

Clean Run[®]

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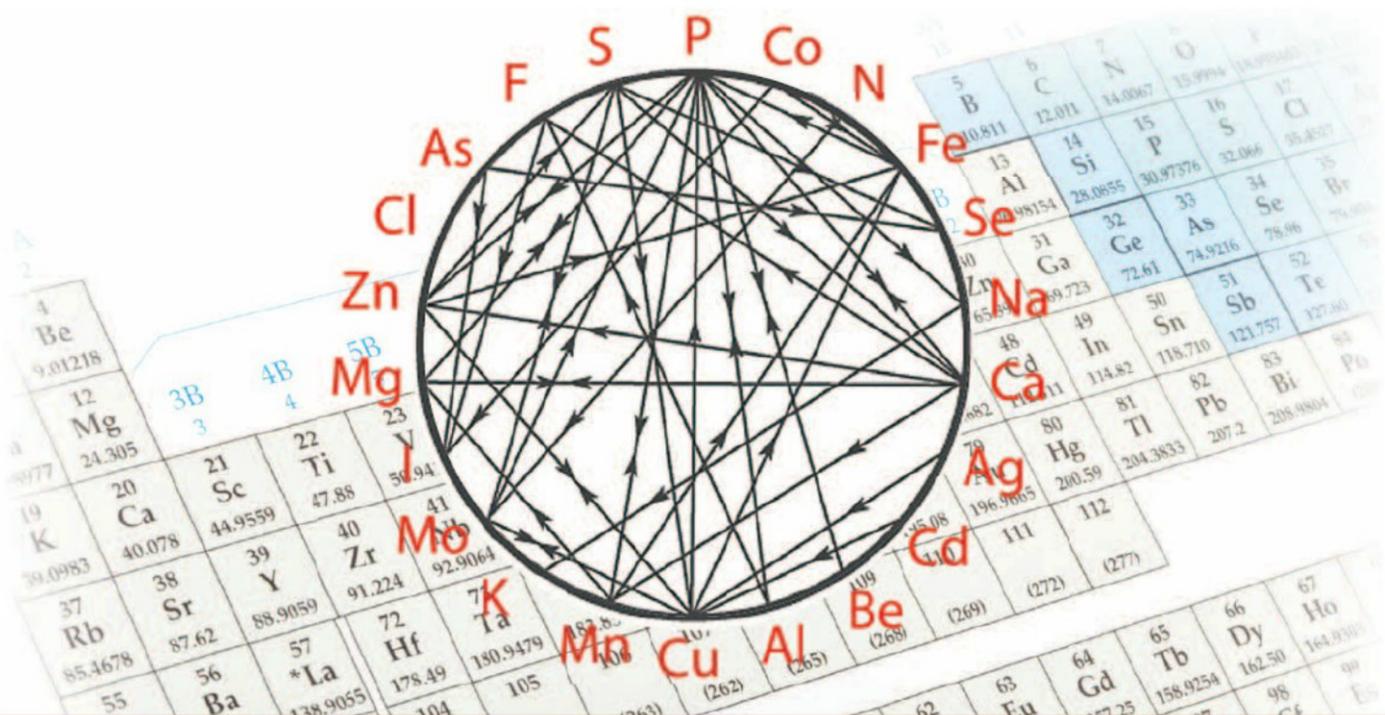


Using a Flick to Turn Your Dog

**Building Food Drive and
Raising the Value of Toys**

**Put Your Feet First to Handle More
Efficiently and Take Fewer Steps**

Recognizing Water Intoxication



Maximizing Nutrition for Your Dog's Unique Needs, Part I

By Julie Casper, L.Ac.

Dogs and children are lucky; they share an irresistible personality characteristic—joy. Their fun-loving nature helps us to forgive many of their “mistakes.” We just can’t help ourselves, we love them; their attitudes are contagious. They also share a fast metabolism, which provides them with the energy necessary to support this naturally exuberant disposition.

Diet and environment have a big impact on your dog’s health. Because of their relatively small size and high metabolic rate, they can get into trouble fast. Their nutrient mineral levels and ratios can explain many health, and behavior-related, problems. With a clear understanding of what is going on metabolically, we can be sure that they are getting the nutritional support necessary to eliminate unwanted toxins. Using a corrective nutritional protocol alone, we can make simple dietary refinements to fine-tune energy production (at the cellular-level). When your dog’s body has the correct nutrition, it can supply all of the energy that their activities require.

As a puppy, natural physical movements are vital for the development of their innate abilities. These include: coordination, vision, hearing, musculoskeletal strength, and overall health. In contrast, for many adult canine athletes, performance training is highly specific. As a result, agility dogs can suffer from repetitive stress injuries and a range of degenerative diseases associated with burnout. This kind of damage is the unsurprising result of overtraining, “undernutrition,” and incorrect supplementation. With recent advances in therapeutic nutrition, you can now achieve athletic performance optimization while protecting your dog’s health at the same time.

Nutritional Research

A great deal of nutritional research is applied to food-producing animals. This has resulted in an evolution of “superbreeds.” For example, while the total number of dairy cattle has decreased, total milk production has increased. Improved nutrition of the chicken has

resulted in stronger eggshells, thereby decreasing losses due to breakage during shipping. A better understanding and application of nutrition has increased the desired performance of food-producing animals, and the economic gains have been significant. Properly applied, nutritional science can be used to increase performance in both animals and man. Optimum performance can be enhanced in any animal whether the animal is used for stud service, work, show, or athletic competition.

The scientific application of animal nutrition has largely been directed at attempting to correct or prevent deficiencies of vital nutrients. Less consideration has been given to the *biochemical balance* of these nutrients; the most important of which are the trace elements.

“Trace elements (minerals) are more important than are the vitamins, in that they cannot be synthesized by living matter. Thus they are the basic spark-plugs in the chemistry of life, on which

the exchanges of energy in the combustion of foods and the building of living tissues depend.” —Henry A. Schroeder, M.D., *The Trace Elements and Man*

Elemental Mineral Diagnostics

Due to the circulatory system’s *homeostatic regulation*, testing for mineral levels in blood has not been adequate. This is because minerals are usually maintained in the blood at the expense of tissue concentrations. What this means is, a tissue *deficiency* of an element can develop without noticeable deviations occurring in the blood levels. For example, bone loss of calcium can become advanced enough to cause increased fragility and fractures while blood calcium levels remain within normal limits. Here’s another example: symptoms of iron deficiency anemia can develop long before low iron levels can be detected in the blood. These examples help to illustrate that the minerals being retained (or lost) in the body’s tissues, are equally as important as the nutrients contained in the diet.

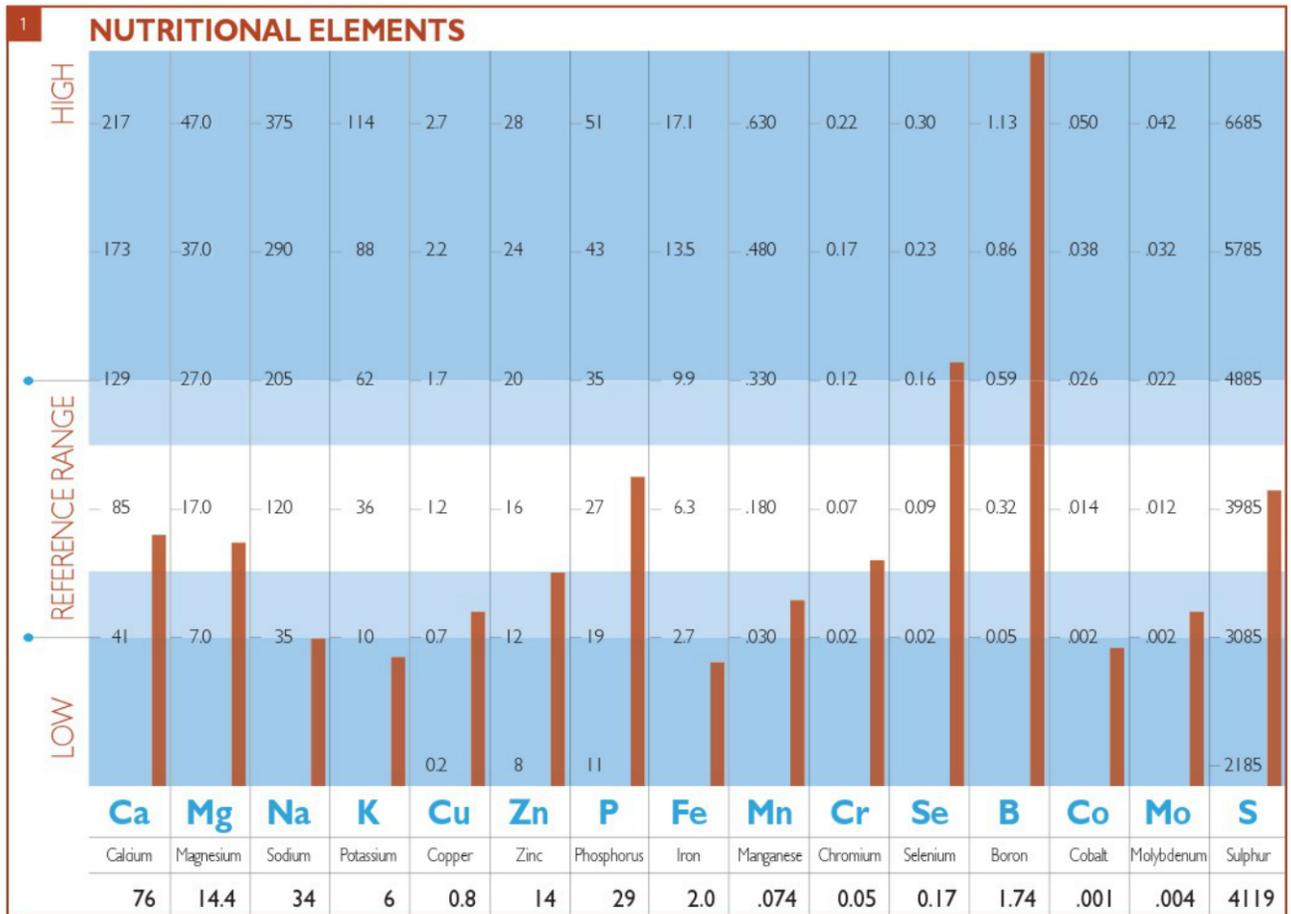
Tissue Mineral Testing and Analysis (hTMA)



Hair Tissue Mineral Analysis or hTMA is an accurate and comparatively inexpensive means of determining the body’s storage levels of minerals. It uses the same analytical technology that’s used for soil and rock testing to detect mineral levels. The hair contains minerals that are deposited as it grows. Hair growth begins inside the hair follicle, and the

only “living” portion of the hair is found in the follicle. The hair that’s visible is the hair shaft, which exhibits no biochemical activity and is considered “dead.” The mineral composition within the cortex remains intact (indefinitely) as the hair continues to grow out. A sample of hair cut close to the skin provides information about the mineral activity in the hair that took place over the past three to four months, depending on the animal’s rate of hair growth.

The graph in **Figure 1** shows the initial hTMA test results for Bonus, an 8-year-old male Border Collie, agility athlete, and companion of *Clean Run* editor, Monica Percival. The results indicate that only a few of the key essential nutrient mineral levels appear within the ideal reference-range. Also apparent, are several notable imbalances in the nutrient elements. This is despite the fact that the dog is fed a high-quality raw diet with additional nutritional supplements. Most agility trainers do take excellent care of their dogs, yet regardless of best efforts,



as these results show, your dog may still have deficiencies (or excesses). Testing with hTMA provides a way to be sure that what you are feeding, and how you are supplementing, is working for your animal. In other words, just because you feed your dog well, their metabolic needs may not be being adequately supported.

A major consideration in the nutritional support of the performance canine should be geared toward improving nutritional balance, rather than simply supplying nutrients to correct or prevent a deficiency. It is important to appreciate that an excess of a nutrient can be as dangerous as a deficiency due to its antagonistic effect on other minerals. In fact, many deficiencies in animals are not due to a lack of nutrients, but are actually induced deficiencies brought about by excessive supplementation.

Hair tissue mineral analysis (hTMA) can aid in determining what the animal is utilizing from its diet, as well as be a guide in directing appropriate supplementa-

tion. Laboratory hTMA can be used to closely monitor the effects of supplementation and provide information for modifying diet and supplements, revealing not only what may be needed, but just as importantly, what should be avoided.

Performance Enhancement

Many trainers use nutritional programs to enhance their dog's fitness and agility. To obtain the best results, it is essential to first build health, and second, strength and agility. To do this, it's important to use nutrition correctly to help prevent fatigue, burnout, and injury, and to maintain health *throughout* your dog's life. A nutrient-dense diet moderated to support your dog's specific biochemical needs will prevent the opposite result, including adrenal exhaustion and autonomic nervous system imbalances. We will discuss this in depth in part 2 of this article.

Effectively supporting an athlete's fitness and baseline health can be seen as a coordinated refinement of several interdependent factors, including nutrition,

metabolic type (oxidation rate), toxic metal and chemical body-burden, carbohydrate intolerance, and musculoskeletal balance. A metabolically individualized nutrition program provides many benefits to a canine athlete's performance, including the following:

- ◆ **Mental clarity and focus:** Coordination, clarity, awareness, judgment, and a quick response time are a major part of all athletic performance. Brain chemistry requires a vast array of nutrients for proper functioning. All toxic metals interfere with the central nervous system, leading to impaired mental functioning. Canines are particularly sensitive to heavy metal toxicity due to their fast metabolic rate and close proximity to the ground where these pollutants settle. Detoxification can be achieved safely by replacing toxins with preferred nutrient minerals. Correcting biochemical imbalances leads to improved mental focus and functioning.



Unleash Your Dog's Best Performance

Just because you feed your dog well, doesn't mean his metabolic needs are being adequately supported. Your dog's metabolism can be analyzed and optimized. Simple diet changes can have a big impact.

Find out how:

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- ◆ **Prevention of injury and burn-out:** Chronic fatigue and burnout physiology are common conditions among canine athletes, particularly later in the competition season or athletic career. Joint and muscle problems, colds, flu, pneumonia, and other illnesses plague many competitive canines, especially those that travel and maintain a frequent training schedule. A strong immune system and resistance to infection depends on healthy, balanced body chemistry and the availability of a variety of vital nutrients. Nutritional imbalances cause weak joints, tendons and ligaments, excessive inflammation and muscle tears. Properly balancing body chemistry can help avoid injuries by maintaining stronger and more flexible cartilage, ligaments, tendons and muscles.
- ◆ **Improved recovery from training and injuries:** Balanced mineral ratios speed recovery from fractures, sprains, strains and other injuries. A low sodium/potassium ratio combined with a low calcium/potassium ratio is indicative of excessive tissue breakdown, or *catabolism*. A chronic catabolic state can impair, or even prevent the normal healing of sports injuries. It also would make it difficult to recover from a hard workout. The body requires many nutrients for healing injuries, including zinc, manganese, copper, calcium, magnesium and a variety of vitamins. When provided in the correct amounts and combinations, healing and recovery results are appreciably improved.

Safe and Correct Use of Dietary Supplements



A canine athlete's nutritional program may contain a variety of nutritional supplements, some of which are unnecessary,

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incorrect, and can even be dangerous. A thorough assessment and analysis of your dog's diet, nutrient mineral balance, and toxic load provides important parameters to help determine the correct supplementation needed to balance body chemistry. We now have a better understanding of biochemical individuality and the stimulating and sedative effects of nutrients upon metabolism. Vitamins and minerals also exhibit synergistic and antagonistic effects upon one another. In fact, minerals can interfere with or reduce absorption of other nutrients, or enhance the absorption and utilization of others.

You may have read (or been advised by an expert) that a specific supplement is good for your dog, or that all dogs are deficient in a certain nutrient. However, the only way you can be sure what supplement to use to address *your dog's* specific needs, is to analyze his current biochemical status. Otherwise it's just "best guess" supplementation, which not only may be a waste of your money, but may be potentially damaging to your dog's health.

Typical multiple vitamin and mineral supplements contain ingredients that have antagonistic relationships. For example, excess calcium intake can produce a phosphorus and magnesium deficiency, resulting in symptoms almost identical to that of calcium deficiency. A continued loss of magnesium will contribute to increased sodium retention and eventually a vitamin A deficiency. Chronically low magnesium levels can lead to nervous behavior, insomnia, increased blood pressure, tremors, muscle spasms, noise sensitivity, and other symptoms. Nutrient interrelationships like this example demonstrates are quite complex. Each individual mineral has over 20 different

factors that determine its therapeutic efficacy. This is why a clinical lab test that detects imbalances, as well as indicates the correct procedure for restoring normal balance, is so important.

Dogs have differing individual responses to supplements. Individualized metabolic functioning is the reason some animals do better on certain supplements, while others do worse on the same supplements. An individual's reactions to supplements depend primarily on three things:

- ◆ The dog's specific biochemical makeup
- ◆ How much stress the dog is under from his training and performance schedule
- ◆ The dog's ability to recover from environmental and other biophysical stressors

A Real World Example

In Figure 1 we saw the initial hTMA test results for Bonus, an 8-year-old Border Collie. **Figure 2** shows his initial toxic element results—environmentally, all dogs face increasing exposure to heavy metals and chemical toxicity. This graph shows that both arsenic and aluminum are at levels high enough to indicate an abundance of these elements are present in the dog's tissues. Toxic metals that are similar in chemical structure to their nutrient mineral counterparts are used by the body as a substitute when there is a nutrient deficiency. Providing Bonus with *specific* preferred nutrient minerals at the correct dosage will replace and help to safely remove these toxins.

In the next issue, we will show you how Bonus has progressed and provide the results from his hTMA retest. We will also delve deeper into the biochemistry of performance and the importance of toxicity screening. 🐾

2 **TOXIC ELEMENTS**

.000	.0700	.245	.0070	.019	.070	1.2	45.2
.000	.0600	.200	.0060	.016	.060	1.0	36.8
.000	.0500	.155	.0050	.013	.050	0.8	28.4
.000	.0400	.110	.0040	.010	.040	0.6	20.0
.000	.0300	.065	.0030	.007	.030	0.4	11.6
.000	.0200	.020	.0020	.004	.020	0.2	3.2
.000	.0100		.0010	0.01	.010	0.0	
			<<	<<		<<	
Sb	U	As	Be	Hg	Cd	Pb	Al
Antimony	Uranium	Arsenic	Beryllium	Mercury	Cadmium	Lead	Aluminum
N/A	.0006	.006	.0010	0.01	.001	0.1	1.3

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"I have never paid attention to my pocketbook when it comes to feeding my dogs; they give their all to me and they deserve the best—or what I thought was the best. I've selected food and supplementation for them based on research, as well as many discussions with canine health professionals. Their coats are beautiful, they are muscular and lean, their eyes are bright, they have energy, and they seem happy. So I was skeptical that the (hTMA) test would show any issues with Bonus. But despite all of my efforts to do the best, the test clearly showed that there was a lot of room for metabolic improvement with Bonus. The good news is that the retest will tell me whether the changes I make in his diet and supplementation have an impact."

—Monica Percival, Bonus's owner



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Julie Casper, L. Ac. is a classically trained Oriental medicine physician and hTMA clinician. She works with human and canine patients across North America. For information on canine services visit: AnimalBite.com. For hTMA testing-only service visit: BestTestForYourDog.com.

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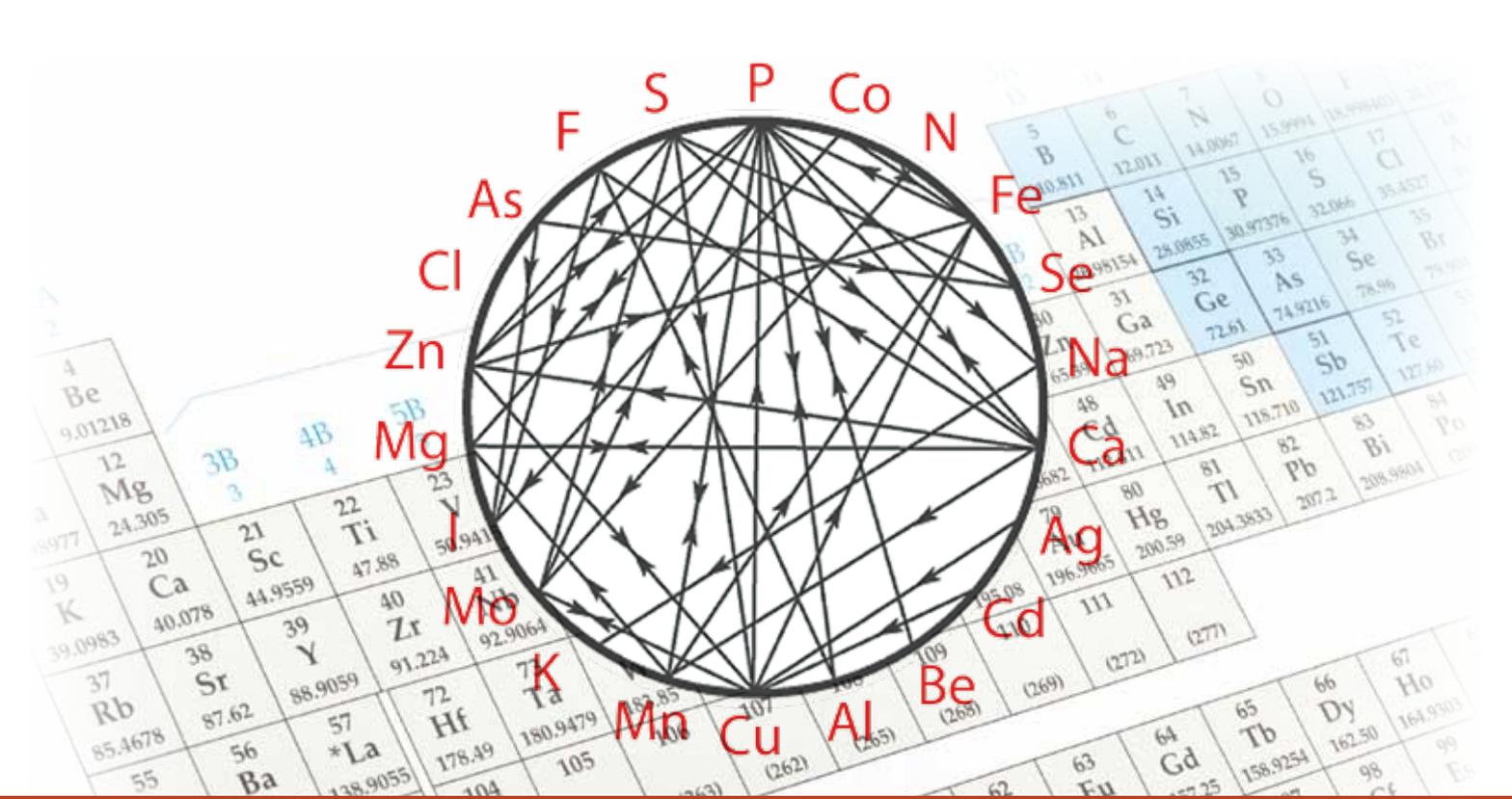
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Maximizing Nutrition for Your Dog's Unique Needs, Part 2

By Julie Casper, L.Ac.

In part I, we explored the important role that elemental nutrient minerals play in metabolic function and bio-individuality. To see a practical application, we looked at the hTMA lab results for Bonus, an 8-year-old male Border Collie, agility athlete, and companion of *Clean Run* editor, Monica Percival. This month we're going to discuss reducing toxicity and optimizing nutrition.

The Biochemistry of Performance

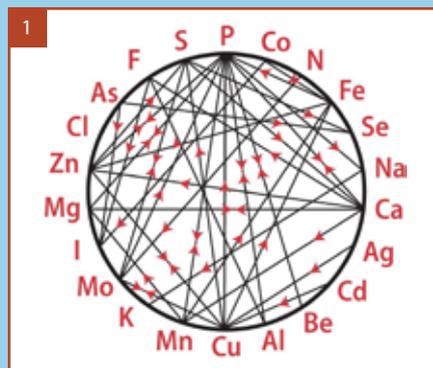
Having an excellent training program is vital for canine athletes, but how well a canine is able to perform, especially throughout an entire career, begins at the cellular level. This is where nutrient mineral levels and ratios determine physiological and cognitive performance capability. When you optimize cell function, you optimize performance.

Nutrient interrelationships are exquisitely complex. Every vitamin and mineral affects several other vitamins and minerals in an interconnected, intricate, ever-changing web of association (synergism and

antagonism) as you can see in **Figure 1**. Here are two simple examples:

- ◆ Calcium is known to antagonize zinc, thus a high intake of calcium depresses intestinal zinc absorption.
- ◆ Iron and copper are synergistic, because sufficient copper is required for iron utilization in the red blood cells.

Elemental nutrients have important functional effects on the endocrine glands. As with mineral and vitamin synergisms and antagonisms, endocrine synergisms and antagonisms exist also. Through the



release of chemical messengers (hormones), the endocrine glands control the stress response. Hormones affect how nutrients influence basic cellular functions, these include:

- ◆ Absorption
- ◆ Excretion
- ◆ Transport
- ◆ Storage

Nutrients influence hormones also. Trace nutrient minerals are involved in hormone secretion, activity of the hormones, and target tissue binding sites. Mineral concentrations within the body affect the functioning of the hypothalamus, pituitary, and thyroid and adrenal glands. If the levels and/or ratios of these minerals are suboptimal, cellular function is compromised, including:

- ◆ Hormone production and release
- ◆ Detoxification and renewal
- ◆ Performance and energy production

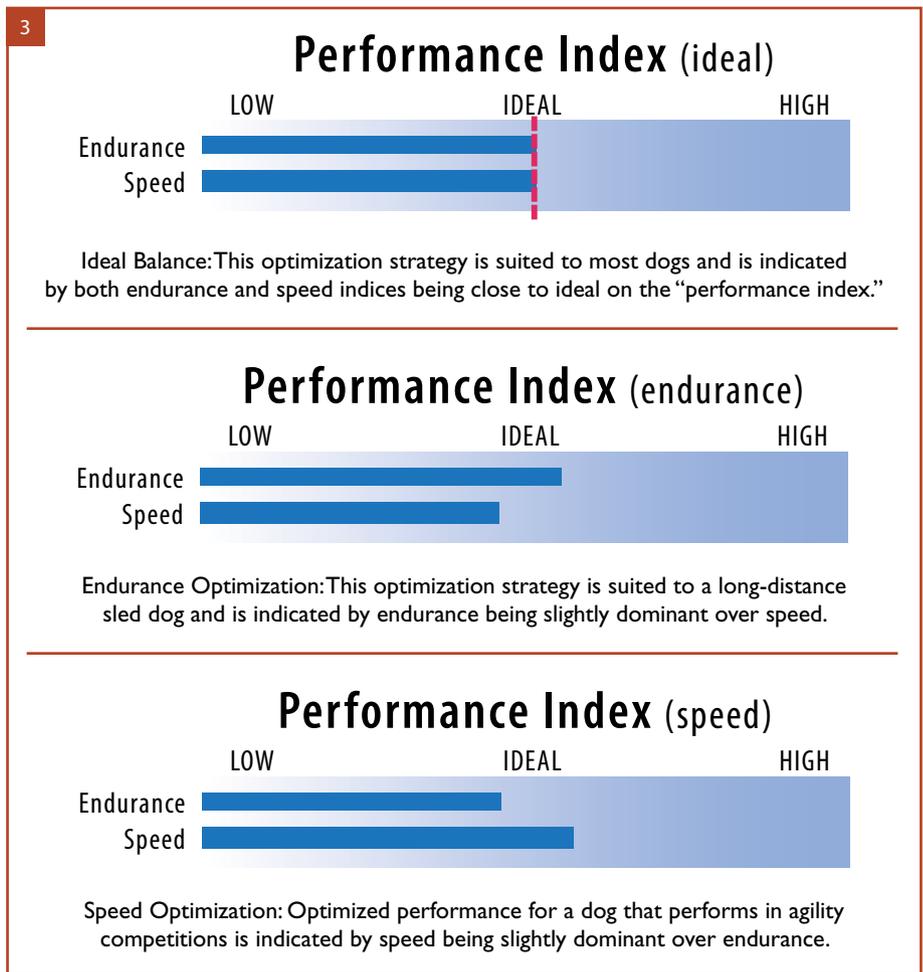
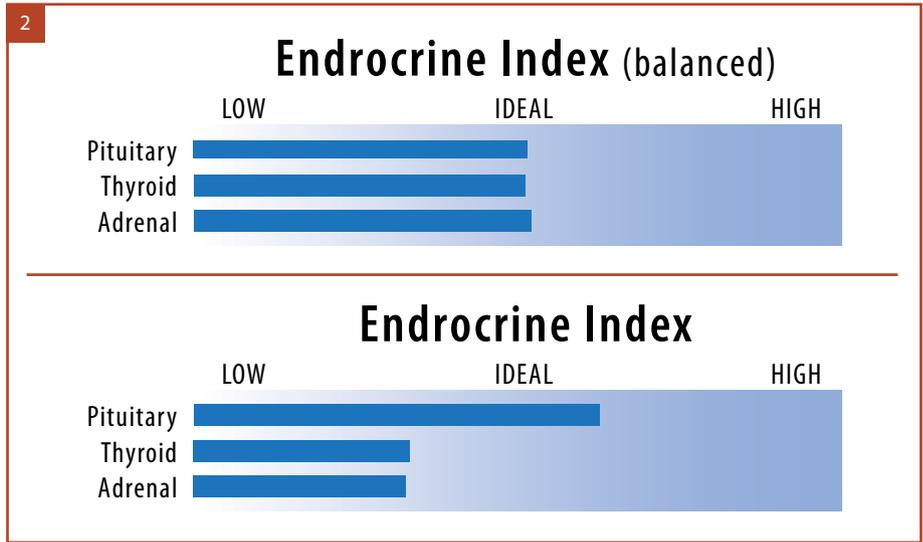
Figure 2 shows a balanced endocrine index (on the left) which is a good indicator of optimal cellular function. Bonus's endocrine index (right) shows acceptable endocrine function, however, it is indicating a trend toward exhaustion of the thyroid and adrenal glands. This information helps us take steps to reverse this trend now, before problems occur.

Providing your canine with the required nutrients at optimal levels and ratios enables his body systems to perform the infinitely complex cellular interactions necessary to support ideal functioning. Extensive tissue mineral research has led to significant advancements in the understanding of nutrient mineral interrelationships. This knowledge also can be applied to vitamin and endocrine interrelationships for a comprehensive approach to nutritional therapeutics.

Examples of Performance Optimization for Different Needs

The performance index identifies cellular stress response ability, or how well the dog can respond to and recover from stress. How you choose to optimize performance will depend on your dog's needs. Different working dogs have different performance needs based on their specialty. **Figure 3** shows three examples of optimization strategies.

For an explanation of the mineral relationships used to create the endocrine and performance index graphs, please refer to the "Unleashing Canine Performance" article at animalelite.com.



The simple act of discovering how to improve your dog's health (naturally, with hTMA) is surprisingly fun to learn. Watching your dog transform is fun too, because improvements are often quick and dramatic. And by balancing your dog's metabolic rate, you can slow the aging process and enjoy each other's companionship longer. What could be more fun?

Toxicity



The environmental reality is that dogs face increasing exposure to heavy metals and chemical toxicity. Toxin body burden is then intensified in utero, thus increasing the toxicity with each generation.

- ◆ Heavy metals are heavy. Toxic metals are put into the air from industrial smoke stacks, vehicle exhaust, agriculture, lawn care services, and other sources. Heavy metals settle on or near the ground. Dogs live their lives at ground level. They roll around and lick themselves, ingesting even more.
- ◆ Industrial processed pet food. The pet food industry has very little

regulation or oversight, and most pet foods are loaded with toxins, both from the foods used to make them and from the industrial machinery used to process them.

These toxic metals are seen at body burden levels in many canine hTMAs:

- ◆ Aluminum is one of the most common toxic elements found at high levels in hTMA assessments of dogs. The most common source is processed dry and wet foods. Other sources include vaccinations, medications, and in-utero transfer. Aluminum has a tendency to accumulate in the brain and nerve tissues and in the bones and teeth, where it interferes with the absorption of a number of essential elements including iron, fluoride, phosphorus, and calcium. It inhibits gastric muscle contraction and can cause constipation. This disrupting effect on the essential minerals leads to endocrine gland dysfunctions as these glands all depend on balanced mineral ratios. These dysfunctions include hypo- or hyperthyroidism, hypo- or hyper-

adrenal, hypoglycemia, diabetes, dry dull coat, dry or flaky skin, and digestive disorders due to lack of pancreatic digestive enzymes and lowered stomach hydrochloric acid. Since aluminum has an affinity for brain and nerve tissue, it can affect any organ in the body via the central nervous system. This can lead to a multitude of health problems and a weakening of the immune response.

- ◆ Mercury toxicity is everywhere. Some sources are industrial and power plant smoke stack releases, tar-sands mining in Canada, vaccines, and fish. Mercury is one of the most studied toxic heavy metals and the lethal effects of both acute toxic exposure and chronic low-level exposures are well documented. Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, damages the brain, kidneys, and developing fetus. Mercury antagonizes and prevents the absorption of impor-

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tant nutrient minerals such as zinc, iron, selenium, and sulfur. Mercury accumulates in the brain and central nervous system. Mercury also adversely affects your dog's overall immune system by attaching to the immune cell structure and altering his ability to function normally. Mercury can cause kidney and cardiac diseases, respiratory problems, arthritis, and gum disease in your dog.

- ◆ Lead can be found in all parts of our environment. Much of it comes from human activities, including burning fossil fuels, aviation fuel, mining, and manufacturing. The concentration of lead in polluted air varies inversely with altitude. Because lead is a heavy element, it settles out of the air onto the ground. Consequently, lead poisoning occurs in dogs that spend their lives close to the ground. Epilepsy can result from lead toxicity in dogs. In young children, hyperactivity may be the first presenting symptom, so if you have a hyperactive dog you can suspect high tissue lead levels. It can take years before lead exposure reaches dangerous levels, so you might not recognize symptoms until your dog is older.

Calcium inhibits lead absorption and protects against lead accumulation in bones and teeth. Both young children and dogs are naturally fast metabolizers with lower levels of tissue calcium and magnesium. This low calcium to lead ratio leads to higher lead absorption into the bones, where it displaces calcium. During times of stress, when the body would normally release more calming

calcium, it will release this stored lead into the bloodstream. This can bring lead into any of the body's organs, leading to cancer and organ failure.

- ◆ Arsenic is number one on the ATSDR's 2013 Priority List of Hazardous Substances list. It is a known carcinogen and affects the skin, digestive system, liver, nervous system, and respiratory system. Arsenic compounds can create reactions in the body that disrupt enzymes that are involved in respiration of cells as well as fat and carbohydrate breakdown and their metabolism. Organic arsenic compounds are mainly used as pesticides, while inorganic arsenic is primarily used to preserve wood. Once arsenic is released in the environment it cannot be destroyed. To make matters worse, arsenic compounds also dissolve in water. Organic forms of arsenic are actually fed to pigs and poultry to improve production, and in the case of swine, to treat diarrhea. This meat is then used in commercial dog foods.
- ◆ Cadmium is a naturally occurring metal, and can be found in food, water and cigarette smoke. It is a known carcinogen that appears to act in two ways: cadmium harms DNA directly and it disturbs a specific DNA repair system which helps prevent cancer. Like other heavy metals, cadmium stays in the body for a long time and accumulates after long-term exposure (even to low levels). Cadmium is released into the air from mining, industry, burning coal, and household wastes, where it

then binds to soil particles and dissolves in water. Fish, plants, and animals accumulate cadmium from the environment. Dogs are exposed to cadmium not only through food but through drinking water and breathing contaminated air. Animal studies suggest cadmium accumulation leads to liver disease, high blood pressure, and nerve and brain damage.

A Real World Example: Bonus's Follow-Up Retest



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In part I, we looked at the initial hTMA test for Bonus. The data provided from those lab results allowed us to design a corrective protocol for Bonus using nutrition alone to safely replace toxic heavy metals with biologically preferred minerals. With this protocol, the cells and organs are supplied with essential nutrients in the appropriate ratios needed to support the dog's unique biochemical profile. An optimized nutritional plan also meets the increased biochemical demands that are placed on an athletic dog from the stressors he encounters in his training program.

Besides providing Bonus with the mineral supplementation recommended after his initial testing, I made some dietary changes for all my dogs based on my conversation with Noa Martensen, canine nutritional consultant at AnimalElite.com. When I had fed my dogs a kibble diet, I had frequently rotated not only the protein I was feeding, but also the brand of food I used. My thought was that no single food was perfect and all of them must lack something or have too much of something, so rotating sources was the best way to provide a balance in the nutrients the dogs were getting. When I switched to a raw diet, I only rotated proteins. After learning more about sources of toxicity, it made sense to me to rotate where I was getting my raw food from as well. It seemed like you couldn't avoid toxicity in food, but by changing sources you would be less likely to keep building up too much of the same toxicity. I also integrated more raw organ meat into the dogs' diet and fish, and I rotated what ground vegetables I used. I never would have guessed that the dogs could be so excited about fish.

NUTRITIONAL ELEMENTS

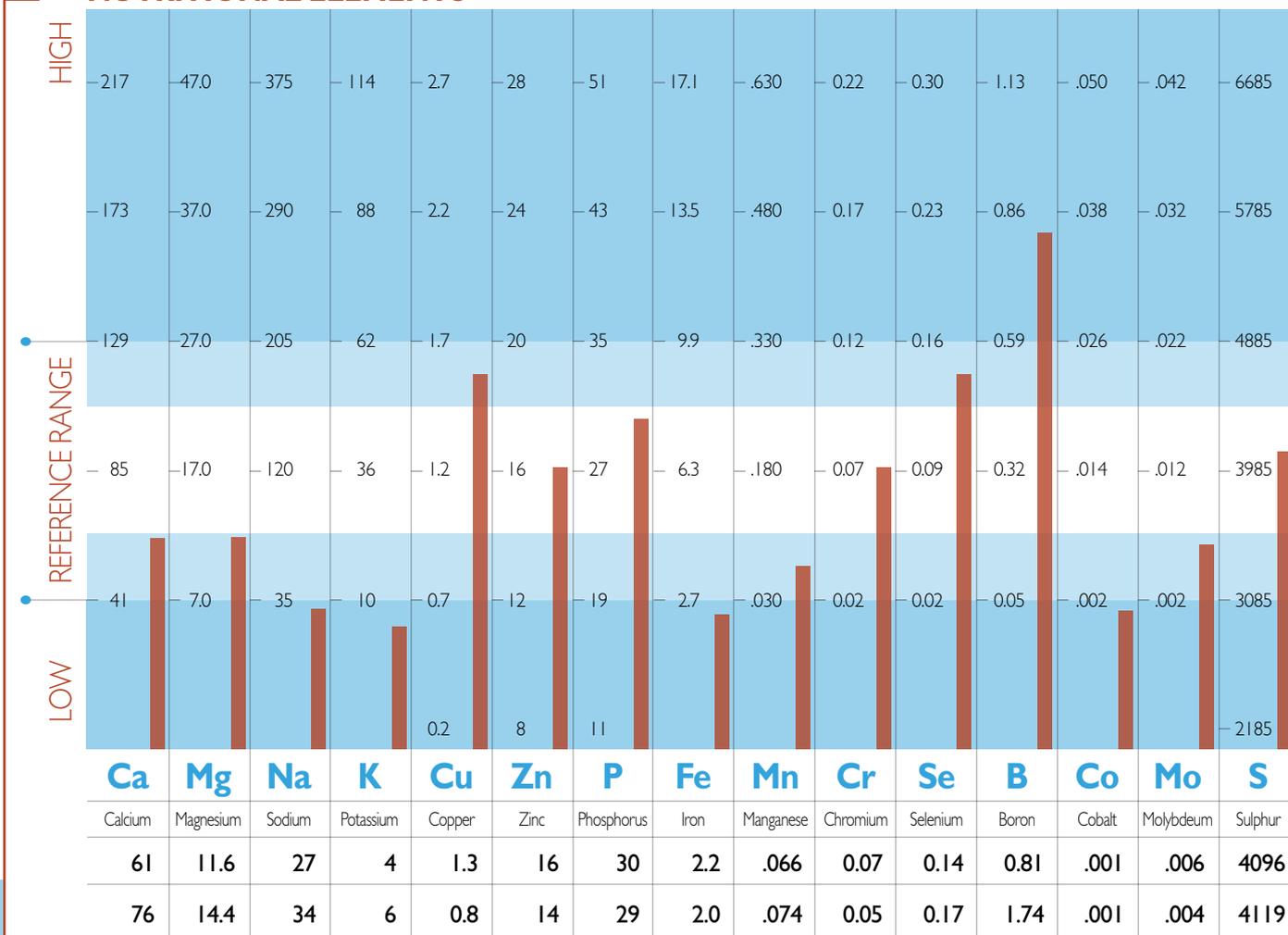


Figure 4 shows the hTMA retest results for Bonus. The top row of numbers shows the retest results; the bottom row shows the initial test results. These results indicate the benefits of provid-

ing Bonus with a diet and supplements designed to address his individual needs. His mineral levels are adjusting as he move towards balanced levels, such as the elimination of excess boron, and are

moving toward the ideal center of the reference-range. This will result in more energy for Bonus, better health, and a longer athletic career."

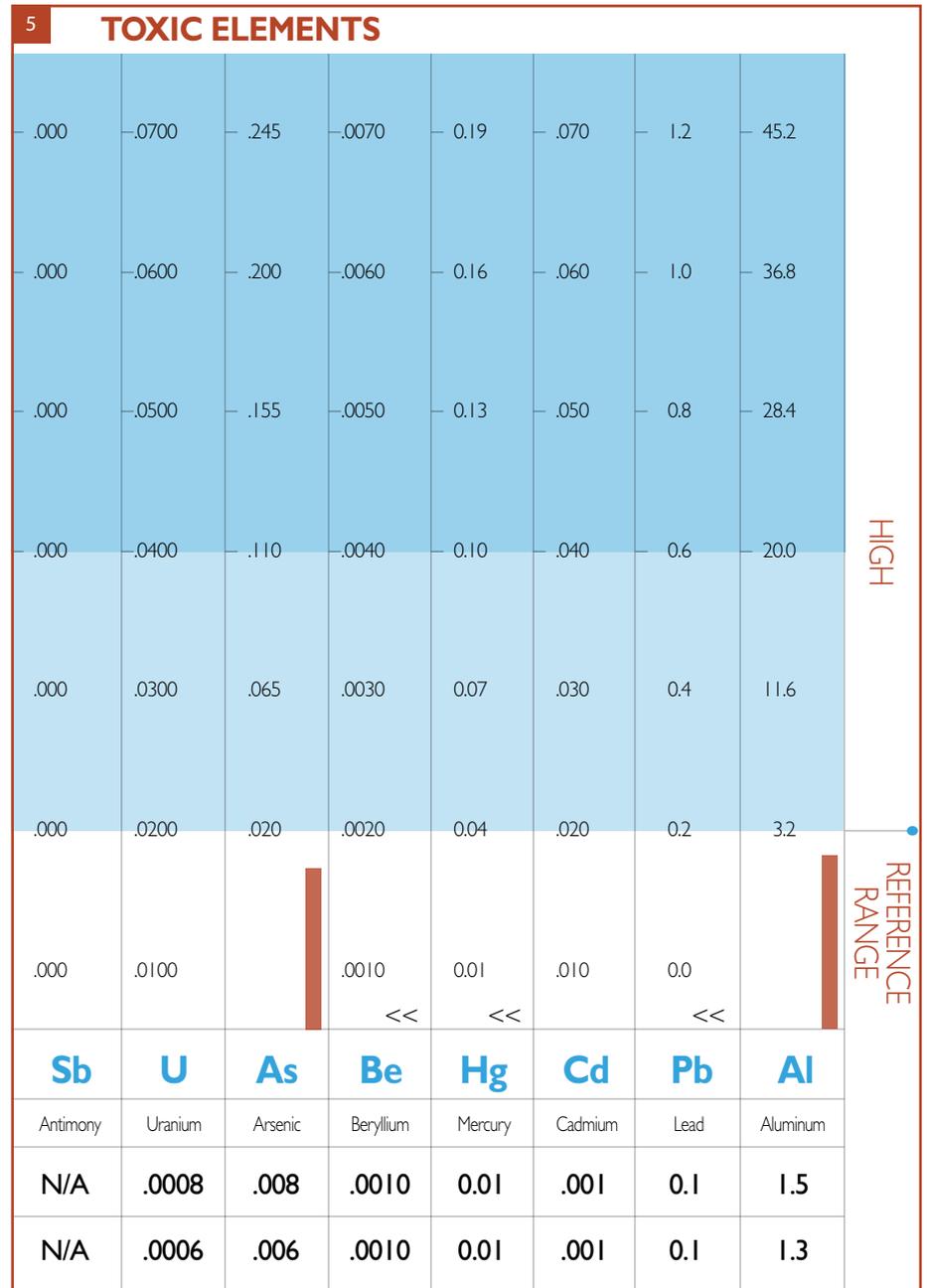
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Figure 5 shows that the toxic elements arsenic and aluminum are being mobilized at a slightly increased rate. The additional elements result (not shown) also revealed that Bonus eliminated a significant amount of tin. Providing the preferred minerals in the amounts specific to Bonus's needs help to mobilize and eliminate these toxins from his system safely (a not too rapid rate). Safely removing these toxins is one of the best preventative health measures you can provide to your dog.

Conclusion

Dogs are naturally fast metabolizers, which is why they grow and develop so quickly. With a comprehensive metabolic profile as a guide, you can support your dog's biochemical demands by providing him with the nutritional resources he needs to express his full potential.

The simple act of discovering how to improve your dog's health (naturally, with hTMA) is surprisingly fun to learn. Watching your dog transform is fun too, because improvements are often quick and dramatic. And by balancing your dog's metabolic rate, you can slow the aging process and enjoy each other's companionship longer. What could be more fun? 🐾



Julie Casper, L. Ac. is a classically trained Oriental medicine physician and hTMA clinician. She works with human and canine patients across North America. For information on canine services visit: AnimalElite.com. For hTMA testing-only service visit: BestTestForYourDog.com.

