

==== INTRODUCTION TO TISSUE MINERAL ANALYSIS ====

Hair is formed from clusters of matrix cells that make up the follicles. During the growth phase, the hair is exposed to the internal metabolic environment such as the circulating blood, lymph, and extracellular fluids. As the hair continues to grow and reaches the surface of the skin, its outer layers harden, locking in the metabolic products accumulated during this period of hair formation. This biological process provides us with a blueprint and lasting record of nutritional metabolic activity that has occurred during this time.

Determining the levels of the elements in the hair is a highly sophisticated analytical technique; when performed to exacting standards and interpreted correctly, it may be used as a screening aid for mineral deficiencies, excesses, and/or biochemical imbalances. Hair tissue mineral analysis (HTMA) provides the health professional with a sensitive indicator of the long-term effects of diet and toxic metal exposure.

THE LABORATORY TEST RESULTS AND THE COMPREHENSIVE REPORT THAT FOLLOWS SHOULD NOT BE CONSTRUED AS DIAGNOSTIC. THIS ANALYSIS IS PROVIDED ONLY AS AN ADDITIONAL SOURCE OF INFORMATION.

TEST RESULTS WERE OBTAINED BY A LICENSED CLINICAL LABORATORY ADHERING TO ANALYTICAL PROCEDURES THAT COMPLY WITH GOVERNMENTAL PROTOCOL AND STANDARDS ESTABLISHED BY TRACE ELEMENTS, INC., U.S.A.

==== METABOLIC TYPE ====

Neuro-endocrine activity affects mineral absorption, retention, and excretion; therefore, tissue mineral patterns reveal certain biochemical characteristics, which are termed metabolic types.

FAST METABOLISM

This dog is regarded as having an increased metabolic rate based upon current hair tissue mineral patterns. Increased sympathetic neurological activity, however, does not necessarily translate into high or optimum performance unless there is a synchronization of the endocrine glands. (See Endocrine and Performance Index's)

CHARACTERISTICS OF FAST METABOLIC TYPES

Generally speaking, a dog with a fast metabolic rate is high spirited and may be suited to athletic performance. However, if the metabolic rate is too excessive, the energy may be rapidly dissipated due to a nervous or high-strung nature. An excessive loss of energy can in turn result in energy swings, and therefore, poor long-term energy production and performance.

PERFORMANCE EVALUATION

The performance index reflects the domination of the thyroid gland over the adrenal glands. This is indicative of the tendency toward good endurance over longer distances, or for longer periods of time. However, as a result of thyroid dominance over the adrenals, speed, quickness and/or power over short periods of duration or distance may be negatively affected.

==== NUTRITIONAL MINERALS ====

This section of the report may discuss those nutritional mineral levels and/or mineral ratios that reveal moderate or significant deviations from normal. The light blue area's of the graph's mineral levels (front page) and mineral ratios (reverse page) represent the established reference ranges as determined from statistical analysis of healthy canines. However, as this HTMA is based upon clinical data and research, a mineral level or ratio that is moderately outside the reference range may not be commented on, unless determined to be clinically significant.

LOW TISSUE CALCIUM (Ca)

Tissue calcium is moderately depressed. This can be a normal physiological response to increased stress or workloads. A moderately low tissue calcium can be considered normal when the dog is dominant in sympathetic neuro-endocrine function.

CALCIUM/PHOSPHORUS RATIO WITHIN NORMAL RANGE

A normal calcium-to-phosphorus ratio is indicative of efficient energy production as well as efficient utilization of foods consumed.

MAGNESIUM (Mg)

Tissue magnesium is within the "acceptable" range. The metabolic utilization and function of magnesium, however, depends upon its relationship to calcium, sodium, potassium, and phosphorus. Even though the test results reveal an acceptable level of magnesium, a relative deficiency or excess may be present in relation to these minerals. These ratios (Ca/Mg, Na/Mg, Mg/K and Mg/P) are also very important in determining magnesium status.

MANGANESE (Mn)

Manganese is required for carbohydrate and lipid (fat) metabolism as well as skeletal development, formation, and reproduction. Studies have shown that in some species, tissue levels are affected by intake. Therefore, a low tissue manganese may indicate that adequate manganese in the diet should be maintained.

COPPER (Cu) EXCESS

Copper is classified as a sedative mineral. In excess, copper may decrease optimum performance, due to its suppressing effect upon endocrine activity, especially the thyroid gland which is responsible for sustained energy production. One of the most common sources of excessive copper intake is from water. Softened water can leach copper from copper water pipes, thereby increasing dietary intake and body burden.

LOW ZINC/COPPER (Zn/Cu) RATIO

Excessive copper intake and retention will contribute to a zinc deficiency. Increased zinc supplementation as well as a reduction in foods containing high levels of copper is recommended at this time.

REDUCE INTAKE OF DOG FOOD CONTAINING THE FOLLOWING LOW ZINC - HIGH COPPER INGREDIENTS

Mineral concentrations will vary according to soil content and fertilizing methods. The sources listed below represent a general guide in recognizing low zinc to high copper nutritional content. If the current food contains significant amounts of the following ingredients, it should be reduced or switched to another food that contains lesser amounts at this time:

Brewers Yeast
Liver Meal

Soybeans
Corn Gluten

ZINC (Zn)

Zinc is required for many enzyme functions, and is one of the minerals most sensitive to the effects of stress. Increased workload and other stressors, such as illness, will significantly increase zinc requirements. A deficiency of zinc can lead to:

Impaired Growth
Delayed Wound Healing
Infections
Weight Loss
Skin and Coat Changes

Loss of Appetite
Lowered Resistance
Decreased Sperm Motility
Reproductive Failure
Decreased Alertness

ZINC AVAILABILITY AND FOODS CONTAINING PHYTATES

Phytic acid found in cereal grains and soybeans will bind with zinc in the intestinal tract, decreasing its absorption and availability, thereby increasing zinc requirements. Zinc supplementation should be started or increased if there is a high intake of dog food containing high levels of these grains.

CHROMIUM (Cr) AND FAT METABOLISM

Chromium, which is involved in carbohydrate and lipid (fat) metabolism acts as a potentiator for the effects of insulin. In some animals, chromium supplementation has been shown to improve lipid metabolism by decreasing cholesterol levels and plaque formation in the aorta.

NOTE:

The first step in reducing toxic metal accumulation is to isolate and remove the source. Assessment of chemicals presently being used within the dog's environment and testing of the food and water supply are suggested.

==== CONCLUSION ====

This report provides a unique insight into the dog's nutritional biochemistry. The recommendations contained

within are specifically designed according to individual metabolic type and current mineral status. Additional recommendations may be based upon other supporting clinical data as determined by the attending veterinarian or trainer.

OBJECTIVE OF THE PROGRAM

The purpose of this program is to re-establish a normal balance of body chemistry through individually designed diet and supplement suggestions, enhancing the dog's ability to utilize the nutrients efficiently and resulting in improved energy production and health.

WHAT TO EXPECT DURING THE PROGRAM

The mobilization and elimination of toxic metals may cause temporary discomfort. This can be expected until removal of the excess metal is complete. Temporary modification of the program can aid in reducing the discomfort associated with the mobilization of the metals.

6/8/1999

LASSIE,

RECOMMENDATION	AM	NOON	PM
SYM-PACK	1	0	1
CALCIUM PLUS	1	0	1
PYRIDOX PLUS	1	0	0
ZINC PLUS	1	0	1
VITAMIN C PLUS	1	0	0

THESE RECOMMENDATIONS MAY NOT INCLUDE MINERALS WHICH APPEAR BELOW THE IDEAL OR IN TURN MAY RECOMMEND MINERALS WHICH APPEAR ABOVE THE IDEAL ON THE TMA GRAPH. THIS IS NOT AN OVERSIGHT. SPECIFIC MINERALS WILL INTERACT WITH OTHER MINERALS TO RAISE OR LOWER TISSUE MINERAL LEVELS, AND THIS PROGRAM IS DESIGNED TO BALANCE THE DOG'S MINERAL LEVELS THROUGH THESE INTERACTIONS.

THESE RECOMMENDATIONS SHOULD NOT BE TAKEN OVER A PROLONGED PERIOD OF TIME WITHOUT OBTAINING A RE-EVALUATION. THIS IS NECESSARY IN ORDER TO MONITOR PROGRESS AND MAKE THE NECESSARY CHANGES IN THE RECOMMENDATIONS AS REQUIRED.



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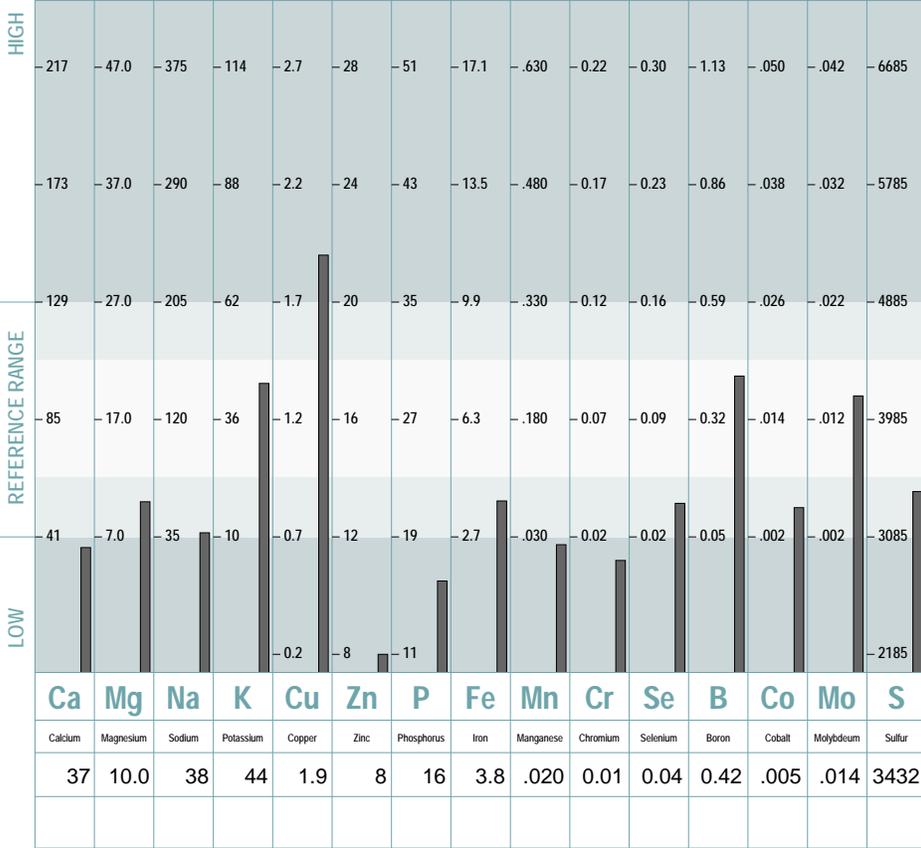
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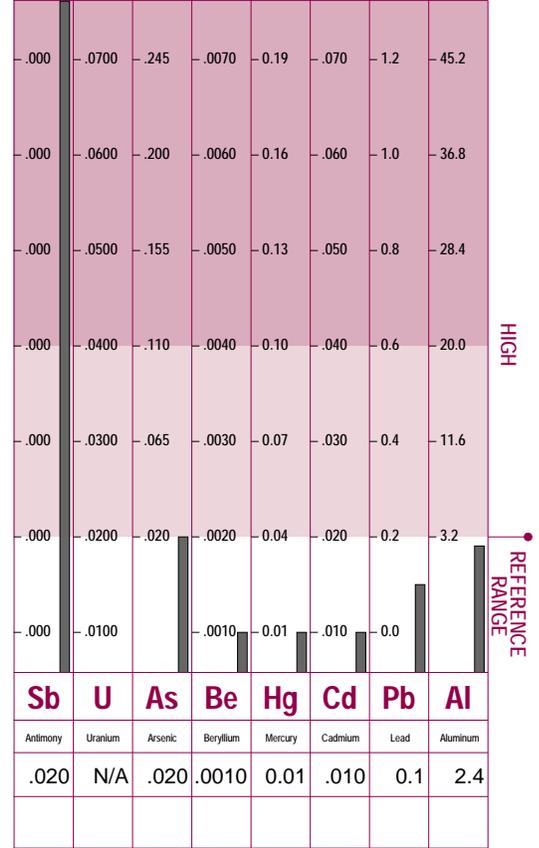
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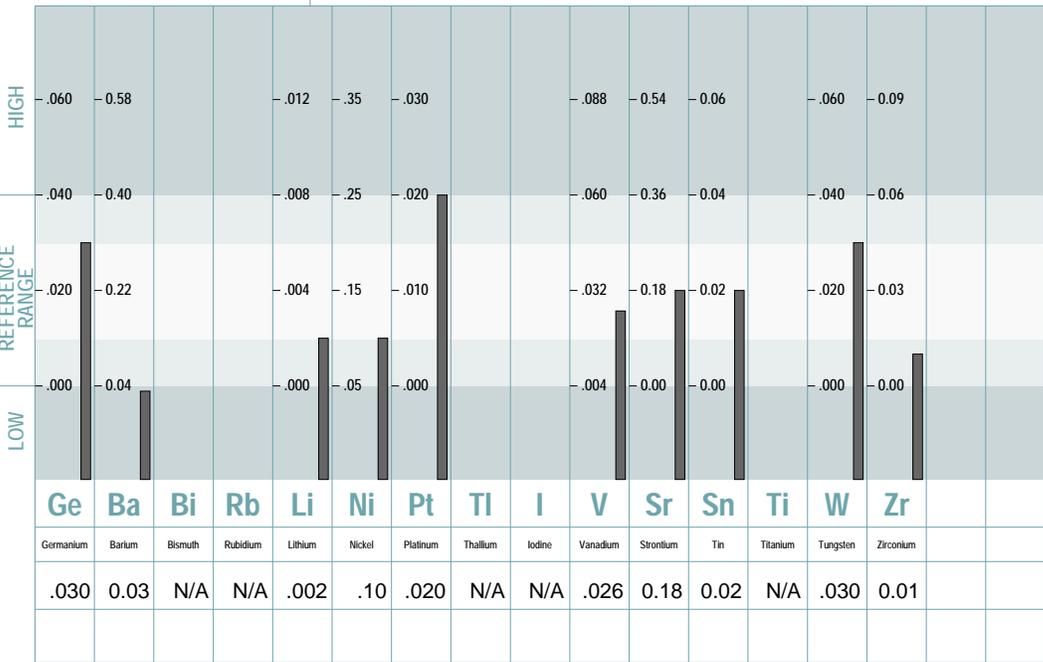
NUTRITIONAL ELEMENTS



TOXIC ELEMENTS



ADDITIONAL ELEMENTS



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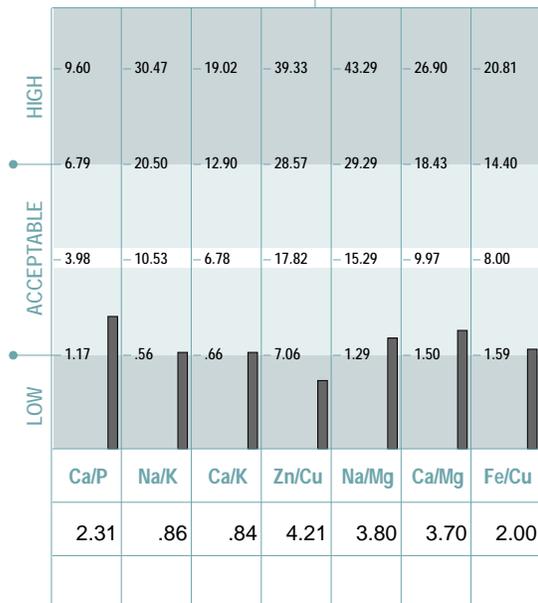
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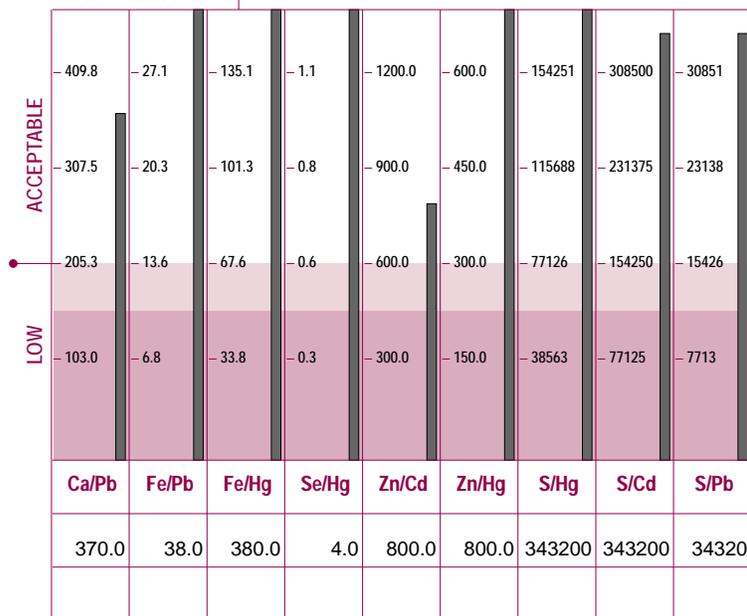
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6/8/1999
CURRENT TEST RESULTS
PREVIOUS TEST RESULTS

SIGNIFICANT RATIOS



TOXIC RATIOS



ADDITIONAL RATIOS

RATIO	CALCULATED VALUE		OPTIMUM
	Current	Previous	
Ca/Sr	N/A		N/A
Cr/V	N/A		N/A
Cu/Mo	N/A		N/A
Fe/Co	N/A		N/A
K/Co	N/A		N/A
K/Li	N/A		N/A
Mg/B	N/A		N/A
S/Cu	N/A		N/A
Se/Tl	N/A		N/A
Se/Sn	N/A		N/A
Zn/Sn	N/A		N/A

LEVELS

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

NUTRIENT MINERALS

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

TOXIC MINERALS

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

ADDITIONAL MINERALS

These minerals are considered as possibly essential. Additional studies are being conducted to better define their requirements and amounts needed.

RATIOS

A calculated comparison of two minerals to each other is called a ratio. To calculate a ratio value, the first mineral level is divided by the second mineral level.

EXAMPLE: A sodium (Na) test level of 24 mg% divided by a potassium (K) level of 10 mg% equals a Na/K ratio of 2.4 to 1.

SIGNIFICANT RATIOS

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

TOXIC RATIOS

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

ADDITIONAL MINERALS

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

REFERENCE RANGES

Generally, reference ranges should be considered as guidelines for comparison with the reported test values. These reference ranges have been statistically established from studying a population of "healthy" animals.

Important Note: The reference ranges should not be considered as absolute limits for determining deficiency, toxicity or acceptance.