MERCURY AND THE EPSTEIN-BARR VIRUS

The Epstein-Barr virus (EBV) causes infectious mononucleosis and has been linked to two forms of cancer, Burkitt’s lymphoma and nasopharyngeal carcinoma. More recently, it has been suspected as the causative agent in Chronic Fatigue Syndrome, a mysterious and rapidly proliferating disease state. The EBV has the specific characteristic of attacking and damaging the cells of the immune system.

Using the highly sophisticated micro-PIXE (particle induced X-ray emission) technique, which is capable of investigation directly within cells, a research team at Uppsala University in Sweden has been studying the EBV and the effect of intracellular mercury. Their initial findings were reported at a medical symposium in 1988. The abstract of that report follows.

ABNORMAL IMMUNE RESPONSE TO EPSTEIN-BARR VIRUS INFECTION AND EVIDENCE OF TOXIC EVENTS ON A CELLULAR LEVEL.

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Chronic illness in association with serological evidence of persistent active Epstein-Barr virus (EBV) has been observed by several investigators in recent years. The role of the virus as a causative agent has not yet been determined. We have investigated 27 patients with chronic malaise and 27 healthy controls. In addition to EBV serological testing we have analyzed individual blood cells for the content of heavy metals, using a nuclear micro-probe, in order to assess possible environmental exposure of importance to immune functions.

Methods: An EBV serology panel, using indirect immunofluorescence, was employed for concurrent measurements of all serum samples at a single laboratory. Red and white blood cells from venous blood samples were separated and prepared according to techniques described elsewhere. The measurements of elemental concentrations in 20 red and 20 white blood cells were performed in the Studsvik Nuclear
Micro-probe at the Studsvik Science Research Laboratory.

This method, particle induced X-ray emission for small targets (micro-PIXE) has been in routine use for research purposes since 1983.

Results: The investigated group of patients displayed a significant increase of EBV antibody titers as compared to controls. The discriminative power could be increased by using a scoring technique in each case. In the micro-PIXE determinations 80% of the patients had detectable amounts of mercury in one or more of the cells measured as compared to none in the control group. The detection limit was 0.5 ug/g dry substance.

Conclusion: Our serological results compare well to findings presented by other investigators in the field of chronic active EBV infections. In addition, an abnormal presence of mercury in blood cells was noted. Mercury, a heavy metal with known toxic properties in even minute quantities, has immuno-modulatory effects in mammals. Our finding of intracellular mercury in cases with apparent evidence of an immuno-regulatory dysfunction warrants further elucidation.

BIO-PROBE COMMENT: These dramatic findings should have a vital impact on the consideration of chronic exposure to low levels of mercury, as occurs in subjects with mercury/silver amalgam fillings. Further evidence of the findings of open-minded, competent researchers at reputable institutions can be found in another recently published study. The researchers are from the renowned Karolinska Institute in Stockholm, Sweden and the University of Southern California School of Dentistry.

MERCURY ACCUMULATION IN TISSUES FROM DENTAL STAFF AND CONTROLS IN RELATION TO EXPOSURE.

Nylander, M; Friberg, L; Eggleston, D; Bjorkman, L.


Samples, mainly from occipital cortex and pituitary gland, but also from renal cortex, olfactory bulbs, thyroid gland, and liver were collected from autopsies of 8 dental staff cases and 27 controls. These samples were analyzed for total mercury content using radiochemical neutron activation analyses.

The results revealed high mercury concentrations (median 815, range 135-4,040 mcg Hg/kg wet weight) in pituitaries from the dental staff cases compared to controls (N=23, median 23, range 6-1,170 mcg Hg/kg). In occipital cortex, the cases had a median of 17, range of 4-300 mcg Hg/kg and the controls (N=20) had a median of 10, range 2-29 mcg Hg/kg. A few samples from olfactory bulbs show low mercury concentrations for both cases and controls. Renal cortex was analyzed from three cases and contained clearly higher concentrations (945, 1,545, 2,110 mcg Hg/kg) compared to controls (N=12, median 180, range 21-810 mcg Hg/kg). There is no control material for the other analyzed samples, but one thyroid sample had an extremely high concentration of 28,000 mcg Hg/kg.

BIO-PROBE COMMENT: The technique and approach of this research team is worthy of note. Previously published research by this group established that neutron activation analysis (NAA) is more efficient than atomic absorption spectroscopy (AAS) for the detection of mercury. On split sample analysis, NAA detected 50% more mercury than did AAS analysis of the same sample.

The much higher levels of mercury found in the pituitary gland than were found in the occipital region of the brain is a most interesting finding. The pituitary gland consists of both glandular and nervous tissue and is not protected by the blood-brain barrier. It is the master gland controlling body functions. It is also interesting to note that the authors found some correlation between the mercury content in pituitary glands and the number of surfaces of amalgam fillings present in the controls.

The findings of these two research teams plus the findings of the research group in Calgary, Canada (previously reported in the Bio-Probe Newsletter) strongly indicate a variance with papers published in defense of mercury/silver amalgam dental fillings, which invariably base their conclusions on
measurements of mercury in the blood and/or urine. It has been well established in the scientific literature that measurements of mercury in the blood or urine are not valid indicators of the body burden or toxic effects of mercury.

Could it be that dentists, conducting evaluations alone, are not well enough informed on the metallurgical kinetics of dental amalgam as well as the physiologic kinetics and toxicology of mercury itself? Most dentists still believe that dental amalgam is a stable material when hardened. Who are we to believe? Let us next consider the research of a Ph. D. metal corrosion specialist. We must keep in mind that dental amalgam fillings are comprised of four or more metals mixed in random combinations (called "phases"), are constantly bathed in electrolyte solutions (saliva, plaque, etc), and are subjected to considerable extreme stresses.

CORROSION AND MERCURY RELEASE FROM DENTAL AMALGAM

Jaro Pleva, Ph. D.


Introduction: The common type of dental amalgam is an alloy containing typically in weight percent - mercury = 50, silver = 35, tin = 10, plus copper and possibly zinc. Reported types of amalgam degradation are crevice corrosion, selective corrosion, galvanic corrosion in contact with dissimilar alloys, and mechanical wear. Laboratory experiments described in the dental literature often neglect a number of important factors which will influence corrosion of fillings in the mouth. These are, for instance, wear, pressure fluctuations from biting contact, temperature increase, acidic and salt exposures, and galvanic contacts with dissimilar metals.

The aim of the present work was to investigate a number of amalgam fillings, which have served in the mouth for several years. Estimates of mercury amounts, corresponding to measured intensity of corrosion attack, are given. The amounts of mercury are compared to recommended limits for maximum daily exposure in food and in air.

Experimental method: Parts of 22 removed amalgam fillings from 15 persons were gathered and investigated. The donators were selected from a group of 250 persons, all of them having large amounts of amalgam. Basic information and health history were obtained by means of a questionnaire. The control group consisted of 10 persons age 30-60 years who never have had any amalgam restorations. No person in the control group had experienced more than three of the more than thirty symptoms specified on the health questionnaire. A statistical evaluation of the patient material will be the subject of a subsequent paper.

The removed amalgam fillings were examined for corrosion attacks by both optical microscope and Scanning Electron Microscope (SEM) type JEOL JSM 840, equipped with EDAX or LINK systems for Energy Dispersive X-ray Analysis (further EDX). Both morphology of attack and chemical composition of amalgam fillings at different levels were investigated.

Results: All obtained amalgam fillings showed blackening of crevice surfaces adjacent to tooth cavity and sometimes also of external surfaces. The grey-black surfaces were corroded by general attack and cracks were observed at some locations. The EDX-analysis of the corrosion products consistently showed decrease in contents of both mercury and silver, at some locations to zero contents. The types, degree, and depth of corrosion are described in detail. Corrosion potentials of amalgam fillings in patients with gold restorations also present were measured.

Discussion: The fate of absent mercury under various conditions and influences is described in great detail. These include loss of mercury from gamma-2 phase and non-gamma-2 amalgam, the evaporation of mercury from fillings, mercury segregation, and the influence of galvanic couplings.

Conclusions: On the basis of depth of corrosion, the typical estimated release from 1 square centimeter of amalgam surface is 10-20 micrograms of mercury per day. Contact to a gold restoration caused a release
of an additional 250 mcg per day. When chewing is considered, mercury release computed on the basis of Faraday's Law, from corrosion currents may reach several hundred micrograms per 1 cm² per day. Compared to known toxic values, mercury from dental amalgam fillings presents a substantial contribution to the body mercury load. Amalgam removal results in alleviation of symptoms known to occur upon chronic exposure to mercury.

BIO-PROBE COMMENT: These three studies demonstrate the type of research now being conducted in Sweden. It is obvious that research scientists in a number of disciplines have become involved in the investigation of the health effects of dental amalgam fillings. In previous years, the investigation and determination of use of dental amalgam has been left to the dental profession itself. This new involvement is reflected in the political events now occurring in Sweden. The pro-amalgam dental establishment steadfastly clings to their previous scientifically unsubstantial defense of amalgam while, increasingly, scientific effort and multi-disciplinary involvement underscores the need for a new look at continued use of the material. This diversity of position is highlighted by the following article, prepared for Bio-Probe by Mats Hanson, Ph.D.

HIDING FROM DAYLIGHT
Mats Hanson, Ph.D.

This spring the Swedish Research Council research information section (Chairman Bertil Fiskesjo from parliament) published a booklet on amalgam. The booklet as well as other issues of the series can be bought in several places, including pharmacies (which first refused to sell the amalgam issue but did so after considerable lobbying).

There will be study groups all over the country, using the amalgam issue and additional material, containing suggestion for topics to discuss, where to get more material (e.g. my phone number). Similar material has been produced for other issues in the series and is part of a system for public education.

Sam Ziff contacted the Research Council and asked for permission to have the booklet translated and published in the USA. The council was positive and I volunteered to translate it after having talked to Sam. A few days later I phoned the council and got the answer: Sorry, no! Some of the contributors absolutely refused to have their views translated into english and especially to have them published by Bio-Probe. What now can be done is to abstract the contents to bring the trolls out into the open. Daylight is said to kill trolls. Hopefully also publicity will. You will probably be able to guess which contributors did not want to have their views translated.

THE AMALGAM-CONFLICT. THE SCIENTIST'S DEBATE ON MERCURY IN DENTISTRY
Contents:
FACTS: Introduction and background - Inger Atterstam
DEBATE: Interviews:
"Take the risks seriously!" - Lars Friberg
"Important to stay rational" - P.O. Lundberg
"Amalgam harmless" - Ivar Mjör
"Dangerous to cause unfounded anxiety" - K. Sune Larsson
"Our biggest environmental scandal" - Mats Hanson, Fredrik Berglund
RESEARCH: Examples of current research:
Mercury accumulates in the brain - Magnus Nylander
Mercury is detected in blood - Ulf Lindh
Mercury affects the immune defence - Sverker Eneström

**Friberg:**

All measures which can reduce the total mercury load on the public are well motivated.

I trusted the dental experts who assured that mercury exposure from amalgam could be disregarded and that amalgam was a stable and safe material.

You can not disregard the well known and obvious risks with mercury vapor.. amalgam fillings constitute the largest source of inorganic mercury uptake into the brain.

The very low levels of mercury from amalgam makes it likely that relatively few persons should be affected. But since amalgam fillings are so common, also a small risk means that many persons are involved.

(blood and urine levels) will not reveal accumulation in the brain.

Regarding mercury, there are probably no safe doses, no lower limit when mercury becomes harmless.

I am convinced that mercury affects the immune system and can produce autoimmune reactions... meaning that also small doses of mercury, because of immune effects, might give considerable and varied symptoms.

We know that mercury vapor easily spreads to the fetus .. we also know that the fetal brain is extremely sensitive towards toxic substances all through pregnancy and also after birth.. suspicion is about subtle, small changes.. Minimal Brain Dysfunction (MBD) is a name which covers many of these problems.

In Poland, where the mercury hygiene in dentistry is much worse than in Sweden, 117 newborn children to female dental personnel were compared with 63 children from non-dentistry as controls. Among the 117 were 5 with the very unusual malformation spina bifida. None in the control group and it should occur in about 5 of 10,000 births.

**Lundberg** (chairman of the LEK-evaluation):

This new field gave me two new experiences. The first one was the difficult position the patients had.

The second important lesson was the lack of knowledge about low- dose effects of mercury, despite extensive mercury research all over the world and despite extensive use of amalgam for more than 100 years.

We established that amalgam is, from a toxicological point of view, an unsuitable dental filling material. This is for me self- evident. Nearly nobody denies today that amalgam fillings leak mercury, especially vapor, continuously and increasingly during chewing and at elevated temperature. Mercury is a very toxic substance.. I can not imagine that such a material can be considered toxicologically suitable.

small changes which might occur and detect individuals who are extremely sensitive to mercury.

It could be that symptoms occur because of unknown processes, mainly in the immune system. One theory is that certain viruses are activated by mercury (EBV)

The recommendation (to avoid amalgam work on pregnant women) should reduce anxiety since the pregnant women will not any more be exposed to this specific risk


None of those who have made their PhD on amalgam participates (in the booklet) and it seems much easier for those who are negative towards amalgam.
There is still no scientific evidence that amalgam fillings in the mouth is a major health problem. On the contrary, many research reports from cell culture studies to direct studies on teeth and pulp have shown that amalgam is a biologically well accepted material. Many years of very good clinical experience with amalgam support this conclusion and cannot be denied.

The international rules have not earlier required biological testing of the products and not any risk evaluation of possible health effects. That has been considered unnecessary since the risks are so small.

drugs are produced to have a biological on humans but dental filling materials are relatively stable substances, often without biological effects.

disinformation! (about toxicologically unsuitable filling material and advice during pregnancy)

Irresponsible researchers and media...Amalgam is basically a very good dental filling material.

**K. Sune Larsson** (prof of dental toxicology)

There is no basis for this recommendation (pregnancy). On the contrary, I searched all available literature about this subject and I found instead evidence that mercury is not accumulated in the fetal brain. It does pass the placenta but is trapped in the liver and reaches the brain in very small amounts.

(Comment: At the Research Council press conference Friberg appointed Sune Larsson the most courageous scientist in Sweden since he, based on one japanese study on 5 guinea pigs by Yoshida, could conclude that amalgam was no risk to pregnant women).

(The recommendation) causes unfounded anxiety among pregnant women, not least among dental personnel. In addition the Health Board and scientists jeopardize their credibility by unfounded statements of this type.

People with serious diseases, e.g. tumors, can have their diagnosis delayed since they believe that their symptoms are caused by dental fillings.

**Mats Hanson & Fredrik Berglund.** (Berglund has recently retired from KABI AB, a drug company where he was in charge of side effects. He also participated in the studies on methyl mercury in the 1960s). The title: Our biggest environmental scandal was my statement but F.B. has not objected. He said about his earlier activities in mercury research: How could I miss the mercury which is closest to us?

My own views are well known and I have no objection to having them translated to any language. Berglund is helping the patient organization very much and has many contacts with physicians and within research.

Research section:

**Magnus Nylander:** about mercury in the brain and kidneys.

**ulf Lindh:** About PIXE (Proton-induced x-ray emission) where amalgam patients (with symptoms) show considerable levels of mercury, increasing after amalgam removal without special protection and decreasing after the amalgam has been completely removed. Together with other researchers they also find a connection between elevated mercury levels and Epstein-Barr virus reactivation (Chronic fatigue syndrome).

**Sverker Eneström:**

Mercury is immunotoxic and gives immune complexes and autoimmune reactions. These occur at lower levels than those needed to produce toxic effects in the kidneys. Also mercury from implanted amalgam produces the same reactions in animals. Humans with scleroderma have the same type of antibodies as the
mercury-exposed animals. The response to mercury varies between animal strains and is also individual. Animals who remain healthy have a better capability to suppress the formation of antibodies than animals who develop symptoms.

BIO-PROBE COMMENT: From the above comments of Dr. Hanson, one can readily distinguish the establishment dentists from the other scientific authorities. Dr. Friberg, a Ph.D. toxicologist, is considered the world’s premier authority on mercury. Dr. Lundberg was considered of such prestige as to be named chairman of the government’s evaluation committee. Dr. Hanson, a Ph.D. research zoophysiologist, is renowned for his investigations on dental amalgam mercury. Dr. Berglund has extensive experience in mercury toxicology.

Dr. Mjor points out that none of the committee participants have a Ph.D. on amalgam. If such a Ph.D. program even existed in dental curricula, the studies would be limited to the physical properties of the material since dental materials departments do not involve themselves with toxicology. That is as it should be since it is becoming painfully obvious that very few in the dental profession have even a basic knowledge of mercury toxicology.

The field of dental materials has devoted its attention to factors of durability, hardness, and longevity. In this regard, dental amalgam fares very well, indeed. However, that is not the concern of the present controversy. Now that science has firmly established that patients with dental amalgam fillings are constantly exposed to mercury from these fillings, decisions on potential health effects should be left to the toxicologists and research scientists. Dentists are simply not trained or well informed in these areas.

An example of the widening schism between the opinions of dentists and scientists recently occurred in Alaska.

THE ALASKA DILEMMA

In the state of Alaska, and in several other states, public support groups are attempting to encourage legislation guaranteeing the dental patient’s “right to know” that the use of dental amalgam fillings results in chronic exposure to mercury. The movement’s intention is not to ban the use of amalgam, but rather to simply ensure that dental patients are informed of the current scientific information and given the right to make an informed judgement for themselves.

In Alaska, the legislation was already drafted when, in February of 1990, all mention of mercury and dental amalgam was removed from the proposed legislation. It seems that the influence of organized dentistry was brought to bear. Since events now occurring in Sweden are having a dramatic effect on the dental amalgam controversy, the following FAX letter from the Chief Dental Officer of Sweden’s Socialstyrelsen (The National Board of Health and Welfare), in response to a telephone inquiry from Dr. Joseph Cumming of the Alaska Dental Society, was provided to the members of the Alaska legislative committee:

"On account of your telephone inquiry I like to inform you that there is no proposal whatsoever to forbid the use of amalgam in Sweden as from the current year."

The letter is signed by Hans Sundberg, The Chief Dental Officer of the Socialstyrelsen and dated 24 January 1990. This short and careful statement, while true at the time of writing, is very misleading.

Firstly, Sweden’s Socialstyrelsen is comparable to our National Institute of Dental Research, the dental branch of The National Institutes of Health. The agency has no power whatsoever to regulate the use of dental materials. It is an advisory agency.

Secondly, the Swedish agency that has the power to ban mercury products (including dental amalgam) had already publicly declared its intention to do so but had given no specific date, estimating its accomplishment by 1992. In this regard, the following letter, in reply to a query from a concerned physician, was sent to Alaska by Sweden’s National Chemicals Inspectorate (Kemi):
"Re: Mercury in dental amalgam. On behalf of Dr. Kerstin Niblaeus, Director General of the Swedish National Chemicals Inspectorate (Kemi), I am pleased to inform you as follows:

Kemi has proposed to the Swedish Government that certain chemicals should be phased out, due to their adverse effects on health and environment. Mercury and mercury compounds were enclosed in that proposal. The Government has commissioned Kemi, together with the Swedish Environment Protection Board to develop a proposal for limiting the use of particularly hazardous compounds. We are at present working on such proposals for among others, mercury and mercury compounds and hope to present a report to the Government before 1st July 1990. As amalgam is a mercury compound we will certainly consider it in our proposal.

I hope this information can be of value to you"

The letter was signed by Bo Wahlstrom, Director of Kiml, and dated 1 March 1990.

Once again, we see the dental profession being maneuvered by a few individuals into an extremely dangerous position, directly contrary to the scientific community.

This hazardous course of action chosen by organized dentistry could have disastrous consequences, a possibility that may already be foreseen. In 1989, the Alaska Dental Society paid for an advertisement in some Alaska newspapers claiming that dental amalgam fillings had been proven to be safe and all claims to the contrary had been found to be baseless. Dangerous statements that were not true at the time of publication nor could they be supported then or now by any valid scientific research.

This year, the Alaska Dental Society took a step that is unprecedented in dental history. Renewal of membership in the ADS (as well as the American Dental Association) would be contingent on members signing a pledge not to sue the ADS, ADA, or the local District Dental Society. Could it be that the leaders of the ADS are finally seeing the handwriting on the wall???

FORUM

The IAOMT will be having their next Board Meeting in Montreal, Canada on Saturday & Sunday, May 19 & 20, 1990. For those planning on attending, it is recommended that you stay at the Queen Elizabeth Hotel. The rates are $95.00 per night Canadian. If calling from the U.S. 1-800-828-7447; calling from Ontario use 800-268-9420; and for the balance of Canada use 800-268-9411. If you desire further information, please contact Barry Faguy, D.D.S., at 514-697-9006.

The Annual Scientific Meeting of the International Academy of Oral Medicine and Toxicology will be held September 14 & 15, 1990 at the Terrace Garden Inn, 3405 Lenox Road N.E., Atlanta, GA 30326. Rates are $80.00 single and $90.00 double. For room reservations call 1-800-241-8260, or 404-261-9250. Dr. Olympia Pinto, Dr. Murray J. Vimy, Dr. Michael F. Ziff and Dr. Jess Clifford will be among the exciting slate of speakers being arranged and confirmed.

In the September 1989 issue of Bio-Probe we wrote about the mercury detoxification results being achieved clinically in Germany by Dr. Daunender using DMPS. Those health practitioners desiring more information about DMPS can contact Robert Martin at 1-800-237-6793. That is the U.S. office of the Hyletex Corporation, representing the parent company in Europe, producers of DMPS.