COLORADO LEGISLATURE INTERVENCES ON DENTAL AMALGAM!

Dental Boards in several states have actively sought to discipline mercury-free dentists, not the least of which is Colorado, where the license of Dr. Hal Huggins was suspended in 1996. The Administrative Law Judge (ALJ) in the Huggins case even stated that patients do not have the right to request removal of mercury amalgam fillings. The outrage of the Huggins case stirred considerable citizen activity in Colorado, where legislative action finally resulted.

Although a number of people in Colorado, and elsewhere, were instrumental in the victory, the ultimate hero was Representative Mark Paschall of the Colorado Legislature. Representative Paschall initiated the legislation and, along with Co-Sponsor Senator Richard Mutzebaugh, steered it through to the Governor's signature. This landmark legislation represents the first outright legislative action specifically directed to protect the interests of patients and mercury-free dentists regarding dental amalgam, and it creates a truly level playing field in Colorado.

HOUSE BILL 97-1187.

BY REPRESENTATIVES Paschall, Tupa, Mace, and Pfiffner; also SENATORS Mutzebaugh, Hernandez, Congrove, and Duke.

Concerning the ability of dentists to use mercury amalgam as a dental restorative material.

SECTION 1. 12-35-118, (1.7)(a) “Nothing in this section shall be construed to deprive any dental patient of the right to choose or replace any professionally recognized restorative material, nor to permit disciplinary action against a dentist solely for removing or placing any professionally recognized restorative material.”

In addition, the word “legitimate” was stricken from (ff) of the section “Practicing outside the scope of legitimate dental or dental hygiene practice.”

It might be hoped that this dramatic legislation will serve as impetus for similar legislation in other states. At the least, it should send a strong message to State Dental Boards that they cannot discriminate against mercury-free dentists with impunity. It is time that patients and mercury-free dentists were afforded their due rights. Representative Paschall is to be highly commended. We recommend that everyone do so by writing him at: Representative Mark Paschall, 7903 W. 62nd Way, Arvada, Colorado 80004.

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CALL FOR PARLIAMENTARY INVESTIGATION OF HEALTH CANADA ON AMALGAM!

In the previous issue [13(2):1-2, Mar 1997], the Bio-Probe Newsletter reported on the public ex-
pose’ of the cover up on dental amalgam in Canada and of a possible class action suit against Health Canada and the Canadian Dental Association. Now, a call for a Parliamentary Investigation of the actions of Health Canada on amalgam has been issued.

The call is being issued by a coalition of fourteen professional and public organizations, representing hundreds of thousands of Canadians. The group is called “Coalition of Canadians for Accountable Government” and the organizations are: The Alliance For Public Accountability, My Health My Rights, Environmental Health Group, Freedom For Choice in Health Care, Pollution Probe, DAMS, Quebec Holistic Dental Association, Consumer Health Organization of Canada, Health Action Network Society, Canadians For Mercury Relief, International Academy of Oral Medicine and Toxicology, Canadians For Mercury Free Dentistry, Canadian Haemophilia Society and the Canadian Health Coalition.

The call for investigation includes the dental amalgam cover up, along with several other prominent issues such as the Health Canada tainted blood scandal and their policies on nutritional supplements and prescription drugs. The dental amalgam challenge is based upon the recent public admission by Health Canada that their four internal risk assessment reports on amalgam since 1976 all challenged the safety of amalgam but, at the urging of the Canadian Dental Association to protect amalgam manufacturers, Health Canada chose to exempt dental filling materials from the Medical Devices Act of Canada, rather than strictly regulate their use.

The Coalition is also calling for a moratorium on the use of amalgam in Canada. Press releases have been issued and Coalition organizations are calling upon their members, and all Canadian citizens, to petition their Members of Parliament. In view of the impending national election in Canada, on 2 June 1997, some political parties are considering the subject as a possible campaign issue. Anyone interested in supporting this effort may do so by contacting: Wayne Obie, 36 Toronto Street, #850, Toronto, Ontario, M5C 2C5, Canada; T: (416) 410-6314, F: (905) 876-4203.

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ARE YOU ALLERGIC TO ARSENIC?
You are ill. You go to your physician, who finds that you have been continuously exposed to low levels of arsenic for many years and that your symptoms can be attributed to arsenic poisoning. Your physician, however, declares that it cannot be arsenic poisoning because you are not allergic (hypersensitive) to arsenic!

What are the chances of that scenario happening? If any physician, let alone the medical profession in general, were to take that position an uproar of monumental proportions would occur. Yet, that is exactly what has been happening in addressing the continuous mercury exposure from amalgam dental fillings.

Mercury, lead and arsenic are generally considered to be the most toxic of the commonly encountered non-radioactive elements. In point of fact, it has been scientifically established that mercury is far more neurotoxic than are lead or arsenic [Sharma, RP; Obersteiner, EJ. Metals and Neurotoxic Effects: Cytotoxicity of Selected Metallic Compounds on Chick Ganglia Cultures, J Comp Path, 91:235-44, 1981]. A common, continuous public exposure to arsenic would be deemed unacceptable. A concerted national effort to eliminate public exposure to lead has been in place for many years. Continuous exposure to neither arsenic nor lead is considered to be acceptable in the absence of demonstration of allergy to them.

Dorland’s Medical Dictionary defines “hypersensitivity” as: “A state of altered reactivity in which the body reacts with an exaggerated immune response to a foreign agent.” Poisons, or toxins, on the other hand can effect all body structures, not just the immune system. Although mercury does have a profound adverse effect on the immune system, it is considered to be a poison, not solely an allergen. The attempts of the dental profession to limit consideration of amalgam mercury exposure to immune system effects constitutes nothing more than a diversion to hide behind a facade.

The consideration of potential harmful effects of mercury exposure should be addressed in the same context as are arsenic and lead, all of which are poisons of a similar nature. Again unlike consideration of arsenic and lead, attempts are made to minimize amalgam mercury exposure by relating the exposure to “named” disease syndromes such as Multiple Sclerosis, Alzheimer’s Disease, Lupus Erythematosus and others. As the causes of these diseases are unknown and since they mimic the pathologic pattern of mercury exposure, investigation of these conditions in relation to mercury is warranted, and must be continued. However, lack of final confirmed determinations should not be allowed to detract from the proper consideration of mercury exposure.

Exposure to arsenic, in sufficient quantities, causes arsenic poisoning! Exposure to lead, in sufficient quantities, causes lead poisoning! Exposure to mercury, in sufficient quantities, causes mercury poisoning! The question is, therefore, what are the quantities of mercury exposure sufficient to cause adverse effects in the general population?

Evaluation of exposure levels in otherwise healthy adult workers, exposed only 40 hours per week, is not sufficient or correct! No competent toxicologist or risk assessment scientist will accept
“Workroom Standards”, such as the US OSHA Standard, as direct interpretation to the general population - which includes children, the elderly, pregnant females, and other specifically susceptible groups.

Governments have established specific standards for general population exposure to mercury vapor. These have been determined by qualified scientists conducting risk assessment evaluations. In the United States, the Public Health Service (USPHS) has established general population “Minimal Risk Level” (MRL) standards of 0.014 micrograms of mercury per cubic meter of air for chronic exposure to mercury vapor and 0.02 micrograms of mercury per cubic meter of air for acute exposure [USPHS, ATSDR. Toxicological Profile For Mercury: Update, TP-93/10, May 1994]. The USPHS stated that patient exposure to mercury vapor from dental amalgam exceeds both of these standards (page 125). Since 1976, Health Canada has commissioned four risk assessment studies of amalgam mercury by their own independent scientists; all four recommended strict regulation of dental amalgam. The fourth study, by Dr. G. Mark Richardson in 1995, recommended a “Tolerable Daily Intake” (TDI) of 0.014 micrograms of mercury per kilogram of body weight per day, and determined that many Canadians exceed that level.

In summary, mercury is a poison like arsenic or lead. Valid, government sponsored risk assessment studies and established standards for the general population have determined that exposure to amalgam mercury presents a potential health risk to patients. The consideration of public exposure to mercury should be addressed in the same manner as are arsenic and lead. To do otherwise, is patently wrong and indefensible!

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AMALGAM MERCURY IN MOTHERS’ MILK - RISK TO INFANTS!

A newly published study has firmly established the presence of mercury from dental amalgam in the milk of nursing females! [Vimy, MJ; et al, 1997] Since this is a matter of the utmost importance, Bio- Probe has reviewed the existing literature on the subject, with the pertinent studies abstracted below in the Science section.

Several studies have already established the transfer of dental amalgam mercury into the tissues of unborn babies, in both animals and humans. [Vimy, MJ; 1990; Drasch, G; et al, 1994] The study on humans by Drasch and associates concluded: “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. The unrestricted application of amalgam for dental restorations in women before and during the child bearing age should be reconsidered.” The publication of these studies has already resulted in the issuing of government advisories against the use of mercury amalgam dental fillings in pregnant females (Germany, Sweden and Canada). In Germany, public opinion is encouraging a ban on the use of dental amalgam in all fertile women. The current research on amalgam mercury in breast milk adds further evidence to the wisdom of such an action.

The ability of metal ions to concentrate in mothers’ milk has been scientifically established for years, as has the ability for methyl mercury to transfer to breast milk and cause neurologic damage to infants. [Amin-Zaki, L; et al, 1981] The investigation of the possible transfer of mercury specifically from amalgam dental fillings to mothers’ milk began in 1990. A study by Vimy and associates implanted amalgam fillings, seeded with radioactively labeled mercury, into pregnant ewes. [Vimy, MJ; et al, 1990] Since radioactively labeled mercury does not occur naturally, it was possible to detect mercury in tissues that was specifically derived from the amalgam dental fillings. The amalgam mercury was found to quickly accumulate in tissues of mothers and fetuses. In the lactating ewes, the levels of labeled mercury in milk were as much as six times higher than the levels of labeled mercury in their blood.

The current study [Vimy, MJ; et al, 1997] evaluated mercury related to amalgam dental fillings transferring to breast milk in both animals and humans. In the animal study, lactating ewes with amalgam fillings nursed foster lambs from ewes without amalgam fillings. The amalgam fillings contained a portion of radioactively labeled mercury, which was found in the tissues of the foster lambs. This confirmed the transfer of mercury from the amalgam fillings of the mothers, into the breast milk, then into the tissues of the foster lambs. The human study examined mercury levels in breast milk of 33 lactating women. The mercury levels correlated with the number of amalgam fillings or mercury vapor concentration levels in mouth air. The infant exposure levels were compared to the United States Public Health Service Minimal Risk Level (MRL) standard for adults, and caution was urged. The combination of prenatal mercury exposure and lactating exposure to maternal amalgam mercury was addressed. Other important factors addressed were mercury exposures related to the differences in body mass between infants and adults and the particular sensitivity of infants to heavy metal toxic effects. This latter concern has also been pointed out by other authors. [Schumann, 1990]

By 1995, the comparison of activity of different forms of mercury had been investigated. [Schumann, K, 1990; Yoshida, M; et al, 1994; Oskarsson, A; et al, 1995] It has been found that any
form of mercury can transfer to breast milk and, from there, into the tissues of infants, although the fat soluble forms of mercury (methyl mercury and mercury vapor) will concentrate more in brain tissue of infants. The Schumann study pointed out that milk increases the bioavailability of Hg++ as the ionic mercury is bound to a greater extent in the red blood cells of the suckling infants. In an evaluation of lactating human females, the study by Oskarsson and associates found that dental amalgam mercury transferred to mothers’ milk, but that methyl mercury from consumption of fish correlated to mercury levels in blood but not to levels in milk. In the portion of the study on rats and mice, the mercury was found to cause pathologic effects in the offspring, including alteration of the thymocytes, increased lymphocyte activities, and effects on noradrenaline and nerve growth factor in the developing brains. These effects occurred in the animals exposed to methyl mercury.

It has been well established scientifically that mercury vapor, being lipid soluble, functions very similar to methyl mercury pathologically. There have been other studies confirming the harmful effect of mercury vapor on unborn babies and developing infants. [Danielsson, BR; et al, 1993; Warfinge, K; et al, 1994; Fredriksson, A; et al, 1996] It should be emphasized that the studies cited herein clearly show that mercury damage to unborn babies and infants is not readily observable early on. The neurologic damage is developmental in nature, primarily effecting learning, behavior and neurologic function. These effects can dramatically alter the functioning of the individual throughout life. Early exposure to inorganic or organic mercury can even result in mental retardation. [Schumann, K, 1990]

In a subsequent study, Oskarsson and colleagues confirmed the accumulation of dental amalgam mercury in mothers’ milk. [Oskarsson, A; et al, 1996] This study found that amalgam mercury dental fillings were the main source of mercury in the milk of lactating humans, related the exposure to the World Health Organization standard for daily intake for adults, and concluded it to be significant enough to be a risk to infants.

At this point, the scientific evidence clearly establishes that mercury transfers from amalgam dental fillings to the tissues of unborn babies and to mothers’ milk, from the milk to body tissues of infants, and, according to existing standards, presents a health risk to the infants. The combination of prenatal exposure and neonatal exposure from nursing presents an undeniable concern. Oskarsson and associates [1996] stated: “We concluded that efforts should be made to decrease mercury burden in fertile women.” Since amalgam dental fillings have now been identified as a significant, if not the major, contributor of mercury in mothers’ milk, the formal regulatory limitation of amalgam fillings in fertile women is clearly indicated! Bio-Probe now calls upon all responsible public officials to immediately initiate action to protect unborn babies and infants from the scientifically proven health risk of mercury exposure from the amalgam fillings of their mothers. The use of mercury amalgam fillings in all fertile women should be banned forthwith!

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SCIENCE


Vimy, MJ; Hooper, DE; King, WW; Lorscheider, FL.


ABSTRACT: Neonatal uptake of Hg from milk was examined in a pregnant sheep model, where radioactive mercury (Hg203)/silver tooth fillings (amalgam) were newly placed. A crossover experimental design was used in which lactating ewes nursed foster lambs. In a parallel study, the relationship between dental history and breast milk concentration of Hg was also examined.

Results from the animal studies showed that, during pregnancy, a primary fetal site of amalgam Hg concentration is the liver, and, after delivery, the neonatal lamb kidney receives additional amalgam Hg from mother’s milk. In lactating women with aged amalgam fillings, increased Hg excretion in breast milk and urine correlated with the number of fillings or Hg vapor concentration levels in mouth air.

It was concluded that Hg originating from maternal amalgam tooth fillings transfers across the placenta to the fetus, across the mammary gland into milk ingested by the newborn, and ultimately into neonatal body tissues. Comparisons are made to the U.S. minimal risk level recently established for adult Hg exposure. These findings suggest that placement and removal of “silver” tooth fillings in pregnant and lactating humans will subject the fetus and neonate to unnecessary risk of Hg exposure.

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Total and Inorganic Mercury in Breast Milk in Relation to Fish Consumption and Amalgam in Lactating Women.

Oskarsson, A; Schütz, A; Skerfving, S; Hallén, IP; Ohlin, B; Lagerkvist, BJ.


ABSTRACT: Total mercury concentrations (mean ± standard deviation) in breast milk, blood, and hair samples collected 6 wk after delivery from 30 women who lived in the north of Sweden were 0.6 ± 0.4 ng/g (3.0 ± 2.0 nmol/kg), 2.3 ± 1.0 ng/g (11.5 ± 5.0 nmol/kg), and 0.28 ± 0.16 microg/g (1.40 ± 0.80 micromol/kg) respectively. In milk, an average of 51% of total mercury was in the form of
inorganic mercury, whereas in blood an average of only 26% was present in the inorganic form.

Total and inorganic mercury levels in blood \( (r = 0.55, p = 0.003; \text{ and } r = 0.46, p = 0.016; \text{ respectively}) \) and milk \( (r = 0.55, p = 0.01; \text{ and } r = 0.45, p = 0.018; \text{ respectively}) \) were correlated with the number of amalgam fillings. The concentrations of total mercury and organic mercury (calculated by subtraction of inorganic mercury from total Mercury) in blood \( (r = 0.59, p = 0.006, \text{ and } r = 0.56, p = 0.001; \text{ respectively}) \) and total mercury in hair \( (r = 0.52, p = 0.006) \) were correlated with the estimated recent exposure to methyl mercury via intake of fish.

There was no significant correlation between the milk levels of mercury in any chemical form and the estimated methyl mercury intake. A significant correlation was found between levels of total mercury in blood and in milk \( (r = 0.66, p = 0.001) \), with milk levels being an average of 27% of the blood levels. There was an association between inorganic mercury in blood and milk \( (r = 0.96, p = 0.001) \); the average level of inorganic mercury in milk was 55% of the level of inorganic mercury in blood. No significant correlations were found between the levels of any form of mercury in milk and the levels of organic mercury in blood.

The results indicated that there was an efficient transfer of inorganic mercury from blood to milk and that, in this population, mercury from amalgam fillings was the main source of mercury in milk. Exposure of the infant to mercury from breast milk was calculated to range up to 0.3 microg/kg x d, of which approximately one-half was inorganic mercury. This exposure, however, corresponds to approximately one-half the tolerable daily intake for adults recommended by the World Health Organization. We concluded that efforts should be made to decrease mercury burden in fertile women.

**Maternal-Fetal Distribution of Mercury (203Hg)**

Released From Dental Amalgam Fillings.

Vimy, MJ; Takahashi, Y; Lorscheider, FL.


**ABSTRACT:** In humans, the continuous release of Hg vapor from dental amalgam tooth restorations is markedly increased for prolonged periods after chewing. The present study establishes a time-course distribution for amalgam Hg in body tissues of adult and fetal sheep.

Under general anesthesia, five pregnant ewes had twelve occlusal amalgam fillings containing radioactive \(^{205}\text{Hg}\) placed in teeth at 112 days gestation. Blood, amniotic fluid, feces, and urine specimens were collected at 1- to 3-day intervals for 16 days. From days 16-140 after amalgam placement (16-41 days for fetal lambs), tissue specimens were analyzed for radioactivity, and total Hg concentrations were calculated.

Results demonstrate that Hg from dental amalgam will appear in maternal and fetal blood and amniotic fluid within 2 days after placement of amalgam tooth restorations. Excretion of some of this Hg will also commence within 2 days. All tissues examined displayed Hg accumulation. Highest concentrations of Hg from amalgam in the adult occurred in kidney and liver, whereas in the fetus the highest amalgam Hg concentrations appeared in liver and pituitary gland. The placenta progressively concentrated Hg as gestation advanced to term, and milk concentration of amalgam Hg postpartum provides a potential source of Hg exposure to newborn.

It is concluded that accumulation of amalgam Hg progresses in maternal and fetal tissues to a steady state with advancing gestation and is maintained.
Dental amalgam usage as a tooth restorative material in pregnant women and children should be reconsidered.

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Mercury Burden of Human Fetal and Infant Tissues.

ABSTRACT: The total mercury concentrations in the liver (Hg-L), the kidney cortex (Hg-K) and the cerebral cortex (Hg-C) of 108 children aged 1 day to 5 years, and the Hg-K and Hg-L of 46 fetuses were determined. As far as possible, the mothers were interviewed and their dental status was recorded. The results were compared to mercury concentrations in the tissues of adults from the same geographical area.

The Hg-K (n=38) and Hg-L (n=40) of fetuses and Hg-K (n=35) of older infants (1-50 weeks of life) correlated significantly with the number of dental amalgam fillings of the mother. The toxicological relevance of the unexpected high Hg-K of older infants from mothers with higher numbers of dental amalgam fillings is discussed.

CONCLUSION: 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. The unrestricted application of amalgam for dental restorations in women before and during the child bearing age should be reconsidered.

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Methyl mercury Poisoning in the Iraqi Suckling Infant: A Longitudinal Study Over Five Years.
Amin-Zaki, L; Majeed, MA; Greenwood, MR; Elhassani, SB; Clarkson, TW; Doherty, RA.

ABSTRACT: In a five year longitudinal study of mothers and infants exposed to methyl mercury during the Iraq epidemic of 1972, the frequencies of signs and symptoms exhibited by the mothers were typical of methyl mercury poisoning. When blood concentrations of mercury are corrected to 1 March 1972, mothers with the most severe signs and symptoms had an average blood mercury concentration significantly higher (p less than 0.01) than either the milder or asymptomatic groups.

Analytical data indicate that the predominant route of exposure for the infant was through breast milk in which approximately 60% of total mercury was determined, by cold vapor atomic absorption, to be organic mercury. Abnormal neurological signs in these infants became more obvious with time: hyperreflexia was observed in 8 of 22 infants at first examination, and in 17 of 22 at second examination. Delayed motor development became evident at the second and third examinations. The frequency of pathological reflexes and delayed motor developmental milestones was so high as to be considered significant even the absence of a controlled study. There was no increase in mortality as compared to a control group.

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The Toxicological Estimation of the Heavy Metal Content (Cd, Hg, Pb) in Food for Infants and Small Children.
Schümann, K.

ABSTRACT: There are differences between young and adult organisms regarding toxokinetic aspects and clinical manifestations of heavy metal intoxications. Chronically, toxic Cd intake causes a microcytotic hypochromic anemia in young rats at lower exposure levels and after shorter exposure periods than in adult animals. Cd absorption is
increased by co-administration of milk and in con-
junction with iron deficiency. After long exposure
periods toxic Cd concentrations accumulate in the
kidney cortex; this process starts very early in life.
In 3 year old children Cd concentrations in the
kidney can reach up to one-third of those found in
adults.

Hg and methyl Hg can cause Hg encephalopa-
thia, and frequently cause mental retardation in
adults. Correspondingly, Hg accumulation in the
brains of suckling rats is approx. 10 times higher
than in grown animals. Milk increases the bioavail-
ability of Hg++. In suckling rats Hg is bound to a
greater extent to ligands in the erythrocytes. Methyl
Hg concentrations in breast milk reach 5% of those
in maternal plasma and that is a severe hazard for
breast-fed children of exposed mothers.

Toxic Pb concentrations can lead to Pb encephalopathy. A high percentage of surviving
children have seizures and show signs of mental
retardation. Anemia and reduced intelligence
scores were recently observed in children after ex-
posure to very low levels of Pb. Pb absorption is
increased in children and after co-administration of
Milk.

The average heavy metal uptake from such diets
[infant formulas or breast milk] exceeds the provi-
sional tolerable weekly intake levels set by the
WHO for adults, calculated on the basis of an aver-
age food intake and a down scaled body weight.
These considerations do not even provide for differ-
ces in absorption and distribution or for the in-
creased sensitivity of children to heavy metal
exposure. [Abstract truncated.]

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Behavioral Effects of Prenatal Metallic Mercury
Inhalation Exposure in Rats.

Danielsson, BR; Fredriksson, A; Dahlgren, L;
G’ardlund, AT; Olsson, L; Dencker, L; Archer, T.


**ABSTRACT:** The effects of administration by
inhalation of metallic mercury vapour (Hg) to
pregnant rats, approximately corresponding to
doses of 0.2 mg Hg/kg/day (high dose) or 0.07 mg
Hg/kg/day (low dose), on the developmental and
behavioral repertoire of the offspring were studied.
Exposure occurred during days 11-14 plus 17-20 of
gestation. The dose levels were selected so as not
to induce maternal toxicity.

Maturation variables such as surface righting,
negative geotaxis, pinna unfolding, and tooth erup-
tion revealed no difference between Hg-treated
offspring and controls. Tests of spontaneous motor
activity showed that the Hg-treated offspring were
hypoaactive at 3 months of age, but hyperactive at 14
months. In spatial learning tasks the prenatally ex-
posed offspring showed retarded acquisition in the
radial arm maze but no differences in circular swim
maze. A simple test of learning, habitation to a
novel environment (activity chambers), indicated a
reduced ability to adapt.

These data suggest that prenatal exposure to Hg
vapour results in similar behavior changes in the
offspring as reported for methyl mercury.

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The Effect on Pregnancy Outcome and Fetal Brain
Development of Prenatal Exposure to Mercury Vapour.

Warfinge, K; Berlin, M; Logdberg, B.


**ABSTRACT:** Fourteen pregnant female squirrel
monkeys were exposed to mercury vapour (Hg) 5
days/week from 5-7 weeks of gestation until deliv-
er in an exposure chamber. Hg exposure varied
from 1 mg/m³ for 22 hr/d (1 monkey), 7 hr/d or 4
hr/d to 0.5 mg/m³ for 7 hr/d or 4 hr/d. Hg concen-
tration in maternal blood ranged 0.05-0.09 mcg/g.

There was a dose related increase in abortion rate
and perinatal mortality in the exposed monkeys
compared to unexposed controls. The morphology
of perinatally sacrificed or succumbed offspring
brains showed signs of migration disturbances such
as increased cell density in the cerebral subcortical
white matter, abnormal cell collections near the
cerebral lateral ventricles. Autometallographically,
Hg was preferentially localized in the heterotopic
cells and in the ventricular aspects of the pseudos-
ratified neuroepithelium. Hg concentration in the
brain of exposed offspring ranged 0.01-0.70 mcg/g.

Autometallography of the maternal brains re-
vealed that the pyramidal neurons of neocortical
layer V contained more visualized Hg than the other
neurons. In the offspring brains, Hg was visualized
throughout the whole neocortex and no laminar
distribution pattern was found. In the fiber systems,
the offspring brains contained more Hg than the
adult brains. In the cerebellum, the Purkinje cells,
the Bergmann glial cells, the astrocytes of the
medullary layer and the deep cerebellar nuclei were
the main targets, for Hg accumulation in both ma-
ternal and offspring brains.

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Prenatal Coexposure to Metallic Mercury Vapour and
Methyl mercury Produce Interactive Behavioral
Changes in Adult Rats.

Fredriksson, A; Dencker, L; Archer, T; Danielsson,
BR.


**ABSTRACT:** Pregnant rats were 1) adminis-
tered methyl mercury (MeHg) by gavage, 2
mg/kg/day during days 6-9 of gestation, 2) exposed
by inhalation to metallic mercury (Hg) vapor (1.8
mg/m³ air for 1.5 h per day) during gestation days
14-19, 3) exposed to both MeHg by gavage and Hg
vapor by inhalation (MeHg +Hg), or 4) were given
combined vehicle administration for each of the two treatments (control). The inhalation regimen corresponded to an approximate dose of 0.1 mg Hg\textsuperscript{0}/kg/day.

Clinical observations and developmental markers up to weaning showed no differences between any of the groups. Testing of behavioral function was performed between 4 and 5 months of age and included spontaneous motor activity, spatial learning in a circular bath, and instrumental maze learning for food reward.

Offspring of dams exposed to Hg\textsuperscript{0} showed hyperactivity in the motor activity test chambers over all three parameters: locomotion, rearing and total activity; this effect was potentiated in the animals of the MeHg + Hg\textsuperscript{0} group. In the swim maze test, the MeHg + Hg\textsuperscript{0} and Hg\textsuperscript{0} groups evidenced longer latencies to reach a submerged platform, which they had learned to mount the day before, compared to either the control or MeHg group. In the modified, enclosed radial arm maze, both the MeHg +Hg\textsuperscript{0} and Hg\textsuperscript{0} groups showed more ambulations and rearings in the activity test prior to the learning test. During the learning trial, the same groups (i.e., MeHg +Hg\textsuperscript{0} and Hg\textsuperscript{0}) showed longer latencies and made more errors in acquiring all eight pellets.

Generally, the results indicate that prenatal exposure to Hg\textsuperscript{0} causes alterations to both spontaneous and learned behaviours, suggesting some deficit in adaptive functions. Consequences of MeHg, which by itself did not alter these functions at the dose given in this study, served to significantly aggravate the change.

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FORUM
IAOMT 1997 ANNUAL MEETING

SITE: Toronto, Ontario, Canada. [Proof of Citizenship might be needed for U.S. citizens. Best to bring passport or voter's registration card, or two IDs, one of which has photo, such as drivers license.]

HOTEL/ROOM RESERVATIONS: Sheraton Centre Toronto Hotel, 123 Queen Street West, Toronto, Ontario, M5H 2M9, Canada. T: (416) 361-1000, Extension 4440. F: (416) 947-4801. IAOMT Room Rate per night [Approximate U.S. value as of current exchange]: Single/double = $155 Canadian ($100 US); Club Room = $165 Canadian ($122 US). [Checks in U.S. funds or credit card payments are acceptable, with conversion rate at time of exchange.]

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http://bioprobe.com or email to bpinfo@bioprobe.com


PROGRAM:
- G. Mark Richardson, Ph.D.: "Chemical Exposures From Dental Materials: Occupational Versus Patient Risks."
- Murray J. Vimy, DMD: "Current Research on Dental Amalgam Biocompatibility."
- Vince Speckhart, MD: "The Clinical Evaluation of Dental Metals By Electroacupuncture Technology."

THE AMERICAN ACADEMY OF HEAD, NECK AND FACIAL PAIN

DATE: 14-16 August 1997.

SITE: Westin Copley Place, Boston, Massachusetts.

MEETING REGISTRATION: American Academy of Head, Neck & Facial Pain, 520 West Pipeline Road, Hurst, Texas 76053-4924.

PROGRAM: William R. Adams, DDS, MS; Jerry E. Bouquot, DDS, MSD; Sol G. Brotman, DDS; Don T. Brown, DDS, MS; Elmer Gaudet, Jr, DDS, MSD; Michael L. Gelb, DDS, MS; Michael McKinnney, PhD; Robert E. McMahon, DDS, MS; Nashir R. Mehta, BDS, DMD; Stephen Milam, DDS, PhD; Brock Rondeau, DDS; Alan T. Schifferman, CPA; Mohamed Sharawy, BDS, PhD; H. Clifton Simmons, III, DDS; Ross H. Tallents, DDS.

If you are a mercury-free dentist or are contemplating going mercury-free, you need to join the IAOMT. The IAOMT has helped fund or has been the catalyst for much of the current scientific research demonstrating that dental amalgam is not the benign dental material that 150 years of use and the ADA would like you to believe. Furthermore, the IAOMT is doing something about Standards of Care and Protocols that protect you, your staff and the patient.

For membership information contact Dr. Ronald M. Dressler, D.D.S. FIAOMT, 3071 Campbellton Rd. SW, Atlanta, GA 30311. (404) 349-2088 or FAX (404) 349-2090