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## Interaction of Minerals and Detoxification

Dr. George M. Tamari, Ph.D.

With the advancement of technology, toxicity in our environment increases from year to year. Unfortunately the health profession cannot do too much in the elimination of toxins in air, soil and water, but we can find ways to contra act the harm caused by those toxic elements.

The observation in nature, that soils rich in certain minerals can cause a deficiency in others has incited many nutritionists to study this interrelationship among the different elements. In the last sixty years, many studies were conducted in order to find the explanation for these antagonistic effects among the different minerals.

It was found that ions whose shell electronic structure (1) or electronic configurations (2,3,4) were similar, would be antagonistic These studies were conducted on animals, and the survival time and body weight gain or loss were used to measure the biological effects of the interaction of the different elements. The Task Group on Metal Interaction compiled impressive data in 1978 (5) and also on nutrient interaction with toxic elements (6).

All of the above information was collected and shown in a chart form in Fig. 1. The elements connected by a line indicate antagonism. In using this chart as an aid in preparing a supplementation program, one should be aware of any imbalance

## Interaction des minéraux et désintoxication

Dr. George M. Tamari, Ph.D.

Avec l'avancée de la technologie, la pollution de notre environnement s'aggrave d'année en année. Bien que le secteur de la santé ne puisse pas faire grand-chose pour éliminer les toxines présentes dans l'air, le sol et l'eau, nous pouvons trouver des moyens de contrer leur nocivité.

C'est en observant les phénomènes de carence en certains minéraux dans les sols riches en d'autres minéraux que des nutritionnistes se sont penchés sur les relations existant entre ces différents éléments. Au cours des soixante dernières années, de nombreuses études ont été menées pour trouver les raisons expliquant ces antagonismes.

Il s'est avéré que les ions dont la structure électronique externe (1) ou les configurations électroniques (2,3,4) étaient similaires, seraient antagoniques. Ces études ont été menées sur des animaux et c'est en mesurant leur temps de survie ainsi que leur prise ou perte de poids que l'on a pu déterminer les effets biologiques de l'interaction de ces différents éléments. Le Task Group on Metal Interaction a compilé d'importantes données en 1978 (5), notamment sur l'interaction nutritionnelle de ces éléments toxiques (6).

Toutes les informations ci-dessus ont été regroupées et publiées sous forme de tableau. Voir Fig. 1. Les éléments reliés indiquent un antagonisme. En utilisant ce tableau pour calculer les doses de

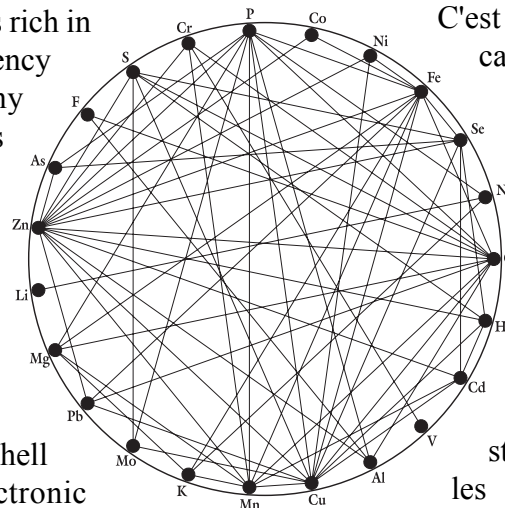


Fig.1

among the elements and the antagonistic effect should be taken into consideration, when calculating the dosage of the supplemented element. Also, the time of intake should allow an interval of 2-3 hours in order to avoid possible competition at the absorption site.

A recently published work (7) shows, that children with lower dietary calcium are more prone to lead-burden than children with a diet richer in calcium.

The data on interaction of essential minerals and toxic elements can be used effectively in two ways:

- By balancing the elevated nutritional mineral(s) with increased intake (food, supplementation) of the antagonistic nutritional element - like in metabolic acidosis.
- Replacement therapy: removing toxic body minerals with antagonistic elements, which are most probably deficient in the diet in the first place.

For instance, lead can be removed by zinc, and calcium. Zinc displaces cadmium, mercury, and aluminium as well. Selenium is an excellent antagonist to mercury. Also copper is antagonistic to lead and cadmium; its use for this purpose is more limited than that of zinc. As its tolerance level is much lower before it becomes toxic. As a basic principle, if the presence of a toxic element were indicated in the hair mineral analysis, a recheck of this element in pubic hair would confirm it as being systemic and not merely exogenous contamination. This would then fully justify proceeding with a replacement/detoxification program.

compléments recommandées dans le cadre d'un programme de santé, il ne faut pas oublier de prendre en compte les effets antagoniques de certains éléments et les déséquilibres qu'ils peuvent entraîner. Par ailleurs, les prises de compléments doivent être espacées de 2 à 3 heures pour éviter toute interférence possible sur le lieu d'absorption.

Une étude récente (7) indique que les enfants présentant des carences calciques étaient moins résistants au cas de saturnisme que les enfants dont l'alimentation était riche en calcium.

Les données sur l'interaction des minéraux essentiels et des éléments toxiques peuvent servir efficacement à :

- Équilibrer les minéraux nutritionnels en augmentant les apports (alimentation, compléments) d'éléments nutritionnels antagoniques (acidose métabolique).
- Éliminer les minéraux toxiques présents dans le corps grâce à des éléments antagoniques, qui sont déjà sûrement en carence dans l'alimentation (traitement substitutif).

Ainsi, le plomb peut être éliminé par le zinc et le calcium. Le zinc élimine aussi le cadmium, le mercure et l'aluminium. Le sélénium s'oppose parfaitement au mercure. Bien que son utilisation à ce propos soit plus limitée que celle du zinc, le cuivre est un bon élément antagonique du plomb et du cadmium. En effet, son niveau de tolérance est très inférieur avant qu'il ne devienne toxique. Par principe de base, si l'analyse minérale capillaire indique la présence de toxine et qu'une double vérification de cet élément à partir d'un poil pubien confirme sa présence comme systématique et pas seulement due à une contamination exogène, la mise en place d'un programme de substitution / désintoxication se justifierait complètement.

## References:

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2. Hartman RH, Matrone G, Wisw GH: Effect of High Dietary Manganese on Hemoglobin Formation. J Nutr 1955;55: 429-439
3. Thompson ABR, Olatunbosun D. Valberg LS. Interrelation of Intestinal of Intestinal Transport System for Manganese and Iron. J Lab Clin Med. 1971;78: 642-655
4. Chetty Kn: Interactions of Cobalt and Iron in Chicks.Ph.D. Thesis. North Carolina State University, 1972.
5. Nordberg GF, et al.: Factors Influencing Metabolism and Toxicity of Minerals: A Concensus Report, Environ Hlth Persp 1978;25:3-41.
6. Sanstead NH: Nutrient Interactions with Toxic Elmwmnts. Advances in Modern Toxicology 1977;2:241-256.
7. Mahaffey KR, Rader JI: Metabolic Interactions: Lead, Calcium and Iron. Ann NY Acad Sci 1980;355:285-297.

## Welcome back Thuy

On May 18th, 2003 our much-appreciated technician, Thuy gave birth to a lovely little boy, Martin. Though, the mother and son are very happy together, Thuy decided to leave Martin in the care of her sister and will rejoin the Anamol Family in March. We are pleased to have Thuy back and knowing how organized she is, we are confident she will succeed to mix professional work with motherhood.

## Seminar News

Our yearly two-day seminar in Toronto was a very successful event: good attendance, good lectures and good spirit! Long-time users of Hair Analysis expressed regret for not making an effort to participate earlier, as they found a deeper understanding of its biochemical correlation and predictive value. For the novice it has been somewhat overwhelming, but most participants learned more than expected.

We apologize to the unusually large number of practitioners whom we were unable to accommodate but the space was not conducive for more than 80 people. If there is sufficient interest, we will repeat the seminar in the fall, and we definitely will look for a larger space.

The next seminar will take place on April 17-18, 2004, in Montreal. Same format, same lectures - in French! Hope to see you there. Comments or inquiries are always welcome.

## Study links diet to senility

In the Toronto Star on February 16 '04, Peter Calamai writes :

*“Scientists have devised a diet of vegetables, vitamins and nutritional supplements that delays and even reverses the effects of Alzheimer's-like senility...”*

For the time being Carl Cotman and his team of University of California keeps only beagles on the anti-senility diet .During the three years of the project the researchers received "startling" results in rejuvenated brain functions and improved mental agility of the beagles. The anti-senility diet consists of vitamin C and E, alpha lipoic acid, acetyl carnitine and roots and vegetables high in antioxidants.

## A Review of the Literature

### Magnesium and hearing

The last several decades have revealed clinical and experimental data regarding the importance of magnesium (Mg) in hearing, increased susceptibility to neurological damage, ototoxicity, and auditory hyperexcitability are linked to states of Mg deficiency. Evidence for these processes has come slowly and direct effect remained elusive because plasma Mg levels do not always correlate with its deficiency. Despite the major progress in the understanding of cochlear mechanical and auditory nerve function, the neurochemical and pharmacological role of Mg is not clear. The putative mechanism suggests that Mg deficiency contribute to a metabolic cellular cascade of events. Mg deficiency leads to increased permeability of the calcium channel in the hair cells with a consequence over influx of calcium, an increased release of glutamate via exocytosis, and stimulation of NMDA receptors on the auditory nerve. This paper provides current overview of relevant Mg metabolism and deficiency and its influence on hearing.

Cevette MJ, Vormann j, Franz K. J Am Acad Audiol 2003;14:202-212

### A child with chronic manganese exposure from drinking water

The patient's family bought a home in a suburb, but the proximity of the house to wetlands and the distance from the town main prohibited connecting the house to town water. The family had a well frilled and they drank the well water for 5 years, despite the fact that the water was turbid, had a metallic taste, and left an orange-brown residue on clothes, dishes and appliances. When the water was tested after 5 years of residential use, the manganese concentration was elevated (1.21 ppm; U.S. Environmental Agency reference <0.05 ppm). The family's 10- year-old son had elevated manganese concentrations in whole blood, urine and hair. The blood manganese level of his brother was normal, but his hair manganese was elevated. The patient, the 10-year old, was in the fifth grade and had no history of learning problems; however, teachers

had noticed his inattentiveness and lack of focus in the classroom. Our results of cognitive testing were normal, but tests of memory revealed a markedly below-average performance: the patient's general memory index was at the 13th percentile, his verbal memory at the 19th percentile, his visual memory at the 14th percentile, and his learning index at the 19th percentile. The patient's free recall and cued recall tests were all 0.5-1.5 standard deviation (1 SD=16th percentile) below normal. Psychometric testing scores showed normal IQ but unexpectedly poor verbal and visual memory. These findings are consistent with known toxic effects of manganese, although a casual relationship cannot necessarily be inferred.

Woolf A, Wright R, Amarasiriwardena c, Bellinger D. Environ Health Perspect 2002;110:613-6

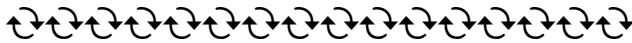
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 • The accuracy of analytical result is the essence of any analytical laboratory. Therefore, we want to share with you our pride and satisfaction in achieving high scores by participating in the periodically offered proficiency test organized by the Canadian Association of Environmental Analytical Laboratories (CAEAL). The list of laboratories passing the proficiency test is published on the Internet at [www.caeal.com](http://www.caeal.com).  
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Two-day seminar on Hair Tissue Mineral Analysis, In-Office Lab Tests and Saliva Hormone Testing will take place on Apr. 17-18 2004 at The Hotel Maritime Plaza in Montreal. The Dr. Wales lectures have been translated and will be delivered in French.

Le séminaire d'une durée de deux jours sur "l'analyse minérale du tissu du cheveu, les tests d'hormone dans la salive et les tests de laboratoire effectués dans le bureau médical", aura lieu les 17 et 18 avril 2004 à l'Hotel Maritime Plaza à Montréal. Les conférences du Dr. Wales ont été traduites et seront données en Français.

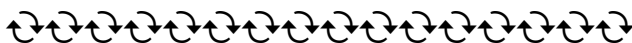
The number of French speaking users of our services is growing steadily and with it the need to communicate in French. Therefore, starting the 2004 spring issue we'll print Dr. Tamari's article in both official languages on the pages of ANAMOL's newsletter.

Le nombre de francophones qui utilisent nos services grandit constamment et, par conséquent, le besoin de communiquer en français. C'est pourquoi, à partir de l'édition du printemps 2004, nous imprimerons l'article du Dr. George Tamari dans le bulletin d'Anamol dans les deux langues officielles.



**Services:**

- Educational Seminars
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- Urine Mineral Analysis
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