BBC-TV ‘PANORAMA’ DOES EXPOSE ON DENTAL AMALGAM CONTROVERSY

On 11 July 1994 at 9:30 P.M. London time, "Panorama" the widely viewed and respected BBC-TV series presented a 40-minute major expose on the controversy over the safety of mercury/silver amalgam dental fillings. The program’s lead reporter is Tom Mangold, who is a veteran, award winning reporter and is highly respected in his field. The data presented is so extensive and important that we have elected to reproduce, in it’s entirety, the following press release provided to us by BBC:

**W.H.O. ADVISOR CONDEMNS USE OF MERCURY IN DENTAL FILLINGS ON PANORAMA AS STUDIES SHOW LINKS BETWEEN DENTAL FILLINGS AND SERIOUS ILLNESS**

Dr. Lars Friberg, Chief Advisor to the World Health Organization (WHO) on metals poisoning tells tonight’s ‘Panorama’ that the use of mercury in dental fillings is not safe and should be avoided. (‘Panorama: Poison in the Mouth’ 9.30 pm BBC-1). The programme also reports on new scientific research which shows clear links between the mercury released from dental fillings and serious illness including Alzheimer’s disease.

Metal fillings are made of amalgam, fifty percent of which is mercury, considered “99.99 percent” safe by the British Dental Association (BDA), despite scientific evidence over the last ten years that the mercury leaks from fillings in the form of mercury vapour which is inhaled and lodges in the brain and the kidneys. Dr. Friberg tells ‘Panorama’ reporter Tom Mangold that he "does not know" why the BDA consider mercury levels in amalgam safe, and that "I think they are wrong." He is particularly concerned about mercury deposits in children’s brains from fillings:

"They are definitely particularly vulnerable. We know that if you take the young child, it takes a few years after birth until the brain is developed and we know that the brains in children are much more sensitive than in the adults. I think that you should try to avoid to implant toxic metals in the mouth."

"There is no safe level of mercury and no-one has actually shown that there is a safe level. I would say mercury is a very toxic substance. I would like to avoid it as far as possible."

‘Panorama’ has investigated a number of new independent scientific studies, some as yet unpublished, which point inexorably towards the health risks of amalgam fillings.

The first is a new study by Dr. Boyd Haley, Professor of Biochemistry at University of Kentucky, which has discovered that small quantities of mercury from amalgams can produce changes in the brain that are identical to changes caused by Alzheimer’s disease. The mercury inhibits the efficiency of tubulin, a protein vital to brain cells.

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Haley tells ‘Panorama’ reporter Tom Mangold:

"To the best that we can determine with these experiments, mercury is a time bomb in the brain. We need to have an effect - if it’s not bothering someone when they’re young, especially when they age, it could turn into something quite disastrous. I still have one amalgam filling. But when I had them replaced I had them replaced with non-amalgam material, because I’m afraid enough of my own research and concerned enough that I don’t want it in my mouth nor do I want [it in the mouth of] my children or my wife."

"I would not want to make the statement that mercury causes Alzheimer’s disease, but there is no doubt in my mind that low levels of mercury, present in the brain, could cause the normal cell death and that this could lead to a dementia which would be similar to Alzheimer’s disease."

‘Panorama’ reports on a unique, on-going study of a group of Wisconsin nuns by Dr. William Markesbery, Professor of Pathology and Neurology and head of the Sanders Brown Center For Aging at the University of Kentucky, which is investigating the link between Alzheimer’s and mercury. He tells ‘Panorama’:

"Mercury is a toxic substance. It’s a neurotoxin, that is to say it causes nerve cells to degenerate if there’s enough mercury present in the brain. And the major problem in Alzheimer’s disease is a degeneration of nerve cells. So it is possible although we have not proven this, it’s possible that mercury could add to the degeneration of nerve cells, that is to the death of nerve cells."

An unpublished study revealed by ‘Panorama’ shows that dentists themselves are suffering neurological damage from their daily handling of amalgam. Dr. Diana Echeverria, a neurotoxicologist at the University of Washington, working with the co-operation of the American Dental Association, has shown that under rigorous testing, dentists exhibit classic signs of mercury poisoning. Yet Dr. Echeverria also believes that the mercury dose dentists receive from their work is not substantially different from that received continually by their patients with metal fillings in their mouths.

She tells ‘Panorama’:

"The kinds of things that we have found are losses in function, associated with the ability to move manually very small things with your hands. A manual dexterity problem. Other kinds of really distinct functions are concentration - the inability to concentrate."

Another piece of research featured by ‘Panorama’ was conducted this year by Professor Gustav Drasch, a forensic toxicologist at the University of Munich. This shows that mercury from a woman’s amalgam fillings crosses the placenta during pregnancy and into the brains of unborn children. Professor Drasch tells the programme:

"Well I think the implications are serious. It is a ques-tion whether or not we have to restrict the application of dental amalgam to women, not only in child bearing age, but even before. If for instance, a girl of 15 gets an amalgam filling, this filling lies in her mouth for 10 years and all the time this filling releases some mercury. And if this girl gets pregnant, let me say five years after, she has a mercury inlay in her mouth and the mercury goes to the baby. So it’s really the question now discussed in Germany today, to speak about restriction of amalgam fillings for women from, let me say, 15 to 50 years."

The British Dental Association (BDA) told ‘Panorama’ that they are unaware of the work of Professor Aposhian of the University of Arizona who discovered that two thirds of mercury deposits in the body comes from fillings, or of the work of Dr. Haley or Dr. Echeverria. They rejected the work of Dr. Drasch as not proving that mercury deposits in the body are hazardous to health.

Mr. John Hunt, Chief Executive of the BDA tells ‘Panorama’ that he believes amalgam is safe. "No doubt about it at all." A BDA fact sheet states that the scientific evidence available to the BDA does not justify banning the use of amalgam in young children. Mr. Hunt confirms this view on the programme: "Yes, certainly. I’ve treated my children with amalgam and I have no doubt that when they have their own children they will also."

Asked about any link between Alzheimer’s and mercury he says:

"As far as I know there is no association with mercury and Alzheimer’s. We rely on expert advice. We look to a group of people, including our consultants, but also we rely upon the Department of Health and other bodies to let us have their results and their advice about results that they would read in papers.

"Before you say it is dangerous or poses a risk, you have to say that mercury in those places is dangerous. And there’s no evidence to suggest that merely because it is found in the kidneys and so on of fetuses and young children, that is a hazard to health. I don’t see why we should necessarily worry the population at large if there are no proven arguments one way or the other. The fact that it is there and detectable doesn’t mean to say that it’s potentially doing any damage. You can probably, with the correct analysis find a whole lot of other substances in the brain that perhaps shouldn’t be there.” (END OF BBC PRESS RELEASE).

After the initial showing in England on 11 July 1994, the Panorama program on dental amalgam will be shown world-wide, via "Lionhart" syndication. Panorama programs are sometimes viewed in 50 or more countries, the United States included. In the U.S.A., it is usually carried as a local-option program on the PBS (Public Broadcasting System) by "Nova."

In order to encourage showing of the program in
as many areas as possible, please ask as many people as possible to contact your local PBS TV station and request that they show the pick-up of the "BBC Panorama" program on dental amalgam. The potential impact of this program is so dynamic that it would be helpful to provide flyers to patients and friends and/or a sign in your office. The more requests to your local PBS or other stations, the better the chance that the program will be shown in your area. (Note: Most PBS stations function, at least in part, on contributions from local citizens.)

"Panorama" is a program with considerable prestige and a very large viewing audience, particularly in Great Britain and continental Europe. Approaching its 40th Anniversary, it is easily the longest running news program of its kind in the world. The Panorama team has been extremely thorough and dedicated to obtaining accuracy for its program on dental amalgam. They spent weeks interviewing, and as can be seen from the Press Release, a large number of the foremost medical experts and scientists who have conducted, or are conducting, research on dental amalgam were interviewed.

It is apparent that both the published findings of medical science and the position of the dental establishment were fairly presented. We believe this program will have an impact on the credibility of the dental establishment that will reverberate around the world.

"...The extensive use of dental amalgam can be seen as a giant epidemiological trial of mercury exposure lacking any control."  

IAOMT STANDARD OF CARE  
MERCURY DETOXIFICATION  

As concern over the potential adverse health effects to mercury exposure from amalgam dental fillings magnifies, the need for valid information on patient protection measures becomes more critical. Current developments in the amalgam controversy indicate the probability of a need for qualified expertise in the near future. The indicators of forthcoming scientific research and increased media interest portend a potential explosion of public concern over the biocompatibility of dental amalgam. When this occurs, public demand for attention will be presented to ill prepared dental and medical professions.

Very few dentists and physicians have any knowledge at all about the toxicity of mercury. Even those that have tried to learn frequently must rely on information that has little, if any, foundation. It is well established that patients can be exposed to excessive levels of mercury by improper removal of dental amalgam, for whatever reason. The injudicious use of agents intended to counter the effects of exposure to mercury can also present problems. The human organism is biochemically and physiologically sensitive.

The International Academy of Oral Medicine and Toxicology (IAOMT) has already established a "Standard of Care" for removal of amalgam dental fillings. This Standard is intended to provide guidelines for the protection of the patient, doctor and staff from excessive mercury exposure from dental procedures, including prophylaxis as well as amalgam removal.

IAOMT Standards of Care are divided into two categories; "Protocols" are supported by scientific documentation, whereas "Preferred Procedures" are theoretically or hypothetically sound but still lack scientific confirmation.

Recently, a great deal of attention has been directed to mercury detoxification, with as much variance of direction being proclaimed as there are advocates. Here again, the IAOMT has taken the lead in the awesome responsibility of establishing a Standard of Care, this time for mercury detoxification, more correctly, this should be called "antitoxic therapy" for mercury exposure.

It has not yet been widely understood or recognized that antitoxic therapy for exposure to mercury (or any other toxic agent) can be directed elimination of exposure, to removal of the poison from the body, to countering its harmful effects within the body, or a combination of these approaches. The first step, therefore, in establishing the IAOMT Standard of Care has been to define the four basic categories of antitoxic therapy. These are:

I. PREVENTION:
1. EXPOSURE PREVENTION: [Hg example: IAOMT Standards of Care for removal of dental amalgam fillings.]
2. ABSORPTION PREVENTION: [Hg example: Activated charcoal.]
3. DAMAGE PREVENTION: [Hg example: Anti-oxidants protect against mercury induced free radical damage.]
II. ELIMINATION:
1. CHEMOTHERAPEUTIC: [Hg example: DMPS, DMSA, etc.]
2. NON-CHEMOTHERAPEUTIC: [Hg example: Sweat therapy.]

III. ANTIDOTAL:
(Reduction of toxic properties by chemical changes induced in the body producing compounds which are less toxic.) [Hg example: Selenium bound to mercury renders the mercury less bioavailable.]

IV. RESTORATION:
(Reconstruction to effect return to a previous state, as of health.) Hg example: It has been demonstrated that body levels of selenium and glutathione are decreased or depleted by mercury.

Protocols or Preferred Procedures will eventually be established for as many agents as possible. These will be divided into the four basic antitoxic categories and classified as being accepted or not accepted as Protocols or Preferred Procedures. As this is a task of awesome proportions, the IAOMT welcomes information from all interested parties. Please send to IAOMT - P.O. Box 608531 - Orlando, FL. 32860-8531.

Health care providers intending to address the issue of mercury exposure from dental amalgam in patient care must become familiar with measures to protect patients from harm and to attempt to redress harm that may have occurred. These measures must be supported by some credible foundation. Responsibility to the health and welfare of the patient and the public in general demands no less.

The IAOMT has also instituted a formal education and training program that will eventually provide a core of health care professionals with credible credentials.

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ABSTRACTS

Drasch, G; Schupp, I; Riedl, G; Gunther, G.
Einfluss von Amalgamfullungen auf die Quecksilberkonzentration in Menschlichen organen. (Influence of Amalgam Fillings on the Mercury Concentration in Human Organs.)

ABSTRACT: The concentration of inorganic (Hg) and organic (MeHg) mercury was determined with the aid of CV-AAS in various tissues (renal cortex, liver and 5 different brain areas) of 168 cadavers. The results were correlated with dental status, age and sex.

The number of teeth with amalgam fillings shows a strong positive correlation to the Hg-concentrations in all investigated tissues (Spearman rank correlation), while there was no influence on the MeHg-concentrations. The mean concentrations of Hg in the renal cortex, the liver and the brain of persons with more than 10 teeth with amalgam fillings are approximately 11, 4 and, respectively, 2 times higher than in the control group with 0-2 amalgam-filled teeth (age group 11-50 years).

In all investigated tissues in this control group the Hg concentrations decrease with advancing age up to the middle age class, while in the higher age groups the values seem to increase again. For MeHg no age dependence, and for Hg and MeHg no sex correlations were found.

From this it may be concluded that, whenever there is a larger number of dental amalgam fillings, they are responsible for most of the Hg in the body tissues.

BIO-PROBE NOTE: This is the fourth published human autopsy study demonstrating a direct correlation between the amount of dental amalgam present and the levels of mercury found in various body tissues (brain, kidney, and now also liver tissue). The lead author of this study is a professor of forensic pathology at the University of Munich in Germany (G. Drasch). There has never been a human autopsy study published that did not find this correlation. These four human autopsy studies combined with the numerous animal studies tracing amalgam mercury into body tissues conclusively prove that amalgam mercury does indeed transfer from the fillings into body tissues. Any spokesperson claiming that mercury is locked into the dental amalgam or that, if released, it does not accumulate in the body is providing statements to the public that are without foundation and directly contradictory to established scientific research.

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Siblerud, RL; Motl, J; Kienholz, E.
Psychometric Evidence that Mercury from Silver Dental Fillings May Be An Etiological Factor in Depression, Excessive Anger, and Anxiety.

ABSTRACT: Scores on the Beck Depression Inventory were compared for 25 women who had silver dental fillings (amalgams) and for 23 women...
without amalgams.

Women with amalgams had significantly higher scores and reported more symptoms of fatigue and insomnia. Anger scores from the State-Trait Anger Expression Inventory showed that the women with amalgams had statistically significantly higher mean scores on expressing anger without provocation and experiencing more intense angry feelings. The women without amalgams scored significantly higher on controlling anger, which suggested they invested more energy in monitoring and preventing the experience and expression of anger.

Anxiety scores from the State-Trait Anxiety Inventory showed the women with amalgams scored significantly less pleasant, satisfied, happy, secure, and steady, and had a more difficult time making decisions. They had significantly higher Trait Anxiety scores. The women with amalgams also had significantly higher levels of mercury in the oral cavity before and after chewing gum.

The study suggests that amalgam mercury may be at etiological factor in depression, excessive anger, and anxiety because mercury can produce such symptoms, perhaps by affecting the neurotransmitters in the brain.

Siblerud, RL; Kienholz, E.
Evidence that Mercury from Silver Dental Fillings May Be An Etiological Factor in Multiple Sclerosis.

ABSTRACT: This paper investigates the hypothesis that mercury from silver dental fillings (amalgam) may be related to multiple sclerosis (MS). It compares blood findings between MS subjects who had their amalgams removed to MS subjects with amalgams.

MS subjects with amalgams were found to have significantly lower levels of red blood cells, hemoglobin and hematocrit compared to MS subjects with amalgam removal. Thyroxine levels were also significantly lower in the MS amalgam group and they had significantly lower levels of total T Lymphocytes and T-8 (CD8) suppressor cells. The MS amalgam group had significantly higher blood urea nitrogen and lower serum IgG. Hair mercury was significantly higher in the MS subjects compared to the non-MS control group.

A health questionnaire found that MS subjects with amalgams had significantly more (33.7%) exacerbations during the past 12 months compared to the MS volunteers with amalgam removal. The paper also examines epidemiological correlations between dental caries and MS; as well as how mercury could be causing the pathological and physiological changes found in multiple sclerosis.

**BIO-PROBE NOTE:** This study utilized 50 MS subjects who had their amalgam fillings removed and 47 subjects who had not. Because of limited funding and subject residence, one-half (N=24) of each group participated in the blood parameter testing. The author provided considerable referenced background information connecting mercury to various key factors in both MS and mercury exposure. These included: Mercury, dental caries and MS; T-lymphocyte response similarities; autoimmunity; blood-brain barrier effects; demyelination; nerve conduction velocity; and IgG response.

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Godfrey M. and Campbell N.
Confirmation of mercury retention and toxicity using 2,3-dimercapto-1-propane-sulphonic acid sodium salt (DMPS)

**REVIEW:** This study adds additional confirmation to the previous studies that have demonstrated that amalgam dental fillings make a significant contribution to total mercury body burden.

The study was done by IAOMT member Dr. Michael Godfrey, a physician, and Dr. Noel Campbell, a dentist, involved 110 adult patients: Eighty symptomatic patients with mercury amalgam dental fillings, ten dental personnel, and ten patients previously symptomatic and diagnosed as suffering from mercury toxicity. The latter group had been treated by having their amalgam fillings replaced with non-mercury containing material, nutritional supplementation, chelation therapy and had subsequently become asymptomatic. The results from these 100 study subjects were compared to each other and to the 10 asymptomatic control patients who had never had amalgam dental fillings.

The purpose of the study was to see if those individuals with amalgam dental fillings had more mercury in their body than those individuals who had never had amalgam dental fillings. The study
also wanted to evaluate dental personnel, who normally have greater work related cumulative exposure to mercury. Further, the authors also wanted to see what had happened to the mercury body burden of those individuals who had their amalgam fillings replaced and had been on a supplementation and chelation program.

The basic protocol for the study was to take a base-line urine mercury level and then challenge each individual with a substance that would cause the excretion of mercury and then take another urine mercury level. One of the most effective substances, that has been scientifically demonstrated to bind with mercury, is DMPS. DMPS is the chemical abbreviation for the chemical 2,3-dimercapto-1-propane-sulphonic acid sodium salt. DMPS has a great affinity for the mercury molecule and will bind to it and assist in its excretion from the body.

DMPS, manufactured by Heyl GmbH- Berlin and sold under the name of Dimaval, has been available in Europe for more than 20 years. (Although the FDA has not approved Dimaval for distribution in the United States, it is our understanding that there are compounding pharmacies in the United States that will formulate DMPS on a physician’s prescription).

All 110 of the study subjects provided urine samples immediately before intravenous injections of DMPS. Urine samples were then obtained from the next urine to be passed. Both urine samples were analyzed for mercury content.

The mean value of urine mercury, after DMPS injection, in the first group of 80 symptomatic patients was very significant and increased from 5.4 to 314.3 micrograms per litre (µg/L). It was also highly significant in the dental personnel increasing from 10.2 to 330.0 µg/L. In the group of ten patients who had their amalgam fillings replaced and who had been on nutritional supplementation and chelation and were now asymptomatic, post DMPS mercury concentrations were less than in the control patients, increasing from 1.4 to 10.7 µg/L. The control patients post-DMPS values increased from 1.8 to 39.1 µg/L.

One other very significant finding reported in the study was that considerable amounts of lead may be excreted with the mercury following DMPS provocation. Chronically affected patients may have high levels of either metal. Furthermore, the authors felt there is a serious need to recognize amalgam for what it is, namely a mercury-leaking implant that can at some time cause toxic effects in a yet unknown proportion of the population.

**BIO-PROBE NOTE:** The last sentence above says it all. Regardless of what the FDA or the ADA may say, the scientific facts are beyond any dispute. Dental mercury accumulates in your body as long as a single mercury-leaking implant remains in any of your teeth. It should also be noted that DMPS removes only extracellular metal. Further, it does not increase the concentration of metal in the brain and reduces organ concentration of metal including the kidney. Our thanks to Dr’s. Godfrey and Campbell for providing us a copy of their research paper.

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Lund, BO; Miller, DM; Woods, JS.

Mercury-Induced H2O2 Production and Lipid Peroxidation Invitro in Rat Kidney Mitochondria.


**ABSTRACT:** Mercuric ion (Hg(II)) causes oxidative tissue damage in kidney cortical cells. We studied the in vitro effects of Hg(II) on hydrogen peroxide (H2O2) production by rat kidney mitochondria, a principal intracellular target of Hg(II).

In mitochondria supplemented with a respiratory chain substrate (succinate or malate/glutamate) and an electron transport inhibitor (antimycin A (AA) or rotenone), Hg(II) (30nmol/mg protein) increased H2O2 formation approximately 4-fold at the ubiquinone-cytochrome b region (AA-inhibited) and 2-fold at the NADH dehydrogenase region (rotenone-inhibited). Concomitantly, Hg(II) increased iron-dependent lipid peroxidation 3.5 -fold at the NADH dehydrogenase region, but only by 25% at the ubiquinone-cytochrome b region.

The mitochondrial concentration of reduced glutathione (GSH) decreased both with incubation time and Hg(II) concentration. Hg(II), at a concentration of 12 nmol/mg protein, caused almost complete depletion of measurable GSH in substrate-supplemented mitochondria after a 30-minute incubation. In electron transport-inhibited mitochondria, Hg(II) caused greater depletion of GSH in rotenone-inhibited than in AA-inhibited mitochondria, consistent with the effects of Hg(II) on lipid peroxidation.
centrations depletes mitochondrial GSH and enhances H2O2 formation in kidney mitochondria under conditions of impaired respiratory chain electron transport. The increased H2O2 formation by Hg(II) may lead to oxidative tissue damage, such as lipid peroxidation, observed in mercury-induced nephrotoxicity.

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Schulte, A; Stoll, R; Wittich, M; Pieper, K; Stachniss, V.
Urinary Mercury Concentrations in Children with and without Amalgam Restorations.

**ABSTRACT:** Studies on adults have documented that the content of mercury in urine is determined by the number and extent of amalgam restorations. The present assay was conducted to examine if this correlation can also be shown in children. In addition, the mercury excretion in the urine of children without amalgam fillings was to be assessed. Therefore the content of mercury was determined in 24-h urine samples of 3-15 year old children by means of atomic absorption spectrometry. The concentration of creatinine was determined as well.

The mean urinary mercury concentration for the 81 subjects with amalgam restorations was 0.66 mcg/l (range 0-4 mcg/l) and for the 86 children without amalgam restorations it was 0.16 mcg/l (range 0-1.8 mcg/l). This difference proved to be very significant (p < 0.001). Also a distinct correlation between the number of amalgam points (each amalgam surface was given 1 to 3 points depending on its extent) and the mercury concentration in urine was found. There was no correlation with other factors; i.e. consumption of fish or accidents with mercury thermometers.

These examinations show that amalgam restorations contribute in children, too, mainly to the origins of mercury in the organism. However, this does not permit any conclusions concerning the toxicity, especially as no clinical symptoms for mercury intoxication were found in children participating in this study.

"Future discussion on the pros and cons of dental amalgam should not be limited to adults or children with their own amalgam fillings, but also include fetal exposure." Prof. Dr. Gustav Drasch

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Rowland, AS; Baird, DD; Weinberg, CR; Shore, DL; Shy, CM; Wilcox, AJ.

The Effect of Occupational Exposure to Mercury Vapour on the Fertility of Female Dental Assistants.


**ABSTRACT:** Exposure to mercury vapour or inorganic mercury compounds can impair fertility in laboratory animals. To study the effects of mercury vapour on fertility in women, eligibility questionnaires were sent to 7000 registered dental assistants in California. The final eligible sample of 418 women, who had become pregnant during the previous four years, were interviewed by telephone.

Detailed information was collected on mercury handling practices and the number of menstrual cycles without contraception it had taken them to become pregnant. Dental assistants not working with amalgam served as unexposed controls.

Women with high occupational exposure to mercury were less fertile than unexposed controls. The fecundability (probability of conception each menstrual cycle) of women who prepared 30 or more amalgams per week and who had five or more poor mercury hygiene factors was only 63% of that for unexposed women (95% CI 42%-96%) after controlling for covariates. Women with low exposure were more fertile, however, than unexposed controls. Possible explanations for the U shaped dose response and limitations of the exposure measure are discussed. Further investigation is needed that uses biological measures of mercury exposure.

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Dutczak, WJ; Ballatori, N.
Transport of the Glutathione-Methylmercury Complex Across Liver Canalicular Membranes on Reduced Glutathione Carriers.


**ABSTRACT:** Methylmercury transport across liver canalicular membranes into bile, a major route of excretion of this toxic compound, is dependent upon intracellular GSH, and a glutathione-methylmercury complex (CH3Hg.SG) has been detected in liver tissue and bile. To examine whether the CH3Hg.SG complex is itself transported across the canalicular membrane and to identify the transport system involved, studies were performed in isolated rat liver canalicular p/asma membrane vesicles.
Uptake of CH3(203)Hg.SG (10 microM) into an osmotically active space was temperature-sensitive and unaffected by either ATP (5 mM) or an inwardly directed Na+ gradient (100 mM); however, CH3Hg.SG uptake was enhanced by a valinomycin-induced K+ diffusion potential (inside-positive) indicating that its transport was electrogenic. Transport of CH3Hg.SG exhibited saturation kinetics with both high affinity (Km = 124 +/- 2 mM, Vmax = 0.23 +/- 0.02 nmol.mg-1.20 s-1) and low affinity (Km = 1.47 +/- 0.22 mM, Vmax = 1.23 +/- 0.14 nmol.mg-1.20 s-1) components.

Uptake of this complex was inhibited by GSH, the GSH analog ophthalmic acid, S-methyl, S-ethyl, S-butyl, S-octyl, and S-dinitrophenyl glutathione, but not by GSSG, bile acids, amino acids, and P-glycoprotein inhibitors. Furthermore, GSH competitively inhibited (Ki = 83 microM) and trans-stimulated CH3Hg.SG uptake into the canalicular vesicles.

These studies provide the first kinetic characterization of a transport system for glutathione-mercaptides and indicate that CH3Hg.SG is not a substrate for the ATP-dependent, canalicular GSSG or glutathione S-conjugate carriers, but appears to be a substrate for canalicular carriers that also transport GSH. Because efflux systems for GSH are found in all mammalian cells, transport of glutathione-metal complexes by such carriers may be a common mechanism for the removal of methylmercury and possibly other metals from cells.

BIO-PROBE NOTE: It has been well established that the intestinal route is a major, if not the major, pathway for elimination of inorganic mercury in humans, as well as for methylmercury (WHO. Environmental Health Criteria 118: Inorganic Mercury, page 18, Geneva, 1991). The urinary route of elimination of inorganic mercury predominates primarily with acute exposure.

As glutathione is a naturally occurring body substance, this study represents documentation of the benefit of a non-chemotherapeutic agent for the chelation of mercury and its removal from the body.

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FORUM
IAOMT 10TH ANNIVERSARY MEETING
Host/Meeting reservations: David C. Kennedy, D.D.S. 2425 3rd Avenue. San Diego, CA. 92101.

Phone: (619) 231-1624.

Registration: IAOMT Members = $285.00; Non-Members = $395.00 [IAOMT membership = $200.00 initial, $175.00 renewal.] Tenth Anniversary Banquet Dinner - Saturday, 24 September - $50.00 per person (RSVP).

Hotel: Doubletree Horton Plaza, 910 Broadway Circle, San Diego, CA, 92101; Phone (800) 222-TREE or (619) 239-2200 or FAX (619) 239-0509 for room reservations. Rate = $99.00/night (single or double). Airport shuttle = $4.00. Cab fare approx. $8-10 U.S.

Program: Friday and Saturday, 23-24 September, 8:15 am - 6:00 pm.
- H.V. Apooshian, Ph.D. (Professor of Molecular and Cell Biology, U of Arizona): Chelating Agents: Part I.
- Peter Duesberg, Ph.D. (Professor of Molecular and Cell Biology, UC Berkeley): The Drug-AIDS Connection.
- Gaston Naessens, Biologist Diplome de L' Union Scientifique National Francaise/Dr. Jacinte Levesque: Somatidian Orthobiology.


17th National Dental Seminar in Homeopathy
October 14-16, 1994. Oakbrook Hills, Illinois. Basic and advanced programs. For information please write: National Dental Seminar, P.O. Box 123, Marengo, IL 60152.