, dried fruits, lima beans, ham, legumes, dark green leafy vegetables, sardines, prune juice and oysters. **THERAPEUTIC CONSIDERATION:** check lead, copper and manganese levels. Check transferrin levels. Prior to iron supplementation, increase intake of B-complex to to aid absorption.

**MAGNESIUM (Mg)** is an essential element with both electrolyte and enzyme-activator functions. It is a predominately intracellular cation, needed for cell function. 1% of body magnesium is found in blood, 60% is stored in bone, and the remainder is equally divided between muscle and other soft tissue. The absorption and excretion of magnesium is regulated by the kidneys and parathyroid hormones. Magnesium prevents tissue breakdown and cell distraction. It is needed for energy production, for the protein and sugar synthesis and for removing excess ammonia from the body. It is necessary for muscle relaxation, neuromuscular transmission and activity, and plays a vital role in the prevention of tooth decay by binding calcium to tooth enamel. Low hair issue levels have been linked to gastrointestinal disorders, malnutrition, alopecia, swollen gums, circulatory problems, skin lesions, sugar intolerance and hyperactivity in children. Only 30 percent of the dietary magnesium is absorbed, the remainder being excreted with the feces. Absorption is dependent on intestinal transit time and the rate of water absorption. Magnesium absorption is inhibited by fat, phosphate and lactose. Phytate and oxalates bind with magnesium to form insoluble compounds. **DEFICIENCY SYMPTOMS:** nervous disorders (tics, tremors, muscle spasms), disorientation, cardiac arrhythmia, fast pulse, pancreatitis, nausea, vomiting, convulsions and seizures (esp. in combination with Vit. B6 deficiency) **GOOD FOOD SOURCES:** all plant foods, particularly nuts, legumes, wholegrain cereals (baked and cooked) and breads, soybeans and seafoods. **THERAPEUTIC CONSIDERATION:** Adequate magnesium alleviates behavioral problems, prevents circulatory problems, headaches, insomnia, excessive perspiration, and sleeping problems. Studies indicate that an adequate magnesium supplementation reduced overall illness in tested individuals.

n.n. = not detected

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Mr. Test

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1KH151792

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**MANGANESE (Mn)** is a co-factor for many enzymes including arginase, cholinesterase, phosphoglucomutase, pyruvate carboxylase, mitochondrial superoxide dismutase, and several phosphatases, peptidases and glucosyltransferases. It functions with Vitamin K in the formation of prothrombin and is needed for the acetylcholine synthesis. Manganese is mostly stored in the liver and the kidneys. Acute deficiency has never been reported in humans, but symptoms of decreased intake include fatigue, lack of physical endurance, hearing loss, slow growth of fingernails and hair, impaired bone metabolism, impaired glucose metabolism incl. diabetes, reduced fertility, and increased allergic sensitivities. Deficiency symptoms may be caused by dietary insufficiency, intestinal malabsorption, or excess dietary intake of phosphorus, cobalt or magnesium. Manganese is absorbed in the small intestine and excreted in bile and pancreatic secretion.

**SOURCES:** liver, kidney, wheat germ, legumes, black tea and nuts.

**Uses/Documentation:** Manganese is known to be an important nutrient, but manganese deficiency has not been documented in humans, as dietary intakes often exceed dietary requirements. The element may be added to TPN solutions in patients who receive chronic parenteral nutrition.

**Contraindications/Precautions:** NOTE: Manganese supplements should be used cautiously in young children. Do not supplement manganese in these populations without medical supervision.

**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 catecholamines and inhibit cholesterol synthesis and lower phospholipid levels. It may have an anti-diabetic, weight-reducing function and anticaries 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.

**The following nutritional program is suitable for children 2 to 12 years of age. For a child under 2 years of age the following recommended dosage have to be adjusted, depending on the child's health, weight and condition. The outlined nutritional support program is recommended for 3-4 months, after which a repeat analysis is recommended. A follow-up test would evaluate and determine this child's ability to digest and absorb nutrients. This program has should be supervised by a licensed health care provider. If any questions or problems arise, consult your doctor.**

### Calcium (Ca)

Low calcium levels represent an inadequate calcium intake or a reduced ability to absorb calcium. The recommended daily intake for children is as follows: 360mg for infants up to 6months of age; 540mg for infants up to 1yr of age; 800mg for children 1-10years of age; 1000mg for children 11-18years old. It must be recognized, however, that children living in other parts of the world thrive, grow and maintain normal skeletons on less than 200mg/day. Apparently, calcium absorption increases when fat and phosphorus consumption is low, the magnesium and Vit.D intake is adequate and physical activity is high. Excellent sources of calcium are low fat milk and yoghurt, hard cheeses, and dark green vegetables. Citrus fruit and juices, canned fish with edible bones, dried peas and beans are also good sources. Butter, sour creme, cream cheeses, and other high-fat dairy products are poor calcium sources. Whole grains are also poor sources. Hard water provides some calcium, but mineral water is a poor source. Cow's milk intolerance is another cause of low calcium levels. The inability of the digestive tract to break down milk proteins, or the presence of lactose (milk sugar) intolerance prevents calcium uptake. To check if such an intolerance is present, avoid ALL dairy products for no less than 1 week. If an intolerance is present, the child's well-being improves noticeably after the 5 day and persists until dairy products are re-introduced into meals. Any noticeable reaction occurring after this "cleansing week" suggests the presence of a dairy food intolerance and the need for digestive support.

### Iodine (I)

The minimum daily intake for children is: 40mcg up to 6month of age; 50mcg for 6-12months of age; 70mcg for children 1-3years old; 90mcg for 4-6year olds; 120mcg for 7-10year olds, and 150mcg for young people 11years and older. Good food sources are fish and iodine-containing salt or add seaweed products.

### Iron (Fe)

Check serum iron and serum ferritin levels before supplementing iron.

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### Magnesium (Mg)

The minimum daily requirements are: 50mg for children up to 6months; 70mg for 6-12months of age; 150mg for children 1-3years of age; 200mg for age 4-6years; 250mg for age 7-10years and 350mg for youngsters 11-14years of age. Magnesium-rich foods are nuts, legumes, wholegrain cereals and bread, soybeans and seafoods.

### Manganese (Mn)

Specific manganese requirements are unknown, but the estimated safe and adequate daily dietary intake is 0,5-0,7mg for infants up to 6months of age; 0,7-1mg for infants up to 1year of age; 1-1,5mg for children age 1-3; 1,5-2mg for children 4-6jährige; 2-3mg for 7-10year olds and 2,5 to 5mg for 11year olds and older. Increase intake of herbal teas.

### Vanadium (V)

To improve vanadium levels, increase intake of soy, corn and sunflower oil.

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