

NEWS UPDATES - FOR THE HEALTHCARE PROFESSIONAL

January - December 2008

Questionable Health Benefits of Dietary Supplements

In 2007 there has been a number of reports suggesting that vitamin supplementation provides little or no health benefits and even increased health risks. Even though some of the studies found statistically significant improvements in subgroups, the conclusions were "these reductions were small and of questionable clinical importance." Many of the studies included the use of single nutrients and some included a combination largely of two or three antioxidants and some studies involved a simple multi-vitamin.

Comment: These findings are of course understandable in that these studies do not involve the assessment of individual nutritional requirements. Nor do they take into consideration drugs that affect nutritional requirements or coexisting health conditions, diet, individual absorption efficiency, etc. Too much emphasis is often placed on an individual nutrient, such as vitamin E and heart disease for example. The development of cardiovascular disease is contributed to by multiple factors and vitamin E may or may not play a significant role in many types of heart disease. Nutritional interrelationships and balance, particularly among minerals are much more important than the impact of a single vitamin or mineral supplement. Nutritional therapy should be tailored to the individual rather than to a condition. For instance, through HTMA studies, we can determine over a dozen factors involved in diabetes. To study just one nutritional factor, such as chromium, would lead to a similar conclusion that chromium itself may not be that beneficial in the treatment of many individuals with diabetes. However, there are other factors that are as important or are more important than chromium alone in controlling insulin and glucose regulation, and when used in the proper combination can significantly impact diabetes.

There is a substantial flaw in most of the medical studies involving nutritional supplementation. This flaw is the use of a medical model to study nutrition in the same way drugs are studied. Nutrition does not suit or fit into this medical or drug paradigm. Nutrients work in concert with each other including vitamin-to-vitamin relationships, vitamin to mineral and mineral-to-mineral relationships as well as their effect on the neuro-endocrine and immune systems. Antagonisms among these relationships must also be taken into consideration. Vitamin E works in concert with vitamins A, C, K, B12, B6 and folic acid, and is influenced by hormones as well. Beneficial findings for the effects of Vitamin E in any health condition would depend upon these and other factors rather than just vitamin E status alone.

Adverse Effects of Cellular Immune Stimulation and HIV

Researchers have been working on vaccines that would produce a cellular immune response and not a humoral immune response in relation to HIV-specific cytotoxic T-cell response. In doing

so, they hoped that the vaccine may lower viral set point and slow disease progression in those who acquired HIV. However, in the trial vaccines neither prevented infection or lowered viral set point. In fact, the recipients of the vaccine appeared to be at higher risk for HIV acquisition and had a twofold increase in the incidence of infection. As a result the international trials were stopped. *Del Rio, C. Aids Clin. Care Nov. 2007.*

Comment: These results support our findings at Trace Elements through HTMA studies that AIDS is associated with an autoimmune or overactive cellular immune response. Instead of supporting the thymus (cellular immune response), focus should be on suppressing it and or supporting humoral immunity which is typically suppressed in ARC and AIDS patients.

Depression and Inflammation

It is known that depression is more likely in individuals who have low intake of long-chain polyunsaturated fatty acids, specifically n –3 fatty acids. Since these fats modulate pro-inflammatory events, it is suggested that low-grade systemic inflammatory conditions could contribute to depression. Inflammation also involves the HPA axis, the immune response as well as the CNS. *Das, UN. Is depression a low-grade inflammatory condition? Am.J.Clin.Nutr. 85,6, 2007.*

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-vertebral 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.

Diabetes and Pollution

Data accumulated from 1999 through 2002 found a strong correlation between organic pollutants and insulin resistance. Increasing number of reports suggest that chronic dietary exposure and accumulation of low concentrations of pollutants, especially organochlorine compounds within the body may be associated with the development of diabetes. Most studies involving diabetes concentrate on genetic and lifestyle factors ignoring the potential effects of xenobiotics. Environmental chemical compounds appear to disrupt the normal metabolism of glucose and lipids, which can also contribute to obesity. *Jones, OAH, et al. Lancet. Vol. 371,9609. 2008.*

Inhibiting Infection by Chelation

Abscesses form when invading bacteria meet cells of the immune system, most notably neutrophils. These abscesses help confine the spread of infection by restricting microbial growth, but the specific host factors involved in the process have not been well defined. In a report in the 15 Feb 2008 Science, Corbin et al. identified a neutrophil protein, calprotectin, as an important inhibitor of bacterial growth inside abscesses. This protein is involved in signaling other immune cells after tissue damage or inflammation occurs. According to the study, calprotectin also defends against infection by chelating manganese and zinc ions -- metals required by the human pathogen *Staphylococcus aureus* for growth and for counteracting immune attack. The researchers showed that infected mice lacking calprotectin had elevated metal levels and increased bacterial growth in tissue abscesses. Inhibition of bacterial nutrient uptake may thus represent a promising new area of research for the design of antimicrobial therapeutics. As noted in an accompanying Perspective by R.P. Novick, however, whether it is possible to reduce an

essential trace metal to a concentration low enough to block bacterial growth without also compromising the functions of host cells remains to be seen.

High Fructose Intake Linked To Increased Gout Risk in Men

More than 46,000 male health professionals aged 40 to 75 completed food-frequency questionnaires at baseline and every 4 years thereafter. During 12 years' follow-up, 1.6% developed gout. After multivariable adjustment, gout risk rose significantly with increasing consumption of sugar-sweetened soft drinks. Compared with men who consumed less than one sugary soft drink a month, those consuming five to six drinks a week had a 29% increased risk; one a day, a 45% increase; and two or more daily, an 85% increase. Risk also rose with increasing consumption of other high-fructose products, such as fruit juice, apples, and oranges. As a potential mechanism underlying the association between fructose and gout risk, the authors note that fructose increases ATP degradation to AMP, thereby increasing production of uric acid. *Choi, K, et al BMJ, Jan. 31, 2008.*

Comment: It should also be noted that fructose lowers tissue copper levels which has been found to be associated with an increase in gout incidence as viewed from hair tissue mineral analysis studies.

Cardiovascular Risk and Calcium Supplementation in Postmenopausal Women

Investigators in New Zealand randomized 1471 postmenopausal women (mean age, 74) to 1000 milligram of daily calcium citrate intake compared to placebo. After 5 years, 21 women in the calcium group had experienced 24 myocardial infarctions (MI), whereas 10 women in the placebo group experienced 10 MI. The results of this study suggest that calcium supplementation does not lower cardiovascular risk in postmenopausal women but, instead, could raise it. However, the few differences between the calcium and placebo groups barely achieved statistical significance. Until larger prospective trials are conducted to establish the true cardiovascular risk, if any, of calcium supplementation in these patients, clinicians should weigh these possible risks against the presumed beneficial role of calcium in preventing osteoporosis. *Bolland MJ et al. Vascular events in healthy older women receiving calcium supplementation: Randomised controlled trial. BMJ 336:262, 2008*

Comment: As we have often stated, calcium supplementation should be based upon individual need and not recommended arbitrarily. Although calcium may be beneficial for some individuals it may pose a threat to others. See, Osteoporosis and Contraindications of Vitamin D and Calcium. TEI Newslet. 5,1, 1991. HTMA is proving to be a significant tool in assessing individual nutritional needs.

Parkinsonian Syndrome Caused by Drug Containing Manganese

Methcathinone (ephedrone) is a psychoactive stimulant and frequently use as a recreational drug. The drug is manufactured by the use of potassium permanganate oxidation of ephedrine or pseudoephedrine. Various chromates may also be used as an oxidant. Chronic use of the drug has lead to neurological symptoms similar to Parkinson's disease. Individual users showed elevated whole blood manganese levels with MRI evidence of hyper-intensity in regions of the substantia nigra and globus pallidus. *Stephen, A, et al. A Parkinsonian Syndrome in Methcathinone Users and the Role of Manganese. N.Eng.J.Med. 358,1009, 2008.*

Hair Isotopes Help Identify Where People Have Lived

Water containing hydrogen and oxygen vary in different geographic locations. When a person consumes water locally the hydrogen and oxygen isotopes within the water becomes recorded in the hair. Hair analysis of these compounds can aid in determining where a person is from or pinpoint areas they have visited. This may become an important tool in forensics and police investigations. *Hairy Forensics. Science News. Vol. 173,9, 2008.*

More on Metabolic Syndrome X

In our previous Newsletter Metabolic Syndrome X-As Defined Through Hair Tissue Mineral Analysis (HTMA) Patterns, we described this condition as being better described as Diabetes type III. Also, from HTMA studies we concluded that the condition was more related to insulin antagonism due to endocrine factors as well as lipotoxicity, both of which have insulin-antagonism characteristics. A recent commentary in the Journal of the American Medical Association supports our findings. The conventional perspective of diabetes type II has centered around glucose metabolism and insulin resistance. But, now it is becoming more recognized that lipids play a major role in glucose metabolism. The underlying insulin resistance (we feel it is actually insulin antagonism), is secondary to the metabolic trauma caused by ectopic lipid deposition or lipotoxicity. As stated by the author, "This finding supports forty-five years of biochemical, physiological, and clinical research pointing to lipid overload as the underlying cause of this disease and of the other coexisting components of the metabolic syndrome. The author also points out the study that was halted in 2008 by the National Heart, Lung and Blood Institute where aggressive glucose control with intensive insulin therapy lead to an increase in deaths from myocardial infarction or stroke. The study concluded that overpowering the insulin resistance may be harmful since high insulin therapy may force lipogenesis and promote ectopic lipid deposition. *Unger, RH. Reinvention Type 2 Diabetes. Pathogenesis, Treatment, and Prevention. JAMA. 299,10, 2008.*

Comment: Our HTMA studies show multi-causal factors involved in the development and progression of the metabolic syndrome and include neurological, endocrine and nutritional factors, which must be addressed in the prevention and treatment of this condition. *Watts, DL. Metabolic Syndrome X-As Defined Through Hair Tissue Mineral Analysis (HTMA) Patterns. TEI Newsletter. 17, 1-2, 2007.*

Folic Acid and Arsenic

It is estimated that over one hundred million individuals worldwide are exposed to arsenic. The most common exposure is due to the chronic consumption of contaminated water supplies in underdeveloped countries. Of course, arsenic is present in the environment in developed countries as well. A randomized trial was performed involving one-hundred thirty individuals in Bangladesh who were consuming arsenic-containing water and whose folic acid levels were low in the blood. It was found that folic acid supplementation significantly lowered blood arsenic levels in these individuals. After twelve weeks blood arsenic levels were reduced by over thirteen percent in the control group compared to only two and a half percent in the placebo group. The authors state that folic acid detoxifies arsenic into a form that can be readily excreted in the urine. *Arsenic Poisoning Prevention. JAMA. 298,20, 2007.*

Copper, an Anti-Bacterial Agent

In many of our past articles we have discussed the anti-bacterial properties of the mineral copper as well as its co-factors, such as calcium, vitamin D, etc. Copper deficiency is also known to lead to the susceptibility of recurring bacterial infections. Chang-Ling, and colleagues recently reported the effectiveness of attaching copper to indomethacin a nonsteroidal anti-inflammatory drug (NSAID). Results found that when copper is complexed with indomethacin the drug is potent against bacteria such as staphylococcus aureus and escherichia coli. This complex produced a potent bacteriostatic effect. *Chang-Ying, Y., et al. Inhibitory Effect of Copper Complex of Indomethacin on Bacteria Studied by Microcalorimetry. Biol.Trace Elem.Res. 122,1, 2008.*

Mineral Status and Diabetes

It has been known for decades that mineral status is disrupted in patients with diabetes. This latest study confirms these many earlier findings. The study reported the comparison level of essential minerals found in the whole blood, urine and hair of individuals with diabetes compared to normal. The minerals studied included chromium, copper, iron, manganese, nickel and zinc. Results showed that zinc, manganese and chromium were significantly reduced in the blood and scalp hair samples of diabetic patients compared to control subjects. Urinary levels were also found to be higher in the diabetic population compared to the health control group. Hair and blood levels of copper and iron were found to be higher in affected group. The study concluded that impaired trace-element metabolism might have a role in the pathogenesis and progression of type II diabetes. *Kazi, GT, et al. Copper, Chromium, Manganese, Iron, Nickel, and Zinc Levels in Biological Samples of Diabetes Mellitus Patients. Biol.trace Elem.Res. 122,1,2008.*

Comment: Once again this study has confirmed many decades of past studies that unequivocally show that mineral disturbances are present in the development and progression of diabetes, and hair mineral analysis is an excellent tool to determine these mineral imbalances and provides information for specific therapy. I would just like to ask, how long does it take for the evidence to be accepted and put into general clinical practice?

Trace Elements and the Immune System

Lukac, et al reported the importance of trace elements on the immune system. They play an important role in physiological processes that are crucial for normal functioning of the immune system. The authors also state that deficiencies of trace elements are often found with infectious disease and can therefore, influence susceptibility, course and outcome of a number of viral infections. Further, "Some trace elements inhibit viral replication in the host cells and therefore have antiviral activity. Many trace elements act as antioxidants or are able not only to regulate the host immune response but also to alter viral genome." Lukac, n, Massanyi, P. *Effects of Trace Elements on the Immune System. Epidemiol. Mikrobiol. Immunol.* 56,1,2007.

Comment: The above statement is quite a powerful statement and with such far-reaching implications that I think most people have difficulty grasping it. For years we have discussed the importance of specific nutrients on the immune system. We have also reviewed how HTMA can provide an indication for individual nutritional needs and how they influence various components of the immune response as well alter the course of viral and bacterial infections. (See previous TEI Newsletters; Calcium and Virus Activation 1989. The immune System and Hair Tissue Mineral Patterns. Nutritional, Neuro-Endocrine Immunology. 1994. Autoimmune Disease and Women, 2002.) It seems to me that treatment of individuals suffering from immunological disorders without assessing their nutritional requirements would be considered negligence.

Hair Tissue Levels of Heavy Metals and Calcium Pump Activity

The calcium pump is an important regulator of calcium within cells and in the extra cellular space. Calcium regulation can be disrupted by environmental factors such as toxins that include heavy metals. This study discussed the effects of mercury and lead exposure on erythrocyte calcium pump activity in women at delivery and in their newborns. Lead and mercury levels were analyzed in 81 hair and blood samples obtained at delivery. Calcium pump activity was measured in red cells cord blood and maternal erythrocyte plasma membranes. Results found that hair mercury and lead negatively correlated with calcium pump activity in maternal and cord blood erythrocytes. Huel, G, et al. Hair mercury negatively correlates with calcium pump activity in human term newborns and their mothers at delivery. *Environ. Hlth. Perspect.* 116,2, 2008.

Comment: Markedly elevated hair calcium levels may be associated with abnormal regulation of the calcium pump, especially if heavy metals are present. Abnormal functioning of the calcium pump can lead to a number of health conditions including diabetes, cardiovascular disease, thyroid disorders, etc. Dysregulation of the calcium pump can also be caused by internal factors such as endocrine disturbances as well as nutritional imbalances, which can be viewed in HTMA studies.

Protein Aids Bone Health

High protein diets have long-been considered detrimental to bone integrity, especially high protein diets that are used for weight loss. However, more research is now showing the opposite.

In fact, Thorpe, et al reported the beneficial effects of increased protein intake on bone density while subjects followed a high protein diet over a four month period and a further eight months of weight maintenance. Weight loss using higher protein intake preserved more bone mineral content compared to a conventional higher carbohydrate diet. *Thorpe, MP, et al. A Diet High in Protein, Dairy, and Calcium Attenuates Bone Loss over Twelve Months of Weight Loss and Maintenance Relative to a Conventional High-Carbohydrate Diet in Adults. J. of Nutr. 138,6, 2008.*

Comment: As seen from HTMA patterns, most people who have bone loss have a co-existing need for more protein in their diet. Particularly, those with Type II osteoporosis. As we have often reported over the years, 80% of the bone matrix is made up of protein, without which mineral density cannot be maintained.

Toxic and Heavy Metal Exposure Early In Life May Promote Disease Later in Life Via Epigenetics

Minerals are necessary for normal cellular, metabolic and neurological function. It is well known that nutrient mineral deficiency can impair neurological development. Iron deficiency is a good example. However, it is also known that iron excess can also impair neurological development. Some transitional nutrients can cause later-life health disturbances when deficient in the diet, but in excess can be just as harmful. These include iron, copper, manganese and zinc as well as others. Heavy metals such as lead, cadmium, mercury, and arsenic are also neurotoxins and when present early in life can contribute to impaired neuro-development and detrimental health effects later in life and have been called the “fetal origins of disease.” Suggesting that early environmental metal exposure can program later life gene expression, or fetal programming. The mechanism for this phenomenon is termed epigenetics. Epigenetics is the study of heritable changes in gene expression that occur without changes in DNA sequence, that unlike mutations, are reversible and responsive to environmental influences. DNA methylation is the most studied of the epigenetic process that regulated gene silencing.

Studies have shown the relationship of mineral imbalance and neurological function as seen in hair tissue mineral analysis tests. Excess hair manganese has been associated with lower scores of short-term memory, dexterity, and attention deficit hyperactivity as well as demonstrating an inverse association between hair manganese and IQ. Hair concentrations of cadmium compared to reference groups were found to be higher in children with mental retardation, learning disabilities, dyslexia and lower IQ. *Wright, RO, et al. Metals and Neurotoxicology. J. of Nutr. 138,12,2007.*

Comment: This excellent article illustrates the importance of recognizing nutritional balance and exposure to heavy metals as early as possible for prevention of health conditions later in life, which can develop years following environmental exposure. Hair tissue mineral analysis remains the single most effective screening tool for heavy metal exposure as well as nutrient mineral balance.

Hair Calcium, Magnesium and Bone Mineral Density

This study reported on the evaluation of serum and hair levels of calcium and magnesium with bone mineral density in premenopausal women. The study included 104 premenopausal volunteers recruited from outpatient clinics and a health promotion center in a university hospital in Seoul, Korea. Participants completed bone mineral density measurements at the spine and hip and hair samples were obtained for calcium and magnesium analysis. Blood samples were obtained from 68 participants. The results found that higher serum magnesium was associated with lower bone mineral density at the spine, whereas higher hair magnesium was associated with higher bone mineral density at the spine. The ratio of calcium to magnesium in the serum was positively associated with bone mineral density at the spine. The study concluded that magnesium in serum and hair was associated with bone mineral density in premenopausal women and the ratio of serum calcium to magnesium appears to be a significant indicator of bone density. *Song, CH, et. al. Associations of Calcium and Magnesium in Serum and Hair with Bone Mineral Density in Premenopausal Women. Biol.Trace Elem. Res.118,1 2007.*

Mercury and Selenium in Antarctic Seals

Strong positive correlations between selenium and total mercury content in the liver of marine mammals and mercury mine workers have been documented in numerous investigations. Investigators have reported a positive correlation between selenium and total mercury concentrations over the past 1,500 years in seal hair and in the lake sediments amended by seal or penguin excrements on King George Island, West Antarctica. Because the changes in the input of selenium and mercury into the marine environments of the studied sites do not seem to be synchronous, this striking correlation indicates a self-protection mechanism in Antarctic seals and penguins: Every time there is heavier mercury burden, more selenium is accumulated to reduce the toxicity of mercury. *Yin, X, at al. Environ.Toxicol.Chem. Mercury and Selenium Association in Antarctic Seal Hairs and Animal Excrements Over the Past 1,500 Years. Environ.Toxicol.Chem. 26,3, 2007.*

Hair Mineral Levels in Children with Anemia

Serum and hair levels of zinc, selenium, and copper were measured in children with iron-deficiency anemia. The study included a group of fifty-two children diagnosed with anemia and ranged in age from one to four years. Forty-six healthy children were used as a control group. The serum zinc and selenium concentrations in the group with iron deficiency anemia were found to be significantly lower, while serum copper was significantly higher than those in the controls. With the exception of copper, the hair levels of iron, zinc and selenium were found lower in the study group. *Gugoze, MK. Et.al. Serum and Hair Levels of Zinc, Selenium, Iron and Copper in Children with Iron Deficiency Anemia. Biol.Trace.Elem.Res. 111, 2006.*

Myocardial infarction at the age of 50 and under: influence of occupational xenobiotics (analysis of chemical elements in hair of patients)

Elemental composition of hair in 39 patients with myocardial infarction and 23 healthy individuals were analyzed. The highest "chemical pollution" was seen in myocardial infarction patients whose occupations were associated with xenobiotics exposure. Hair mineral concentrations of affected patients contained high amounts of iron, copper, manganese, chromium, cadmium, lead, strontium, rubidium, potassium, bromine and chlorine. Almost two-thirds of those patients had potassium and strontium levels considerably exceeding maximally allowable values. Reliably higher levels of some chemical elements in myocardial infarction patients vs. controls could be a proof of direct cause-effect relationships between xenobiotics influence and coronary incidence in individuals aged 50 and under, especially those subjected to regular risk factors. *Zerbino, DD, Solomenchuk, TN. Med.Tr.Prom.Ekol. 2,2007.*

Evaluation of toxic metals in biological samples (scalp hair, blood and urine) of steel mill workers by electrothermal atomic absorption spectrometry.

The determination of toxic metals in the biological samples of human beings is an important clinical screening procedure. This study aimed to assess the possible influence of environmental exposure on production workers and quality control workers of a steel mill. All subjects were males ranging in age from 25-55 years. In this investigation, the concentrations of Pb, Cd, Ni and Cr were determined in biological samples including blood, urine and scalp hair samples from the steel mill workers in relation to controlled unexposed healthy subjects of the same age group. Quality control for these procedures was established with certified sample of human hair, urine and whole blood. The results indicate that the level of lead, cadmium and nickel in scalp hair, blood and urine samples were significantly higher in both groups of exposed workers compared to those of the control group. The results showed the need for immediate improvements in workplace ventilation and industrial hygiene practices. *Afridi, HI, et.al. Toxicol.Ind. Hlth. 9,2006.*

Determination of cadmium in whole blood and scalp hair samples of Pakistani male lung cancer patients by electrothermal atomic absorption spectrometer.

A large number of epidemiologic studies have been undertaken to identify potential risk factors for cancer, amongst which the association with cadmium has received considerable attention. There is compelling evidence in support of positive associations between cadmium and risk of lung cancer. In this present study we measured the concentration of cadmium in whole blood and scalp hair samples of 120 male lung cancer patients (smokers) and 150 controls or referents (smokers and nonsmokers) from different cities of Pakistan. Both referents and patients were of same age group (ranged 40-70 years), socio-economic status, localities and dietary habits. All samples were analyzed for Cd concentration. The results of this study showed that the average cadmium concentration was higher in the blood and scalp hair of lung cancer patients at different stages as compared to controls ($p < 0.001$). The smoker referents have high levels of Cd in both biological samples as compared to nonsmoker subjects. These results illustrate that the patients who continued smoking after confirmed diagnosis of lung cancer have 34.2-67.26 and 22.4-57.3% more cadmium in blood samples and scalp hair respectively than lung cancer patients who

cease smoking. This study is compelling evidence in support of positive associations between cadmium, cigarette smoking and lung cancer risk. *Kazi, TG. et.al. Sci.Total.Environ. 389,2,3, 2008.*

History of individuals of the 18th/19th centuries stored in bones, teeth, and hair analyzed by LA-ICP-MS--a step in attempts to confirm the authenticity of Mozart's skull.

A cranium stored in the Stiftung Mozarteum in Salzburg/Austria which is believed to be that of Mozart, and skeletal remains of suspected relatives which have been excavated from the Mozart family grave in the cemetery in Salzburg, have been subjected to scientific investigations to determine whether or not the skull is authentic. A film project by the Austrian television ORF in collaboration with Interspot Film on this issue was broadcast at the beginning of the "Mozart year 2006". DNA analysis could not clarify relationships among the remains and, therefore, assignment of the samples was not really possible. The skull and excavated skeletal remains have been quantified for lead, chromium, mercury, arsenic, and antimony content by laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) to obtain information about the living conditions of these individuals. A small splinter of enamel from a tooth of the "Mozart cranium" was also available for investigation. Quantification was performed by using spiked hydroxyapatite standards. Single hair samples which are recorded to originate from Mozart have also been investigated and compared with hair samples of contemporary citizens stored in the Federal Pathologic-Anatomical Museum, Vienna. In general, lead concentrations were found to be 7 to 8 times higher in the bone samples of 18th century individuals compared to recent sampling, reflecting elevated lead levels in food and/or beverages during that time period. Elevated lead levels were also found in hair samples. The amount of antimony in the enamel sample of the "Mozart cranium" was significantly higher than in all the other tooth samples investigated, indicating possible antimony ingestion in early childhood. Elevated concentrations of elements in single hair samples gave additional information about possible exposure of the individuals to heavy metals at a particular point in their life. *Stadlbauer, C. et.al. Anal.Bioanal.Chem. 308,3, 2007.*

Urine, hair, and nails as indicators for ingestion of uranium in drinking water.

The concentration of uranium in urine, hair, and nails due to continuous exposure through ingestion of drinking water was studied. The study population consisted of 205 individuals living in 134 different households in southern Finland where drinking water is supplied from private wells. The population was selected to include a broad range of uranium daily intake from drinking water (0.03-2,775 microg d). The uranium content in drinking water, urine (overnight collection), hair and nails was determined by ICP-MS. The uranium content in all excretion pathways was correlated with the uranium intake, particularly at elevated levels where drinking water was the major source of exposure to uranium. The association between the different bioassays was examined. The absorption factor, f_1 , was calculated for the population with an intake above 10 microg d and was below 0.01 for 72% of the study persons (range 0.0002 to 0.070). No statistically significant difference in f_1 values was found between women and men. However, the absorption factor was higher among younger (< 60 y) than older (> or =60 y)

subjects and among people with a lower exposure (below 100 microg d) than among those that ingest over 100 microg d.

These results conclusively demonstrated that the uranium found in the bioassays can be traced to the drinking water, thus providing a direct link to the source of exposure. Hair may serve as an excellent indicator of occupational or environmental exposure to uranium and provide information regarding its source. Bioassay of hair is attractive as it is an effective bio-concentrator, samples can be easily stored and the concentration reflects an integrated value. *Karpas, Z. et.al. Health Phys. 88,3, 2005. Karpas, Z. et.al. Measurement of the $^{234}\text{U}/^{238}\text{U}$ ratio by MC-ICPMS in drinking water, hair, nails, and urine as an indicator of uranium exposure source. Health Phys. 89,4,2005.*

Metal concentrations in the serum and hair of patients with titanium alloy spinal implants.

A retrospective study of serum and hair metal concentrations in patients with titanium alloy spinal implants was performed. Several studies have demonstrated that metal debris are present in the tissues surrounding titanium alloy spinal implants. However, few studies suggest that metals dissolve, circulate in the body fluid, and accumulate in remote organs. Titanium, aluminum, and vanadium concentrations in serum and hair were measured after surgery in 46 patients with titanium alloy spinal implants (12 patients in the implant failure group and 34 patients in the no implant failure group) and 20 patients without spinal implants (control group). All the subjects were examined again 1 year after the first examination or implant removal. Of the 46 patients with titanium alloy spinal implants, 16 patients (34.8%) exhibited abnormal serum metal concentrations and 11 patients (23.9%) exhibited abnormal hair metal concentrations. In the control group, three patients (15%) exhibited only abnormal serum and metal aluminum concentrations at the first examination. In both of the two patients who exhibited abnormal serum titanium concentrations and then had their spinal implants removed, the serum and hair titanium levels decreased to beneath the reference value limit in 1 year after the removal. Comparison of the implant failure and no implant failure groups showed no significant differences in the incidence of abnormal serum concentrations of titanium, aluminum, or both metals. Therefore, serum metal concentrations did not seem to be a useful indicator of hardware loosening or implant failure. Approximately one third of patients with titanium alloy spinal implants exhibited abnormal serum or hair metal concentrations at a mean time of mean 5.1 years after surgery. Titanium or aluminum may travel to distant organs after dissolution of metals from the spinal implants. *Kasai, Y. et.al. Spine 28,12,2003.*

The role of mercury and cadmium heavy metals in vascular disease, hypertension, coronary heart disease, and myocardial infarction.

Mercury, cadmium, and other heavy metals have a high affinity for sulfhydryl (-SH) groups, inactivating numerous enzymatic reactions, amino acids, and sulfur-containing antioxidants (NAC, ALA, GSH), with subsequent decreased oxidant defense and increased oxidative stress. Both bind to metallothionein and substitute for zinc, copper, and other trace metals reducing the effectiveness of metalloenzymes. Mercury induces mitochondrial dysfunction with reduction in ATP, depletion of glutathione, and increased lipid peroxidation; increased oxidative stress is

common. Selenium antagonizes mercury toxicity. The overall vascular effects of mercury include oxidative stress, inflammation, thrombosis, vascular smooth muscle dysfunction, endothelial dysfunction, dyslipidemia, immune dysfunction, and mitochondrial dysfunction. The clinical consequences of mercury toxicity include hypertension, CHD, MI, increased carotid IMT and obstruction, CVA, generalized atherosclerosis, and renal dysfunction with proteinuria. Pathological, biochemical, and functional medicine correlations are significant and logical. Mercury diminishes the protective effect of fish and omega-3 fatty acids. Mercury, cadmium, and other heavy metals inactivate COMT, which increases serum and urinary epinephrine, norepinephrine, and dopamine. This effect will increase blood pressure and may be a clinical clue to heavy metal toxicity. Cadmium concentrates in the kidney, particularly inducing proteinuria and renal dysfunction; it is associated with hypertension, but less so with CHD. Renal cadmium reduces CYP4A11 and PPARs, which may be related to hypertension, sodium retention, glucose intolerance, dyslipidemia, and zinc deficiency. Dietary calcium may mitigate some of the toxicity of cadmium. Heavy metal toxicity, especially mercury and cadmium, should be evaluated in any patient with hypertension, CHD, or other vascular disease. Specific testing for acute and chronic toxicity and total body burden using hair, toenail, urine, serum, etc. with baseline and provoked evaluation should be done. *Houston, MC. Altern. Ther. Health Med. 13,2,2007.*

Changes of selenium, copper, and zinc content in hair and serum of patients with idiopathic scoliosis.

This work aimed at extending the search for abnormalities of trace elements in patients with idiopathic scoliosis to the content of zinc, copper and selenium in these subject's hair and serum. A total of 59 patients (54 girls and 4 boys) with idiopathic scoliosis, aged 13 on the average (range, 10-18 years), were examined. The degree of spine curvature deformity ranged between 12 degrees and 82 degrees . The hair of scoliotic patients under examination showed significantly increased content of zinc and copper, and decreased content of selenium, in comparison with the control group. In scoliotic patients, the Cu/Zn ratio in hair did not differ significantly from the values found in the probands of the control group. The Cu/Se ratio in this group of patients was significantly higher due to a higher Cu value and a lower Se value in comparison with the controls. In comparison with controls, the serum selenium concentration in the group of scoliotic patients was significantly decreased. Various changes in the content of trace elements in biological samples taken from patients with idiopathic scoliosis are not accidental. What might bring about a shift in our knowledge is speciation of various forms of trace elements in the organism in relation to idiopathic scoliosis. *Dastyh, M. et.al. (c) 2008 Orthopaedic Research Society. Published by Wiley Periodicals, Inc. J Orthop Res.*

Hair Calcium and Magnesium Levels in Patients with Fibromyalgia: A Case Center Study

This study explored calcium and magnesium levels in patients diagnosed with fibromyalgia compared to matched control groups. Findings revealed significantly higher hair levels of both calcium and magnesium in the affected group. The study suggests that calcium and magnesium supplements may be indicated as an adjunctive treatment for patients with fibromyalgia. *Ng, S. J. Manipulative. Physiol. Ther. 22,9, 1999.*

Comment: In the past we have discussed our HTMA findings of patients with fibromyalgia in which we also found elevated levels of hair calcium and magnesium levels. However, the above cited study did not evaluate the mineral interrelationships, i.e. ratios, particularly among calcium and magnesium, which is considerably more important than evaluating the levels alone. Nor did this study discuss the other mechanism related to the condition. In our published study *Fibromyalgia A Metabolic Profile, TEI Newslet. 3,16,2004*, we discussed the importance of nutrient interrelationships as well as the neuro-endocrine factors related to the development of fibromyalgia. For example approximately 81 percent of those diagnosed with this condition were found to be parasympathetic dominant showing imbalances between calcium and magnesium, phosphorus, potassium, as well as imbalance between zinc and copper and deficiencies of iron, chromium and manganese. Endocrine involvement was also present. All of these factors play a part in the development and of course successful treatment of fibromyalgia and should be taken into consideration. The elevation of the calcium-to-magnesium ratio is more important than evaluating the levels alone. With a relative magnesium deficiency, excessive intracellular calcium accumulates, contributing to the many physical signs and symptoms associated with this condition. *Magaldi, M, et.al. Changes In Intracellular calcium and magnesium ions in the physiopathology of the fibromyalgia syndrome. Minerva Med. 91, 2000.*

Hair Mineral Levels in Patients With Diabetes Mellitus

Hair, blood and urine minerals levels were analyzed in diabetic patients and compared to levels found in a non-diabetic control group. Results showed that the mean levels of zinc, manganese, and chromium were significantly lower in the blood and scalp hair of the patients diagnosed with diabetes compared to normal controls. Further, the urinary levels were higher in the diabetic group. Higher levels of copper and iron were found in the blood and scalp hair of the diabetic group as well. This study concluded, "Impaired trace-element metabolism may have a role in the pathogenesis and progression of type-2 diabetes mellitus." *Kazi, TS, et al. Copper, Chromium, Manganese, Iron, Nickel and Zinc Levels in Biological Samples of Diabetes Mellitus Patients. Biol.Trace Elem.Res. 122,1. 2008*

Comment: Actually it has been known for decades that alterations in micro and macro nutrient status is associated with the development of type-II diabetes. Over the years, studies have showed that deficiencies and excesses of certain nutrients have been correlated with the presence of diabetic complications. But, there is confusion concerning the nutritional requirements of patients with diabetes, as many studies are contradictory in different population groups studied. The confusion is understandable since diabetes is typically not viewed from a metabolic standpoint. Diabetes has been classified under the two main categories, type-I and type-II. However, many variations exist under each category in which causation can be completely different. From hair tissue mineral (HTMA) studies we have recognized over six different mineral patterns associated with the development of type-II diabetes. Therefore, specific and targeted nutritional therapy based upon HTMA of individuals may not only reduce and even reverse the progression of complications from diabetes, but may also serve to prevent development. The value of HTMA in showing individual metabolic nutritional requirements of patients with diabetes and other disease states has not been fully appreciated. Perhaps this is due to the inability to properly interpret HTMA laboratory results particularly in relation to other tests as well as recognizing the neuro-endocrine influence on nutritional balance. For example in the study cited above, when tissue mineral levels are low in the HTMA results, it represents a

lower tissue level, which may be due to excessive losses due to individual metabolic characteristics rather than reduced intake. Therefore, it would be expected to find the inverse relationship in the urinary excretion studies. Among patients with impaired glucose tolerance, diet and exercise interventions for a period of six years lowered the cumulative incidence of diabetes at 20 years and delayed onset of the disease. For further information see, *Trace Elements and Glucose Disorders, TEI Newslet. 11, 2, 1999.*

Low Salt Intake and Oxalate Kidney Stones

Oxalates are commonly found in foods and are usually eliminated through the intestines. When oxalates in conjunction with other chemicals cannot be eliminated through this normal excretory route they are then eliminated via the kidneys, which can result in stones developing. Normally, dietary oxalates are exchanged for chloride in the intestine via a specific protein and then simply excreted. For this oxalate-attaching protein to work it needs sufficient amounts of chloride. However, when there is insufficient chloride available, oxalates are retained by the intestine, absorbed and then excreted through the kidneys. Of course the main source of chloride in our diet is from sodium chloride. When sodium chloride is markedly restricted in the diet or if there is poor absorption or retention due to adrenal insufficiency, a predisposition may exist for the development of calcium oxalate kidney stones. *Kidney Stones. J.A.M.A.299,13. 2008*

Comment: The most common sources of oxalic acid in foods are found in plants such as rhubarb, buckwheat, spinach, chard, beets, nuts, berries, chocolate, parsley and berries. Some species of aspergillus molds can produce oxalic acid as well as the metabolism of ethylene glycol. Oxalic acid can combine with the minerals calcium, magnesium and iron forming crystals. Of these, the most common are calcium oxalates, which can deposit in tissues other than the kidneys, such as the intestines.

Dietary Protein and Health

Rodrigues and colleague reported at the Protein Summit 2007 that, “Dietary protein recommendations have traditionally been based upon preventing deficiency [i.e., the Recommended Dietary Allowances (RDAs)] as opposed to promoting optimal health. The use of the RDA is for evaluating populations and the adequacy of food supply, not for assessing the adequacy of intake of the individual.” Research is showing that in fact higher protein intake may be important on the major health outcomes including weight management, diabetes and cardiovascular disease. Little evidence of harm is found with protein intakes four times the requirements. In fact, evidence has shown that the concern of higher protein intake on bone loss, renal function and cancer has proved to be of little concern. *Rodrigues, R, Garlick, PJ. Introduction to Protein Summit 2007: Exploring the Impact of High Quality Protein on Optimal Health. Am.J.Clin.Nutr. 87 S. 2008.*

Comment: We base the dietary protein intake recommendations on individual metabolic types. Higher protein is needed in the slow metabolic types and less in the fast metabolic types and even less in certain metabolic subpatterns. Although well meaning, we are often criticized by some for recommending that some individuals should consume approximately forty percent of

their daily caloric intake from protein. However, the Protein Summit reported that “a significant percentage of adolescent females and older women appeared to have inadequate protein intake”, and also stated “given the prevalence of being overweight or obese in America and the role protein may play in managing body weight, it makes sense to consider increasing protein intake recommendations to twenty-five to thirty percent of calories.” The acceptable macronutrient distribution range for protein is thirty-five percent of the daily caloric intake. This level is in agreement and approaches the amount of protein we recommend and have done so over the past twenty-five years. Apparently the median caloric intake of protein in children is only 13.4 percent and about 16 percent in men aged 51 to 70 years. *Fulgoni, VL, III. Current Protein Intake in America: Analysis of the National Health and Nutrition Examination Survey. Am.J.Clin.Nutr. 87 S. 2008.*

Emotions and Disease

In the past, we have often spoken about how emotions are linked to disease progression. Recently 192 couples in the Tecumseh Community Health Study were evaluated based upon their ability to express or suppress their emotions and the effect this has on mortality. Among the couples considered anger suppressors, the mortality rate was twice as high as that of other groups considered anger expressors. Psychologist Janice Kiecolt-Glaser of Ohio State College of Medicine in Ohio State say the data “add weight to the growing evidence that poor emotional housecleaning has health consequences in marriages and that bottling up anger can shorten your life.” *Resentment Kills. Science. Vol 319. 2008.*

Comment: Emotions are intimately linked to, and can affect the biochemical balance within the body. Stress from chronic emotional issues eventually impact the neuro-endocrine system and ultimately contribute to nutritional imbalances furthering the progression of somatic conditions.

Viruses and Mental Illness

It has been suspected that childhood infections may contribute to the future development of mental illness. Recent studies have shown evidence for this connection. Investigators found that youngsters in Sweden who were exposed to viral infections that affected the central nervous system displayed psychotic illness, including schizophrenia, by the ages of 17 to 29. Infections that showed this link included mumps and cytomegalovirus that revealed strong links. The studies concluded “evidence that certain infections during childhood and adulthood may be risk factors for schizophrenia.” *Bower, B. Sickness and Schizophrenia. Psychotic ills tied to previous infections. Science News. 173. 2008.*

Comment: The relationship between infections and later mental illness has been suspected for some time. Just how this relationship develops is still speculative. However, HTMA studies may help to somewhat explain this relationship. In the past we have discussed the neuro-endocrine-metabolic response of the body to viral and bacterial infections. More specifically, bacterial infections tend to develop more often in individuals with a sympathetic metabolic pattern in conjunction with a low tissue copper status, along with other mineral imbalances that also increase bacterial susceptibility. Bacterial infections tend to lower tissue copper as well as

enhance the humoral immune response. On the other hand, virus susceptibility is more prominent in parasympathetic metabolic patterns in conjunction with increased tissue copper levels. Viruses tend to produce a cellular immune response as well as increase tissue copper retention. As tissue copper levels rise particularly in the brain due to chronic viral activity, emotional manifestations can occur much later following the viral episode. Actually, copper deficiency and excess can both contribute to different mental effects. Copper deficiency along with other mineral and nutritional imbalances produced by chronic bacterial infection could contribute to manic depression, anxiety, and aggressive behavior while excess copper can contribute to schizophrenia, chronic fatigue, depression, fatigue and withdrawal.

Chromium and Blood Pressure Control

When one thinks about blood pressure we often think about the nutritional impact of elevated cholesterol and sodium and/or deficiencies of calcium and magnesium, etc. But, the mineral chromium can also have significant impact. Nutritional specialist H.G. Preuss at Georgetown University in Washington along with other researchers studied the effects of chromium supplements on animals predisposed to the human counterpart of the metabolic syndrome. They found that not only did chromium help with blood sugar control, but the animals receiving the supplement had consistently lower blood pressure than the control group and lived nineteen percent longer. Chromium supplementation resulted in a reduction of blood vessel constriction by lowering the hormone angiotensin II. *Keeping Metabolic Syndrome at Bay. Sci.News. 173. 2008.*

Comment: Elevated blood pressure and poor glucose control is associated with the metabolic syndrome as well as with diabetes and the development of cardiovascular disease (CVD) in general. Chromium has a close relationship to insulin and is known to be related to atherosclerosis and hypercholesterolemia. Chromium status should always be evaluated in individuals with the above conditions and in many other health conditions as well.

Insulin and Cancer

High insulin levels are known to be associated with insulin resistance and is common in type-II diabetes. Research is beginning to show that high levels of insulin and insulin like growth factor -1 (IGF-1) are also associated with increased development of some forms of cancer. It has been observed that elevated IGF-1 or concentrations within the high normal range increased the risk of epithelial cancers such as prostate, breast and colon cancers. *Pollak, MN. Insulin, Insulin-Like Growth Factors, Insulin Resistance and Neoplasia. Am.J.Clin.Nutr.86S, 3. 2007.*

Comment: Insulin is synergistic with other nutritional and neuro-endocrine factors, particularly the hormone estrogen. High estrogen levels can increase insulin and insulin can increase estrogen as well. In previous editions of E-News Updates we provided evidence of increased parathyroid activity in breast cancer. Interestingly, we have discussed in other publications the synergistic relationship between insulin, estrogen and parathyroid hormone (PTH). Therefore, more is involved than just insulin or IGF-1 alone in the development of cancer, which should also be

evaluated. These studies emphasize the importance of glucose stability in any disease and not just in cases of diabetes.

Plastics and Diabetes

Bisphenol A, a substance found in plastic bottles, and the lining of aluminum cans is widespread and has been related to diabetes, heart disease and other health conditions. Studies by the National Center for Environmental Health found bisphenol A in the urine of ninety-three percent of the participants tested. Bisphenol A mimics estrogen within the body and may also increase insulin levels. Even though the FDA released a document saying the chemical is safe at current exposure levels, Angel Nadal, of the Spanish Biomedical Research Network in Diabetes and Associated Metabolic Disorders in Spain states “I do not understand why the governments of the United States and Europe put money into studying pollutants like bisphenol A and then later don’t listen to what the scientists have found. They are using a last-century approach to toxicology.” *Ehrenberg, R. Popular plastics chemical poses another threat: this time diabetes. Sci.News. 174,6. 2008.*

Lead and Pregnancy

We are often asked about starting rebalancing programs during pregnancy. Some are concerned that heavy metal mobilization may occur during metabolic rebalancing. However, the fact is, even if therapeutic rebalancing is not undertaken, if heavy metals are present within the mother they can still be mobilized during pregnancy. These reports describe instances of lead mobilization in two mothers who had on-going and previous lead exposure. The first case involved an ongoing lead exposure in an expectant mother who was found to be anemic during her twenty-third week of gestation. Blood lead was slightly elevated at 31 mcg/dl (upper limit 25 mcg/dl). The mothers lead level was 75-85 mcg/dl after the baby was delivered by Cesarean section and the infants blood lead level was elevated as well. The source of the lead was from fifteen year old bullet fragments located in her lumbar region. Another case involved a mother who had been exposed to lead seven years prior to conception. During pregnancy her blood lead level increased to 81 mcg/dl. The increase in lead was due to increased bone resorption during pregnancy. *Raymond, LW, et al. Maternal-fetal lead poisoning from a 15-year-old bullet. J.Matern.Fetal Neonat.Med 11,1, 2002. Riess, ML, et al. Lead poisoning in an adult:Lead mobilization by pregnancy? J.Gen.Intern.Med. 22,8, 2007.*

Comment: Lead and other heavy metals within the body can be present due to previous exposure, sometimes years previously. It is essential for those who want to become pregnant to be screened for the possibility of toxicities. If found to be elevated, it would be warranted to rebalance the chemistry in order to not only improve their health in general but to mobilize and excrete heavy metals prior to conception. However, from the present studies if heavy metals are found during pregnancy it would be wise to implement therapy in order for them to be excreted and reduce their exposure to the fetus.

Fast Metabolic Rate and Obesity

Recently Flaa, et al. published their findings of an eighteen year follow-up study in which they assessed the relationship between sympathoadrenal activity in individuals with increased body mass index (BMI). Based upon arterial hormone testing they found that “the epinephrine response to mental stress is a negative predictor of future BMI, waist circumference, and triceps skinfold thickness. To determine sympathoadrenal activity, the researchers measured arterial catecholamines. Flaa, A., et al. *Does sympathoadrenal activity predict changes in body fat? An 18-year follow-up study. Am.J.Clin.Nutr.* 87,6. 2008.

Comment: I understand the difficulty in comprehending how individuals who are classified as Fast Metabolic Types from HTMA studies can be overweight. As we have discussed in the past, individuals with “Metabolic Syndrome” are frequently overweight. The question that often arises is, does the Fast Metabolic rate occur first which contributes to weight gain and metabolic syndrome, or does the weight gain contribute to the Fast Metabolic rate. I certainly contend that the Fast Metabolic rate contributes to the overweight condition as well as the accompanying metabolic syndrome and other complications such as diabetes and cardiovascular disease. For further information see, *TEI Newsletter 17,1-2, 2007, Metabolic Syndrome X- As Defined Through Hair Tissue Mineral Analysis (HTMA) Patterns.*

Other News in 2007 Reports in *Science News*, 172, 2007

Breast Milk Can Contribute to HIV Infections in Infants?

This theory has now been blown away. Health authorities have now reversed their advice for mothers to stop breast feeding and now say that babies born to HIV-positive mothers in poor countries have a greater chance of avoiding infection if they are breast feed exclusively.

Antacids and Fractures

The popular drugs that block the production of stomach acid have been found to increase the susceptibility to hip fractures in people over 50 years of age.

Hyperthyroidism in Cats

If you are a pet owner and have a pet that has developed an over-active thyroid, keep them away from flame retardant materials. An epidemic of hyperthyroidism in cats has been linked to certain flame-retardants that are commonly found in the home on mattresses, clothing, drapes, blankets, carpets, etc. It is probably just a matter of time before canines are also found to be affected.

Fatty Liver and Carbohydrates

It is thought that high fat intake can contribute to fatty enlargement of the liver. But, more recent animal studies found that over-consumption of quickly digested carbohydrates in the form of breads, french fries and sweets are a significant cause of liver enlargement and fatty infiltration.

Ask For Your Steak Rare Instead of Well Done

Apparently when meat is overcooked a chemical is formed that mimics a female sex hormone. This may be the reason breast cancer risk has been linked to red meat intake. It is not necessarily the red meat, but the chemical formed when it is over-cooked.

Calcium, Vitamin D and The Brain

This is interesting. It seems in older individuals who consume more calcium and vitamin D, there is a an increase in the number and size of lesions found in their brains.

Lead and Vitamin D

Although vitamin D is an important nutrient, high intake in the young can increase the uptake of lead from the environment.

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