

New Study Finds: Thimerosal Induces Autism-like Neurotoxicity (15.07.2009)

A new study published in the June issue of the peer-reviewed journal of Toxicology & Environmental Chemistry, finds cytotoxic effects of Thimerosal that are similar with pathophysiological findings observed in patients diagnosed with autistic disorders (ADs).

Background:

Autism Spectrum Disorders (ASD) are a group of developmental disabilities that are caused by an abnormality in the brain. According to the Centers for Disease Control and Prevention (CDC), 1 in 500 (2/1,000) to 1 in 150 children (6.7/1,000) have an Autism Spectrum Disorder (ASD) and four boys are diagnosed to every one girl. ASDs range from a severe form, autistic disorder (classic autism) to a mild form, Asperger syndrome. If a child has symptoms of either disorder but does not meet the specific criteria of either, he/she is diagnosed with pervasive developmental disorder not otherwise specified (PPD-NOS). The cause of ASD is still under investigation.

The new study:

The research reported in the cited study was undertaken to investigate cellular damage in three in vitro human neuronal and fetal-cell model systems. The potential damage induced by Thimerosal and other metal compounds, including aluminum sulfate, methylmercury hydroxide, lead acetate, and mercuric chloride was assessed using cell vitality assays and microscope-based digital image capture techniques.

This study showed Thimerosal-induced cellular damage in human neuronal and fetal-cell model systems in a concentration- and time-dependent fashion using Thimerosal at low nanomolar (parts-per-billion) concentrations. These concentrations are comparable to those found in fetal and early infant exposure to mercury from Thimerosal-containing biologics and vaccines in the 1990s and, in some instances, today. These levels induced significant cellular toxicity in the human neuronal and fetal cells studied. The Thimerosal-induced cellular damage was consistent with that found in pathophysiological studies of patients diagnosed with an ASD. In both instances, the studies found significant mitochondrial dysfunction, reduced cellular oxidative-reduction activity, cell degeneration, and cell death.

The present study also revealed that Thimerosal is significantly more toxic than the other metal compounds studied (e.g., aluminum sulfate, methylmercury hydroxide, lead acetate, and mercuric chloride). The explanation for Thimerosal's greater toxicity than even methylmercury hydroxide (MeHgOH) appears to be the fact that Thimerosal was chemically engineered in the 1920s to be a more highly toxic alkylmercury compound, whose biological transport and intracellular delivery properties were enhanced. Compared to MeHgOH, Thimerosal has: 1) higher aqueous solubility (i.e. ability to dissolve in water and water-based systems); 2) higher solubility in cell membranes (i.e. ability to dissolve in cell membranes); and 3) higher intracellular toxicity (i.e. ability to inactivate essential cell processes) and mercury retention.

🏰The cited study:

→ D.A. Geier, P.G. King, M.R. Geier, *Mitochondrial Dysfunction, Impaired Oxidative-Reduction Activity, Degeneration, and Death in Human Neuronal and Fetal Cells Induced by Low-Level Exposure to Thimerosal and Other Metal Compounds*, *Toxicol. Environ. Chem.*, 91 (2009) 735-749. [doi: 10.1080/02772240802246458](https://doi.org/10.1080/02772240802246458)

🏰Related studies:

→ Alberto Eugenio Tozzi, Patrizia Bisiacchi, Vincenza Tarantino, Barbara De Mei, Lidia D'Elia, Flavia Chiarotti, Stefania Salmaso, *Neuropsychological Performance 10 Years After Immunization in Infancy with Thimerosal-Containing Vaccines*, *Pediatrics*, 123/2 (2009) 475-482. [doi:10.1542/peds.2008-0795](https://doi.org/10.1542/peds.2008-0795)

→ Donald R. Branch, *Gender selective toxicity of thimerosal*, *Exp. Toxicol. Pathol.*, 61/2 (2009) 133-136. [doi:10.1016/j.etp.2008.07.002](https://doi.org/10.1016/j.etp.2008.07.002)

→ José G. Dórea, Rejane C. Marques, *Modeling Neurodevelopment Outcomes and Ethylmercury Exposure from Thimerosal-Containing Vaccines*, *Toxicol. Sci.*, 103/2 (2008) 414-415. [doi:10.1093/toxsci/kfn049](https://doi.org/10.1093/toxsci/kfn049)

→ Grazyna Zareba, Elsa Cernichiari, Rieko Hojo, Scott Mc Nitt, Bernard Weiss, Moiz M. Mumtaz, Dennis E. Jones, Thomas W. Clarkson, *Thimerosal distribution and metabolism in neonatal mice: comparison with methyl mercury*, *J. Appl. Toxicol.*, 27/5 (2007) 511-518. [doi: 10.1002/jat.1272](https://doi.org/10.1002/jat.1272)

→ Said Havarinasab, Erik Björn, Jimmy Ekstrand, Per Hultman, *Dose and Hg species determine the T-helper cell activation in murine autoimmunity*, *Toxicology*, 229/1-2 (2007) 23-32. [doi:10.1016/j.tox.2006.09.006](https://doi.org/10.1016/j.tox.2006.09.006)

→ D.A. Geier, M.R. Geier, *An evaluation of the effects of thimerosal on neurodevelopmental disorders reported following DTP and Hib vaccines in comparison to DTPH vaccine in the United States*, *J. Toxicol. Environ. Health Part A*, 69/16 (2006) 1481-1495. [DOI: 10.1080/15287390500364556](https://doi.org/10.1080/15287390500364556)

→ David A. Geier, Mark R. Geier, *Early Downward Trends in Neurodevelopmental Disorders Following Removal of Thimerosal-Containing Vaccines*, *J. Am. Phys. Surg.*, 11/1 (2006) 8-13. available from: <http://www.jpands.org/vol11no1/geier.pdf>

→ S.J. James, William Slikker III, Stepan Melnyk, Elizabeth New, Marta Pogribna, Stefanie Jernigan, *Thimerosal Neurotoxicity is Associated with Glutathione Depletion: Protection with Glutathione Precursors*, *Neurotoxicol.*, 26 (2005) 1-8. [doi:10.1016/j.neuro.2004.07.012](https://doi.org/10.1016/j.neuro.2004.07.012)

→ Sarah K. Parker, Benjamin Schwartz, James Todd, Larry K. Pickering, *Thimerosal-Containing Vaccines and Autistic Spectrum Disorder: A Critical Review of Published Original Data*,

Pediatrics, 114/3 (2004) 793-804. [doi:10.1542/peds.2004-0434](https://doi.org/10.1542/peds.2004-0434)

→ M. Waly, H. Olteanu, R. Banerjee, S.-W. Choi, J.B. Mason, B.S. Parker, S. Sukumar, S. Shim, A. Sharma, J.M. Benzecry, V.-A. Power-Charnitsky, *Activation of methionine synthase by insulin-like growth factor-1 and dopamine: a target for neurodevelopmental toxins and thimerosal*, Mol. Psychiatry, 9/4 (2004) 358-370.

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→ [EVISA Link Database: Toxicity of Thimerosal](#)

Related News

→ [EVISA News, May 15, 2008: New study will investigate the influence of environmental factors in autism](#)

→ [EVISA News, May 3, 2006: Texas Study Relates Autism to Environmental Mercury](#)

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→ [EVISA News, March 24, 2006: American lawmakers initiate mercury probe for vaccines](#)

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→ [EVISA News, February 11, 2005: New findings about Thimerosal Neurotoxicity](#)