

Report on Mercury Toxicity from Dental Amalgams and Thimerosal Presented to Congressional Hearing 8 May 2003

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In developing an opinion on mercury toxicity from exposures to dental amalgam and thimerosal I have reviewed toxicologic data relevant to animal and human studies to environmental mercury, methylmercury, thimerosal and exposure to mercury from amalgam fillings. I have reviewed literature searches conducted on various computerized databases; evaluated published literature on primary studies as referenced in part herein. I have reviewed relevant unpublished reports, consulted review articles, where appropriate, and held working meetings with experts in the field. I have also conducted experiments in my laboratory at the University of Kentucky with regards to the enzyme and cellular toxicity of both dental amalgams and thimerosal, including vaccine with and without thimerosal added as a preservative. In addition, I have reviewed evaluations and conclusions of various governmental agencies, including the International Agency for Research on Cancer (IARC), the World Health Organization (WHO), the National Institute of Health (NIH), the United States Environmental Protection Agency (EPA), and other groups regarding this issue. I have come to the following conclusions.

1. Mercury is the most toxic, non-radioactive elements known to man. Virtually every industry has either reduced or banned the use of mercury with the exception of dentistry. Dental amalgam is approximately 50% mercury by weight. *Each* amalgam typically has between half of a gram to a gram of mercury. A typical person having between 5 and 15 amalgams, would have several grams of mercury implanted in his or her mouth. This amount is colossal using any standard. I am aware of no other situation today where grams of mercury are implanted in any human being. In fact, in the healthcare industry, mercury has been all but banned.

2. The concentration of thimerosal in vaccines that contain this agent as a preservative is approximately 125,000 nanomolar. In our studies pure thimerosal shows toxicity to neurons in culture at 10 to 20 nanomolar, a 12,500 to 6,250 dilution factor. Calculations, using a conservative approach, demonstrate that vaccinations of infants exposed them to concentrations of thimerosal that could biologically injure them, especially if they were exceptionally susceptible to mercury toxicity due to genetic predisposition, other concurrent toxic exposures

(e.g. to lead, elemental mercury, cadmium, etc.) further, our research has shown that thimerosal, which releases the toxic agent ethylmercury, inhibits the same brain enzymes as does Hg^{2+} . Therefore, multiple exposures from dental amalgams, food, and vaccines are all capable of adding to the toxic load of these infants.

3. Further, we need to emphasize that humans are not rats in a pristine cage, being fed chow that is tested to be free of other toxic agents. Humans are exposed to numerous toxic agents that may act in a synergistic fashion to enhance the toxicity of other toxicants. That is, and this is well established, low levels of lead will greatly enhance the toxicity of mercury. It is well known that levels of lead previously thought to be non-toxic are now associated with decreased mental abilities in children. Could it be that this lead is enhancing the toxicity of mercury exposures from dental amalgams and vaccines?

4. The position of organized dentistry, primarily the American Dental Association (ADA), that "no valid scientific evidence exists that dental amalgam poses any health risk-other than rare, localized allergic reactions," is, in my opinion, indefensible in the light of huge amounts of published science. The major basis I have heard for the ADA stand is the finding of "expert committees" within the dental branch of the FDA and WHO. I looked up the members of these committees and have serious concerns about who the ADA classifies as "expert" that served on these committees. In my opinion, there was a severe paucity of relevant research publications on mercury toxicity by members of these committees. The ADA stand is especially weak if one considers the recent National Academy of Sciences and EPA reports implying that 8 to 10% of American women of child bearing age have blood levels of mercury that put any child they give birth to at risk for having neurological problems. Also, a plethora of peer reviewed, published, scientific studies and articles completely refute the evaluation of the ADA regarding amalgam safety. Frankly, outside of the Journal of the American Dental Association or JADA, the ADA's trade journal, which is *not* a refereed scientific journal, but solely a *trade* journal, scientific consensus is completely contrary to the ADA's position (note that the ADA escapes adjudication by claiming to be a trade organization with no responsibility to public health.) The fact is that there are no solid, refereed publications showing that mercury is not significantly emitted from dental amalgams. On the contrary, there are several showing significant emissions of mercury from dental amalgams. In the one JADA article (Saxe, et al. JADA Alzheimer's Disease, Dental Amalgam and Mercury, V130, p191, 1999) it is claimed that amalgams are not related to brain Hg levels. I have several design and scientific criticism of this paper, which I will not go into here. However, in this same paper there is a histogram that shows that about 6% of the subjects had mercury brain levels above 1 micromolar levels and about 15% had brain levels above 0.5 micromolar levels. Therefore, roughly 6 to 15% of Americans, on the day they die, have what any competent neurologist or neurochemists or toxicologist would call **severely toxic levels** of mercury. These levels are about 1,000 times that needed to cause

neurons to die in culture. Therefore, one needs to ask the questions "where does this mercury come from and why does it exist in brain tissues at such high levels." I seriously doubt that the major cause is eating seafood for 85 year old AD subjects. The cause is obvious exposures from known sources (amalgams, food and vaccines) and the reason it collects in certain individuals is because they cannot effectively excrete mercury due to genetic susceptibilities or presence of other toxicants (lead, pesticides, etc.) or loss of cellular protection due to advanced age or disease. Perhaps this same phenomena accounts for the 22,000 times normal level of mercury in the heart tissues of children who die with Idiopathic Dilated Cardiomyopathy (Frustaci et al., J. American College of Cardiology, v33#6, p1578, 1000.) This latter issue alone should make Congress consider a ban on mercury in dentistry and medicine.

5. Dental amalgam emits dangerous levels of mercury. In fact, according to a 1991 WHO report, dental amalgam constitutes *the major* human exposure to mercury.¹ Grams of mercury are in the mouth of individuals with several amalgam fillings. Also, the level of blood and urine mercury positively correlates with the number of amalgam fillings.² It would be quite informative to require that the American Medical Association (AMA) be required to evaluate the state of mercury toxicity caused by dental amalgams and make a report regarding this issue. The lack of AMA support for the ADA contention on amalgam safety says something.

6. Careful evaluation of the amount of mercury emitted from a commonly used dental amalgam in a test tube with 10 ml of water was presented in an article entitled "Long-term Dissolution of Mercury from a Non-Mercury-Releasing Amalgam."³ This study showed that "the overall mean release of mercury was 43.5 ± 3.2 micrograms per cm^2 /day, and the amount remained fairly constant during the duration of the experiments (2 years.)" This was without pressure, heat or galvanism as would have occurred if the amalgams were in a human mouth. To be fair, this amalgam contained about 66% mercury compared to about 50% in most amalgams in use. The importance of this publication is that the discovery of the tremendous amount of mercury released from this amalgam material was not discovered by NIDCR, FDA, ADA, CDC or any other American research group. It came from the University of Singapore. Why hasn't the ADA or FDA or CDC done similar studies on every amalgam preparation used in the USA today? In my laboratory we have done this on several aged amalgams made from one conventional, widely used amalgam company. The results indicated that about 4.5 micrograms Hg/cm^2 / day was released without abrasion, but this increased to about 47 micrograms/ cm^2 /day with two 30 second brushings with a toothbrush. Therefore, the question remains, who is protecting the American public from adverse exposures to mercury? It appears as if those who should be doing this job are failing to do so. Having an unbiased research group repeat the study above on all ADA approved amalgam materials would be very informative and I strongly recommend that this be done even though doing this is was not supported by the ADA spokesperson at a past Congressional hearing on

this issue.

Recent research has shown that the birth hair of normal children increase in mercury content with increasing dental amalgams in the birth mother (A. Holmes, M. Blaxill and B. Haley, Reduced Levels of Mercury in the First Baby Haircuts of Autistic Children, in press, International J. Toxicology v22#4, 2003.) In contrast, autistic children have much lower levels of mercury in their birth hair, yet due to numerous reports have elevated mercury in their bodies on mercury challenge testing. This strongly indicates that a subset of the population does not have the ability to excrete mercury even if it is from low chronic daily exposure from dental amalgam.

7. Furthermore, due to the substantial amounts of mercury in amalgams, it is the number of amalgams that controls the amount of mercury exposure and this is likely not significantly affected by the length of time each amalgam is in the mouth.⁴ Put another way, since each large amalgam (i.e. those with 0.5 and 1.0 grams of mercury) contains between 500,000 to 1,000,000 micrograms of mercury, and if mercury were estimated to be released at a high rate of 10 micrograms a day from each amalgam, it would take between 137 and 274 years before any individual amalgam is completely depleted of its mercury content. A small amalgam with 0.1 grams of mercury would take 27.4 years for depletion at this rate. Also, there is a high variance which is influenced by the surface area of the amalgam, its copper content, its location and the individual's eating and grinding habits, and rate of acidity, as noted herein. However, even at very conservative estimates, these figures equate to a substantial amount of *chronic* (continuous, daily) mercury exposure over a sustained, prolonged period of time. I think it is imperative that the ADA provide detailed research that demonstrates that amalgams MADE OUTSIDE THE MOUTH DO NOT RELEASE MERCURY ON REASONABLE ABRASION AS WOULD BE EXPECTED ON CHEWING FOOD OR DRINKING HOT DRINKS. The ADA and other supporters of amalgam refuse to do these studies or fund these studies even though several refereed journal reports list solutions in which amalgams have been soaked as "severely cytotoxic."

8. About 80% of the mercury vapor from amalgams is readily taken up by the human body and distributed to various organs. Very little, if any, of the mercury vapors are exhaled; the vapors as well as mercury particles are absorbed into the lungs and body tissues. Through the lungs, for instance, mercury enters the bloodstream where it has access to all of the major organs; of particular concern are the kidneys and the central nervous system.⁵ For example, studies have been performed where amalgams containing radioactive mercury were placed in sheep and monkeys, showed the radioactivity collecting in all body tissues and especially high in the jaw and facial bones.⁶ Human studies are also supportive.⁷

9. Even more concerning is the **synergistic toxicity effects** of other elements in amalgams, which increase the toxicity of mercury. For example, Zinc (or Zn) is a

needed element for body health and is found in very low percentages in dental amalgams when compared to mercury. However, Zn^{+2} is a synergist that enhances mercury toxicity. Studies have shown that solutions in which amalgams have been soaked were "severely cytotoxic initially when Zn release was highest."⁸ (see also, Lobner & Asrari, Neurotoxicity of Dental Amalgam is Mediated by Zinc. J. Dental Research v82#3, 243, 2003.) We have repeated similar amalgam soaking experiments in my laboratory. Cadmium (from smoking), lead, zinc and other heavy metals enhanced mercury toxicity as expected. This is a well known phenomena in toxicology as it has been reported many years ago in a study on determining the lethal dose (LD) that "the administration of an essentially no-response level (LD-1) of a mercury salt together with a 1/20 of the LD-1 of a lead salt killed all of the animals." If the toxicity were additive only 1 to 2 rats of 100 should have died, instead 100% died. (J. Shubert, E. Riley & S. Tyler. Combined Effects in Toxicology--A Rapid Systemic Testing Procedure: Cadmium, Mercury and Lead. J. Toxicology and Environmental Health v4, p763, 1978.) What the data from several studies clearly shows is that no one can state what is a "safe" level of mercury exposure without knowing the concentration of all other factors that may synergistically exacerbate mercury toxicity.

10. Synergistic effects on ethylmercury is demonstrated by the dramatic enhancements of thimerosal toxicity against neurons in culture by aluminum cation (Al^{3+}), antibiotics and testosterone. Al^{3+} is another component of vaccines and dramatically increases the killing of neurons by thimerosal. Testosterone, at low nanomolar levels is not noticeably toxic to neurons. However, if testosterone is present with low nanomolar levels of thimerosal the rate of neuron death is greatly enhanced, more so than with Al^{3+} . This likely explains the 4 to 1 ratio of boys to girls that become autistic and the fact that most of the severe cases of autism are boys. This involvement of testosterone in autism is further supported by the work of Dr. Baron Cohen of England who studied the amniotic fluid of mothers who gave birth to autistic children. The only abnormality he found was that their amniotic fluid contained elevated testosterone. It is likely that this early elevated testosterone level rendered these children at enhanced risk for ethylmercury neurotoxicity.

11. There are two common misconceptions fostered by pro-amalgam supporters concerning mercury amalgam fillings: (1) that the mercury in dental amalgam is all chemically bound and not released at significant rates; and (2) that amalgam mercury is in a form that is biologically inactive. We have tested this in a direct fashion in my laboratory by soaking amalgams in distilled water and then testing these solutions for toxicity in a manner similar to our testing of solutions known to contain specific amounts of Hg^{2+} . The results were unequivocal, solutions in which amalgams were soaked for only one hour gave very similar effects on inhibiting the activity of tubulin and creatine kinase, two enzymes previously reported to be greatly inhibited in Alzheimer's diseased brain as compared to age-matched normal brain (B. Haley, The Relationship of the Toxic Effects of

Mercury to Exacerbation of the Medical Conditions Classified as Alzheimer's Disease, Nordisk Tidsskrift for Biologisk Medisin, 2003.) Therefore, amalgams likely created a cytotoxic environment *in situ* as report by others also.

12. By definition, an amalgam is a mixture of uncharged metal powders in elemental form that is mixed with liquid mercury to form an emulsion that hardens with time. Amalgams are not an alloy similar to steel or bronze. Furthermore, in the case of dental amalgam, all of the elements that are used to form amalgam have totally filled electron shells and form what is known as metallic bonds. Mercury is a liquid because it makes very weak metallic bonds, even with other metals, and this bonding is reversible allowing bound mercury to become unbound and escape as a vaporous atom, Hg^0 , at a rate that is significant. As such, there does not exist an irreversible covalent bond between mercury and the other metals that is caused by two elements binding to fill in shells with missing electrons. This means that, unlike most chemically bound molecules, the elements that are mixed in an amalgam do not lose their individual elemental properties on release from the amalgam, unless this release is caused by electro-galvanism. Simply put, mercury vapor emitting from amalgams does not lose any of its toxicity because it was at one time inside of a dental amalgam. As shown in study after study, mercury vapor is emitted from amalgams at substantial and toxic amounts, and is then distributed within the human body. The claims made by ADA spokesperson, even by one past director for the NIDCR, that mercury in amalgams is like sodium in table salt, or like hydrogen in water, represent what would be considered as preposterous by anyone knowledgeable in freshman level general chemistry.

13. As to the second misconception, all of the metal elements in amalgam, including mercury, are *not* biologically inactive. As noted in numerous studies, some of which are cited herein, mercury emits from amalgams on a 24 hour a day basis.⁹ The emissions are increased based on the introduction of hot substances, such as beverages (coffee and the sort), with chewing (such as chewing gum or food) and with galvanism as Hg^{2+} (the simple electrical current set up between different metals in the mouth and ionic saliva.) Additionally, numerous interactions cause the scratching of the amalgams, again causing an increase in mercury vapor emissions. This includes the grinding of teeth. Once the mercury vapor is emitted it enters the body and is converted to toxic Hg^{2+} inside of cells by a specific enzyme (catalyase). In the blood it is carried to various organs, including, but not limited to, the brain as supported by various studies, some of which are cited herein. Based on this, mercury vapor from dental amalgams cannot be said to be biologically inactive as it is rapidly converted to a toxic form once inside a cell.

14. Equally unsupportable, scientifically, is any "estimate" that amalgams emit mercury at minute amounts under a tenth of a microgram per day as suggested by an ADA pro-amalgam spokesperson at the last congressional Hearing. Applying simple math to this "estimate" of 0.1 micrograms/day/amalgam confirms

this inaccuracy. If one would divide the 0.1 microgram/day amount by 8,640 (24 hours/day X 60 minutes/hour X 60 ten second intervals/minute) to calculate the amount of mercury in micrograms available for a ten second mercury vapor analysis. This equals 1.16×10^{-5} micrograms total. Assume the oral cavity is somewhere between 10cm^3 to 100cm^3 volume (note that 1 milliliter equals 1cm^3) then 1.16×10^{-6} micrograms/ cm^3 or 1.16×10^{-7} micrograms/ cm^3 would be obtained from a single amalgam. Note that the conventional vapor sniffer reads at its lowest setting about 10 micrograms/meter³ or 10 micrograms/1,000,000 cm^3 or 0.000001 or 10^{-6} micrograms/ cm^3 . Therefore, the readings from 0.1 microgram mercury released/day/amalgam in a 10 second reading would give values in a 10cm^3 oral volume that are barely if at all detectable. In a 100cm^3 oral volume it would take about 8-9 fillings to get a minimal reading on a vapor sniffer. This indicates that it would almost be impossible to detect mercury emitting from one amalgam or several if the "estimate" of the ADA spokesperson were accurate.

However, the mercury vapor sniffer has been used by numerous individuals to detect mercury vapor in a human mouth or oral volume, and in my opinion the levels reported would underestimate the amount of mercury emitting from a single amalgam because of the following. Consider that somewhere between one-half to five-sixths of the mercury released would enter the body through the tooth (that area of the amalgam that exists below the visibly exposed amalgam surface) and not into the oral air. While the margins between a tooth and an amalgam filling are small they are large compared to an atom of mercury vapor. So mercury does enter readily through this route. In addition, some mercury in the oral air would be rapidly absorbed from the air into the saliva and oral mucosa since mercury is a lipophilic (or hydrophobic) vapor. This mercury would not be measured by the mercury analyzer and yet would enter the body. Further, as the mercury analyzer pulls mercury containing oral air into the analysis chamber, mercury free ambient air rushes into the oral cavity decreasing the mercury concentration.

Taking all of this into account one can calculate that most mercury analyzers could not detect this "estimated" 0.10 micrograms/day level of mercury even if the test subject had several amalgams. However, it is quite easy to detect mercury emitting from one amalgam using these analyzers. Therefore, it is impossible for daily emissions from amalgam to be anything less than the detection limits of an analyzer in a 10 second test. Separately, if amalgam is gently rubbed with a toothbrush the amount of mercury emitted, as measured by a commercial mercury vapor sniffer, increases dramatically. As I have cited herein, mercury emissions from amalgams increase substantially when hot liquids are introduced or when the individual is chewing.¹⁰

15. Additionally, it is also important to note that measurement of mercury emissions by a mercury vapor analyzer in the human mouth tends to greatly underestimate the amount of mercury exiting the amalgam as it does not measure

much of the mercury that is rapidly absorbed in saliva and oral mucosa. Also, as the analyzer pulls mercury contaminated air out of the mouth, mercury concentrations are also decreased as mercury free ambient air rushes in the oral cavity.

16. It is also important to note that when it comes to amalgam fillings, the concern is chronic, *not acute*, exposures. Basically, in the case of an acute exposure, one would be exposed to a large amount of mercury in a single dosage that, in and of itself, may or may not be toxic. In the case of chronic exposures, while an individual exposure may not be toxic, the concern is the sum of the exposures. With amalgams, the exposure is constant, 24 hours a day (*chronic*), and increases with the introduction of various elements, such as chewing and the like, and also the introduction of other chemicals which may act synergistically with mercury. Furthermore, mercury accumulates within the human body in various organs and remains there for prolonged periods of time as a "retention toxicity." A "retention toxicity" from mercury differs from most conventional toxicities as the toxin is not removed, but remains and builds up. For example, getting drunk or alcohol toxic one night, the toxicity is cleared by the body as it metabolizes the alcohol to other compounds. Mercury, being an element cannot be metabolically changed and, most importantly, forms a long-term attachment (or covalent bond) with proteins inside of cells and organelles, causing what is called retention toxicity as the level of mercury can build up with continuous chronic exposure.

In fact, mercury has been shown to remain in human organs for years after initial exposure accumulating in the brain, kidney, and lung.¹¹ Specific to amalgam and the central nervous system, low doses of mercury vapor enter and remain within motor neurons for prolonged periods of time. According to various studies, these are levels well within the WHO guidelines for occupational exposure.¹² Simply put, these published studies show that amounts of mercury that are considered within safe limits reaches the central nervous system, and accumulates to toxic levels via "retention toxicity." Mercury can be lodged in various organs causing toxicity for a prolonged period of time. This is of particular concern with amalgams, as mercury continuously accumulates in a given subject for years, adding up to potentially toxic levels in many individuals, including, as noted below, the developing fetus.

17. Any claim on the part of the ADA or established dental organizations that a zinc oxide layer is formed on the amalgams that decreases mercury release can only be true if an individual is not using his or her teeth. Note that zinc is listed at "trace levels" in amalgams. How can trace levels cover the 50% mercury? However, in the real world, any zinc oxide layer is easily removed by slight abrasion such as chewing food or brushing the teeth. Further, my laboratory has confirmed that solutions in which amalgams have been soaked can cause the inhibition of brain proteins that are inhibited by adding mercury chloride, and these are the same enzymes inhibited in AD brain samples.

18. Even more concerning is that at least some of the inorganic mercury that is emitted from amalgams is converted to methylmercury, a more toxic, organic form of mercury.¹³ This strongly indicates that "organo mercury species" are indeed capable of being made in the human body and likely explains the appearance of methylmercury in the blood and urine of individuals who do not eat seafood, but do have amalgam fillings.

19. The bottom line is that amalgams emit significant levels of neurotoxic mercury that are injurious to human health and would exacerbate the medical condition of those individuals with neurological diseases such as Amyotrophic lateral sclerosis ("ALS" or "Lou Gehrig's Disease")¹⁴, Multiple Sclerosis ("MS"), Parkinson's, autism and Alzheimer's Disease ("AD"). For example, mercury inhibits the same enzymes in normal brain tissues as are inhibited in Alzheimer's Disease.¹⁵ AD is pathologically confirmed post-mortem by the appearance of neuro-fibrillary tangles (NFTs) and amyloid plaques in brain tissue. Published research, within the past year, has shown that exposure of neurons in culture to sub-lethal doses of mercury (much less than is observed in human brain tissue) causes the formations of NFTs,¹⁶ the increased secretion of beta-amyloid protein and the hyper-phosphorylation of a protein called Tau.¹⁷ *All three of these mercury-induced aberrancies are regularly identified by world class scholars as the major diagnostic markers for AD. Yet the ADA states there is no scientific data published to indicate that mercury from amalgams could contribute to these diseases.*

20. Furthermore, mercury from amalgams is transferred from a pregnant mother to the developing fetus, causing increased mercury body burden in children solely based on the presence of amalgams in the mother.¹⁸ Mercury exposure is even more devastating to the developing brain than to an adult brain. This has been shown in study after study culminating with the recent publication by Dr. Lorscheider, et al., showing brain neuron degeneration from small amounts of mercury and conclusively proving that such degeneration does not occur with the introduction of any other element, including *lead*.¹⁹ The research mentioned above on the levels of mercury in the birth-hair of children increasing with the mother's amalgam clearly demonstrates that mercury from dental amalgams enters the child *in utero* as has been previously reported.

21. Also, low level exposures like those associated with amalgam fillings and the resultant increase in the mercury body burden are toxic to the central nervous system.²⁰ These can cause from severe to subtle neuropsychological functions such as depression of performance, intellectual functioning, impairments of attention, impairment of short-term memory function, visual judgment of angles and directions, psychomotor retardation and personality changes. As further proof that these are mercury related, scientists have shown that in some cases, the effects can be reversed simply by removal of the source of mercury intoxication, together with proper medical treatment.²¹ Mercury from fillings also

leads to "considerable concentrations of [mercury] in the olfactory bulbs."²² This may also explain the phenomena of Alzheimer's patients losing their sense of smell in the early stages of the disease. (Kovacs, T., Cairns, N.J., Lantos, P.L. Olfactory Centres in Alzheimer's disease: Olfactory bulb is Involved in Early Braak's Stages. Neuroreport 12(2): 285-288, 2001 and Gray, A.J., Staples, V., Murren, K., Dahariwal, A. and Benthon, P. Olfactory Identification is Impaired in Clinic-Based Patients with Vascular Dementia and Senile Dementia of Alzheimer's type. Int. J. Geriatr. Psychiatry 16 (5): 513-517, 2001.)

22. Mercury from dental fillings has also been associated with adverse effects in the cardiovascular system, including high blood pressure, low heart rate, low hemoglobin, and low hematocrit.²³

23. Many of the experiments that show mercury emission and exposure from dental amalgams are so simple and inexpensive to do that they could have should have been completed many years ago, in the 1950's and 60's. **Yet, they have not been done, or at least not reported on, despite numerous requests by concerned citizens by the agencies and bureaucracies that today testify that amalgams are safe. This includes the ADA and dental branch of the FDA.** It is important to note that I do not hold the entire FDA responsible for the actions of the dental branch of the FDA. Other researchers also doing these tests do not find amalgams safe based on the continuous, chronic release of mercury. The fact that both the national Academy of sciences and the EPA warn the government of the dangers of the level of mercury found in Americans and the NIH and WHO studies that amalgams are the major contributor to the mercury body burden of humans. Couple this with the certain fact that mercury, and only mercury of the toxic metals, can mimic the aberrant biochemistry and produce the components of the widely accepted diagnostic hallmarks of Alzheimer's disease and it should be obvious that all exposures to mercury should be held to the lowest levels.

24. Finally, science has produced compelling evidence at the biological level that mercury can cause the aberrancies found in Alzheimer's disease. Recent research has shown both strong biological plausibility and epidemiological studies regarding ethylmercury exposure from thimerosal in vaccinations being the cause of the devastating disease of autism and related disorder. Yet, our organizations and bureaucracies formed to protect us deny even the possibility that mercury or organic mercury is involved in the causation or exacerbation of these diseases. One only needs to know the history of Pink disease (acyrodynia) to understand that proving mercury involvement in disease is quite difficult due to genetic susceptibility. **However, all of the scientific and biomedical facts together emphasizes the need for congressional action to stop the exposure of Americans to mercury and organic mercury compounds.**