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ADVERSE IMMUNE EFFECTS OF DENTAL AMALGAM - NEW EVIDENCE!

The following abstract is from a study published in the November 1994 issue of the FASEB Journal (Vol. 8, Pgs. 1183-1190). The study was conducted at three medical research centers, two in Sweden and one in the United States (The Scripps Research Institute, La Jolla, California), and demonstrated that both mercury and silver from dental amalgam adversely effects the immune system in genetically susceptible animals.

Hultman, P; Johansson, U; Turley, SJ; Lindh, U; Enestrom, S; Pollard, KM.

Adverse Immunological Effects and Autoimmunity Induced by Dental Amalgam and Alloy in Mice.

FASEB J. (1994): 8, 1183-1190.

ABSTRACT: Dental amalgam fillings are the most important source of mercury exposure in the general population, but their potential to cause systemic health consequences is disputed. In this study, inbred mice genetically susceptible to mercury-induced immune aberrations were used to examine whether dental amalgam may interfere with the immune system and cause autoimmunity.

Female SJL/N mice were implanted in the peritoneal cavity with 8-100 mg silver amalgam or silver alloy for 10 weeks or 6 months. Chronic hyperimmunoglobulinemia, serum IgG autoantibodies targeting the nucleolar protein fibrillarin, and systemic immune-complex deposits developed in a time- and dose-dependent manner after implantation of amalgam or alloy. Splenocytes from mice implanted with amalgam or alloy showed an increased expression of class II molecules. The functional capacity of splenic T and B cells was affected in a dose-dependent way: 10 weeks of low-dose and 6 months of high-dose amalgam implantation strongly increased mitogen-induced T and B cell proliferation, whereas 10 weeks of high-dose implantation decreased the proliferation.

Not only mercury but also silver accumulated in the spleen and kidneys after amalgam implantation. In conclusion, dental amalgam implantation in a physiological body milieu causes chronic stimulation of the immune system with induction of systemic autoimmunity in genetically sensitive mice. Implantation of silver alloy not containing mercury also induced autoimmunity, suggesting that other elements, especially silver, have the potential to induce autoimmunity in genetically susceptible vertebrates.

Accumulation of heavy metals, from dental amalgam and other sources, may lower the threshold of an individual metal to elicit immunological aberrations. We hypothesize that under appropriate conditions of genetic susceptibility and adequate body burden, heavy metal exposure from dental amalgam may contribute to immunological aberrations, which could lead to overt autoimmunity.

Table of Contents

MORE NEW EVIDENCE OF POTENTIAL HARM FROM DENTAL AMALGAM MERCURY

The Twelfth International Neurotoxicology Conference was held on 30 October-2 November, 1994 in Hot Springs, Arkansas. The Conference Theme was "Neurotoxicity of Mercury: Indicators and Effects of Low-Level Exposure." Although the conference focused on exposure to methylmercury from fish consumption, several presentations addressed dental amalgam mercury exposure. Most dramatic, new data from the laboratories of the University of Calgary and the University of Kentucky was presented by Fritz L. Lorscheider, Ph. D. These new findings add further information to those previously reported regarding the potential for mercury, especially mercury vapor, to cause neurologic damage as is found in Alzheimer's Disease.

The conference was well attended by international authorities on mercury, as well as numerous governmental regulatory officials from the United States and Canada. Considerable attention was directed to the issue of dental mercury, related to both patient exposure and contribution to environmental mercury contamination. The controversy over the use of mercury in dentistry has definitely become a topic of great interest in the government agencies of both the United States and Canada.

Several representatives of the Scientific Division of the American Dental Association were in attendance, as was Michael F. Ziff, D.D.S., Executive Director of the International Academy of Oral Medicine and Toxicology (IAOMT). Dr. Ziff presented a poster clinic on the annual contribution of dental mercury to the environment. The following abstracts, related to dental amalgam mercury, were extracted from the program provided by the conference organizers and are to be published in the journal "Neurotoxicology, 15(4), 1994.":

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Lorscheider, FL; Vimy, MJ; Pendergrass, JC; Haley, BE.

Toxicity of Ionic Mercury and Elemental Mercury Vapor on Brain Neuronal Protein Metabolism.

ABSTRACT: Numerous reports establish that amalgam mercury (Hg) vapor is continuously released from tooth fillings into mouth air, and for the general population this form of Hg exposure is greater than all other environmental sources combined. Uptake and accumulation of amalgam Hg occurs in various monkey and human tissues, including brain (Goering et al., Fundam Appl Toxicol., 19:319-329, 1992). Our laboratories now focus on the effects of inorganic Hg (both ionic and vapor forms) upon CNS neuron function.

Recent studies have demonstrated that Hg is selectively concentrated in human brain regions involved with memory function, and may be implicated in the etiology of Alzheimer's Disease (AD). Abnormal microtubule formation in AD brains has been associated with a defect in the tubulin polymerization cycle (Khatoon et al., Ann Neurol., 26:210-215, 1989) which may increase the density of neurofibrillary tangles. A similar tubulin defect can be induced in the brain of $HgCl_2$-treated rats, suggesting a connection between exposure to inorganic Hg and AD (literature reviewed in Goering et al., ibid). We have also demonstrated that $HgCl_2$ markedly inhibits in vivo ADP-ribosylation of rat tubulin and therefore alters a specific neurochemical reaction involved in maintaining brain neuron structure (Palkiewicz et al., Neurochem., 62:2049-2052, 1994).

In our present investigations 3 groups of rats were exposed to Hg vapor 4 h/day for 0, 2 or 14 consecutive days. Vapor concentration during exposure periods was maintained at 300 mcg Hg/m^3 air, a level detectable in mouths of some human subjects with large numbers of amalgam fillings. Cold vapor atomic fluorescence spectrometry (Winfield et al., Clin Chem., 40:206-210, 1994) revealed average brain Hg concentrations after 0, 2 and 14 days exposure to be 10, 108 and 396 ng/g tissue (wet wt.) respectively. Photoaffinity labelling of the beta-subunit of the tubulin dimer with [a32P]8N3GTP in brain homogenates was partially diminished after 2 days, and very markedly diminished after 14 days of Hg vapor exposure. Since the rate of tubulin polymerization is dependent upon binding of tubulin dimers to GTP, we conclude that low-level Hg vapor exposure inhibits the polymerization of tubulin essential for formation of microtubules.

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Lorscheider, FL.

Amalgam Mercury - Emerging Evidence Questions a Dental Paradigm.

ABSTRACT: The use of mercury (Hg) metal as a material component in dental tooth fillings began in the early 1800's, and since its introduction periodic concerns have arisen about the health safety risks to dentists and their patients. For over 160 years the opinion within dentistry has been that Hg remains "locked in" the alloy portion of the amalgam fillings, a belief not based upon experimental evidence. At the present time amalgam fillings contain approximately 50% Hg and are used for 80% or more of all tooth restorations.

Since 1980 several laboratories have demonstrated that dental amalgam continuously releases Hg vapor (Hg^0) into human mouth air. Intra-oral air concentra-