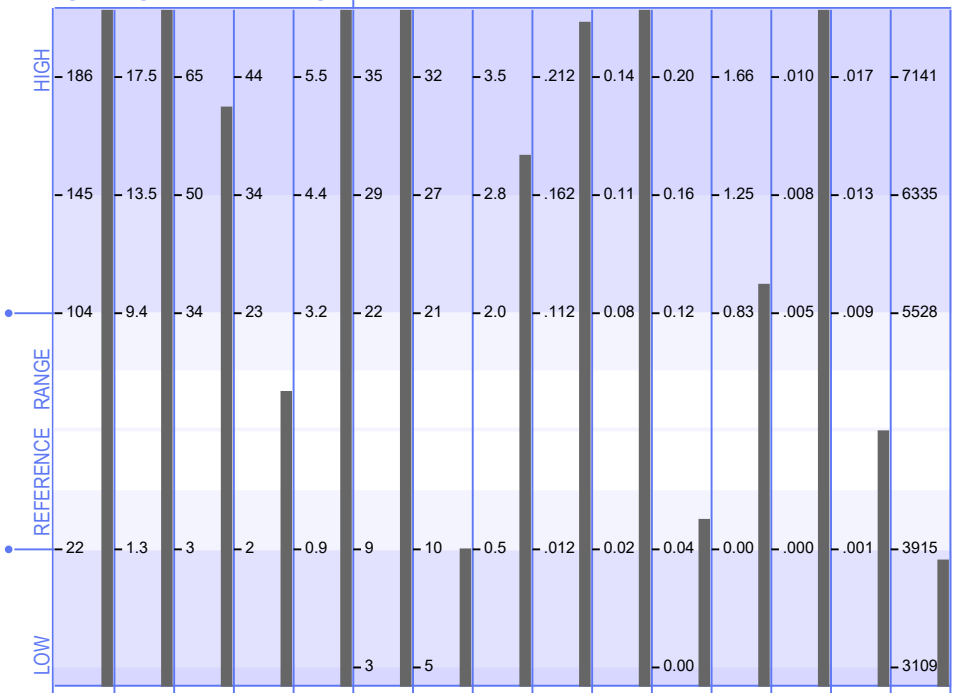
TRACE ELEMENTS
4501 Sunbelt Drive · Addison, Tx · 75001 · U.S.A.

LABORATORY NO.:	1843616
PROFILE NO.: 2	SAMPLE TYPE: SCALP

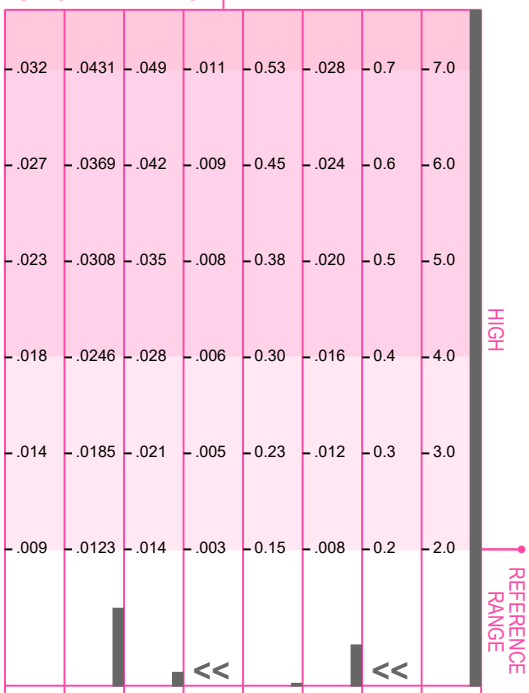
PATIENT: LABBE, KRISTA	AGE: 41	SEX: F	METABOLIC TYPE: SLOW 1
REQUESTED BY: FISCHER, R.	ACCOUNT NO.: 7850		DATE: 5/2/2024

NUTRITIONAL ELEMENTS



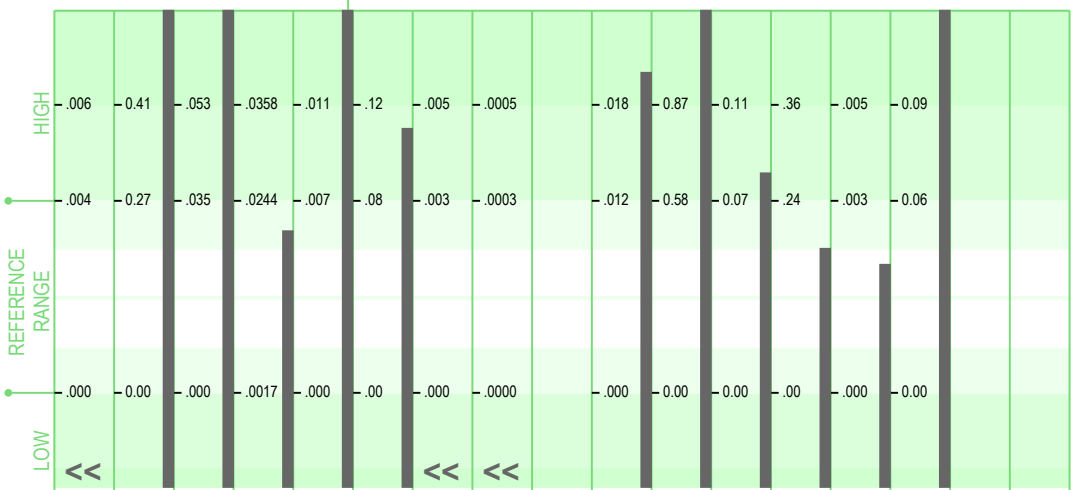
Ca	Mg	Na	K	Cu	Zn	P	Fe	Mn	Cr	Se	B	Co	Mo	S
Calcium	Magnesium	Sodium	Potassium	Copper	Zinc	Phosphorus	Iron	Manganese	Chromium	Selenium	Boron	Cobalt	Molybdenum	Sulfur
476	123.9	61	16	6.7	48	10	3.0	.235	0.68	0.05	0.93	.017	.005	3839

TOXIC ELEMENTS



Sb	U	As	Be	Hg	Cd	Pb	Al
Antimony	Uranium	Arsenic	Beryllium	Mercury	Cadmium	Lead	Aluminum
N/A	.0085	.005	.001	0.01	.004	0.1	8.3

ADDITIONAL ELEMENTS



Ge	Ba	Bi	Rb	Li	Ni	Pt	Tl	V	Sr	Sn	Ti	W	Zr
Germanium	Barium	Bismuth	Rubidium	Lithium	Nickel	Platinum	Thallium	Vanadium	Strontium	Tin	Titanium	Tungsten	Zirconium
.001	1.03	.094	.0208	.032	.11	.001	.0001	.020	6.69	0.08	.18	.002	0.28

"<<": Below Calibration Limit; Value Given Is Calibration Limit

"QNS": Sample Size Was Inadequate For Analysis.

"N/A": Currently Not Available

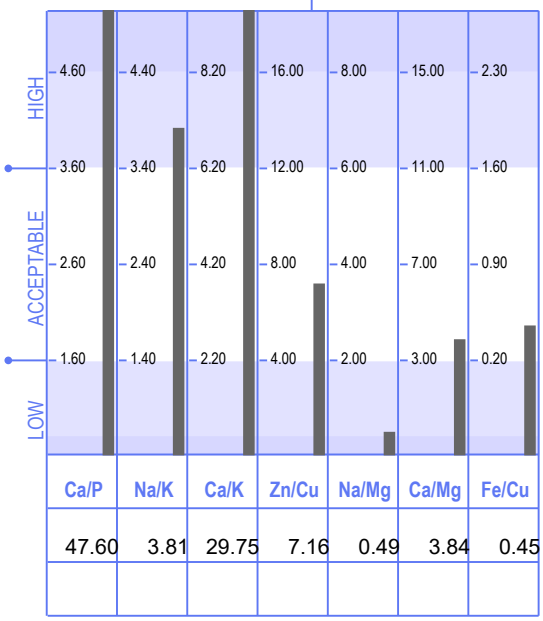
Ideal Levels And Interpretation Have Been Based On Hair Samples Obtained From The Mid-Parietal To The Occipital Region Of The Scalp.

Laboratory Analysis Provided by Trace Elements, Inc.
an H. H. S. Licensed Clinical Laboratory.
No. 45 D0481787 Lab Dir: T. Flowers-Moore, Ph.D.

5/2/2024
CURRENT TEST RESULTS

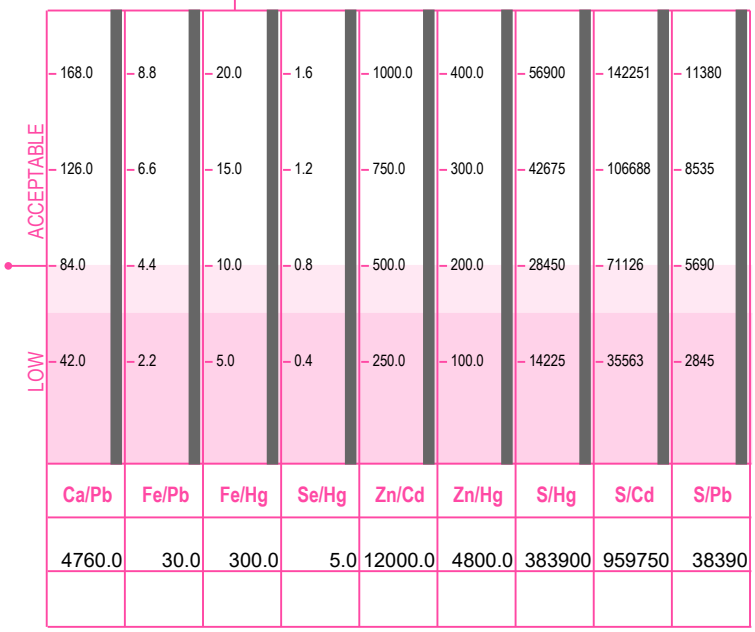
PREVIOUS TEST RESULTS

SIGNIFICANT RATIOS



Ca/P	Na/K	Ca/K	Zn/Cu	Na/Mg	Ca/Mg	Fe/Cu
47.60	3.81	29.75	7.16	0.49	3.84	0.45

TOXIC RATIOS



Ca/Pb	Fe/Pb	Fe/Hg	Se/Hg	Zn/Cd	Zn/Hg	S/Hg	S/Cd	S/Pb
4760.0	30.0	300.0	5.0	12000.0	4800.0	383900	959750	38390

ADDITIONAL RATIOS

RATIO	CALCULATED VALUE		EXPECTED
	Current	Previous	
Ca/Sr	71.2		263/1
Cr/V	34.0		8/1
Cu/Mo	1340.0		356/1
Fe/Co	176.5		615/1
K/Co	941.2		6350/1
K/Li	500.0		6350/1
Mg/B	133.2		21/1
S/Cu	573.0		2668/1
Se/Tl	500.0		370/1
Se/Sn	0.6		3.2/1
Zn/Sn	600.0		624/1

LEVELS

All mineral levels are reported in milligrams percent (milligrams per one-hundred grams of hair). One milligram percent (mg%) is equal to ten parts per million (ppm).

NUTRITIONAL ELEMENTS

Extensively studied, the nutrient elements have been well defined and are considered essential for many biological functions in the human body. They play key roles in such metabolic processes as muscular activity, endocrine function, reproduction, skeletal integrity and overall development.

TOXIC ELEMENTS

The toxic elements or "heavy metals" are well-known for their interference upon normal biochemical function. They are commonly found in the environment and therefore are present to some degree, in all biological systems. However, these metals clearly pose a concern for toxicity when accumulation occurs to excess.

ADDITIONAL ELEMENTS

These elements are considered as possibly essential by the human body. Additional studies are being conducted to better define their requirements and amounts needed.

RATIOS

A calculated comparison of two elements to each other is called a ratio. To calculate a ratio value, the first mineral level is divided by the second mineral level.
EXAMPLE: A sodium (Na) test level of 24 mg% divided by a potassium (K) level of 10 mg% equals a Na/K ratio of 2.4 to 1.

SIGNIFICANT RATIOS

If the synergistic relationship (or ratio) between certain minerals in the body is disturbed, studies show that normal biological functions and metabolic activity can be adversely affected. Even at extremely low concentrations, the synergistic and/or antagonistic relationships between minerals still exist, which can indirectly affect metabolism.

TOXIC RATIOS

It is important to note that individuals with elevated toxic levels may not always exhibit clinical symptoms associated with those particular toxic minerals. However, research has shown that toxic minerals can also produce an antagonistic effect on various essential minerals eventually leading to disturbances in their metabolic utilization.

ADDITIONAL RATIOS

These ratios are being reported solely for the purpose of gathering research data. This information will then be used to help the attending health-care professional in evaluating their impact upon health.

REFERENCE INTERVALS

Generally, reference intervals should be considered as guidelines for comparison with the reported test values. These reference intervals have been statistically established from studying an international population of "healthy" individuals.
Important Note: The reference intervals should not be considered as absolute limits for determining deficiency, toxicity or acceptance.

INTRODUCTION TO HAIR TISSUE MINERAL ANALYSIS (HTMA)

Hair is used for mineral testing because of its very nature. Hair is formed from clusters of specialized cells that make up the hair follicle. During the growth phase, the hair is exposed to the internal environment, such as blood, lymph, and extra-cellular fluids. As the hair continues to grow and reaches the skin's surface, its outer layers harden, locking in the metabolic products accumulated during the formation period. This biological process provides a blueprint and lasting record of mineral status and nutritional and metabolic activity during this time.

The precise analytical method of determining the levels of minerals in the hair is a highly sophisticated technique. However, when performed to exacting standards and interpreted correctly, it may be used as a screening aid for determining mineral deficiencies, excesses, and imbalances. HTMA provides you and your health care professional with an economical and sensitive indicator of the long-term effects of diet, stress, toxic metal exposure, and their impact on your mineral balance, which is difficult to obtain through other clinical tests.

It is important for the attending healthcare professional to determine your mineral status as minerals are absolutely critical for life and abundant health. They are involved in and are necessary for cellular metabolism, structural support, nerve conduction, muscular activity, immune functions, anti-oxidant and endocrine activity, enzyme functions, water and acid/alkaline balance, and even DNA function.

Many factors can affect mineral nutrition, such as; food preparation, dietary habits, genetic and metabolic disorders, disease, medications, stress, environmental factors, and exposure to heavy metals. Rarely does a single nutrient deficiency exist in a person today. Multiple nutritional imbalances, however, are quite common, contributing to an increased incidence of adverse health conditions. It is estimated that mild and sub-clinical nutritional imbalances are up to ten times more common than nutritional deficiency alone.

The laboratory test results and the following comprehensive report should not be construed as diagnostic. This analysis is provided only as an additional source of information to the attending doctor.

Test results were obtained by a licensed clinical laboratory adhering to analytical procedures that comply with governmental protocol and standards established by Trace Elements, Inc. U.S.A. The interpretive data based upon these results is defined by research conducted by David L. Watts, Ph.D.

UNDERSTANDING THE GRAPHICS

NUTRITIONAL ELEMENTS

This section of the cover page graphically displays the test results for each reported nutritional element and how they compare to the established population reference range. Values above or below the reference range indicate a deviation from "normal." The more significant the variation, the greater the possibility of a deficiency or excess.

TOXIC ELEMENTS

The toxic elements section displays the results for each reported toxic element. It is preferable that all levels be as low as possible and within the lower white section. Any test result that falls within the upper dark red areas should be considered statistically significant but not necessarily clinically significant. Further investigation is then warranted to determine the possibility of actual clinical significance.

ADDITIONAL ELEMENTS

This section displays the results of additional elements for which there is limited documentation. These elements may be necessary for biochemical function and may adversely affect biochemical function. Further study will help to reveal their role, interrelationships, and eventually their proper therapeutic application or treatment.

SIGNIFICANT RATIOS

The significant ratios section displays the important nutritional mineral relationships. This section consists of calculated values based on the respective elements. Mineral relationships (balance) are as meaningful, if not more so than the individual mineral levels. The ratios reflect the critical balance that must be constantly maintained between the minerals in the body.

TOXIC RATIOS

This section displays the relationships between critical nutritional elements and toxic metals. Each toxic metal ratio result should be in the white area of the graph, and the higher, the better. Toxic ratios that fall within the darker red area may indicate an interference of that toxic metal upon the utilization of the nutritional element.

ADDITIONAL RATIOS

The additional ratios section provides calculated results on some additional mineral relationships. At this time, there is limited research and documentation regarding these ratios.

METABOLIC TYPE

This section of the report will discuss the metabolic profile based on research by Dr. D. L. Watts. Each classification is established by evaluating the tissue mineral results and determining the degree to which the minerals may be associated with a stimulating and/or inhibiting effect upon the main "energy-producing" endocrine glands. These glands regulate nutrient absorption, excretion, metabolic utilization, and incorporation into the body's tissues: the skin, organs, bone, hair, and nails. How efficiently each nutrient is utilized depends mainly upon the proper functioning of the endocrine glands.

SLOW METABOLISM (TYPE #1)

** Parasympathetic Dominant
** Tendency Toward Decreased Thyroid Function (reduced secretion of hormones)
** Tendency Toward Decreased Adrenal Function (reduced secretion of hormones)

The mineral pattern obtained from these test results is indicative of a slow metabolic (Type #1) pattern. This particular profile can be related to a number of contributing factors, such as;

* Diet - Dietary factors such as low protein intake, high carbohydrate intake, and eating refined carbohydrates, especially those containing appreciable amounts of sugar, have an indirect yet significant suppressing effect on the metabolic rate.

* Endocrine Function - Low thyroid activit, as well as low adrenal gland function, will contribute to a lowering of the metabolic rate.

* Digestion - Poor absorption and utilization of nutrients found in the foods that are consumed will result in decreased energy production on a cellular level, thereby affecting metabolism. In turn, a lowered metabolic rate will have an adverse effect on the digestion process, thereby creating a vicious cycle.

* Viral Infections - A past occurrence of a severe or chronic viral infection can contribute to a decrease in the metabolic rate due to the body's neuro-immunological response to infection.

After a prolonged period of time, a significantly reduced metabolic rate, such as indicated in these test results, has been correlated with the following characteristics:

Fatigue
Lethargy
Depression
Cold Feet
Tendencies Toward Recurring Viral Infections
Dry Skin
Water Retention
Cold Hands
Weight Gain in Thighs and Hips

It should be noted that even though this patient may not be overweight at this time, she can still have a lowered

metabolic rate, as overweight and underweight tendencies may not always be reflective of metabolism on the cellular level.

NUTRIENT MINERAL LEVELS AND OTHER ELEMENTS

This section of the report may discuss those nutritional mineral levels that reveal moderate or significant deviations from normal. The light blue and light green areas of each graph section represent the reference interval for each element based on a statistical analysis of apparently healthy individuals. The following section, however, is based upon clinical data; therefore, an element that is moderately outside the reference interval may not be commented on unless determined to be clinically significant.

NOTE:
For those elements whose levels are within the normal range, it should be noted that nutritional status is also dependent upon their critical balance with other essential nutrients. Therefore, if applicable, a discussion regarding their involvement in metabolism may be found in this report's ratio section(s).

CALCIUM (Ca)
The tissue calcium level is considerably higher than normal. This does not necessarily indicate that there is too much calcium but rather, the calcium is not being utilized properly.

CONDITIONS ASSOCIATED WITH ELEVATED TISSUE CALCIUM
Over 90% of the calcium in the body is stored in the bones and teeth. This reserve of calcium can be drawn upon by the body as the need arises. However, if the calcium is not properly utilized, it may accumulate in tissue other than the bones and teeth. If this metabolic pattern has been present over a long period of time, excess accumulation may contribute to the following:

* Changes in Skin and Hair Texture - Calcium accumulation in soft tissues, such as the skin, will have a dehydrating effect. This can contribute to dry skin and wrinkling. Changes in hair texture, as well as brittle nails, may also develop.

* Low Energy Levels - Calcium is considered a sedative mineral and, when found to be excessive in the body, is often associated with decreased metabolism and energy levels.

Other trends for a woman of this age with this calcium profile include fatigue, depression, anemia, and osteoporosis (Type II).

SOME FACTORS THAT MAY CONTRIBUTE TO HIGH CALCIUM LEVELS
There are a number of factors that are related to improper calcium utilization and which may lead to elevated tissue levels, even if dietary calcium intake is low.

* Endocrine - Low thyroid and adrenal activity can contribute to excessive deposition of tissue calcium.

* Nutritional - Inadequate protein intake, excessive sugar, and refined carbohydrate intake, high vitamin D intake, and increased requirements of other vitamins and minerals, such as; vitamin E and phosphorus.

HYDROCHLORIC ACID PRODUCTION AND PROTEIN DIGESTION
Your mineral profile may be reflective of a deficiency in hydrochloric acid (HCL) production, which can result in inadequate protein digestion. Hydrochloric acid in sufficient amounts is necessary for the complete digestion and utilization of dietary protein. Symptoms, such as bloating of the stomach, flatulence, and constipation, may be observed with an HCL deficiency, especially following high-protein meals.

CALCIUM (Ca)
An extreme elevation of hair tissue calcium is often the result of an external variable rather than a reflection of metabolic calcium status. Some hair bleaching, tinting, and perming agents will contribute to an elevation of calcium levels in the hair. Unlike standard shampoos, conditioners, rinses, etc.., some salon chemical treatments

will alter the chemical structure of the hair itself. If the hair specimen was exposed to a treatment of this type, then the interpretation should not necessarily be considered fully representative of calcium status within the body.

It is recommended that future specimen submittals be obtained from "virgin" hair to provide a more metabolically representative sample.

MAGNESIUM (Mg)

Magnesium is the fourth most abundant metal found in the body and is essential for muscle relaxation, protein synthesis, nerve excitability, and energy production on a cellular level. However, magnesium also has a sedating effect upon the body, and when in excess, may contribute to a number of conditions, such as;

- Low Blood Pressure
- Fatigue
- Craving for Salt
- Decreased Mental Alertness
- Depression
- Dizziness
- Muscle Weakness
- Lowered Body Temperature

SOME FACTORS THAT MAY CONTRIBUTE TO HIGH TISSUE MAGNESIUM LEVELS

Some factors that may contribute to elevated magnesium, other than possible excessive magnesium intake, include;

- High Carbohydrate Intake
- Vitamin B6 Deficiency
- Elevated Tissue Calcium
- Hypothyroidism (Low Thyroid)
- Low Adrenal Function
- Vitamin E Deficiency
- HCL Deficiency
- Low Protein Intake

SODIUM (Na)

Sodium can be a sensitive indicator of some forms of stress. Your tissue sodium level of 61/1 mg% is elevated above normal. For this particular metabolic type, an elevated sodium level is indicative of a recent or continuing exposure to uncontrolled stress.

COPPER (Cu)

Your copper profile is indicative of excess copper in the tissues. This element will have an antagonistic effect on the functions of other essential elements. In particular, copper has a direct antagonistic effect on zinc activity within the body. Excess accumulation of copper may produce signs of zinc deficiency, even though zinc intake may be adequate or even if the tissue zinc level is within the normal range.

ELEVATED BODY BURDENS OF COPPER

In women, chronically high tissue copper levels increase the tendency toward or are associated with one or more of the following symptoms:

- Anemia
- Allergies
- Hair Loss
- Appetite Disturbance
- Hyperactivity
- Low Thyroid Activity
- Iron Deficiency
- Headaches (frontal)
- Skin Conditions
- Constipation
- Learning Disability

NOTE:

* Excess copper is frequently associated with endometriosis and premenstrual syndrome.
* During or following pregnancy, copper accumulation frequently increases.

SOME SOURCES OF COPPER THAT MAY CONTRIBUTE TO AN ELEVATED COPPER LEVEL

Several factors can attribute to excess copper accumulation:

* Foods high in copper
* Drinking water run through copper water pipes
* Prolonged copper supplementation

* Zinc deficiency
* Vitamin B6 Deficiency
* Vitamin C Deficiency
* Oral Contraceptive Use
* Copper IUD

NOTE:

* Exogenous contamination can occur from frequently swimming in pools or spas where copper sulfate has been added as an algicide.

* During pregnancy, the fetus inherits many of the mother's mineral profiles. Research studies have shown that children of high copper-profile women have a much greater frequency of acquiring higher levels of copper than those women whose levels were normal.

ZINC (Zn)

Your zinc level is elevated above normal. Possible sources of zinc other than dietary may include some zinc-containing anti-dandruff shampoos, sunscreens, mouthwash, toothpaste, zinc lozenge,s and nasal sprays. It should also be noted that zinc has been found to be markedly elevated in imported herbs, such as chamomile, basil, parsley, sage, and thyme.

An elevated zinc level may also result from the accumulation of toxic metals, as zinc can be displaced or eliminated through the hair, skin, and organs due to their accumulation. In addition, the accumulation and/or elimination of copper, cadmium, lead, and mercury is antagonistic to zinc retention and utilization within the body, which can contribute to a temporary increase in the zinc level.

ELEVATED ZINC (Zn) AND MEDICATED SHAMPOOS

Some medicated (anti-dandruff) shampoos are the cause of abnormally elevated zinc levels. If this is the case, the reported zinc tissue level should not be considered representative of current metabolic zinc activity.

IRON (Fe)

Elevation of tissue iron within the body is not unusual. For example, excess iron is stored in the liver. However, if accumulation becomes too great, storage will then begin in other body tissues, such as the kidneys, pancreas, joints, and eventually the brain.

CONDITIONS ASSOCIATED WITH HIGH IRON

Headaches
Pancreatic Disturbance
Allergies
Hives
Cardiac Irregularities
High Blood Pressure
Arthritis
Blood Sugar Disturbance
Liver Dysfunction

ENVIRONMENTAL FACTORS CONTRIBUTING TO HIGH IRON LEVELS

Excess iron accumulation within the body is most often due to excess intake or occupational exposure.

SOURCES OF IRON

High Iron Foods
High Iron Soils
Auto Shops
Welding Environment
Iron Cooking Utensils
Iron Water Pipes
Iron Nutritional Supplements

MANGANESE (Mn)

Manganese is an essential element that, in combination with certain vitamins and minerals is required for many biochemical reactions, including carbohydrate metabolism and energy production. However, if manganese accumulation reaches extremely high levels and becomes chronic, it may eventually give rise to:

- Headaches
- Dizziness
- Tremors
- Hyperactivity

Note: When manganese is found high in the hair tissue, it is frequently elevated along with iron or aluminum.

NOTE: A unusually high level of manganese may be from continued exposure, ingestion, or inhalation from an environmental or external contaminating source, such as:

- Electronics Industry
- Gasoline (additives)
- Steel Industry
- Fertilizers
- Medications (some)
- Glass Manufacturing

HERBAL SOURCES OF MANGANESE

Some herbs contain significant levels of manganese. These may include:

- Peppermint
- Cascara Sagrada
- Chickweed
- Comfrey
- Goldenseal
- Black Cohosh

CHROMIUM (Cr)

Chromium is a constituent of the "glucose tolerance factor." It is necessary for carbohydrate metabolism and the maintenance of blood sugar levels. An elevation is frequently due to the displacement of chromium within the tissues by an antagonistic element.

COBALT (Co)

Your cobalt level of 0.017/1 mg% is above the established reference range for this essential trace element. Excess cobalt has been indirectly associated with anemia due to its recognized antagonistic effect on iron metabolism. Symptoms of excess cobalt may also include:

- Flushing
- Chest Pains
- Dermatitis
- Nausea
- Vomiting
- Kidney Problems
- Thyroid Disturbance
- Deafness
- Cardiac Abnormalities
- Asthma

Sources of Cobalt:

Cobalt metal and its compounds are used extensively for the production of or are found in:

- High Temperature Alloys
- Hard Metals
- Diamond Tools
- Drying Agents in Paints
- Additives in Animal Feeds and Pigments
- Salts Used for Electroplating
- Dental Materials

Cobalt is commonly used in dyes (cobalt blue) and is related to conditions such as; asthma, contact dermatitis, and cardiovascular and endocrine disturbances. The paint used on decorative plates and pottery contains cobalt and is a possible source of this element by way of occupational exposure or the use of such utensils for serving acidic food or storing liquids.

COBALT AND HEART DISEASE

Excess cobalt is associated with cardiomyopathy, particularly in workers exposed to high cobalt levels in their work environment. The excess exposure was readily detected in hair tissue samples and the organs of exposed workers.

HERBAL SOURCES OF COBALT INCLUDE:

Some herbs naturally contain significant levels of cobalt. At this time, the following herbs should be

discontinued, if presently being consumed.

Goldenseal
Alfalfa
Black Cohosh
Chamomile
Slippery Elm

BARIUM (Ba)

Your barium level of 1.03/1 mg% is above the established reference range for this element. Elevated levels of barium have previously been associated with high blood pressure and cardiovascular disease.

Barium compounds are used widely in industry in the production of plastics, rubber, electronics, and textiles. Barium compounds are used in ceramic glazes and enamels, in glass and paper production, as well as a lubricant additive in pharmaceuticals and cosmetics, and is contained in rodenticides. Barium is also used in diagnostic procedures, such as a GI series.

Dietary sources of barium include milk, potatoes, flour, cereal products, and nuts, with Brazil nuts containing the highest amounts. Water can also be a source of barium, either from naturally occurring sources or from industrial pollution. Atmospheric sources include coal and diesel fuel combustion. Barium is used as drilling mud in oil wells and can be a significant environmental source.

BISMUTH (Bi)

The bismuth level is elevated above the reference range. This element is relatively non-toxic and has no known biochemical function, although it is commonly found in low concentrations in the body.

High tissue levels may be found with the use of products containing bismuth, such as;

* Cosmetics
* Burn Ointments
* Antiseptic Powders
* Products used for G.I. disturbances (helicobacter pylori)
* Wart Treatments
* Hair Dyes

Other sources of exposure include;

Superconductors
Silvering of Mirrors
Dentistry

LITHIUM (Li)

Your lithium level of 0.032/1 mg% is above the established reference range for this element. The most common cause of elevated tissue lithium is from therapeutic intake, lithium supplements and lithium found occurring naturally in some water supplies. Lithium accumulates primarily in the pituitary and thyroid glands and where, if excessive will interfere with iodine uptake by the thyroid gland, possibly blocking thyroxine release or thyroid-stimulating hormone (TSH). Therefore, long-term lithium excess can contribute to decreased thyroid activity, fatigue, and weight gain. Other conditions associated with chronic lithium excess include:

Increased Urination
Increased Thirst
Blood Sugar Disturbances
Alkalinity of the Urine
Hair Loss
Osteoporosis
Hypercalcuria
Leukocytosis

POSSIBLE HERBAL SOURCES OF LITHIUM

Other than standard nutritional supplements containing lithium, some herbal preparations may also be unknown yet significant sources of lithium and, therefore, should be discontinued at this time. These include:

Cayenne Pepper
Peppermint
Chickweed
Alfalfa
Goldenseal
Black Cohosh
Comfrey

Lithium hypochlorite is used as a sanitizing agent for pools and spas and, if exposed, may contribute to external contamination of lithium on your hair. If this is the case, the elevated level of lithium reported on this test should not be considered representative of tissue accumulation.

NICKEL (Ni)

High nickel found in the hair is not uncommon. Its sources are high in our environment and include:

- Ceramics
- Hydrogenated Oils
- Rubber Products
- Electroplating
- Metal Prosthesis
- Dyes
- Dental Alloys
- Plastics
- Fungicides
- Fuel Additives
- Tobacco
- Paint and Wallpaper pigments
- Insecticides

FOOD SOURCES OF NICKEL

- Tea
- Legumes
- Cocoa
- Hydrogenated Fats
- Whole Grains
- Oysters
- Margarine

Other sources of nickel include herbal preparations, particularly peppermint and chickweed. These herbs should be discontinued or reduced significantly if currently being taken.

Note: Nickel contributes to more instances of dermatitis than any other metal, and in excess has also been reported to be related to renal disturbance.

VANADIUM (V)

Your vanadium level of 0.02/1 mg% is above the established reference range for this element. Vanadium is antagonistic to the sulfur amino acids; cystine, cysteine, and methionine. In human studies, excess vanadium intake inhibited cholesterol synthesis by way of squalene synthetase enzyme inhibition. However, it was also found that vanadium had no beneficial effect in lowering existing lipid levels in patients suffering from hypercholesterolemia or ischemic heart disease. Elevated vanadium is also antagonistic to vitamin C and hemoglobin synthesis. Decreased hormone production, selective protein deficiencies, and blood sugar disturbance could occur with excessive intake or exposure to this element. Environmental and occupational sources of vanadium include:

- Petroleum Refining
- Boiler Cleaning
- Metal Refining

STRONTIUM (Sr)

Your strontium level is above the established reference range. In excess, strontium is antagonistic to calcium metabolism and can therefore interfere with normal calcium function. Strontium may be contained in some mouth rinses and dental varnishes used in the treatment of dentin hypersensitivity.

ZIRCONIUM (Zr)

The zirconium level is above the established reference range for this element. Excess accumulation of zirconium has not been well documented in humans. Some sources of zirconium may include antiperspirants that contain zirconium chlorohydrate. Zirconium is also considered a biocompatible element and may be found in some dental materials.

NUTRIENT MINERAL RATIOS

This section of the report will discuss those nutritional mineral ratios that reveal moderate or significant deviation from normal.

Continuing research indicates that metabolic dysfunction occurs not necessarily as a result of a deficiency or excess of a particular mineral level but more frequently from an abnormal balance (ratio) between the minerals. Due to this complex interrelationship between the minerals, it is extremely important that imbalances be determined. Once these imbalances are identified, corrective therapy may then be used to help re-establish a more normal biochemical balance.

NOTE: The "Nutritional Graphic" developed by researchers at Trace Elements, and presented on the cover of this report shows the antagonistic relationships between the significant nutrients, including the elements (arrows indicate antagonistic effect upon absorption and retention).

HIGH CALCIUM/PHOSPHORUS (Ca/P) RATIO

Phosphorus is involved in almost every reaction of metabolism. When low levels of phosphorus are found in the hair relative to tissue calcium (see high Ca/P ratio), it often reflects abnormal calcium and phosphorus metabolism.

HIGH SODIUM/POTASSIUM (Na/K)

Your sodium-potassium profile is elevated above the normal range. When sodium is high relative to potassium (see high Na/K ratio), it is indicative of a relative sodium excess. This pattern may eventually lead to fluid retention and subsequent weight gain. Weight gain contributed to by this pattern is often only water retention. At this time, it is not necessary to reduce sodium intake, but it is recommended rather that dietary potassium intake be increased relative to sodium intake.

HIGH CALCIUM/POTASSIUM (Ca/K) AND HYPOTHYROIDISM

High calcium relative to potassium will frequently indicate a trend toward hypothyroidism (underactive thyroid). The mineral calcium antagonizes the retention of potassium within the cell. Since potassium is necessary for sufficient quantity to sensitize the tissues to the effects of thyroid hormones, a high Ca/K ratio would suggest reduced thyroid function and/or cellular response to thyroxine. If this imbalance has been present for an extended period of time, the following symptoms associated with low thyroid function may occur.

- Fatigue
- Dry Skin
- Constipation
- Depression
- Over-weight Tendencies
- Cold Sensitivity

LOW SODIUM/MAGNESIUM (Na/Mg) RATIO

This ratio is below the normal range. The adrenal glands play an essential role in regulating sodium retention and excretion. Studies have also shown that magnesium will affect adrenal cortical activity and response, and reduced adrenal activity results in increased magnesium retention. The sodium-magnesium profile is indicative of reduced adrenal cortical function. The following associated symptoms may be observed:

- Fatigue
- Dry Skin
- Allergies (Ecological)
- Constipation
- Lowered Resistance
- Low Blood Pressure

TOXIC METAL LEVELS

Hair is used as one of the tissues of choice by the Environmental Protection Agency in determining toxic metal exposure. A 1980 report from the E.P.A. stated that human hair could be effectively used for biological

monitoring of the highest-priority toxic metals. This report confirmed the findings of other studies, which concluded that human hair might be a more appropriate tissue than blood or urine for studying community exposure to some trace metals.

A heavy metal may be elevated in this HTMA, yet no known environmental exposure can be ascertained. This is not unusual, as exposure may have originated years earlier. Additionally, research has found that heavy metals can be inherited by the fetus during pregnancy. Heavy metals can be found in the body for years following the initial exposure and will remain in body tissues until removal is initiated. For example, the half-life of cadmium in some tissues will range from ten to thirty years.

ALUMINUM (Al)

Your aluminum level is above the established reference range. As aluminum is the third most abundant element in nature, the body is continually exposed to this potentially toxic element. Once the aluminum exposure exceeds the body's own natural ability to eliminate the compound, it will begin to accumulate internally. Aluminum will accumulate in the lungs, brain, liver and the thyroid gland. When in excess, aluminum will have an adverse effect upon metabolism, often being associated with memory loss, confusion and depression. Additional symptoms of aluminum burden may include: headaches, fatigue, numbness, constipation and dry skin.

Since aluminum is omnipresent in soils and waters, virtually all foods contain measurable amounts of natural aluminum. However, a much larger amount of aluminum compounds are typically ingested in the form of intentional additives, such as; preservatives, coloring agents, leavening agents, etc. Other sources include processed cheeses, spices, pickles and baked goods.

SOME ADDITIONAL SOURCES OF ALUMINUM:

Antacids (most)
Salt (some)
Aluminum Cookware
Buffered Aspirin (some)
White Flour (some)
Treated Water
Baking Powder (some)
Antiperspirants (some)
Aluminum Cans
Vaccines (some)

AVOID:

* Antacids containing aluminum as hydroxide. This is a major source of ingested aluminum.
* Cooking acidic foods in aluminum cookware.
* Inhaling antiperspirant spray, especially those containing aluminum chlorohydrate.

POSSIBLE HERBAL SOURCES OF ALUMINUM

Some herbs contain a significant amount of aluminum and therefore may be a source of your high level. For the time being, the following herbs should be discontinued if they are being taken.

Peppermint
Goldenseal
Comfrey
Alfalfa
Chamomile
Black Cohosh
Chickweed
Licorice
Valerian Root

TOXIC METAL RETENTION AND NUTRITIONAL STATUS:

Every individual is constantly being exposed to sources of heavy metals. However, the main factor contributing to the absorption and retention of these metals in the body is influenced by one's own nutritional status. For instance, a lack of nutrients that will combat the accumulation of lead will then allow tissue lead level's to rise. This accumulation can occur even if lead exposure is minimal. Therefore, improving your nutritional status can help in reducing the toxic metal burden as well as reducing the adverse effects that toxic metal accumulation can produce in the body.

IMPORTANT NOTE ON TOXIC METAL ELIMINATION:

As toxic metals are mobilized from storage tissues for removal from the body, the patient may experience an