



mothering
NATURAL FAMILY LIVING



Find

make mothering.com your home page

subscription services | discuss | experts | activism | news | book reviews | peggy's kitchen | poems | shopping guide
pregnancy & birth | new baby | growing child | body & soul

editorial columns

choose a column

family tools

choose a tool

community features

choose a feature

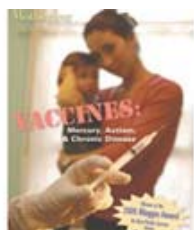


growing child
● vaccines

Featured Product
2006 Mothering Calendar

Children are the evidence that LOVE, NOT FEAR is the answer

Sponsored By



Vaccines: Mercury, Autism and Chronic Disease
Recognized for journalistic excellence, and now reprinted in one 32-page, full-color publication, these articles contain information no parent should be without, including details on the use of the known neurotoxin mercury in flu vaccines, alarming evidence of the possible connection between vaccines and autism, exploration of the rise in chronic disease, stories of parental activism and advocacy on behalf of their vaccine-injured children, and the hopeful example of one child's recovery from autism.

Toxic Overload: Assessing the Role of Mercury in Autism

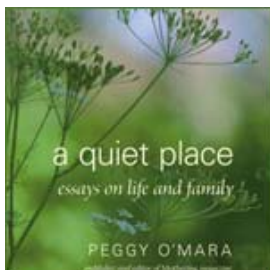
By Boyd E. Haley
Issue 115, November/December 2002

From 1996 to 1997, J. Curtis Pendergrass, PhD, did some experiments in my research laboratory at the University of Kentucky that confirmed the toxicity of thimerosal in vaccines. The results appeared on our website (www.altcorp.com), where they attracted the attention of some parents of autistic children.

These parents informed me that increased mandatory vaccination of infants was, in their opinion, the cause of an apparent epidemic of autism. This was the first time I had heard of this situation. The rationale for considering vaccinations as the cause of their children's problems seemed sensible and worth an investigation. I would like to state here that I am a very strong supporter of the national vaccine program, and that nothing in this article should be construed to imply that parents should avoid getting their children vaccinated. But I do recommend avoiding vaccines that contain thimerosal.

My laboratory was well experienced in mercury research. We had earlier demonstrated that mercury, when exposed to normal human brain tissue homogenates, is capable of causing many of the same biochemical aberrancies found in Alzheimer's diseased (AD) brains.1-4 Also, rats exposed to mercury vapor show the same major protein aberrancy as AD brains. Specifically, the rapid inactivation of important brain enzymes occurs following the addition of low levels of mercury or exposure to mercury vapor, and these same enzymes are significantly inhibited in AD brains.5 Also, mercury exposure to neurons in culture by other researchers, at a concentration lower than that found in many human brains, has now been shown to produce three of the widely accepted pathological diagnostic hallmarks of AD.6,7

Therefore, we hypothesized that exposure to mercury is involved in the etiology of AD, or at least would exacerbate this disease. We also proposed that other heavy metals, such as lead and cadmium, which act synergistically to enhance the toxicity of mercury, could be involved. Additionally, we proposed that exposure to organic-mercury compounds like methyl mercury from fish and ethyl mercury from thimerosal would also enhance the toxicity of any exposure to mercury. The early work of Dr. Pendergrass confirmed this with pure thimerosal, with some interesting additional observations. First, in human brain samples the exposure to mercury dramatically reduced the



a quiet place
A new book by Peggy O'Mara



Subscription Center

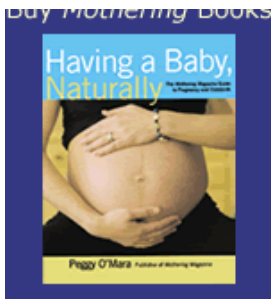
Subscribe
Give a Gift
Renew
Change Address
Customer Service

mothering's 30th Celebrate with us!
May 12-14th
Mother's Day Weekend
Santa Fe, NM

[Click Here](#)

Advertise at Mothering.com

commonsense media
on -good stuff || -pause
off -turn it off



viability of a major brain protein called tubulin, but had little if any effect on another major protein, actin. Both tubulin and actin are critically important for the growth of dendrites or maintenance of axon structures of neurons. Exposing neurons to mercury rapidly results in the stripping of tubulin from the axon structure, leaving bare neurofibrils that form the tangles that are the diagnostic hallmark of AD. Thimerosal, like mercury, also rapidly reduces the viability of tubulin; in addition, however, it abolishes the viability of actin. This likely represents a major difference in the mechanism of mercury versus organic-mercury (more neurotoxic) toxicity. However, both mercury and organic-mercury inhibit tubulin viability and would work in concert to damage neurons of the central nervous system.

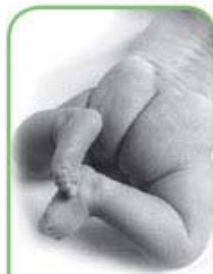
We therefore decided to investigate vaccines with and without thimerosal present as a preservative, using human brain tissues. To date the data have been very consistent: the toxicity of the vaccines is primarily dependent on the presence of thimerosal and, in my opinion, would be classified as severely toxic to numerous brain proteins. In the spring of 2001 these data were presented to the Institute of Medicine Immunization Safety Review Committee, which concluded its analysis by suggesting that thimerosal involvement in autism was a plausible hypothesis. Since then I have formed a collaboration with one of my colleagues, Mark Lovell, PhD, who uses cultured neurons in some of his experiments. Using his cultured neuron system, we studied the extent of neurotoxicity of pure thimerosal and of vaccines with and without thimerosal present. The experiments were done as follows: Neurons were grown in culture for 24 hours. Then pure thimerosal or vaccines were added to test cultures. The death of neurons was observed for the next 24 hours and compared to the death of neurons in the absence of toxicant.

The results were almost identical to the results observed with brain tissues: vaccines with thimerosal present were much more toxic than thimerosal-free vaccines. Pure thimerosal was toxic at the low nanomolar level--an extremely low concentration, about 10,000 times less than the thimerosal concentration found in most vaccines. These results leave little doubt about thimerosal being the toxic agent in the vaccines. However, many vaccines contain aluminum ions that have neurotoxic properties, and aluminum was once considered a factor in AD etiology. So we tested aluminum in the same system.

Aluminum is not nearly as toxic to neurons in culture as is thimerosal. However, we had earlier observed with mercury that the presence of other metals would enhance toxicity. Experiments were done to determine if aluminum would increase the toxicity of very low levels of thimerosal. The results were unequivocal: the presence of aluminum dramatically increased the rate of neuronal death caused by thimerosal. Therefore, the aluminum and thimerosal combination found in vaccines produces a toxic mixture that cannot be compared to situations where thimerosal alone is the toxic exposure.

The enhanced toxicity of thimerosal created by the addition of aluminum represents a problem with all forms of mercury toxicity. Synergism of toxic metals is well known. A slightly toxic solution of lead, mixed with a slightly toxic solution of mercury, results in a very toxic mixture. This is similar to the enhanced adverse reactivity to thimerosal found in optomological solutions, when subjects were prescribed to take the antibiotic tetracycline. For some reason, tetracycline increased the ocular toxic reaction to thimerosal. We have done some experiments to determine if certain antibiotics could also increase thimerosal-induced neuronal death in the neuron culture system. Our preliminary results indicate that this is the case, especially with tetracycline and ampicillin. Further research is needed in this area for accurate evaluation. But our results support previous reports and indicate how important it is to check out the effects of other compounds on the exacerbation of mercury and organic-mercury compound toxicity.

One of the conundrums of autism is why there is an approximate ratio of four boys to every girl who gets this disease. Dr. Lovell therefore tested the possibility that this could be hormone related. The latest results were quite marked in their effects. Neurons that were pre-incubated with estrogen demonstrated substantial protection against thimerosal-induced neuron death. In contrast, the addition of testosterone caused a very large increase in thimerosal-induced neuron death. A low nanomolar level of thimerosal that gave less than 5 percent neuron death in three hours could be increased to 100 percent cell death by the addition of one micromolar level of testosterone. Testosterone alone at this level also showed less than 5 percent cell death. The opposing effects of estrogen and testosterone may explain the gender-based four-to-one ratio. Most important, the tremendous enhancement of thimerosal toxicity by testosterone points out the impact of synergistic effects when



Baby Belle Bottoms

cloth diapers & so much more

Huge Product Selection
Gift Registry
Intelligent Customer Service
Fast Fast Fast Shipping

1.888.648.5178



SUBSCRIBE TO THE FREE MOTHERING NEWSLETTER

enter email

- subscribe
- remove

process

addressing mercury toxicity.

Those involved in promoting the use of mercury in medicine and dentistry favor the old adage "Dose makes the toxin," and pick a supposedly safe level based on testing young, healthy mammals that have been exposed to mercury compounds. The synergistic enhancement of thimerosal toxicity by testosterone and aluminum demonstrates that no one can pick a concentration of mercury or organic-mercury and say with confidence, "This is a safe dose for human infants"--at least not with our current level of knowledge.

MMR (measles-mumps-rubella) has been widely discussed as a vaccine involved in autism-related problems. Our studies did not find MMR vaccines (no thimerosal added) to be nearly as neurotoxic as thimerosal-containing vaccines. So how does this fit into the observations of measles virus in the intestines of a large percentage of autistic children?

My theory, and it is only a theory at this time, is based on the fact that thimerosal is an inhibitor of the brain protein tubulin. One of the jobs of tubulin is to support the axon structure of nerve axons; exposure to thimerosal, or mercury, destroys this capability. Tubulin also has another job: it is involved in formation of the meiotic spindle on which a cell splits in two. In other words, tubulin is needed for cell division, and cell division is needed for development of an immune response. Inhibit tubulin function with thimerosal injections, and you inhibit the immune response.

I have been told that the MMR vaccination is often given at the same time that three thimerosal-containing vaccines are given. Inhibit the immune response with the thimerosal-containing vaccinations, and an infant has less ability to respond to the measles virus in the MMR vaccination that is injected at the same setting. This might explain the presence of measles virus in about 80 percent of autistic children.

The research results we have obtained on the toxicity of thimerosal are not really surprising. This ethyl mercury-releasing compound was known to be neurotoxic through the publication of several research articles, some quite old. Any competent biochemist would look at the structure of the compound and identify it as a potent enzyme inhibitor. What is surprising is that the appropriate animal and laboratory testing was not done on the vaccines containing thimerosal (and aluminum) before the government embarked on a mandated vaccine program that exposed infants to the levels of thimerosal that occurred.

At this time it appears that exposure to thimerosal is the most likely suspect in vaccines that may be involved in causing autism and related disorders. The final verdict will come with observing the rate of autism now that thimerosal has been removed from the infant vaccine program. Let us therefore give credit to those who have worked to remove thimerosal from the vaccines given to infants and emphasize that continued testing of all vaccines is imperative to obtain the safest national vaccine policy possible, including a thimerosal-free flu vaccine for our elderly citizens.

NOTES

1. S. Khatoon et al., "Aberrant GTP-Tubulin Interaction in Alzheimer's Disease," *Annals of Neurology* 26 (1989): 210-215.
2. S. David et al., "Abnormal Properties of Creatine Kinase in Alzheimer's Disease Brain," *Molecular Brain Research* 54 (1998): 276-287.
3. E. F. Duhr et al., "HgEDTA Complex Inhibits GTP Interactions with the E-Site of Brain-Tubulin," *Toxicology and Applied Pharmacology* 122 (1993): 273-288.
4. J. C. Pendergrass and B. E. Haley, "Mercury-EDTA Complex Specifically Blocks Brain-Tubulin-GTP Interactions: Similarity to Observations in Alzheimer's Disease," in *Status Quo and Perspective of Amalgam and Other Dental Materials, International Symposium Proceedings*, L. T. Friberg and G. N. Schrauzer, eds., 98-105 (Stuttgart and New York: Georg Thieme Verlag, 1995).
5. J. C. Pendergrass et al., "Mercury Vapor Inhalation Inhibits Binding of GTP to Tubulin in Rat Brain: Similarity to a Molecular Lesion in Alzheimer's Disease Brain," *Neurotoxicology* 18, no. 2 (1997): 315-324.
6. G. Olivieri et al., "Mercury Induces Cell Cytotoxicity and Oxidative Stress," *J. Neurochemistry* 74 (2000): 231-241.
7. C. C. W. Leong et al., "Retrograde Degeneration of Neurite Membrane Structural Integrity and Formation of Neurofibrillary Tangles at Nerve Growth Cones Following in Vitro Exposure to Mercury," *NeuroReports* 12, no. 4 (2001): 733-737.

Boyd E. Haley, PhD, is a professor and chair of the department of chemistry at

the University of Kentucky, Lexington. His research on biochemical aberrancies in Alzheimer's disease led to his identifying mercury toxicity as a major exacerbating factor, perhaps even a causal factor. Haley has testified before numerous government agencies on the effects of mercury toxicity from dental amalgams and vaccines.

For more information on vaccines see the *Mothers Magazine* Reprint: **[Vaccines: Mercury, Autism and Chronic Disease](#)**

--

[current issue](#) | [article index](#) | [about us](#) | [advertising](#) | [submission guidelines](#) | [calendar](#) | [buy books](#) | [buy back issues](#)