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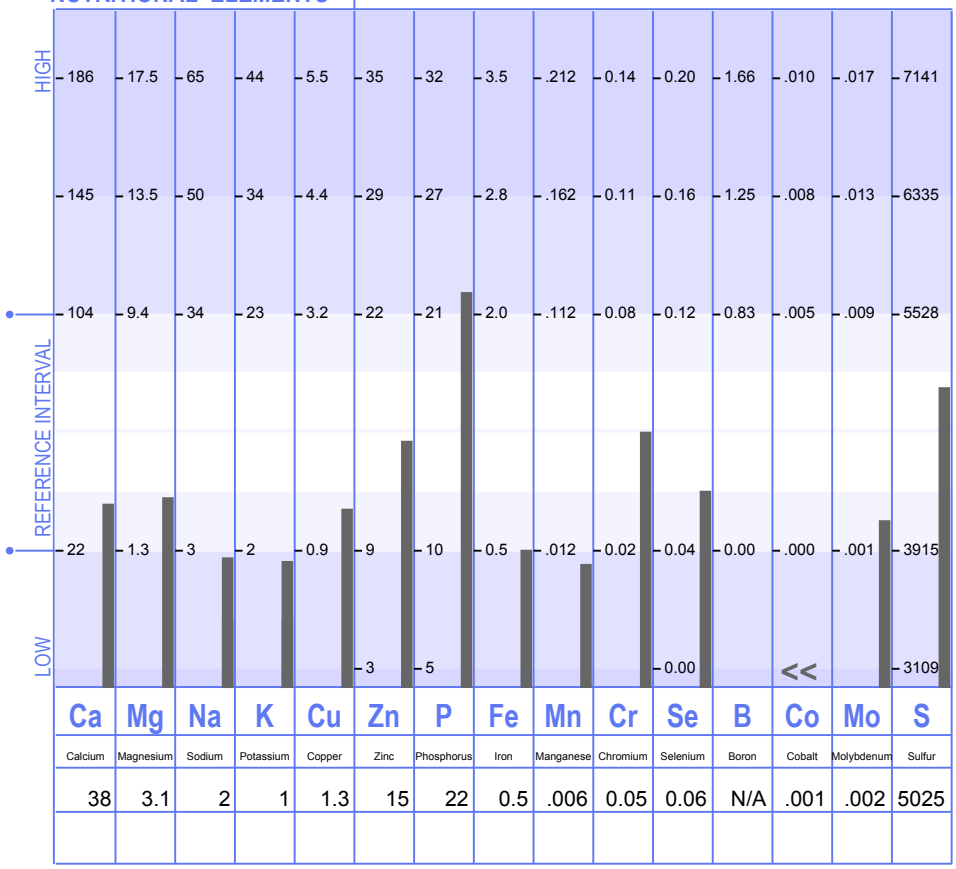
| | |
|---|---|
| LABORATORY NO.: | 1642238 |
| PROFILE NO.: 2 | SAMPLE TYPE: SCALP |

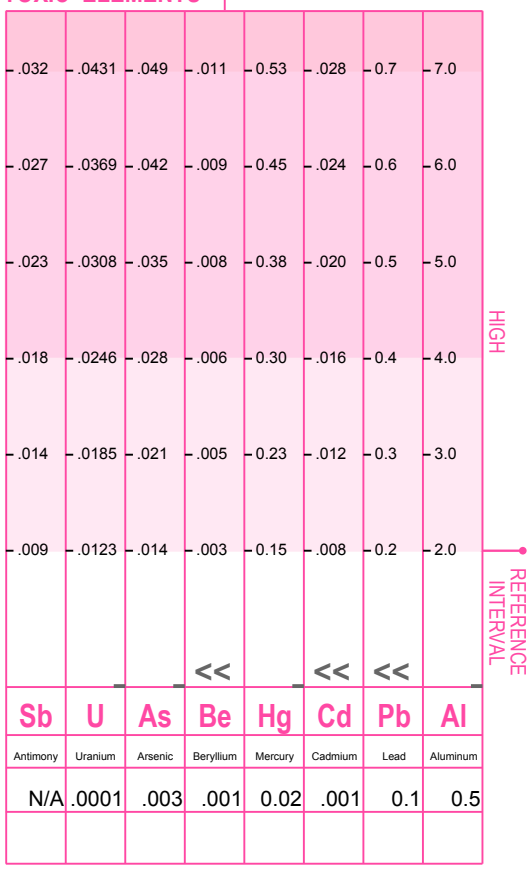
| | | | |
|---|---|---|---|
| PATIENT: MARRAS, TERESA | AGE: 49 | SEX: F | METABOLIC TYPE: FAST 4 |
| REQUESTED BY: LANDON, J | ACCOUNT NO.: 2216 | | DATE: 4/11/2021 |

## NUTRITIONAL ELEMENTS



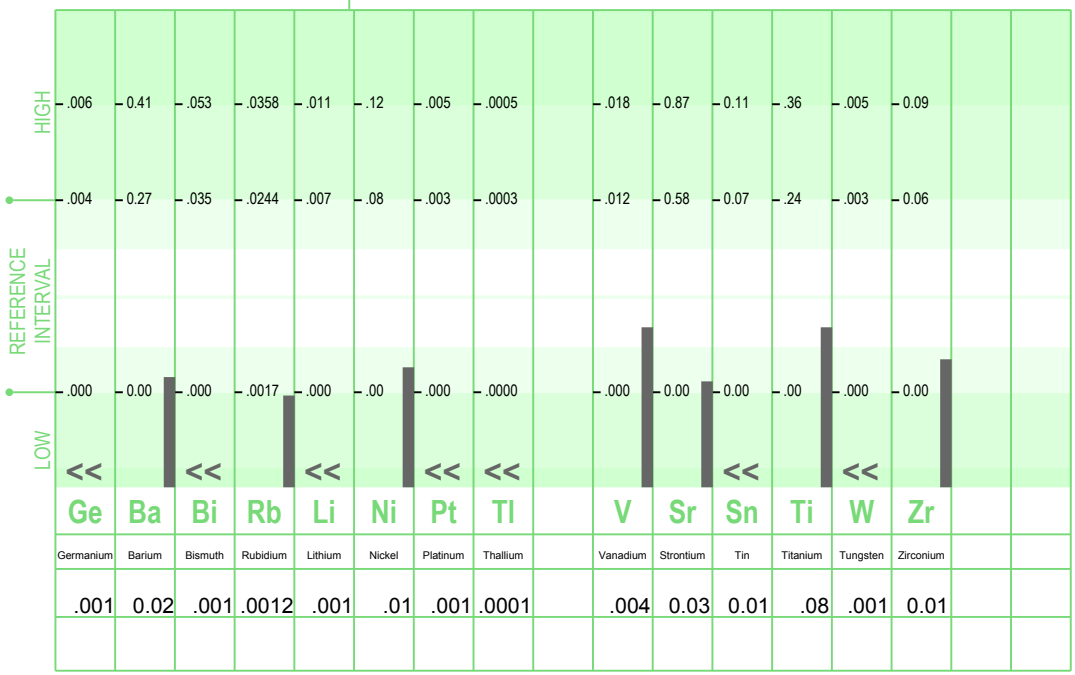

| | Ca | Mg | Na | K | Cu | Zn | P | Fe | Mn | Cr | Se | B | Co | Mo | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Calcium | Magnesium | Sodium | Potassium | Copper | Zinc | Phosphorus | Iron | Manganese | Chromium | Selenium | Boron | Cobalt | Molybdenum | Sulfur |
| HIGH | 186 | 17.5 | 65 | 44 | 5.5 | 35 | 32 | 3.5 | .212 | 0.14 | 0.20 | 1.66 | .010 | .017 | 7141 |
| | 145 | 13.5 | 50 | 34 | 4.4 | 29 | 27 | 2.8 | .162 | 0.11 | 0.16 | 1.25 | .008 | .013 | 6335 |
| | 104 | 9.4 | 34 | 23 | 3.2 | 22 | 21 | 2.0 | .112 | 0.08 | 0.12 | 0.83 | .005 | .009 | 5528 |
| REFERENCE INTERVAL | 22 | 1.3 | 3 | 2 | 0.9 | 9 | 10 | 0.5 | .012 | 0.02 | 0.04 | 0.00 | .000 | .001 | 3915 |
| LOW | | | | | | 3 | 5 | | | | 0.00 | | << | | 3109 |
| | 38 | 3.1 | 2 | 1 | 1.3 | 15 | 22 | 0.5 | .006 | 0.05 | 0.06 | N/A | .001 | .002 | 5025 |

## TOXIC ELEMENTS




| | Sb | U | As | Be | Hg | Cd | Pb | Al |
|---|---|---|---|---|---|---|---|---|
| | Antimony | Uranium | Arsenic | Beryllium | Mercury | Cadmium | Lead | Aluminum |
| HIGH | .032 | .0431 | .049 | .011 | 0.53 | .028 | 0.7 | 7.0 |
| | .027 | .0369 | .042 | .009 | 0.45 | .024 | 0.6 | 6.0 |
| | .023 | .0308 | .035 | .008 | 0.38 | .020 | 0.5 | 5.0 |
| | .018 | .0246 | .028 | .006 | 0.30 | .016 | 0.4 | 4.0 |
| | .014 | .0185 | .021 | .005 | 0.23 | .012 | 0.3 | 3.0 |
| REFERENCE INTERVAL | .009 | .0123 | .014 | .003 | 0.15 | .008 | 0.2 | 2.0 |
| | | | | << | | << | << | |
| | N/A | .0001 | .003 | .001 | 0.02 | .001 | 0.1 | 0.5 |

## 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 |
| HIGH | .006 | 0.41 | .053 | .0358 | .011 | .12 | .005 | .0005 | | .018 | 0.87 | 0.11 | .36 | .005 | 0.09 |
| | .004 | 0.27 | .035 | .0244 | .007 | .08 | .003 | .0003 | | .012 | 0.58 | 0.07 | .24 | .003 | 0.06 |
| REFERENCE INTERVAL | .000 | 0.00 | .000 | .0017 | .000 | .00 | .000 | .0000 | | .000 | 0.00 | 0.00 | .00 | .000 | 0.00 |
| LOW | << | | << | | << | | << | << | | | | << | | << | |
| | .001 | 0.02 | .001 | .0012 | .001 | .01 | .001 | .0001 | | .004 | 0.03 | 0.01 | .08 | .001 | 0.01 |

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

"QNS": Sample Size Was Inadequate For Analysis.

"N/A": Currently Not Available

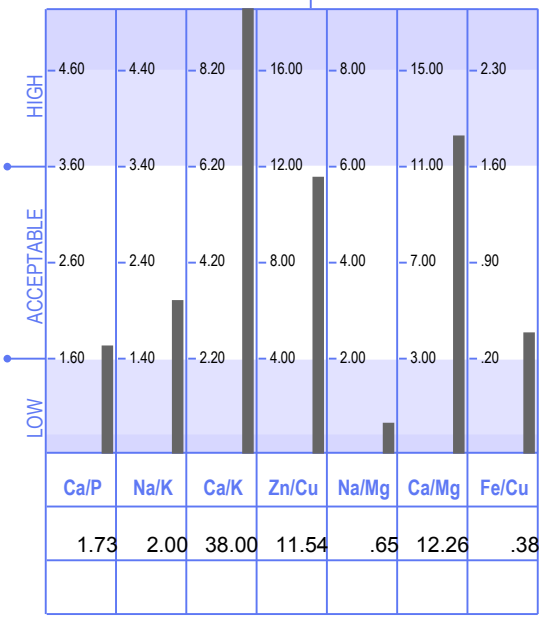
Ideal Levels And Interpretation Have Been Based On Hair Samples Obtained From The Mid-Parietal To The Occipital Region Of The Scalp.

Laboratory Analysis Provided by Trace Elements, Inc. Dallas, Texas USA an H.H.S. Licensed Clinical Laboratory. No. 45 D0481787

4/11/2021
CURRENT TEST RESULTS

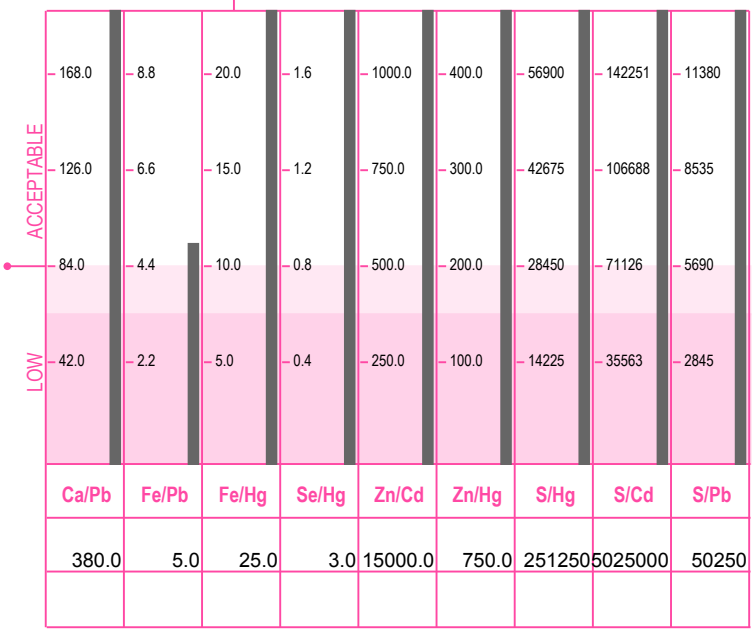
PREVIOUS TEST RESULTS

## SIGNIFICANT RATIOS




| Ca/P | Na/K | Ca/K | Zn/Cu | Na/Mg | Ca/Mg | Fe/Cu |
|---|---|---|---|---|---|---|
| 1.73 | 2.00 | 38.00 | 11.54 | .65 | 12.26 | .38 |

## TOXIC RATIOS




| Ca/Pb | Fe/Pb | Fe/Hg | Se/Hg | Zn/Cd | Zn/Hg | S/Hg | S/Cd | S/Pb |
|---|---|---|---|---|---|---|---|---|
| 380.0 | 5.0 | 25.0 | 3.0 | 15000.0 | 750.0 | 251250 | 5025000 | 50250 |

## ADDITIONAL RATIOS

| RATIO | CALCULATED VALUE | | EXPECTED |
|---|---|---|---|
| | Current | Previous | |
| Ca/Sr | 1266.67 | | 263/1 |
| Cr/V | 12.50 | | 8/1 |
| Cu/Mo | 650.00 | | 356/1 |
| Fe/Co | 500.00 | | 615/1 |
| K/Co | 1000.00 | | 6350/1 |
| K/Li | 1000.00 | | 6350/1 |
| Mg/B | N/A | | 21/1 |
| S/Cu | 3865.38 | | 2668/1 |
| Se/Tl | 600.00 | | 370/1 |
| Se/Sn | 6.00 | | 3.2/1 |
| Zn/Sn | 1500.00 | | 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 surface of the skin its outer layers harden, locking in the metabolic products accumulated during the period of formation. This biological process provides a blueprint and lasting record of mineral status and nutritional metabolic activity that has occurred during this time.

The precise analytical method of determining the levels of minerals in the hair is a highly sophisticated technique: when performed to exacting standards and interpreted correctly, it may be used as a screening aid for determining mineral deficiencies, excesses, and/or 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 effects on your mineral balance that 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, as well as 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. In fact, 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 comprehensive report that follows 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 of the reported nutritional elements and how they compare to the established population reference range. Values that are above or below the reference range indicate a deviation from "normal". The more significant the deviation, the greater the possibility a deficiency or excess may be present.

**TOXIC ELEMENTS**

The toxic elements section displays the results for each of the reported toxic elements. 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 as statistically significant, but not necessarily clinically significant. Further investigation may then be 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/or may adversely

effect biochemical function. Further study will help to reveal their function, 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) is as important, 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 the important 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 documentation regarding these ratios. For this reason, these ratios are only provided as an additional source of research information to the attending health-care professional.

## METABOLIC TYPE

This section of the report will discuss the metabolic profile, which is based on research conducted 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 tissues of the body: the skin, organs, bone, hair, and nails. How efficiently each nutrient is utilized depends largely upon proper functioning of the endocrine glands.

**FAST METABOLISM (TYPE #4)**

** Sympathetic Dominance
** Tendency Toward Decreased Thyroid Function (decreased secretion of hormones)
** Tendency Toward Decreased Adrenal Activity (decreased secretion of hormones)

The current tissue mineral pattern is indicative of a fast metabolic rate (Fast Metabolism, Type #4). Even though the metabolic rate is considered fast, this patient may be experiencing adrenal and thyroid insufficiency. This pattern is characteristic of a "stress burnout" syndrome. Stress burnout is often associated with chronic or prolonged stress. Apparently, the stress has been present for an extended period of time and eventually the thyroid and adrenal glands can no longer maintain sufficient energy production to keep up with stress demands. This pattern can result in periodic fatigue and depression.

It should be noted that stress is a normal part of life and serves a useful purpose when it is controlled. However, chronic uncontrolled stress will eventually contribute to various vitamin and mineral imbalances, and the ability to maintain adequate energy levels and optimum health will decrease.

## 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 area's of each graph section represent the reference interval for each element based upon 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. If applicable, discussion regarding their involvement in metabolism may be found in the ratio section(s) of this report.

**EXHAUSTION STAGE OF STRESS INDICATED BY LOW TISSUE (Na) AND (K) LEVELS**
Low tissue sodium and potassium can often reflect a reduction in adrenal cortical activity. This pattern is indicative of an exhaustion stage of stress in the fast metabolizer (Type #4). This stage of stress is frequently the result of prolonged or severe stress, and is often referred to as a "stress burnout".

**MANGANESE (Mn) AND BLOOD SUGAR REGULATION**
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. Manganese deficiency is frequently related to such manifestations as, low blood sugar levels, ligamentous problems and reproductive dysfunction.

## 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 occur 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/POTASSIUM (Ca/K) RATIO**
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 in 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 | Depression |
| Dry Skin | Over-weight Tendencies |
| Constipation | 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 | Constipation |
| Dry Skin | Lowered Resistance |
| Allergies (Ecological) | Low Blood Pressure |

**HIGH CALCIUM/MAGNESIUM (Ca/Mg) RATIO**

Calcium and magnesium should always be in a proper balance to one another. If this normal equilibrium is upset, one mineral will become dominant relative to the other. In this case, calcium is high relative to magnesium (see high Ca/Mg ratio), which may be indicative of abnormal calcium metabolism. Even though the magnesium level is not low at this time, excess calcium relative to magnesium will suppress magnesium function within the body.

**MINERAL METABOLISM AND VITAMIN B6**

A deficiency of, or increased requirement for vitamin B6 (pyridoxine) leads to alterations in the metabolism, utilization and balance between calcium and magnesium. Calcium retention will increase and the excretion of magnesium will also increase when vitamin B6 is lacking. Therefore, an increased need for vitamin B6 may be indicated by your current HTMA pattern.

## TOXIC METAL LEVELS

**ALL CURRENT TOXIC METAL LEVELS ARE WITHIN THE ACCEPTABLE RANGE**

## TOXIC METAL RATIOS

**ALL CURRENT TOXIC METAL RATIOS ARE WITHIN THE ACCEPTABLE RANGE**

## DIETARY SUGGESTIONS

The following dietary suggestions are defined by several factors: the individual's mineral levels, ratios and metabolic type, as well as the nutrient value of each food including protein, carbohydrate, fat, and vitamin and mineral content. Based upon these determinations, it may be suggested that foods be avoided or increased temporarily in the diet to aid in the improvement of your biochemistry.

**GENERAL DIETARY GUIDELINES FOR THE FAST METABOLIZER**

* INCREASE INTAKE OF HIGH PURINE PROTEIN FOODS...high purine protein sources include liver, kidney and heart. Other good sources include sardines, tuna, clams, crab, lobster and oysters. Unless notified otherwise, high purine and moderate purine protein intake should constitute approximately 33% of total daily caloric intake.

* INCREASE INTAKE OF MILK AND MILK PRODUCTS...such as cheese, yogurt, cream, butter (unsalted). Increase intake of nuts and seeds such as almonds, walnuts, peanuts, peanut butter and sunflower seeds. Foods high in fat unless notified otherwise should constitute approximately 33% of total daily caloric intake.

* REDUCE CARBOHYDRATE INTAKE...including unrefined carbohydrates. Sources such as cereals, whole grains and whole grain products are contraindicated for frequent consumption until the next evaluation. Carbohydrate intake in the form of unrefined carbohydrates should be approximately 33% of total daily caloric intake.

* AVOID ALL SUGARS AND REFINED CARBOHYDRATES...this includes white and brown sugar, honey, candy, soda pop, cake, pastries, alcohol and white bread.

**FOODS HIGH IN IRON CONTENT**

The following foods may be increased in the diet:

| | |
|---|---|
| Beef (lean) | Sunflower Seeds |
| Egg (yolk) | Oysters |
| Pumpkin Seeds | Chipped Beef |

NOTE: Dairy foods such as milk and cheese actually decrease the availability of iron from the diet. If dairy foods or vegetarian diets are consumed exclusive of meats, iron absorption can be reduced by as much as 60 percent.

**AMINO ACIDS THAT IMPROVE CALCIUM ABSORPTION**

Calcium absorption is greatly enhanced when the diet is high in the amino acids, lysine, arginine and histadine. These proteins also help to reduce acidity of the tissues. Both effects are favorable for the fast metabolizer, therefore addition of any of the following foods to the diet is recommended at this time:

| | |
|---|---|
| Lima Beans | Salami |
| Garbanzo Beans | Sausage (lean) |
| Rumproast | Lamb |
| Skim Milk | Smelt |
| Beef Stew | Vegetable Stew |
| Cottage Cheese | Canadian bacon |
| Spare Ribs | Peanuts |
| Lentils | Bass |
| Flounder | Heart |
| Cod | Chuck Roast |
| Ham | Liverwurst |

**SPECIAL NOTE:**

This report contains only a limited number of foods to avoid or to increase in the diet. FOR THOSE FOODS NOT SPECIFICALLY INCLUDED IN THIS SECTION, CONTINUED CONSUMPTION ON A MODERATE BASIS IS ACCEPTABLE UNLESS RECOMMENDED OTHERWISE BY YOUR DOCTOR. Under some circumstances, dietary recommendations may list the same food item in the "TO EAT" and the "TO AVOID" categories at the same time. In these rare cases, always follow the avoid recommendation.

## CONCLUSION

This report can provide a unique insight into nutritional biochemistry. The recommendations contained within are specifically designed according to metabolic type, mineral status, age, and sex. Additional recommendations may be based upon other supporting clinical data as determined by the attending health-care professional.

**OBJECTIVE OF THE PROGRAM:**

The purpose of this program is to re-establish a normal balance of body chemistry through individually designed dietary and supplement suggestions. Properly followed, this may then enhance

the ability of the body to more efficiently utilize the nutrients that are consumed, resulting in improved energy production and health.

**WHAT TO EXPECT DURING THE PROGRAM:**

The mobilization and elimination of certain metals may cause temporary discomfort. As an example, if an excess accumulation of iron or lead is contributing to arthritis, a temporary flare-up of the condition may occur from time to time. This discomfort can be expected until removal of the excess metal is complete.



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