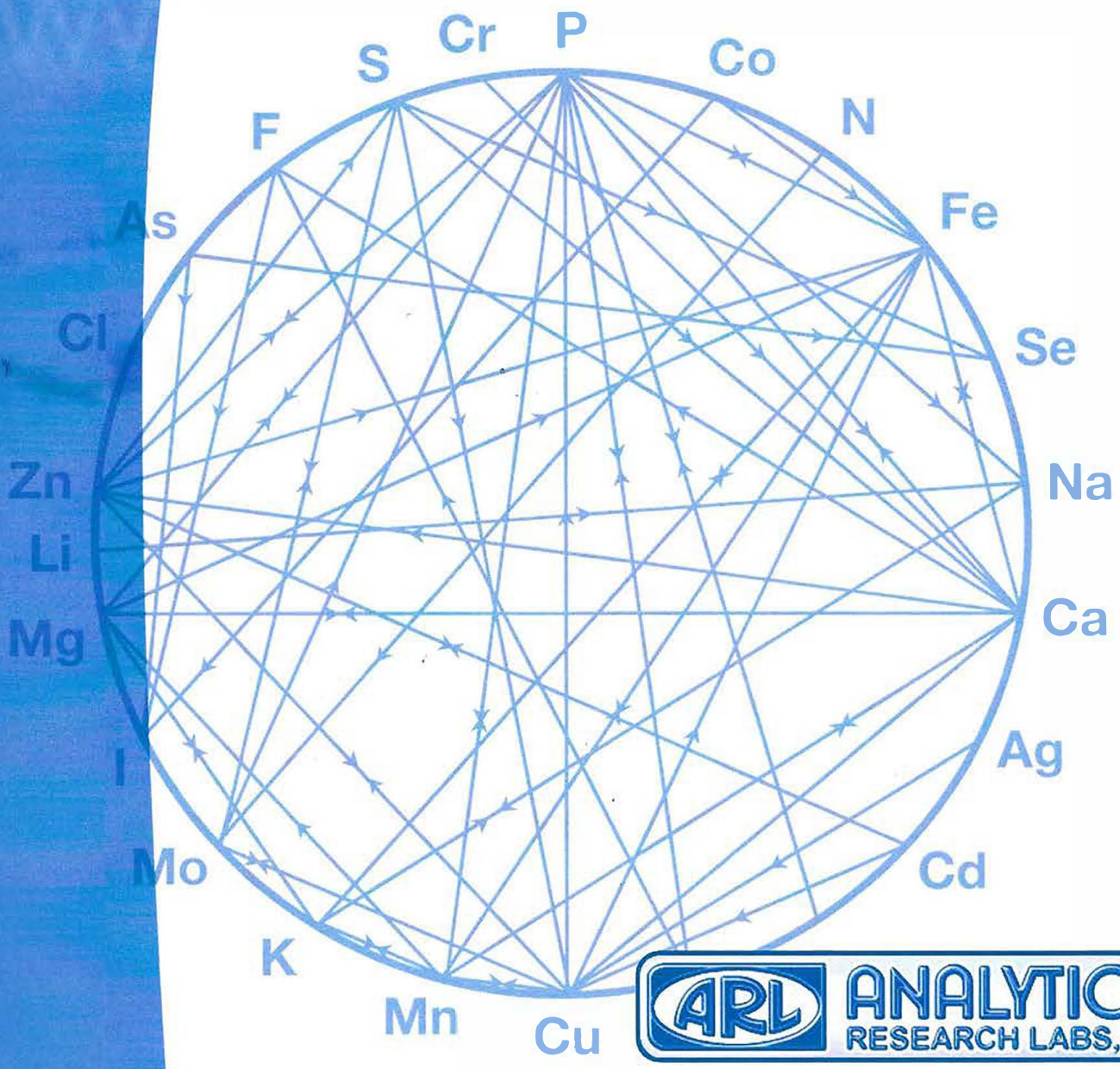
Brian Brezinski

Your Name Here

Tissue Mineral Analysis



ARL ANALYTICAL RESEARCH LABS, INC.

2225 W. Alice Ave. Phoenix, AZ 85021

Brian Brezinski [redacted]

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Patient: [redacted]
Sex: F
Age: 35
Lab #639635

HAIR TISSUE MINERAL ANALYSIS

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INTRODUCTION TO HAIR TISSUE MINERAL ANALYSIS

A hair tissue mineral analysis (HTMA) is a screening test that measures the levels of twenty-one minerals and toxic metals present in a sample of hair. Minerals are the "spark plugs" of life and play many important health related roles within the human body. Providing a "window into the cells", hair makes an excellent biopsy material and reveals a clear record of mineral metabolism. Hair, like all other body tissues, contains minerals that are deposited as the hair grows. Although the hair is dead, the minerals remain as the hair continues to grow. The minerals and toxic metals are locked inside the hair during the growth stage as the body uses it for the storage and elimination of minerals.

A hair tissue mineral analysis reflects long term metabolic activity as it measures an average of mineral accumulation over a three month period of time. This is often an advantage as the test results are not influenced by day-to-day variations in body chemistry due to stress, diet or other factors. Creating a blueprint of one's individual biochemistry, a hair tissue mineral analysis can assist in identifying mineral patterns which may be associated with stress, blood sugar and carbohydrate imbalances, metabolic rate, biochemical energy production, and glandular imbalances. Hair tissue mineral analysis is used worldwide to measure environmental contamination with toxic metals in the soil, plants and human and animal populations.[1,8,13,20,31,35,40,44]

Screening tests (like all tests) do have limitations and ideally should be used in conjunction with other laboratory tests, medical histories and physical examinations. This test is provided to assist the health care professional in identifying nutritional and toxic elements that play a role in human health. The contents of this analysis are not intended to be diagnostic.

UNDERSTANDING YOUR RESULTS/LABORATORY NOTES

The accuracy and reliability of the test results and interpretation is based directly upon the laboratory receiving a properly collected hair sample that is clean and free from external contaminants. It is difficult for the laboratory to make a determination as to whether the sample was taken properly. Accordingly, the laboratory assumes no responsibility for results from an improperly submitted hair sample.

- Test results - The ideal values for minerals are indicated by the gray bands, i.e. calcium 40 mgs%, magnesium 6 mgs%, sodium 25 mgs%, potassium 10 mgs%, etc. Your mineral values are printed directly above the name of each mineral. The black rectangle blocks represent a bar graph showing where your values lie in relation to the ideal values. Significant mineral ratios and your oxidation rate are located at the bottom of the graph.
- Reference ranges (blue shaded area) indicated on the graph of test results represent statistical "ideal" levels. These reference ranges should not be considered as absolute in considering mineral excesses, deficiencies or toxic levels of elements.
- The results of the hair tissue mineral analysis are reported in milligrams percent (mg%) or milligrams per 100 grams of hair.
- Accutrace Laboratories, Inc., a wholly owned subsidiary of Analytical Research Laboratories, Inc., automatically retests any mineral levels that are found to be outside an expected range of results, provided enough hair is available for this process.
- Test results were obtained using sophisticated ICP-MS instrumentation and procedures in a clinical laboratory environment with government regulatory standards outlined by the Department of Health and Human Services under the Clinical Laboratory Improvement Amendment (CLIA).

ANALYTICAL RESEARCH LABS, INC.
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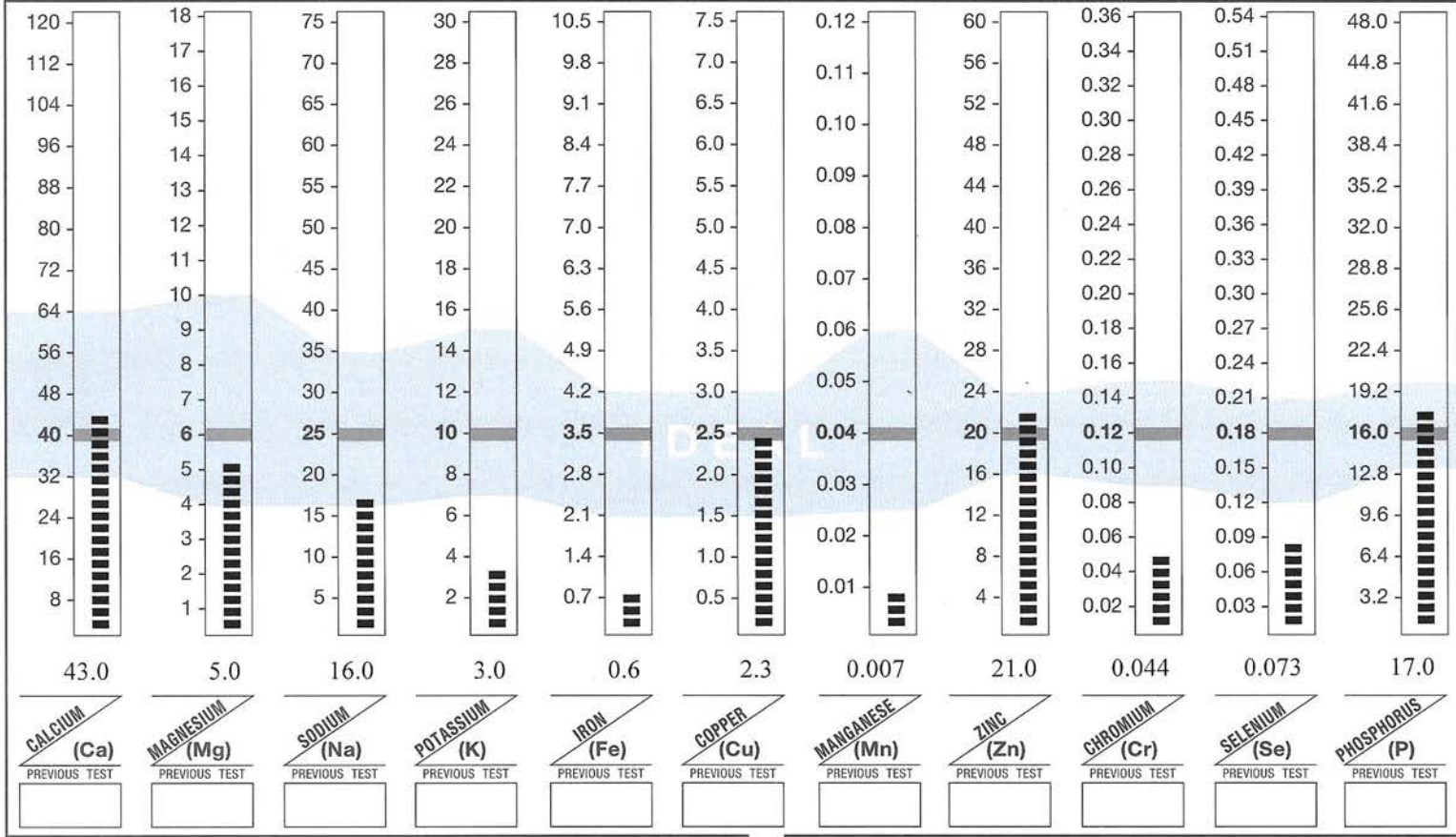
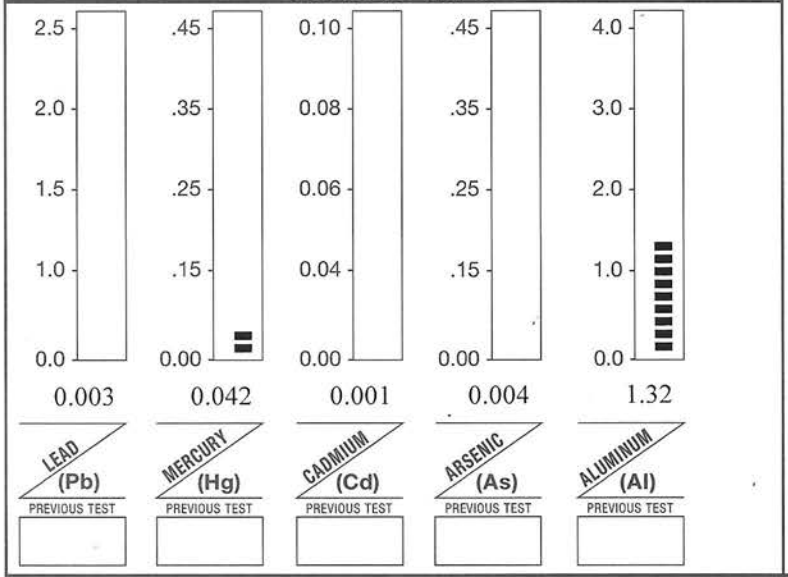
PATIENT NAME: [redacted]		Brian Brezinski		
SEX: F	AGE: 35	DATE: 11/1/18	LAB NO. 639635	CLIENT ACCT. NO. [redacted]

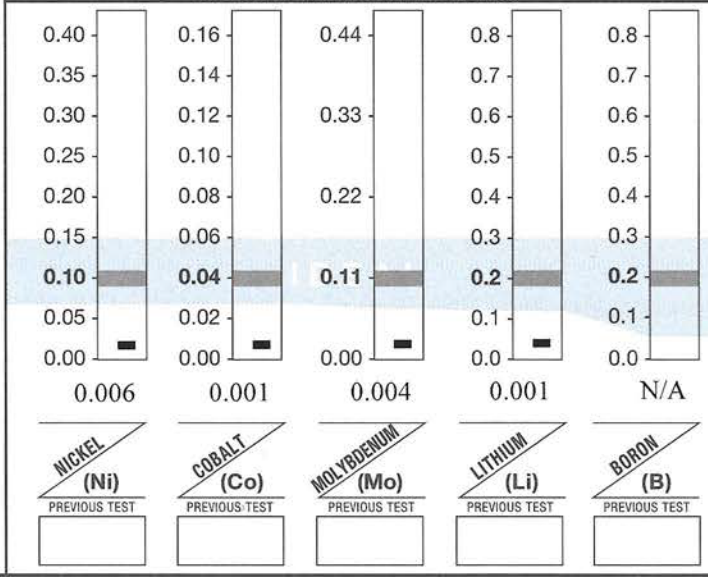
NUTRIENT MINERALS



TOXIC METALS



ADDITIONAL MINERALS



SIGNIFICANT MINERAL RATIOS

MINERAL RATIO	IDEAL RATIO	CURRENT RATIO	% OF IDEAL	PREVIOUS RATIO	LOW / IDEAL / HIGH
CA/MG	6.67	8.60	129		
CA/K	4.00	14.33	358		
NA/MG	4.17	3.20	77		
NA/K	2.50	5.33	213		
ZN/CU	8.00	9.13	114		
CA/P	2.50	2.53	101		

MIXED OXIDIZER [ ] FAST OXIDIZER [ ] SLOW OXIDIZER [***]

N/A -- NOT AVAILABLE REPORTED IN Mg/% Testing by ACCUTRACE LABORATORIES, INC. • CLIA# 03D0641886 • 2225 W. Alice Ave., Phoenix, AZ 85021

Interpretation Of Your Test Results

The interpretation of your hair tissue mineral analysis depends upon developing a "metabolic blueprint" of how the body is responding to stress. The ability to determine the stage of stress (42) and the oxidation rate (48) from a hair tissue mineral analysis makes it possible to assess the likelihood of many conditions and guide correction based upon your metabolic imbalances. A thorough interpretation of the tests results also requires the identification of mineral levels, ratios and metabolic patterns.

Metabolic Patterns

A metabolic pattern is a combination of mineral levels and/or mineral ratios that reveal how the body is responding to stress. Identifying metabolic patterns simplify the interpretation as the science of mineral balancing is almost always aimed at improving major metabolic patterns and not a single mineral. A general rule is that metabolic patterns are the most important factors to consider when interpreting a hair tissue mineral analysis, followed by mineral ratios and mineral levels. Ratios represent mineral relationships and balances in the body.

Oxidation Rate

The term "oxidation rate" refers to the "burning" of foods in the body or how the body converts the foods you eat to energy. There are three types of oxidation rates, slow oxidation, fast oxidation and mixed oxidation. There are varying degrees of each oxidation rate and ideally it would be best to have either a slightly slow or slightly fast oxidation rate.

Slow Oxidation

A slow oxidizer is an individual who metabolizes food at a rate slower than that required for the production of optimal energy levels to adequately perform basic body functions. In slow oxidation the activity of both the adrenal and thyroid glands is less than optimal. Slow oxidizers often experience some degree of fatigue, lack of energy, sugar cravings, low blood sugar levels, constipation, weight gain, dry skin and depression.

Fast Oxidation

A fast oxidizer is an individual who metabolizes food at a rate faster than ideally required for the production of optimal energy levels to adequately perform basic body functions. Although this results in higher energy levels, the energy generated is temporary and is dissipated rather quickly. Fast oxidation is generally characterized by excessive activity of the adrenal and thyroid glands. Fast oxidizers often experience some degree of anxiety, irritability, elevated blood sugar levels, elevated blood pressure, oily skin and a tendency for frequent bowel movements.

Mixed Oxidation

A mixed oxidizer is an individual who metabolizes food at a rate that fluctuates between slow and fast oxidation. There are two types of mixed oxidation - slow/mixed oxidation and fast/mixed oxidation. Mixed oxidation is normally a transitory state of oxidation and is moving toward a state of slow or fast oxidation. Mixed oxidizers often experience a combination of symptoms associated with both fast and slow oxidation.

- Your hair tissue mineral analysis indicates a significantly slow oxidation rate.

[redacted]

Stress And Its Effect On Human Energy And Health

Stress is the response of the body to any physical or emotional stimulus and may be both harmful or beneficial, depending upon the type and intensity of the stressor. For example, exercise places stress upon the bones and muscles and keeps them strong. Stress that is controlled and limited also serves a very useful purpose by driving us to lead more productive and creative lives. However, constant stress, such as financial worries, job-related pressures, family issues, etc., will have a negative effect on your health and result in the depletion of essential energy producing trace minerals and vitamins. Without these energy producing minerals and vitamins the ability to cope with stress decreases and a cycle of declining health begins. Excessive stress is often associated with many health related issues and may also lead to the premature aging of the body.

The body reacts to stress by mobilizing all of its available energy. If adequate levels of energy can be mobilized to overcome the stress, health and well-being are restored. However, if the body cannot produce enough energy to overcome the stress, the body automatically reacts to it with a general adaptation syndrome consisting of three distinct stages. Hans Selye, M.D., identified these stages as the *alarm* stage, the *resistance* stage and the *exhaustion* stage. (11,42,51) The *Stress Theory of Disease* states that the body passes through these three stages as it comes under prolonged stress. Each stage has a particular biochemistry and specific conditions. Understanding the stage of stress can assist in guiding its correction from a less healthy and lower energy stage of stress to a more healthy and higher energy stage.

Alarm Stage

The alarm stage of stress is considered an early stage of stress in which the body has adequate energy to fight back against the stress. It is often associated with activation of the sympathetic nervous system, a fast oxidation rate, higher blood pressure and blood sugar, higher body temperature and more frequent bowel movements. The body reacts to acute stress by releasing hormones produced by the adrenal glands which mobilize the body's energy to meet and overcome the stress.

Resistance Stage

The resistance stage of stress occurs as the body attempts to adapt to the stress when it can no longer maintain an alarm stage. This stage of stress is best described as an endless battle, with the body attempting to contain the stress as it's unable to eliminate it. The resistance stage of adaptation can go on for a long period of time in an effort to limit or minimize the stress. The body still has some energy reserves available to resist stress, though less than in the alarm stage.

Exhaustion Stage

The exhaustion stage of stress occurs when the body has exhausted its energy levels in an attempt to contain the stress. In this stage, the body no longer has the necessary energy reserves to resist or contain the stress and is now in a holding pattern to prevent a further decline in health. Symptoms may include fatigue, depression, apathy, despair, constipation, dry skin and hair, adrenal exhaustion and at times less than optimal thyroid activity. This is the most common stage of stress among adults today.

- Your hair tissue mineral analysis indicates your body is presently in the *resistance stage* of stress.

Energy Production And Your Glandular System

The adrenal and thyroid glands are the main energy-producing organs in the body. They work together to release simple sugars from the liver and then process them into energy. These glands need to be functioning at optimal levels to have the maximum amount of energy possible.

The adrenal and thyroid glands also determine the rate of metabolism or oxidation rate. If both of these glands are underactive, an individual will generally be in a state of slow oxidation. A slow oxidizer will have a lowered rate of metabolism and normally will experience fatigue or a lack of energy. If the adrenal and thyroid glands are overactive, an individual will generally be in a state of fast oxidation and experience an abundance of energy, but only for limited amounts of time. If one of the glands is underactive and the other overactive then an individual will be in a state of mixed oxidation and at times may experience both a lack of energy and then a burst of energy.

The adrenal glands are also responsible for providing extra *energy* when needed. In an emergency situation, it is the adrenal glands that release the hormone adrenaline which generates a sudden increase in energy.

Finally, adrenal hormones are required for maintaining normal blood pressure and blood sugar, combating inflammation, carbohydrate metabolism and to activate the body's response to stress. The adrenal glands are also the sole source of female hormones after natural or surgically-induced menopause (20).

- Your hair tissue mineral analysis indicates a pattern of diminished cellular adrenal glandular activity. This may be due to chronic stress, toxic metals, nutrient deficiencies, fear or other stress related factors. Diminished adrenal gland activity may contribute to symptoms of fatigue, exhaustion, depression, mood swings and PMS or menopausal symptoms in women.

  Weak adrenal gland activity may also contribute greatly to the accumulation of heavy metals as normal detoxification mechanisms become impaired. The body may compensate for adrenal weakness by retaining excessive amounts of copper, iron, manganese, aluminum, chromium, lead, cadmium, arsenic and other toxic metals.

- Your hair tissue mineral analysis indicates a cellular thyroid effect that is outside an optimal range. This may possibly contribute to fatigue, weight gain, dry skin, brittle hair, depression, a tendency for infections, low body temperature, low blood pressure and low blood sugar. Common causes of thyroid activity outside the optimal range include the presence of mercury, copper and chlorine toxicity, impaired adrenal activity, nutrient deficiencies and chronic stress.

Special Metabolic Patterns

High Sodium/Potassium (Na/K) Ratio

Sodium and potassium are regulated mainly by the adrenal hormones aldosterone and cortisol. A high sodium/potassium ratio on a hair analysis is an indicator of a relatively greater secretion of aldosterone (sodium) in relation to cortisol (potassium).

Many people assume that a high sodium/potassium ratio indicates an excessive salt intake. While possibly true, in many instances, salt intake has little impact upon the sodium/potassium ratio.

A high sodium/potassium ratio is associated with several conditions, including acute stress, inflammation, and sometimes a zinc or magnesium deficiency.

This pattern also may indicate the emotion of anger, or an aggressive personality.

- You currently exhibit a high sodium/potassium ratio.

Adrenal Insufficiency

An adrenal insufficiency is depicted on a hair analysis chart by low levels of both sodium and potassium. An adrenal insufficiency is a reduced ability to mobilize defenses against stress. The body is still able to *adapt to stress*, but with a limited response. In addition, an adrenal insufficiency refers to the inability of the adrenal glands to produce a normal quantity of hormones. The major hormones produced by the adrenal cortex are aldosterone and cortisol. A balance between aldosterone and cortisol is necessary to maintain one's health.

- Your chart reveals low sodium and potassium levels which are associated with a degree of adrenal insufficiency, underactivity of the adrenal glands.

DIETARY PATTERNS

Sugar and Carbohydrate Tolerance

The excessive intake of carbohydrates in the diet is often associated with the development of many health conditions including, glucose (sugar) metabolism, digestive difficulties, yeast infections, fatigue, depression and others. Excessive carbohydrates may also upset the balance between calcium and phosphorus and between calcium and magnesium. (3,7,11,15,18,33,37,44,48,49,54,55)

Inasmuch as the release of insulin is promoted by calcium and inhibited by magnesium, the proper ratio of calcium to magnesium is critical for optimal insulin secretion, thus resulting in one's ability to properly metabolize sugars and simple carbohydrates.

- Your hair tissue mineral analysis indicates an imbalanced glucose (sugar) metabolism as indicated by your elevated calcium/magnesium ratio.

Protein Synthesis

Adequate protein synthesis is vitally important for the regeneration of all body tissues. This requires proper digestion, absorption and utilization of proteins. Protein synthesis is influenced by the amount and type of protein consumed in the diet and by one's eating habits.

- An elevated phosphorus level is indicative of rapid protein breakdown, while a low phosphorus level indicates inadequate protein synthesis.
- The mineral zinc must be singled out as particularly important for protein synthesis. It is required for the enzyme RNA transferase, a key step in protein synthesis.
- A low sodium/potassium ratio reveals significant information regarding the individual's capability of utilizing protein. The lower the sodium/potassium ratio, the less protein can be synthesized.

- Your tissue mineral analysis indicates adequate protein synthesis at this time.

Digestion

Excellent digestion is a key to improving one's health. If digestion is impaired, even the best diet will not supply

the body with needed nutrients. Additionally, improperly digested food will ferment or putrefy in the intestines and produce extremely toxic chemicals that are then absorbed into the body. Proper digestion depends on one's diet, eating habits, energy levels, digestive enzymes, bowel flora and the condition of the intestines.

- Phosphorus levels are highly indicative of one's ability to synthesize protein. The inability to synthesize protein frequently results in impaired digestion.
- A low sodium/potassium ratio is indicative of an excessive stress situation, which will eventuate in a reduction in both hydrochloric acid and pancreatic digesting enzymes.
- Extreme fast oxidation pattern is often associated with a tendency for excessive stomach acid secretion when under stress. This can result in poor digestion to some degree.
- Zinc is required for all digestive enzyme production. It is also required to rebuild the fast-growing intestinal tissue, and for the production of bile and liver and pancreatic secretions.
- Excessive tissue copper can result in poor digestion and poor motility of the bowel, hence resulting in food putrefaction resulting in gas and bloating often associated with poor digestion.

- Your hair tissue mineral analysis indicates adequate digestion at this time.

NERVOUS SYSTEM PATTERNS

Autonomic State

The autonomic nervous system regulates many functions in the body and consists of the sympathetic and parasympathetic branches. The sympathetic branch activates the brain, muscles and the thyroid and adrenal glands which enable the body to respond to stress. During the day, one primarily uses the sympathetic nervous system which is associated with expending energy and is catabolic, breaking down body tissues. (20) One is in a more sympathetic state when physically or mentally active.

The calcium/phosphorus ratio on a hair mineral analysis is an indicator of an individual's autonomic state. A calcium/phosphorus ratio less than 2.5 indicates a sympathetic state, while a calcium/phosphorus ratio greater than 2.5:1 indicates a parasympathetic state.

The autonomic state is important as it is closely related to the activity of the adrenal and thyroid glands.

In some cases this may not hold true and the individual would fall into a para-sympathetic state, if they are a fast oxidizer with adrenal exhaustion (low sodium/potassium ratio), or a fast-mixed oxidizer with a sodium/magnesium ratio greater than the calcium/potassium ratio.

The sympathetic branch of the nervous system is balanced by the parasympathetic branch which is associated with the nurturing and regeneration of body tissues. The parasympathetic branch also enhances digestion and the elimination of toxins. This branch is restful, conserving of energy and is anabolic or builds up new tissue. Healing requires that one spend sufficient time in a parasympathetic state to permit proper digestion, elimination of toxins and rebuilding of the body. (20,52) One is more parasympathetic when sleeping, resting or relaxing.

The vast majority of individuals today have either overactive sympathetic nervous systems or they have exhausted the sympathetic system from overusing it. These individuals often shift into an ***unhealthy*** *parasympathetic state* in which the body is exhausted and now is attempting to permit some degree of healing and regeneration. A high percentage of slow oxidizers fall into this category. Maintaining a proper balance between the sympathetic and parasympathetic branches is critical to your health. This allows you to conduct all the necessary functions of daily life and at the same time provide for the regeneration of the body.

Dr. Melvin Page, DDS studied the balance between calcium and phosphorus in serum and its relationship to the balance between the sympathetic and parasympathetic nervous systems. (33) The mineral balance between calcium

and phosphorus reflects an average autonomic state over the past several months.

- Your hair tissue mineral analysis indicates your body is predominantly in a *parasympathetic state*. This is often due to the exhaustion of the sympathetic nervous system, which causes the body to shift to an ***unhealthy*** *parasympathetic state* to allow for some degree of healing and regeneration. General causes for this state include nutrient deficiencies, toxic metal excesses, excessive activity or mental patterns such as worrying, fears, anger or resentments.

  To balance the autonomic nervous system, additional rest is required and it is important not to push yourself or work too hard as these activities stimulate the sympathetic nervous system.

ORGAN AND SYSTEMS PATTERNS

Immune System Activity

The immune system is a network of organs, cells and tissues that work together to provide the body's first line of defense against organisms, toxins and substances that invade our systems and cause disease. The immune system has many aspects including the health of the white blood cells, the digestive tract, cell membranes, antioxidant nutrients and the autonomic balance. Certain indicators on a hair tissue mineral analysis often reflect the overall condition of the immune system.

- A low sodium/potassium ratio results in an impaired immune system response, due to one's inability to adequately synthesize protein.
- A very high sodium/potassium ratio may indicate kidney stress and an imbalanced immune system. A high ratio may indicate autoimmune problems, or an overactive immune system. Rheumatoid arthritis, Hashimoto's thyroiditis and lupus are examples of autoimmune diseases.
- A zinc deficiency, or loss, will impair immune system function. Zinc is involved in all protein synthesis and is required for the integrity of the skin and mucus membranes of the body, which are critical tissues in defending against infection.
- Chronic over-activity of the adrenal glands in the "fast" oxidizer has a suppressive effect upon the thymus gland, thus impairing immune system function.
- A copper imbalance often indicates impaired immune system function. Copper is required for energy production within the cells and mobilization of copper from the liver which is part of the normal infection-fighting mechanism of the body. The mineral itself is a fungicide and an anti-bacterial.
- A low tissue zinc/copper ratio is frequently associated with an immune deficiency, due to excessive tissue copper displacing zinc, which is necessary for immune system function.

- Your hair tissue mineral analysis suggests adequate immune system activity.

Liver and Kidney Stress

The liver is the largest gland in the body and performs a large number of functions that impact all body systems. Some of the functions performed by the liver include the filtering of harmful substances from the blood, the storage of vitamins and minerals and the maintenance of proper blood sugar levels. The liver is also responsible for the production of cholesterol and other vital substances.

The main function of the kidneys are to separate toxins and other waste products from the blood. They are also involved with the regulation of blood pressure and maintaining the balance of water, salts and electrolytes.

Both the liver and kidneys are very important organs of detoxification and are common sites of toxic metal accumulation.

- Certain indicators on a hair tissue mineral analysis, i.e., *sodium/potassium ratio, excess tissue copper, high levels of iron and manganese, or the presence of toxic metals, such as; mercury, cadmium, arsenic and aluminum*, often reflect the overall condition of the kidneys and liver.

▸ Your hair tissue mineral analysis indicates a trend for liver and kidney stress. This may contribute to impaired toxic metal elimination, impaired immune system, carbohydrate intolerance, fluid imbalances and other conditions that may affect liver and kidney function.

Inflammation

Inflammation is the body's normal reaction to an injury, disease, or the presence of a foreign substance. Inflammation is generally recognized by swelling, redness, heat, or possibly pain. If the body can overcome the causative factor, then the inflammation is reduced and the inflammatory process terminates. However, if the inflammatory process continues, inflammation can become chronic.

Acute inflammation generally causes an increase in adrenal activity and thus a rise in the secretion of the hormone aldosterone (sodium). Aldosterone is a pro-inflammatory hormone. Cortisol and cortisone (potassium) are anti-inflammatory hormones because they diminish inflammation. The pro-inflammatory and anti-inflammatory hormones need to be in balance with each other for optimum health.(20)

Certain indicators on a hair tissue mineral analysis often reflect inflammation and/or an inflammatory response in the body.

- An elevated sodium/potassium ratio, as determined by a hair analysis, is an excellent indicator of the predominance of the pro-inflammatory hormones (represented by sodium on a hair analysis chart) over the anti-inflammatory hormones (represented by potassium).
- A low sodium/potassium ratio, as determined by a hair analysis, is an excellent indicator of excessive protein catabolism (breakdown) which is frequently associated with an inflammatory condition such as arthritis. Degeneration of the joints causes inflammation and joint pain.
- A magnesium deficiency relative to a high sodium level, as indicated by an elevated sodium/magnesium ratio on a hair analysis, is often associated with an inflammatory process.
- Acute stress can result in an inflammatory reaction. Many factors can be the source of stress, such as a change in weather, change in diet, fatigue, toxic metal accumulation, emotional conflicts, etc.
- A low potassium level represents inadequate glucocorticoid (anti-inflammatory) activity, which often contributes to an inflammatory tendency.
- Copper, in excess, can result in a suppression of anti-inflammatory hormones. A deficiency of anti-inflammatory hormones is responsible for an inflammatory process.
- Excess iron is known to deposit in the joints, resulting in an inflammation of the joints.

▸ Your hair tissue mineral analysis currently indicates the presence of an inflammatory tendency, as indicated by your;
  - ▸ elevated sodium/potassium ratio
  - ▸ low potassium level

Cell Permeability

Cell permeability refers to the ability of substances to move into or out of the cell by crossing the cell membrane. Some substances are able to cross the membrane very easily and the membrane is said to be very permeable to these substances. Additionally, other substances move across with increased difficulty and others are excluded completely. In the latter case the cell membrane is impermeable to these substances. The correct degree of cell permeability is very important to maintaining excellent health. "Sodium and potassium tend to increase the cell's exchanges and the entrance of water-soluble toxins. Calcium and magnesium tend to reverse this situation." (27)

- Your hair tissue mineral analysis indicates significantly decreased cell permeability. This impairs the entrance of hormones, glucose and other substances into the cells. It also impairs the elimination of toxic substances from the cells. This may contribute to reduced adrenal gland activity, thyroid imbalance, cellular nutrient deficiencies, cellular toxicity and often symptoms of chronic low cellular glucose or insulin resistance.

ELECTROLYTE PATTERNS

Calcium

Calcium is found in every cell throughout the body. Over ninety percent is found stored in the bones and teeth. Calcium is regulated by the thyroid, parathyroid, adrenal and pituitary gland. It's use in the body is involved in maintaining the acid alkaline balance. It is necessary for normal blood clotting, nerve conduction, muscle contraction and relaxation, cell division, heart rate, and maintenance of the bones and teeth. It is a primary extra-cellular element.

Excellent quality bioavailable calcium is lacking in the diets of most people. The main food sources are raw and organic dairy products, carrots and carrot juice and a few other vegetable sources such as nuts and seeds. However, when cows milk is pasteurized and homogenized, calcium availability declines greatly. As a result, most people are not benefitting enough from the calcium in the milk, cheese and yogurt they are consuming.(51)

- Your calcium level is within an optimal range. For clinical assessment however, it must be considered in relation to all the other minerals. Hidden toxic metals, nutrient deficiencies or prescribed medications can affect hair calcium readings. For this reason, calcium supplementation may be recommended.

Magnesium

Magnesium is extremely important in keeping calcium in a bio-available form. In other words, magnesium is necessary for the utilization of calcium. Magnesium tends to follow calcium up and down.

Magnesium is required for the bones and nervous system. It is also essential for over 600 vital enzymatic reactions in the body. It is a primary intra-cellular element. (44)

- Your magnesium level is within an optimal range. For clinical assessment however, it must be considered in relation to all the other minerals. Extenuating factors such as hidden toxic metals, nutrient deficiencies or prescribed medications can affect hair magnesium readings. For this reason, magnesium supplementation may be recommended.

Sodium

Sodium is an essential mineral for maintaining water balance and blood pressure in the body and is a primary

extra-cellular element.

- A low sodium level on a hair tissue mineral analysis is often associated with reduced sodium retention due to impaired adrenal gland activity. This may contribute to symptoms of fatigue and low blood pressure. A low sodium level does not necessarily mean one is consuming too little salt.

Potassium

Potassium is a primary intra-cellular element required for fluid balance, nerve activity and muscle activity.

- A low potassium level on a hair tissue mineral analysis is often associated with excessive excretion of potassium due to stress and adrenal gland weakness. This may contribute to feelings of fatigue and low blood sugar.

NUTRIENT MINERAL PATTERNS

Iron

Iron is required in hemoglobin for transporting oxygen in the blood, for detoxification and for energy production in the cells. Iron is found in lean meats, organ meats, shellfish, molasses, beans, whole-grain cereals, and dark green vegetables.

- In most cases, a low iron level in the hair does not necessarily indicate a deficiency or lack of iron and often represents bio-unavailable iron. This means an excess of iron may be present in the liver or other organs, but is not revealed in the hair at this time. An iron imbalance is often associated with general fatigue.

Copper

Copper is an essential mineral in the body and directly or indirectly affects virtually every bodily system function. Copper is required for energy production, cardiovascular health, neurotransmitter activity, female reproductive system, skin health, blood formation and the immune system.

- Your hair copper level is within an optimal range. For clinical assessment however, it must be considered in relation to all the other minerals. Factors such as hidden toxic metals, nutrient deficiencies or prescribed medications may influence hair copper readings.

Manganese

Manganese is essential for energy production, maintaining glucose metabolism, maintaining tendon and ligament integrity and is essential for bone development.

- A low manganese level is often associated with a manganese deficiency in the diet, especially if one consumes refined foods or white sugar.

Zinc

Zinc is found in small quantities in the body (about two grams) and is essential for over 50 functions including all protein synthesis, growth and development, male reproductive system, insulin production and secretion, vision, digestion, prostate health, skin, hair and nail health, and immune system activity.

- Your zinc level falls within an optimal range. For clinical assessment however, it must be considered in relation to all the other minerals. Factors such as hidden toxic metals, nutrient deficiencies or prescribed medications may influence hair zinc readings.

Chromium

Chromium enhances utilization of insulin, resulting in improved burning of glucose. Chromium is involved in maintaining blood sugar levels and energy levels. It is also associated with cholesterol regulation.

- A low chromium level may contribute to blood sugar imbalances, cravings for sweets or starches, fatigue, elevated cholesterol.

Selenium

Selenium is required for thyroid function. Selenium is an essential component of the enzymes that convert Thyroxine (T4) to Triodothyronine (T3). Selenium is also important in heavy metal detoxification and is also important in enhancing immune system function.

- A low selenium level may contribute to impaired detoxification and thyroid gland activity.

Phosphorus

Phosphorus is an essential mineral that is involved in protein synthesis and energy production within the cells. All proteins contain phosphorus and thus are a significant source of organic phosphorus. The hair tissue mineral level of phosphorus is often associated with the adequacy of protein synthesis in the body. This depends on the diet, lifestyle, condition of the intestinal tract and liver and the levels of other nutritional minerals such as zinc and copper.

- Your hair tissue mineral level of phosphorus is within an optimal range. This may change as your body undergoes the elimination of toxic metals and other metabolic changes. An adequate amount of high-quality dietary protein, digestive enzymes and healthful eating habits will all help to maintain a normal phosphorus level. Adequate protein synthesis is necessary for the regeneration of all body tissues.

TOXIC METALS AND CHEMICALS

The presence of toxic metals and chemicals can potentially present a serious health hazard. (1,11,12,13,14,15,16,19,22,29,31,39,51). A serious problem today is that a large number of babies are born high in toxic metals due to toxicity in the mothers. A review of over 400 medical studies by the US Environmental Protection Agency revealed that hair tissue mineral analysis is a meaningful test to detect toxic metals (47).

Toxic metals can cause hundreds of symptoms and contribute to many serious health conditions. There are no safe levels of toxic metals and reducing the presence of toxic metals is a primary goal of your nutritional balancing program.

Seven different methods are used simultaneously in your recommended dietary, supplement and lifestyle program to assist in the reduction of toxic metals. These are 1) improve your energy level, 2) provide support for the organs of elimination, 3) inhibit the sympathetic nervous system, 4) reduce exposure, 5) supplement with heavy metal antagonists, 6) supplement with natural heavy metal chelators and 7) recommend other natural detoxification methods.

The hair tissue mineral analysis does not test for toxic chemicals such as pesticides and solvents. However, enhancing energy production, inhibiting the sympathetic nervous system, assisting the organs of elimination and reducing exposure to all toxins greatly assists the removal of toxic chemicals from the body.

Hair tissue mineral analysis only detects metals present in the hair tissue. No test can detect all toxic metals, as some are hidden deep within other tissues or organs. The unique value of hair mineral tissue mineral analysis is not so much to detect toxic metals, but to guide the balancing of body chemistry to assure their safe and swift removal. When the seven methods above are combined, the metals will be removed without the need for synthetic chelators.

Toxic metals are often layered deep within body tissues. The recommended diet, supplement, lifestyle and detoxification program will slowly release layer after layer. Hidden metals will often be revealed on future mineral tests as they are eliminated through the hair, skin and through other routes.

Aluminum

Aluminum is the third most prevalent element and the most abundant metal in the earth's crust. Individuals are naturally exposed to relatively large amounts of aluminum from food, water and air.

Common sources of aluminum include; aluminum cans, aluminum food containers, aluminum foil used in cooking, aluminum cookware, anti-perspirants, antacids, table salt, some baking powder/baking soda and tea.

Aluminum is mainly stored in the lungs, liver, thyroid, bone and brain. Aluminum toxicity may contribute to memory loss, dementia, fatigue, behavior difficulties and skin rashes.

- Your hair analysis reveals a presence of aluminum in the tissues at this time.

DETOXIFICATION

In addition to your dietary, lifestyle and supplement recommendations, sauna baths can be extremely helpful for heavy metal detoxification.(39,52). Electric light infrared saunas have been found to provide the most beneficial results. Saunas are often more effective for heavy metal detoxification than steam baths, hot tubs or tub baths, by stimulating the skin, the largest organ of detoxification. They also help enhance circulation and oxygenation of the body. The best times for sauna baths are first thing in the morning or last thing at night.

METABOLIC TRENDS

Mineral research by Dr. Paul C. Eck and others indicates that certain patterns on a hair tissue mineral analysis may often be associated with a particular health condition. (7,11,51) We refer to these mineral patterns as metabolic trends. Metabolic trends are not intended to be diagnostic in nature and they do not necessarily indicate that such a trend is currently present. Metabolic trends often indicate that if your present mineral levels, ratios and patterns continue as they are for a long enough period of time, it is possible you may develop these conditions. Your hair tissue mineral analysis indicates tendencies for the following metabolic trends.

Adrenal Insufficiency

This is the reduced activity or response of the adrenal glands and is often associated with chronic stress or nutritional deficiencies. A slow or slow-mixed oxidation rate is closely associated with reduced cellular gland activity.

Anemia

Anemia is a reduction in the number of red blood cells per cubic millimeter, in the quantity of hemoglobin or in the volume of red blood cells.

Depression

This is a condition often associated with a dejected mood, insomnia, fatigue, guilt feelings or preoccupations.

Fatigue

Fatigue is a loss of energy or the power to respond to the environment. Symptoms may include reduced muscular strength, stamina or endurance, impaired cognition and a reduced emotional response. Fatigue is often associated with a slow or slow-mixed oxidation rate.

Glucose Intolerance

Glucose tolerance is the ability of the body to metabolize glucose, a form of sugar. Sugar intolerance occurs when ingested sugar causes an excessive increase in blood sugar and often excessive insulin secretion.

Hypothyroidism

Hypothyroidism is a reduced level of thyroid activity and is often associated with chronic stress and nutritional deficiencies.

Inflammation

Inflammation is a localized protective response of the body due to a stress such as an injury, tissue destruction or an emotional response. It is often characterized by pain, heat, swelling and impaired function.

Kidney Stress

The kidneys regulate the composition of the blood by removing wastes and toxic substances. Kidney dysfunctions due to excessive stress may involve improper filtering of the blood, resulting in a variety of possible health conditions.

Liver Stress

The liver performs over 500 functions, ranging from amino acid synthesis and glycogen storage to detoxification. Excessive stress on the liver may hinder the performance of various liver functions.

General Information

Balancing Body Chemistry

Balancing body chemistry requires time. In many cases, vital minerals have been replaced in the body tissues with toxic metals such as lead, cadmium, mercury, aluminum and others. These toxic metals are often bound in the tissues and may not show up on your initial hair tissue mineral analysis. The process of corrective healing and rebuilding of body chemistry may require many months to even years depending on your condition at the beginning of the program. It is a well known fact that it often takes six months to replenish one mineral, such as iron (reserves) in an individual with iron deficiency anemia. Additional factors such as diet, lifestyle, stress and medications can all alter mineral levels and ratios and can affect the rate of improvement.

General Dietary Principles

For the slow and slow-mixed oxidizer, general dietary principles to follow are:

- Higher amounts of low-fat protein foods - such as small fish, fowl, bean and grain combinations, eggs and lean meats.
- Lower dietary intake of fat.
- Moderate amounts of unrefined carbohydrates - such as whole grains and whole grain products, legumes (beans, peas, lentils), root vegetables (potatoes, yams, etc.), squash.
- Avoid or eat sparingly: fatty meats and foods high in fat content, organ meats (high purine content), and dairy products (high fat content).
- Eat plenty of vegetables with at least two of your meals per day.

Both the supplement and dietary recommendations are important for the eventual success of your program. For a thorough explanation of the optimum diet for you, we recommend our personal diet plan - "An Eating Plan for Optimal Health" (Profile V), which is designed to aid in the balancing of your particular biochemical imbalances. This dietary concept provides three transition stages of dietary recommendations based upon metabolic (oxidation) rate, individual mineral readings and ratios and symptom based food recommendations. The eating plan provides two entry level stages (Introductory and Intermediate) of transition diets on your way to the final and third stage "Optimal Diet". This allows you to begin with a dietary transition level you feel comfortable with before moving on to the Optimal Diet. Our easy to follow plan also emphasizes the benefits of good eating habits and quality food selections.

Eating Habits

- Eating habits are as important as what you eat.
- Eat regular meals, at set times during the day if possible.
- Allow time for meals, sit down to eat, refrain from eating on the run.
- Chew your food thoroughly, eat slowly and relax for at least 10 minutes after eating before returning to work or other activities.
- Food should be as fresh as possible and organically grown if possible. Simple food combinations can favorably assist digestion.

Lifestyle

A healthy lifestyle will significantly enhance the speed at which your body chemistry will return to a balanced state. An unhealthy lifestyle will definitely slow progress.

Important Elements Of Lifestyle Are:

Sleep: Getting plenty of sleep and rest is absolutely essential to obtain the best results possible from the program. Most healing takes place while you sleep. Sleep and rest allow your body to utilize the healthier foods and supplementary nutrients you are providing. We cannot emphasize enough the importance of getting proper amounts of sleep and rest. Eight to ten hours of sleep per night and a rest or nap of about 20 minutes per day will enhance the effectiveness of the nutrition program.

Individuals with adrenal insufficiency may find that the more they sleep, the worse they feel, especially upon arising. This occurs because their exhausted adrenal glands further slow down during sleep and upon awakening, the adrenal glands are functioning more slowly than when they went to bed. In these instances, it may be preferable to take short naps or rest periods several times a day if needed, no more than 20 minutes each, rather than sleep more hours at night.

Some people are reluctant to go to bed. By the end of the day, the adrenal glands finally become active, due to being 'whipped' all day. Such a person feels more alive in the evening (night people) and hence they are reluctant to go to bed. The solution to the above problem is to realize that the goal is to have normally functioning adrenal glands all day, without the need to 'whip up' the glands with coffee, exercise, mental stress or alcohol.

By enhancing body chemistry and obtaining adequate rest, reactivation of the adrenal glands may be accomplished over a period of time.

Exercise: Perform some type of gentle physical activity every day. Strenuous exercise is not necessary or recommended at this time. Light exercise such as walking, cycling, swimming, dancing, yoga, stretching or gardening are excellent forms of exercise. Preferably, exercise out of doors. Don't push any exercise to exhaustion.

Medications

When beginning your supplement program, it is important that you do not stop taking any prescribed medications. However, as your metabolism improves, some medications may gradually be reduced. It is our recommendation to discuss this with your doctor or health-care professional before making any changes.

How to Follow the Supplement Program

- The supplement program recommendations are based upon the results of your hair tissue mineral analysis. For optimal results, it is best to follow the program exactly as outlined. Do not combine the A.M., Noon and P.M. dosages.
- Supplements should be taken just prior to, during, or immediately after meals.
- If for any reason it is necessary to reduce the number of tablets, take the program twice, or even once per day, instead of three times per day.
- You may take extra dietary aids if needed to combat gas or bloating. Start with one additional tablet per meal and increase tablet count as necessary to help alleviate bloating. Consult your health care professional if gas or bloating continues.
- Supplements may be placed in zip-lock bags or in a vitamin chest to avoid having to open your supplement bottles every day.

What to Expect on the Program

- Generally, most individuals will notice some degree of change within a few weeks of beginning the program. However, everyone is different and some respond faster than others.
- The program is designed to restore your body's energy system. For this reason many people will feel an increase in their energy levels. If this occurs, do not immediately increase your workload and obligations. It is preferable to conserve the newly found energy, like putting money away in the bank. Otherwise, you may slow your progress considerably.
- It is possible you may observe increased fatigue for a while. This is referred to as retracing and is discussed in the following section.
- Conditions will be addressed in their own order, not necessarily in a sequence which you may think is most important. For this reason, you may notice improvement in certain areas first, while others require more time for correction.

Healing and Retracing

Healing reactions are symptoms that accompany changes in body chemistry as deep healing occurs. (11,17,24,27,51,52) Retracing is the process whereby the body goes back and revisits chronic conditions in order to heal them completely.

These may include sites of infection or injuries. An inflammatory process may possibly occur for a few days or less.

Most people experience a half dozen or more low-grade chronic infections of which they are unaware. These may flare up or become painful as the healing process proceeds. Common sites are the eyes, ears, throat, sinuses, bladder and intestines. These types of symptoms will usually pass within a few days with supportive measures such as additional rest and sleep.

Reactions may also be due to the elimination of toxic metals. When an elimination occurs, toxic metals are first moved from storage tissues into the blood stream. They are then sent to the liver, kidneys, bowel and skin for removal from the body. During the time the toxic metals are present in the blood, one may experience symptoms such as a headache, fatigue, nausea, diarrhea, constipation or stomach pain.

These reactions are normal and part of the deep healing of the body. They usually pass within a day or two. It is best to temporarily stop your nutritional supplement program and rest more during these reactions.

Why Minerals May be Recommended Even if the Level is High

Research has shown that replacement therapy, recommending those minerals that are deficient on the hair tissue mineral analysis, is often not an effective method of balancing body chemistry.

Instead, your supplement program takes into account the complex relationships between minerals and between minerals and vitamins. Therefore, it is common that a mineral that is low will not be recommended and that a mineral whose level is high will be recommended. This method is essential to the success of the program.

Retesting

Retests are recommended in approximately three to four month intervals. Retesting is essential because as your body chemistry changes the diet and supplement program should be adjusted to meet your current needs. Otherwise, the program will no longer properly balance your body chemistry and your progress will cease. It is best not to remain on a supplement program more than six months without a retest.

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GLOSSARY OF TERMS

The following glossary of terms are important to the comprehension of this interpretation. Please take the time to review these items and refer back to this list as often as needed.

- **Adaptation** - Adaptations are the way the body alters itself, changing mineral and vitamin levels, body temperature, blood sugar levels, etc., to survive in the best way possible, given the circumstances. In mineral balancing nutrition programs, foods, vitamins and minerals are used to remove the need for adaptations. Sometimes, nutrients are also used to force the body to adapt in ways that will promote health, using nutrition to push the body in such a way that it moves back toward normal functioning.

- **Bio-Unavailability** - This is a particular type of mineral retention or non-utilization, due to lack of a releasing factor. Bio-unavailable minerals are generally elevated, unless the mineral is locked up in tissues other than hair. In this case, the level may be very low.

- **Compensation Principle** - The minerals on the chart compensate for and adapt to one another in order to maintain critical levels and ratios.

- **Dual Concept of Energy** - There are two aspects to the body's biochemical energy system, 1) the rate of energy production or oxidation rate and 2) the energy pathway or the steps involved in energy production. Both the rate and the functioning of all steps must be optimized to obtain maximum energy production.

- **External Stress** - Factors arising from outside our bodies, which affect our health, are called external stressors. They may include physical factors (heat, cold or noise), social pressures, financial or job stress, microorganisms such as bacteria, etc.

- **Internal Stress** - Internal stressors are those factors, which originate from inside the body, which cause stress. Nutritional imbalances can be the result of stress, but is also a cause of internal stress. This is hidden stress, which can cause both physical and emotional problems.

- **Metabolism** - Metabolism is the total of the chemical reactions taking place in the body. Metabolism is divided into two parts, anabolism and catabolism. Anabolism refers to those reactions which build up body tissues, while catabolism refers to reactions and processes which tear down body tissues.

- **Mineral Displacement** - One mineral can displace or replace another. Displacement causes an elevated reading of the mineral displaced.

- **Mineral Excretion** - A physiological effect of elimination of an unneeded mineral, that had been retained. Excretion elevates the mineral reading.

- **Mineral Loss** - A pathological loss of minerals through the hair can occur due to lack of a retaining factor. A mineral loss elevates the reading.

- **Mineral Levels** - Refers to actual mineral levels reported on the graph.
- **Mineral Ratios** - A relationship consisting of one mineral level divided by a second mineral level.
- **Mineral Patterns** - A group of levels or ratios or some combination of the two. Slow and fast oxidation, for example, are mineral patterns defined by several ratios.
- **Minerals-Antagonistic** - Minerals which are inversely related. When the level of one mineral goes up, the other mineral level goes down. Minerals may be both synergistic and antagonistic under different conditions.
- **Minerals-Synergistic** - Minerals which are directly related. When the level of one mineral goes up, the level of the other mineral goes up also. Minerals may be both synergistic and antagonistic under different conditions.
- **Oxidation Rate** - The oxidation rate is the rate at which food is burned in the body. The oxidation rate is closely related to the metabolic rate, a term referring to the general rate of chemical reaction or metabolism in the body.

  Fast Oxidation - The condition in which there is too rapid a release of energy in the biochemical pathway.
  Slow Oxidation - Slower than normal release of energy in the biochemical pathway.
  Mixed Oxidation - A transition or unstable state in which one of the glands, thyroid or adrenal, is overactive and the other underactive, causing an unstable release of energy.

- **Retracing** - The concept that as old mineral patterns are passed through on the way back to health, previous symptoms may return for a period of time.
- **System Principle** - The hair analysis graph must be viewed as a system - that is, all at once, for proper understanding. Trying to understand one reading without considering all the other readings, will only lead to confusion and misinterpretation.
- **Stages of Stress** - Dr. Hans Selye discovered that one's body passes through several well-defined stages as they come under more and more stress. He called these stages alarm, resistance and exhaustion.
- **Time Factor** - As ratios remain uncorrected over time, compensations and adaptations occur on many different levels. Time is required for correction, because these compensations and adaptations must be reversed, usually in reverse order called, retracing.
- **Toxic Metals** - Lead, mercury, cadmium, arsenic, aluminum and nickel. These may be found in the body, but have no known necessary function and can cause disease.
- **Toxic Metal Elimination** - An important goal and occurrence is the removal of toxic metals. Sometimes temporary symptoms may occur such as, a metallic taste, headache or skin rash as toxic metals are removed.

EDUCATIONAL MATERIAL TO FOLLOW

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BASIC RATIOS AND THEIR MEANING

INTRODUCTION

Balance in all phases of life is critically important to maintain health and this principle applies to mineral levels in hair analyses.

What is a mineral ratio? A pure number consisting of one mineral level divided by a second mineral level. Mineral ratios are often more important in determining nutritional deficiencies and excesses than mineral levels alone, although both are important and should be considered together. The understanding of mineral ratios is extremely exciting and much more revealing than analyzing mineral levels alone.

THE IMPORTANCE OF RATIOS

- *Ratios* are often more important than levels.
- Ratios represent *homeostatic balances*.
- Ratios are indicative of disease *trends*. These are not diagnostic but are research *associations*.
- Ratios are frequently *predictive* of future metabolic dysfunctions or hidden metabolic dysfunctions.
- Ratios can be used to *chart progress*. However, one must consider *all* the important ratios, as well as mineral levels, symptoms and signs.
- The following five (5) ratios are the most important for evaluation purposes:

THE BASIC MINERAL RATIOS

Calcium/Magnesium (Ca/Mg) Ratio:

- Normal ratio is 6.67:1
- Referred to as the blood-sugar ratio
- Calcium is required for the release of insulin from the pancreas
  Magnesium inhibits insulin secretion
- Magnesium is necessary to keep calcium in solution
- A very high (greater than 16.0) or very low calcium/-magnesium ratio (less than 2.0) is often associated with mental or emotional disturbances.

Sodium/Potassium (Na/K) Ratio:

- Normal ratio is 2.5:1
- Referred to as the life-death ratio because it is so critical
- Related to the sodium pump mechanism, and the electrical potential of cells which is regulated by sodium and potassium levels
- Sodium is normally extracellular, while potassium is normally intracellular. If the ratio of these minerals is unbalanced, it indicates important physiological malfunctions within the cells.
- The sodium/potassium ratio is intimately linked to adrenal gland function, and the balance between aldosterone (mineralocorticoid) and cortisone (glucocorticoid) secretion.
- A low sodium/potassium ratio, greater than 1:1 and less than 2.5:1 is indicative of a tendency towards kidney and liver dysfunction, allergies, arthritis, adrenal exhaustion, digestive problems, deficiency of hydrochloric acid.
- A sodium/potassium ratio less than 1:1 is indicative of a tendency towards heart problems, arthritis, kidney and liver disorders.
- Severe elevation of the sodium/potassium ratio is indicative of inflammation and adrenal imbalance.
- A high ratio can also be associated with asthma, allergies, kidney and liver problems.

Calcium/Potassium (Ca/K) Ratio:

- Normal ratio is 4:1
- Called the thyroid ratio because calcium and potassium play a vital role in regulating thyroid activity.
- Does not always correlate with blood thyroid tests because hair analysis is a ***tissue*** test. Often blood tests will be normal but hair analysis will indicate an impaired thyroid function. Sometimes symptoms of hypothyroidism may be evident, but the hair test will show a hyperactive thyroid ratio. For nutritional correction, *it is prudent to follow the hair analysis indication.*
- The thyroid gland is one of the major glands which regulate metabolic rate in the body. A hyperactive thyroid is associated with fast metabolism.
- When the thyroid (and adrenal) ratios are not normal, the efficiency of energy production in the body decreases. It is like an engine that is turning too slow

or too fast - power output declines.
- *Symptoms of Reduced Thyroid Activity Include:* Cold hands and feet - tendency to feel cold, dry skin and dry hair, fatigue, lack of sweating, tendency to gain weight, tendency towards constipation.
- *Symptoms of Overactive Thyroid Activity Include:* Excessive sweating, hyperactivity, irritability, nervousness, occasional tendency towards frequent bowel movements or diarrhea during times of stress, oily hair and skin.

Sodium/Magnesium (Na/Mg) Ratio:
- Normal ratio is 4.17:1
- Referred to as the adrenal ratio because sodium levels are directly associated with adrenal gland function. Aldosterone, a mineral corticoid adrenal hormone, regulates retention of sodium in the body. In general, the higher the sodium level, the higher the aldosterone level.
- The sodium/magnesium ratio is also a measure of energy output, because the adrenal glands are a major regulator (along with the thyroid gland) of the rate of metabolism.
- The sodium/magnesium ratio is a tissue reading and will often not match blood tests for adrenal hormones. Usually the blood tests will be normal, but the tissue mineral test will show abnormal adrenal function. Symptoms, however, usually correlate well with the hair analysis.
- *Symptoms often associated with Underactive Adrenal Glands Include*: Allergies, depression, fatigue or diminished stamina, hypoglycemia, poor digestion - diminished ability to tolerate fats and meat protein, weight fluctuations.
- *Symptoms often associated with Overactive Adrenal Glands Include:* Aggressiveness, impulsiveness, diabetes, hypertension, increased stamina and drive, tendency to inflammation and inflammatory reactions, type A personality.

Zinc/Copper (Zn/Cu) Ratio:
- Normal ratio is 8:1
- Using the zinc/copper ratio is a much more effective method of evaluating zinc and copper readings than considering either copper or zinc levels alone.
- A high zinc/copper ratio is indicative of a zinc dominance.
- *Symptoms often associated with a high zinc/copper ratio may include:* Atherosclerosis, female problems, hypercholesterolemia, skin problems.
- A low zinc/copper ratio is indicative of a copper dominance and a possible copper toxicity.
- *Symptoms often associated with a low zinc/copper ratio may include:* Allergies, asthma, headaches, immune deficiency, female problems, infections, insomnia, liver problems, skin problems (eczema, acne, hives, psoriasis, skin rashes), psychological problems, behavior problems, emotional instability.
- Severe copper toxicity - excessive breakdown, emotional instability, zinc deficiency problems such as impotence, slow healing, loss of taste, smell, appetite, and hair loss.

OXIDATION TYPES

Definition of Fast Oxidation:
Calcium/Potassium Ratio Less Than 4:1
and
Sodium/Magnesium Ratio Greater Than 4.17:1

Definition of Slow Oxidation:
Calcium/Potassium Ratio Greater Than 4:1
and
Sodium/Magnesium Ratio Less Than 4.17:1

Definition of Mixed Oxidation:
Calcium/Potassium Ratio Greater Than 4:1
and
Sodium/Magnesium Ratio Greater Than 4.17:1
or
Calcium/Potassium Ratio Less Than 4:1
and
Sodium/Magnesium Ratio Less Than 4.17:1

For more information on this topic go to www.arltma.com - Articles

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OXIDATION TYPES

Metabolic typing is a central concept in hair analysis interpretation and the science of nutritional balancing. The term 'oxidation types' originated with Dr. George Watson, PhD, a researcher at UCLA. He wrote a fascinating book entitled, *Nutrition and Your Mind*, and a second book entitled, *Personality Strength and Psychochemical Energy*. Dr. Watson discovered two metabolic types, first by using odor tests and later by using blood tests. He found that the blood pH of fast oxidizers was slightly more acidic than that of slow oxidizers.

He discovered that certain foods and nutrients benefited each metabolic type. He was able to correct the oxidation rate using diet and supplementary nutrients. This caused dramatic improvements in both his client's physical and emotional symptoms.

Dr. Paul C. Eck refined Dr. Watson's oxidation concepts. An important advance was to relate it to homeostatic states as defined by the stress theory of disease. *Fast oxidation correlates with an alarm stage of stress. Slow oxidation correlates with a resistance or exhaustion stage of stress.* Essentially, fast and slow oxidation are ways that the body responds to stress. The stress may be from within, such as nutrient deficiencies or fatigue. Stress may also arise from a multitude of external sources. Dr. Eck also began to use hair mineral analysis for assessing oxidation types. After considerable experimentation, he settled on two mineral ratios for this determination.

DEFINITIONS OF THE OXIDATION TYPE AND THE OXIDATION RATE

Fast oxidation is defined as a hair calcium/-potassium ratio less than 4 and a hair sodium/-magnesium ratio greater than 4.17. The lower the calcium/potassium ratio or the higher the sodium/-magnesium ratio, the faster the oxidation rate.

Slow oxidation is defined on a hair mineral analysis as a calcium/potassium ratio greater than 4 and a sodium/magnesium ratio less than 4.17. The higher the calcium/potassium ratio or the lower the sodium/-magnesium ratio, the slower the oxidation rate.

It is important to note that many factors can influence the hair mineral levels and ratios. These include the presence of excessive toxic metals, nutritional deficiencies, infections, illnesses or stress from any source. For this reason, the first few hair analyses may give only a superficial picture of the condition of body chemistry. After several months to more than a year of nutritional balancing, the hair mineral patterns often change dramatically.

FAST OXIDATION

Fast oxidation is characterized by excessive activity of the thyroid and adrenal glands. More adrenal activity and thus a higher level of aldosterone raises the hair or soft tissue sodium and potassium levels. This also results in lower tissue levels of calcium and magnesium due to increased solubility of calcium and magnesium. Blood mineral levels do not usually correspond to the levels of these minerals in the hair.

On a hair mineral analysis, the pattern of fast oxidation is one of lowered calcium and magnesium levels, along with elevated levels of sodium and potassium. Fast oxidizers also have significant *sympathetic nervous system tone.* This in part accounts for their increased adrenal and thyroid glandular activity, as sympathetic nervous activity stimulates the activity of these glands.

SLOW OXIDATION

In slow oxidation, the activity of the adrenal and thyroid glands decreases. The glands themselves and at times the sympathetic nervous system are both basically depleted of nutrients and do not function well. In part for this reason, slow oxidation is related to a *parasympathetic state of body chemistry* with less fight-or-flight activity. In almost all cases, the sympathetic nervous system is exhausted and the person moves into a parasympathetic state by default.

Slow oxidation, especially when the rate is very slow, is an *exhaustion stage of stress,* according to Dr.

[redacted]

Selye's stress theory of disease.

Tissue sodium correlates well with the activity of aldosterone, an adrenal hormone. *Thus, on a hair mineral analysis, slow oxidizers have low levels of sodium and potassium. Calcium and magnesium rise in the hair as the tissue sodium level decreases.* This occurs, in part, due to reduced solubility of calcium that results when the tissue sodium level is low.

Mixed Oxidation

Mixed oxidation is said to be present when the calcium/potassium ratio is greater than 4 and the sodium/magnesium ratio is greater than 4.17. Alternatively, the calcium/potassium ratio may be less than 4 and the sodium/magnesium ratio less than 4.17.

We use the terms *fast-mixed* oxidation when the key ratios tend more toward fast oxidation. When they tend more toward slow oxidation, we call it *slow-mixed oxidation.* Mixed oxidation is a temporary state that will change to fast or slow oxidation when one follows a nutritional balancing program.

Symptoms Of Fast Oxidation

True fast oxidizers tend to be anxious, irritable and aggressive if their oxidation rate is very fast. Their blood sugar and blood pressure tend to be on the high side of normal. They are often warm and sweat easily. They usually have oily skin, and a tendency for frequent or loose bowel movements. They may gain weight in the area of the abdomen due to high levels of cortisol and cortisone.

Most people whose hair analysis indicates fast oxidation, however, are not true fast oxidizers. Instead, they are what we call *tired or temporary fast oxidizers,* or *slow oxidizers under stress.* Hair analysis indicators for this condition are:

- A sodium/potassium ratio less than about 2, OR at times when the ratio is greater than about 10.
- A hair calcium level greater than about 40 mg%, OR a magnesium level greater than about 6 mg%.
- A four-low-electrolyte pattern with calcium less than about 40 mg%, magnesium less than about 6 mg%, sodium less than about 25 mg% and potassium less than about 10 mg%.

Symptoms Of Slow And Mixed Oxidation

Slow oxidizers often suffer from fatigue, sweet cravings and low blood sugar. As their oxidation rate slows further, they often become apathetic and depressed. Their blood pressure and blood sugar may be low unless arteriosclerosis or diabetes have set in. Their skin and hair are often dry and their hair may become brittle or thin. Many experience constipation and other symptoms associated with reduced adrenal and thyroid glandular activity. Slow oxidizers may gain weight on the hips and the legs due to their metabolic imbalances.

Mixed oxidizers often display a mixture of symptoms of both fast and slow oxidation. One may need to wait until the mixed oxidation pattern resolves into slow or fast oxidation to gain a clear picture of underlying metabolic patterns.

For more information on this topic go to www.arltma.com - Newsletters

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Foods That Should Be Eliminated, or Avoided When Possible

Read All Labels On Processed Foods

Alcohol
Applesauce
Apple butter
Cakes
Candy
Canned Foods w/Sugar
Chewing Gum
Chocolate
Cookies
Cool Whip
Corn Sweetener
Cough Lozenges/Syrup
Cranberry Sauce
Deli Cole Slaw
Dextrose
Eggnog
Fruits
Fruit Juices
Glucose
Honey
Honey Roasted Peanuts
Ice Cream
Jams and Jellies
Jello
Juice Concentrate
Karo Syrup
Ketchup
Maple Syrup
Meat Fillers
Milk
Molasses
Pastries
Peanut Butter (Commercial)
Pop Tarts
Potato Salad
Processed Meats
Relish
Salad Dressings
Sherbet
Soda Pop
Sorbitol
Soup (containing sugar)
Steak Sauce
Sucrose
Sugared Cereals
Sweet Pickles
Sweetened Yogurt

Additional Food Information Which May Be Helpful

Choose Organic Foods When Possible

Acceptable Complex Carbohydrates

Barley
Buckwheat
Oats
Organic Blue or Yellow Corn/ (Including chips and corn tortillas)
Quinoa
Rice (Preferably organic brown rice)
Rye

Complex Carbohydrates To Be Avoided

Corn Starch
Flour Tortillas
Grits
Most White Rice, Except Basmati Rice
White or Wheat Flour

Acceptable Protein Type Foods

Beans
Brewer's Yeast
Eggs
Fish
Natural Peanut Butter
Nuts and Seeds
Poultry
Protein Drinks [Low Sugar]
Red Meats
Wheat Germ

Protein Foods To Be Avoided

Processed Cheese
Processed Meats
Raw Wheat Germ is usually rancid

Fats and Oils To Be Avoided

Commercial Peanut Butter
Cool-Whip
Margarine
Redi-Whip

Acceptable Fats And Oils

Avocado
Butter
Cream
Meats

Acceptable Fats And Oils - Continued

Nuts and Seed Butters, Nuts and Seeds
Olive Oil
Sour Cream
Unrefined Vegetable Oil

[redacted]

Calcium/Magnesium Ratio

Normal And Abnormal Ratios

The ideal Ca/Mg ratio in an unwashed sample of hair is about 6.67:1. Generally, a Ca/Mg ratio lower than 4.5 or greater than 8.5 is indicative of a sensitivity to sugars and simple carbohydrates. Between 10:1 and 12:1, or 3:1 and 3.3:1 are considered hypoglycemic ranges. Over 12:1 and less than 3:1 are considered a severe sugar and simple carbohydrate sensitivity range. Washing the hair at the laboratory can skew the Ca/Mg ratio and render it less reliable.

Ratios greater than 10:1 or less than 3:1 also indicate a tendency for calcium precipitation in the tissues. This can cause bone spurs, arthritic changes, arterial calcification and calcium stone formation in the kidneys or gall bladder. Magnesium is required to keep calcium in solution. When the ratio is imbalanced, it may reflect a relative magnesium deficiency.

Highly imbalanced ratios - above 12:1 and less than 3:1 - often indicate emotional difficulties.

But I Don't Eat Carbohydrates

An imbalanced Ca/Mg ratio may often indicate excessive carbohydrates in the diet. All foods contain carbohydrates. However, carbohydrate-rich foods are grains, pasta, bread, potatoes, beans, carrots, peas, corn, fruit, sweets and sugars such as fructose, dextrose, malt sweeteners, honey and maple syrup. At times, patients tell us they are not eating any of these foods, yet their Ca/Mg ratio is unbalanced. There are several explanations.

Many people are not aware or truthful about the amount of carbohydrates they consume. Carbohydrates may be hidden in many foods, especially prepared and packaged foods. Many, many items have added sugar, cornstarch, barley malt, flour, fructose and other starches or sugars. Also, remember the starchy vegetables - potatoes, carrots, beets, turnips, rutabaga, winter squash, corn, beans and peas. Although they are superior to eating sugar because they contain more fiber, vitamins and minerals, one can still overeat on them. Fruits, fruit juices, wine, beer, mixed drinks and soft drinks may be very high in carbohydrates.

If you have thoroughly ruled out excessive dietary carbohydrates, consider these other causes for an unbalanced Ca/Mg ratio.

Stress

Stress of any kind can affect the Ca/Mg ratio. This is most likely due to its affect on the adrenal glands and glucose metabolism. Stress can increase blood sugar through the action of cortisol, leading to reduced sugar tolerance. Nutritional depletion from stress, and sustained excessive cortisol and insulin secretion can cause increased insulin resistance.

Cortisol release increases osteoblastic activity that may lead to a higher tissue calcium level as calcium is released from the bones. Excessive calcium channel activity due to stress can cause a catabolic state, with increased cell death and release of magnesium from the cells.

An imbalanced Ca/Mg ratio may also be secondary to an imbalanced Na/K ratio. The latter is a blood sugar ratio related less to diet and more to the effects of stress on energy production.

The Ca/Mg and Na/K ratios may correlate because of a direct relationship between calcium and sodium, both extracellular elements and between magnesium and potassium, both intracellular elements.

Also, sodium and magnesium tend to be antagonistic, as do calcium and potassium. That is, one rises when the other falls. Dr. Louis Kervan found that sodium-magnesium is a common transmutation, perhaps affected by adrenal gland activity. Dr. Paul Eck found the Ca/K and Na/Mg ratios are better indicators of glandular activity than simply mineral levels.

When both Ca/Mg and Na/K ratios are low, it is referred to as a double inversion. It can reflect a more severe Na/K inversion, associated not only with carbohydrate intolerance, but also immune system weakness, protein catabolism, chronic emotional stress

and adrenal exhaustion.

Similarly, if the Ca/Mg and the Na/K ratios are elevated, the high Ca/Mg ratio may reflect a more severely elevated Na/K pattern, which is associated with acute stress, inflammation and related symptoms.

Emotional Stress

Emotional stress, even positive stress, can affect the Ca/Mg ratio. Perhaps it is because stress affects carbohydrate tolerance. Other factors may also contribute. For example, the *"calcium shell"* phenomenon is related to an excessively elevated calcium level. This has a numbing and protective effect in the face of stress. Usually the magnesium level also rises, but in some cases the Ca/Mg ratio may also be elevated.

Copper toxicity, often related to stress, also initially affects the calcium level. Once again, the Ca/Mg ratio is usually maintained, but may not be under some circumstances. Addressing emotional factors may be essential for balancing the Ca/Mg ratio.

Zinc, Taurine and Vitamin B_6

Deficiencies of zinc, taurine and vitamin B6 affect magnesium levels. These nutrients are synergistic with magnesium. High-carbohydrate diets deplete zinc and vitamin B6 and often lack taurine, which is found only in meats.

Deficiencies of these nutrients may cause a magnesium loss or biounavailability. Recall that a high level of any nutrient element on a hair analysis often indicates biounavailability, or loss of the element into the hair tissue.

Most diets are also low in magnesium. This is made worse by drinking a lot of milk, taking calcium supplements that do not contain magnesium, or eating refined-food diets. While calcium deficiency gets lots of press, magnesium deficiency also occurs commonly.

Toxic Metals and Contamination

Lead and other toxic metals in the body can skew a Ca/Mg ratio. Lead displaces calcium from the bones. Cadmium can also displace calcium. Toxic metals may or may not be revealed on the hair analysis, as they may be sequestered deep in body tissues. If not revealed on the test, they will often show up on future tests as body chemistry improves provided the patient follows a scientific program designed to balance body chemistry.

Handling Imbalanced Ca/Mg Ratios

Begin by reducing dietary carbohydrates, improving digestion and correcting the diet in accordance with the oxidation type. Supplementing with sufficient zinc, magnesium, vitamin B6 and taurine are helpful, along with supplements indicated by other hair analysis patterns.

Reducing stress may be very important. Severe stress can inhibit or even override any dietary or supplement program! Any time the Ca/Mg ratio is very imbalanced - greater than 15:1 or less than 2.5:1 - emotional stress is likely and important to address.

If a double inversion is present (low Ca/Mg and low Na/K), or adrenal exhaustion is suspected, the first priority for correction is the Na/K ratio. As this improves, often the Ca/Mg ratio will improve as well. The two ratios may alternate in their improvement over a period of months.

If toxic metals are affecting the ratio, the diet and supplement program can help mobilize these from storage, at which time the ratio will often improve.

For more information on this topic go to www.arltma.com - Articles

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HIGH SODIUM/POTASSIUM RATIO

A normal sodium/potassium ratio is between 2.5:1 and 4:1. Commonly, the sodium/potassium ratio is elevated on a hair analysis. A high ratio is associated with specific symptoms including acute stress, inflammation, zinc and/or magnesium deficiency and an aggressive personality.

ACUTE STRESS

A high sodium/potassium ratio on a hair analysis is an indicator of acute stress. The reason is as follows:

- Acute stress causes increased adrenal gland activity.
- This results in a rise in the secretion of the hormone ***aldosterone***.
- Aldosterone secretion causes sodium to be retained in the body by the kidneys. Thus the sodium level in the body tissues rises.

Sodium retention by aldosterone is part of the ***alarm reaction or fight-flight reaction*** to stress. Early in the alarm reaction, the potassium level remains low. Thus, on a tissue mineral test, the ratio of sodium/potassium is elevated. In contrast, a low sodium/potassium ratio indicates chronic stress and an exhaustion stage of stress.

What if a person has a high sodium/potassium ratio but is a slow oxidizer? Slow oxidation indicates an exhaustion stage of stress. However, ***within the exhaustion stage*** one can have an acute stress response indicated by a high sodium/potassium ratio. This is a common occurrence. A slow oxidizer with a low sodium/potassium ratio means a double exhaustion stage pattern, which is definitely less desirable.

INFLAMMATION

Aldosterone is a *pro-inflammatory* hormone because it tends to increase inflammation in the body. Cortisol and cortisone, associated more with potassium levels, are *anti-inflammatory* hormones because they diminish inflammation. The pro and anti-inflammatory hormones must be in a good balance with each other for optimum health.

A person with a high sodium/potassium ratio is secreting more aldosterone, in relation to cortisol. Because there is a greater amount of pro-inflammatory hormone, a *tendency for inflammation* exists in the body. This is particularly true when the sodium/potassium ratio is greater than 10:1.

Inflammation can take the form of any 'itis', such as arthritis, bursitis, colitis, or tendinitis. It is a tendency for aches and pains. A high sodium/potassium ratio also indicates a tendency for mental excitation. A ratio that persists between 3 and 6 suggests a forward-looking person. A ratio greater than 6:1 suggests aggressiveness and anger.

HIDDEN COPPER, MERCURY AND CADMIUM TOXICITY

A high sodium/potassium ratio may reflect hidden copper toxicity, especially in the slow oxidizer. This is because copper elevates sodium and depresses potassium readings. The copper may be present even if the hair copper level is low or normal. Hidden copper toxicity is certain if the potassium level is less than 4 mg%, or if the calcium level is over about 80 mg%.

Cadmium and mercury toxicity can also elevate sodium levels and can cause a high sodium/potassium ratio. This is true even if the cadmium or mercury are hidden within body tissues and not revealed on the hair test. As cadmium, copper or mercury are eliminated, a retest mineral analysis will reveal an improved sodium/potassium ratio.

An exception is if a retest is performed during a toxic metal elimination. The sodium/potassium ratio may temporarily rise as cadmium, for example, is being eliminated. This occurs because cadmium passes out of the body through the kidneys. As cadmium is eliminated, it may stress the kidneys slightly. This causes the sodium/potassium ratio to rise further. The ratio will normalize when the elimination

is complete.

Zinc And Magnesium Deficiency

A high sodium/potassium ratio often indicates a zinc and/or magnesium deficiency. Zinc lowers sodium and raises the potassium level. Zinc deficiency is very common today. Magnesium also has a lowering effect upon sodium, and is deficient in many diets today.

We recommend supplementing with zinc, or a product containing zinc, when the sodium/potassium ratio is elevated. Magnesium or calcium may also be very helpful to correct the ratio.

Salt-Eating And The Sodium/Potassium Ratio

Many people assume that a high sodium/potassium ratio indicates an excessive salt intake. While possibly true, in many instances salt eating has little impact upon the sodium/potassium ratio. A high ratio frequently occurs in people who consume no salt whatsoever! The main causes of a high sodium/-potassium ratio are excessive aldosterone secretion due to stress, or a zinc and magnesium deficiency. Salt-eating plays a secondary role.

We recommend restricting table salt in individuals with a high sodium/potassium ratio, especially if the blood pressure is elevated. However, it is not usually necessary to eliminate all salt from the diet. Also, sea salt is often tolerated better than table salt.

Kidney Stress And The Immune System

A very high sodium/potassium ratio may indicate kidney stress, and an imbalanced immune system. While a low sodium/potassium ratio is associated with a weak immune system, a high ratio may indicate autoimmune problems, or an overactive immune system. Rheumatoid arthritis and Hashimoto's thyroid-itis are examples of autoimmune diseases.

For more information on this topic go to www.arltma.com - Articles

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ADRENAL INSUFFICIENCY

WHAT IS ADRENAL INSUFFICIENCY?

Adrenal insufficiency refers to the inability of the adrenal glands to produce a normal quantity of hormones. It may also be defined as a reduced ability to cope with stress. It is one of the most common imbalances in our population today.

Adrenal insufficiency is not to be confused with Addison's disease. Addison's disease is more or less a total adrenal gland shutdown, or adrenal burnout. Adrenal burnout, low sodium/potassium ratio, is a more severe mineral imbalance which affects the energy-producing mechanisms of the body.

ABOUT THE ADRENAL GLANDS

The adrenal glands are often referred to as the stress glands or the fight-or-flight glands. The fight-or-flight response is mediated by the adrenal medulla. The fight-or-flight response is the way our bodies respond to stress.

The stress response is caused by the action of the adrenal hormones. Symptoms of adrenal insufficiency can be directly traced to a reduced secretion of these hormones when under stress. Adrenal hormones are divided into two groups, those produced in the adrenal medulla and those produced in the adrenal cortex.

Hormones produced in the medulla are epinephrine and norepinephrine. The hormones produced by the adrenal cortex are aldosterone, cortisol and cortisone. The cortical hormones have a slower, more prolonged action.

Aldosterone is called a mineralocorticoid hormone. Its primary function is to increase sodium retention by the kidneys. Aldosterone levels roughly correlate with *sodium* levels on a hair mineral analysis. Aldosterone is a pro-inflammatory hormone required to initiate a healing reaction.

Cortisol and cortisone are referred to as glucocorticoid hormones because they cause conversion of amino acids and glycogen to glucose. The corticosteroids are anti-inflammatory and provide a mild sense of euphoria. Cortisol levels roughly correspond to the *potassium* level on a hair mineral analysis.

A balance between aldosterone and cortisol, sodium and potassium, is necessary to maintain one's health. This balance is associated with the ratio of sodium to potassium on a hair analysis.

CAUSES OF ADRENAL INSUFFICIENCY

Genetics. Genetics can affect the adrenal glands. Also, genetic defects can be a cause of physical and emotional stress that can weaken the adrenal glands.

Congenital Weakness. Congenital means present at birth. However, it is not related to the genes. It is caused by nutritional deficiencies of the mother that are passed on to the child. It may also be caused by toxic metals or other toxins passed on from the mother's body that interfere with the functioning of the adrenal glands. This is a very common cause of adrenal insufficiency today.

Nutritional Imbalances. These can begin early in childhood with inadequate diets, diet inappropriate for one's oxidation type, poor food quality, or digestive problems that prevent proper nutrition. Even natural foods today often are low in vital minerals and do not provide adequate nutrition. Pesticides, heavy metals, bacteria, solvents and other organic chemicals can all act as stressors that weaken the adrenal glands.

Emotional or Psychological Stress. Responding to emotional stress over and over will eventually deplete the adrenal glands. A single overwhelming shock such as death of a loved one, can also deplete the adrenal glands. Emotional stress can begin in childhood, or at any time in life. It is actually the resistance or fear of a situation that causes the stress response.

Other possible stressors include pressures from family, school, work, social pressure, financial stress and others. People who force their bodies to "run or fight" all the time by any means will tend to exhaust their adrenal glands. The 'fight-or-flight' tendency must be balanced by adequate rest and sleep.

Stimulants. Most stimulants whip the adrenal glands. This may cause one to feel better for a while, but the long-term effect is to weaken the adrenal glands.

Stimulants include sugar, alcohol, caffeine, theobromine in chocolate, amphetamines and other medical drugs, cocaine, heroin and others.

Other types of stimulants can include loud noise, loud music, light stimulation, excessive exercise and excessive vibration. Anger, fear and worry can actually act as stimulants as well.

Note that stimulant use can be a result, as well as a cause of adrenal insufficiency. A person who is tired, due to weak adrenal glands, may be attracted to stimulants such as drugs, loud music, or anger to feel better temporarily.

Infections, Energetic and Structural Imbalances. These are all internal stressors that, if left uncorrected, can eventually weaken the adrenal glands by forcing the body to mount a chronic stress response to these irritants.

Toxic Substances. These may include chlorine in water, polluted air, mercury from dental fillings, household chemicals, food additives, pesticide exposure, dusts, molds and pollens. These often cause allergies that can be controlled with cortisone, the adrenal hormone.

Medical therapy, particularly cortisone or prednisone therapy, weakens the adrenal glands by creating hormone imbalances.

Mental Attitude. One's attitude makes a great difference in determining the stress response. Worry, fear, anger and resentment tend to increase the stress response. An attitude of gratitude, and compassion for oneself and others tends to diminish the stress response. Understanding the impermanence of the body and the world we live in, emotional detachment and detachment from all form, and a single-minded desire to extend love can greatly diminish the stress response.

Detection Of Adrenal Insufficiency

Hair Analysis

Hair mineral analysis is an excellent assessment tool for adrenal insufficiency when the test is properly performed. It is probably more reliable and sensitive than the blood or urine tests.

The hair must not be washed at the laboratory. This is because washing at the laboratory erratically removes sodium and potassium, critical minerals for adrenal assessment. According to the research of Dr. Paul Eck, the following are indicators of adrenal insufficiency on a hair analysis. The more of these indicators that are present, the greater the evidence of adrenal insufficiency. Also, the more extreme the values, the more suggestive of adrenal insufficiency problems.

- Sodium level less than 25 mg%
- Potassium level less than 10 mg%
- Sodium/potassium ratio less than 2.5:1
- Sodium/magnesium ratio less than 4.17:1
- Calcium/potassium ratio greater than 10:1

Correction Of Adrenal Insufficiency

- The only medical treatment for adrenal insufficiency is cortisone replacement therapy. Unfortunately, this therapy is accompanied by serious side effects. In our experience, the best approach involves:
- Nutritional assessment through tissue mineral analysis.
- A wholesome diet of natural foods appropriate for one's oxidation type and digestive ability.
- Nutritional supplements to reduce stress and enhance adrenal activity. The adrenal glands especially require vitamins A, C, E, pantothenic acid, manganese and zinc. Adrenal glandular substance is also recommended to provide adrenal nucleoprotein and other specific nutritional factors to help rebuild the adrenal glands.
- Supplements to enhance overall metabolism, eliminate toxic metals and enhance absorption and digestion of food.
- Lifestyle modification to reduce harmful stressors.

In mild cases of adrenal insufficiency, correction can be made in a matter of months. In more difficult or longstanding cases, complete correction may require several years. Persistence and patience are needed for optimal results.

For more information on this topic go to www.arltma.com - Articles

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MANGANESE

The information on this sheet is of a general nature and is for educational purposes only. It is in no way intended to reflect the findings in this report.

SOURCES OF MANGANESE

Meats - snails, egg yolk
Nuts/seeds - sunflower, coconuts, peanuts, pecans, walnuts, chestnuts, hazelnuts, almonds, brazil nuts
Fruits - blueberries, olives, avocados
Vegetables - corn, corn germ, parsley, legumes
Grains - wheat, wheat germ and bran, rice, barley, oats, buckwheat, rye
Miscellaneous - kelp, cloves, tea

ROLES IN THE BODY

- Energy Production, essential for
- Glucose tolerance levels, necessary for maintaining
- Tendons and ligaments, maintains integrity of
- Bone development, essential for

FUNCTIONS OF MANGANESE

Nervous system - synthesis of neurotransmitters
Reproductive system - fertility
Endocrine system - required for normal adrenal and thyroid gland activity
Skeletal - tendons, ligaments, connective tissue
Metabolic - energy production, glucose tolerance, utilization of fats and carbohydrates
Detoxification - involved in superoxide dismutase

SYMPTOMS ASSOCIATED WITH A MANGANESE DEFICIENCY

allergies
hypoglycemia
diabetes
myasthenia gravis
dizziness
ringing in the ears
fatigue
weakness, muscle
bone fractures or osteoporosis
weak ligaments and tendons

SYMPTOMS ASSOCIATED WITH A MANGANESE EXCESS

anorexia
neurological symptoms
ataxia
schizophrenia
iron deficiency

SYNERGETIC NUTRIENTS
zinc, choline, vitamin K

ANTAGONISTIC NUTRIENTS
Absorption - calcium, phosphorus, iron, soy protein
Metabolic - copper, magnesium, iron, vanadium

HAIR ANALYSIS NOTES
Manganese is called the maternal mineral because manganese-deficient animals cease to care for their young.

High Hair Manganese:
- may be due to manganese toxicity derived from drinking water containing excessively high levels of manganese.

Low Hair Manganese:
- low hair manganese levels are extremely common. However, if the manganese level is below .03 mg% it is considered very low.
- low manganese usually correlates with slow oxidation and low energy levels.

REASONS FOR MANGANESE SUPPLEMENTATION
- to raise low sodium levels
- to lower excessive iron, copper or other toxic metal levels
- to correct a low sodium/potassium ratio

[redacted]

CHROMIUM

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SOURCES OF CHROMIUM

Seafood - oysters
Meats - calves' liver, egg yolk
Nuts/seeds - peanuts
Fruit - grape juice
Dairy - American cheese
Grains - wheat and wheat germ
Miscellaneous - brewer's yeast, black pepper, molasses
Dental partials

ROLES IN THE BODY

- Glucose tolerance factor - chromium is involved in maintaining blood sugar levels and energy levels.
- Cholesterol regulation
- Other possible roles involved in the synthesis of DNA

FUNCTIONS OF CHROMIUM

Circulatory - serum cholesterol regulation
Digestive - sugar and carbohydrate utilization (via insulin)
Nervous - maintenance of nervous system by regulation of blood sugar
Eyes - corneal clarity
Muscular - supplies energy for muscular contraction
Skeletal - essential component of bones and hair
Protective - immune system (via insulin)
Metabolic - fat, protein, and carbohydrate metabolism regulation

SYMPTOMS ASSOCIATED WITH A CHROMIUM DEFICIENCY

atherosclerosis
depressed growth
diabetes
elevated serum cholesterol levels
fatigue
hypoglycemia

SYMPTOMS ASSOCIATED WITH A CHROMIUM EXCESS

asthma
allergies
calcium deficiency
causes an iron deficiency
diarrhea
kidney damages
sinusitis
ulcers
vomiting

SYNERGETIC NUTRIENTS

insulin, glucose, magnesium, vitamin B_6, zinc, manganese oxalates, salicylates

ANTAGONISTIC NUTRIENTS

Absorption - iron, manganese, zinc, vanadium, phytates
Metabolic - glucagon

HAIR ANALYSIS NOTES

High Hair Chromium:

- a high chromium level is often indicative of a loss of chromium through the hair, and is frequently caused by an iron toxicity or another mineral imbalance problem.

Low Hair Chromium:

- supplementing with chromium when the chromium reading is low, is frequently helpful in correcting symptoms of fatigue, or sugar and carbohydrate intolerance.
- excessive iron intake is a frequent cause of both high and low chromium levels.

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SELENIUM

SOURCES OF SELENIUM

Seafood - oysters, tuna, mackerel, herring, lobsters, scallops, shrimp, pike, trout, carp, cod, flounder, salmon
Meats - liver, kidney, heart, beef, lamb, egg, pork
Nuts/seeds - brazil nuts, cashews, peanuts, walnuts
Grains - wheat germ and bran, brown rice, barley
Miscellaneous - brewer's yeast

ROLES IN THE BODY

- At the molecular level selenium as a sulfhydryl agent, anti-oxidant (glutathione peroxidase), and as a synergist to vitamin E.
- At the cellular level selenium is involved in the destruction of peroxides, protection of cell membranes, as an electron transfer agent, and in glutathione metabolism.
- Selenium helps maintain the circulatory system, digestive organs, and reproductive system. It is also involved with heavy metal detoxification.

FUNCTIONS OF SELENIUM

Circulatory - needed for the heart muscle
Excretory - protection from toxic metals
Respiratory - involved in oxygen transport
Digestive - intestinal homeostasis
Nervous - protection from mercury and cadmium
Reproductive - protection against birth defects
Endocrine - synergistic with the sex hormones
Blood - stabilizes the red blood cell membranes
Integumentary - helps maintain hair, skin and nails
Immune - enhances immune system in animals
Metabolic - lipid and sulfhydryl metabolism; may prevent liver necrosis
Detoxification - helps remove mercury, cadmium, silver, arsenic and peroxides

POSSIBLE SYMPTOMS ASSOCIATED WITH SELENIUM DEFICIENCY

acanthocytosis
alcoholic liver failure
neonatal jaundice
toxic metal poisoning

POSSIBLE SYMPTOMS ASSOCIATED WITH EXCESSIVE SELENIUM

depression
dermatitis
gastrointestinal distress
liver damage
mottled teeth
nervousness
pallor
possibility of malignancy
selenosis

[redacted]

Nutrients That Are Synergistic With Selenium

Metabolic - vitamin C, vitamin E, glutathione
Absorption - amino acids, peptides, proteins

Antagonistic Nutrients

Metabolic - silver, arsenic, mercury, cadmium, titanium
Absorption - copper, mercury, silver, sulfate

Hair Analysis Notes

High Hair Selenium:

- can be due to the use of shampoos containing selenium
- may indicate a loss of selenium through the hair

Low Hair Selenium:

- may be due to dietary deficiency, which is relatively common, especially among those who eat refined foods

Reasons For Selenium Supplementation

Selenium may be given to help prevent or correct cadmium, mercury, or arsenic toxicity. Selenium is an anti-oxidant and may be given to help protect against free radical damage. Note that excessive selenium supplementation may be toxic.

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ALUMINUM

The information on this sheet is of a general nature and is for educational purposes only. It is in no way intended to reflect the findings in this report.

SOURCES OF ALUMINUM TOXICITY

- beverages from aluminum cans (soda pop and beer)
- food cooked in aluminum cookware
- use of aluminum-containing antacids
- use of anti-perspirants
- drinking water (aluminum is frequently added to municipal water)
- baking powders
- drying agents in salt and other products
- processed cheese
- bleached flour
- fluoridated water increases leaching of aluminum from aluminum pots and pans
- dental crowns and inlays

Today children are often born with elevated aluminum that is passed from mother to fetus through the placenta.

DETECTION OF ALUMINUM TOXICITY

There is debate whether blood testing for aluminum has much value. Blood levels definitely do not indicate total body load of aluminum.

Hair aluminum levels appear to correlate well with bone levels of aluminum. Several hair tests may be needed before aluminum is revealed on the test. This is because the aluminum may be tightly bound within body tissues, and several months on a nutrition program may be required to mobilize the aluminum.

HOW ALUMINUM AFFECTS HEALTH

Nervous System - in animal studies, aluminum blocks the action potential or electrical discharge of nerve cells, reducing nervous system activity. Aluminum also inhibits important enzymes in the brain (Na-K-ATPase and hexokinase). Aluminum may also inhibit uptake of important chemicals by nerve cells (dopamine, norepinephrine, and 5-hydroxytryptamine).

Behavioral Effects - dementia resulting from kidney dialysis related to aluminum toxicity causes memory loss, loss of coordination, confusion and disorientation.

Digestive System - aluminum reduces intestinal activity, and by doing so can cause colic.

POSSIBLE CONDITIONS ASSOCIATED WITH ALUMINUM TOXICITY

Early symptoms of aluminum toxicity include: flatulence, headaches, colic, dryness of skin and mucous membranes, tendency for colds, burning pain in head relieved by food, heartburn and an aversion to meat.

Later symptoms include paralytic muscular conditions, loss of memory and mental confusion.

OTHER POSSIBLE CONDITIONS ASSOCIATED WITH ALUMINUM TOXICITY

Alzheimer's disease
amyotrophic lateral sclerosis
anemia
hemolysis, leukocytosis, porphyria
colitis
dental cavities
dementia dialactica
hypoparathyroidism
kidney dysfunction
liver dysfunction
neuromuscular disorders
osteomalacia
Parkinson's disease
peptic ulcer

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PRESENTING SYMPTOMS

Allergies
Arthritis
Arthritis, Osteo
Arthritis, Rheumatoid
Back Problems
Dermatitis
Inflammation
Periodontal Disease
Psoriatic Arthritis
Tendinitis

[redacted]

Report Summary

- Your hair tissue mineral analysis indicates a significantly slow oxidation rate.
- Your hair tissue mineral analysis indicates your body is presently in the *resistance stage* of stress.
- Your hair tissue mineral analysis indicates a pattern of diminished cellular adrenal glandular activity.
- Your hair tissue mineral analysis indicates a cellular thyroid effect that is outside an optimal range.
- You currently exhibit a high sodium/potassium ratio.
- Your chart reveals low sodium and potassium levels which are associated with a degree of adrenal insufficiency, underactivity of the adrenal glands.
- Your hair tissue mineral analysis indicates an imbalanced glucose (sugar) metabolism as indicated by your elevated calcium/magnesium ratio.
- Your tissue mineral analysis indicates adequate protein synthesis at this time.
- Your hair tissue mineral analysis indicates adequate digestion at this time.
- Your hair tissue mineral analysis indicates your body is predominantly in a *parasympathetic state*.
- Your hair tissue mineral analysis suggests adequate immune system activity.
- Your hair tissue mineral analysis indicates a trend for liver and kidney stress at this time.
- Your hair tissue mineral analysis currently indicates the presence of an inflammatory tendency, as indicated by your;
  - elevated sodium/potassium ratio
  - low potassium level
- Your hair tissue mineral analysis indicates significantly decreased cell permeability at this time.
- Your calcium level is within an optimal range at this time.
- Your magnesium level is within an optimal range at this time.

- Your sodium level is below an optimal range at this time.
- Your potassium level is below an optimal range at this time.
- Your iron level is below an optimal range at this time.
- Your copper level is within an optimal range at this time.
- Your manganese level is below an optimal range at this time.
- Your zinc level is within an optimal range at this time.
- Your chromium level is below an optimal range at this time.
- Your selenium level is below an optimal range at this time.
- Your phosphorus level is within an optimal range at this time.
- Your hair analysis reveals a presence of aluminum in the tissues at this time.