

The Discovery of a Unique Natural Heavy Metal Chelator

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Introduction

It would be true to say that nearly everyone on the globe today has some degree of heavy metal toxicity—from air pollution, inoculations, fish, water contamination, amalgam fillings, in-utero exposure from mother's fillings, and toxins. The World Health Organization (WHO) has acknowledged environmental pollution as the underlying cause of 80% of all chronic degenerative diseases.¹ In a Technical report on mercury in the environment by the Committee on Environmental Health² it was written that "the developing fetus and young children are thought to be disproportionately affected by mercury exposure, because many aspects of development, particularly brain maturation, can be disturbed by the presence of mercury. Minimizing mercury exposure is, therefore, essential to optimal child health."

Heavy or toxic metals are trace metals that are at least five times denser than water. As such, they are stable elements in that they cannot be metabolised by the body, as well as bio-accumulative in that they are passed up the food chain to humans.

A Technical Report written by the American Academy of Pediatrics also wrote: "Mercury in all of its forms is toxic to the fetus and children, and efforts should be made to reduce exposure to the extent possible to pregnant women and children as well as the general population."³

There are at least 76 published functional and behavioural abnormalities associated with heavy metal toxicity.⁴

The measurement of heavy metals from the body can now be undertaken with a detection limit that exceeds parts per

billion using mass spectrometers. Since we can only measure what the patient can eliminate, not the actual total body burden, it is important to measure what is eliminated in both the urine and the faeces in order to have a more representative picture as different chelating agents prefer different elimination pathways. If only urine or only faeces are used, then it is easy to miss the chelating effects of a new compound being tested. In these series of trials, both urine and faeces were used for testing.

Abstract

Of late, a three-year heavy metal detoxification study was concluded in a Russian metal foundry. The work was commissioned by a large multi-national company who were interested in undertaking a health impact study to determine the degree of heavy metal toxicity in a representative sample of their work force. In addition, they were interested in finding a cost-effective heavy metal chelator that could be used in that part of the world where the average monthly earnings do not exceed \$150.

The amount of data analysed over the three-year period amounts to more than 300 pages of statistics, so only the pertinent results will be presented in this paper, along with the methodology and other treatment protocols. More than 20 natural compounds were used in the various protocols, including various combinations of these, over three separate trials with over 350 people participating.

¹ World Health Organization (WHO) 1974, Florence, Italy ² Goldman LR, Shannon MW. Technical report: mercury in the environment: implications for pediatricians. American Academy of Pediatrics: Committee on Environmental Health. Pediatrics (2001) Jul;108(1):197-205. ³ Goldman, LR., Shannon, MW. and the Committee on Environmental Health. Technical Report: Mercury in the Environment: Implications for Pediatricians (RE109907) American Academy of Pediatrics, Pediatrics, Volume 108, Number 1, July 2001, pp 197-205. ⁴ Townsend Letter for Doctors, # 213, April 2001.

Statistical analyses of all trials have shown that there was one compound that consisted of three natural substances that was successful in chelating all the metals tested using a double blind, placebo controlled pre-post provocation trial. Both urine and faeces samples were used for the metal testing, determined by using both Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) and Atomic Fluorescence Spectroscopy⁵. Both internal and external laboratories were used for the testing both in Russia as well as the USA.

Trial of a Number of Natural Substances

During the trials there were a number of natural substances that were found to chelate certain metals, but not others. There were also dose-dependent relationships with some of these substances. However, there was only one compound tested in double blind, placebo controlled trials that was effective in mobilizing and excreting metals in the urine and faeces for all the metals tested. This proprietary formulation has been filed at the United Kingdom Patent Office and an international patent is pending. The compound is called HMD (Heavy Metal Detox) and consists of a homeopathic homaccord of cell decimated *Chlorella*, *Coriandrum sativum* leaf tincture (Cilantro) and *Chlorella* Growth Factor. This is a powerful, synergistic chelating formula, which is very cost effective.

The objective of this article is to introduce the results of the HMD protocols, as well as touching on the results for the other natural compounds tested, which is of interest to other researchers in the field of heavy metals.

The Research Design

The research study involved the participation of a group of medical doctors from a local hospital who also formed the ethics committee. There were also a group of analytical chemists from the plant, a group of nurses, translators, secretaries, administrators and other experts in analytical chemistry and spectrometers that took part in the research over the three-year period.

All participation was on a voluntary basis, each person signed a *Consent Form*, which had clear criteria for participation in the research.

It was initially decided to take a representative sample of employees from the metallurgical smelting plants, as these were believed to be the higher risk areas in terms of toxicity. Of a sample of 2,000 employees, a random sample of 374 (18.7%) were chosen to undergo a Tissue Hair Mineral Analysis (THMA)⁶ at a reputable laboratory in the USA. Pubic hair was sent to the laboratory and analysed for 8 different types of heavy metals, namely Sb, U, As, Be, Hg, Cd, Pb and Al. There were also a further 15 minerals analysed.

It is recognised in the literature that THMA is a unique, convenient and cost-effective screening method, which reflects body minerals and heavy metal stores more accurately than blood and urine, as hair naturally stores minerals over time.⁷ The four main metals that were common to all the workers were antimony, arsenic, cadmium and lead, which were at very high levels. These metals were the ones chosen for further study, as they were the main by-products of the metal foundry's manufacturing process and were the ones that the company wanted to eliminate from their workforce.

Mercury was not really an issue as Russians do not use amalgam fillings, but gold alloys, and seldom eat fish. Studies are presently on-going, however, to determine the efficacy of HMD with mercury and the results for these should be published shortly. Initial pilot testing has shown encouraging results – incorporated in the results is a sample of 24 people that underwent pre-post provocation testing for mercury using HMD.

The research design was a double blind, placebo-controlled study – neither did participants, researchers nor the analytical chemists doing the spectrometry analysis know which treatment protocol each participant belonged to. The coding was stored in the coordinators safe until it was time to interpret the statistical data.

Methodology

Each participant had to acquire a baseline sample of urine (24-hour collection) and faeces before commencing to take any remedies. Both urine and faeces were taken in order to determine the excretory route used by the various substances tested.⁸ These samples were returned to the research team and circumspectly recorded in preparation for X-ray fluorescence spectrometry using the foundry's in-house instrument. Further Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) analyses were conducted using two independent laboratories in Russia and the USA.

All the participants were given time off during the trials as it was important for them not to continue being exposed to the heavy metals during the pre-post testing period. There were however two workers in the sample who continued working during the trial due to work pressures.

After the baseline urine samples were collected for 24 hours and faeces as soon as the need arose, each participant was given their precise detoxification remedy, which they began to take three times per day (see Treatment Protocols below). The post-provocation urine samples were collected for 12 hours and the post-provocation faeces samples after 48 hours later due to the slower transit time. These samples were again returned to the research team, coded and sent to the laboratory for analysis.

⁵ Dean, J.R. Atomic Absorption and Plasma Spectrometry (2nd edition). John Wiley, UK, 1997. ⁶ Passwater, RA. And Cranton, EM. Trace elements, Hair Analysis and Nutrition. Keats Publishing, Inc. New Canan, 1983. ⁷ Toxic Trace Metals in Mammalian and Human Hair and Nails, EPA-600 4.049, August 1979, U.S. Environmental Protection Agency, Research and Development. This is a review of 400 studies on hair analysis and toxic metals. ⁸ Angerer, J. and Schaller, KH. Analyses of Hazardous Substances in Biological Materials (Volume 4). VCH, Germany, 1994.

All participants took certified metal-free, high-grade Yaeyama cell-decimated *Chlorella* tablets⁹⁻¹³ (500 mg x 3 daily), from Japan in order to prevent the reabsorption of metals from the gut due to the high levels of toxic metals that were measured in these workers. This was an added precaution to prevent any adverse reactions. The placebo group also took this *Chlorella*. The results indicated that the *Chlorella* by itself was not chelating metals per se. Yaeyama *Chlorella* is grown in the environmentally pristine coral reef region of Japan's Ishigaki Island using mountain spring water, tropical sunshine and food grade nutrients. High impact jet-spray drying that pulverizes the algae wall breaks Yaeyama *Chlorella* cell walls, making it into cell-decimated *Chlorella*.¹⁴ The pulverizing helps to increase absorption of its vital nutrients. Furthermore, all the homeopathic homaccords used in the study were prepared by a reputable homeopathic pharmacy in the UK.

Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS)¹⁵. A biostatistician was responsible for running all the analyses using ANOVA, Pearson's correlation coefficients and other descriptive statistics.

The Treatment Protocols

Over the three years there were a number of trials conducted using different natural substances that the literature supported as being effective chelators. It is important to at least touch on these trials in order to better understand what had been tested, and how. All the 374 workers that were initially screened using the THMA took part in one of these trials. The various trials consisted of the following:

1. Placebo or Control Group – taking only water with a little cognac added to mask the taste. The dosage was 60 drops x 3 daily.
2. Homeopathic *Chlorella* Group - this consisted of a homaccord of homeopathic *Chlorella* ranging from 6c to 30c. Dosage was 60 drops x 3 daily.

3. Cilantro Group¹⁶ – taking Cilantro or *Coriandrum sativum* leaf tincture. Dosage was 60 drops x 3 daily.
4. *Chlorella* Growth Factor, taken alone. Dosage was 60 drops x 3 times daily.
5. Homeopathic DMSA, using a homaccord of homeopathic DMSA of 6c to 30c as a tincture. Dosage was 60 drops x 3 daily.
6. PleoChelate¹⁷ – a ready-made remedy prepared by Sanum-Kehlbeck, GmbH & Co, purported to chelate metals. It consists of minerals in homeopathic dosages of D2 in water. Dosage was 60 drops x 3 daily.
7. Homeopathic cell-decimated *Chlorella* + *Chlorella* Growth Factor (CGF) + Cilantro in the form of organic coriander *sativum* leaf tincture. Dosages varied between 40, 50 and 60 drops x 3 times daily.
8. Homeopathic cell-decimated *Chlorella* + *Chlorella* Growth Factor (CGF) + Cilantro in the form of organic coriander *sativum* leaf tincture + PleoChelate. Dosages varied between 40, 50 and 60 drops x 3 times daily.
9. Homeopathic cell-decimated *Chlorella* + *Chlorella* Growth Factor (CGF) + Cilantro in the form of organic coriander *sativum* leaf tincture + PleoChelate + Homeopathic DMSA (homaccord 6c, 12c and 30c). Dosages varied between 40, 50 and 60 drops x 3 times daily.
10. Cilantro and vitamin C¹⁸⁻²¹ together. Cilantro paste (see Summary of Various Protocols) was taken at a dosage of one tablespoon daily with 2 grams of vitamin C x 3 times daily.
11. Cilantro, vitamin C and homeopathic lead, arsenic, cadmium and antimony (homaccords of 6c to 30c). The homeopathics were taken separately as individual homaccords such as plumbum (60 drops x 3 daily) concomitantly with the Cilantro paste (See Summary of Various Protocols) and the vitamin C (dosage of 5 grams by 2 times daily).

⁹ Janusz Pempkowiak and Alicja Kosakowska. Accumulation of cadmium by green algae *Chlorella vulgaris* in the presence of marine humic substances. *Environment International* Volume 24, Issues 5-6, July-August 1998, Pages 583-588. ¹⁰ N. Akhtara, J. Iqbal and M. Iqbal Removal and recovery of nickel(II) from aqueous solution by loofa sponge-immobilized biomass of *Chlorella sorokiniana*: characterization studies. *Journal of Hazardous Materials* Volume 108, Issue 1-2, 30 April 2004, Pages 85-94. ¹¹ E. Beceiro-González*, A. Taboada-de la Calzada, E. Alonso-Rodríguez, P. López-Mahía, S. Muniategui-Lorenzo and D. Prada-Rodríguez Interaction between metallic species and biological substrates: approximation to possible interaction mechanisms between the alga *Chlorella vulgaris* and arsenic(III). *Trends in Analytical Chemistry*. Volume 19, Issue 8, August 2000, Pages 475-480. ¹² G. M. P. Morrison and T. M. Florence Comparison of physicochemical speciation procedures with metal toxicity to *Chlorella pyrenoidosa*. *Analytica Chimica Acta*, Volume 209, 1988, Pages 97-109. ¹³ L. C. Rai, J. P. Gaur and H. D. Kumar. Protective effects of certain environmental factors on the toxicity of zinc, mercury, and methylmercury to *Chlorella vulgaris* *Environmental Research*, Volume 25, Issue 2, August 1981, Pages 250-259. ¹⁴ Mitsuda, H., Nishikawa, Y., Higuchi, M., Nakajima, K., Kawai, F. Effects of breaking of *Chlorella* cells on the digestibility of *Chlorella* protein. *Jpn Soc Food Nutr.* 1977; 30: 93-98. ¹⁵ Norusis, MJ. *SPSS Professional Statistics 6.1*, SPSS Inc., Chicago, USA, 1994. ¹⁶ Omura Y; Beckman SL Role of mercury (Hg) in resistant infections & effective treatment of *Chlamydia trachomatis* and Herpes family viral infections (and potential treatment for cancer) by removing localized Hg deposits with Chinese parsley and delivering effective antibiotics using various drug uptake enhancement methods. *Acupunct Electrother Res*, 1995 Aug, 20:3-4, 195-229. ¹⁷ PleoChelate – www.sanum.com ¹⁸ Carol, Spindell, Farkas. Importance of interactions between nutrients and environmental contaminants as a factor in experimental design in toxicological research: with emphasis on selenium and ascorbic acid *The Science of The Total Environment*, Volume 9, Issue 2, March 1978, Pages 149-159. ¹⁹ Ariel H. B. Poliandria, Jimena P. Cabillaa, Miguel O. Velardeza, Cristian C. A. Bodoa and Beatriz H. Duvilanski. Cadmium induces apoptosis in anterior pituitary cells that can be reversed by treatment with antioxidants. *Volume 190, Issue 1, 1 July 2003, Pages 17-24.* ²⁰ Poliandri, AH., Cabilla, JP, Velardez, MO., Bodo CC and Duvilanski, BH. Cadmium induces apoptosis in anterior pituitary cells that can be reversed by treatment with antioxidants. *Toxicology and Applied Pharmacology*, Volume 190, Issue 1, 1 July 2003, Pages 17-24. ²¹ Hande Gurer and Nuran Ercal Can antioxidants be beneficial in the treatment of lead poisoning? *Free Radical Biology and Medicine*, Volume 29, Issue 10, 15 November 2000, Pages 927-945

General Results for All Protocols

There were many trials using each remedy at different doses, with different percentages of each substance, in the various compounds tested. The data for all these analyses run into hundreds of pages and cannot be shared in the space available here. However, the data presented in *Table 1* (N=160) shows the success (✓) or failure (✗) of these trials using the above named natural substances. Success meant that there was an increase in the specific metal in the post-testing, compared to baseline for the group being tested as a whole. It is important to bear in mind the stringent criteria that were used in this study to include a remedy as being “successful”. To be considered a successful remedy it must have shown the ability to eliminate metals in ALL the people involved in the particular trial.

Summary of Results for the Various Compounds Tested

A brief summary of the results follows:

1. **Chlorella Growth Factor**²² by itself was only effective at eliminating cadmium in faeces at a dosage of 40 drops x 3 daily. The post-faeces sample had 150% more cadmium than the baseline sample.
2. The **PleoChelate**, a homeopathic mineral compound produced by Sanum-Kehlbeck in Germany that is used by many Biological Medicine specialists was effective at chelating arsenic in urine only.

The dosage was 60 drops x 3 daily and there was an average of about 500% increase of arsenic in the post-urine test, compared to baseline.

3. The **homeopathic DMSA**, used at 50 drops x 3 daily, showed elimination of cadmium in faeces (400% increase) and arsenic in urine (1,200% increase).
4. Perhaps a word of caution about the Cilantro testing is in order. Apart from one trial using 30 drops x 3 daily of Cilantro where there was a 20% increase in the post-provocation urine compared to the baseline, and one at 50 drops x 3 daily where there was a 10% increase in the faeces of the post-sample, all other trials showed a strong percentage **decrease** of metals in the post-urine and faeces. The levels were consistently around 90 – 100% decrease in metals for all the metals tested. This consistency and repetitiveness in results is indicative that when Cilantro is used alone it is probably removing metals intracellularly into the mesenchyme, but as there are no other chelators to attach to the metals in the mesenchyme, through the laws of osmosis (higher concentration to lower concentration) the metals are going back into the cell in force. The body is therefore withholding more metals than the baseline or pre-provocation sample. This “osmotic backlash” could prove detrimental for a severely toxic person with chronic disease.
5. **Homeopathic Chlorella** did not eliminate any of the metals in the post-provocation test.

Treatment	Pb	Pb	Cd	Cd	Sb	Sb	As	As
	(U)	(F)	(U)	(F)	(U)	(F)	(U)	(F)
Chlorella Growth Factor	✗	✗	✗	✓	✗	✗	✗	✗
PleoChelate	✗	✗	✗	✗	✗	✗	✓	✗
Homeopathic DMSA	✗	✗	✗	✓	✗	✗	✓	✗
Cilantro tincture	*	*	*	*	*	*	*	*
Homeopathic Chlorella	✗	✗	✗	✗	✗	✗	✗	✗
Homeopathic Chlorella+CGF+ Cilantro	✓	✓	✓	✓	✓	✓	✓	✓
Homeopathic	✗	✗	✗		✗	✗	✗	
Chlorella+CGF+				✓				✓
Cilantro+PleoChelate	✗	✗	✗	✗	✗	✗	✗	✗
Homeopathic Chlorella+CGF+Cilantro+PleoChelate+ Homeopathic DMSA	✗	✗	✗	✗	✗	✗	✗	✗
Cilantro + vitamin C	✗	✓*	✗	✓*	✗	✗	✗	✗
Cilantro + vitamin C + homeopathic plumbum	✓*	✗	✗	✗	✗	✗	✗	✗
Cilantro + vitamin C + homeopathic arsenicum	✗	✗	✗	✗	✗	✗	✗	✗
Cilantro + vitamin C + homeopathic antimonium	✗	✗	✗	✗	✗	✗	✗	✗
Cilantro + vitamin C + homeopathic cadmium	✗	✗	✓*	✗	✗	✗	✗	✗

Table 1 The Effectiveness of the Different Compounds Tested (N=220)

* NB. The Cilantro and vitamin C trial was conducted using blood samples, not faeces as indicated in Table 1. The participants took fresh Cilantro paste made from 1 Clove Garlic, ½ cup Walnuts, 1 cup packed fresh Coriander leaves, 2 tablespoons lemon juice and 6 tablespoons olive oil – one tablespoon at the beginning and end of their shifts. This was combined with 5 grams of ascorbic acid powder every time they took the Cilantro paste. The trial lasted 3 weeks or a total of 18 days. Post-blood tests showed a significant decrease in lead and cadmium compared to baseline, even though the workers were still exposed to these metals throughout the trial.

²² Kanno, T.,Shinpo, K and Masada, M. Growth-promoting factor for yeast from an extract of Chlorella vulgaris CK-5 : Seibutsu-kogaku 74: 159–162. 1996.

6. The **Homeopathic Chlorella, CGF and Cilantro** compound that is now known as HMD showed the most promise as it eliminated ALL the metals tested, both through the urinary as well as the biliary route. The results for this compound are shown in *Table 2* for the urine and *Table 3* for the faeces. The elimination of the four metals is compared to the placebo trials. Once it was established that the homeopathic Chlorella + Cilantro + CGF was the most promising compound, this was further tested amongst 84 foundry workers to determine the exact percentage of each substance in the compound, as well as the dose that was most effective for each of the metals tested.

Eventually, after conducting pre-post urine and faeces provocation testing on these 84 workers the most effective mixture was found that eliminated all metals from the body as measured by ICP-MS and X-ray fluorescence in the post-urine and post-faeces samples.

7. When **PleoChelate** was added to the HMD compound, there was only elimination of cadmium and arsenic in faeces. The dosage that was most effective for the arsenic in faeces was 50 drops x 3 daily (100% elimination) and 40 and 50 drops for the cadmium in faeces (200% elimination).

Detailed Results of the HMD Compound Trials

The only compound that was effective at mobilizing and eliminating all metals was HMD consisting of Homeopathic chlorella, chlorella growth factor (CGF) and Coriandrum sativum leaf tincture.

As this particular compound showed merit on a number of occasions, it was tested thoroughly in double-blind, placebo controlled trials with an additional 84 foundry workers to determine the exact dosage that was most effective, as well as the exact proportions of each element of the compound that would be the most effective at eliminating metals.

The results will be presented for each metal in urine and then in faeces. The results are expressed as **percentage increases (+) or percentage decreases (-)** of heavy metals in urine or faeces. If there is a **percentage increase** in the post-provocation sample, this is an indication that the body is **eliminating** these metals from the body – an indication that the chelating agent is mobilizing and eliminating the metals. A percentage decrease is an indication that the body may actually be retaining metals, which is not the desired response and could be detrimental to a person’s overall health. When the percentage is close to zero then the body is not eliminating or storing metals. The criteria for choosing a successful remedy was that the Total Mean (%) in the group of people being tested had to be **positive (percentage increase)** – the higher the positive number, the more metals were being eliminated.

Given that the trials also involved testing the specific percentages of each element in the effective HMD compound, the best results of these trials have been taken, as the data is too extensive to present here. The most effective proprietary combination has been used in the final HMD compound presently available to practitioners and the public.

Table 2 shows the mean elimination of metals in URINE in the post-provocation sample of urine after the HMD was taken for 12 hours only. There is a dose-dependent relationship for each of the four specific metals tested. For example, arsenic was eliminated more effectively when taking 40 drops x 3 daily (7,514% increase in the post-urine), compared to higher doses of 50 and 60 drops. Antimony also showed the same dosage of 60 drops x 3 daily was the most effective. The cadmium data were rather surprising as only the 50 drops x 3 daily were effective (26.43%); none of the other two dosages were effective. The lead elimination peaked when a dosage of 60 drops x 3 daily was used (466.4%).

Table 3 shows the same but for the elimination of metals in the FAECES. For arsenic the 60 drops x 3 daily was most effective (298.1%); for antimony only the 60 drops x 3 daily was effective (50%); for cadmium the 40 drops x 3 daily (45.11%) and for lead only the 50 drops x 3 daily (142.1%).

	Arsenic			Antimony			Cadmium			Lead		
Placebo Group	104.87			14.91			-20.50			-16.95%		
Homeopathic Chlorella+CGF+ Cilantro	40	50	60	40	50	60	40	50	60	40	50	60
	7,514	784.1	1,440	60.7	48.8	59.1	0	26.43	0	335.5	0	466.4

**40 = 40 drops x 3 daily;
50 = 50 drops x 3 daily;
60 = 60 drops x 3 daily**

*Table 2 Results of the HMD Testing In Urine (N=84)
(Mean elimination of metals expressed as % increase or decrease)*

	Arsenic			Antimony			Cadmium			Lead		
Placebo Group	61.13			14.91			-22.62			-6.01		
Homeopathic Chlorella+CGF+ Cilantro	40	50	60	40	50	60	40	50	60	40	50	60
	52.57	163.7	298.1	0	0	50	45.11	26.4	43.13	0	142.1	0

**40 = 40 drops x 3 daily;
50 = 50 drops x 3 daily;
60 = 60 drops x 3 daily**

*Table 3 Results of the HMD Testing In Faeces (N=84)
(Mean elimination of metals expressed as % increase or decrease)*

The predominant route of excretion is via the urine, which will enhance the excretion rate of the mobilized metals as compared to the fecal route, decreasing the possibility of re-absorption through the bowel, particularly in cases of leaky-gut syndrome, therefore decreasing the burden on the liver.

Additional Mercury Research

To date, a clinical sample of 24 patients with amalgam fillings have taken the HMD in pre-post provocation tests using a 2-hour protocol. Urine was taken from the patient immediately after obtaining permission, the HMD was given in a single dose of 60 drops and a second urine sample was taken approximately 2 hours later. This was arranged like this for patients visiting the Integrated Medicine Centre in Cyprus for convenience. Samples were analysed using a dedicated PSA Atomic Fluorescence Mercury Analyser capable of detection limits up to parts per trillion. The results are shown in *Table 4*.

Provocation with HMD (60 drops)	MERCURY
Pre-test	+12.62%
Post-test	+ 126.40%

Table 4 Results of the HMD Testing in Urine for Mercury (N=24)
(Mean elimination of metals expressed as % increase or decrease)

The results from this pilot study for mercury show that the HMD is eliminating just over 100% mercury in the post-urine sample compared to the pre-test urine. This study with mercury is still on-going with complete pre-post provocation trials using HMD over 24 hour collection for the pre-test urine and 12 hours for the post. This is also being correlated to the amount of amalgam fillings in the mouth.

Other Health Benefits of HMD

The three individual elements that HMD consists of are all natural substances, which apart from their chelating properties also have other health benefits such as:

1) Chlorella Growth Factor (CGF)

In the 1950s, Dr. Fujimaki, of the People's Scientific Research Center in Tokyo, separated a substance from a hot water extract of chlorella by electrophoresis. He found this hot water extract promoted the healthy growth of human children as well as young animals. Because of this growth-promoting effect discovered in the early

experiments with chlorella extract, it was named Chlorella Growth Factor (CGF). Scientific research indicates that regular use of Chlorella Growth Factor prevents heart disease²³, and reduces high blood pressure²⁴ and serum cholesterol levels.²⁵⁻²⁷

Chlorella Growth Factor (CGF) derived its name because laboratory test indicated that the addition of CGF to a standard growth medium increased the growth of friendly bacteria, lactobacillus, by up to 400%.²⁸⁻²⁹

CGF is a nucleotide-peptide complex and in addition to playing a synergistic role in the chelation of metals as used in HMD, CGF has many other benefits such as:

- ◆ It stimulates growth.³⁰
- ◆ It stimulates and builds the immune system.³¹
- ◆ Act as a hepato-protective agent.³²⁻³³
- ◆ It improves cellular efficiency and integrity.
- ◆ It helps to detoxify other xenobiotics.^{34,35}
- ◆ It strengthens the body's ability to recover quickly from exercise and disease.
- ◆ It mitigates some side-effects of chemo and/or radiation treatment.
- ◆ It can lower blood sugar levels.³⁶⁻³⁷
- ◆ It combats damaging free radicals.
- ◆ It enhances production of interferon.
- ◆ It accelerates and enhances the re-growth of damaged tissue even when ulcerated, burnt and resistant to other healing modalities.
- ◆ It activates cellular functions and increases metabolism.
- ◆ It normalizes the metabolism of fats.
- ◆ It activates protein synthesis.
- ◆ It regulates liver and kidney functions.
- ◆ It increases the growth of beneficial bacteria in your colon.
- ◆ It promotes rapid healthy growth in children without adverse side effects.
- ◆ It enhances RNA/DNA functions responsible for the production of proteins, enzymes and energy at the cellular level.
- ◆ It helps you to resist the effects of premature aging.
- ◆ It encourages the rejuvenation of the body's own DNA/RNA, thus you will look and feel younger, typically beginning with visible positive changes as it strengthens and improves hair, skin, and nails.

²³ Wang, LF, Lin, JK and Tung, YC. Effect of *Chlorella* on the levels of glycogen triglyceride and cholesterol in ethionine treated rats. *J Formosan Med. Assoc.*, 79, 1, 1980. ²⁴ Mutai, M. Effects of *Chlorella* phospholipids on the aortic collagen and elastin metabolism and on the serum lipid content in rats with experimental arteriosclerosis. *Exper. Mol. Pathol.*, 37, 150, 1982. ²⁵ Okuda, M., Hasegawa, J., Sonoda, M., Okabe, T. and Tanaka, Y. The effects of *Chlorella* on the levels of cholesterol in serum and liver. *Jpn. J. Nutr.*, 33, 3, 1975. ²⁶ Hashimoto, S., Setoyama, T., Yokokura, T. and Mutai, M. Effects of soybean phospholipids, *Chlorella* phospholipids, and clofibrate on collagen and elastin synthesis in the aorta and the serum and liver lipid contents in rats. *Exper. Mol. Pathol.*, 36, 99, 1982. ²⁷ Sano, T. and Tanaka, Y. Effect of dried, powdered *Chlorella vulgaris* on experimental atherosclerosis and alimentary hypercholesterolemia in cholesterol-fed rabbits. *Artery*, 14, 76, 1987. ²⁸ Sano, T., Kumamoto, Y., Kamiya, N., Okuda, M. and Tanaka, Y. Effects of lipophilic extracts of *Chlorella vulgaris* on alimentary hyperlipidemia in cholesterol fed rats. *Artery*, 15, 217, 1988. ²⁹ Lin, YC. The supplementary effect of algae on the nutritive value of soybean milk. *J Formosan Med. Assoc.*, 68, 15, 1969. ³⁰ Ishibashi, M. Effects of Chlorella feeding on rats. I. Effects on growth. *Bull. Azabu. Vet. Coll.*, 22, 125, 1971, in *Biol. Abstr.*, 54, 9694, 1972. ³¹ Miyazawa, Y., Murayama, T., Ooya, N., Wang, LF, Tung, YC., Yamaguchi, N. Immunomodulation by unicellular green algae (*Chlorella pyrenoidosa*) in tumour bearing mice. *J Ethnopharmacol.* 1988; 24:135-146. ³² Fink, H. and Harold, E. The protein value of unicellular green algae and their action in preventing liver necrosis. *Zeitscher Physiol. Chem.*, 305, 182, 1956. ³³ Wang, LF, Lin, JK and Tung, YC. Protective effect of *Chlorella* on the hepatic damage induced by ethionine in rats. *J. Formosan Med. Assoc.*, 78, 1010, 1979. ³⁴ Kumamoto, S., Method of Human Cell Culture. US patent 4,468,460, 1984. ³⁵ Pore, RS. Detoxification of chlordecone poisoned rats with *Chlorella* and *Chlorella* derived sporopollenin. *Drug Chem. Toxicol.* 1984; 7 (1): 57-71. ³⁶ Lee, H.T., Lai, J.E and Tung, YC. Hypoglycaemic action of Chlorella. *J Formosan Med. Assoc.*, 76, 272, 1977. ³⁷ Gray AM, Flatt PR. Insulin-releasing and insulin-like activity of the traditional anti-diabetic plant *Coriandrum sativum* (coriander). *Br J Nutr* 1999 Mar;81(3):203-9.

2) *Coriandrum sativum* (leaf) herbal tincture – commonly referred to as Cilantro

A researcher named Dr. Yoshiaki Omura, using bio-energetic measures, discovered that some patients excreted more toxic metals after consuming a Chinese soup containing cilantro. Cilantro is the leafy part of a common herb whose seed, coriander, is a familiar culinary spice.

Cilantro has a health-supporting reputation that is high on the list of the healing spices. Cilantro has been well-researched and has been found to have the following benefits:

- ❖ Blood sugar lowering properties³⁷
- ❖ Anti-inflammatory properties – contains flavonoids include quercetin, kaempferol, rhamnetin, and epigenin
- ❖ Free radical scavenger and prevents lipid peroxidation³⁸⁻³⁹
- ❖ Antimicrobial properties due to its rich volatile oils such as carvone, geraniol, limonene, borneol, camphor, elemol, and linalool. Research by Mexican and US researchers has isolated the compound dodecanal – which laboratory tests showed is twice as effective as the antibiotic gentamicin at killing Salmonella.⁴⁰⁻⁴¹

This research also looked at using *Coriandrum sativum* seed tincture – this was also effective in a number of trials and is certainly worthy of further study.

3) Homeopathic Cell-Decimated Chlorella

The chlorella vulgaris was made into a homeopathic homaccord of three different potencies from 6C to 30C. The literature is full of data about chlorella purporting to detoxify heavy metals. Homeopathic chlorella was tested based upon initial results using homeopathic plumbum, arsenicum, antimonium and cadmium. These homeopathics did appear to have some chelating properties to the specific metal that they represent, probably based upon their resonating properties. When homeopathic chlorella was tried by itself there was no chelating effect. But when combined with the other natural remedies there seems to be a powerful synergistic effect.

Recent research at the University of Kalyani in West Bengal, which was reported in *New Scientist*, 2003, has shown the efficacy of homeopathic Arsenicum oxide in the detoxification of arsenic in mice which had a hepato-protective effect.⁴²

Dose-Dependent Relationship

These three natural remedies mentioned above were mixed together in various ratios. The combinations of the different elements of the compound in varying percent-

ages did play an important role in the efficiency of their chelating characteristics.

The **Power of the Compound** depicts the efficacy of its chelating power as measured by the percentage increase of metals from the body (urine and faeces) in the post-provocation sample compared to the pre-provocation sample. The Premium chelator was the one that worked most effectively when taking the average elimination, over all the four metals measured. The *Moderate chelator* was the one that worked second-best and the *Poor chelator* was the one that worked the least when compared to the others. The author wishes to keep the various ratios proprietary for the time being. The HMD compound presently on the market, however, is the Premium Chelator.

Treatment Protocols Using HMD

The vast amount of data collected clearly showed that there was a dose-dependent relationship depending on what metal was being chelated. As has already been discussed, for some metals, the minimum dose of 40 drops x 3 daily was the most effective, for others 50 drops x 3 daily and others the maximum dose of 60 drops x 3 daily.

In order to gain maximal effectiveness of the one compound, it would be wise to rotate the dosage on a daily basis as follows:

Morning dose: 40 drops

Lunchtime dose: 50 drops

Dinner time: 60 drops

Following this dosage protocol, **all** metals will be chelated on a daily basis, be it in a rotational fashion. It is the author's belief that it is impossible to completely remove all the metal stores from the body, one can only reduce the toxic amounts over time. Continual detoxification would also overburden the kidneys and liver, as well as mobilizing metals around the body and re-storing in different sites that may be more detrimental. It is therefore strongly recommended that the HMD be taken in rotation, along with other natural substances that will help to chelate the metals being released intracellularly, such as chlorella vulgaris, as well as a few grams of vitamin C daily. It is best to begin the elimination slowly – taking only 20 drops x 2 daily for the first 6 days of the protocol, then increasing this to the 40, 50 and 60 drops taken morning, lunch and evening respectively, before food. It is highly recommended to take the HMD only 6 days of the week, allowing one day's rest to allow the liver and kidneys to recover.

It is the author's belief that HMD can be taken over long periods of time. Apart from the heavy metal chelating effects, the individual ingredients have been well researched and have been found to have many other benefits such as immune modulation, hepato-protective

³⁸ Chithra V, Leelamma S. *Coriandrum sativum* changes the levels of lipid peroxides and activity of antioxidant enzymes in experimental animals. *Indian J Biochem Biophys* 1999 Feb;36(1):59-61. ³⁹ Chithra V, Leelamma S. Hypolipidemic effect of coriander seeds (*Coriandrum sativum*): mechanism of action. *Plant Foods Hum Nutr* 1997;51(2):167-72. ⁴⁰ Delaquis PJ, Stanich K, Girard B et al. Antimicrobial activity of individual and mixed fractions of dill, cilantro, coriander and eucalyptus essential oils. *Int J Food Microbiol*. 2002 Mar 25;74(1-2):101-9. ⁴¹ Kubo I, Fujita K, Kubo A, Nihei K, Ogura T. Antibacterial Activity of Coriander Volatile Compounds against Salmonella choleraesuis. *J Agric Food Chem*. 2004 Jun 2;52(11):3329-32. ⁴² *BMC Complementary and Alternative Medicine*, Vol 3., p.7., 2003.

effect, antimicrobial, anti-inflammatory, lowering blood sugar, normalizes fat metabolism and increases levels of interferon. Where clinical heavy metal testing using a pre-post provocation test has shown high levels of metals it is recommended that HMD be taken for a period of 3-6 months consecutively; 6 days per week with one day rest.

Biochemical Analyses

In addition to examining the heavy metals, blood was also taken from a random sample of the 84 workers tested with HMD and analysed for a variety of clinical parameters. The main components tested were liver function (bilirubin, protein albumin, Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Thymol and kidney function (urea, phosphorus, creatinine and uric acid).

The main purpose of correlating the pre-post biochemical blood tests with the detoxification protocols was to determine whether there was any undue stress on the kidneys and liver, which are the main detoxification organs involved during the elimination of heavy metals from the body. Particularly with such a toxic population of people, it is important to ascertain the possible side-effects of the chelating protocols, as well as the stresses on the organ systems of the body.

Conclusions of Biochemical Tests

On all the blood chemistry tests measuring a variety of kidney and liver functions, there was no significant changes that would indicate that the detoxification organs were under undue stress, or that there was any deterioration of tissues or other organs.

Perhaps that the detoxification remedy is made of natural substances and do not consist of synthetic chemicals is one reason why there are no adverse detoxification reactions. There were also no reports of people undergoing any type of detoxification reactions whatsoever during the 48-hour detox trial. This data is encouraging, as one of the problems in using synthetic substances such as DMPS, EDTA and DMSA with a very toxic population is the severity of the detox reactions.

Heart Rate Variability Testing

Heart Rate Variability (HRV) is a test of Autonomic Nervous System (ANS) functioning. The ANS is connected to all organs and systems of the body, so indirectly we are really measuring the level of physiological functioning of all the systems of the body. We are also measuring the level of adaptive response of the autonomic nervous system – the healthier the ANS, the better it will adapt to changes in the environment.

The HRV data showed the pre-post changes during the 48 hours of the treatment trial. Even though the time period was relatively too short to record significant improvements in ANS functioning, there were 8 out of

a total of 20 people who had significant improvements in the functioning of their physiological systems. If more time were available it would be possible to follow these people and take HRV measurements every week for at least a month during the use of the HMD.

Conclusions

This brief presentation of this three year research study to determine a cost-effective and safe metal chelator that can be used on a mass scale in metal foundries, as well as by the general population, has clearly shown that HMD has proven to be an effective chelator for all the four metals tested and has shown promise in the chelation of mercury during the pilot study.

There is certainly more research to conduct to determine the efficacy of HMD with other metals, including mercury. Preliminary trials have already begun and show encouraging results. This research will be on-going and the results will be presented in further publications.

One factor that is being investigated is the energizing of HMD using Miron glass bottles⁴³ as well as other methods of energizing the specific ingredients being tested. This work is again underway, and has shown very encouraging results to date. Therefore, all the HMD presently being sold at www.worldwidehealthcenter.net is bottled in Miron glass and a proprietary process has energized the ingredients. Miron glass provides the benefits of superior protection from light degradation, increased shelf life, energizing effects on organic molecular life, natural preservation and refinement of healing properties as well as providing attractive packaging. The secret of Miron Violet Glass is based on the fact that violet spectral range (720 - 770 Bio hertz) permanently activates and energizes the molecular structure, and the healing energies of substances stored in the Miron Violet Glass don't "escape".

This is exciting work that clearly shows the powerful effects of synergy as well as the use of natural substances in the removal of toxic metals from the body. There is still a considerable amount of work that needs to be completed in the embryonic science of toxicology, heavy metals and their removal from the body tissues and organs. 🌸

Further information on HMD and other issues relating to heavy metal toxicity can be found at www.heavymetaldetox.net

ABOUT THE AUTHOR

Dr. Georgiou has been an active clinician for 25 years, and Natural Medicine Director and Founder of the Integrated Medicine Centre, in Larnaca, Cyprus (www.integratedmedicinecentre.com), which specializes in many aspects of Integrated Medicine. He has 9 degrees and diplomas in Natural Medicine from the UK and USA including the Biological Sciences, Clinical Nutrition, Naturopathy, Herbal Medicine, Iridology, Homeopathy, Su Jok Acupuncture, Clinical Psychology and Clinical Sexology as well as specialized training in VEGA bio-dermal screening and bioresonance, Live Blood Analysis, Thermography, Heavy Metal testing using spectrometers, and other modalities. He is the International European Director for the University of Natural Medicine and founder of the College of Natural Medicine in Cyprus. drgeorge@avacom.net

⁴³ <http://www.luminanti.com>