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The Importance of Hair Mineral Analysis

Dr. George M. Tamari, Ph.D.

One of the more interesting and exciting ideas that have emerged from recent research lies in the confirmation that nutrition is a major contributing factor to the maintenance of good health. As the body does not manufacture minerals and trace elements they have to be ingested from food. It is important, therefore, the mineral status of each patient. As early as 1982, Dr. Martin Laker published an article in **The Lancet**¹ on this issue. He concluded, based on the scientific evidence available, that the best medium for determining the mineral status of the human body is to analyze untreated hair tissue.

A specific protocol which, when followed, will provide reproducible, quality controlled analytical data. The information derived from this process provide evidence of:

- Deficiencies of mineral(s)
- Excesses of mineral(s)
- Patterns indicating metabolic disturbances
- The presence of toxic elements

With this information, the health professional, will be able to provide a program to optimize the mineral status of the patient and to eliminate any toxic elements. It is very complicated to achieve this goal. Dr. Roger Williams pointed out the significant differences that exist among individuals'

digestive system and organs². The existence of these differences make it difficult to create a general guideline for supplementation of minerals that will meet the needs of everyone. His study emphasizes the necessity for designing supplementation programs based on each individual patient's needs. Consequently, every patient has to be treated individually and only by trial and error can one learn the proper dosage of supplement(s) that will optimize the mineral status.

One of the major advantages of using Hair Mineral Analysis (HMA) is that it is an elegant, unobtrusive and inexpensive way to detect the presence of *metabolic acidosis*. **Two types** of acidosis can easily be detected by HMA:

- (a) *lactic acidosis* presents a pattern of elevated calcium and magnesium indicate
- (b) *nutritionally induced metabolic acidosis*, is recognized by pattern of elevated calcium, magnesium and phosphorus³.

When there is a deficiency of minerals or vitamins that play an essential role in the Krebs' Cycle, it can result in a disturbance in the *electron transport system* (ETS). The body's attempt to overcome the disturbance in the ETS, may result in a reduction of pyruvate, which is a breakdown product of glucose, and is used as an oxidizer. The reduced pyruvate is called: *lactic acid*.

Lactic acid will reduce the pH in the cell. The cell can't survive in such acidic environment; it draws calcium and latter magnesium from the blood in order to neutralize it via salt formation (calcium and magnesium lactate). The blood calcium level is well maintained between 9-11 mg%. In case the calcium level sinks bellow 9 mg%, it triggers the parathyroid gland to produce hormone (Parathyroid hormone; PTH) , which in turn will transfer calcium from the bones and teeth. The result will be: a) neutralization of the acidity at cell level, b) overloading the cell with calcium and causing difficulties in the function of the mitochondria, and c) continued transfer of calcium from the skeletal structure and teeth causing osteoporosis and dental carries. It has been noted in the literature that deficiency of iron, vitamin B1 or coenzyme Q10 can cause lactic acidosis; also that by supplementing the deficient mineral or vitamin the production of lactic acid was stopped.

Correcting mineral deficiencies seems to be quite simple by supplementing the deficient minerals. Before building up a supplementation program it is advisable to consult the "*Mineral Interaction Chart*". This will ensure that no antagonistic elements will be recommended to take at the same time with consequent interference in absorption of these elements. One way of avoiding such a problem is to recommend the ingestion of antagonistic elements on a staggered basis, about 2-3 hours apart.

It also useful to consider all synergistic effects when supplementing with zinc. Zinc is absorbed better if taken with vitamin B6. Selenium is more effectively utilized in the company of vitamin E (α , β , γ mixed tocopherol). The absorption of iron is increased when combined with ascorbic acid.

The role of Diet

It was observed that people consuming diet containing elevated levels of protein, soft drink and phosphate-buffered canned food, have an increased osteolytic activity resulting in bone loss.

The solanaceous plant has members such as potato, tomato, green pepper, and eggplant, which have been found to contain a calcium-active hormone:

1,25-dihydroxy-cholecalciferol. It has been found that this hormone is useful in promoting bone remineralization⁴. This would suggest that consuming foods belonging to the solanaceous family may be used as a potential therapeutic agent in promoting recalcification of the bone in patients undergoing significant osteolysis.

The main problem is caused by diet containing low calcium and elevated phosphorus triggering increased activity of the parathyroid gland producing the hormone that causes loss of skeletal mass. This loss, however, can't be detected by radiographic density measurement until 30-40% bone loss occurred. Measuring calcium and phosphorus in hair tissue can serve as an early detection of this trend. Elevated levels of calcium, magnesium and phosphorus in hair can reveal a tendency leading to substantial bone loss. It was found that when the ratio of calcium: phosphorus in food was changed from 1:5 (that caused nutritionally induce hyperparathyroidism) to 1:1, this demineralization process has been reversed⁵.

So we can see that Hair Mineral Analysis can provide invaluable information. It is, however, only part of the whole picture. HMA can be utilized most successfully when all information gathered regarding the same individual is taken into consideration. Only then can the skilled health practitioner guide his/her patient on the road to health.

References:

1. M Laker. On Determining Trace Element Levels in Man: The Uses of Blood and Hair *The Lancet*, July 31 1982
2. Williams, R. *Biochemical Individuality 1956* John Wiley & Sons Inc., Texas, U.S.A.
3. Bland, J. Dietary Calcium, Phosphorus and Their Relationships To Bone Formation and Parathyroid Activity, *J John Bastyr College Naturopathic Med 1979;1:185-189*
4. Boris A, Hurley J, Timal T, Mallon J, Matuszewski D. Evidence for promotion of Bone Mineralization by 1,25-Dihydroxy-vitamin D. *J Nutr 1978;108:185-189*
5. Anderson M, Hunt R, Griffiths HJ, McIntyre KW, Zimmerman R. Long Term Effect of low Dietary Calcium:Phosphorus Ratio on Skeleton of Monkeys. *J Nutr 1977; 107:834-838*

A Review of the Literature

Chronic barium intoxication disrupts sulphated proteoglycan synthesis: a hypothesis for the origins of multiple sclerosis.

High level **contamination** by natural and industrial sources of the alkali earth metal, **barium (Ba)** has been identified in the ecosystems/workplaces that are associated with high incidence clustering of multiple sclerosis (MS) and other neurodegenerative diseases such as the transmissible spongiform encephalopathies (TSEs) and amyotrophic lateral sclerosis (ALS). Analyses of ecosystems supporting the most renowned MS clusters in Saskatchewan, Sardinia, Massachusetts, Colorado, Guam, NE Scotland demonstrated consistently elevated levels of **Ba** in soils (mean: 1428 ppm) and vegetation (mean: 74 ppm) in relation to mean levels of 345 and 19 ppm recorded in MS-free regions adjoining. The high levels of **Ba** stemmed from local quarrying for **Ba** ores and/or use of **Ba** in paper / foundry / welding / textile / oil and gas well related industries, as well as from the use of **Ba** as an atmospheric aerosol spray for enhancing/refracting the signaling of radio/radar waves along military jet flight paths, missile test ranges, etc. It is proposed that chronic **contamination** of the biosystem with the reactive types of **Ba** salts can initiate the pathogenesis of MS; due to the conjugation of **Ba** with free sulphate, which subsequently deprives the endogenous sulphated proteoglycan molecules (heparin sulfates) of their sulphate co-partner, thereby disrupting synthesis of S-proteoglycans and their crucial role in the fibroblast growth factor (FGF) signaling which induces oligodendrocyte progenitors to maintain the growth and structural integrity of the myelin sheath. Loss of S-proteoglycan activity explains other key facets of MS pathogenesis; such as the aggregation of platelets and the proliferation of superoxide generated oxidative stresses. **Ba** intoxications disturb the sodium-potassium pump - another key feature of the MS profile. The co-clustering of various neurodegenerative diseases in these Ba-contaminated ecosystems suggests that the pathogenesis of all of these diseases could pivot upon a common disruption of the sulphated proteoglycan-growth factor mediated signaling system. Individual genetics dictates which specific disease emerges at the end of the day.

M Purdey, Med Hypothesis 2004; 62(5):746-754

From the desk of the lab manager:

The following article has appeared in our Spring 03 newsletter.

During my 15 years with Anamol Laboratories I've been striving to provide our customers with accurate, fast and courteous service. To improve the administration of incoming samples by preventing delays and unnecessary phone calls, I would need your assistance with the following:

- When completing hair analysis forms (H101) & Dietary Surveys (N2002), the doctor's and patient's name should be **printed** to ensure correct spelling.
- The marking of gender (sex) and hair location (from where the sample was taken e.g. head nape, pubic), and the submitted quantity of hair of 1 tablespoon are all essential for correct and accurate results.

We respectfully ask all of our customers to mark the method of payment as well. Anamol Laboratories is operating on a prepaid basis and we accept payment by cash, cheque, VISA or MasterCard.

Some health practitioners request their patients to complete the submittal form and mailing the hair sample. In these cases, please stamp on the form the doctor's name first and make sure payment is added to the shipment.

Thank you for your understanding and cooperation. If you have any request, comment or suggestion to further improvements, please write or e-mail us, or if it is urgent, contact us by telephone.

Though we have experienced considerable improvement during the past two years, there is still some measure of the same difficulties. Therefore I found necessary to reprint the column with a few additional requests and suggestions:

- Write patient's name on the sample envelope.
- Results are printed on the language of the requisition form. Please indicate if the report wanted in any other language.
- Requests for free supply should be indicated on the bottom of the same form.
- We have to ask our new customers to send in a copy of your letterhead or business card, as Anamol Laboratories does not deal with the public.
- It is not necessary to issue an individual cheque to each sample in the same shipment.
- Please indicate form of payment by checking the appropriate space.
- Change of address or phone number should be highlighted.
- Please advise us if there is any change in your credit card number.

Nagy Azat, M.Sc., N.C.

ANAMOL Survey 04-05

Thanks to ISO we had to incorporate a Hair-Analysis-User survey in our protocol. At the same time we are grateful to our clients who responded in an unexpectedly large number. The survey has proved itself a valuable feedback and an excellent tool of communication. Some practitioners suggested improvements that were available already. There was interest in forms and printout in different languages- in existence: English, French, German, Spanish- comparative computer program for several charts of the same person, more information on toxic elements, etc; the above request were fulfilled immediately, for mutual satisfaction. There are some suggestions we are recently working on and others that we are unable to realize at this point but we appreciate them all the same.

We gratefully and humbly acknowledge kind words of appreciation, thanks and compliments. The average satisfaction with Anamol's performance can be expressed as 80% or higher.

Please keep your comments, suggestions and requests coming, even if you have returned Survey 05 already. As you have been kind enough to answer our questions, we are always here for you when you need us. Please don't hesitate to call.

Request for Research Information

A frequent request from our responders was for information on current and relevant research on Hair Mineral Analysis. At Anamol we continuously search for such information from all available resources. Whenever we find anything of interest, we will report it in our Newsletter.

Over the years there has been a shift in the nature of research in this field. In the 60's and 70's there was keen interest in studying the relationship of minerals and trace elements to both health and disease. Research grants were readily available and many articles were published even in the most conservative medical journals such as **The Lancet**, which in their 31 July, 1982 issue included an outstanding article by Dr. Martin Laker, entitled "On Determining Trace Levels in Man: The Uses of Blood and Hair"

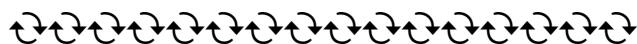
Over time, the direction of research shifted. More funds were granted for pharmaceutical studies and consequently there were fewer articles promoting preventive medicine. Unfortunately, this funding void has not been filled by companies that produce supplements. Small manufacturers don't have the funds and the large ones apparently do not feel the need. Perhaps, in the near future, under pressure from a health-oriented public, they will support more research.

Despite the paucity of current research, we may be reassured because the information which has already been published is still valid.

Until then, have a most enjoyable Spring & Summer!

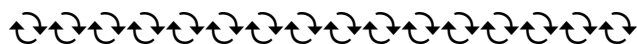
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- Hair Tissue Mineral Analysis
- Urine Mineral Analysis
- Water Mineral Analysis



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