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**Hair Tissue
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Newsletter

Nutritional Updates for the Practitioner

Aluminum Induced Cholestasis Reduced By Vitamin E

Aluminum is known to reduce bile secretions by impairing hepatocellular transporters. Investigations on animals were carried out to determine if the aluminum-induced reduction in bile flow was related to oxidative stress. It was found that aluminum increased lipid peroxidation by fifty percent, reduced liver glutathione by forty-three percent, catalase by eighty-three percent and glutathione peroxidase activity by fifty percent. Vitamin E supplementation reduced these adverse effects significantly, as well as increased bile flow and contributed to an increase in aluminum removal. *Gonzalez, MA, et al. Involvement of Oxidative Stress in the Impairment in Biliary Secretory Function Induced by Intraperitoneal Administration of Aluminum to Rats. Biol.Trace Elem.Res. 116, 2007.*

Comment: Vitamin E Plus is a hypoallergenic source of natural vitamin E with selenium amino acid chelate added as a synergist. Trace Nutrients provides vitamin E in a dry form that is more easily utilized than the oil-form by many individuals with fat absorption problems. Further Vitamin E plus is in a succinate form. Vitamin E succinate has been shown to have greater biological effects compared to other forms such as gamma and alpha tocopherol. Vitamin E succinate possesses anti-tumor, anti-angiogenesis and anti-androgen effects and has been shown to be effective in treatment of various types of cancer including breast, gastric and prostate.

Malafa, MP, et al. Vitamin E succinate promotes breast cancer dormancy. J. Sur.Res. 93,1, 2000. Shanker, M, et al. Vitamin E succinate in combination with mds-7 results in enhanced human ovarian tumor killing through modulation of extrinsic and intrinsic apoptotic pathways. Cancer let. 254,2,2007. Crispin, PL, et al. Vitamin E succinate inhibits NF-kappaB and prevents the development of a metastatic phenotype in prostate cancer cells: implications for chemoprevention. Prostate, 67,6, 2007.

Wang, XF, et al. A peptide conjugate of vitamin E succinate targets breast cancer cells with high ErbB2 expression. Cancer Res. 67,7, 2007.

Folic Acid Deficiency and Strokes

Studies have shown that folic acid supplementation can reduce the risk of stroke by as much as twenty-four percent. The U.S. and Canada began fortifying grain products with folic acid in 1998. Since that time, stroke incidence has decreased significantly compared to countries where folic acid fortification has not been implemented.

Wang, X, et al. Efficacy of Folic Acid Supplementation in Stroke Prevention: A Meta-Analysis. Lancet. Vol. 369, 2007.

Comment: Folic acid aids in the reduction of elevated homocysteine, a known risk factor for cardiovascular disease and may therefore, be beneficial for the prevention of strokes. Of course, other factors lead to elevated homocysteine and cardiovascular risks as well, such as deficiencies of vitamin B6, B12, magnesium, copper, etc. Therefore, the status of these nutrients should also be assessed.

Hair Chromium Levels in the Elderly With Type 2 Diabetes and Controls

Hair chromium levels were analyzed in a healthy elderly population and an age-matched control group with type 2 diabetes. Lower chromium levels were observed in the diabetic group. Also, the average hair chromium values showed a slight decrease with age in the control group. This is thought to be a result of age-related factors that may reduce insulin sensitivity and produce chromium deficiency. *Stupar, J, et al. Longitudinal hair chromium profiles of elderly subjects with normal glucose tolerance and type 2 diabetes mellitus. Metabolism. 56,1,2007.*

Also, Huang and colleagues collected hair samples from healthy individuals and those with diabetes. A hybrid algorithm applied to the mineral results was

found to be a good symptom index that could recognize individuals with type 2 diabetes.

Huang, H, et al. Hybrid progressive algorithm to recognize type II diabetic based on hair mineral contents. Conf. Proc. IEEE, Eng. Med. Biol. Soc. 5, 2005.

Comment: Chromium is necessary for insulin sensitivity and its loss from the body can be caused by hyperinsulinism as well as elevated glucose levels. Needless to say, chromium is only one part of the glucose tolerance factor (GTF). Trace Nutrients GT-Formula provides not only chromium in the preferred form of an amino acid chelate, but this product also contains the other known glucose tolerance factors as well; niacin, glycine, glutamic acid and cysteine.

Mercury and Heart Disease

Numerous studies over the last decade have shown the potential of the harmful effects of mercury on cardiovascular disease (CVD). A study following a group of men over a period of thirteen years found that for each microgram of mercury found in the hair the risk of acute coronary events increased by an average of eleven percent, and CVD death by ten percent. The mechanism for increased susceptibility is associated with the interaction of mercury and selenium, reducing the free radical scavenging effects of glutathione enzymes. Selenium protects the body from adverse affects of mercury. When mercury enters the body it is bound by selenium forming a mercury selenide complex. However, in those cases of high exposure to mercury, selenium will be required in greater amount in order to bind the mercury. As a result, selenium bioavailability will be reduced, thereby allowing increased free radical activity, which can promote cardiovascular disease, cancer and other related health conditions. *Virtanen, JK, et al. Mercury as a risk factor for cardiovascular disease. J.Nutri.Biochem. 18, 2007.*

Comment: Mercury is well known to be a neurotoxin and is implicated in a number of adverse health conditions. However, other heavy metals and nutrient mineral imbalances are also associated with disease, particularly CVD and CHD. Assessment of mercury for anyone with CVD or CHD is warranted, however, one should not overlook the overall mineral status that can be determined from hair mineral patterns and the implications of imbalances singularly or in combination that can contribute to the development and progression of CVD, CHD and other health conditions.

Calcium Found Not to Prevent Hip Fractures

Prospective cohort studies suggest that calcium intake is not significantly associated with decreasing the risk of hip fracture in men or women. Controlled studies have shown no reduction in hip fracture risk with calcium supplementation and may even increase risk. The authors summarized their report stating, "future studies of the prevention of hip fracture or any non-ver-

tebral fracture in women should not consider calcium supplementation alone, but rather, should focus on the optimal combination of calcium plus vitamin D and possibly also the correction of phosphate deficiency by using calcium-phosphate supplements.

Bischoff-Ferrari, HA, et al. Calcium intake and hip fracture risk in men and women: a meta-analysis of prospective cohort studies and randomized controlled trials. Am.J.Clin.Nutr. 86,6, 2007.

Comment: This study supports our past findings here at Trace Elements and subsequent recommendations for the assessment and treatment of osteoporosis. HTMA studies have long ago revealed that osteoporosis or increased fracture risk is not associated with calcium deficiency alone. There are over thirty factors associated with proper bone integrity which need to be considered when forming an appropriate prevention and therapeutic regimen for individuals with hip fractures or that are at increased risk of fractures.

Hypervitaminosis D and Osteoporosis

Due to the ever-prevailing increase in the incidence of osteoporosis and resulting fractures, the logical assumption has been to recommend increased intake of calcium and vitamin D. However, this has not quelled the tide of this condition due to the steady rise in incidence. It seems that few have the courage to speak against this mainstream, yet unsupported logic of raising the recommended daily intake of calcium and vitamin D. A report by Lanske, et al in fact discusses the role of too much vitamin D in the elderly, despite vitamin D being the most commonly recommended vitamin in that age group. High vitamin D intake in animal studies show that the vitamin alters mineral ion metabolism and promotes signs of premature aging, arteriosclerosis, emphysema, osteoporosis, soft tissue calcification and generalized atrophy of the organs. Ablation of the vitamin D pathway reversed these developments and prolonged survival. They cite how uncontrolled vitamin D intake could cause occult vitamin D intoxication and could produce skeletal changes that one would actually expect to find in vitamin D deficiency. Hypervitaminosis D causes hypercalcuria and loss of bone mineral density. This emphasizes once again that the use of vitamin D without clear objectives is an unrealistic approach and can lead to unexpected complications.

Lanske, B, et al. Vitamin D and aging: old concepts and new insights. J. of Nutritional Biochem. 18,12, 2007.

Comment: Once again, vitamin D requirements vary from individual to individual and should not be broadly recommended based upon health conditions. Measuring vitamin D levels alone or even evaluating vitamin D intake does not insure adequacy or recognize excesses. Vitamin D has to be assessed in conjunction with other minerals, vitamins, nutrients, health condition, medication use and metabolic characteristics if it is to be used effectively for any individual.

WANT FASTER RESULTS?

Laboratory Specimen Preparation Policy

It is widely known and reported that current hair washing procedures do not distinguish the amount of endogenous from exogenous trace elements removed by various cleaning techniques. The following published studies are just a brief sampling of research showing the problems inherent with exposing human hair to a variety of laboratory wash procedures.

Chittleborough tabulated twenty-four treatment techniques and found that many preparatory treatments removed significant fractions of endogenous elements. His studies support a no-wash policy of hair samples for hair trace element analysis. *Science of the Total Environment*. 14,1, 53-75, 1980.

Different washing procedures remove different contaminants as well as different proportions of trace elements from hair samples. Washing procedures are therefore a major source of inconsistencies among laboratories.

Hair: A Diagnostic Tool to Complement Blood Serum and Urine. Science. Vol.202, 1271-1273. Dec. 1978

The different preanalysis treatments of the hair samples could be responsible for the lack of agreement on trace element levels. Some mineral levels in samples treated by different washing procedures showed significant differences depending upon the technique used.

The use of hair as a biopsy material for trace elements in the body. Katz, S. American Lab. Feb. 1979.

Buckley, et al reported that no washing procedure effectively removed all exogenous minerals, but all treatments extracted varying proportions of the endogenous minerals. Further it has been found that adsorption of elements from the cleaning solutions can occur depending upon the length of time the hair is exposed to the solution.

Radioisotopic studies concerning the efficacy of standard washing procedures for the cleansing of hair before zinc analysis. Buckley, RA, Chem, HCA, Dreosti, IE. The American J. of Clin. Nutr. 40, 840-846, 1984.

No washing procedure reported could completely remove all external trace elements and therefore, it has been suggested that for lead, cadmium, and arsenic there is no purpose in attempting to cleanse hair samples. Data for other elements are quite varied depending upon the type of washing procedure and the mineral in question. Studies of various washing techniques imply that test results from different laboratories may not be comparable, even if the same washing procedure is used but for different time periods.

Taylor, A. Usefulness of measurements of trace elements in hair. Ann. Clin. Biochem. 23, 364-378, 1986.

Trace Elements has, itself done extensive studies on washed and unwashed hair samples. In one study we chose hair samples taken from canines. Since canines do not have sweat glands on their body but rather on their footpads, we felt this would limit significant contact with sodium and potassium that could normally occur from perspiration. Therefore, canine hair samples ensured that the majority of sodium and potassium found in unwashed samples would be endogenous. A dozen samples were treated with various pre-wash procedures and compared to untreated samples. Our results agreed with the published studies, in that there was found a significant removal of endogenous elements with different washing techniques. As much as, and in some cases over 90 per cent of the endogenous sodium and potassium were removed by some washing techniques.

Inter-laboratory comparison studies have revealed a good agreement between labs when sample preparation was the same (unwashed). Agreement is also noted on results from a standard reference material between laboratories where the sample is not subjected to the various laboratories washing procedures. However, a significant inter-laboratory deviation is found on some elements when washed and unwashed sample results are compared, most notably sodium and potassium. In fact, there was a two-fold decrease of sodium on washed samples and a ten-fold decrease in potassium values.

Conclusion:

As the above cited published studies report, researchers looking into the different available wash techniques have verified the inadequacies and inconsistencies found in washing procedures. Also noted is the inability for the various washing procedures to insure removal of only the exogenous elements found on the hair while not radically affecting the endogenous levels. As expected, these non-selective techniques would invalidate the clinical significance of some critical elements being reported. However, we have found that for those labs that do wash their hair specimens, they appropriately avoid placing clinical significance on elements commonly affected by the wash procedure. It should be emphasized that whether or not a lab utilizes a wash process, it is vital that each laboratory report their test results on reference intervals based upon their own established methodology.

In light of this data, and in order to preserve the important endogenous elements, Trace Elements has adopted a no-wash policy in their preparation of human hair specimens for trace element analysis. Please be assured that our continuing research supports the view that analyte levels found in unwashed hair samples provide a better metabolic indication of nutritional status, neuro-endocrine activity and the nutritional interrelationships of an individual.

Trace Elements utilizes a modified non-aggressive wash technique (DI water rinse) for equine hair specimens, in order to remove dirt, debris and other contaminants commonly found on horse hair.

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1 Day Seminar – Hair Tissue Mineral Analysis

Minerals and Advanced Therapy InterClinical is offering one day intensive training workshops designed at helping you better interpret and understand HTMA reports in your practice.



Zac Bobrov
Technical Director
InterClinical Laboratories.

Zac has been involved in the area of nutritional and herbal medicine for over twenty years.

For the past ten years he has worked as Technical Director for InterClinical Laboratories.

He is an engaging and very entertaining speaker with a deep knowledge of natural medicine in practice.

HTMA is a powerful analytical technique regularly used in naturopathy and nutritional medicine today.

It can provide a wealth of clinical information for the practitioner. Minerals are the foundation for developing treatment strategies to restore nutritional balance in your patients, support endocrine needs and aid in the chelation and detoxification process.

Practitioners' individual needs will be catered for in these workshops which will cover fundamentals through to advanced techniques in interpretation.

Program will include how to interpret HTMA reports, metabolic individuality and endocrine relationships, toxicity, chelation and treatment protocols including practitioners own patient reports and case studies.

See included flyer for Sydney Seminar dates.