



InterClinical Laboratories Practitioner Newsletter

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Epigenetics and Hair Tissue Mineral Analysis

Spring is here! Thanks to all who joined us on winter's final eve for Dr Bradley McEwen's (PhD) exclusive webinar *The Nutritional Medicine Management & Detoxification of Lipophilic Heavy Metals*. The event could not have been such a success without your enthusiastic participation. Attendees and their patients will undoubtedly benefit from the sharpened skills and confidence in the identification and detoxification of these lipophilic or "fat loving" heavy metals.

This leaves only one webinar left for the year, *The Relationship Between Epstein Barr virus & Hair Tissue Mineral Analysis* presented by Gary Moller. Gary is a seasoned clinician and doctoral researcher who is excited to share his cutting edge findings with you. Gary uses Hair Tissue Mineral Analysis (HTMA) to detect a correlation between Epstein Barr virus (EBV) and liver dysfunction leading to copper accumulation in the body. EBV, which he refers to as "the vampire within" may be the root cause of much chronic ill health as the apparently fully recovered glandular fever patient experiences an "acute infection" pattern years, even decades later. Practical skills learned include recognising the patterns of EBV and glandular

fever within HTMA and effective nutritional and lifestyle strategies to combat the virus. A sure-fire way to increase your clinical edge!

Click into the 'events' section of our website or call the office and one of our friendly staff members will book you a place. Both Brad and Gary's webinars will be available for purchase for on-demand viewing for those who cannot make the live event.

In the theme of spring which symbolises rebirth and growth, this month's clinical update focuses on 'nutrigenomics' a field of research resulting from the combined study of nutrition and epigenetics. In *Nutrition, Epigenetics and Hair Tissue Mineral Analysis* David L. Watts discusses the nutritional influence on epigenetic expression which begins in vitro via the mothers nutritional status and environment. Such environmental factors include toxic and heavy metal exposure in early life that may promote disease later down the track. Further details in the subsequent article.

Thank you for your ongoing support.

Yours in good health

The team at InterClinical Laboratories

Nutrition, Epigenetics And Hair Tissue Mineral Analysis (HTMA)

by Dr D. L. Watts (Trace Elements Inc. and InterClinical Laboratories)

Encyclopaedia Britannica defines epigenetics as "the study of the chemical modification of specific genes or gene-associated proteins of an organism. Epigenetic modifications can define how the genetic information is expressed and used by cells. The term epigenetics came into general use in the early 1940's, when British embryologist Conrad Waddington used it to describe the interactions between genes and gene products, which direct development and give rise to an organism's phenotype (observable characteristics). Since then, information revealed by epigenetics studies has revolutionised the fields of genetics and developmental biology. Specifically, researchers

have uncovered a range of possible chemical modifications to deoxyribonucleic acid (DNA) and to proteins called histones that associate tightly with DNA in the nucleus. These modifications can determine when or even if a given gene is expressed in a cell or organism." (Encyclopaedia Britannica, 2008)

To simplify, genes contained in DNA are copied and inherited across generations and are provided by both parents. This produces traits such as eye colour, height, weight and blood type. DNA is passed on to new cells during development and also when they are reproduced within the body. Epigenetics is the study of how inherited traits are modified or changed by influences

Hair Tissue Mineral
Analysis Pathology

Nutritional, Herbal and
Natural Medicines

Practitioner Education

Research and
Development

Continued overleaf

other than a change to the DNA sequence. The genome is the genetic material contained within the cells and the epigenome is involved in regulating gene expression. In other words, non-genetic or inherited factors can cause genes to express themselves differently by modifying or changing their expression by activation or silencing of specific genes through abnormal methylation processes.

Epigenetic Expression

Epigenetics affect genetic expression in the embryo by activating and deactivating genes to guide the differentiation of stem cells to form specialised cells, such as heart cells, muscle, nerve and skin cells. Following birth there are more and more influences that act upon the genome. These include; environmental factors, hormones, stress and nutrition. The nutritional influence begins in utero and is affected by the nutritional status and environment of the mother. Even the mother's emotional status can influence the developing foetus. Inheritable epigenetic changes in gene expression unlike genetic mutations of DNA sequences are responsive to environmental influences.

Nutrigenomics and Nutrigenetics

The effect of diet on epigenetic expression is being studied extensively. The combination of studying nutrition and epigenetic expression has resulted in a field of research termed nutrigenomics. Nutrigenomics is described as a branch of nutritional genomics and is the study of the effects of food constituents on gene expression. Nutrigenetics is a term used to study the individual genetic variation or response to the environment, diet or nutrients based upon single nucleotide polymorphisms (SNP) within the genome that indicate individual phenotypic differences. (Mutch, 2005) Both fields are actually striving to be able to recognise individual nutritional needs so that a personalised nutritional approach can be implemented for the treatment and prevention of disease.

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

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 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 “foetal origins of disease”. Suggesting that early environmental metal exposure can program later life gene expression, or foetal programming. Although 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. 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, 2007) Sanders, et al explored the effect of cadmium exposure in mothers and their newborns. Cadmium is known to cross the placental barrier from the mother to the foetus and impacts development. The study showed the adverse effect of cadmium on DNA methylation in both the maternal and foetal DNA. (Sanders 2013)

The Effects of Long-Term Nutritional Deficiencies and Disease

National nutritional recommendations and policies are based primarily on preventing short latency or short-term deficiency disease. Examples of short-term nutritional disease include vitamin C deficiency and scurvy, niacin deficiency and beriberi, iodine deficiency and goitre, and vitamin D deficiency and rickets. It is now recognised that the long-term, inadequate intake of many nutrients lead to several major chronic diseases in industrialised nations and may take years to manifest. Nutritional needs necessary to prevent these chronic disease conditions are higher than the requirements necessary to prevent the effects of short-term deficiency conditions. Therefore, Heaney concluded, “recommendations based solely on preventing the index diseases are no longer biologically defensible.” (Heaney, R.P. 2003)





concluded that HTMA offers a method of investigating the impact of long term exposure to endocrine disruptors and nutritional status on reproductive outcomes. (Dickerson, et al 2011).

Metabolomics and Nutritional Assessment

A paper was presented at a symposium of Experimental Biology on improving human nutrition through genomics, proteomics and biotechnologies, and was related to nutritional research related to the future of diet and health. This paper addressed concerns that all humans are not the same in respect to their response to diet. Some individuals may gain weight on a particular diet and others may lose weight on the same diet. This emphasises the need to approach nutritional needs of individuals based upon genetic and metabolic needs rather than trying to place everyone under one simplistic umbrella. In quoting the authors, "it is clear that diversity of the human population is a nutritional reality. Once this diversity is realised, it becomes imperative that the problems of metabolic regulation, and their causes and interventions, will need to be personalised in order to be addressed and finally solved," it is obvious that individual metabolic assessment and a targeted nutritional approach is much more important than generalised nutritional recommendations. (German, et al 2003)

Personalised Nutrition and Hair Mineral Analysis (HTMA)

DNA methylation is probably the most understood mechanism in epigenetic research. Acetylation, ubiquitination and phosphorylation are also known to modify the genome. The methylation process requires over a dozen essential nutrients, including minerals such as zinc, magnesium, copper, selenium and vitamins such as B12, folate, choline, vitamin C, B2, niacin and others. Not only is the status of each nutrient important, but the interrelationship between these nutrients are important for normal methylation reactions.

The HTMA can be considered one of the most economical tests in providing results of a wide number of nutritional elements and their interrelationships. It also provides information about an individual's nutritional status relative to the presence of heavy metals from the environment. In addition, it can also be considered an excellent tool for developing personalised nutritional recommendations that are known to impact the epigenome. The use of HTMA can greatly aid the clinician in recognising long-term nutritional imbalances and impending deficiencies of nutrients that lead to chronic disease.

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Vitamin Supplementation Could Help 2 Billion Kids

An article that appeared as a headline in USA Today, 3/24/2004 illustrates the importance of nutritional balance early in life. The article stated the critical importance of proper nutrients for children to reach their full physical and intellectual potential. Cutberto Garza, director of the Food and Nutrition program of the U.N. University stated "When a child needs iron or vitamin A or iodine, she needs it now. And if she doesn't get it, then you're going to pay for the rest of her life. But, if you meet that need, the positive outcomes are absolutely glorious."

It is well known that nutritional deficiencies begin to develop long before signs and symptoms manifest. This is true of nutritional imbalances as well. The positive or negative impact of nutritional status begins even before conception with the nutritional status of the mother.

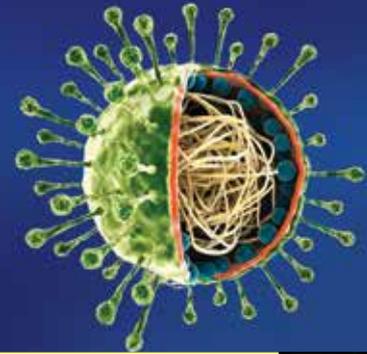
Hair Mineral Patterns, Reproduction and Environmental Endocrine Disruptors

It is known that chemicals from the environment can impact fertility. It is also believed that heavy metals such as mercury as well as the status of some nutrient minerals can impact fertility and reproduction in humans. A report by Dickerson, et al, studied the hair mineral concentrations in women with fertility problems who underwent in vitro fertilisation treatment and investigated treatment outcomes. Mercury, zinc and selenium were analysed. Hair mercury revealed a negative correlation with oocyte yield and follicle number following ovarian stimulation. The hair zinc and selenium correlated positively with oocyte yield after ovarian stimulation. Their data found that mercury had a deleterious impact while zinc and selenium showed a positive impact in the ovarian response to gonadotropin therapy for in vitro fertilisation. The researchers found that minerals such as zinc and selenium may be important for reproductive outcomes and are reflective of long term environmental exposure and dietary status. Their study

The Relationship Between Exposure to Epstein Barr Virus & Hair Tissue Mineral Analysis

A focus on EBV, the liver and copper.

Gary Moller



MONDAY 12 OCTOBER 2015
7:00PM

Things you will learn during this webinar:

- The relationship between liver function and EBV and how this may impact on health.
- How to recognise the patterns for EBV and glandular fever on the HTMA.
- How to recognise patterns on the HTMA that may indicate that there may be an active, rather than dormant virus.
- How to identify other possible causes of ill health and complicating factors, such as a sub-clinical bacterial infection.
- How to hunt, suppress and possibly kill the vampire within by employing effective nutritional and lifestyle strategies.
- Implications of EBV/glandular fever for exercise and competition, including coping strategies, especially as it relates to young people, such as competitive swimmers.

About the presenter

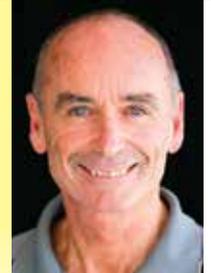
Gary Moller

DipPhEd, PGDipRehab, PGDipSportMed (Otago)

Like most natural health practitioners today, Gary is a "Health Sleuth", helping people understand and resolve complex and chronic health issues. His principal "CSI" tool is the InterClinical Laboratories HTMA, which Gary regularly incorporates into his clinical practice.

Gary is deeply engrossed in preparations to enter a doctoral programme in nutrition to research using the HTMA to help uncover EBV's subtle and lasting consequences for health. The topic of this webinar will be his PhD thesis.

Gary is a healthy veteran athlete. He intends to be the 60+ yrs world mountain bike champion in 2016. A serious injury in January scuppered this year's plans for world domination. He attributes much of his recent sporting success, including rapid recovery from injury, to the HTMA which has helped to guide and refine his nutrition.



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OR BOOK BY PHONE: InterClinical Laboratories on (02) 9693 2888

Copper an essential mineral

Copper is an essential element in biological systems. It plays a significant role in iron absorption, protein synthesis, energy production, connective tissue formation and immune function. The right ratio of copper and iron in the body is needed for good health.

Hair Tissue Mineral Analysis can uncover the important iron to copper ratio level and determine the amount of copper your patient's needs.

Copper Plus includes vitamin B2 as a co-factor. Copper Plus provides a low dose option to increase the copper: iron ratio or provide essential elemental copper when needed.

Molyzinc supplies elemental zinc and molybdenum, which together are potent antagonists of copper. With vitamin C added as a co-factor, Molyzinc provides an ideal supplement to reduce copper excess.



Both Copper Plus and Molyzinc provide safe mineral therapy to gently bring copper back into balance.

ORDER TODAY - Clinical essentials to manage copper balance.

For more information, please contact:

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