The Current Use of Chelation in American Healthcare: An Overview

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Clinical Professor
University of Texas, Southwestern
Executive Director
American College of Medical Toxicology
Lack Of Statistics Or Evidence Makes Chelation Therapy Controversial
By Dr. Alan B. Ruckheim | February 27, 1991

Q: Is there anything you can tell me about chelation therapy? My friend calls it the "Roto-Rooter" technique. I have heard it is used to cure hardening of the arteries, but have been unable to find anything in my library about it. I hope you can help me. A-F. I'll try, though I must tell you there is a great deal of emotional activity about the procedure. Chelation is a procedure by which a metal (such as lead) is bound to a chemical compound that permits its removal from the body.

Troubled study at heart of therapy debate
By Tlste Tsouderos, Chicago Tribune reporter | December 12, 2011

With $30 million of taxpayer money, researchers set out to conduct one of the largest studies ever of an alternative medical treatment, a controversial therapy for coronary artery disease. The project was marred with problems from beginning to end. Because the treatment was so out of step with mainstream medicine, it was difficult to find enough patients to take part. The researchers failed to inform the subjects that one risk of the treatment was death. In consent forms, documents, they made a confusing statement about the study drug, implying it was safer than it was. The researchers overseeing the study stepped up background checks on the doctors involved after some physicians ran into disciplinary problems unrelated to the chelation trial.

Despite The Controversy, Chelation Therapy Is Put Through Testing Process
By Christine Morris, Knight Ridder Newspapers | April 1, 2001

Sylvia Green says chelation therapy saved her life. Six years ago, the right artery leading from her heart to her brain was 98 percent blocked. She was told surgery was her only hope, and the prospect terrified her. In search of an alternative, she decided to try chelation, a controversial but widely used infusion of a synthetic amino acid called EDTA. Two years later, her carotid artery was less than 50 percent blocked. By the summer of 1999, it was down to 30 percent. "If it wasn't for chelation," said Green, 92, who lives in Sunny Isles Beach, "I wouldn't be here talking to you."

Energy healing sparks debate
By Tlste Tsouderos and Tribune Newspapers | December 11, 2011

Energy healers say they can detect and channel a "universal energy" and even manipulate this energy within another person. Science has not proved that this energy exists, that anybody can detect it or manipulate it, or that it has anything to do with disease. In fact, proving the existence of such energy would require a dramatic transformation in what is known about disease and how the human body works. Yet the National Center for Complementary and Alternative Medicine has funded studies of energy healing for everything from fibromyalgia (a $300,000 grant)

Doctors sued over 'dangerous' autism treatment
By Patricia Callahan, Tribune reporter | March 4, 2010

The father of a 7-year-old Chicago boy who was diagnosed as a toddler with autism has sued the Naperville and Florida doctors who treated his son, alleging they harmed the child with "dangerous and unnecessary experimental treatments." James Coman and his son won interim relief in Illinois Medicine, a Tribune source that

FDA cracks down on autism treatment
By Tlste Tsouderos, Chicago Tribune reporter | October 14, 2010

Products called chelators that are sold over the counter as treatments for autism, heart disease and other conditions are dangerous and illegal, the U.S. Food and Drug Administration warned in a crackdown announced Thursday. The chemicals, which help remove metals from the body, are potent drugs that can cause serious side effects, including kidney damage, dehydration and even death, said FDA Medical Officer Dr.
Each year, ATSDR receives dozens of calls from individuals who have been chelated (challenged) with DMPS or DMSA prior to collection of any urine samples, and subsequently been diagnosed as having mercury poisoning. The sole basis of these diagnoses was laboratory reports that indicated that the individual had been determined to have toxic levels of mercury, based solely upon comparison of post-chelation mercury values with historical (typically pre-chelation) values. Without exception these individuals have been advised to undergo additional chelation.

Some physicians have also looked to mercury as a possible cause of undiagnosed health problems and subsequent chelation therapy as a treatment for those problems. As a result, the use of chelation has expanded in recent years to include the treatment of mildly symptomatic or asymptomatic patients with no documented history of mercury exposure (McKay et al., 2003), and it is becoming increasingly, and unfortunately, common for practitioners to make a diagnosis of mercury intoxication and begin treatment without carrying out an adequate clinical workup (McKay et al., 2003).
Health Consultation

Franklin Township Residential Mercury Investigation

Higgins Farm
Franklin Township, Somerset County, NJ
EPA Facility ID: NJD981490261

Background

On October 22, 2003, the New Jersey Department of Environmental Protection (NJDEP), on behalf of the U.S. Environmental Protection Agency (EPA), contacted the New Jersey Department of Health and Senior Services (NJDHSS) regarding possible exposures related to the Higgins Farm National Priorities List site. A person living just outside of the well-restriction zone for Higgins Farm had raised concerns. The index resident (IR) advised EPA that three children in residence, two of whom had neurologic impairments, had used and currently were using a private well. The IR expressed concern that contaminants related to the Higgins Farm site were impacting the health of the family.

Contact with the IR by the NJDHSS revealed that the IR and one of the children were undergoing chelation therapy for “metals exposures.” This child was 5 ½ years old and has been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). An out-of-state physician had diagnosed of metals exposure.
<table>
<thead>
<tr>
<th></th>
<th>IR (24-hour sample)</th>
<th>Reference Range (24 hour sample, adult)**</th>
<th>Child B (spot sample)</th>
<th>Reference Range (spot sample, child)**</th>
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</thead>
<tbody>
<tr>
<td>Lead</td>
<td>3.3</td>
<td>&lt; 15</td>
<td>14</td>
<td>&lt; 20</td>
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<tr>
<td>Arsenic</td>
<td>13</td>
<td>&lt; 140</td>
<td>23</td>
<td>&lt; 200</td>
</tr>
<tr>
<td>Mercury</td>
<td>21</td>
<td>&lt; 5</td>
<td>10</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

Data Source: Doctor's Data, Inc; St. Charles, IL

* All results are provided in ug/g creatinine.
** Reference ranges provided by Doctor’s Data, Inc.
Case 2

- 33 y.o. F visits a medical toxicologist for a 2\textsuperscript{nd} opinion because her naturopath had diagnosed her with heavy metals poisoning
- History of chronic fatigue, difficulty concentrating, unable to get out of bed or talk and too fatigued to write a letter
- Went to several – what she calls “regular MDs’ including psychiatrist, dermatologist, infectious disease specialist and gynecologist but they were unable to relieve her symptoms so out of frustration she sought treatment from a naturopath who she has seen for a year
- Naturopath ordered a urine heavy metal screen
- Prior to DMPS – Urinary Hg 1 mcg/gm creat, After DMPS – Urinary Hg 18 mcg/gm creat
- A course of chelation to reduce the mercury burden had been recommended
- The patient never had any symptoms of mercury toxicity nor any known exposure to mercury
Case 3

- A 53 y.o. F was treated with 1500 mg of EDTA IV pushed over 10-15 minutes in a naturopathic practitioner’s clinic.
- EDTA was intended to remove heavy metals from her body.
- Approximately 10-15 minutes after treatment began, the patient became unconscious.
- The patient’s ionized calcium level during code was 3.8 mg/dL (ref: 4.5–5.3 mg/ dL)
- Efforts to revive the patient were unsuccessful.

What is a Chelate?

- "The adjective chelate, derived from the great claw or chela (chely- Greek) of the lobster or other crustaceans”
- “Refers to the coordinating atoms linked in a single ligand or binding molecule so that the combination with the metal ion results in a ring structure.”
What is Chelation Therapy?

- Use of a chelating agent to remove a metal
- Many questions
- Many books
Many Questions

- How do we assess metal toxicity?
  - Clinically
  - Laboratory Interpretation
- Does enhancing excretion = therapeutic efficacy?
- Can chelation cause harm?
Chelation therapy—Chelation therapy is a chemical process in which a substance is used to bind molecules, such as metals or minerals, and hold them tightly so that they can be removed from a system, such as the body. In medicine, chelation has been scientifically proven to rid the body of excess or toxic metals. For example, a person who has lead poisoning may be given chelation therapy in order to bind and remove excess lead from the body before it can cause damage.

Deep breathing—Deep breathing involves slow and deep inhalation through the nose, usually to a count of 10, followed by slow and complete exhalation for a similar count. The process may be repeated 5 to 10 times, several times a day.

Energy healing therapy—Energy healing therapy involves the channeling of healing energy through the hands of a practitioner into the client’s body to restore a normal energy balance and, therefore, health. Energy healing therapy is based on the belief that disease is caused by energy imbalances in the body.
<table>
<thead>
<tr>
<th>Heavy Metals</th>
<th>Essential Trace Metals – toxic in excess</th>
<th>Other Toxic Metals</th>
<th>Radioactive Metals</th>
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</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Chromium</td>
<td>Aluminum</td>
<td>Actinium</td>
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<tr>
<td>Mercury</td>
<td>Cobalt</td>
<td>Antimony</td>
<td>Americium</td>
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<td>Cadmium</td>
<td>Copper</td>
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<td>Plutonium</td>
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<td>Osmium</td>
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<tr>
<td></td>
<td>Nickel</td>
<td>Tellurium</td>
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<tr>
<td></td>
<td>Selenium</td>
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<td>Cobalt-60</td>
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<tr>
<td></td>
<td>Zinc</td>
<td>Tin</td>
<td>Strontium-90</td>
</tr>
<tr>
<td></td>
<td>Vanadium</td>
<td></td>
<td></td>
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</table>
Objectives

1. Describe the FDA approved chelators currently used and their indications
2. Discuss how to obtain chelators
3. Discuss the frequency of use of these chelators
4. Understand the spectrum of health care providers who are involved with chelation including allopathic physicians, alternative medicine providers, professional societies, and laboratories
FDA Approved Chelators

- Dimercaprol (BAL)
- Edetate Calcium Disodium (Calcium EDTA)
- Succimer (DMSA)
- Penicillamine
- Trientine Hydrochloride
- Deferoxamine Mesylate
- Deferiprone
- Deferasirox
- Pentetate Calcium Trisodium (Ca-DTPA)
- Pentetate Zinc Trisodium (Ca-DTPA)
- Prussian Blue (Radiogardase)
**INDICATIONS**

BAL in Oil (Dimercaprol Injection USP) is indicated in the treatment of arsenic, gold and mercury poisoning. It is indicated in acute lead poisoning when used concomitantly with Edetate Calcium Disodium Injection USP.

Dimercaprol Injection USP is effective for use in acute poisoning by mercury salts if therapy is begun within one or two hours following ingestion. It is not very effective for chronic mercury poisoning.

Dimercaprol Injection USP is of questionable value in poisoning caused by other heavy metals such as antimony and bismuth. It should not be used in iron, cadmium, or selenium poisoning because the resulting dimercaprol-metal complexes are more toxic than the metal alone, especially to the kidneys.
Ethylenediaminetetraacetic Acid
EDTA

- First Synthesized – 1930s
  - Looking for a substitute of citric acid to use with dye solutions in the textile industry

- Many Current Industrial Uses
  - Paper and pulp industry
  - Laundry detergent
  - Water treatment
  - Food and beverage industry
EDTA – with and without Ca\(^{2+}\)

- **Edetate calcium disodium**, aka Calcium EDTA
  - trade name: Calcium Disodium Versenate®

- **Edetate Disodium**, aka Disodium EDTA
  - trade names: Sodium Versenate®, Endrate®
Edetate Calcium Disodium

### INDICATIONS AND USAGE

Edetate calcium disodium is indicated for the reduction of blood levels and depot stores of lead in lead poisoning (acute and chronic) and lead encephalopathy, in both pediatric populations and adults.

Chelation therapy should not replace effective measures to eliminate or reduce further exposure to lead.
Edetate Disodium

Drug Details

- Drug Name(s): SODIUM VERSENATE (Brand Name Drug)
- FDA Application No.: (NDA) 010573
- Active Ingredient(s): EDEDATE DISODIUM
- Company: 3M
- Chemical Type: 2 New ester, new salt, or other noncovalent derivative
- Review Classification: S Standard review drug

- There are no Therapeutic Equivalents
- Approval History and Related Documents are not available
- Labels are not available

Products on Application (NDA) #010573
Click on a column header to re-sort the table:

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Active Ingredients</th>
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<th>Dosage Form/Route</th>
<th>Marketing Status</th>
<th>RLD</th>
<th>TE Code</th>
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<tbody>
<tr>
<td>SODIUM VERSENATE</td>
<td>EDEDATE DISODIUM</td>
<td>200MG/ML</td>
<td>INJECTABLE; INJECTION</td>
<td>Discontinued</td>
<td>No</td>
<td>None</td>
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Deaths Associated with Hypocalcemia from Chelation Therapy --- Texas, Pennsylvania, and Oregon, 2003--2005

Chelating agents bind lead in soft tissues and are used in the treatment of lead poisoning to enhance urinary and biliary excretion of lead, thus decreasing total lead levels in the body (1). During the past 30 years, environmental and dietary exposures to lead have decreased substantially, resulting in a considerable decrease in population blood lead levels (BLLs) (2) and a corresponding decrease in the number of patients requiring chelation therapy. Chelating agents also increase excretion of other heavy metals and minerals, such as zinc and, in certain cases, calcium (3). This report describes three deaths associated with chelation-therapy–related hypocalcemia that resulted in cardiac arrest. Several drugs are used in the treatment of lead poisoning, including edetate disodium calcium (CaEDTA), dimercaprool (British anti-Lewisite), D-penicillamine, and meso-2,3-dimercaptopropanionic acid (succimer). Health-care providers who are unfamiliar with chelating agents and are considering this treatment for lead poisoning should consult an expert in the chemotherapy of lead poisoning. Hospital pharmacies should evaluate whether continued stocking of Na2EDTA is necessary, given the established risk for hypocalcemia, the availability of less toxic alternatives, and an ongoing safety review by the Food and Drug Administration (FDA). Health-care providers and pharmacists should ensure that Na2EDTA is not administered to children during chelation therapy.

Chelating agents, especially those intended for use in children, should be effective in reducing lead and other heavy metals from the body without producing substantial adverse effects on levels of critical serum electrolytes, such as calcium. The only agent recommended for intravenous (IV) chelation therapy for children is CaEDTA (1). However, hospital formularies usually stock multiple chelation agents. One such agent, Na2EDTA, was formerly used for treatment of hypercalcemia, but its use has become infrequent because of concerns regarding nephrotoxicity and because of the availability of less toxic alternatives (3). Furthermore, Na2EDTA contains a warning stating, "The use of this drug in any particular patient is recommended only when the severity of the clinical condition justifies the aggressive measures associated with this type of therapy." According to the package insert, Na2EDTA is "indicated in selected patients for the emergency treatment of hypercalcemia and for the control of ventricular arrhythmias associated with digitalis toxicity." According to FDA and CDC, the safety and effectiveness of Na2EDTA in pediatric patients has not been established, and its use is not recommended because it induces hypocalcemia and possibly fatal tetany (4).

In 2005, the Texas Department of Health childhood lead poisoning surveillance program reported a death attributable to chelation-associated hypocalcemia to CDC. Subsequently, CDC queried state and local lead-surveillance programs regarding chelation-related fatalities; additional deaths were identified in Pennsylvania and Oregon.
Questions and Answers: The NIH Trial of EDTA Chelation Therapy for Coronary Artery Disease

The National Heart, Lung, and Blood Institute (NHLBI) and the National Center for Complementary and Alternative Medicine (NCCAM), both components of the National Institutes of Health (NIH), are sponsoring the Trial To Assess Chelation Therapy (TACT). TACT is the first large-scale, multicenter study to determine the safety and efficacy of EDTA chelation therapy for individuals with coronary artery disease.

Update: TACT has completed enrollment. Participants will continue to be followed through 2011, and the results will be analyzed in 2012.

The questions and answers below provide additional information on coronary artery disease, EDTA chelation therapy, and the study.

On this page:

1. What is coronary artery disease?
2. How is CAD diagnosed and treated?
3. What is EDTA chelation therapy?
4. Does EDTA chelation therapy have side effects?
5. How might EDTA chelation therapy work to clear blocked arteries?
6. Is there evidence that EDTA chelation therapy works for CAD?
7. How frequently is EDTA chelation therapy used?
8. Why did NCCAM and NHLBI decide to study this therapy?
9. How will the NIH study be conducted?
10. What will the study determine?
11. What types of participants will be recruited?
12. Where will the study take place?
13. How can I learn more about the study?
**Succimer**

**Original Approval or Tentative Approval Date**  January 30, 1991  

**Products on Application (NDA) #019998**

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<th>Drug Name</th>
<th>Active Ingredients</th>
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<tr>
<td>CHEMET</td>
<td>SUCCIMER</td>
<td>100MG</td>
<td>CAPSULE; ORAL</td>
<td>Prescription</td>
<td>Yes</td>
<td>None</td>
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</table>

**INDICATIONS AND USAGE**

CHEMET is indicated for the treatment of lead poisoning in pediatric patients with blood lead levels above 45 μg/dL. CHEMET is not indicated for prophylaxis of lead poisoning in a lead-containing environment; the use of CHEMET should always be accompanied by identification and removal of the source of the lead exposure.

**Other Heavy Metal Poisoning:** No controlled clinical studies have been conducted with succimer in poisoning with other heavy metals. A limited number of patients have received succimer for mercury or arsenic poisoning. These patients showed increased urinary excretion of the heavy metal and varying degrees of symptomatic improvement.
### Penicillamine

**Original Approval or Tentative Approval Date**
December 4, 1970

**Products on Application (NDA) #019853**
Click on a column header to re-sort the table:

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<th>Drug Name</th>
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<td>CUPRIMINE</td>
<td>PENICILLAMINE</td>
<td>250MG</td>
<td>CAPSULE; ORAL</td>
<td>Prescription</td>
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<td>None</td>
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<tr>
<td>CUPRIMINE</td>
<td>PENICILLAMINE</td>
<td>125MG</td>
<td>CAPSULE; ORAL</td>
<td>Discontinued</td>
<td>No</td>
<td>None</td>
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</table>

**INDICATIONS**

CUPRIMINE is indicated in the treatment of Wilson's disease, cystinuria, and in patients with severe, active rheumatoid arthritis who have failed to respond to an adequate trial of conventional therapy. Available evidence suggests that CUPRIMINE is not of value in ankylosing spondylitis.

### Trientine

**Original Approval or Tentative Approval Date**
November 8, 1985

**Products on Application (NDA) #019194**
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<tr>
<td>SYPRINE</td>
<td>TRIENTINE HYDROCHLORIDE</td>
<td>250MG</td>
<td>CAPSULE; ORAL</td>
<td>Prescription</td>
<td>Yes</td>
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</table>
Iron Chelators
Deferoxamine Mesylate

Original Approval or Tentative Approval Date: April 1, 1968

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Active Ingredients</th>
<th>Strength</th>
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<th>TE Code</th>
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<tr>
<td>DESFERAL</td>
<td>DEFEROXAMINE MESYLYATE</td>
<td>500MG/VIAL</td>
<td>INJECTABLE; INJECTION</td>
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<tr>
<td>DESFERAL</td>
<td>DEFEROXAMINE MESYLYATE</td>
<td>2GM/VIAL</td>
<td>INJECTABLE; INJECTION</td>
<td>Prescription</td>
<td>Yes</td>
<td>AP</td>
</tr>
</tbody>
</table>

INDICATIONS AND USAGE
Desferal is indicated for the treatment of acute iron intoxication and of chronic iron overload due to transfusion-dependent anemias.

Deferasirox & Deferiprone (oral)

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Company</th>
<th>Original Approval or Tentative Approval Date</th>
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<tbody>
<tr>
<td>DEFERASIROX</td>
<td>NOVARTIS</td>
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</tr>
</thead>
<tbody>
<tr>
<td>DEFERIPRONE</td>
<td>APOPHARMA INC</td>
<td>October 14, 2011</td>
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</table>
## Chelators for Radioactive Metals

### Calcium DTPA & Zinc DTPA

<table>
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<tr>
<th>Active Ingredient(s)</th>
<th>PENTETATE CALCIUM TRISODIUM</th>
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<tr>
<td>Company</td>
<td>HAMELN PHARMS</td>
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<tr>
<td>Original Approval or Tentative Approval Date</td>
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<tr>
<th>Active Ingredient(s)</th>
<th>PENTETATE ZINC TRISODIUM</th>
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<td>Original Approval or Tentative Approval Date</td>
<td>August 11, 2004</td>
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</tbody>
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### INDICATIONS AND USAGE

Ca-DTPA is indicated for treatment of individuals with known or suspected internal contamination with plutonium, americium, or curium to increase the rates of elimination.

# Prussian Blue

## Drug Details

- **Drug Name(s):** RADIOGARDASE (PRUSSIAN BLUE) (Brand Name Drug)
- **FDA Application No.:** (NDA) 021626
- **Active Ingredient(s):** FERRIC HEXACYANOFERRATE(II)
- **Company:** HEYL CHEMISCH
- **Original Approval or Tentative Approval Date:** October 2, 2003

**Products on Application (NDA) #021626**

<table>
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<tr>
<th>Drug Name</th>
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<tr>
<td>RADIOGARDASE (PRUSSIAN BLUE)</td>
<td>FERRIC HEXACYANOFERRATE(II)</td>
<td>500MG</td>
<td>CAPSULE; ORAL</td>
<td>Prescription</td>
<td>Yes</td>
<td>None</td>
</tr>
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</table>

## INDICATIONS AND USAGE

Insoluble Prussian blue is indicated for treatment of patients with known or suspected internal contamination with radioactive cesium and/or radioactive or non-radioactive thallium to increase their rates of elimination.
Non FDA Approved Chelators

- DMPS – 2,3-dimercapto-1-propanesulfonic acid
DMPS
2,3-Dimercapto-1-propanesulfonic acid

“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.”

DMPS can reverse the features of severe mercury vapor-induced neurological damage

Stevens-Johnson syndrome in a child with chronic mercury exposure and 2,3-dimercaptopropane-1-sulfonate (DMPS) therapy

Recovery from Severe Arsenic-Induced Peripheral Neuropathy with 2,3-Dimercaptopropanesulphonic Acid

Paul M. Wax; Charles A. Thornton

University of Rochester School of Medicine, Rochester, New York
Object #2:
How to Obtain Chelators

- Prescription
  - FDA Approved Drugs
  - Compounding pharmacies
- Non-prescription
  - Over the internet
Are your medications compounded?

Your doctor may prescribe medications that a pharmacist can prepare especially for you to meet your specific medical needs.

Pharmacy compounding is an important public health function provided by your pharmacist when commercially manufactured drugs are unavailable or not suitable for you.

Some compounded drugs may present risks to patients because compounded drugs have not been evaluated for safety and effectiveness by the FDA.

ASK YOUR DOCTOR OR PHARMACIST IF YOUR MEDICATIONS ARE COMPOUNDED. UNDERSTAND THE RISKS AND BENEFITS OF USING COMPOUNDED MEDICATIONS.

Visit http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/PharmacyCompounding/default.htm to learn more.

U.S. Department of Health and Human Services
U.S. Food and Drug Administration
Compounding Pharmacies

- Pharmacy compounding - customized preparation of a medicine that is not otherwise commercially available.
- Prescribed by physician, veterinarians, or other prescribing practitioner, and compounded by a state-licensed pharmacist.
- Uses bulk active pharmaceutical ingredients
- Subject to ongoing legal and regulatory debate
B. Nominated Drug Substances Being Proposed for Inclusion on the Bulk Drugs List

*Dimercapto-1-propanesulfonic acid.*

Dimercapto-1-propanesulfonic acid (DMPS), a chelating agent, is well characterized chemically. DMPS has been used to treat heavy metal poisoning. At doses reported in the literature for this indication, DMPS appears to be relatively nontoxic, and serious adverse reactions associated with its use have not been commonly reported. Limited anecdotal evidence of DMPS’s effectiveness for this indication is also reported in the literature.
The Arsenic Was In The Coffee

NEW SWEDEN, Maine, May 2, 2003

Arsenic Poisoning and McGuff Compounding Pharmacy

May 9, 2003
By William Blair, Pharm.D.

On April 27, 2003, 16 patients were poisoned with arsenic at the Gustaf Adolph Evangelical Lutheran Church in New Sweden, Maine.

One person died and 15 others were sickened after drinking arsenic-laced coffee at a church reception following Sunday services.

Immediately after the poisonings occurred, McGuff Compounding Pharmacy Services, Inc. (McGuff CPS) was contacted and asked to provide DMPS Injection to treat the victims. McGuff CPS rushed DMPS Injection to Maine.

Subsequently, several additional orders have been requested and sent. We have been told that the patients are improving.
where to obtain chelators

Chelation Therapy | IronOverloadMedicine.com
www.ironoverloadmedicine.com
A Once-Daily Chronic Transfusional Iron Overload Treatment.

How to Buy and Use Chelation Agents
home.earlink.net/~morian/HOW_TO_buy_DMSA.html
Nov 30, 2003 – Please send corrections, updates, and additional information to morian@earthlink.net; please share this file with anyone and everyone.

Oral Chelation, EDTA Chelation, Liver Cleansing, Digestive ...
www.extremehealthusa.com/
Enhanced Oral Chelation - Oral Chelation to detoxify from heavy metals, anti-aging with powerful antioxidants Goji Berries and Red Wine.
Goji Berries - The Goji Berry Story - Natural Supplements - Store Locator

Flushing Out Lead, Metals With Chelation Therapy: NPR
www.npr.org > News > Health
Jan 3, 2011 – The treatment she has been getting — chelation therapy — is to get her lead levels down. Although hospitals offer the treatment, some ...

Chelation Therapy
www.cancer.org/Treatment/chelation-therapy
Chelation therapy most often involves the injection of ethylene diamine tetraacetic acid (EDTA), a chemical that binds, or chelates, ...
Find Support & Treatment ...

Chelation Therapy for Heart Disease - MayoClinic.com
www.mayoclinic.com/health/chelation-therapy/MY00159
Sep 15, 2010 – Chelation therapy for heart disease — Overview covers the definition and ...
Get free personalized health guidance for you and your family.

Angioprim The Best Solution For EDTA Chelation Therapy.
www.improvordoralchelation.com/
Low cost chelation products offers "bw" price, but they fail to tell you that it may take a year to achieve any level of effectiveness and your arteries can get ...
HOW TO BUY and USE chelation agents

(Previous title was: HOW TO BUY DMSA WITHOUT A PRESCRIPTION)
This file was last updated on 11/30/03

INDEX:

• PUBLICATION NOTES
• How to buy ALA (alpha lipoic acid)
• How to buy DMSA
• How to buy DMPS
• How to buy small dosages (ready made)
• Compounding Pharmacies (small doses made to order)
• How to mix small dosages
• Comments on mixing methods & getting kids to take stuff
  • Dividing up capsules
  • Mixing stuff into food/juice
  • Giving night-time doses
  • Pill shooters, forcing kids to take pills
  • Teaching kids to swallow pills/capsules
  • Attitude issues, asking child how to give
  • Traveling with doses of chelation agent
  • Getting school to give doses
• Where to buy TTFD
• Where to buy transdermal ALA
DMSA Chelation

DMSA Chelation

DMSA For Detoxing Lead and Mercury

Our bodies are constantly exposed to an onslaught of environmental toxins. Lead and mercury are two heavy metals that seem to have found their way into almost everyone. Lead and mercury do not occur naturally in the body and as such are very toxic. These two heavy metals are known to interfere with how nerves communicate.

Meso-2,3-dimercapto-1-succinic acid (DMSA) is a compound approved in the 1980s by the FDA for the removal (chelation) of heavy metals. DMSA is considered the preferred agent for the chelation (removal) of heavy metals in both adults and children. Mercury is considered to be the second most toxic substance on the planet (uranium is #1) and the negative effects of mercury exposure are well documented.

Meso-2,3-dimercapto-1-succinic acid (DMSA) is also known as succimer and sold as a prescription under the trade name Chemet. DMSA is also sold as an over the counter nutritional supplement in some areas but it is often very difficult to find and can be very expensive (over $1 per capsule). DMSA has a somewhat strong sulfur like smell. It’s chemical properties make it particularly suited to chelate (remove via excretion) mercury and lead, the two most common toxic heavy metals in people.

One of the main advantages of DMSA is its large therapeutic window. This means there is a wide margin between the amount necessary to produce the intended result and the level that could potentially overload the patient. This makes DMSA exceptionally safe.

How Did I Get Heavy Metals (Mercury and Lead) In My Body?

There are several possible ways heavy metals got into your body. Below each of the more common exposures will be discussed. Remember there are no safe levels for heavy metals. Chelation of toxic heavy metals with
http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Dhpc&field-keywords=chelators&x=0&y=0

Accessed 1/11/12
Captormer-250 45c By Thorne Research
by Thorne Research

Be the first to review this item | 0

Price: $108.05 (33.77 / oz)

In stock.
Processing takes an additional 4 to 5 days for orders from this seller. Ships from and sold by Bon Vivant Essentials.

9 new from $108.05
Objective #3

- Discuss the frequency of use of these chelators
I would like to order:

Product link: http://marketpublishers.com/r/S12C64856C5EN.html
Product ID: S12C64856C5EN
Price: US$ 2,650.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service: office@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click ‘BUY NOW’ button on product page http://marketpublishers.com/r/S12C64856C5EN.html
Table 1. Frequencies and age-adjusted percentages of adults 18 years of age and over who used complementary and alternative medicine in the past 12 months, by type of therapy: United States, 2002 and 2007

<table>
<thead>
<tr>
<th>Therapy</th>
<th>2002</th>
<th>2007</th>
<th>Difference between percents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number in thousands</td>
<td>Percent (standard error)</td>
<td>Number in thousands</td>
</tr>
<tr>
<td>Alternative medical systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acupuncture</td>
<td>2,136</td>
<td>1.1 (0.07)</td>
<td>3,141</td>
</tr>
<tr>
<td>Ayurveda</td>
<td>154</td>
<td>0.1 (0.02)</td>
<td>214</td>
</tr>
<tr>
<td>Homeopathic treatment</td>
<td>3,433</td>
<td>1.7 (0.09)</td>
<td>3,909</td>
</tr>
<tr>
<td>Naturopathy</td>
<td>498</td>
<td>0.2 (0.03)</td>
<td>729</td>
</tr>
<tr>
<td>Traditional healers¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curandero</td>
<td>...</td>
<td>...</td>
<td>21</td>
</tr>
<tr>
<td>Espiritista</td>
<td>...</td>
<td>...</td>
<td>20</td>
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<tr>
<td>Hierbero or Yerbera</td>
<td>...</td>
<td>...</td>
<td>41</td>
</tr>
<tr>
<td>Shaman</td>
<td>...</td>
<td>...</td>
<td>186</td>
</tr>
<tr>
<td>Botanica</td>
<td>...</td>
<td>...</td>
<td>95</td>
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<tr>
<td>Native American healer or Medicine man.</td>
<td>...</td>
<td>...</td>
<td>224</td>
</tr>
<tr>
<td>Sobador</td>
<td></td>
<td></td>
<td>267</td>
</tr>
<tr>
<td>Biologically based therapies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chelation therapy</td>
<td>66</td>
<td>*0.0 (0.01)</td>
<td>111</td>
</tr>
<tr>
<td>Folk medicine</td>
<td>233</td>
<td>0.1 (0.02)</td>
<td>...</td>
</tr>
<tr>
<td>Nonvitamin, nonmineral, natural products²</td>
<td>38,183</td>
<td>18.9 (0.28)</td>
<td>...</td>
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<tr>
<td>Nonvitamin, nonmineral, natural products²</td>
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<td>...</td>
<td>38,707</td>
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<tr>
<td>Diet-based therapies¹,²</td>
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<td></td>
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<tr>
<td>Vegetarian diet</td>
<td>3,184</td>
<td>1.6 (0.08)</td>
<td>3,351</td>
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<tr>
<td>Macrobiotic diet</td>
<td>317</td>
<td>0.2 (0.03)</td>
<td>171</td>
</tr>
</tbody>
</table>

- Frequency of adults (≥ 18 y.o.) who use chelation therapy
  - 2002 – 66,000
  - 2007 – 111,000
Frequency of children (< 18 y.o.) who use chelation therapy

2007 – 72,000
### Chelator Use

<table>
<thead>
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<th>Chelator</th>
<th># of use</th>
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</thead>
<tbody>
<tr>
<td>BAL</td>
<td>59</td>
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<tr>
<td>DFO</td>
<td>82</td>
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<tr>
<td>EDTA</td>
<td>64</td>
</tr>
<tr>
<td>Penicillamine</td>
<td>5</td>
</tr>
<tr>
<td>Succimer</td>
<td>256</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>466</strong></td>
</tr>
</tbody>
</table>

\[
\text{466} / \text{183,000} = 0.25\% 
\]
## The Toxicology Investigators Consortium (ToxIC) Registry

Paul M. Wax • Kurt C. Kleinschmidt • Jeffrey Brent •
On behalf of the ACMT ToxIC Case Registry Investigators

### 2010-2011

<table>
<thead>
<tr>
<th>Chelator</th>
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<tr>
<td>BAL</td>
<td>1</td>
</tr>
<tr>
<td>DFO</td>
<td>4</td>
</tr>
<tr>
<td>EDTA</td>
<td>5</td>
</tr>
<tr>
<td>Penicillamine</td>
<td>0</td>
</tr>
<tr>
<td>Succimer</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
</tr>
</tbody>
</table>
Objective #4

- Understand the spectrum of health care providers who are involved with chelation including allopathic physicians, alternative medicine providers, professional societies, and laboratories
Complementary and Alternative Medicine (CAM)

- “Refers to therapies not usually taught in U.S. medical schools or generally available in U.S. hospitals. They include a broad range of practices and beliefs such as acupuncture, chiropractic care, relaxation techniques, massage therapy, and herbal remedies.”

http://nccam.nih.gov/
Prevalence of Alternative Medicine

- > 40% of populations has used alternative therapies
- 629 million visits – greater than total visits to all US primary care providers
- > $20 billion spent on alternative therapies (comparable to out of pocket expenses for all US physician services)

IOM Report 2005
Directory of Health Professionals

**Traditional**
- Allopathic Medicine
- Osteopathic Medicine

**Alternative**
- Chiropractic
- Traditional Oriental Medicine / Acupuncturists
- Homeopathic Medicine
- Naturopathic Medicine
- Environmental Medicine
- Orthomolecular Medicine
- Chelationists
- Biological Dentists
Medical Schools Embrace Alternative Medicine

Patients' desire for alternative therapies is driving changes in medical education.

By MERYL DAVIDS LANDAU

April 12, 2011

Now that nearly 40 percent of American adults swear by some form of complementary and alternative medicine, or CAM—from nutrition and mental relaxation to acupuncture, magnet therapy, and foreign healing systems like traditional Chinese medicine and Indian ayurveda—a growing number of medical schools, too, are supplementing medication with meditation.

Interest in teaching alternative approaches "has exploded, especially this last year," says Laurie Hofmann, executive director of the Institute for Functional Medicine, which is based in Gig Harbor, Wash. The nonprofit institute educates healthcare professionals to look for underlying systemic imbalances as a cause of illness rather than focus on treating symptoms and, when possible, to correct with lifestyle changes and mind-body techniques.
Professional Societies

- American College of Medical Toxicology
- American Association of Oriental Medicine
- American Association of Naturopathic Physicians
- American College for the Advancement of Medicine
- American Holistic Medical Association
- American Board of Clinical Metal Toxicology
- International Academy of Oral Medicine and Toxicology
- Environmental Dental Association
- International Association of Colon Therapy
Detoxification / IV Chelation

Whether you're new to detoxification education or are a seasoned practitioner, ACAM's rigorous training will enhance your practice's treatment options and improve health outcomes.

Already trained? Take the next step and achieve certification status in chelation therapy.

As the recognized leader in heavy metal detoxification / chelation therapy education, ACAM works diligently to ensure our curriculum is robust, relevant and of the highest caliber. Our chelation therapy training course covers a broad spectrum of detoxification topics from biochemistry to billing. Our faculty ensure scientific rigor, complete understanding and safe, practical application of therapy to maximize health outcomes.

Physicians, nurses, naturopaths and more benefit from this comprehensive training. A hands-on lab component is afforded to all participants.

Chronic degenerative disease and the etiological link to the environmental exposure of toxic metals is validated in medical literature. As toxic metal exposure, in air, food water and imported goods becomes recognized and established as a cause of both acute and chronic disease, it has become more important for clinicians to be well-informed about the exposure sources and effects of toxic metals. For example, risk for cardiovascular mortality events begin at a blood lead level well within

http://www.acamnet.org/site/c.ltJWJ4MPlwE/b.6805203/k.BD39/Detoxification__IV_Chelation.htm
Chelation/Metal Toxicology

Chelation Therapy/Metal Toxicology

For Advanced Practitioners: Thursday, May 3, 2012 - Friday, May 4, 2012
For Beginning Practitioners: Thursday, May 3, 2012 - Saturday, May 5, 2012

Chronic degenerative disease and the supposed link to the environmental exposure of toxic metals is validated in medical literature. As toxic metal exposure, in air, food, water and imported goods becomes recognized and established as a cause of both acute and chronic disease, it has become more important for clinicians to be well-informed about the exposure sources and effects of toxic metals. For example, risk for cardiovascular mortality events begin at a blood lead level well within the established normal reference range.

EDTA chelation therapy involves repeated administration of a synthetic amino acid to reduce vascular inflammation caused by specific toxic metals and to reduce the body burden of those metals in other organ systems. It's use for heart disease is being reviewed at an NCCAM-funded multi-center clinical trial.

Your patients have a significant risk of developing heart disease during their lifetimes. With this knowledge, many patients are becoming interested and well-educated in non-conventional treatment options that will prevent, augment or replace their current pharmacologic regimens. These patients want to work with a physician that is able to identify their risk for heart disease, recommend preventative nutritional suggestions and feel comfortable implementing a treatment strategy that is effective and safe.

Target Audience: Physicians, nurses, naturopaths and more benefit from this comprehensive training.
American Board of Clinical Metal Toxicology

Welcome to ABCMT's Website

Why you want an ABCMT doctor!

ABCMT has been certifying doctors for 24 years. The doctor must be a D.O. or M.D. and licensed to practice in his (his/her) state. He (He/She) must take a comprehensive course on the diagnosis and treatment of Metal Toxicity and related diseases. He then takes a test administered by ABCMT and upon passing becomes a Diplomate Candidate in Clinical Metal Toxicology.

He must continue his training, get two letters of recommendation, do at least 2000 intravenous treatments for metal toxicity, serve a co-chaperonship with a physician certified by ABCMT in Clinical Metal Toxicology, write a publishable paper with references, submit six completed charts for comprehensive review and take an oral examination administered by ABCMT certified physicians. Upon passing the orals his status changes to Diplomate of the American Board of Clinical Metal Toxicology and he is designated a Clinical Metal Toxicologist.

Why you want to be an ABCMT doctor!

ABCMT has been certifying doctors for 24 years. By obtaining certification you become a leader in the field of Clinical Metal Toxicology. It instills your patients with the confidence that you are knowledgeable, well trained and on the cutting edge of a fast growing medical discipline. We will establish a proactive political presence to obtain recognition and approval of your certification as a Clinical Metal Toxicologist with medical boards, insurance providers and government authorities.

ABCMT will continue to monitor and improve standards of care in Clinical Metal Toxicology based on research, physician experience and patient outcomes. We will build an organization that will be recognized as the leader in providing the protocols and certifying physicians in the medical discipline of Clinical Metal Toxicology.

As a member, ABCMT will provide you with comradery, referrals, web presence, knowledge source, discounted services, marketing tools and a proactive political presence. We will establish a virtual community in which you can grow.

Diplomate & Diplomate Candidate Designation

Diplomate Candidate - After taking the Basic Metals course and passing the written exam, the doctor is a Diplomate Candidate of Clinical Metal Toxicology.

Diplomate - After completing up to 3 years of clinical work and 2000 IV infusions, writing a paper.

http://abcmt.org/
American Board of Clinical Metal Toxicology
Established in 1982

Links

Government Agencies
The Agency for Toxic Substances and Disease Registry - www.atsdr.cdc.gov

Organizations
Advanced Medical Education & Services Physician Association - www.amespa.org
Age Management Medicine Group – www.agemed.org
American Academy of Environmental Medicine - www.aaem.com
American Association for Health Freedom - www.healthfreedom.net
American College for the Advancement of Medicine - www.acam.org
The Institute of Functional Medicine - www.functionalmedicine.org
International Academy of Oral Medicine and Toxicology - www.isomt.org
The International Board of Clinical Metal Toxicology – www.ibcmt.com
International College of Integrative Medicine – www.icirmed.com

http://abcmt.org/
CAM Laboratory Testing

- Candida Overgrowth Detection
- Intestinal Permeability Testing
- **Heavy Metal Screening**
- Adrenocortex Stress Profile
- Natural Killer Cell Test
- Oxidative Stress Testing
- Detoxification Profile
- Biological Terrain Assessment
- Adipose Tissue Testing
Feeling Fat, Fuzzy, or Frazzled?

Great Smokies Diagnostic Laboratory

Established in 1986, Great Smokies Diagnostic Laboratory has helped pioneer the field of laboratory functional testing.

Functional testing assesses the dynamic inter-relationship of physiological systems, thereby creating a more complete picture of one's health, unlike traditional allopathic testing, which is more concerned about the pathology of disease.

By supporting the practitioner in identifying the root cause of chronic conditions, functional testing helps the practitioner to develop optimal interventions to assist patients in their quest for achieving lasting health.

This laboratory serves over 8000 primary/specialty physicians and health care providers worldwide, offering over 125 specialized diagnostic assessments.

These innovative tests cover a wide range of physiological areas, including digestive, immune, nutritional, endocrine, metabolic function - along with GENOVATIONS™ profiles targeting modifiable effects of gene polymorphism.

The laboratory is accredited by the College of American Pathologists and fully licensed by HCFA.

CONTACT INFORMATION
Great Smokies Diagnostic Laboratory - www.gSDL.com

Toll-free phone number:
(800) 522-4762
Call this number with questions about the types of testing offered, and to access the Physician Referral service to find a physician near you.
Comprehensive Urine Element Profile

Toxic Element Clearance Profile in $\mu$g/g Creatinine

<table>
<thead>
<tr>
<th>Element</th>
<th>Reference Range</th>
<th>Toxic Ratio</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>5.4</td>
<td>&lt;= 1.4</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>0.48</td>
<td>&lt;= 2.19</td>
<td></td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.52</td>
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<tr>
<td>Antimony</td>
<td>0.12</td>
<td>&lt;= 2.12</td>
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<tr>
<td>Arsenic</td>
<td>6</td>
<td>&lt;= 1.4</td>
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<tr>
<td>Beryllium</td>
<td>0.1</td>
<td>&lt;= 2.97</td>
<td></td>
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<tr>
<td>Bismuth</td>
<td>0.19</td>
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<td></td>
</tr>
<tr>
<td>Cadmium</td>
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<td></td>
</tr>
<tr>
<td>Cesium</td>
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<tr>
<td>Gallium</td>
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<td>Gallium</td>
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<td>Rubidium</td>
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<tr>
<td>Strontium</td>
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</tr>
<tr>
<td>Thallium</td>
<td>0.32</td>
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</tr>
<tr>
<td>Tungsten</td>
<td>0.004</td>
<td>&lt;= 3.88</td>
<td></td>
</tr>
</tbody>
</table>

* Elevated values may indicate the presence of a chelating agent.

Creatinine Concentration

- Urine Creatinine: 48.00-200.00 mg/dL
- Total Volume: 1,200 mL
- Length of Collection: 24.0 hours
- Provocation Comment: Information regarding provocation was not provided.

Collection Information

Cational Maximum Permissible Limit (CMPL): Element cation in significantly elevated, consistent with increased body burden. Increased element concentrations can have a negative impact on overall health and well-being. These values are derived from Casare and Dool's Toxicology: The Basic Science of Poisons, 5th Ed. 1996 McGraw Hill NY pp 997-998. Units have been standardized.

## Comprehensive Elemental Hair Analysis

### 0020 Element Analysis - Hair

<table>
<thead>
<tr>
<th>Element</th>
<th>Results mg/gm</th>
<th>1st Quintile</th>
<th>2nd Quintile</th>
<th>3rd Quintile</th>
<th>4th Quintile</th>
<th>5th Quintile</th>
<th>Reference Limits</th>
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<tbody>
<tr>
<td><strong>Highly Toxic Heavy Metals</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Aluminum</td>
<td>1.8</td>
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<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;2.00</td>
<td>&lt;2.00</td>
<td>&lt;= 2.90</td>
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<tr>
<td>Arsenic</td>
<td>0.16 H</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.15</td>
<td>&lt;0.15</td>
<td>&lt;= 0.15</td>
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<tr>
<td>Beryllium</td>
<td>&lt;DL*</td>
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<td></td>
<td></td>
<td></td>
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<td>&lt;= 0.10</td>
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<tr>
<td>Cadmium</td>
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<td>&lt;0.05</td>
<td>&lt;0.05</td>
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<tr>
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<td>&lt;0.20</td>
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<td>&lt;0.80</td>
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<td>Mercury</td>
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<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;2.42</td>
<td>&lt;2.42</td>
<td>&lt;= 2.42</td>
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<td>Thallium</td>
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<td>&lt;= 0.009</td>
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<td><strong>Potentially Toxic Elements</strong></td>
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<td>Antimony</td>
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<td>&lt;= 0.01</td>
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<td>Barium</td>
<td>2.3 H</td>
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<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.20</td>
<td>&lt;0.20</td>
<td>&lt;= 0.20</td>
</tr>
<tr>
<td>Bismuth</td>
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<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.42</td>
<td>&lt;0.42</td>
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<tr>
<td>Tin</td>
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</tr>
<tr>
<td>Titanium</td>
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<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;0.10</td>
<td>&lt;3.51</td>
<td>&lt;3.51</td>
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<tr>
<td>Tungsten</td>
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<td>&lt;0.01</td>
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<tr>
<td>Uranium</td>
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</tr>
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*DL* = Detection Limit, H = High Limit

Chelation Therapy Related Links

This is a great resource page with links for you to do further research on chelation therapy.

Moms against Mercury is a non profit organization dedicated to raising awareness while educating the public of the dangerous use of Thimerosal, a mercury based preservative, used in vaccines and the flu shot.

Safe Minds was founded to raise awareness, support research, change policy and focus national attention on the growing evidence of a link between mercury and neurological disorders such as autism, attention deficit disorder, language delay and learning difficulties. Our mission is to end the health and personal devastations caused by the needless exposure to mercury, one of the most neurotoxic substances on earth.

Mercury on the brain video online that show how mercury causes brain neuron degeneration.

Are you getting the Big Picture yet? These are all great reasons why people will need to know about chelation for toxic metals.

The ATSDR ToxFaQsTM is a series of summaries about hazardous substances developed by the ATSDR Division of Toxicology. Check out the links below and you will soon see why chelation may be of interest to you.

cHELATION of Aluminum Antimony Arsenic Beryllium Cadmium Lead Mercury Thallium Thorium Uranium Nickel Silver Titanium Tin

CHELATION THERAPY FOR CHILDREN WITH AUTISM FOUND SAFE AND BENEFICIAL

Tempe, AZ - Chelation Therapy for children with Autism has been found to be safe and beneficial according to two papers published October 2009 by Southwest College of Naturopathic Medicine, based in Tempe, Arizona.

The study evaluated treating heavy metal toxicity in children with autism with dimercaptosuccinic acid (DMSA), a prescription medicine approved by the FDA for treating lead poisoning. DMSA acts by binding to heavy metals, which are then excreted in the urine. In the study, DMSA was given to 65 children with autism (ages 3-8 years) to determine its effects.

The study found that DMSA dramatically increased excretion of several toxic metals, including a 10-fold increase in excretion of lead. DMSA was well tolerated with no reported side effects on standard safety tests, including no effect on kidney, liver or other organ function. There was little effect on most essential minerals, except for some modest losses of chromium and potassium (less than the typical daily intake).

Of particular interest was DMSA’s dramatic effect on glutathione levels. Glutathione is the body’s primary defense against toxic metals and has been found in other studies to be significantly lower in children with autism. The 3-day treatment with DMSA normalized glutathione levels for at least 1-2 months in nearly all of the children participating in the study.

DMSA therapy also demonstrated promising effects on reducing key symptoms of autism, showing improvements in language, cognition, and sociability. Further studies, including randomized, placebo controlled trials, are indicated to confirm these results.

The principle investigators for this study were Matthew Barai, N.D., Chair of the Department of Pediatric Medicine and Associate Professor of Pediatrics at Southwest College of Naturopathic Medicine (SCNM) and James B. Adams, Ph.D., Adjunct Professor in the Division of Clinical Sciences at SCNM.

“Toxic metals are a common problem in autism,” said Dr. Barai. “This data answers the question that many physicians have, ‘whether chelation is safe and effective?’, and clearly it’s both.”

The safety and efficacy of chelation therapy for children with autism was reported in two papers, “Safety and Efficacy of Oral DMSA Therapy for Children with Autism Spectrum Disorders: Part A – Medical Results”, and its companion paper, “Part B – Behavioral Results.”


Division of Basic Medical Sciences, Southwest College of Naturopathic Medicine, Tempe, AZ, USA. jadamsasu.edu

Abstract

BACKGROUND: This study investigated the effect of oral dimercapto succinic acid (DMSA) therapy for children with autism spectrum disorders ages 3-8 years.

METHODS: Phase 1 involved 65 children who received one round of DMSA (3 days). Participants who had high urinary excretion of toxic metals were selected to continue on to phase 2. In phase 2, 49 participants were randomly assigned in a double-blind design to receive an additional 6 rounds of either DMSA or placebo.

RESULTS: DMSA greatly increased the excretion of lead, substantially increased excretion of tin and bismuth, and somewhat increased the excretion of thallium, mercury, antimony, and tungsten. There was some increase in urinary excretion of essential minerals, especially potassium and chromium. The Phase 1 single round of DMSA led to a dramatic normalization of RBC glutathione in almost all cases, and greatly improved abnormal platelet counts, suggesting a significant decrease in inflammation.

CONCLUSION: Overall, DMSA therapy seems to be reasonably safe, effective in removing several toxic metals (especially lead), dramatically effective in normalizing RBC glutathione, and effective in normalizing platelet counts. Only 1 round (3 days) was sufficient to improve glutathione and platelets. Additional rounds increased excretion of toxic metals.
Conclusions

- Numerous approved chelators are available by prescription only
- Chelators also appear to be available by non-prescription and over the internet
- A wide variety of health care providers use these medications
- The internet continues to provide mixed messages about chelation therapies
- Communication to health care providers, the public and the media conveying scientifically sound information about the role for chelation remains a critical public health imperative
Thank You