



**TEST PATIENT**

Sample Test Name  
 Sex : F  
 Date Collected : 00-00-0000

**LAB ID: 00000000 UR#:0000000**

**TEST PHYSICIAN**

DR EDWARD CHAN  
 11-1, WISMA LAXTON,  
 JALAN DESA, TAMAN  
 DESA, 58100 KL

**INTEGRATIVE MEDICINE**

HAIR	Result	Range	Units	
<b>Hair Mineral Analysis, Level 2</b>			ppm	
<b>Nutrient Mineral Levels</b>			ppm	
<b>Hair Description</b>	Black			
<b>Chromium (hair)</b>	<b>0.048</b>	0.020 - 0.210	ppm	
<b>Cobalt (hair)</b>	<b>0.008*L</b>	0.010 - 0.300	ppm	
<b>Copper (hair)</b>	<b>11.265</b>	10.000 - 41.00	ppm	
<b>Iodine (hair)</b>	<b>1.436</b>	0.150 - 3.500	ppm	
<b>Iron (Hair)</b>	<b>7.576</b>	4.600 - 17.700	ppm	
<b>Manganese (hair)</b>	<b>0.200</b>	0.050 - 0.920	ppm	
<b>Molybdenum (hair)</b>	<b>0.023*L</b>	0.030 - 1.100	ppm	
<b>Selenium (hair)</b>	<b>0.927</b>	0.400 - 1.700	ppm	
<b>Vanadium (hair)</b>	<b>0.014</b>	0.010 - 0.200	ppm	
<b>Zinc (hair)</b>	<b>173.991</b>	150.000 - 272.	ppm	
<b>Calcium (Hair)</b>	<b>393.406</b>	220.000 - 1600	ppm	
<b>Magnesium (hair)</b>	<b>32.604</b>	20.000 - 130.0	ppm	
<b>Boron (hair)</b>	<b>0.403</b>	0.000 - 0.840	ppm	
<b>Germanium (hair)</b>	<b>&lt;0.003</b>	0.000 - 1.650	ppm	
<b>Lithium (hair)</b>	<b>0.002</b>	0.000 - 0.300	ppm	
<b>Strontium (hair)</b>	<b>0.611*L</b>	0.650 - 6.900	ppm	
<b>Tungsten, hair</b>	<b>0.003</b>	0.000 - 0.010	ppm	
<b>Toxic Mineral Levels</b>			ppm	
<b>Aluminium (hair)</b>	<b>4.845</b>	0.000 - 8.000	ppm	
<b>Antimony (hair)</b>	<b>0.024</b>	<0.300	ppm	
<b>Arsenic (hair)</b>	<b>0.127</b>	0.000 - 0.200	ppm	
<b>Barium (hair)</b>	<b>0.344</b>	0.000 - 4.640	ppm	
<b>Beryllium, hair</b>	<b>&lt;0.010</b>	0.000 - 0.100	ppm	
<b>Bismuth, hair</b>	<b>&lt;0.010</b>	0.000 - 0.200	ppm	
<b>Cadmium (hair)</b>	<b>0.251*H</b>	0.000 - 0.200	ppm	
<b>Lead (hair)</b>	<b>3.297*H</b>	0.000 - 3.000	ppm	
<b>Mercury (Hair)</b>	<b>1.462*H</b>	0.000 - 0.600	ppm	
<b>Nickel (hair)</b>	<b>0.174</b>	0.000 - 1.000	ppm	
<b>Palladium, Hair</b>	<b>&lt;0.050</b>	0.000 - 0.100	ppm	
<b>Platinum, Hair</b>	<b>&lt;0.005</b>	0.000 - 0.010	ppm	
<b>Silver, Hair</b>	<b>0.020</b>	0.000 - 1.000	ppm	
<b>Thallium, Hair</b>	<b>&lt;0.001</b>	0.000 - 0.010	ppm	
<b>Tin, Hair</b>	<b>0.113</b>	0.000 - 0.700	ppm	
<b>Titanium, Hair</b>	<b>0.222</b>	0.000 - 1.500	ppm	
<b>Uranium, Hair</b>	<b>0.015</b>	0.000 - 0.100	ppm	
<b>Zirconium, Hair</b>	<b>0.076</b>	0.000 - 0.500	ppm	
<b>Hair Mineral Ratios</b>			ppm	

(\*) Result outside normal reference range

(H) Result is above upper limit of reference rang (L) Result is below lower limit of reference range



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Calcium/Copper Ratio	<b>34.92</b>	5.50 - 292.00	RATIO	
Calcium/Iron Ratio	<b>51.9</b>	16.1 - 293.0	RATIO	
Calcium/Magnesium Ratio	<b>12.1</b>	4.9 - 26.1	RATIO	
Calcium/Strontium Ratio	<b>643.9</b>	40.7 - 5517.0	ppm	
Calcium/Zinc Ratio	<b>2.3</b>	0.9 - 11.3	RATIO	
Iron/Copper Ratio	<b>0.7</b>	0.1 - 2.5	RATIO	
Iron/Manganese Ratio	<b>37.9</b>	5.5 - 195.0	RATIO	
Zinc/Chromium Ratio	<b>3624.81 *H</b>	383.00 - 2254.	RATIO	
Zinc/Copper Ratio	<b>15.4 *H</b>	8.2 - 13.2	RATIO	
Zinc/Iron Ratio	<b>23.0</b>	10.4 - 45.4	RATIO	
Zinc/Magnesium Ratio	<b>5.34</b>	1.09 - 12.40	RATIO	
Zinc/Manganese Ratio	<b>869.96</b>	142.00 - 3542.	RATIO	

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**Nutrient Minerals Comment**

**MOLYBDENUM (Mo)** 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)** 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 1mg/day to 4.7mg/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.

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**Toxic Hair Metals Comment****ALUMINIUM (Al) :**

Despite being a recognized neurotoxin, Al is used widely in everyday living.

**COMMON SOURCES:**

Oral Al bioavailability from water appears to be about 0.3%, so food is the primary common source. However, Al bioavailability from food has not been adequately determined.

Industrial and medicinal exposure and perhaps antiperspirant use, can significantly increase absorbed aluminium. Inhalation bioavailability of airborne Al particles appears to be about 1.5% in the industrial environment but may be considerably higher in the vicinity of bauxite mines.

Brain uptake of Al may be mediated by Al-transferrin and Al-citrate complexes.

Aluminium is deposited in bone tissue and elimination half-lives of several years have been reported. Al elimination is primarily renal with ~ 2% excreted through the bile.

Most ingested aluminum comes from food and drink, while additional amounts may come from pharmaceuticals. Whilst the GIT absorption of aluminium is fairly minimal, its absorption is typically decreased by the presence of dietary phosphates (from animal protein sources), but may be increased by the presence of citric or malic acids (carboxylic acids) present in foods or drink. Excretion of aluminum from the bloodstream is predominantly by urine.

Once in the body, aluminum binds to the iron-bearing protein transferrin in the bloodstream, together with citrate & malic acid. Once inside a cell, aluminium may bind to DNA, ATP, NADP, NADPH or phosphorylated proteins. The deposition of aluminum in brain tissue is implicated as a contributory agent in various neurodegenerative conditions including Alzheimer's disease. In neuronal and other tissues, aluminum may cause a chronic, low-grade inflammation via microglial cell activation and contribute to

**HIGH Cadmium (Hair) Comment:**

Cadmium - is a well-known toxin similar to mercury, which has no known human need.

Cd has been reported to be significantly elevated in smokers.

Sources include: Sewage sludge, seafood, tobacco, mining, phosphate, fertilizers, soft water, welding.

Cd exposure has also been associated with hypertension or hypotension, fatigue, loss of sense of smell, anaemia, proteinuria, osteomalacia, nausea, vomiting, diarrhoea, emphysema, dry scaly skin, hair loss kidney problems.

The kidney proximal tubule is the main site of accumulation. May modify catecholamine metabolism. Decreases CYP-450. Inhibits anti-trypsin. Causes changes in arterial endothelium.

Synergistic for Uptake/Retention: Iron deficiency. Lead and Mercury accentuate toxicity.

Antagonistic for Uptake/Retention: Adequate Zinc, Calcium, Magnesium and Copper.

**HIGH Lead (Hair) Comment:** Lead is a well-known neuro-toxin that has no known human need. Studies show that lead toxicity is associated with deficits in the C.N.S. functioning and that this can persist into young adulthood.

Sources: Paint, ceramics, solder, soil, newsprint, dolomite, pewter ware.

Physiological Interactions: Lead binds to haemoglobin, deposits in bone, aorta, kidney tubules, brain, adrenal, thyroid, liver. Inhibits haeme synthesis, may depress mitochondrial respiratory chain. ATP-ases also affected.

Symptoms of excessive exposure: Fatigue, microcytic anaemia, metallic taste, glycosuria, I.Q. loss, delayed mental development, hyperactivity, loss of appetite/anorexia, weight loss, headaches, nervousness, decreased nerve conduction, possibly motor neuron disorders, metallic taste, insomnia, reticulocytosis.



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Synergistic for Uptake/Retention: Calcium, iron, zinc and phosphate deficiencies increase absorption. Children and infants have a 40% higher absorption.  
Antagonistic for Uptake/Retention: Calcium, zinc, and phytate decrease absorption.

**HIGH Mercury (Hair) Comment:**

Mercury is a well-known neuro-toxin that has no known human need. Circulating metals in blood 'feed' the hair root. Therefore, hair reflects longterm or chronic exposure. Early symptoms of mercury overexposure include insomnia, dizziness, fatigue, drowsiness, weakness, depression, tremors loss of appetite, loss of memory, nervousness, headache, dermatitis, numbness, and tingling of lips and feet, emotional instability and kidney damage. Symptoms of acute toxicity: loss of teeth, extreme tremor, mental and emotional disorders, kidney failure.

Chronic mercury ingestion may be a risk factor for cardiovascular disease. This increased risk has been proposed to be due to the promotion of lipid peroxidation by mercury. Elevated levels of mercury in hair have been associated with inducement of autoimmune diseases, multiple sclerosis.

Sources: Shellfish, large fish, dental amalgams, electrical relays, fungicides, mining, paints, explosives, batteries, mercurial diuretics, fungicides, fluorescent lamps, cosmetics, hair dyes, and petroleum products. Vaccines containing thimerosal are another source of exposure. Improper disposal of broken mercury thermometers and other apparatuses that use mercury including button cells and tube lights may also result in mercury exposure.

Physiological Interactions: Accumulates in kidney, liver. Organic mercury has a ½ life of 2 months & binds to enzymes, proteins, and glutathione. MAO, catalase, P-450, and mitochondrial functions are affected.

Symptoms of excessive exposure: Headache, fine tremor, increased salivation, excitability, poor mental concentration, metallic taste, fatigue, anorexia, psychoses, hypertension with renal dysfunction.

Synergistic for Uptake/Retention: Selenium Deficiency

**Hair Minerals Analysis Comments**

The measured hair analysis results never reveal exactly how much to supplement when a level is abnormal. What we are measuring is the tissue (hair) saturation of each particular mineral.

When nutritionally essential elements are low or deficient, the Reference Daily Intake (RDI) levels provide guidance for supplementation. The RDI's for elements or minerals are the daily intakes recommended for essential body functions.

ELEMENT	RDI**
Calcium	1000 milligrams***
Chromium	120 micrograms
Copper	2 milligrams
Magnesium	400 milligrams
Manganese	2 milligrams
Selenium	70 micrograms
Zinc	15 Milligrams

Tests ordered: HAIR2