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LABORATORY NO.: **999999**

PROFILE NO.: **10**

CANINE **Daisy**

AGE: **9**

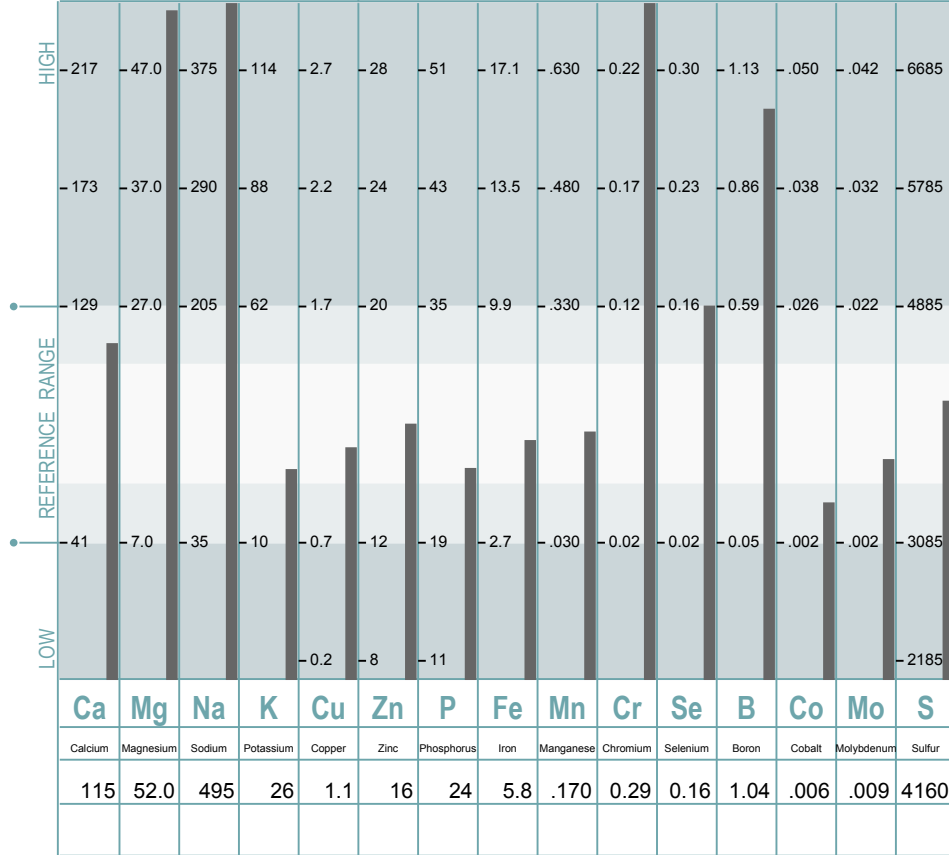
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REQUESTED BY: **XXXXXXXXXX**

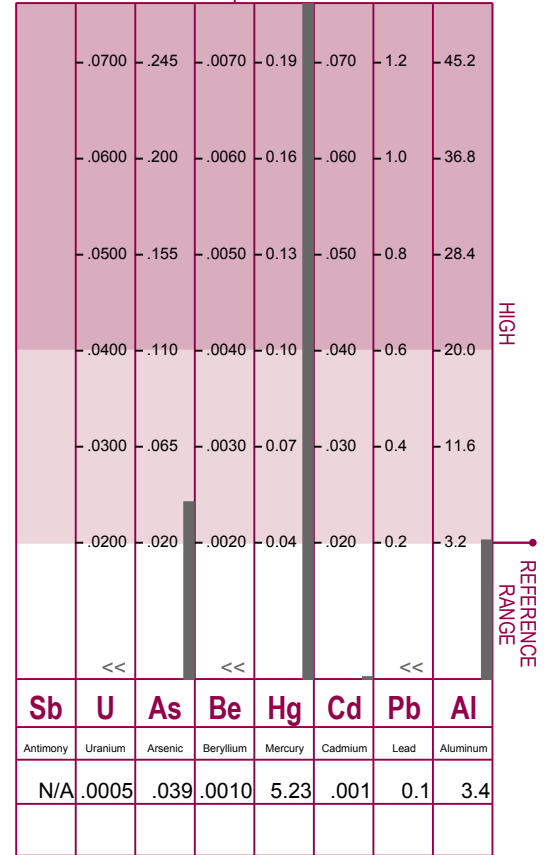
ACCOUNT NO.: **2216**

DATE: **17/05/2019**

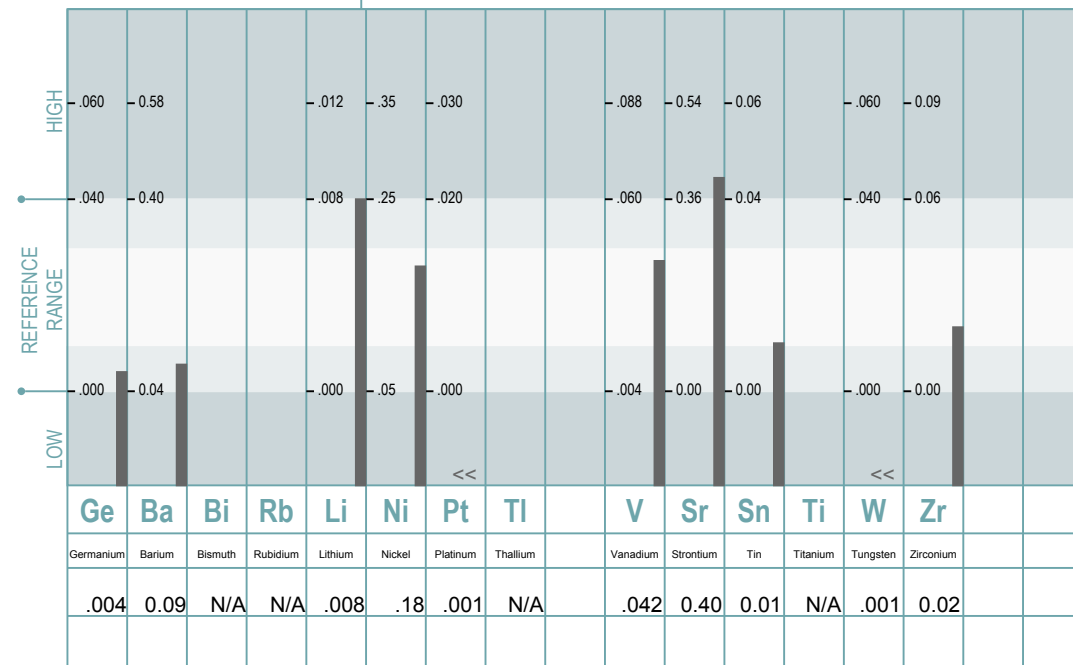
**NUTRITIONAL ELEMENTS**



**TOXIC ELEMENTS**



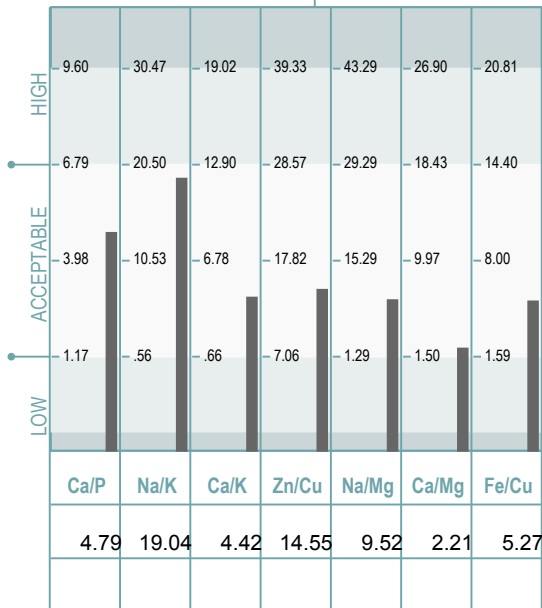
**ADDITIONAL ELEMENTS**



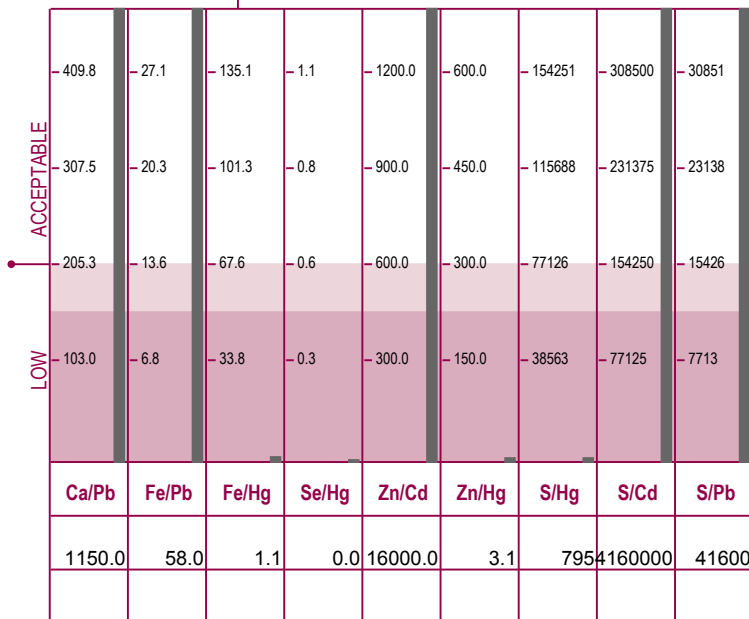
"<<": Below Calibration Limit; Value Given Is Calibration Limit  
 "QNS": Sample Size Was Inadequate For Analysis.  
 "N/A": Currently Not Available  
 Laboratory Analysis Provided by Trace Elements, Inc.  
 an H. H. S. Licensed Clinical  
 Laboratory. No. 45 D0481787

17/05/2019  
 CURRENT TEST RESULTS

## SIGNIFICANT RATIOS



## TOXIC RATIOS



## ADDITIONAL RATIOS

RATIO	CALCULATED VALUE		OPTIMUM
	Current	Previous	
Ca/Sr	287.50		N/A
Cr/V	6.90		N/A
Cu/Mo	122.22		N/A
Fe/Co	966.67		N/A
K/Co	4333.33		N/A
K/Li	3250.00		N/A
Mg/B	50.00		N/A
S/Cu	3781.82		N/A
Se/Tl	266.67		N/A
Se/Sn	16.00		N/A
Zn/Sn	1600.00		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 RATIOS

These ratios are being reported solely for the purpose of gathering research data. This information will then be used to assist 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.

## INTRODUCTION TO HAIR 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.

### SLOW METABOLISM

Based upon the HTMA, this dog is considered to have a lowered metabolic rate as a result of an increase in Para-Sympathetic neurological activity. Optimum health and performance is diminished in a slow metabolic state. The degree to which neuro-endocrine activity may affect the performance of this dog is reflected in the "Performance Index" listed in the following section.

## ENDOCRINE AND PERFORMANCE INDEXES

### \*\* ENDOCRINE INDEX \*\*

The endocrine index is a graphic presentation of the pituitary-adrenal-thyroid relationship, or axis (P.A.T.). These endocrine glands influence energy production on a cellular level and ultimately the health and performance of the dog. Ideally, there should be a balance within the P.A.T. The levels need not be at the ideal range as this range is used only as a reference point. However, they should be balanced above, below or at the "ideal" point. A major deviation between the P.A.T. axis can be indicative of a tendency or trend toward an adverse health condition. In the performance animal, a major deviation of the P.A.T. axis is reflective of an adverse affect upon speed and/or stamina.

#### NOTE:

A "balanced" P.A.T. would appear on the following index with all three bar graphs extending the same length to the right. Ideally, all three would extend to the mid-way point, but as mentioned previously, a balance anywhere within the box is acceptable.



### THYROID EVALUATION

The thyroid gland is responsible for the rate of sustained cellular energy production and release. The present TMA pattern reflects thyroid activity within the normal range.

## ADRENAL FUNCTION

The adrenal gland produces a number of vital hormones, many of which have an effect upon energy production. Adequate adrenal activity is indicated by the current HTMA mineral pattern.

### \*\* PERFORMANCE INDEX \*\*

The following performance index (P.I.) graphically displays the relationship of the energy producing glands on speed and endurance.



### PERFORMANCE EVALUATION

The performance index displays a current trend toward adrenal dominance relative to thyroid function. Since the adrenal glands produce hormones that are conducive to quick energy production, this pattern is indicative of adequate energy production for speed and quickness in events or activities of shorter duration.

## 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.

### CALCIUM (Ca) WITHIN NORMAL RANGE

The mineral calcium is required for the maintenance and strength of bones and teeth, normal blood clotting ability, muscular contraction and nerve conduction.

Even though the tissue calcium level is within the normal range, its proper function in the biological system requires a homeostatic equilibrium with other nutritional co-factors, especially magnesium, phosphorus, and vitamin D. These co-factors should always be considered when evaluating calcium status (see Ca/Mg, Ca/P ratios).

### 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.

### BORON (B)

The boron level is elevated. It should be noted that boron has been found to antagonize vitamin B2, thereby increasing vitamin B2 requirements when boron is elevated. One potential source of boron can be veterinary supplements and if applicable, should be reduced in the dog's diet at this time.

### OTHER SOURCES OF BORON

Antibiotics	Analgesics
Dental hygiene products	Insecticide Dusts
Cleaning solutions with boric acid	Soap (borax)

Note: Elevated boron levels may be due to external contamination from soap and detergent residues.

## TOXIC METALS AND RATIOS

All humans and animals are exposed to toxic metals to some degree. The retention of these toxic metals, however, is dependent upon the animal's susceptibility. The balance of the protective nutrient minerals within the body in relation to the heavy metals can frequently be the determining factor to this susceptibility. By examining the toxic metal levels in relation to the protective minerals, the extent to which the heavy metals may be involved in abnormal chemistry can frequently be seen.

Hair is used as one of the tissues of choice by the Environmental Protection Agency in determining toxic metal exposure. A 1980 report from the E.P.A. stated that hair can be effectively used for biological monitoring of the highest priority toxic metals. This report confirms the findings of other studies which concluded that hair may be a more appropriate tissue for studying exposure to some trace metals.

### METABOLIC EFFECTS OF MERCURY (Hg)

Mercury is a potent neurotoxin which can affect nerve tissue. In excess, mercury can produce:

Tremors	Visual Impairment
Neurological Disturbance	Ataxia
Digestive Disturbance	

The effect of mercury depends upon the amount and type ingested, as well as the duration of exposure.

### LOW IRON RELATIVE TO MERCURY (Fe/Hg) RATIO

Iron is known to antagonize the effects of mercury and hasten its removal. Sufficient iron intake is recommended in the presence of high mercury intake or exposure.

### LOW SELENIUM-TO-MERCURY (Se/Hg) RATIO

Although selenium supplementation does not aid in the removal of mercury, it will tend to decrease the symptoms of mercury toxicity if present.

Some symptoms of mercury toxicity in dogs include; lack of muscle coordination, digestive disturbance and tremors.

### ALUMINUM (Al)

Aluminum is found in most plants to some degree, but usually in insignificant amounts. However, aluminum has also been found to be unusually high in some veterinary supplements containing herbs. Excessive aluminum intake can interfere with the absorption of other minerals such as phosphorus. With some canned foods, aluminum may also be leached from the cans and from aluminum feeding dishes.

Excessive aluminum exposure and retention can result in lowered serum phosphate, which may be evaluated at this time.

### NOTE:

Aluminum brushes and grooming tools can contaminate the hair sample, contributing to an artificial and false elevation of aluminum. If such items are used, the aluminum level reported on the test results should not be considered as fully representative of tissue accumulation, and the above information pertaining to aluminum should be disregarded.

### ZINC/MERCURY (Zn/Hg) RATIO

When the body has a sufficient level of zinc, zinc is able to produce an antagonistic or protective response to the adverse affects of mercury. However, when the tissue zinc level is low, or when zinc is low in relation to mercury (see low Zn/Hg ratio), the protective action of zinc upon mercury may become markedly reduced. In addition, low levels of zinc relative to mercury may be indicative of a tendency toward disturbed zinc metabolism.

## SULFUR AND HEAVY METALS

The absorption and retention of toxic metals, such as; cadmium, lead and mercury, are enhanced in the presence of a protein deficiency, particularly the sulfur compounds. Sulfur is known to protect cells from the toxic effects of heavy metals, such as enzyme inhibition and excessive free-radical production. While the current sulfur level may be within the normal range, one or more of the heavy metal sulfur ratios (S/Hg, S/Cd, S/Pb) are low. This is pattern is indicative of a need for increased protein intake at this time. Foods high in sulfur amino acids include, animal protein, fish, poultry and garlic.

### NOTE:

At this time, further confirmation of elevated heavy metal toxicity using a blood test may or may not reveal an elevated level. This is due to the protective response of the body, in which following a toxic metal exposure, the element is sequestered from the blood and stored in various other tissues. Therefore, if the exposure is not ongoing or chronic, elevated blood levels may not be present.

### 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.