# What Your "Locks" REVEAL about "INVISIBLE" Health Dis-orders

Hair Tissue Mineral Analysis (HTMA) Reveals Your...

Metabolic Blueprint

(nutrients & toxic metals)

Eating Patterns

Aging Patterns

Emotional Imbalances



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This booklet has been prepared by the Institute for Wholistic Rejuvenation for the education of patients/clients about hair tissue mineral analysis (HTMA) and this unique system of interpreting your test results.

Since 1965 research and clinical programs have studied and established trace element concentrations in human hair as reported by the International Atomic Energy Agency. These programs were coordinated under Nuclear-based Methods for the purpose of analysis pollutants in human hair.

Since that time, the use of hair as a biological marker has been presented at dozens of scientific conferences worldwide. For example, the Human Hair Symposiums held in Atlanta, GA included a vast number of contributors from universities and research centers including, but not limited to:

Cleveland Clinic, Ohio
University of Texas, Houston
University of Aston, England
Texas Medical School
Emory University, Atlanta, GA
Universidad de Chili
CDC Atlanta, GA
Slade Hospital, England
McGill University,
Montreal, Canada
University of TN, Memphis
USDA, Albany, CA

University of Miss., Hattiesburg University of Leeds, England Mayo Medical School, Minn.
Army Medical Center, Presidio
N.Y. University, NY
Wayne State University, Detroit
University of CA., San Francisco
IAEC, Vienna, Austria
University of S.C., Charleston
University of Rochester, NY
University of Toronto,
Ontario, Canada

Georgia State University, Atlanta, GA University of Witwatersrand, Africa Dalhousie University, Nova Scotia, Canada

The laboratory we use, TEI, utilizes ICP-Mass Spectrometry for the analysis of all reported minerals. It also uses the most advanced temperature-controlled microwave digestion technique available. The laboratory is equipped with trace element class clean room complete with dual HEPA filtration systems to avoid contamination. High sensitivity balances are used for calibration and quality control check standards and specimen weighing are calibrated with weight sets traceable to the National Institutes of Standards and Technology (NIST).



Hair Tissue Mineral Analysis – Unique View into Your Invisible Metabolic World of Intracellular Health

## Q. What is hair mineral analysis?

A. Hair tissue mineral analysis (HTMA), is an analytical test which measures the mineral content of the hair. The sampled hair, obtained by cutting the first inch and one-half of growth closest to the scalp at the nape of the neck, is prepared in a licensed clinical laboratory through a series of chemical and high temperature digestive procedures. Testing is then performed using highly sophisticated detection equipment and methods to achieve the most accurate and precise results.

# Q. Why use hair? Why not blood?

A. Hair is ideal tissue for sampling and testing. First, it can be cut easily and painlessly and can be sent to the lab without special handling requirements. Second, clinical results have shown that a properly obtained sample can give an indication of mineral status and toxic metal accumulation following long term or even acute exposure.

An HTMA reveals a unique metabolic world: intracellular activity, which cannot be seen through most other tests. This provides a blueprint of the biochemistry occurring during the period of hair growth and development.

# **Examples:**

• Thirty to 40 days following an acute exposure, elevated serum levels of lead may be **un**detectable. This is due to the body removing the lead

from the serum as a protective measure and depositing the metal into such tissues as the liver, bones, teeth and hair.

- Nutrient loss from the body can become so advanced that severe health conditions can develop without any appreciable changes noted in those same nutrient levels in a blood or urine test.
- Symptoms of elemental deficiency can be present long before low levels can be detected in blood serum.
- Excess sodium is associated with hypertension adequate amounts are required for normal health.

Hair is used as one of the tissues of choice by the Environmental Protection Agency in determining toxic metal exposure. A 1980 report from the E.P.A. stated that human hair can be effectively used for biological monitoring of the highest priority toxic metals. This report confirmed the findings of other studies in the U.S. and abroad, concluding that human hair may be a more appropriate tissue than blood or urine for studying community exposure to some trace elements.

### Q. Why test for minerals?

- A. Trace minerals are essential in countless metabolic functions in all phases of the life process. Examples follow:
  - Zinc is involved in the production, storage and secretion of insulin and is necessary for growth hormones.
  - Magnesium is required for normal muscular function, especially the heart. A deficiency has been associated with an increased incidence of abnormal heart conditions, anxiety/panic disorders and nervousness.
  - Potassium is critical for normal nutrient transport into the cell. A
    deficiency can result in muscular weakness, mild depression, cognitive
    decline, and lethargy.
  - Excess sodium is associated with hypertension, but adequate amounts are required for normal health.

In the words of the late author and noted researcher, Dr. Henry

Schroeder, trace elements (minerals) are "...more important factors in human nutrition than vitamins. The body can manufacture many vitamins, but it cannot produce necessary trace minerals or get rid of many possible excesses."

## Q. What can cause a mineral imbalance?

A. There are many factors to take into consideration, such as:

**Diet** – Improper diet through high intake of refined and processed foods, alcohol and fad diets can all lead to a chemical imbalance. Even the nutrient content of a "healthy" diet can be inadequate, depending upon the soil in which the food was grown or the method in which it was prepared.

**Stress** – Physical and/or emotional stress can deplete the body of many nutrients while also reducing the capability to absorb and utilize them.

**Medications** – Both prescription and over-the-counter medications can deplete the body stores of nutrient minerals and/or increase the levels of toxic metals. These medications include diuretics, antacids, aspirin and oral contraceptives, to name a few.

**Pollution** – From adolescence through adulthood the average person is continually exposed to a variety of toxic metal sources such as cigarette smoke (cadmium), hair dyes (lead), hydrogenated oils (nickel), antiperspirants (aluminum), dental amalgams (mercury and cadmium), copper and aluminum cookware and lead-based cosmetics. These are just a few of the hundreds of sources which can contribute to nutrient imbalances and adverse metabolic effects.

**Nutritional Supplements** – Taking incorrect supplements or improper amounts of supplements can produce many vitamin and mineral excesses and/or deficiencies, contributing to an overall biochemical imbalance and the subsequent symptoms.

**Inherited Patterns** – A predisposition toward certain mineral imbalances, deficiencies and excesses can be inherited from parents.

# Q. Can vitamin requirements be determined from a mineral test?

A. Minerals interact not only with each other but also with vitamins, proteins, carbohydrates and fats. Minerals influence each of these factors, and they, in turn, influence mineral status. Minerals act as enzyme activators, and vitamins are synergistic to minerals as coenzymes. It is extremely rare that a mineral disturbance develops without a corresponding disturbance in the synergistic vitamin(s). It is also rare for a disturbance in the utilization or activity of a vitamin to occur without affecting a synergistic mineral(s).

#### For example:

- Vitamin C affects iron absorption and reduces copper retention.
- Boron and iron influence the status of vitamin B2.
- Vitamin B2 affects the relationship between calcium and magnesium.
- Vitamin B1 enhances sodium retention.
- B12 enhances iron and cobalt absorption.
- Vitamin A enhances the utilization of zinc, while antagonizing vitamins D and F.
- Protein intake will affect zinc status, etc.

Therefore, evaluating mineral status provides good clues of vitamin status and requirements. Continuing research involves the recognition of many synergistic and antagonistic interrelationships between minerals and vitamins – like everything in life, ratio balances are vital in order to achieve wellness.

# Q. What do I receive when I order a complete hair analysis profile from my health professional?

A. After hundreds of thousands of hair analysis, the laboratory has created a unique system of interpreting hair mineral analysis results. Each test report will provide the clinician with the most complete and comprehensive evaluation and discussion of significant mineral levels, ratios (interrelationships) and toxic metals as tested in the hair.

Included is a listing of individual foods and food groups that the health professional can recommend to eat or avoid in accordance with food allergy indicators and individualized metabolic requirements. What emerges is a very comprehensive report complete with graphs and accompanying explanations and recommendations for YOUR specific needs and a more technical report for your health care professional who has advanced training in interrupting the results so that it's easy to understand. This screening technique test helps you and your practitioner learn about what is invisible nutritional imbalances and toxic elements that, most often, provides the reason for underlying causal problems to your dis-orders.

## **Q.** Is Hair Tissue Mineral Analysis supported by research?

A. Hair tissue mineral analysis is supported by an impressive body of literature in a variety of respected national and international scientific publications. Over the past twenty-five years' hair mineral testing has been extensive. Each year in the United States alone, federally licensed clinical laboratories perform over 150,000 hair mineral assays for health care professionals interested in an additional screening aid for a comprehensive patient evaluation. This does not take into consideration the thousands of subjects used in numerous continuing research studies conducted by private and government research agencies.

# How to Cut a Hair Sample for Tissue Mineral Analysis (TMA)

We need about a tablespoon of hair cut from the scalp, the remainder of the length is cut-off and not tested—a little less will do. A paper scale is included in your kit; use as directed to assure there is enough hair for an accurate reading.



# Hair Cutting Procedure

Do not use pubic hair, as it is less accurate, unless you have no other option.

1) Cut several small snips of hair as close as possible to the scalp. You may cut the samples from along the sides behind the ear, top or back of the head as low to the neck as possible. Place the samples on a clean surface with the cut end facing you. Now cut off any long ends of hair that are over 1 inch (or about 2 centimeters) long. The long ends of hair are older and are not as good for sampling. The new hair, near the scalp, is much better.

You will have enough hair when the 1-inch cut samples will fill an ordinary tablespoon.

- 2) Combine hair sample cuttings and place in the paper envelope provided.
- 3) Write your name, age, date of sampling, and type or brand of shampoo on the envelope.

#### Provided by:

Dr. Gloria Gilbère www.gloriagilbere.com 208-255-5252

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#### HAIR PREPARATION

Make sure your hair has been washed, preferably with a mild soap or a natural, non-toxic shampoo, within 48 hours of cutting the samples.

I like any organic shampoo such as that made by the brand Aubrey Organics—available at most health food stores. Using a conditioner or rinse is okay, but it would be best to just use soap or a very mild shampoo for the best results. Do not place other products on the hair just before cutting the hair sample such as hair cream, gels, hair spray or others. Make a note of the type of shampoo (brand, etc.) when you send in your sample.

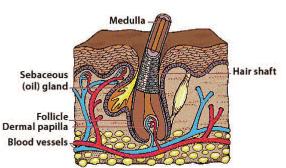
#### TINTS, DYES, COLOR RINSES (SUCH AS HENNA) & HIGHLIGHTING

These can be on your hair when you cut a sample for analysis. We are aware that some laboratories do not allow these products or hair treatments when taking a sample for a hair analysis.

However, we find that they usually do not affect the test enough to force you to wait for weeks to send in your sample. In fact, most tints, dyes and rinses do not contain many minerals so they will not affect the test at all. The more natural the hair, however, the greater the accuracy.

#### **BLEACHES & PERMANENTS**

After a bleach or permanent, especially a beauty parlor permanent, wash your hair four or five times before sending in a sample as these affect the hair structure and may have more effect on the test results.



# References

Following is a limited sampling of references supporting the use of hair tissue mineral analysis in the research and healthcare fields.

Several research programs for studying and establishing hair trace mineral concentrations have been implemented since 1965 by the International Atomic Energy Agency. These research programs have been coordinated under "Nuclear-based Methods for the Analysis of Pollutants in Human Hair." Hair was chosen by the I.A.E.A. due to the concentration of minerals in the hair and its reflection of both external and internal contamination. The bulk of data on trace element concentrations has been reported from hair samples obtained from the scalp.

Ryabukhin, T.S.: International Coordinated Program on Activation Analysis of Trace Element Pollutants in Human Hair. Hair, Trace Elements, and Human Illness. Brown, A. C.; Crounse, R. G., ed. Praeger Publications, 1980.

"Bioassay of hair is attractive as it is an effective bio-concentrator, samples can be easily stored, the concentration reflects an integrated value, and, finally, the measurement of the (234)U/(238)U isotopic ratio in digested hair samples by MC-ICPMS is feasible and highly informative."

Karpas Z, Lorber A, Sela H, Paz-Tal O, Hagag Y, Kurttio P, Salonen L., Measurement of the 234U/238U ratio by Mc-ICPMS in drinking water, hair, nails, and urine as an indicator of uranium exposure source. Health Phys. 2005 Oct;89(4):315-21.

"Findings reported that individuals with normal serum testosterone levels had a significantly higher HTMA zinc level compared to a low testosterone group. Also, the study concluded that decreased testosterone was associated with a significant reduction of the zinc to copper ratio in hair samples."

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

"Various mineral imbalances as revealed by hair analysis can indicate metabolic dysfunctions before any symptoms occur, and that hair analysis of minerals is used not only for diagnostic purpose but also to monitor the nutritional state of the patient until treatment benefits are achieved and the effects of the program have been stabilized."

A Review of Hair Analysis for Minerals, Hormones and Drugs Ahmad, G. et al. A review Hair tissue Analysis: An analytical method for determining

essential elements, toxic elements, hormones and drug use and abuse. Intl.Res.J.Appl.Basic Sci. 4, 2013.

"The value of exposure (kinetics and dose) of orthodontic patients to metal ions released from orthodontic appliances can be assessed by hair mineral analysis."

Metal ions released from fixed orthodontic appliance affect hair mineral content. Mikulewicz M, Wołowiec P, Loster B, Chojnacka K. Biol Trace Elem Res. 2015 Feb;163(1-2):

"Human head hair is a recording filament that can reflect metabolic changes of many elements over long periods of time and thus furnish a print-out of post nutritional events."

Strain, W. H.; Pories, W. J.; Flynn, A.; Hill, O. A.: Trace Element Nutriture and Metabolism Through Head Hair Analysis. Trace Substances in Environmental Health. Hemphill, D. D., ed. University of Missouri Press, Columbia, 1972.

It is well known that nutritional mineral deficiency 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 and include iron, copper, manganese, zinc and 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." Hair concentrations of cadmium compared to reference groups were found to be higher in children with mental retardation, learning disabilities, dyslexia and lower I.Q.

Metals and Neurotoxicology. Wright, RO, et al. J. Of Nutr. 138,12, 2007.

"Multivariate apportionment of trace elements in the blood, scalp hair and nails of the patients was also significantly different than that in the healthy donors."

Comparative study of trace elements in blood, scalp hair and nails of prostate cancer patients in relation to healthy donors. Qayyum MA, Shah MH. Biol Trace Elem Res. 2014 Dec:162(1-3):46-57.

Hair, blood and urine minerals analyzed in diabetic patients compared to non-diabetic controls showed that the mean levels of zinc, manganese and chromium were significantly lower in the blood and scalp hair of patients diagnosed with diabetes. Higher levels

of copper and iron were also found in the scalp hair of the diabetic group as well.

Copper, Chromium, Manganese, Iron, Nickel and Zinc Levels in Biological Samples of Diabetes Mellitus Patients. Kazi, TS, et al. Biol. Trace Elem. Res. 122,1, 2008.

"The consequence of trace elements deficiency has been associated with an increased risk of human immunodeficiency virus type 1 (HIV-1) disease progression and mortality."

Evaluation of chromium and manganese in biological samples (scalp hair, blood and urine) of tuberculosis and diarrhea male human immunodeficiency virus patients. Afridi HI, Kazi TG, Talpur FN, Arain S, Arain SS, Kazi N, Panhwar AH, Brahman KD. Clin Lab. 2014;60(8):1333-41.

"Statistical evaluation of these data by multivariant analysis (MANOVA) using a contrast matrix and by discriminant analysis showed that elemental hair anomalies can be used to diagnose correctly the above-mentioned pathologies, demonstrating the usefulness of hair analysis as a complementary tool for the detection of disturbances in calcium/bone metabolism."

Miekeley, N., et al. Elemental Anomalies in Hair as Indicators of Endocrinologic Pathologies and Deficiencies in Calcium and Bone Metabolism., J. Trace Elem. Med. Biol. 15, 1, 2005

"The consensus of most workers in the field is that if hair samples are collected properly, cleaned and prepared for analysis correctly and analyzed by the best analytical methods, using standards and blanks as required, in a clean and reliable laboratory, by experienced personnel, the data are reliable."

Toxic Trace Metals in Mammalian Hair and Nails. United States Environmental Protection Agency Publication 1979; EPA-600/4: 79: 049

"The high exposure of toxic elements may be synergistic with risk factors associated with hypertension. These data present guidance to clinicians and other professionals who will be investigating the toxicity of heavy elements in biological samples (scalp hair and blood) of hypertensive patients."

Distribution of arsenic, cadmium, lead, and nickel levels in biological samples of Pakistani hypertensive patients and control subjects. Afridi HI, Kazi TG, Talpur FN, Arain S, Arain SS, Kazi N, Panhwar AH. Clin Lab. 2014;60(8):1309-18

"Higher values of scalp hair mercury and lead content were observed in men and women with increased body mass index independently of their age."

Hair toxic element content in adult men and women in relation to body mass index. Skalnaya

MG, Tinkov AA, Demidov VA, Serebryansky EP, Nikonorov AA, Skalny AV. Biol Trace Elem Res. 2014 Oct;161(1):13-9.

A study of men over a period of thirteen years found that for each microgram of mercury found in the hair, the risk of acute coronary events increased by an average of eleven percent and cardiovascular disease death rate by ten percent.

Mercury as a Risk Factor for Cardiovascular Disease. J. Nutr. Biochem. 18, 2007.

An example of how mineral intake is reflected in the hair was demonstrated in a study of several thousand lraqi peasants, whose diet contained grain heavily treated with fungicides. The fungicides contained organic mercury, which was reflected in higher concentrations in the hair when consumption was highest and decreased when consumption was lowest. Hair concentrations correlated directly with the extent of symptoms.

Al-Shahristani, H.; Al-Haddad, I. K.: Mercury Content of Hair From Normal and Poisoned Persons. J Radioanalytical Chem 1973; 15.

Al-Shahristani, H.; Shihab, K. M.: Variation of Biological Half-Life of Methylmercury in Man. Arch Environ Health 1974; 28.

Hair samples collected and analyzed from five countries with known arsenic sources, both high and low included the United States, Canada, and People's Republic of China, Bangladesh and Nepal. Hair arsenic concentration in all hair samples correlated with the amount of arsenic in drinking water and revealed the low intake of selenium in areas of high arsenic concentrations. "The results demonstrate the viability of hair as a noninvasive biomonitor in assessing aspects of dietary Se and environmental As exposure."

Spallholz JE, Boylan LM, Palace V, Chen J, Smith L, Rahman MM, Robertson JD., Arsenic and Selenium in Human Hair; A comparison of Five Countries With and Without Arsenicosis., Biol Trace Elem Res. 2005 Aug;106(2):133-44.

"The proliferation of trace element analysis as a tool for biological investigation of nutrition, growth and development, and disease processes has led to consideration of (hair) trace element analysis as a means not only of present evaluation and estimation, but also as a technique for the reconstruction of past biological events in an organism."

Gilbert, R. I.: Trace Elements in Human Hair and Bone. Hair, Trace Elements and Human Illness Brown, A.C.; Crounse, R. G. ed. Praeger Publications, 1980.

"The findings indicate that hair samples are superior to urine samples. Even so, it can provide more valuable information for prevention, diagnostics, treatment and research of diabetes by simultaneously analyzing the hair and urine samples."

The diagnostics of diabetes mellitus based on ensemble modeling and hair/urine element level analysis. Chen H, Tan C, Lin Z, Wu T. Comput Biol Med. 2014 Jul;50:70-5.

This study was performed to establish a relationship between elements in the serum, red cells and hair and included one hundred and seventy-four children. Tests measured the concentrations of the heavy metals, cadmium and lead, as well as calcium, magnesium, copper, zinc and iron. Serum and red blood cell concentrations of cadmium and lead were within normal allowable levels, but hair levels exceeded maximum levels. Supplementation of magnesium and vitamin B6 was begun in children with elevated hair heavy metals. Follow-up tests showed a marked reduction in the lead and cadmium concentration in the hair and erythrocytes.

Concentrations of Selected Bioelements and Toxic Metals and Their Influence on Health Status of Children and Youth Residing in Szczecin. Kedzierska, E. Ann. Acad. Med. Stetin. 49, 2003.

"Hence, assessing the levels of trace elements in hair of male pattern androgenetic alopecia patients may be more valuable compared to serum and urine for treatment planning."

BMI and levels of zinc, copper in hair, serum and urine of Turkish male patients with androgenetic alopecia. Ozturk P, Kurutas E, Ataseven A, Dokur N, Gumusalan Y, Gorur A, Tamer L, Inaloz S. J Trace Elem Med Biol. 2014 Jul;28(3):266-70.

"Results showed that Mongolian subjects particularly those with Parkinsonism and arthritis had high accumulation of manganese, iron, lead, cadmium and aluminum in the hair compared to the controls. It was reported that the urinary 8OHdG also correlated with the hair mineral results."

Excess Hair Mineral Accumulation, Oxidative Stress And Parkinsonism Komatsu,F, et. al. A High Accumulation of Hair Minerals in Mongolian People: 2(nd) Report; Influence of Manganese, Iron, Lead, Cadmium and Aluminum to Oxidative Stress, Parkinsonism and Arthritis. Curr. Aging Sci. 1, 2011.

"The significance of hair analysis as a biological indicator of abnormal intake of trace elements in man is confirmed. Geographical variations of hair trace element concentrations, on the whole, depend on geochemical conditions or nutritional factors."

Batzevich VA., Hair trace element analysis in

human ecology studies., Sci Total Environ. 1995 Mar 15;164(2):89-98.

"They found a significant correlation between the hair calcium to magnesium ratio with HOMAIR and insulin. Their findings concluded that insulin resistance was increased along with increased hair calcium to magnesium ratio and decreased concentrations of hair chromium."

Hair Mineral Concentrations and Insulin Resistance Chung, JH, Yum, KS.Correlation of Hair Mineral Concentrations with InsulinResistance in Korean Males. Biol.Trace Elem.Res. 150, 12,2012.

"Hair Mn concentrations were inversely associated with gestational age at sampling and positively associated with living within 50 m of a plantation and Mn concentrations in drinking water. Our findings suggest that pregnant women living near banana plantations aerially sprayed with mancozeb may be environmentally exposed to Mn."

Blood and hair manganese concentrations in pregnant women from the infants' environmental health study (ISA) in Costa Rica. Mora AM, van Wendel de Joode B, Mergler D, Córdoba L, Cano C, Quesada R, Smith DR, Menezes-Filho JA, Lundh T, Lindh CH, Bradman A, Eskenazi B. Environ Sci Technol. 2014 Mar 18:48(6):3467-76.

"The result of research studies indicate that hair mineral analysis can be useful as a diagnostic tool in the examination of trace metal exposure, including abnormal nutritional intake, and may assist in the study of certain mental states. They (hair mineral analysis) may suggest mineral imbalances present in the body that perhaps could be rectified by a mineral supplemented diet."

"Hair metal testing is a fascinating new diagnostic tool and often gives unexpected clues to mineral imbalances in the body. The authors would support this statement from the results that they have accumulated to date."

Barlow, P. J.; Kapel, M.: Metal and Sulfur Contents of Hair in Relation to Certain Mental States. Hair, Trace Elements, and Human Illness Brown, A.C.; Crounse, R. G., eds. Praeger Publications, 1980.

"By implementation of statistic pattern recognition methods, it has been found that the concentrations of TEs in hair can remarkably reflect different recovery phases of NPC patients."

Leung PL, Huang HM., Following the recovery of naso-pharyngeal cancer patients by trace elements in hair using statistical pattern recognition methods., Biol Trace Elem Res. 1998 Jun;62(3):235-53.

"These data present guidance to clinicians and other professionals investigating deficiency of essential trace metals in biological samples (scalp hair and blood) of RA patients."

Hair Mineral Levels in Rheumatoid Arthritis Patients Afridi, HI, et al. Evaluation of status of zinc, copper and iron levels in biological samples of normal and arthritis patients in age groups 46-60 and 61-75 years. Clin. Lab. 58, 2012.

"We suggest that the changed element status (Zn, Mg, and Cu) in hair may play an indicator role in the diagnosis of epileptic patients."

Ilhan A, Uz E, Kali S, Var A, Akyol O., Serum and hair trace element levels in patients with epilepsy and healthy subjects: does the antiepileptic therapy affect the element concentrations of hair?, Eur J Neurol, 1999 Nov:6(6):705-9.

Mercury, cadmium and other heavy metals have a high affinity for sulfhydryl groups, inactivating enzymatic reactions, amino acids, and sulfur-containing antioxidants. Cadmium concentrations in the kidney induce renal dysfunction and contribute to hypertension due to sodium retention, glucose intolerance, dyslipidemia and zinc deficiency. Heavy metal toxicity should be evaluated in any patient with hypertension, cardiovascular heart disease, or other vascular disease. Specific testing for acute and chronic toxicity and total body burden using hair, nail, urine and serum with baseline and provoked evaluation should be done.

The Role of Mercury and Cadmium Heavy Metals In Vascular Disease, Hypertension, Coronary Heart Disease and Myocardial Infarction. Houston, MC. Altern. Ther. Health Med. 13,2,2007.

Various changes in the content of trace elements in biological samples taken from patients with idiopathic scoliosis are not accidental. What might bring a shift in our knowledge is speciation of various forms of trace elements in the organism in relation to idiopathic scoliosis.

Changes of Selenium, Copper and Zinc Content in Hair and Serum of Patients with Idiopathic Scoliosis. Dastych, M, et al. 2008 Orthopedic Research Society. Wiley Periodicals, Inc. J. Orthop.

The constituents of the hair is determined by the entry of substances from external sources and from substances which enter it from the blood stream.

Hopps, H. C.: The Biological Bases for Using Hair and Nail for Analysis of Trace Elements. Sci Tot Environ 1977; 7.

"The analysis of blood, excreted by-products, and human head hair represents method for determining body element levels."

Pihl, R. O.; Drake, H.; Vrana, F. Department of

Psychology, McGill University, Montreal, Quebec, Canada.: Hair Analysis in Learning and Behavior Problems. Hair, Trace Elements, and Human Illness. Brown, A. C.; Crounse, R. G., eds. Praeger Publications, 1980.

"Thus, it is observed that there exists some positive correlation between element levels in hair and nails and CHD, hypertension, and diabetes of these subjects."

Sukumar A, Subramanian R., Elements in hair and nails of urban residents of New Delhi, CHD. hypertensive, and diabetic cases., Biol Trace Elem Res. 1992 Jul:34(1):89-97.

Hair chromium levels were analyzed in a healthy elderly population and an age-matched control group with type 2 diabetes. Lower hair chromium levels were observed in the diabetic group.

Longitudinal Hair Chromium Profiles of Elderly Subjects with Normal Glucose Tolerance and Type 2 Diabetes Mellitus. Stupar, J., et al. Metabolism.

A hybrid algorithm was applied to the hair minerals from a group of healthy individuals compared to those with diabetes and was found to be a good symptom index that could recognize individuals with type 2 diabetes.

Hybrid Progressive Algorithm to Recognize Type II Diabetes Based on Hair Mineral Contents. Huang, H, et al. Conf. Proc. IEEE, Eng. Med. Biol. Soc. 5, 2005.

Lead and mercury levels were analyzed in eighty one hair and blood samples obtained at delivery of newborns. The results found that hair mercury and lead negatively correlated with calcium pump activity in maternal and cord blood erythrocytes.

Hair Mercury Negatively Correlates with Calcium Pump Activity in Maternal and Cord Blood Erythrocytes. Huel, G, et al. Environ. Hlth. Perspect. 116,2, 2008.

Higher serum magnesium was associated with lower bone mineral density at the spine, whereas high hair magnesium was associated with higher bone mineral density. 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.

Associations of Calcium and Magnesium in Serum and Hair with Bone Mineral Density in Premenopausal Women. Song, CH, et al. Biol. Trace Elem. Res. 118, 1, 2007.

Hair levels of iron, zinc and selenium were found lower in the study group of fifty-two children

diagnosed with anemia, compared to controls.

Serum and Hair Levels of Zinc, Selenium, Iron, and Copper in Children with Iron Deficiency Anemia. Gugoze, MK, et al. Biol. Trace Elem. Res. 111, 2006.

"The analysis of recently grown hair for zinc provides a biomarker of recent zinc status."

Rush E, Li L, Chandu V, Whiting R., Hair zinc concentrations not subject to seasonal variation in adults in New Zealand., Biol Trace Elem Res. 2003 Dec;95(3):193-202.

"These data confirm that the analysis of Zn in hair represents an addition to conventional materials in the assessment of the nutritional status of groups of individuals."

Contiero E, Folin M., Trace elements nutritional status. Use of hair as a diagnostic tool., Biol Trace Elem Res. 1994 Feb;40(2):151-60.

Dietary levels of some of the essential micro-elements have been reported to correspond to hair concentrations of the elements.

Reinhold, J. G.; Kfoury, G. A.; Ghalambor, M. A.; Jean, C.: Zinc and Copper Concentrations in Hair of Iranian Villagers. Am J Clin Nutr 1966; 18.

Strain, W. H.; Steadman, L. T.; Lankau, C. A.; Berliner, W. P.; Pories, W. J.: Analysis of Zinc Levels in Hair for the Diagnosis of Zinc Deficiency in Man. I Lab Clin Med 1966: 68.

Hair mineral analysis was performed on over three-hundred adult females with BMI's ranging between low, normal and high. Significant differences were noted in zinc levels between women with a low BMI compared to those with a high BMI. The obese group had the lowest zinc levels as well as the lowest ratios of sodium/potassium, iron/copper and zinc/copper. "...we suggest that hair concentrations of Ca, Cu, Fe, Mg, K, Na and Zn may be correlated with adult female BMI, but further studies are needed."

Wang, CT, et al., Concentrations of Calcium, Copper, Iron, Magnesium, Potassium, Sodium and Zinc in Adult Females hair with Different Body Mass Indexes in Taiwan., Clin. Chem. Lab. Med. 43, 4, 2005

Levels of lead, cadmium and nickel in scalp hair, blood and urine samples were significantly higher in groups of exposed workers compared to those of a control group. The determination of toxic metals in the biological samples of human beings is an important clinical screening procedure.

Evaluation of Toxic Metals in Biological Samples (Scalp Hair, Blood and Urine) of Steel Mill Workers by Electrothermal Atomic Adsorption Spectrometry. Afridi, HI, et al. Toxicol. Ind. Hlth. 9, 2006. Mineral levels of one hundred and twenty male lung cancer patients were compared to one hundred-fifty controls. The study showed that the average cadmium concentration was high in the blood and scalp hair of lung cancer patients at different stages compared to controls.

Determination of Cadmium in Whole Blood and Scalp Hair Samples of Pakistani Male Lung Cancer Patients by Electrothermal Atomic Absorption Spectrometer. Kazi, TG, et al. Sci. Total Environ. 389,2, 2008.

Hair tissue mineral analysis was performed on one-hundred and twenty individuals. Supplementation of magnesium and vitamin B6 was implemented in the treatment groups and placebos in the control group. Repeat hair mineral analysis revealed a positive influence as a result of supplementation. Magnesium levels were increased in the hair along with a significant reduction of the heavy metals, lead and cadmium, "The above mentioned results indicate a positive influence of magnesium supplementation on the decrease of lead and cadmium hair content in the individuals studied."

Kozielec T, Salacka A, Karakiewicz B., The influence of magnesium supplementation on concentrations of chosen bioelements and toxic metals in adult human hair. Magnesium and chosen bioelements in hair., Magnes Res. 2004 Sep;17(3):183-8.

"From the analyses, it was clear that hair concentrations of Ca, Fe, and Zn could reflect the effects of supplementation."

Leung PL, Huang HM, Sun DZ, Zhu MG., Hair concentrations of calcium, iron, and zinc in pregnant women and effects of supplementation., Biol Trace Elem Res. 1999 Sep;69(3):269-82.

"One such procedure which has shown great potential, at least for the determination of micro-element nutriture..., is the use of hair as the biological sample. Perhaps an even more important advantage would be that hair, by the very nature of the sample, should reflect a rather long-term nutritional state rather than recent (i.e. previous meal or day) dietary intake."

Sauberlich, H. E.; Scala, J. H. Department of Nutrition, Letterman Army Institute of Research, San Francisco, California.

Dowdy, R. P. Department of Human Nutrition, Foods, and Food Systems Management, University of Missouri, Columbia, Missouri

"Hair may provide a continuous record of nutritional status."

Maugh, T. H. Hair: A Diagnostic Tool to Complement Blood Serum and Urine. Science1978; 202.

"The pathogenesis of liver cirrhosis/cancer has been associated with changes in the balance of certain essential trace and toxic elements. It was observed that the status of Se and Zn in addition to some biochemical parameters was improved in biological samples of both groups of patients after sixty days treatment with mineral supplementation."

Investigation of essential trace and toxic elements in biological samples (blood, serum and scalp hair) of liver cirrhotic/cancer female patients before and after mineral supplementation. Kolachi NF, Kazi TG, Afridi HI, Kazi NG, Khan S. Clin Nutr. 2012 Dec;31(6):967-73. doi: 10.1016/j. clnu.2012.04.015. Epub 2012 May 17.

A positive correlation of selenium levels was found between samples of umbilical cord blood and the newborn's hair. Correlation was also found between placenta and umbilical cord blood and between cord blood and maternal blood.

Selenium Levels in Related Biological Samples: Human Placenta, Maternal and Umbilical Cord Blood, Hair and Nails. Lorenzo, A, et al. J. Trace Elem. Med. Biol. 19,1, 2005.

"Changes in the hair iron concentrations were accompanied by similar changes in the concentrations of the markers most commonly used to diagnose and monitor iron deficiency. The results suggest that quantification of hair iron may be useful to complement evaluations of the body iron status."

Bisse E, Renner F, Sussmann S, Scholmerich J, Wieland H., Hair iron content: possible marker to complement monitoring therapy of iron deficiency in patients with chronic inflammatory bowel diseases?, Clin Chem. 1996 Aug;42(8 Pt 1):1270-4.

"Hair calcium concentration did reflect the risk of CHD on a population basis and was strongly influenced by both the hardness of the water supply and the annual sunshine hours which also independently affected the SMR for CHD."

MacPherson A, Bacso J., Relationship of hair calcium concentration to incidence of coronary heart disease., Sci Total Environ. 2000 Jun 8;255(1-3):11-9.

"HTMA studies found that those affected with atopic dermatitis had significantly reduced zinc levels compared to controls."

Hair Zinc Levels and Dermatitis Kim, JE, et al. Hair Zinc Levels and the Efficacy of Oral Zinc Supplementation in Children with Atopic Dermatitis. Acta Derm Venereol, 94, 2014.

"Thus, chromium and selenium levels in the hair of viscerally obese adults were inversely associated with insulin resistance, whereas copper levels in the hair were positively associated with insulin resistance. This suggests that the mineral status of viscerally obese adults might play a role in the development of insulin resistance."

Concentrations of chromium, selenium, and copper in the hair of viscerally obese adults are associated with insulin resistance. Kim HN, Song SW. Biol Trace Elem Res. 2014 May;158(2):152-7. doi: 10.1007/s12011-014-9934-6. Epub 2014 Mar 19

"While the imbalance of certain trace elements leads to generation of more free radicals, the imbalance of some other trace elements causes changes in dopamine (neurotransmitter) activity. It is essential to monitor before and periodically during treatment the levels of essential trace elements for effective treatment of bipolar disorder."

Trace elemental distribution in the scalp hair of bipolars using PIXE technique. Pradeep AS, Naga Raju GJ, Sattar SA, Sarita P, Prasada Rao AD, Ray DK, Reddy BS, Reddy SB. Med Hypotheses. 2014 Apr;82(4):470-7. doi: 10.1016/j. mehy.2014.01.028. Epub 2014 Feb 2.

"Conclusions. It seems safe to conclude that our results confirmed usefulness of hair element analysis in screening tests for the assessment of the biomarker of various cancer diseases in a female population."

Screening of trace elements in hair of the female population with different types of cancers in wielkopolska region of poland. Czerny B, Krupka K, Ożarowski M, Seremak-Mrozikiewicz A. ScientificWorldJournal. 2014;2014:953181. doi: 10.1155/2014/953181. Epub 2014 Dec 15

"The study revealed that low level of trace elements (Se, Zn) and high level of heavy elements (As, Cd, and Ni) were associated with increased risk of cancer."

Interaction between carcinogenic and anti-carcinogenic trace elements in the scalp hair samples of different types of Pakistani female cancer patients. Wadhwa SK, Kazi TG, Afridi HI, Talpur FN, Naeemullah. Clin Chim Acta. 2015 Jan 15;439:178-84. doi: 10.1016/j.cca.2014.10.007. Epub 2014 Oct 15

This study explored calcium and magnesium levels in patients diagnosed with fibromyalgia compared to matched controls. Findings revealed significantly higher hair levels of both calcium and magnesium in the affected group. "Wilcoxon rank sum tests showed that patients with fibromyalgia had significantly higher calcium and magnesium levels than the control subjects at alpha = .025 and .05, respectively."

Ng SY., Hair calcium and magnesium levels in patients with fibromyalgia: a case center study., J Manipulative Physiol Ther. 1999 Nov-Dec;22(9):586-93.

Zinc and copper concentrations were measured in the hair and urine of patients who were hospitalized for myocardial infarction (MI). Mineral concentrations were also measured in descendants of the patients and compared to a control group. The study suggests that in MI patients, a genetic disorder of mineral imbalance at a younger age can be used in predicting susceptibility to heart disease in individuals prior to onset and diagnosis in asymptomatic patients.

Detection of Potentially Myocardial Infarction Susceptible Individuals in Indian Population: A Mathematical Model Based on Copper and Zinc Status. Taneja, SK, et al. Biol. Trace Elem. Res. 75, 2000.

It is concluded that hair metal analysis in samples close to the scalp is not seriously invalidated by sources of external contamination.

Cadmium, Copper, Lead and Zinc Concentration in Human Scalp and Pubic Hair. Wilhelm, M, et al. Instit, Toxicol. Univ. of Dussseldorf, W. Wermany. 199-206, Vol. 92, 1990.

Nickel- sensitive women had significantly higher levels of nickel in nails, hair and plasma than control subjects.

Nickel in Nails, Hair and Plasma from Nickel-Hypersensitive Women. Gammelgaard, et al. Acta. Derm. Venereol. 417, Vol. 70, 1990.

"High content of mercury in hair may be a risk factor for acute coronary events and CVD, CHD, and allcause mortality in middle-aged eastern Finnish men."

Virtanen JK, Voutilainen S, Rissanen TH, Mursu J, Tuomainen TP, Korhonen MJ, Valkonen VP, Seppanen K, Laukkanen JA, Salonen JT., Mercury, fish oils, and risk of acute coronary events and cardiovascular disease, coronary heart disease, and all-cause mortality in men in eastern Finland., Arterioscler Thromb Vasc Biol. 2005 Jan;25(1):228-33. Epub 2004 Nov 11.

"The elemental analysis of hair is becoming increasingly popular for the assessment of nutritional status."

Katz, S. A. Professor of Chemistry, Rutgers University.: The Use of Hair as a Biopsy Material for Trace Elements in the Body. Am Lab 1979; Feb.

"Regarding certain factors (age, sex, health, occupation, etc.), the influence causing the change in element levels is obvious, whereas the influence of other factors (structure of hair, height and weight of the subject, etc.) is obscure. It is very important to consider all the factors at the time of investigation for effective interpretation, validity, and application of results of hair analysis."

Sukumar A., Factors influencing levels of trace elements in human hair., Rev Environ Contam Toxicol. 2002;175:47-78.

"In this study, we found that TAC, hair Zn, and hair Se levels were lower in children with RW than HC and negatively correlated with wheezing episodes in the last 6 months. Also body Zn and Se levels can be reliably measured in hair samples."

Hair zinc and selenium levels in children with recurrent wheezing. Razi CH, Akelma AZ, Akin O, Kocak M, Ozdemir O, Celik A, Kislal FM. Pediatr Pulmonol. 2012 Dec;47(12):1185-91. doi: 10.1002/ppul.22628. Epub 2012 Sep 4

"Research literature supports the view that trace element content of the hair and nail reflect body intake... from which one can conclude that hair and nail are suitable samples for evaluating body stores."

Hopps, H. C.: The Biological Bases for Using Hair and Nail for Analysis of Trace Elements. Trace Substances In Environmental Health VIII. Hemphill, D.D., ed. University of Missouri, Columbia. 1974.

"This reference range of trace elements in the mane hair of racing horses should be used to assess disease and the nutritional status in equine practice."

Asano R, Suzuki K, Otsuka T, Otsuka M, Sakurai H., Concentrations of toxic metals and essential minerals in the mane hair of healthy racing horses and their relation to age., J Vet Med Sci. 2002 Jul;64(7):607-10.

"Hair concentrations may provide useful information on longer term nutrition."

Casey, C. E.; Hambidge, K. M.: Trace Element Deficiencies in Man. Advances In Nutritional Research Vol.3. Draper, H. H., ed. Plenum Pub., 1980.

Hambidge, K. M.; Walravens, P.A.: Trace Elements in Nutrition. Prac Ped 1974, 1:1

"The patients were divided into three groups of ten; one group was studied two years after total hip replacement, one at four years, and one at six years. High levels of titanium and aluminum were found in the hair, especially in the group studied six years after implantation, while the levels of the three ions in the blood and urine were not significant."

Trinchi V, Nobis M, Cecchele D., Emission spectrophotometric analysis of titanium, aluminum, and vanadium levels in the blood, urine, and hair of patients with total hip arthroplasties., Ital J Orthop Traumatol. 1992;18(3):331-9.

"The study holds promise that hair selenium may be used as a monitoring tool for low-level occupational exposure to selenium."

Srivastava AK, Gupta BN, Bihari V, Gaur JS, Mathur N., Hair selenium as a monitoring tool for occupational exposures in relation to clinical profile., J Toxicol Environ Health. 1997 Aug 8;51(5):437-45.

"The results of the quality assurance program, which included 31 participants on four continents, are described. Of the participating laboratories, 92% consistently meet QA/QC performance limits for the determination of Hg in human hair."

Gill US, Schwartz HM, Bigras L., Results of multiyear international interlaboratory comparison program for mercury in human hair., Arch Environ Contam Toxicol. 2002 Nov;43(4):466-72.

"The hair concentrations of Ca, Fe, Cu, and Zn in the three groups of gravida were lower or significantly lower than those in controls. In sera, the differences did not show statistical significance in most cases"

Huang HM, Leung PL, Sun DZ, Zhu MG., Hair and serum calcium, iron, copper, and zinc levels during normal pregnancy at three trimesters., Biol Trace Elem Res. 1999 Aug;69(2):111-20.

"There is now a considerable body of literature on the use of hair in forensic science, in the diagnosis of disease states, and in the assessment of nutritional

Stevens, B. J.: Determination of Aluminum, Copper, and Zinc in Human Hair. Atomic Spectroscopy 1983: 4:45

"Data for Pb levels in scalp hair (≤120µgg(-1)) and blood (≥650µgdL(-1); WHO, 2004) for children that have lived within IDP camps in Mitrovica indicate significant Pb uptake has indeed taken place."

Potentially harmful elements (PHEs) in scalp hair, soil and metallurgical wastes in Mitrovica, Kosovo: the role of oral bioaccessibility and mineralogy in human PHE exposure. Boisa N, Bird G, Brewer PA, Dean JR, Entwistle JA, Kemp SJ, Macklin MG. Environ Int. 2013 Oct;60:56-70. doi: 10.1016/j. envint.2013.07.014. Epub 2013 Sep 4

Results showed that hair copper concentrations could be correlated with the degree of severity, in that the higher the copper burdens, the more severe the autism. Levels of lead and mercury were also found higher in the affected group and increased with the degree of severity. Whereas, selenium and magnesium were significantly different in the low functioning group of children compared to others in the affected group as well as controls.

Priya, L, Geetha, A. Level of Trace Elements (Copper, Zinc, Magnesium and Selenium) and Toxic Elements (Lead and Mercury) in the Hair and Nail of Children with Autism. Biol.Trace Elem.Res. 2010.

HTMA is a good indicator of exposure to uranium and without these tests many individuals would unknowingly be exposed to not only heavy metals such as uranium and other metals, but radon gas as well.

Kehagia, K, et al. Hair Analysis as an Indicator of

Exposure to Uranium. Radial. Prot. Dosimetry. Nov. 2010

"This study demonstrated an independent association between chronic stress measures and hair mineral levels in young girls, indicating the importance of physiological stress-mineral pathways independently from individual or behavioural factors."

Cross-sectional relationship between chronic stress and mineral concentrations in hair of elementary school girls. Vanaelst B, Michels N, Huybrechts I, Clays E, Flórez MR, Balcaen L, Resano M, Aramendia M. Vanhaecke F. Rivet N. Raul IS. Lanfer A. De Henauw S. Biol Trace Elem Res. 2013 Jun;153(1-3):41-9. doi: 10.1007/s12011-013-9647-2. Epub 2013 Apr 2

"Although human hair can be a useful tool for biomonitoring temporal changes in metal concentrations, levels are not correlated with those found in urine except for total mercury, thus providing additional information."

Biomonitoring of arsenic, cadmium, lead, manganese and mercury in urine and hair of children living near mining and industrial areas. Molina-Villalba I, Lacasaña M, Rodríguez-Barranco M, Hernández AF, Gonzalez-Alzaga B, Aguilar-Garduño C, Gil F. Chemosphere. 2015 Apr;124:83-91. doi: 10.1016/j.chemosphere.2014.11.016. Epub 2014 Nov 27

"Both deficiency and excess of trace elements was shown to be of pathogenetic value in the development of thyroid disease."

Hair Trace Elements in Patients with Goiter. Farkhutdinova, LM, et al. Klin Lab Diagn. Aug. (8)

Imbalances in the optimum levels of trace elements may adversely affect the biological process and are associated with many disease processes.

Rahman, A. et al. Zinc, Manganese, Calcium, Copper and Cadmium Level in Scalp Hair Samples of Schizophrenic

Patients. Biol. Trace Elem. Res. 127,2, 2009.

"As part of the metabolic syndrome, the optimal calcium and magnesium concentrations in hair tissue may reflect decreased risk of metabolic syndrome."

Hair Tissue Mineral Analysis and Metabolic Syndrome. Park, SB, et al. Biol. Trace Elem. Res. 130,3, 2009.

"The levels of iron and zinc were significantly lower in the whole blood of children with growth retardation compared to the control group."

Hair Minerals and Growth Ozmen, H, et al. The Levels of Calcium and Magnesium, and Of Selected Trace Elements, in Whole Blood and Scalp Hair of Children with Growth Retardation. Iran, J.Ped. 23,2, 2013.

Their research findings suggested that some minerals such as arsenic, selenium and probably iodine, zinc, sodium and vanadium contribute to the regulation of cancer and that a metallomics study using multiple logistic regression analysis is a useful tool for estimating cancer risks.

Metallomics Study Using Hair Mineral Analysis and Multiple Logistic Regression Analysis: Relationship Between Cancer and Minerals. Yasuda, H, et al. Environ. Health Prev.Med. 24,5, 2009.

Heavy metals are being increasingly recognized as mediators or factors in the development and progression of cardiovascular disease and that a deficiency, lack of homeostatic control or excess intake of some metals may lead to cardiovascular mortality.

Afridi, HI., et al. Evaluation of Toxic Elements in Scalp Hair Samples of Myocardial Infarction Patients at Different Stages as Related to Controls. Biol. Trace Elem. Res.134, 1, 2010.

"Analysis of t test showed a significant difference between NASH (P<0.001) patients in hair selenium concentrations when compared with controls."

Hair selenium levels in hepatic steatosis patients. Pan D, Huang H. Biol Trace Elem Res. 2013 Jun;152(3):305-9. doi: 10.1007/s12011-013-9624-9. Epub 2013 Feb 15

"Hair analysis used to determine mineral content in the body may be an auxiliary tool in identifying the links between factors leading to the development of hypertension."

Blood pressure and levels of Fe, Ca, Mg, Zn, Cu, Na and K in the hair of young Bantu men from Tanzania. Rebacz-Maron E, Baranowska-Bosiacka I, Gutowska I, Chlubek D. Biol Trace Elem Res. 2013 Mar;151(3):350-9. doi: 10.1007/s12011-012-9578-3. Epub 2013 Jan 3

"Hair lead levels have been found to correlate well with body lead contamination."

Black AP, Knight R, Batty J, Haswell SJ, Lindow SW., An analysis of maternal and fetal hair lead levels., BJOG. 2002 Nov;109(11):1295-7.

(Information acknowledged and provided by TEI for Patient Education)



# About Dr. Gloria Gilbère.

CDP, DA Hom, ND, PhD, DSC, EcoErgonomist™, Wholistic Rejuvenist™, Certified Advanced HTMA Practitioner

#### www.gloriagilbere.com

Dr. Gloria has been in natural health for over 30 years and is a certified dental professional, doctor of natural health and homeopathy, certified dietary supplement counselor, nutrition-based medicine consultant, EcoErgonomist, Wholistic Rejuvenist, Certified HTMA Practitioner.

- Consults worldwide via phone and Skype and on-site by appointment in two locations:
- Author of 18 health books:
- A health journalist & health detective has authored over 1,700 articles;
- Award-winning syndicated talk-show host of Dr. Gloria Your Health Detective, heard worldwide on www.healthylife.net;
- A "Health Detective" Blogger with over 102,117 readers;
- Creator of post-graduate certifi¬cation programs to become a Wholistic Rejuvenist;
- Founder/CEO Institute for Wholistic Rejuvenation;
- Teaches & consults in universities and hospitals worldwide;
- Past President (14 yrs.) of an Int'l Fibromyalgia organization;
- Specializes in hard to identify & treat chronic and inflammatory disorders – often mis-diagnosed, over-medicated, and conventionally treated for symptom-care that most often leads to drug-management;
- Board Member (4-term) Nat'l Board for Colon Hydrotherapy.

After more than twenty years owning and operating two natural health clinics in northern Idaho, USA, Dr. Gloria transitioned to a mostly virtual worldwide practice via Skype and telephone (she even places the call in 19 countries).



The institute she founded, The Institute for Wholistic Rejuvenation, is the educational umbrella for all consulting, patient advocate services, and post-graduate certification courses.

# NaturalRejuven otion.solutions™

The exclusive resource for all products and services she uses and recommends is Natural Rejuvenation Solutions at www.naturalrejuvenation.solutions. Many of the supplements are made exclusively for the institute and not elsewhere available. To order in the U.S. and Canada call (888) 352-8175 (Mon. – Thurs. 8:am to 2:pm, Closed Friday). Direct line call (208) 255-5252 and speak to a customer service advocate. You can also email for information and/or to schedule a consultation to: support@naturalrejuvenation.solutions.

# The VALUE of Hair Tissue Mineral Analysis (HTMA):

It measures 29 major nutrient minerals and 8 toxic metals – imbalances can lead to many disorders including, but not limited to:

- Adrenal & thyroid exhaustion
- Immune system & digestive disorders
- Multiple allergic response syndromes & brain-fog
- Headaches & memory loss
- Hair loss/thinning
- Sleep disorders
- Skin disorders
- Chronic fatigue
- Inflammatory disorders (fibromyalgia, arthritis, gum disease, etc.)

The full report includes a detailed discussion about health and disease manifestations based on levels and ratios necessary for wellness. A diet plan will be presented identifying your current metabolic type and individualized supplement and dietary recommendations. Suggested re-testing is 4-5 months after modifications are implemented.

# What Does the Testing Kit Contain?

- Small white envelope to place hair sample (need a full 2 TB of hair)
- Client health questionnaire, MUST be fully completed.
- Mailing label to return materials for submission to the lab.
- Instruction sheet

#### IMPORTANT:

Once laboratory results are received, Dr. Gilbère will email or call you to arrange a telephone one-to-one consultation – normally that occurs approx. 3 weeks from date of submission.

#### NOTE:

The cost of the HTMA INCLUDES your consultation with Dr. Gilbère via telephone worldwide in 19 countries (she calls you). It covers only recommendations/interpretation of results; it is not a new client consult for a full work-up of other health issues – the cost for this is \$149. USD.

If you decide to become a full client within 90 days, the cost of the HTMA will be deducted from the initial new client consultation fee of \$240 which INCLUDES an initial 60 min. consultation and follow-up calls to guide you and answer questions/concerns for 90 days, usually a call per month but may be more often at the discretion of Dr. Gilbère.

To order your HTMA kit, go to www.gloriagilbere.com OR call direct: (208) 255.5252 or Toll-free U.S. & Canada (888) 352.8175.