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SAMPLE

HAIR TISSUE MINERAL ANALYSIS RETEST

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Information in this report is intended for informational purposes only. It is not intended as a diagnosis, treatment or prescription for any health condition and is not a substitute for regular medical care.

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. Hair plays many important health related roles within the human body. It is an excellent biopsy material and reveals a clear record of mineral levels. Hair, contains minerals that are deposited as the hair grows. Although the hair continues to grow. The minerals and toxic metals are locked in the hair. The body uses it for the storage and elimination of minerals.

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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 can also identify mineral contamination with toxic metals in the soil, plants and human food.

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Screening tests (like all tests) do not diagnose. In conjunction with other laboratory tests, medical histories and physical examinations, the health care professional in identifying nutritional and toxic elements. The contents of this analysis are not intended to be diagnostic.

UNDERSTANDING YOUR RETEST 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. It is difficult for the laboratory to make a determination as to who is responsible for the results. Generally, the laboratory assumes no responsibility for results from an individual.

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- Test results - The ideal value for each mineral is printed directly above the name of each mineral. The black red line indicates 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. automatically retests any mineral if not enough hair is available for the test.
- Test results were obtained using procedures in a clinical laboratory environment with government regulatory oversight of the Department of Health and Human Services under the Clinical Laboratory Improvement Amendment (CLIA).

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WHAT YOUR RETESTS REPRESENTS

The process of correcting body chemistry is somewhat like peeling off old layers of wallpaper so that the walls can be seen. The top layer of wallpaper shows the mineral analysis corresponds to the current state, after following a nutritional rebalancing program for several weeks. The next layer, after the removal of the top layer of mineral patterns beneath. You can see the patterns that are now coming into view.

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newly exposed mineral patterns that are now coming into view.

Reasons Why Interpretation of Retests is Complex

Many types of changes in your chemistry may have occurred since your initial hair mineral analysis. These changes may include:

Retention of a Mineral. The body may have an increased requirement of that mineral. When this occurs, the level of that mineral will decline on the retest.

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for varying reasons, such as an increased requirement of that mineral. When this occurs, the level of that mineral will decline on the retest.

Excretion of a Mineral. The mineral is eliminated first into the blood, from which it goes to the liver, kidneys and hair to be excreted.

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Mobilization of a Mineral. A mineral may move out of tissue storage, into other areas of the body where it is needed. It is in this way that a mineral is thus made 'bio-available', or available for use.

Mineral Compensation. As minerals are retained, incorporated, excreted and mobilized, other minerals will balance and compensate for these changes in order to maintain critical mineral levels and ratios.

Mineral Replacement. A mineral may be replaced by a more desirable mineral for that site.

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may be replaced by a more desirable mineral for that site.

Test mineral values generally go down, or diminish, during replacement or compensation.

Test mineral values generally go down, or diminish, during replacement or compensation.

The reason for the complexity of the interpretation of the retest is that all these phenomena are occurring simultaneously in your body.

WHY CHANGES MAY NOT CORRELATE WITH THE WAY ONE FEELS

At times, a retest hair mineral analysis shows significantly better, or perhaps worse. On other occasions, the test results are the same.

To understand this phenomenon, one must consider: 1) deep metabolic changes, 2) the body's response to these changes, and 3) the accumulation of minerals in the hair tissue.

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To understand this phenomenon, one must consider: 1) deep metabolic changes, 2) the body's response to these changes, and 3) the accumulation of minerals in the hair tissue.

Symptoms Improve, Yet The Retest Changes Very Little

The main reason one occasionally sees little change on a hair test when symptoms improve is that symptomatic improvement may occur first, while deeper metabolic changes take longer to occur. Since the hair tissue mineral

analysis reveals the deeper patterns, one must wait, perhaps six months or more for the deeper changes to be revealed on a tissue mineral analysis. In other words, there is a lag between the symptomatic change and the deep correction of body chemistry.

Another possibility is that a patient with a chronic condition or other type of imbalance may feel better, not necessarily mean that deep correction has occurred. Underlying biochemical patterns may remain the same, even with other symptomatic approaches to health care. It can also occur with nutrient therapy.

A hair tissue mineral analysis provides an insight to the way the body is responding to stress. The test is a metabolic blueprint of a homeostatic state or stress response. It is possible to have symptomatic change, yet the basic way in which the body responds to stress may remain the same.

Symptoms Remain The Same, Yet The Retest Shows Improvement

Occasionally a retest mineral analysis shows improvement, yet one feels the same. One reason this occurs is that at times a hair tissue mineral analysis is acting like an early warning system. Symptoms will follow.

A related reason is that with a hair tissue mineral analysis corrects the most important imbalances first. The most important imbalances are corrected, yet symptomatic concerns, however. Therefore, one may not feel better immediately even though positive change is occurring. Some understanding of the correction process is required in order to continue with the program in spite of little apparent symptom change.

For example, often the first imbalance to be corrected is a latent and perhaps serious health condition. These conditions usually have no obvious symptoms and one is unaware of the developing pathology.

Since there are no obvious symptoms of pathology, one is also often not aware of the correction of the latent pathology either. Therefore, one may not feel better immediately even though positive change is occurring. Some understanding of the correction process is required in order to continue with the program in spite of little apparent symptom change. In fact an important healing process is occurring, yet one may not feel better immediately even though positive change is occurring. Some understanding of the correction process is required in order to continue with the program in spite of little apparent symptom change.

For instance, a tissue mineral retest may show improvement, yet one feels the same. One reason this occurs is that at times a hair tissue mineral analysis is acting like an early warning system. Symptoms will follow. A related reason is that with a hair tissue mineral analysis corrects the most important imbalances first. The most important imbalances are corrected, yet symptomatic concerns, however. Therefore, one may not feel better immediately even though positive change is occurring. Some understanding of the correction process is required in order to continue with the program in spite of little apparent symptom change.

Meanwhile, one's more 'pressing' symptoms may not change. In reality, these may be much less important, however, than the elimination of a toxic metal and will be dealt with later.

Symptoms Improve, Yet The Retest Looks Worse

This occurs often on a hair tissue mineral analysis. The main reason is that imbalances in body chemistry are unwound or uncovered layer by layer. A hair tissue mineral analysis reveals hidden toxic metals and other imbalances. However, a deeper

This is not a cause for alarm due to the fact that the body is compensating and adapting to the deeper imbalances. Usually one feels better as these are uncovered. Adaptive energy is being used to adapt to the deeper imbalances. Usually one feels better as these are uncovered. Adaptive energy is being used to adapt to the deeper imbalances. Usually one feels better as these are uncovered. Adaptive energy is being used to adapt to the deeper imbalances.

In those following a nutritional balancing program, blood, urine and other tests may also be skewed temporarily as the unwinding of layers of adaptations proceed. One simply addresses the imbalances that are present without placing too much emphasis on the seemingly worsened appearance of the mineral or other test.

Symptoms Are Worse, Yet The Retest Shows Improvement

The most common reason a retest reveals improvement when one feels worse is due to a healing reaction or

retracing reaction. This may be a temporary flare-up of an old infection or due to the removal of a toxic substance. A healing reaction may also be a condition that causes a temporary flare-up of an old infection or due to the removal of a toxic substance. The healing of some other previous condition that causes a temporary flare-up of an old infection or due to the removal of a toxic substance.

Many people are very out of touch with the severity of their biochemical imbalances. They are not in touch with the severity of their symptoms. As body chemistry is used to ignoring or minimizing their symptoms. As body chemistry is in touch with one's condition and this may be perceived as feeling worse. For example, giving up coffee, soda pop or sugar can cause one's true fatigue condition to become apparent. One may feel worse for a while although in fact their health is improving.

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Emotional Changes

Mental and emotional changes that accompany an improvement in body chemistry can also cause annoying symptoms at times. These may include increased emotional sensitivity. This can lead to temporary symptoms of anxiety or irritability.

Also, changes in the oxidation rate can be uncomfortable. For example, many slow oxidizers feel anxious when they are "too relaxed" when their oxidation rate is improved.

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IMPORTANT CHANGES IN YOUR BIOCHEMICAL PROFILE

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 a metabolic pattern is the science of mineral balancing. is almost always aimed at improving mineral balance. A general rule is that metabolic patterns are the most important. A hair tissue mineral analysis, followed by mineral ratios and mineral balances in the body.

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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.* To bring a person to optimal energy levels, mineral rebalancing programs. This slightly slow, or slightly fast oxidation rate is controlled, constant release of usable energy from the foods they eat.

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Slow Oxidation

A slow oxidizer is an individual who burns 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 characterized by excessive activity of the adrenal and thyroid glands, excessive degree of anxiety, irritability, elevated blood sugar levels, elevated blood pressure, and frequent bowel movements.

Mixed Oxidation

A mixed oxidizer is an individual who is 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 oxidation or metabolic rate has increased from slow oxidation to fast oxidation. This indicates increased adrenal and thyroid function. This may be a result of increased energy production, or may occur temporarily as a result of increased physical or emotional stress.

As a fast oxidizer, the most important

- ▶ Eat at least one high fat-containing food with every meal. Choose from dairy fats (whole milk, cheese, cream, butter), nut and seed butters, avocados and fatty meats (pork, lamb, duck, beef).
- ▶ Eat moderate amounts of protein, including organ meats, dairy products, shellfish and the small fish such as herring, sardines, anchovies.
- ▶ Reduce carbohydrates (starches and sugars, even fruit sugars) to a minimum, for maximum metabolism. Also, whole wheat, whole rye and oats, unless sprouted, are high in phytates. Phytates interfere with calcium, magnesium and zinc absorption. Grains have a long tendency to be 'allergic' to these grains.

The above recommendations are for a fast oxidizer. If you are a mixed oxidizer and desire to obtain a more personalized diet, we recommend that you consult with a professional.

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 can be used for a useful purpose by driving us to lead more productive and creative lives. However, stress, such as worries, job-related pressures, family issues, etc., will have a negative effect on the body. It can deplete the body of essential energy producing trace minerals and vitamins. Without these, the body's ability to cope with stress decreases and a cycle of declining health and energy is created. This can lead to 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 symptoms. Understanding the stage of stress can assist in guiding its correction and return to a more healthy and higher energy stage.

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Alarm Stage

The alarm stage of stress is called the *fight or flight* response. 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 when the body attempts to contain the stress after the initial alarm stage. This stage of stress is characterized by the body attempting to contain the stress as it's unable to eliminate it. The body is in a holding pattern to limit or minimize the stress. This stage can last for a long period of time in an effort to resist stress, though less than the alarm stage.

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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 thinning hair. The body is unable to maintain optimal thyroid activity. This is the most common stage of stress.

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- Your hair tissue mineral analysis shows:
- Your previous hair tissue mineral analysis was in the exhaustion stage of stress.

Exhaustion 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 are responsible for providing extra energy when needed. If both of these glands are underactive, an individual will have a lowered rate of metabolism and normally will experience a lack of energy. If the adrenal and thyroid glands are overactive, an individual will generate an abundance of energy, but only for limited amounts of time. If the glands are inactive 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.

→ Your hair tissue mineral analysis resulting in a breakdown in the energy one can recover from fatigue with rest. This may be due to chronic stress, toxic metals, nutrient deficiencies, or other stress related factors. Adrenal burnout may contribute to symptoms of fatigue, exhaustion, depression, mood swings and PMS or menopausal symptoms in women.

Adrenal burnout may also contribute greatly to the accumulation of heavy metals as normal detoxification mechanisms become impaired. The body may be retaining excessive amounts of copper, iron, manganese, aluminum and other toxic metals.

→ Your hair tissue mineral analysis may contribute to irritability, hyperactivity, reactive hypoglycemia, high blood pressure, paranoia, excessive hunger,

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SPECIAL METABOLIC PATTERNS

Low Sodium/Potassium (Na/K) (Inversion) Ratio

A sodium/potassium inversion is the single most important imbalance on a hair tissue mineral analysis. This indicates a reduced vitality and impaired metabolism. Sodium is an extracellular element while potassium belongs inside the cell. As cells are destroyed, potassium leaks into the interstitial spaces.

This low ratio is often associated with impaired sugar and carbohydrate tolerance. The body is unable to tolerate sugars and may begin to cannibalize body proteins. This is not only inefficient, but may lead to catabolism.

Tissue breakdown, or catabolism, is a common finding in individuals exhibiting a low sodium/potassium ratio. A low sodium/potassium ratio often results in an inability to properly digest and utilize foods consumed thus resulting in the body breaking down storage tissues (protein) in an effort to maintain adequate energy levels and a state of equilibrium of the metabolic process (homeostasis). In other words, body proteins are broken down into amino acids for conversion into sugars in order to produce energy. Enhancing your ability to properly metabolize sugars and simple carbohydrates is beneficial.

The pattern is also associated with impaired digestion. Balancing this ratio is a major focus of your recommendation program.

→ Your sodium/potassium ratio is low. If you are currently exhibiting a low sodium/potassium ratio. Inasmuch as you are currently exhibiting a low sodium/potassium ratio, you should include a protein food with each meal at this time.

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*,

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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 hormones secreted by the adrenal cortex are aldosterone and cortisol. A balance between these hormones is essential for one's health.

→ Particularly beneficial is a diet that maintains a balance between sodium and potassium levels.

indicated by the increase in both your

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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 intolerance, diabetes, obesity, infections, fatigue, depression and others. Excessive carbohydrate intake can also lead to an imbalance between calcium and magnesium. (3,7,11,15,18,33,37)

Inasmuch as the release of calcium from bone is regulated by magnesium, the proper ratio of calcium to magnesium is critical to one's ability to properly metabolize sugars and simple carbohydrates.

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The adrenal glands also play a major role in regulating carbohydrate metabolism in the body. A low sodium/potassium ratio is indicative of excessive glucocorticoid production. Potassium reflects glucocorticoid levels (regulates glucose metabolism), while sodium reflects mineralocorticoid levels (regulates salt and water balance). When the mineralocorticoid hormones get out of balance with the glucocorticoid hormones, an individual can also develop a sensitivity to the ingestion of sugars and simple carbohydrates.

Simply stated, one's inability to properly metabolize sugars and simple carbohydrates is often a result of a low sodium/potassium ratio. Being that a high potassium level relative to sodium is a stress-raising hormone, a stress-induced sensitivity to the ingestion of

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→ Although your calcium/magnesium ratio is still exhibiting mineral patterns commonly associated with an imbalanced glucose (sugar) metabolism, namely a high calcium/magnesium ratio and a low sodium/potassium ratio. Both of these mineral patterns are associated with a sensitivity to the ingestion of sugars, starches and simple carbohydrates at this time, due in part to acute stress, whether it be internal or external.

Protein Synthesis

Adequate protein synthesis requires proper digestion, absorption and utilization of protein consumed in the diet and by the body tissues. This requires proper digestion, absorption and utilization of protein consumed in the diet and by the body tissues. This requires proper digestion, absorption and utilization of protein consumed in the diet and by the body tissues. This requires proper digestion, absorption and utilization of protein consumed in the diet and by the body tissues.

- An elevated 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.

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→ Your tissue mineral analysis indicates impaired protein synthesis at this time as indicated by your low phosphorus level and your low zinc level.

→ Since a low sodium/potassium ratio indicates an individual's capability in utilizing protein, your low sodium/potassium ratio indicates impaired protein synthesis at this time.

Digestion

Excellent digestion is a key to improving the body with needed nutrients. Additionally, improperly digested food can remain 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 pepsin secretion.
- Extreme fast oxidation pattern is indicative of a person under stress. This can result in poor digestion.
- Zinc is required for all digestive enzymes, for the production of tissue, and for the production of hydrochloric acid.
- 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 impaired digestion, due in part to your;

- low phosphorus level
- low sodium/potassium ratio
- low zinc level

NERVOUS SYSTEM PATTERNS

Autonomic State

The autonomic nervous system consists of the sympathetic and parasympathetic branches. The sympathetic branch enables the body to respond to stress, while the parasympathetic branch is associated with expending energy and maintaining a relaxed state. 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 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.

The sympathetic branch of the autonomic nervous system is associated with the nurturing and regeneration of the body, the elimination of toxins. This branch requires that one spend sufficient time in a relaxed state and rebuilding of the body. (20,52) One is in a more sympathetic state when physically or mentally active.

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, with a low degree of healing and regeneration. A high percentage of slow oxidizers, where the balance between the sympathetic and parasympathetic branches is off, cannot perform all the necessary functions of daily life and at the same time produce the necessary energy.

Dr. Melvin Page, DDS studied the relationship of the mineral balance in serum and its relationship to the balance between the sympathetic and parasympathetic nervous systems. (a) The mineral balance between calcium and phosphorus reflects an average autonomic state over the past several months.

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→ 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 exposures, chronic stress, or resentments.

- ▶ To balance the autonomic nervous system, it is important not to push yourself or work too hard as the body's energy is depleted.

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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 integrity of the skin and mucus membranes, antioxidant nutrients and the autonomic nervous system. A hair tissue mineral analysis often reflects the overall condition of the immune system.

- A low sodium/potassium ratio indicates a weak immune system, due to one's inability to adequately synthesize protein.
- A very high sodium/potassium ratio indicates a balanced 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 immune system can have a depressive effect upon the thymus gland, thus impairing immune system function.
- A copper imbalance often impairs the immune system. Copper is required for energy production within the cells and mobility of the normal infection-fighting mechanism of the body. The body's energy is depleted.
- 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.

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→ Your hair tissue mineral analysis suggests an impaired immune system that may limit the body's ability to remain in a healthy state, due in part to your;

- ▶ low sodium/potassium ratio
- ▶ zinc deficiency, or loss
- ▶ copper imbalance

Liver and Kidney Stress

The liver is the largest gland in the body. Some of the functions performed by the liver include the storage of vitamins and minerals and the metabolism of cholesterol and other substances.

The main function of the kidneys is to filter waste from the blood. They are also involved with the regulation of blood pressure and electrolyte balance.

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

Inflammation

Inflammation is the body's normal response to 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.

Certain indicators on a hair tissue mineral analysis can indicate an inflammatory response in the body.

- An elevated 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, as indicated by high sodium levels, can be the source of stress, emotional conflicts, etc.
- A low potassium level represents a deficiency 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, due in part to your;
- low sodium/potassium ratio

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Cell Permeability

Cell permeability refers to the ability of substances to pass through 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 remains in an optimal range.

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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.

Optimal Calcium Level

For clinical assessment however, it is necessary to consider the presence of other minerals. Hidden toxic metals, pesticides, and drugs. For this reason, calcium

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- Your calcium level remains in an optimal range.

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 majority of the chemical reactions in the body. It is a primary mineral for over 600 vital enzymatic

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Low Magnesium Level

A low magnesium level on a hair tissue mineral analysis is often associated with a fast oxidation rate. Excessive excretion of magnesium in the urine as part of an alarm stage.

- Your previously low magnesium level remains the same.

Sodium is an essential mineral for maintaining water balance and blood pressure in the body and is a primary extra-cellular element.

For clinical assessment however, toxic metals, nutrient deficiencies, and

Potassium

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

For clinical assessment however, toxic metals, nutrient deficiencies o

NUTRIENT MINERAL PATTERNS

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 represents bio-unavailable iron. This is often revealed in the hair at this time. Anemia, or lack of iron and often liver or other organs, but is not fatigue.

→ Your iron level is currently below an optimal range.

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

Low copper levels may contribute to [REDACTED] sodium and potassium levels, connective tissue problems and hormonal imbalances. Other symptoms may include anxiety, irritability, fatigue and allergies.

→ Your copper level remains low.

Manganese

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

Low Manganese Level

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

Sample

→ Your manganese level remains low.

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 health, and immune system.

Low Zinc Level

A low zinc level can be due to a diet low in zinc, consumption of sugars and simple carbohydrates, an acute stress response, or a deficiency of zinc, particularly copper.

Low zinc levels are often associated with mood swings, digestive disturbances, skin problems, vision problems, prostate problems in men and a reduced sense of taste and smell.

Low zinc levels may also be a compensatory effort by the body to help balance the sodium/potassium ratio.

→ Your zinc level, indicating a zinc deficiency, or loss, remains the same.

- A zinc deficiency, or loss, can lead to a decrease in the normal insulin activity inasmuch as zinc is required for the action of insulin. This, in turn, leads to an inability to metabolize sugars and simple carbohydrates at a normal rate.

Sample

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.

Low Chromium Level

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

→ Your chromium level remains low, and serves as an important factor in the development of a glucose imbalance in your glucose metabolism. Chromium is essential for insulin transport and a low chromium level may be contributing to the imbalance.

Sample

Selenium

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

→ Your selenium level remains low. This may be due to a dietary deficiency, especially among those who eat refined foods.

Phosphorus

Phosphorus is an essential mineral. All proteins contain phosphorus and its deficiency of phosphorus is often associated with a poor lifestyle, condition of the intestinal tract, and deficiency of copper.

Sample

energy production within the cells. The hair tissue mineral level of phosphorus is low. This depends on the diet, and the balance of other minerals such as zinc and

Low Phosphorus Level

A low hair tissue mineral phosphorus level indicates excessive protein catabolism, or tissue breakdown. This may be due to improper diet with a low protein intake, inadequate protein quality, impaired digestion, imbalanced intestinal flora, intestinal infections such as candida, giardia, or other parasitic infections. Other considerations that may play a role in a low phosphorus level are chronic stress, and chronic illness. These mineral imbalances can impair protein synthesis which can lead to tissue breakdown. Improper eating habits that interfere with digestion may also contribute to a low phosphorus level. Balancing the phosphorus level with dietary modifications, digestive support, and adequate protein synthesis is important for the regeneration of tissues.

Sample

energy production within the cells. The hair tissue mineral level of phosphorus is low. This depends on the diet, and the balance of other minerals such as zinc and

→ Your previously low phosphorus level remains the same.

TOXIC METALS AND CHEMICALS

The presence of toxic metals and chemicals in the environment is a serious problem today. A review of over 400 medical studies has shown that hair tissue mineral analysis is a meaningful test to detect the presence of toxic metals and chemicals in the body.

Toxic metals can cause hundreds of health conditions. There are no safe levels of toxic metals and reduction of exposure is the only safe 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 is a meaningful test to detect the presence of toxic metals and chemicals in the body. It can detect all toxic metals, as well as the presence of chemicals in the body.

Hair tissue mineral analysis only detects the presence of toxic metals, as some are hidden deep within other tissues or organs. The unique value of hair 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, supplements, lifestyle and

Sample

hazard. (1, 11, 12, 13, 14, 15, 16, 19, 22, 29, 31, 39, 51). The hair tissue mineral level of phosphorus is low. This depends on the diet, and the balance of other minerals such as zinc and

Sample

energy production within the cells. The hair tissue mineral level of phosphorus is low. This depends on the diet, and the balance of other minerals such as zinc 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 body.

When the body's energy is low, the body does not realize this is occurring. The body's chemistry can result in a rapid release of toxins from tissue storage. When this occurs, symptoms are usually transitory in nature.

Sample

are retained. Ordinarily a person does not realize this is occurring. The balancing of one's body chemistry can result in a rapid release of toxins from tissue storage. When this occurs, symptoms are usually transitory in nature.

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 foil used in cooking, aluminum cookware, and aluminum powder/baking soda and tea.

Aluminum is mainly stored in the brain. Aluminum toxicity may contribute to memory loss, dementia, fatigue,

Sample

→ Your retest still indicates a problem.

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. Pauling may often be associated with a trend. Metabolic trends are not necessarily indicate that such a trend is currently present. Metabolic trends continue as they are for a long time. Your hair tissue mineral analysis indicates tendencies for the following metabolic trends.

Sample

on a hair tissue mineral analysis. These mineral patterns as metabolic trends are not necessarily indicate that such a trend is currently present. Metabolic trends continue as they are for a long time. Your hair tissue mineral analysis indicates tendencies for the following metabolic trends.

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.

Fatigue

Fatigue is a loss of energy or the strength, stamina or endurance, in the body with a slow or slow-mixed oxidation.

Sample

ns may include reduced muscular response. Fatigue is often associated with a slow or slow-mixed oxidation.

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.

GENERAL INFORMATION

Balancing Body Chemistry

Balancing body chemistry requires the removal of toxic metals such as lead, cadmium, and mercury, and may not show up on your initial blood test. A complete body chemistry may require many months of treatment. In addition 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 fast and fast-mixed oxidizers, general dietary principles to follow are:
- Many fast oxidizers can tolerate fats and oils. Fats and oils are a source of high-energy nourishment, providing sustained energy which helps moderate fast oxidation. Fat-soluble vitamins, both of which are needed by the fast oxidizer.

Most fast oxidizers may include one of the following fat-containing foods with each meal:

- Nuts, seeds and nut butters
- Dairy fats: butter, cream, sour cream, or cheese
- Meats: lamb, duck, goose, beef
- Vegetable oils, mayonnaise, salad dressing
- Avocado, coconut

Note: Certain cardiovascular conditions require a low-fat intake.

- Moderate amounts of protein, which includes high-purine proteins: organ meats (liver, heart, etc.), salmon, tuna, mackerel, herrings and sardines. Shellfish and legumes are of moderate purine content.
- Reduce carbohydrates (starches and sugars, including fruit sugars) to a minimum. Also reduce whole wheat, rye and oats, unless they are sprouted. These grains are high in phytates which interfere with calcium, magnesium and zinc absorption. Fast oxidizers, therefore, have a strong tendency to be 'allergic' to these grains.
- Eat plenty of vegetables with at least one fruit per day.

Both the supplement and dietary program are essential for the success of your program. For a thorough explanation of the optimal diet plan - "An Eating Plan for Optimal Health" (Profile V), which is designed for particular biochemical imbalances. This dietary concept provides three types of diets 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 to help you find your way to the final and third stage "Optimal Diet". This allows you to feel comfortable with before moving on to the Optimal Diet. Our emphasis is on good eating habits and quality food selections.

Sample

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. Proper food combinations can favorably assist digestion.

Lifestyle

A healthy lifestyle will significantly aid in your progress. Your body chemistry will return to a balanced state. An unhealthy lifestyle will hinder your 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 often experience fatigue arising. This occurs because the adrenal glands are functioning poorly. In these instances, it may be preferable to take short naps or rest periods of 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 several weeks.

Exercise: Perform some type of exercise recommended at this time. Light walking, gardening are excellent forms of exercise. Continuous exercise is not necessary or recommended. Swimming, dancing, yoga, stretching or any other exercise should not 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.

Sample

Sample

Sample

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 **Sample** am twice, or even once per day,
- If for any reason it is necessary to take the supplement more than once per day, take the additional tablet per meal and 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.
- The program is designed to restore energy levels. If this occurs, you may find it difficult to conserve the newly found energy. 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 of the body's response to the program. Retracing is the process whereby the body attempts to heal itself completely. These may include symptoms which last 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 this process, one may experience symptoms such as a headache, fatigue, nausea, etc.

These reactions are normal and usually pass within a day or two. It is best to temporarily stop your nutritional supplementation 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 should be recommended and that a mineral whose level is high will be reduced as part of the program.

Retesting

Retests are recommended 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.

Sample

GLOSSARY OF TERMS

The following glossary of terms are important to the correct interpretation of the graph. Please take the time to review these items and refer to them as you interpret the graph.

Sample

- **Adaptation** - Adaptation is the body's response to stress. It is the body's way of adjusting to stress. Adaptation involves mineral and vitamin levels, body temperature, blood sugar, and the body's ability to balance nutrition. Adaptation is a natural process. 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 is low.

Sample

- **Compensation Principle** - The body will adapt to one another in order to maintain critical levels and balance.

- **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, viruses, and fungi.

Sample

- **Internal Stress** - Internal stressors are factors that arise from inside the body, which cause stress. Nutritional imbalances cause internal stress. This is hidden stress, which can cause both physical and mental health 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.

Sample

- **Mineral Excretion** - A pathologic loss of minerals through the hair can occur due to lack of a retaining factor. Excretion elevates the mineral level, as it removes the mineral, that had been retained.

- **Mineral Loss** - A pathologic 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 mineral ratios. Two. Slow and fast oxidation, for example, are mineral patterns.

- **Minerals-Antagonistic** - Minerals which are directly related. When the level of one mineral goes up, the level of the other mineral 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 of the body. The oxidation rate is closely related to the metabolic rate. The oxidation rate is a chemical reaction or metabolism in the body.

Fast Oxidation - The conversion 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 health of the body is a system. That is, all at once, for proper understanding. Trying to understand one part of the system, without 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.

- **Toxic Metals** - Lead, mercury, cadmium, etc. may be found in the body, but have no known necessary function.

- **Toxic Metal Elimination** - 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

BASIC RATIOS AND THEIR MEANING

INTRODUCTION

Balance in all phases of life is essential to maintain health and this principle is reflected in levels in hair analyses.

What is a mineral ratio? A mineral ratio is one mineral level divided by another.

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 mineral levels.
- Ratios represent *homeostasis*.
- Ratios are indicative of *diagnosis* 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 other factors.
- The following five (5) ratios are the most important for evaluation purposes:

THE BASIC MINERAL RATIOS

Calcium/Magnesium (Ca/Mg)

- 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 10:1) calcium/magnesium ratio is associated with mental or emotional problems.

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

potential of cells which is regulated by potassium levels

is normally extracellular, while potassium is intracellular. If the ratio of these minerals is off, it indicates important physiological imbalances 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 adrenal dysfunction, allergies, arthritis, inflammation, digestive problems, deficiency of vitamin C, and 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 4:1

is a thyroid ratio because calcium and potassium play a vital role in regulating thyroid function.

- 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 indicate a hyperthyroid ratio. For nutritional purposes, it is prudent to follow the hair analysis.

is a thyroid ratio because calcium and potassium play a vital role in regulating thyroid function.

and is one of the major glands which controls the 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 hair, fatigue, lack of sweating, weight gain, tendency towards constipation.
- *Symptoms of Overactive Thyroid* 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, sodium and magnesium levels are directly associated with adrenal function. Aldosterone, a mineralocorticoid hormone, regulates retention of sodium. 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 not always accurate as it will often not match blood levels due to fluctuations in hormones. Usually the blood test is accurate but the tissue mineral test is more accurate for adrenal function. Symptoms, however, 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, diabetes, hypertension, increased tendency to inflammation and allergic reactions, type A personality.

Zinc/Copper (Zn/Cu) Ratio:

- Normal ratio is 8:1

- Using the zinc/copper ratio is a much more effective way to determine zinc and copper readings than looking at copper or zinc levels alone.

A high zinc/copper ratio is indicative of a zinc deficiency.

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, female problems, infections, skin problems (eczema, psoriasis, skin rashes), psychological problems, emotional instability.

Symptoms often associated with a low zinc/copper ratio may include: Allergies, asthma, headaches, female problems, infections, skin problems (eczema, psoriasis, skin rashes), psychological problems, emotional instability.

Symptoms often associated with a low zinc/copper ratio may include: Allergies, asthma, headaches, female problems, infections, skin problems (eczema, psoriasis, skin rashes), psychological problems, emotional instability.

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

Sodium/Magnesium Ratio Less Than 4.17:1

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

OXIDATION TYPES

Metabolic typing is a central concept in hair analysis interpretation and the balancing of the diet and the rate.

analysis interpretation and the balancing. The term 'oxidation' was first used by Dr. George Watson, PhD, a biochemist who wrote a fascinating book entitled *Mind*, and a second book entitled *Strength and Psychochemistry*.

He 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 determined the oxidation rate using different nutrients. This caused dramatic changes in his client's physical and emotional state.

Dr. Paul C. Eck refined these 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 physical exertion, deficiencies or fatigue. Stress has a multitude of external sources. Dr. Eck uses hair mineral analysis for assessment of stress. After considerable experimentation, he determined 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 higher the calcium/potassium ratio or the lower the sodium/magnesium ratio, the faster the oxidation.

Slow oxidation is defined as a hair 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.

Sample

Sample

Sample

Sample

It is important to note that many factors can influence hair mineral levels and ratios. These include the presence of excessive toxic metals, deficiencies, infections, illnesses or stress. For this reason, the first few hair analyses 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 specifically, there is a higher level of aldosterone in the soft tissue sodium and potassium levels. This 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 and elevated levels of sodium and potassium. Fast oxidizers also have significant sympathetic system tone. This in part accounts for the increased adrenal and thyroid glandular activity. Sympathetic nervous activity stimulates the thyroid and adrenal 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 depleted of nutrients and do not function properly. For this reason, slow oxidation is related to a parasympathetic state of body chemistry with less 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.

Selye's stress theory of disease.

Tissue sodium correlates well with aldosterone, an adrenal hormone. *mineral analysis, slow oxidizers have a sodium and potassium. Calcium and in the hair as the tissue sodium level 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. Alternatively, the calcium/potassium ratio is greater than 4 and the sodium/magnesium ratio is greater than 4.

We use the terms *fast-mixed oxidation* and *slow-mixed oxidation*. *Fast-mixed oxidation* key ratios tend more toward fast oxidation. *Slow-mixed oxidation* 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 aggressive if their oxidation rate is fast. Their blood sugar and blood pressure tend to be on the high side of normal. They are often warm to the touch. They usually have oily skin, and 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 under stress*. Hair analysis criteria for fast oxidation are:

- A calcium/potassium ratio less than about 2, OR a calcium/magnesium ratio is greater than about 10.
- A 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%.

FAST AND MIXED OXIDATION
People in this category often suffer from fatigue, sweet tooth, and high 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 activity.

Slow oxidizers may experience numbness in the arms and the legs due to their slow oxidation rate. They often display a mixture of 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

visit our newsletters

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Report Summary

Sample

- Your oxidation or metabolic rate is fast, due to fast oxidation.
- Your hair tissue mineral analysis indicates a pattern of fast or fast-mixed oxidation with adrenal glandular burnout resulting in a breakdown in the energy producing systems of the body.
 - Your previous hair tissue mineral analysis was in the *exhaustion stage* of stress.
- Your hair tissue mineral analysis indicates a pattern of fast or fast-mixed oxidation with adrenal glandular burnout resulting in a breakdown in the energy producing systems of the body.
- Your hair tissue mineral analysis indicates a pattern of fast or fast-mixed oxidation with adrenal glandular burnout resulting in a breakdown in the energy producing systems of the body. Your thyroid is outside the optimal range.
- Your sodium/potassium ratio is low, indicating a low sodium/potassium ratio.
- Your adrenal activity has improved, as indicated by the increase in both your sodium and potassium levels.
- Although your calcium/magnesium ratio has favorably decreased, you are still exhibiting mineral patterns commonly associated with an imbalanced glucose (sugar) metabolism, namely a high calcium/magnesium ratio and a low sodium/potassium ratio.
- Your tissue mineral analysis indicates a pattern of fast or fast-mixed oxidation with adrenal glandular burnout resulting in a breakdown in the energy producing systems of the body. This is time as indicated by your low phosphorus level and your low sodium/potassium ratio.
- Since a low sodium/potassium ratio is contributing to an impaired protein synthesis at this time, your low sodium/potassium ratio is contributing to an impaired protein synthesis at this time.
- Your hair tissue mineral analysis indicates impaired digestion, due in part to your;
 - low phosphorus level
 - low sodium/potassium ratio
 - low zinc level
- Your hair tissue mineral analysis indicates a pattern of fast or fast-mixed oxidation with adrenal glandular burnout resulting in a breakdown in the energy producing systems of the body. You are in a *parasympathetic state*.
- Your hair tissue mineral analysis suggests an impaired immune system that may limit the body's ability to remain in a healthy state, due in part to your;
 - low sodium/potassium ratio
 - zinc deficiency, or loss

▸ copper imbalance

→ Your hair tissue mineral analysis indicates that your bloodwork is in the optimal range, at this time.

→ Your hair tissue mineral analysis indicates that your bloodwork is in the optimal range, due in part to your;
▸ low sodium/potassium ratio

→ Your hair tissue mineral analysis indicates that cell permeability is within an optimal range.

→ Your calcium level remains low.

→ Your previously low magnesium level remains low.

→ Your previously low sodium level is now in an optimal range.

→ Your previously low potassium level has increased and is now in an optimal range.

→ Your iron level is currently below an optimal range.

→ Your copper level remains low.

→ Your manganese level remains low.

→ Your zinc level, indicating

→ Your chromium level remains low.

→ Your selenium level remains low.

→ Your previously low phosphorus level remains the same.

→ Your retest still indicates a

Sample

Sample

Sample

Sample