InterClinical Laboratories Practitioner
Newsletter

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SEASON GREETINGS

It's been an incredibly busy and productive year at InterClinical Laboratories.

Our webinar presentations throughout 2015 have all been a great success, with practitioners logging in from all over the country. We would like to take this opportunity to thank all who were actively involved, your efforts helped to make the series a complete success. If you missed out, log into our website where you can purchase any of the webinars for on-demand viewing.

2016 brings with it new projects including exciting new events and education opportunities–details to be published in the New Year.

Within our final newsletter for 2015, you will find information on one of our lesser known services – Canine and Equine HTMA. The correct mineral balance is as important for animals as it is for humans. Hair tissue mineral analysis is the ideal way to test nutritional and toxic minerals, by a non-invasive method. A sample analysis provides several months' worth of biochemical activity which can be done privately, through your veterinarian or allied healthcare professional, to assist in helping our furry friends maintain optimal health.

We have also included multiple clinical updates for your perusal, covering topics including hair zinc and copper levels and testosterone, hair mineral levels and rheumatoid arthritis and zinc and the common cold. The first two studies found patterns of mineral elevation or depletion providing useful information for when decoding your own patients Hair Tissue Mineral Analysis (HTMA) reports. The third study confirms the long held belief of zinc supplementation and shorter cold duration, suggesting beneficial use alongside old faithful vitamin C in any cold-fighting remedy.

Most importantly, we'd like to thank you for your ongoing support throughout this year. Wishing the very best to you and your families for 2016, may it be a year of growth, renewed and invigorated practice for all.

Yours in health
The team at InterClinical Laboratories

Equine/Canine Health And Hair Tissue Mineral Analysis

The correct mineral balance is important for all animals, including healthy dogs and horses. Minerals have many crucial functions, including acid-base balance, bone and joint structure, enzymatic reactions, energy metabolism, antioxidant support and hormonal functions. Nutritional mineral needs are increased during the lifespan; in infancy, pregnancy, lactation and during hard work. Hair tissue mineral analysis (HTMA) can aid in determining what minerals are in excess and deficiency, and reveal any toxic mineral levels.

Nutritional needs

Like humans, dogs require water, protein, fats, carbohydrates and fibre, vitamins and minerals. Nutritional minerals in canine health can be classified into three major categories: macro minerals (sodium, potassium, calcium, phosphorus and magnesium) requiring gram amounts per day, trace minerals (iron, zinc, copper, iodine, selenium and chromium) which are required in mg or mcg amounts per day, and additional trace minerals (cobalt, molybdenum, vanadium, nickel, lead and tin) which have an unclear role in animal nutrition.

Unbalanced diets in dogs can lead to calcium and phosphorus deficiencies. High meat diets are high in phosphorus and low in calcium, while diets high in phytates can inhibit the absorption

Continued overleaf

of trace minerals. Insufficient supplies of calcium or excess phosphorus can decrease calcium absorption and can result in irritability, hyperesthesia, loss of muscle tone, with temporary or permanent paralysis associated with nutritional secondary hyperparathyroidism. The requirements for dietary calcium and phosphorus are increased over maintenance during growth, pregnancy and lactation.

Magnesium is an essential cofactor of many intracellular metabolic enzyme pathways and is rarely deficient in complete and balanced diets. However, when calcium or phosphorus supplementation is excessive, insoluble and indigestible mineral complexes form in the intestine and may decrease magnesium absorption. Clinical signs of magnesium deficiency in puppies are depression, lethargy and muscle weakness.

Iron and copper found in most meats are usually efficiently utilised, and nutritional deficiencies are rare except in animals fed a diet composed almost entirely of milk or vegetables. A deficiency of iron or copper is marked by microcytic, hypochromic anaemia, and often by a reddish tinge to the hair of a white-haired animal. Deficiency of zinc results in emesis, keratitis, achromotrichia, retarded growth and emaciation. Decreased zinc availability has been noted in canine diets containing excessive levels of phytate.

Equine dietary requirements differ considerably from that of canines. Horses can use hay and other roughage as nutrients sources more efficiently than other non-ruminants, and the current recommendation suggests at least 1.5% - 2% of their body weight in forage or forage substitutes. Horses also require water, protein, minerals and vitamins.

The skeletal system of the horse is of the utmost importance, and therefore the calcium to phosphorus balance requires precise attention. Excessive intakes of certain minerals may be as harmful as deficiencies; mineral supplements should complement the composition of the basic ration. Depending on whether the horse is being fed mostly roughage or grain will affect the calcium to phosphorus ratio. Low blood levels of calcium can lead to porous bones and stress tetany (excess sweating, muscle twitching and stiff limbs).

Salt (NaCl) requirements are markedly influenced by sweat losses. Hot weather and physical exertion will affect the amount of salt that the horse requires. Horses will voluntarily seek out and consume salt to meet their daily requirements if given the opportunity.

Potassium is contained in most roughage at >1%. Working horses, lactating mares, and horses receiving diuretics need higher potassium intakes because of sweat, milk, and urinary losses. Hard work can increase the amount required and excess supplementation can affect the kidneys of healthy horses and cause acute hyperkalemia.

Copper absorption can be inhibited by excessive iron supplementation, and deficiency can cause osteochondritis dissecans in young growing horses and is associated with a higher risk of aortic or uterine artery rupture in adults. Copper deficiency can cause hypochromic microcytic anaemia and pigmentation loss. Excessively high copper intake can potentially reduce the absorption of selenium and iron. Iron in excess potentially interferes with copper utilisation, and the presence of anaemia (low PCV or red cell volume) alone is not sufficient indication for iron supplementation in horses.

Selenium is needed by horses as part of glutathione peroxidase activity, which is increased during exercise. Certain parts of Australia and New Zealand have soils that are particularly deficient in selenium.

Toxicity in animals

Heavy metals are ubiquitous in our environment. Horses and dogs can be regularly exposed to both natural and man-made sources of heavy metals. Food sources, purity of water sources and medications can all be contaminants that have the ability to affect nutritional mineral levels.

Dogs can potentially come into contact with heavy metal sources in a variety of situations. Ceramic food and water bowls that are poorly glazed have been known to contain lead and cadmium. Pet food can also be a source of contamination. A study from 2011 found that concentrations of toxic metals were highest in dry food vs wet food, and that dry dog food had the highest levels overall. Arsenic, cadmium, mercury, thallium, uranium and vanadium were all found in significant levels in various dog foods.

(Obenaug, L et al. 2011. Analysis of Toxic Trace Metals in Pet Foods Using Cryogenic Grinding and Quantitation by ICP-MS. Spectroscopy. (26)1)

Toys and collars can also contain heavy metals. Tests run by Ecology Centre in Michigan ran tests in 2009 on pet toys, tennis balls, beds collars and leashes, and reported that 45 percent had detectable levels of hazardous toxins including arsenic, chlorine and bromine. In the testing of tennis balls specifically for pets found that 48% contained detectable levels of lead. One example contained 2,696 ppm of lead and 262 ppm of arsenic.

(http://www.ecocenter.org/healthy-stuff/)

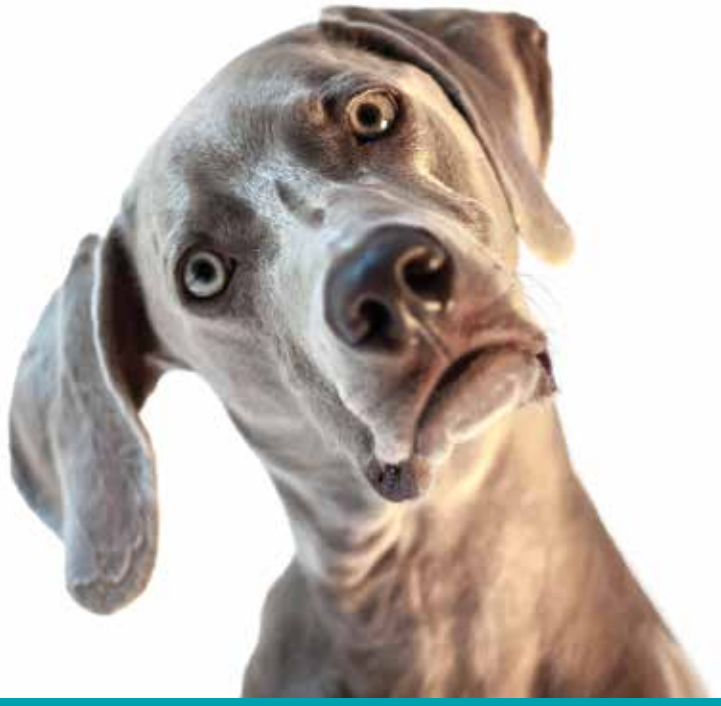
Horses also come into contact with a variety of potential sources of heavy metals. Soil can be a source of naturally occurring heavy metals, as well as heavy metals from industrial exposure or runoff, and fertilisers, pesticides, herbicides and fungicides. Soil samples from farmland in the vicinity to a battery recycling plant in Spain showed levels ranging from 127 to 5657mg/kg-1 of lead, which had caused the death of six horses.

(Palacios, H et al. 2002. Lead poisoning of horses in the vicinity of a battery recycling plant. Science of the Total Environment. (290) 81-89.)

Drinking water is also a possible source of contamination. Water piped through lead or copper pipes, tank and bore water can all possibly contain heavy metals. Feeds, either forage or supplementary feeding can contain high levels of aluminium, pre-packaged feed can contain aluminium as an anti-caking agent and feed can also be contaminated with pesticides and fertilisers containing arsenic, cadmium, mercury, nickel and lead. Building materials are sources of contamination if chewed, both treated timber (chrome copper arsenic) and wood painted with lead paint can be sources of contamination.

Animal HTMA reports

The correct mineral balance is as important for animals as it is for humans. Hair tissue mineral analysis is the ideal way to test nutritional and toxic minerals, by a non-invasive method. Equine and canine tests are all reported as a complete comprehensive interpretive report. The equine and canine reports include information regarding metabolic typing, endocrine and performance indexes and mineral imbalances.



CLINICAL UPDATES FOR THE HEALTH PROFESSIONAL

Hair Zinc and Copper Levels and Serum Testosterone

The minerals zinc and copper influence testosterone synthesis. Zinc is necessary for synthesis while copper can antagonise zinc and therefore, impact testosterone levels. This paper studied the association between the HTMA mineral concentrations of zinc and copper and serum testosterone levels in men. The study included eighty-eight men in a clinic of family medicine at a university hospital. Serum total testosterone was measured in the morning along with hair sample collection. Findings reported that individuals with normal serum testosterone levels had a significantly higher HTMA zinc level compared to the low testosterone group. Also, the study concluded that decreased testosterone was associated with a significant reduction of the zinc to copper ratio in hair samples.

Chang, CS, et al. Correlation between serum testosterone level and concentrations of copper and zinc in hair tissue. Biol. Trac. Elem. Res. 144, 2011.

Hair Mineral Levels in Rheumatoid Arthritis Patients

This study involved the assessment of the minerals copper, iron and zinc in hair, blood and urine of patients diagnosed with rheumatoid arthritis to investigate the role of trace elements in the aetiology and pathogenesis of this condition. There were two groups aged forty-six to sixty and sixty-one to seventy-five years of age, including males and females compared to aged matched healthy control groups. Results of the study revealed significantly lower levels of iron, copper and zinc in blood and scalp hair samples in arthritis patients compared to the health control groups. Conclusions of the study stated, “These data present guidance to clinicians and other professionals investigating deficiency of essential trace metals in biological samples (scalp hair and blood) of RA patients.

Afrisi, HI, et al. Evaluation of status of zinc, copper and iron levels in biological samples of normal and arthritis patients in age groups 46-60 and 61-75 years. Clin. Lab. 58, 2012.

Zinc and the Common Cold

It has been known for some time that the mineral zinc has an antiviral effect. Rhinovirsues are associated with the common cold by attaching itself to the nasal epithelium by an intracellular adhesion molecule. The antiviral effect of zinc to the rhinovirus is that is blocks this receptor. The authors compared the outcome of zinc supplementation with a placebo to determine its effect on duration, severity and incidence of the common cold. Their results found that zinc supplementation was associated with shorter duration of the cold. Mean duration was 4.47 days compared to 8.68 days in the low-dose users and the incidence of cold was 38.2 percent in the zinc group and 61.8 percent in the placebo group.

Das, RR, et al. Oral Zinc for the Common Cold. JAMA, 311, 14, 2014.

Equine and Canine Hair Tissue Mineral Analysis

Did you know InterClinical Laboratories also test horses and dogs?

Like humans, minerals play an integral part in an animal's health. They are necessary for many bodily functions, including formation of structural components, energy transfer, the production of hormones and as enzymatic cofactors.

Animals can be exposed to toxic minerals through a variety of situations including food, soil, water and medication. These toxins can accumulate in tissue and disrupt normal body chemistry.

Hair tissue mineral analysis is a non-invasive analytical test that measures the mineral content of hair. As a storage tissue, hair mineral testing shows mineral deficiencies, excesses and the presence of toxic elements. These results can indicate the long term effects of diet, stress and toxic mineral exposure.

Contact InterClinical Laboratories today for a Canine or Equine HTMA submittal kit.

Because pets are family members, too… and all family matters!

Minerals tested

Nutritional Elements	Toxic	Additional Elements
Calcium	Uranium	Germanium
Magnesium	Arsenic	Barium
Sodium	Beryllium	Lithium
Potassium	Mercury	Nickel
Copper	Cadmium	Platinum
Zinc	Lead	Vanadium
Phosphorus	Aluminium	Strontium
Iron		Tin
Manganese		Tungsten
Chromium		Zirconium
Selenium		
Boron		
Cobalt		
Molybdenum		
Sulphur		

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