



InterClinical Laboratories

Newsletter

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**Celebrating
10 YEARS**

Quality Assurance in Laboratory Standards

InterClinical Laboratories Pty Limited has been the leading provider for tissue mineral analysis services in Australia and New Zealand for over a decade. We are committed to our profession, to our clients and to the ongoing pursuit of quality analytical services using the finest modern technology in the world. We provide reliable and important quantitative data on patient mineral balances. We offer useful, qualitative information for practitioners designed to aid in patient appraisal and recommendations. Our interpretive reports are the most advanced of their kind.

All information provided is designed to assist the practitioner in utilizing his own clinical judgment in the patient appraisal and determining appropriate courses of action.

Many HTMA laboratories are still using older technologies such as ICP-OES (Optical Emission Spectrometry) and AA (Atomic Absorption). Our laboratory uses ICP-MS (Mass Spectrometry), the most modern and expensive analytical technique to be applied to routine elemental mineral analysis. All testing is performed in a trace element laboratory clean room environment, utilizes the latest microwave temperature-controlled digestion technique and have a highly skilled and professional analytical/support staff.

Our laboratory facilities are based in the United States and owned by Trace Elements Incorporated. TEI is a licensed and certified clinical laboratory that undergoes regular inspections with the Clinical Laboratory Division of the Department of Health and Human Services, HCFA.

Further, each patient result is based upon an hourly National Institute of Standards and Technology (NIST) traceable standard curve, a rigorous quality control validation for every 24 specimens and is compared to a representative reference range derived from the like analysis of an international collection of normal and "healthy" subjects. The laboratory also performs routine spiked sample recoveries, daily split specimen analysis and voluntarily participates in various interlaboratory test comparison (TC) surveys. Additionally, TEI like many leading laboratories, participates in an on-going Quality Assurance/Quality Control program and adheres to CLIA guidelines for precision, reliability and overall good laboratory practices. Needless to say, you can be assured that we stand behind our analytical data.

As mentioned above, our facilities use state-of-the-art ICP-MS methodology for all trace element determinations. These systems are capable of handling a high volume of specimens in applications such as HTMA where

limits of detection requirements are in the part-per-million (ppm) and low part-per-billion (ppb) range. The laboratory also uses the most advanced, high-volume and uniform temperature-controlled microwave digestion technique. Microwave digestion is the method of choice for speed, reduced contamination, complete digestions, and retention of analytes to insure precise results.

Our laboratory is equipped with a trace element class clean room utilizing HEPA filtration systems. The clean room ensures that air quality and temperatures are isolated in order to protect equipment and processed specimens from potential contamination. High sensitivity balances used by the laboratory for calibration/QC check standards and specimen weighing are calibrated with weight sets traceable to NIST. All stock standards used for daily calibration and Quality Control are prepared by a leading ISO 9001 certified laboratory. In addition, all standard material is sourced from NIST standard reference material. Further, the laboratory uses 16 megohm double-deionized water, sterile polypropylene wet-digestion and sampling test tubes, acid-leached, triple-rinsed miscellaneous glassware and plasticware. All glassware when used is Class A.

The laboratory conducts daily, weekly and monthly QA/QC studies to confirm and validate all aspects of test methodology, including precision, accuracy and verifiable detection limits. Further, the laboratory is continuously evaluating the different aspects of daily laboratory performance, such as; reagents, QC reference materials, split specimen analysis, double-blind samples, spiked samples, calibration-verification studies and routine daily monitoring of patient data trends, before, during and after each daily analytical run. This attention to detail assures that our clients are receiving data obtained by the highest standards. Additional audits involve personnel training, laboratory reporting, safety issues, customer service, etc..

Laboratory management has also recently developed an extremely comprehensive and thorough state-of-the-art data management program utilizing automated quality control (AQC) software to assist the chief technologist and laboratory director in validating all QC test results and individual specimen test results prior to release for eventual report processing. Trace Elements Inc successfully participates in an on-going proficiency testing program with Le Centre de Toxicologie du Quebec, which offers urine, blood and hair tissue elemental testing involving clinical laboratories that utilize high resolution instrumentation in North America and Europe. Also participating in various other inter-laboratory test comparison studies, our facilities are committed to providing the clinician with the most timely, precise and reliable test data available.

Hair Tissue Mineral Analysis

Nutritional Products

Practitioner Education

Research and Development

Practical Clinical Application of HTMA: Case Studies

Dr David L. Watts Director of Research, Trace Elements Inc & InterClinical Laboratories

Hair tissue mineral analysis (HTMA) often reveals the presence of nutritional imbalances, metabolic disturbances and/or heavy metal exposures that are often not detected by other types of routine screening tests. The following case studies are just some examples that show the value of HTMA in revealing existing and potential health conditions that may otherwise would have gone unrecognized

Case 1: Arsenic Exposure

This first case involved a young man who was experiencing a number of health complaints of undetermined origin. His symptoms were general, but periodic fatigue and confusion were of major concern. Other laboratory tests that were performed failed to show any significant abnormalities that could pinpoint a reason for his vague symptoms. Therefore, the doctor submitted a hair sample for analysis.

The HTMA test results revealed a Parasympathetic or Slow Metabolic Type #1 mineral pattern. A potential inflammatory response was noted due to the markedly elevated sodium-to-potassium (Na/K) ratio of 15:1 (TEI ideal Na/K = 2.4:1). A glucose disturbance was also reflected by the markedly reduced calcium/magnesium (Ca/Mg) ratio of 2.5:1 (TEI ideal Ca/Mg = 7:1). In this case however, the most startling observation in the test results was that the patient's arsenic level was found to be over three and a half times above the established reference range. TEI's upper range for arsenic is <0.020 mg%. Results were rechecked and confirmed. The patient was unable to provide a possible exposure source to arsenic from his occupation, working environment, or hobbies. It was suggested that samples from other family members be submitted for analysis to determine if they had been exposed. HTMA results confirmed the presence of elevated arsenic in the other family members as well.

Since test results of all family members revealed arsenic elevations, it was apparent that a common exposure existed. A water mineral analysis was suggested in order to determine if this was a possible source. Water analysis performed locally found the arsenic level to be several times above the acceptable EPA Standard. The family was then promptly informed to avoid their drinking water until a proper filtration system could be installed.

It should be emphasized that HTMA proved invaluable in determining excess arsenic in this particular family that may have otherwise gone unnoticed for years and which could have contributed to a host of health and developmental problems. As a result of HTMA, a targeted metabolic approach to nutritional therapy was instituted in order to reduce excessive arsenic tissue burden and to address the other nutritional and metabolic imbalances found within this family.

Case 2: Uranium and Radon Exposure

Hair samples were submitted to our laboratory from family members living in the northeast area of the United States. The major findings in the test reports were markedly elevated levels of uranium (U). Test results for uranium revealed levels greater than 0.3200 milligrams-percent (mg%) in the child and 0.6600 mg% in the parent. These values represent levels of over 20 and 40 times the established normal range respectively. Obviously these results were quite significant, as the normal reference range for hair scalp uranium established here

at Trace Elements testing laboratory is less than 0.0170 mg%. It should be noted that the original hair specimens were rechecked per TEI's standard procedure and the secondary testing confirmed elevated uranium.

Since exposure appeared in both family members it was apparent that they were possibly exposed to a common source of uranium in their environment. To start, a water test for uranium was suggested. Subsequent analysis of the drinking water performed by a local laboratory confirmed elevated uranium. As it is common to find radon gas associated with excess uranium and its decay, it was also suggested that the home be tested for the presence of radon. Subsequent radon testing found levels well above current E.P.A standards in the home. Remedial action was then taken, including the venting of the basement to eliminate further radon gas exposure throughout the house and a water filtration system was added to the water supply for the removal of uranium. Again, individualized nutrition and a course of Trace Nutrient™ nutritional supplementation was recommended based upon the individual's unique metabolic types and presenting mineral patterns for the correction of nutritional imbalances and the mobilization and excretion of uranium.

Discussion:

At Trace Elements, we have often found high levels of uranium in individuals in various geographic pockets throughout the US. Levels greater than 0.300 mg% often correspond to high uranium levels in the water supply. The most common geographical areas are those where granite naturally exists and those areas in which uranium is naturally occurring along with radon. High uranium in water supplies is also found in agricultural areas where the water is exposed to fertilizer runoffs. However, agricultural sources of uranium are not typically associated with radon. It should be stressed that uranium is a naturally occurring element and therefore will be found in all humans to some extent. However, HTMA has proven to be an effective screening tool in determining excess exposure in individuals and families which otherwise would not have been detected.

Case 3: Infection Not Responding to Antibiotics

This case involves a male in his late 30's who suffered a foot injury caused by a nail puncture. The patient was treated but an infection developed and antibiotics failed to bring the infection under control. A worsening of the infection and lack of response to antibiotics eventually led to the patient being scheduled for amputation of the infected foot. Our client submitted a hair sample from the patient for analysis to see if anything further could be determined.

The mineral pattern revealed the patient was Sympathetic dominant, or a fast metabolizer. The most outstanding finding was an elevated zinc-to-copper (Zn/Cu) ratio of over fifteen to one. TEI ideal Zn/Cu ratio = 8:1.

Supplement recommendations were based upon the patient's metabolic type and HTMA profile. Specifically, copper supplementation was recommended in the amount of six milligrams per day. The patient's infection began to improve and surgery for amputation was postponed. The patient responded to the point he was released from the hospital with eventual complete healing of the involved extremity.

Discussion:

Copper deficiency is known to adversely affect the humoral-immune response and lead to susceptibility of bacterial manifestations. Low hair copper levels have been seen in individuals with susceptibility to bacteria infections and who fail to respond to some forms of antibiotic therapy. Copper therapy is known to reduce inflammation and can enhance the effects of some forms of antibiotics. A copper deficiency is not usually suspected in such cases and may not be revealed through usual testing. The hair mineral analysis screen can determine an impending mineral deficiency or imbalance before the manifestation of overt clinical signs.

Case 4: Insulin Resistance and Diabetes

This case involved a female in her mid-forties who suffered from diabetes due to insulin resistance. The patient was hyperinsulinemic, overweight and taking oral medication for glucose control. Her doctor submitted a hair sample to assess her metabolic status and mineral balance. The patient's mineral pattern revealed a Parasympathetic dominance, or slow metabolic pattern, with a markedly elevated calcium (Ca) level. Significant imbalances in the following mineral interrelationships were noted; calcium-to-phosphorus (Ca/P) was over 27 to 1 (TEI Ideal Ca/P = 2.6:1), calcium-to-magnesium (Ca/Mg) ratio over 30 to 1 (TEI Ideal Ca/Mg = 7:1), calcium-to-potassium (Ca/K) ratio over 300 to 1 (TEI ideal Ca/K = 4.2:1), and zinc-to-copper (Zn/Cu) ratio less than 4 to 1 (TEI Ideal Zn/Cu = 8:1).

The patient was recommended a course of dietary changes and Trace Nutrients™ supplement recommendations based upon her metabolic type and specific mineral pattern. Dietary supplementation consisted of emphasizing specific nutrients to support the metabolic pattern. Para-Pack, and magnesium supplementation (Magnesium Plus) along with its synergists, such as vitamins E, B6, A, C etc. was emphasized. Chromium supplementation in the form of glucose tolerance factors (GT – Formula), was recommended due to the elevated Ca/Mg ratio, which would address the problem of insulin receptor deficit should it exist. Zinc (Zinc Plus) supplementation and its synergists as well as Trace Nutrients anti-viral formula (Nutri-Vi) would address the low Zn/Cu ratio and viral susceptibility.

Within a short time the patient's energy levels increased significantly. The reduction in weight of over thirty pounds helped to significantly impact glucose control and therefore, oral medication for glucose control was reduced.

Discussion:

Hyperinsulinism can be caused by a number of factors ranging from insulin resistance due to receptor deficits to an autoimmune response and of course diseases affecting the pancreas itself as well as other endocrine disturbances. The doctor found no indication of pancreatic disease or overt endocrinopathy. At Trace Elements, we have established that a Ca/Mg ratio over 14:1 is a strong indication of hyperinsulinism. The elevated Ca/Mg ratio greater than 30:1 indicates a marked insulin production. Insulin is a thyroid antagonist which would account for the elevation in Ca/K greater than 300:1. The parasympathetic metabolic mineral pattern in conjunction with the low Zn/Cu ratio less than 4:1 would indicate an over-active cellular immune response that could have been initiated by a virus. However, determination of thyroid antibodies was not reported.

Insulin is a lipogenic, metabolic and thyroid suppressing hormone. Reduction in hyperinsulinism aids in improving thyroid activity and increases the metabolic rate. Weight loss is inevitable with insulin reduc-

tion and even imperative for those who have a parasympathetic dominance with an elevated Ca/Mg ratio. An improvement in the Ca/Mg balance reflects improved glucose control and insulin sensitivity. However, it should be noted that oftentimes a person with this metabolic pattern might experience fatigue during the course of therapy as insulin sensitivity improves. This is due to the hypoglycaemic response caused by the excess insulin having a more pronounced metabolic effect. This can be controlled by having the patient eat more frequently throughout the day as well as maintain adequate protein intake. Also, the anti-viral nutrients will aid in improving the Zn/Cu pattern and allow a normalization or reduction in the over-active cellular-immune response.

Further, obesity should be viewed as an endocrine/metabolic disturbance. It is often promulgated that obesity contributes to diabetes. However, it is my opinion that diabetes causes obesity due to the multiple interrelated and cascading endocrine involvements. As an example, when the tissue sensitivity to insulin is reduced the body appropriately produces more insulin to compensate. However, prolonged high insulin levels cause an increase in adipose deposition while also suppressing the thyroid gland. Secondarily, adrenal hormone response is blunted resulting in an overall reduction in the metabolic rate. This results in less calories being burned and thus contributes further to weight gain even if daily calories are not increased.

David L. Watts, D.C., Ph.D., F.A.C.E.P. C.C.N

Dr. Watts has been involved in clinical nutrition for 20 years and is a world leading expert on Tissue Mineral Analysis interpretations. Over the past 25 years his research has focused on the study of tissue mineral patterns found in human hair. Having reviewed over 200,000 tissue mineral profiles, he has identified inter-relationships between minerals, vitamins, and the neuro-endocrine system. He has further classified vitamins, minerals, herbs, foods, water, and drugs into specific categories according to their metabolic effects. His research has led to the development and recognition of individual tissue mineral patterns associated with various disease trends, metabolic types, and even emotional characteristics.

Dr. Watts has written over 50 scientific publications and is invited to lecture internationally. He provides nutritional evaluations and consultations to health care professionals worldwide, while serving as Director of Research for Trace Elements, Inc., a federally licensed clinical laboratory.

Practitioner Website Referral Database
InterClinical regularly receives enquiries from patients looking for Practitioners using InterClinical's HTMA and nutritional therapies. If you would like to be included in our database and our website, please contact our office or send an email or fax, with your name, contact details and qualifications with your permission for us to include you on our database.

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**Presented by
Mr Zac Bobrov**
Technical Director
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