Recognizing Mineral Imbalance in Our Pets

By Kim Bloomer, VND and Jeannie Thomason, VND

Minerals are not optional and in fact play a vital role in the overall health and wellbeing of our pets. Feeding our pets according to their nature is important, and will always provide the best possible solution to any potential imbalances.

To understand mineral balance in a pets' diet, let's first take a look at the various minerals, what they do, and how to recognize a deficiency. As we look at the function of each mineral and where these minerals are obtained, remember that the sources we are referencing are for our carnivorous pets, dogs and cats.

Overall balance depends on balanced minerals in the pet's diet.

What are minerals?
Minerals are a vital component for health in humans, animals, and plants. They play a major role in regulating the various functions of the body, such as maintaining the proper fluid balance in the body, bone and cartilage formation, normal muscle and nerve function, and the production of hormones.

Due to the severe depletion of minerals in our soils, it is now necessary to supplement to keep the body in homeostasis (proper balance). Deficiencies in minerals can interfere with the health and function of every single system within the body.

All minerals are either elemental or chelated. Elemental means that they come from the earth and are composed of chemical molecules. These chemical molecules cannot be reduced to simpler substances. They are basic constituents of all living matter. They exist in an inorganic state. The minerals in raw meat and bone are elemental and are the easiest to absorb since they are in their natural 'food' state.

Chelated minerals are minerals that are suspended in an amino acid or other organic substance. The chelation process makes these minerals, obtained from various sources such as shells, sand, vegetation, etc., easier for the body to absorb. Chelation is the preferred form in supplements.

Let's take a further look at how these minerals function in the body and how to recognize a deficiency.

The Macros

• Calcium, Phosphorus and Magnesium
The mineral calcium is the one that is needed in the greatest amounts. Calcium aids the formation of bone, muscle contraction, nerve transmission and blood coagulation. Phosphorus is also required in high amounts in the diet. It works together with calcium to maintain the growth and structure of the body's skeletal system. Phosphorus is needed in a slightly less amount than calcium. Magnesium aids the absorption of other minerals such as calcium and phosphorus and vitamins. This mineral is essential for proper bone growth as well as enzyme function.

Deficiency - If you're feeding a raw meat diet but don't provide raw bones as well, there will then be a deficiency of calcium and an excess of phosphorus. Not enough calcium in the diet can lead to bone deformities. Meat contains natural phosphorus while bone contains natural calcium. Too much of one will cause a deficiency of the other. A natural balance occurs when you feed as close to a natural prey model as possible. A good ratio to keep in mind is a 1:1 or a 1:2 bone to meat. A good example of that is chicken necks, which is in a perfect 1:1 ratio of bone to meat. It is rare for there to be a deficiency of phosphorus in dogs and cats - especially

An imbalance of minerals is rare in pets fed a raw meat and bone diet.

those fed a raw meat diet.

An imbalance of magnesium is also rare in our raw fed pets, but it is a definite concern for those being fed overcooked commercial pet foods. A deficiency of magnesium can surface in the form of depression, muscle tremors, weakness and even excessive irritability. What might appear to be a behavioral problem could actually be a physical depletion of this important mineral.

Magnesium, calcium and phosphorus are naturally occurring in a raw meat and bone diet. So when we follow a natural, raw, prey model diet for our dogs and cats the imbalances are rare, because the minerals work together in natural harmony in the appropriate ratios.

• Sodium, Chloride and Potassium
Sodium, chloride and potassium play a major role in maintaining proper fluid balance and waste removal within the body. While sodium helps move nutrients to cells, chloride helps keep the body in the proper alkaline/acid balance. Chloride is a very vital nutrient for our carnivorous pets because it is necessary for the production of hydrochloric acid (stomach acid) which aids in the digestion of protein. Potassium is needed for proper functioning of muscles, nerves and enzymes.

Deficiency - Typically a deficiency will manifest itself as excessive or prolonged diarrhea or vomiting, kidney disease, and burns.

• Silicon and Sulfur
Silicon is needed for a variety of bodily functions that include the formation of fur, tissue, cartilage, healthy nervous system, and metabolism. Sulfur is needed for the elimination of toxins in every single cell of the body which is where it is also stored. It is also a lubricant found in between joints.

Deficiency - One of the more common indicators of a deficiency of sulfur is arthritis**.** Other symptoms include skin, muscle, bone, nerve and urinary disorders. Silicon deficiency symptoms include arthritis and skin, muscle, bone, nerve and urinary disorders. These rarely occur in a dog or cat that is fed a proper species appropriate raw meat and bone diet.

The Micros
Microminerals are needed in trace amounts.

• Copper
Copper is necessary for the formation of collagen, bone and connective tissue, the absorption of iron, the development and maturation of red blood cells, and the development of pigment in hair. It is an antioxidant.

Deficiency - Copper deficiencies are rare in dogs and cats. With a copper deficiency, an anemia can develop, and there may be abnormalities in bone development and slow healing of wounds due to poor absorption of iron.

• Iodine
Iodine is necessary for the proper functioning of the thyroid gland and the production of thyroid hormones. Thyroid hormones regulate the rate of metabolism in the body and play an important role in normal growth.

Deficiency - Iodine deficiency results in lower than normal production of thyroid hormones and can produce the characteristic goiter, as well as affecting the skin, weight gain, hair loss, general weakness, behavioral changes such as irritability, apathy and drowsiness. Hypothyroid affected animals often are not able to breed successfully.

• Iron
As its primary function, iron combines with copper and protein to form hemoglobin, the molecule in red blood cells that carries oxygen. Iron also is necessary for certain enzymes in the body to function normally. The body needs a constant supply of iron since red blood cells only live about 110 days and then die and need to be replaced.

Deficiency - Symptoms include weakness, fatigue, and weight loss in dogs. When not enough iron is in the diet the result will be the development of anemia (lower than normal number of red blood cells). Symptoms of anemia include decreased growth rate, weakness, and increased susceptibility to stress or disease. Animals with iron deficiency may also develop constipation. Puppies and kittens can be born with lower than normal stores of iron if their mothers did not receive adequate iron during pregnancy.

• Manganese
Manganese is essential for the proper use of protein and carbohydrate by the body, reproduction, and the action of many enzymes in the body responsible for the production of energy and making fatty acids.

Deficiency - A deficiency can cause defective growth and reproduction, as well as affecting fat metabolism. Lack of manganese is very rare in dogs and cats; when it does occur, newborn and young animals are more likely affected. The symptoms of manganese deficiency include poor growth, skeletal abnormalities, and shortened tendons in newborns, reduced birth weight, reproductive failure, and ataxia (loss of equilibrium).

• Selenium
Selenium is a trace mineral which was recognized as a toxic substance before it was identified as a necessary nutrient. The daily requirement for selenium is actually less than the require-

Minerals naturally function together, so when supplementing, provide a mineral blend that contains all the macro and micro minerals.

ment for any of the other trace elements. This is definitely a case of 'If a little is good, a lot is NOT better.' Selenium is an antioxidant which functions in conjunction with Vitamin E and certain enzymes to protect cells.

Deficiency - This is rare in dogs and basically unknown in cats, but much more common in cattle and sheep that graze plants growing in soil that is depleted in selenium. In dogs, one possible effect of a selenium deficiency is degeneration of skeletal and cardiac muscles. If it does occur, we see poor reproduction, puppy death, muscle weakness, and abnormalities of the heart muscle.

• Zinc

While zinc is considered a micro mineral it is very much an essential mineral due to its critical function in metabolism.

Deficiency - A deficiency most commonly appears in dogs as a skin condition that is called 'zinc responsive dermatosis' that affects Huskies, Malamutes and puppies of any breed on zinc-deficient diets or diets that are over-supplemented with calcium. The usual symptoms are hair loss, and scaling and crusting of the skin around the face, head, and legs. Lesions often encircle the mouth, chin, eyes, and ears. The foot pads may be scaly and the coat is dull and dry. Puppies may also show these symptoms coupled with lethargy, anorexia, and proneness to secondary infections.

Supplement wisely

It is important to remember that minerals must work together to "self regulate" or balance each other. Single mineral supplementation rarely corrects a deficiency, and likewise, deficiencies rarely involve a single deficient mineral. Research shows that supplementing only "isolated minerals" can lead to an imbalance in other minerals, or worse, block absorption completely. One mineral needs several others to be properly utilized in the body.

Dogs and cats that are fed a raw meat and bone diet will have a less likely chance of being mineral deficient unlike their kibble fed counterparts. However, we must take into consideration that even though we believe raw feeding to be the best approach, due to the severe depletion of our soils, our herbivorous animals are becoming more mineral deficient, which can then lead to a deficiency in our raw fed dogs and cats.

Definition of chelate: "Of or pertaining to a heterocyclic ring containing a metal ion attached by coordinate bonds to at least two nonmetal ions in the same molecule"

Consider supplementing with a liquid or powder that contains ALL these minerals so that they can function together, with the synergy nature intended. We use a liquid chelated, precisely balanced, organic ionic mineral complex product called Young Living Mineral Essence. Other good and inexpensive sources are FOOD-grade diatomaceous earth (DE), organic apple cider vinegar, and clays such as Bentonite or French Green. Please know your source and be cautious. Follow the manufacturers' recommended daily amounts and feeding guidelines, adjusting those for the weight of your pet. If you're in doubt, consult with your holistic veterinarian, animal nutritionist or veterinary naturopath.

About the authors:

Dr. Kim Bloomer is a veterinary naturopath (Doctor of Veterinary Naturopathy, VND), hosts the online radio show *Animal Talk Naturally*, and is a proficient blogger and writer on natural pet health. Dr. Kim is also co-author of the book "Whole Health for Happy Dogs". She worked in traditional veterinary medicine for many years and continues to do extensive research into natural health care for dogs and cats. Dr. Kim is currently enrolled in the Clayton College of Natural Health studying for her human Doctor of Naturopathy degree. You can find her at www.AspenbloomPetCare.com for well pet consultations.

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