

Eudamonia Inc.
 #204, 9730 101 Avenue
 Fort St. John, BC V1J 2A8
 Phone:
 Fax:
 Email: info@eudamonia.com



Date of Collection: 4-Jan-2011
 Sample Received: 14-Jan-2011
 Reported Date: 23-Jan-2011
 Sample Type: Pubic hair

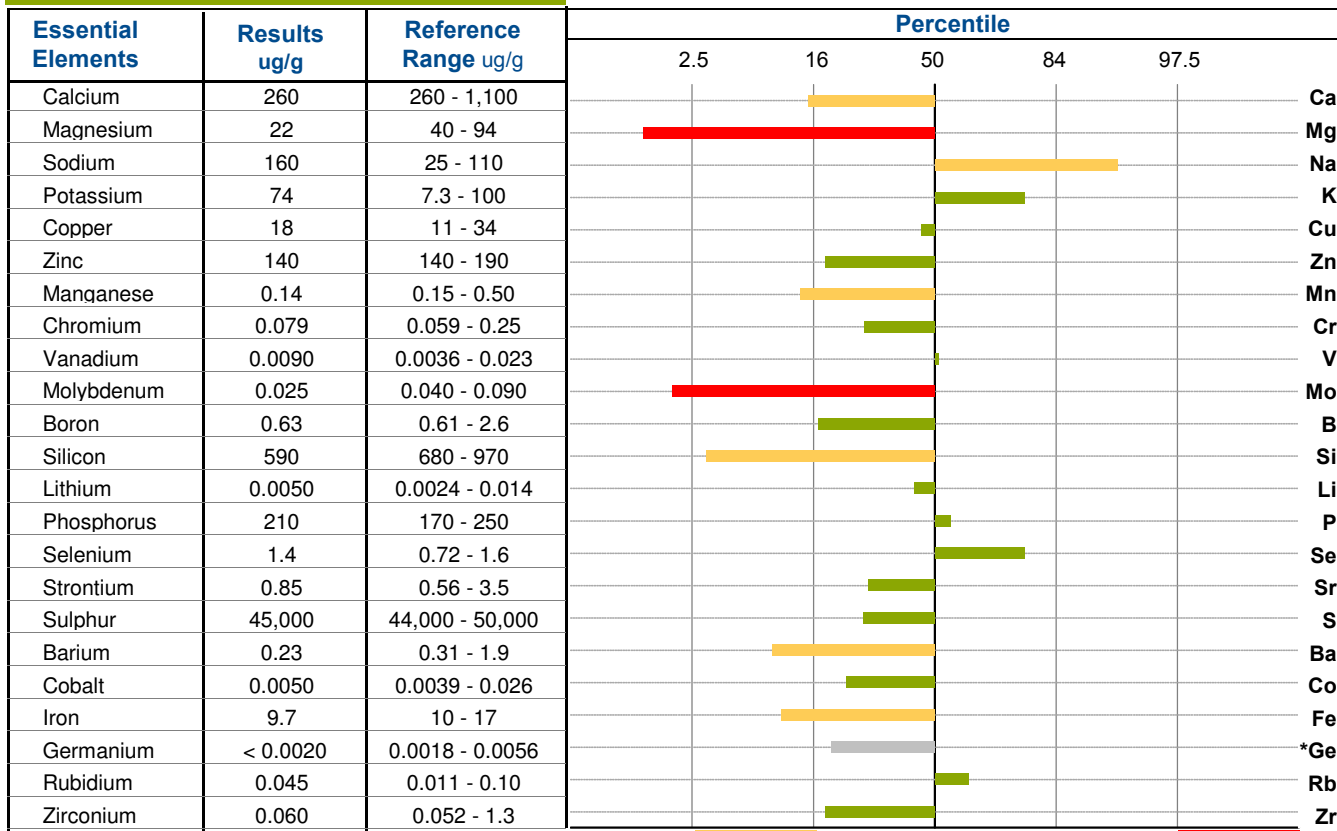
Hair Elements Analysis Report **Accession #: 262906**

Provider:
 ABC Nutrition
 4567 Good Ave
 Healthytown, ON L0L 0M0
 Phone:
 Fax:

Patient:
 Harry Hedd
 4321 Hirsute Close
 Scalpville, ON L0L 0L0
 Phone:

Gender : M
Date of Birth :
Age: 62

Essential / Non-Toxic Elements



* Result lies below detection limit (DL is at left end of bar).
 Abnormal V.Abnormal Below Average Average Above Average Abnormal V.Abnormal

Tested at Rocky Mountain Analytical, Calgary AB

NOTE: This interpretation follows the system developed by Andrew Hall Cutler PhD, which requires consideration of the overall distribution pattern for essential elements as a first step in the interpretation of the results. If the essential element distribution pattern is statistically normal, then both toxic and essential element results can usually be taken at face value. If the essential elements results exhibit a statistically improbable distribution pattern, this suggests heavy metal toxicity or some other interfering process. The interpretation comments starting on page 3 state whether the essential element graph above fits a statistically normal or statistically unlikely distribution pattern.

Toxic / Potentially Toxic Elements

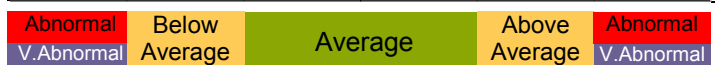
Toxic Elements	Results ug/g	Reference Range ug/g	Percentile						
			6.7	31	69	93	99.4		
Aluminum	1.2	<20							Al
Antimony	0.11	<0.12							Sb
Arsenic	0.16	<0.29							As
Bismuth	0.0010	<0.081							Bi
Gallium	0.0020	<0.012							Ga
Cadmium	0.010	<0.11							Cd
Lead	0.72	<3.1							Pb
Mercury	0.065	<1.6							Hg
Nickel	< 0.15	<0.72							*Ni
Tin	0.099	<0.56							Sn
Titanium	1.1	<2.7							Ti
Tungsten	< 0.010	<0.010							*W
Uranium	0.0030	<0.14							U
Silver	< 0.15	<1.0							*Ag
Beryllium	< 0.0050	<0.0055							*Be
Cesium	< 0.00050	<0.0018							*Cs
Gadolinium	< 0.0010	<0.0030							*Gd
Indium	< 0.00030	<0.00040							*In
Platinum	< 0.0040	<0.0051							*Pt
Tellurium	< 0.0060	<0.0060							*Te
Thallium	< 0.00010	<0.0050							*Tl
Thorium	< 0.0030	<0.0060							*Th

* Result lies below detection limit (DL is at right end of bar)



Element Ratios

Ratios	Results	Reference	Percentile					
			2.5	16	50	84	97.5	
Se/Hg	22	1.2 - 12						Se/Hg
Ca/P	1.2	1.2 - 3.9						Ca/P
Ca/Na	1.6	3.3 - 31						Ca/Na
Ca/Mg	12	6.7 - 18						Ca/Mg
Ca/K	3.5	4.7 - 94						Ca/K
Ca/Pb	360	350 - 3,400						Ca/Pb
Ca/Fe	26	22 - 81						Ca/Fe
Zn/Hg	2,100	180 - 1,200						Zn/Hg
Zn/Cd	14,000	3,200 - 26,000						Zn/Cd
Zn/Cu	7.7	3.8 - 15						Zn/Cu
Fe/Cu	0.55	0.31 - 1.3						Fe/Cu
Fe/Hg	150	15 - 110						Fe/Hg
Na/K	2.1	0.94 - 3.6						Na/K
Na/Mg	7.2	0.31 - 2.5						Na/Mg
Fe/Pb	13	10 - 64						Fe/Pb



DISCLAIMER MANDATED BY THE COLLEGE OF PHYSICIANS AND SURGEONS OF ALBERTA

This hair analysis method has been reviewed and accepted by the Laboratory Accreditation Committee of the College of Physicians and Surgeons of Alberta. The College considers hair element analysis to be complementary medicine. Analysis of chemical elements in hair has been used in research but is not approved for diagnosis of toxicity or deficiency states. Rocky Mountain Analytical does not diagnose or make treatment recommendations. Data is provided for research and educational purposes only.

THIS IS A PUBIC HAIR SPECIMEN. DOES THAT MAKE A DIFFERENCE?

In this interpretation, pubic hair results are treated in exactly same fashion as scalp hair results, i.e. the same counting rules are applied, and in practice, we find that the classification of the essential element distribution pattern agrees quite well whether scalp or pubic hair is used. A normal element distribution in pubic hair predicts a normal element distribution in scalp hair about 80% of the time. An abnormal element distribution in pubic hair is accompanied by an abnormal distribution in scalp hair about 90% of the time. As always, the practitioner has to weigh the laboratory test results against the clinical situation.

DOES THE LENGTH OF THE HAIR STRANDS MATTER?

Hair grows about 1 cm per month. We ask patients to give us samples composed of the first cm of hair closest to the scalp, in order to give a picture of what has gone on for the patient in the month or so prior to sampling. If we receive hair samples with strands longer than 1 cm, please be aware that the interpretation will reflect average conditions over an amount of time proportional to the length of the hair! For example, a hair sample consisting of 6 cm strands will give results averaged over roughly 6 months prior to sampling.

DISTRIBUTION PATTERN OF ESSENTIAL ELEMENTS IS NORMAL AND ORDERLY

The Z-scores for the essential elements meet the criteria for a normal distribution pattern, as outlined by Dr. Andrew Hall Cutler, in his book: Hair Test Interpretation: Finding Hidden Toxicities. The "textbook" distribution pattern will be more or less symmetrical, with most of the essential elements lying within one standard deviation of their mean, and with few elements lying more than 2 standard deviations away from their mean. Dr. Cutler considers this to be evidence that transport of the essential chemical elements (and many of the potentially toxic elements) into hair is normal and orderly; the levels of these elements are considered to be reflective of body stores (with some exceptions).

ESSENTIAL ELEMENT DISTRIBUTION PATTERN EXHIBITS A BIAS TOWARD THE LEFT

In addition to whatever else might be going on, the essential elements are exhibiting a "left bias" with 15 to 17 essential elements whose results lie below their mean (15 to 17 green, red, yellow or purple bars going left). This is still a statistically normal pattern but it is unusual enough to comment upon. It may be due to a globally reduced intake of essential elements due to dietary choices, which might be more likely to occur in children or the elderly. It may reflect a reduced ability to digest and assimilate nutrients due to decreased gastric acidity, decreased pancreatic enzyme output or decreased ability of the gut wall to absorb nutrients due to inflammation, atrophy or surgery. Some practitioners experienced with hair testing are of the opinion that this can reflect some toxic influence, such as a heavy metal beginning to disrupt the element transport mechanisms into hair. It may also be a genetic tendency.

ESSENTIAL ELEMENTS WHICH HAVE A GREY BAR ARE BELOW DETECTION LIMIT

Occasionally, one or more of the bars for the essential elements will be grey. A grey bar for an essential element indicates that the measured result is below the detection limit for that element. The actual result for an essential element with a grey bar will lie somewhere to the left of the end of that bar, indicating that the true result is at least as low as indicated, but could be lower.

SOME ELEMENTS WITH YELLOW BARS HAVE NO ASSOCIATED COMMENT

If no comment appears for any given essential element that has a yellow bar (above or below the mean), it is usually not an oversight. In most cases it means that the finding is not clinically significant.

CALCIUM LOWER THAN NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)

Calcium is lower than normal. Low hair calcium is not a reliable indicator of body calcium status. Nevertheless, it might be worthwhile reviewing dietary intake of calcium, ensuring that there is adequate intake of calcium.

IRON LOWER THAN NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)

The iron level is low, but it is generally accepted that hair iron does not correlate to other measures of bodily iron; therefore, low hair iron should not be interpreted as an indicator of iron deficiency and it does not indicate a need for iron supplementation. Sometimes low hair iron is a marker of lead exposure, and it is sometimes helpful to refer to the ratio Fe/Pb. A low iron result in conjunction with a low Fe/Pb ratio (yellow or red zone low) might be caused by lead exposure.

GERMANIUM BELOW DETECTION LIMIT (GREY BAR POINTING LEFT)

Here the germanium result is at or below its detection limit. The "true" result is most likely in the yellow or red zone low. It is not known how well hair germanium reflects body stores; a finding of low germanium may not be significant. Germanium is thought to be important for modulation of immune function and for delivery of oxygen to cells. Many herbs and medicinal plants traditionally used in healing--such as ginseng, garlic, comfrey, and aloe are reported to contain substantial amounts of germanium. Germanium is also found in oysters and mushrooms. Some of the immunomodulatory effects of mushrooms might be due to germanium. There might be some benefit in paying attention to a low hair germanium level in a patient with suboptimal immune system function.

MAGNESIUM LOW (RED BAR POINTING LEFT)

Low magnesium is associated with poor sleep, muscle spasm in particular neck and back spasm, as well as hypertension. Diabetics are often low on magnesium. Magnesium-containing foods include spinach, broccoli, okra, whole grains, peas, pumpkin seeds, sunflower seeds, celery seed, black beans, almonds, walnuts, and brown rice. Since chlorophyll contains magnesium, many dried herbs such as coriander, spearmint, dill, parsley and sage are high in magnesium.

MANGANESE BELOW NORMAL (YELLOW, RED OR PURPLE BAR POINTING LEFT)

Manganese is low and hair manganese is thought to be representative of body stores when element transport is normal. Manganese-deficient individuals have problems metabolizing protein, and accumulate ammonia in the face of high protein intake. Low cholesterol is a finding in manganese deficiency. Manganese deficiency can cause neurologic problems including seizures, hearing loss, ataxia and tinnitus, and low manganese has been linked to myasthenia gravis. In children, low manganese impairs bone growth, as well as balance and co-ordination. Manganese stabilizes histamine storage vesicles; low manganese may be associated with atopy. Foods rich in manganese include spinach, asparagus, whole grains (brown rice, rye), nuts (macadamia, cashew, hazelnut, almond), soybeans, chickpeas (garbanzo beans), oats, bananas, pineapple, blueberries and blackberries.

MOLYBDENUM BELOW NORMAL (YELLOW, RED OR GREY BAR POINTING LEFT)

When element transport is normal and orderly, hair molybdenum is believed to reflect body stores of molybdenum. Low molybdenum may reflect dietary intake. Foods that grow above ground - such as peas, leafy vegetables (including broccoli and spinach) and cauliflower - tend to be higher in molybdenum; foods particularly high in molybdenum include nuts and cereals such as oats. Excess supplementation with copper can reduce body stores of molybdenum. Molybdenum is a cofactor for various enzymes involved in the metabolism of sulphur and also in the breakdown of alcohol. Low molybdenum can manifest with asthma, alcohol intolerance and sensitivity to salicylate-containing foods. (Salicylate containing foods include apples, citrus fruits, strawberries, tomatoes, and wine.)

SILICON LOW (YELLOW, RED OR PURPLE BAR POINTING LEFT)

The degree to which the silicon level in hair reflects body stores is unknown. Silicon is an important trace element for maintenance of healthy bone, hair and connective tissues. Sensitivity to cold is supposed to be an additional symptom of silicon deficiency. Foods high in silicon include fruits, almonds, whole grains, onions, carrots, and seeds.

YELLOW OR RED BARS FOR TOXIC/POTENTIALLY TOXIC ELEMENTS

For some of the elements normally present in hair at very low levels, only the upper part of the statistical distribution could be accurately determined. It was possible to accurately determine the 95th percentile threshold for all elements (i.e. that concentration below which 95% of the results fall). By convention, reference ranges are usually set at the 95th percentile, so we are always able to determine whether an element is within its reference range. When a toxic/potentially toxic element has a yellow or red bar, this does not necessarily mean that this is a worrisome result; it only means that the result lies toward the high end of the observed range of values in clinically normal individuals.

GREY BARS FOR TOXIC/POTENTIALLY TOXIC ELEMENTS

A grey bar for a toxic/potentially toxic element indicates that the measured result is below the detection limit for that element. The "actual" result for an element with a grey bar will lie somewhere along the bar, but in most cases, the actual result will be quite a bit lower (farther to the left) than indicated by the length of the bar.

ESSENTIAL ELEMENT DISTRIBUTION PATTERN EXHIBITS A BIAS TOWARD THE LEFT

As noted above, the essential elements are exhibiting a "left bias" with 15 to 17 essential elements whose results lie below their mean (15 to 17 grey, green, red, yellow or purple bars going left). Recognize that the same tendency may also affect the toxic elements; the levels of some of these elements in the hair may be under-represented relative to levels in the blood and other tissues.

ARSENIC ABOVE NORMAL RANGE (YELLOW, RED OR PURPLE BAR)

Hair arsenic is thought to accurately reflect body burden. It is relatively easy to be exposed to arsenic as it was widely used in the past as a pesticide/rodenticide, and in some areas, the groundwater has naturally high levels of arsenic. Dust from burning of coal contains arsenic; therefore arsenic is widely dispersed in the environment. Arsenic can be high in crustaceans and fish living in contaminated water, also in fruits and vegetables grown in contaminated areas. Commercially-raised pigs and poultry are given arsenic-containing feed additives (e.g. roxarsone), and the element may concentrate in their flesh, especially the liver. Rice is notorious for being contaminated with arsenic; rice pabulum is an easily overlooked potential source of exposure. (Arsenic in rice: I. Estimating normal levels of total arsenic in rice grain. Zavala YJ, Duxbury JM. Environ Sci Technol. 2008;42(10):3856-60.) Pressure-treated lumber used for fencing, playground structures and deck construction may have been treated with an arsenic-containing wood preservative (chromated copper arsenate). Running barefoot or climbing on this type of treated wood can lead to exposure (Arsenic on the hands of children after playing in playgrounds. Kwon E, et al. Environ Health Perspect. 2004. ;112:1375-1380.) Maternal-fetal transfer of arsenic also takes place. Arsenic toxicity can result in peripheral neuropathy, GI complaints (pain, nausea, diarrhea), headaches, fatigue, anemia, poor tolerance of carbohydrates, and personality changes (fear and anxiety). Chronic arsenic exposure may result in impaired cognitive development in children. With all that being said, bear in mind that our reference ranges are quite conservative. A yellow or red bar does not necessarily imply arsenic toxicity, but merely indicates that the result in question lies toward the upper end of the distribution of results from clinically normal individuals. A purple bar warrants a careful search for sources of arsenic exposure, as well as additional testing, such as urine provocation. In the literature, the normal range for arsenic is <0.5 to 1 microgram/gm, with hair levels in individuals exposed to arsenic via soil and water lying >2 microgram/gm.

ANTIMONY HIGHER THAN AVERAGE OR HIGH (YELLOW OR RED BAR)

Most people have some exposure to antimony through the flame-retardant treatments applied to upholstery, carpets, drapes and some clothing (in particular children's pyjamas). Antimony can also be found in PETE plastic. Therefore, it is not unusual to find antimony in hair of normal people who do not have workplace exposure to antimony. Levels in normal individuals in the literature range up to 1 mcg/g. Our normal ranges are quite conservative in comparison. A yellow or red bar for antimony merely indicates that the measured level for this patient is at the high end of the range observed in clinically normal individuals. It does not mean that the patient is carrying a toxic body burden of antimony. Elevation of antimony in conjunction with elevation of other toxic/potentially toxic elements (aluminum, tin, nickel and titanium) can sometimes be an early indicator that something is beginning to interfere with element transport, even though the essential element distribution pattern is still normal.

GENERAL COMMENT ABOUT ELEMENT RATIOS

Some hair testing laboratories make extensive use of the ratios of various elements in their interpretations. There is controversy regarding the validity of element ratios derived from samples which are subjected to a wash procedure in the laboratory. RMA uses a wash procedure prior to analysis. A selection of the more common ratios are included in this report for the convenience of those practitioners used to working with ratios; however, the commentary provided for these ratios is not extensive. Note that even if essential element transport is abnormal, the ratios are still deemed to be valid in most cases.

HIGH RATIO: Na/Mg (YELLOW, RED OR PURPLE BAR POINTING RIGHT)

The ratio: Na/Mg is 7.17. This result is more than one standard deviation above the mean. Some practitioners who routinely use hair testing feel that a high Na/Mg ratio may be an indicator of excessive adrenaline (epinephrine) output. Excessive adrenaline can be associated with anxiety, hyperactivity, panic and poor immune function.



George Gillson, MD PhD
Medical Director

Note: The College of Physicians and Surgeons of Alberta considers hair element analysis to be complementary medicine. Analysis of elements in hair has been used in research but is not approved for diagnosis of toxicity or deficiency states. Rocky Mountain Analytical does not diagnose or make treatment recommendations. Data is provided for research and educational purposes only.