According to the World Health Organization (WHO), "There is no 'safe' level of mercury"

TD-DMPS? (a unique, proprietary, transdermally applied, combination of 2-3-dimercaptopropane-1-sulfonate, gluthathione and other amino acids, in a base of Evito™)

Background Information:

In a study due to be released by the winter of 2004, conclusive data was accumulated regarding the efficacy of a specifically formulated transdermally applied combination of DMPS conjugated with a number of peptides, called TD-DMPS? . This proprietary formulation of DMPS used in the study consisted of DMPS conjugated with glutamic acid, glycine and cystein (glutathione) and methionine in a base of Evito. The resulting solution was administered transdermally at a dose of 1.5 mg / kg every *other* day.

This unique and extremely easy method of using DMPS was proven to be a highly safe and effective method of removing mercury and arsenic. Complete hair toxic metal, fecal toxic metal, urine toxic metal, and red blood cell toxic metal levels were collected in 31 children with the diagnosis of autism or PDD. Specimens were collected and analyzed for all patients at baseline, and repeated every 2 months until one full year of data was accumulated. 21 out of 31 children completed the full one year period with all continuing on treatment beyond 12 months but with testing frequency decreasing to every four months.

Each patient reviewed in the study also had Apolipoprotein E tested, as well as complete diagnostic stool analysis performed every 6 months, complete organic acid testing done every 2 months, as well as complete standard labs consisting of lipid profile, chemistry, liver functions, CBC with differential, TSH, thyroid profile, and iron studies done every 2 months.

Virtually all patients reviewed in the study did NOT show any appreciable amount of mercury level on baseline tests. Results however clearly showed that as treatment continued, an increase in the level of mercury being excreted was increased. Full results of the study with detailed explanation of the story of how this process began will be made available soon.

DMPS (2-3-dimercaptopropane-1-sulfonate) Information:

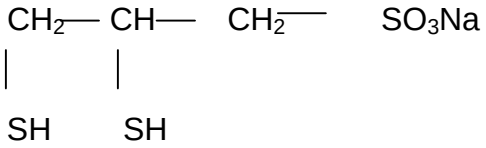
By Rashid A. Buttar, DO, FAAPM, FACAM, FAAIM

DMPS or 2-3-dimercaptopropane-1-sulfonate, is a vicinal dithiol compound designed to be a water soluble analog of BAL, first synthesized by L.N. Owen. This agent was first developed in China and was then introduced into Russia where the compound was

used for workers injured by exposure to heavy metals. Later it was introduced into Germany and was approved for use in acute and chronic mercury and lead poisoning. DMPS has been used extensively in Europe for the last 50 years.

In the United States, DMPS is considered an experimental drug and is not approved by the FDA, but is allowed as a bulk item to be compounded. The properties of DMPS are similar in many respects to DMSA. However, DMPS has certain advantages over DMSA and has better clinical results in chelating lead, cadmium, mercury, silver, tin, arsenic, and mercury compounds.

The chemical structure of DMPS is:



DMPS is quite soluble in water and is absorbed after oral administration. However, DMPS is absorbed approximately 55% from the gastrointestinal tract. Due to the wide spectrum of gastrointestinal dysbiosis inherent within our society and the extreme levels of gut malabsorption, there is difficulty with achieving consistent results with the oral ingestion. Due to the immense vacillation in gut absorption within certain patient populations, especially in the immuno-compromised and developmentally delayed patient populations such as patients with autism, autism like spectrum and PDD, orally administered DMPS has not proven to be as effective. Lastly, most children treated with oral DMPS have complained of abdominal discomfort and abdominal cramping with exacerbation of constipation. These issues lead to a great variability in absorption and compliance, and thus in efficacy of the orally administered DMPS.

Although IV administered DMPS has been effective and is an excellent chelator, the extreame “peak” and “trough” levels achieved can have potentially negative side effects as a result of too much mercury being mobilized at one point and subsequently, no mercury being pulled out until the next IV treatment. Other complications are due to mineral deficiency which again is a result of rapid and effective removal of metals/minerals but prevents the ability to start a consistent “pull” of mercury from the system. Due to the potential side effects, IV treatment should not be repeated but every other week. With children below the age of 8, it is also not only difficult to administer an IV, but due to potential side effects, may not be the ideal suggested method of treatment.

When compared to DMSA, from a clinical basis, the results using the TD-DMPS? proved far superior. This may be a result of issues regarding gut absorption as earlier discussed. DMSA was also used in a transdermal delivery mechanism, conjugated in the same manner as the TD-DMPS? but did not show a fraction of the same efficacy. The trandermally administered TD-DMPS? negates all the above issues and has been

used in a clinical setting for over two years. It was first used in testing for efficacy as a mercury chelator in adults in April 2000. It was first used with children in September, 2001.

DMPS is slightly more toxic than DMSA, yet 10 times less toxic than BAL. Its use may be associated with a somewhat higher incidence of erythema multiforme. Stevens-Johnson syndrome is a rare and contested event. It has a slightly different bodily distribution than either BAL or DMSA. DMPS is actively secreted by the kidney and is quite effective in removing certain toxic metals from the kidney parenchyma as well.

Depression may manifest during the process of mercury detoxification, along with other symptoms initially worsening but this clears with continued treatments. These observations are expected by the experienced clinician familiar with effective detoxification, commonly referred to a Hertzimer's Reaction. The mobilization of mercury is attributed to this temporary worsening of symptoms, which in most cases resolves within the first 30 days of treatment. The worse the mercury load, the worse the Hertzimer's and the longer it will last. However, most parents have observed enough behavioral changes that continuation of treatment was not an issue. It is important to note that approximately half the patients that have been treated with TD-DMPS? have previously been treated with DMSA.

DMPS is somewhat more difficult to prepare chemically and is much more expensive than DMSA. Although some feel that there is no clinical advantages over DMSA, clinical evidence indicates that DMPS is a superior agent to detoxify mercury and arsenic. DMPS also seems to "clean" the kidneys of heavy metal residues and improve kidney function in patients who have been exposed to heavy metals, as does EDTA.

DMPS reportedly does not cross the blood brain barrier but it does decrease total body burden of mercury. As a result of effectively decreasing total body burden of mercury, and due to the process of diffusion from a higher concentration gradient to a lower concentration gradient, there is a consistently reproducible improvement in cognitive function in patients who have mercury toxicity and treated with the TD-DMPS? .

DMPS should NOT be used if pregnancy is suspected and is contraindicated in documented pregnancy. However, TD-DMPS? may eventually be acceptable as a treatment modality during pregnancy, although not yet established. DMPS is an extracellular chelator. Intravenous DMPS is primarily excreted in the urine and to a minor extent in the feces. However, in the autism study conducted, increased levels of mercury being eliminated was measurable in the feces, urine, and hair. In a few patients, even the RBC metal profile showed an increase in mercury levels compared to baseline, albeit the levels were still within the normal reference ranges.

IV administered DMPS has a half life of approximately 2 hours, with over 95% being excreted in 12 hours. Oral DMPS leads to excretion of heavy metals mostly in the stool with the oral form reaching peak blood levels in 45 minutes. The half life is 45 minutes. The TD-DMPS does not have an established half life but compared to IV DMPS in a

number of patients, appears to have a half life approximately 3 to 4 times that of the IV administered DMPS, ie, the half life of TD-DMPS? appears to be between 6 and 8 hours. Further isotope tagged evaluation of TD-DMPS? is planned to determine a precise half life.

Even though DMPS has a high affinity for mercury, the highest affinity appears to be for copper and zinc, which are the metals that appear first in high levels (after chelation) in the urine. The "normal" urine challenge test will show high copper levels and low manganese levels. Only consider someone copper toxic if the level excreted is more than four-fold the upper limit of the reference range. If the patient has a high body burden of these metals, no mercury is removed with the first test. Only subsequent DMPS tests will show the mercury. In adult patients being treated with IV DMPS, as long as there is a high body burden of mercury, virtually none of the other heavy metals will be excreted. However, with children with developmental delays, the observation is different.

With patients that have an inability to eliminate mercury, as in children with autism or adults with Alzheimer's, before the mercury levels will start to show, you will see an increase in the levels of antimony, arsenic, nickel and tin. As these metal levels start to decrease, the mercury level starts to increase. Remember, these tests are ONLY showing the amount of heavy metals being excreted. They are NOT telling us the actual levels in the body of these metals. They are highly accurate from a qualitative (the quality) standpoint. However, these tests are NOT accurate from a quantitative (the actual quantity) standpoint. This is important to understand: as different heavy metals appear in the urine test at different times, so the patient's symptoms change while going through detoxification. Since these children are "non-excretors" of mercury, the levels of tin, antimony, arsenic and nickel are first observed to become elevated and as these levels drop, the mercury begins to appear. Currently, I have no explanation of this consistently observed phenomenon except as what is noted.

As with other chelating agents, the patients' mineral status should be determined before administering DMPS and repletion of deficient minerals accomplished. Watch magnesium status as most adverse responses are due to magnesium depletion. (DMPS does not chelate magnesium). Selenium is another important mineral to monitor while treating with TD-DMPS? .

Dosing is as follows: Administer 1.5 mg / kg of TD-DMPS? ever OTHER day, not to exceed 50 drops every OTHER day. Daily doses may be divided into two administrations but usually the entire dose is administered at one time. However, treatment is left to the discretion of the attending physician as far as the specific protocol but it is important to get the daily dose in as close together as possible. This is desired so as not to compete with the mineral repletion done on the opposite date of treatment with the TD-DMPS? . Since TD-DMPS? is still not a widely accepted medication and is only approved by the FDA as a bulk compounding drug, a full disclosure/informed consent document is suggested to be on the safe side.

Chromium, copper and zinc should not be given until 12 hours after the administration of the TD-DMPS? . Otherwise the DMPS may bind to copper, zinc, and other "good "minerals and not bind to the mercury. All minerals should be given a minimum of 24 hours after the TD-DMPS? has been administered.

Even though there is a remote possibility of Stevens-Johnson syndrome, the side effects are usually mild. These are occasional temporary lowering of blood pressure, allergic reactions, and skin rashes. We have NOT observed this in our clinic. DMPS is not mutagenic, seems to have no evidence of teratogenic effects and is not carcinogenic.

Monitor with a chemistry profile after 10 days to check liver enzymes and hemoglobin levels as DMPS can increase liver enzymes and decrease hemoglobin. If a skin rash appears, rotate the site of administration. The rash is not an allergic reaction since it resolves quickly and does not return. Approximately 5% of children experience this. Hold the therapy if the child develops a cold or URI and restart after illness is resolved. A mild and transient leukopenia has been observed in about 5% of patients and attributed to the mobilization of mercury. Hold treatment for 72 hours and then re-institute starting at a lower dose and steadily increase the dose. Follow up with CBC in 2 weeks.

TD-DMPS? also has glutathione already conjugated into the preperation in a 4 to 1 ratio, with approximately 1 mg of DMPS and 4 mg of glutathione per drop of TD-DMPS? . The following segment will explain the benefit of glutathinoe (GSH).

The Science of Glutathione

By Patricia A.L. Kongshavn, Ph.D

Former Professor: Department of Medicine, McGill University, Montreal, Canada

Glutathione is a small molecule found in almost every cell. It cannot enter most cells directly and therefore must be made inside the cell, from its three constituent amino acids: glycine, glutamate and cysteine. The rate at which glutathione can be made depends on the availability of cysteine, which is relatively scarce in foodstuffs. Furthermore, the cysteine molecule has a sulfur-containing portion which gives the whole glutathione molecule its 'biochemical activity', i.e. its ability to carry out the following vitally important functions: Firstly, glutathione is the major antioxidant produced by the cell, protecting it from 'free radicals' ('oxygen radicals', 'oxyradicals'). These highly reactive substances, if left unchecked, will damage or destroy key cell components (e.g. membranes, DNA) in microseconds. Oxyradicals are generated in the many thousand mitochondria located inside each cell, where nutrients like glucose are burnt using oxygen to make energy. (Mitochondria can be thought of as the batteries that provide the power for the cells to operate). Oxyradicals also come from pollutants, from UV radiation and other sources. In addition, glutathione recycles other

well-known antioxidants such as vitamin C and vitamin E, keeping them in their active state. Secondly, glutathione is a very important detoxifying agent, enabling the body to get rid of undesirable toxins and pollutants. It forms a soluble compound with the toxin that can then be excreted through the urine or the gut. The liver and kidneys contain high levels of glutathione as they have the greatest exposure to toxins. The lungs are also rich in glutathione partly for the same reason. Many cancer-producing chemicals, heavy metals, drug metabolites etc. are disposed of in this way. Thirdly, glutathione plays a crucial role in maintaining a normal balance between oxidation and anti-oxidation. This, in turn, regulates many of the cell's vital functions, such as the synthesis and repair of DNA, the synthesis of proteins and the activation and regulation of enzymes. Fourthly, glutathione is required in many of the intricate steps needed to carry out an immune response. For example, it is needed for the lymphocytes to multiply in order to develop a strong immune response, and for 'killer' lymphocytes to be able to kill undesirable cells such as cancer cells or virally infected cells. The importance of glutathione cannot be overstated. It has multiple roles as indicated and, indeed, as one examines each system or organ more closely, the necessity for glutathione becomes increasingly evident. Glutathione values decline with age and higher values in older people are seen to correlate with better health, underscoring the importance of this remarkable substance for maintaining a healthy, well-functioning body.

References:

Lomaestro B, Malone M. Glutathione in health and disease: Pharmacotherapeutic Issues Ann Pharmacother 29: 1263-73,1995

Glutathione *the undiscovered* "*natural drug*"

By Patricia A.L. Kongshavn, Ph.D
Former Professor: Department of Medicine, McGill University, Montreal, Canada

A recent press release by CBS highlighted the need for a "universal or all-purpose drug" able to combat any germ or toxic chemical released by hostile forces. In general, the idea would be to bolster the defenses we already possess, in particular the immune system, to fight against infections and cancer. CBS made brief mention of two substances, cysteine and glutathione, that deserve much greater attention.

Glutathione is a key substance found in every cell in our body, and may be thought of as a "naturally occurring universal drug" – and one without adverse side effects! It is the cell's most important antioxidant, neutralizing "free radicals" that would otherwise damage or destroy the cells. The body produces free radicals during metabolism. Under any form of stress, such as chemical toxicity or bacterial infections, the body generates many more free radicals. If glutathione is in short supply, these free radicals can overwhelm the cell. Exposure to radiation from sunlight or other sources also results in increasing highly reactive free radicals that likewise our bodies need to neutralize.

Glutathione is also the main detoxifying agent in the body. It converts damaging chemical substances (toxins) into harmless products that the body eliminates. Such chemicals include cancer-producing substances, heavy metals, herbicides, pesticides,

smoke and other pollutants. Thus, glutathione provides important protection against many environmental hazards. The liver is particularly rich in glutathione for this purpose.

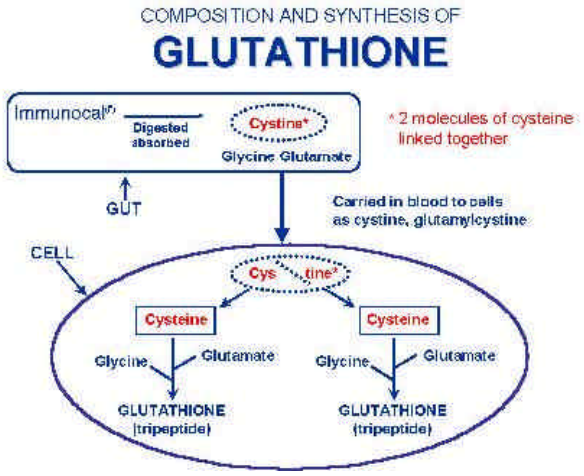
The immune system is our main defense against infection. Once again, glutathione plays a vital role, enabling the immune system to function optimally, which it cannot do when glutathione is deficient. For example, the cells of the immune system (lymphocytes) cannot multiply as much, cannot produce as many antibodies, and cannot kill unwanted cells like cancer cells or those infected with a virus. Glutathione deficiency also adversely affects other systems and organs such as the lungs, the nervous system, and the intestinal tract.

It is on record that there are many medical disorders associated with glutathione deficiency. These include AIDS and cancer wasting, some intestinal disorders, lung diseases, over-trained athletes syndrome and trauma. Furthermore, as we age, glutathione levels decrease which no doubt explains, in part, an older person's lowered resistance to disease.

Glutathione is a very small protein made inside the cells from three amino acids obtained ultimately from our food or supplementation. One of these amino acids, cysteine, gives the glutathione its antioxidant and detoxifying properties. This amino acid is relatively rare in foodstuffs and this can lead to glutathione deficiency, even in healthy people. For example, one study demonstrated that, by feeding a cysteine enriched food product, namely Immunocal®, glutathione values increased by 35.5% in the lymphocytes of normal young adults. (see reference below)

It is well documented that glutathione sold as a dietary supplement is mostly destroyed during digestion and therefore is of little use. Cysteine itself is toxic and suffers the same fate unless chemically modified. Practitioners use N-acetyl cysteine as a supplement, but it has certain unpleasant side effects, even in moderate doses. Thus, the best source for cysteine supplementation is from cysteine-rich foodstuffs. It is normally present in food as the stable form, cystine (2 molecules of cysteine linked together). Our bodies digest, absorb, and carry cystine to the cells where they convert it into cysteine. Since heat or mechanical stress etc., easily split cystine into cysteine (where digestion destroys it), raw unprocessed foods or special food supplements high in bioactive cysteine (cystine) provide the best source of this vital amino acid.

Sixty years ago, Florey and Fleming revolutionized the medical treatment of infection with the discovery of antibiotics that act against a broad range of bacteria. Glutathione, a "natural drug", perhaps in the same way could provide a significant contribution towards defending ourselves against the growing number of diverse biological and chemical hazards facing our society today.



References:
Lands LC, Grey VL, Smountas AA. Effect of supplementation with a cysteine donor on muscular performance. J Appl Physiol 87:1381-5, 1999.

You may request a copy of the US Congressional Sub-Committee Hearing on Human Rights and Wellness held on May 6, 2004 where Rashid Buttar, DO provided details on using the TD-DMPS? in the treatment of children with the diagnosis of autism, autism like spectrum and PDD, how and why it was developed, and results of the treatment.

This is available as a pdf document. With all the references, this is a 939 page document. The Congressional hearing was entitled **"Autism Spectrum Disorders: An Update of Federal Government Initiatives and Revolutionary New Treatments of Neurodevelopmental Diseases ".** Dr. Buttar's presentation was entitled**, "Autism, The Misdiagnosis of Our Future Generations".** Dr. Buttar is the Vice-Chairman of the American Board of Clinical Metal Toxicology and holds a position of Visiting Scientist at North Carolina State University.

This document can be requested by sending an email to drbuttarclinic@aol.com and will be available for download in the near future.

You may also see a 52 minute detailed audio and video presentation of the explanation by Dr. Buttar on the web at www.nomercury.org