

## Scientific Papers Showing Linking Thimerosal Exposure to Autism

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1. Rose et al. 2015 J Toxicol "Increased Susceptibility to Ethylmercury-Induced Mitochondrial Dysfunction in a Subset of Autism Lymphoblastoid Cell Lines" PMID 25688267.

In a comparison of lymphoblast cells from children with autism and matched non-autistic controls, a significantly higher number of "autistic" cell lines showed a reduction in ATP-linked respiration, maximal respiratory capacity and reserve capacity when exposed to mercury as compared to control cell lines. This supports the notion that a subset of individuals with autism may be vulnerable to mitochondrial dysfunction via thimerosal exposure.

2. Geier et al. 2015 Clin Chim Acta "Thimerosal: Clinical, Epidemiologic and Biochemical Studies," PMID 25708367.

This review article includes a section on numerous papers linking thimerosal exposure via infant vaccines to autism. This also includes a critique of studies from the U.S. Centers for Disease Control that deny any type of link.

3. Hooker et al. 2014 BioMed Research International, "Methodological Issues and Evidence of Malfeasance In Research Purporting to Show that Thimerosal-Containing Vaccines are Safe" <http://dx.doi.org/10.1155/2014/247218>.

This review article shows methodological flaws in six separate CDC studies claiming that thimerosal does not cause autism. In three specific instances (Madsen et al. 2003, Verstraeten et al. 2003 and Price et al. 2010) evidence of malfeasance on the part of CDC scientists is shown. Background data (not reported in print) from these three publications suggest a strong link between thimerosal exposure and autism.

4. Geier et al. 2014 J Biochem Pharmacol Res "The risk of neurodevelopmental disorders following a Thimerosal-preserved DTaP formulation in comparison to its Thimerosal-reduced formulation in the vaccine adverse event reporting system (VAERS)" 2:64.

A comparison of autism reports from thimerosal-containing versus thimerosal free DTaP formulations showed a relative risk of 7.67 for autism when children were exposed to thimerosal via the DTaP vaccine.

5. Koh et al. 2014 Mol Brain, "Abnormalities in the zinc-metalloprotease-BDNF axis may contribute to megalencephaly and cortical hyperconnectivity in young autism spectrum disorder patients" PMID 25182223.

This protein (zinc-metalloprotease-BDNF) is upregulated by the presence of organic mercurials including thimerosal and it is responsible for large brains (megalencephaly) and cortical hyperconnectivity in children with autism.

6. Geier et al. 2013 *Translational Neurodegeneration*, "A two-phase study evaluating the relationship between Thimerosal-containing vaccine administration and the risk for an autism spectrum disorder diagnosis in the United States" PMID 24354891.

This study included a comparison of VAERS (Vaccine Adverse Event Reporting System) reports of autism following DTaP (Thimerosal containing and Thimerosal free). In addition the link between thimerosal containing HepB vaccine administration and autism was elucidated with a dose-dependent effect, using the CDC's Vaccine Safety Datalink.

7. Gorrindo et al. 2013 *PLOS One* "Enrichment of Elevated Plasma F<sub>2t</sub>-Isoprostane Levels in Individuals with Autism Who Are Stratified by Presence of Gastrointestinal Dysfunction" DOI: 10.1371.

This paper showed significant levels of oxidative stress in children with autism with comorbid gastrointestinal problems. Thimerosal as well as vaccines in general contributes markedly to the amount of oxidative stress sustained physiologically.

8. Gronborg et al. 2013 *JAMA Pediatrics*, "Recurrence of Autism Spectrum Disorders in Full and Half-Siblings and Trends over Time A Population-Based Cohort Study" doi10.1001/jamapediatrics.2013.2259.

This publication shows that ASD prevalence rates in Denmark decreased by 30% of the time period from 1994 to 2004 after Denmark removed thimerosal from their vaccines in 1992. This is directly counter to the fraudulent CDC Madsen et al. 2003 publication.

9. Sharpe et al. 2013 *J Toxicol* "B-lymphocytes from a population of children with autism spectrum disorder and their unaffected siblings exhibit hypersensitivity to thimerosal" PMID 23843785.

This paper shows that peripheral blood lymphocytes specific to antibody based immunity, from autistic subjects and their unaffected siblings, were much more sensitivity and exhibited higher rates of cell death than those of unaffected, unrelated control children. Thimerosal levels required to kill the cells from the subjects were less than 40% of those required to kill the cells of unrelated, non-autistic controls.

10. Duszczuk-Budhathoki et al. 2012 *Neurochem Res* "Administration of thimerosal to infant rats increases overflow of glutamate and aspartate in the prefrontal cortex: protective role of dehydroepiandrosterone sulfate" PMID 22015977.

The study authors determined that since excessive accumulation of extracellular glutamate is linked with excitotoxicity, data implies that neonatal exposure to thimerosal-containing vaccines might induce excitotoxic brain injuries, leading to neurodevelopmental disorders.

11. Sharpe et al. 2012 J Toxicol "Thimerosal-Derived Ethylmercury Is a Mitochondrial Toxin in Human Astrocytes: Possible Role of Fenton Chemistry in the Oxidation and Breakage of mtDNA" PMID 22811707.

Thimerosal significantly damaged the mitochondrial membranes and DNA in human astrocytes (which are also implicated in autism spectrum disorder). The enzyme caspase-3, which signals cell death was upregulated by 5 times in the presence of thimerosal and mitochondrial membranes showed significant depolarization.

12. Sulkowski et al. 2012 Cerebellum "Maternal thimerosal exposure results in aberrant cerebellar oxidative stress, thyroid hormone metabolism, and motor behavior in rat pups; sex- and strain-dependent effects" PMID 22015705.

Rat pups were exposed to thimerosal levels in utero (similar to the maternal flu shot) and exhibited aberrant brain oxidative stress (in the cerebellum) as well as autistic like behaviors. These effects were reserved primarily to males in the "Spontaneously Hypersensitive Rat" strain.

13. Kern et al. 2011 Toxicol Environ Chem "Toxicity biomarkers among US children compared to a similar cohort in France: a blinded study measuring urinary porphyrins" PMID 24482554

This age and gender matched cohort study of 28 autism cases and 28 controls showed significantly higher urinary porphyrin levels in children with autism, specifically in those porphyrins (hexacarboxyporphyrin and precoproporphyrin) associated with mercury toxicity.

14. Gallagher et al. 2010 J Toxicol Env Health A "Hepatitis B vaccination of male neonates and autism diagnosis, NHIS 1997-2002" PMID 21058170.

The study authors investigated the National Health Inventory Survey (a very large national database) and found that boys receiving the full HepB series were 3 times as likely to receive an autism diagnosis as compared to those not receiving any HepB vaccine (statistically significant). Non-white boys had a significantly worse outcome.

15. Minami et al. 2010 Cell Biol Toxicol "Induction of metallothionein in mouse cerebellum and cerebrum with low-dose thimerosal injection" PMID 19357975.

The study authors determined that in combination with the brain pathology observed in patients diagnosed with autism, the present study helps to support the possible biological plausibility for how low-dose exposure to mercury from thimerosal-containing vaccines may be associated with autism.

16. Geier et al. 2009 J Neurol Sci "Biomarkers of environmental toxicity and susceptibility in autism" PMID 18817931.

Mercury toxicity was assessed in a cohort of 28 children with autism. The cohort showed significantly higher levels of urinary porphyrins associated with mercury toxicity as well as decreased plasma levels of reduced glutathione, cysteine and sulfate, also indicating active mercury toxicity and an inability to detoxify heavy metals.

17. Young et al. 2008 J Neurol Sci “Thimerosal exposure in infants and neurodevelopmental disorders: an assessment of computerized medical records in the Vaccine Safety Datalink” PMID 18482737.

The study authors determined that significantly increased risk ratios were observed for autism and autism spectrum disorders as a result of exposure to mercury from Thimerosal-containing vaccines using the CDC’s Vaccine Safety Datalink.

18. Geier et al. 2008 Neuro Endocrinol Lett “Neurodevelopmental disorders, maternal Rh-negativity, and Rho(D) immune globulins: a multi-center assessment” PMID 18404135.

Mothers receiving thimerosal via Rho(D) immune globulin injection saw a significantly higher rate of autism in the children exposed to mercury in utero. Overall, twice as much autism was seen in the exposed group of children versus the non-exposed control group.

19. Adams et al. 2007 J Tox Environ Health A “Mercury, lead, and zinc in baby teeth of children with autism versus controls” PMID 17497416

Children with autism showed significantly higher levels of mercury in their baby teeth than non-autistic controls, indicated marked exposure to mercury during gestation and early infancy.

20. Geier et al. 2007 J Matern Fetal Neonatal Med “A prospective study of thimerosal-containing Rho(D)-immune globulin administration as a risk factor for autistic disorders” PMID 17674242.

Children with autism were twice as likely as non-autistic controls to be born from mothers who had Rh incompatibilities with the developing fetus during pregnancy and thus were exposed to thimerosal via Rho(D) immune globulin injections during pregnancy.

21. Geier et al. 2007 J Toxicol Env Health A “A case series of children with apparent mercury toxic encephalopathies manifesting with clinical symptoms of regressive autistic disorders” PMID 17454560.

This case series of eight autistic patients showed a history of excretion of significant amounts of mercury post chelation challenge, biochemical evidence of decreased function in their glutathione pathways and had no known significant mercury exposure except from Thimerosal-containing vaccines/Rho(D)-immune globulin preparations; and had alternate causes for their regressive ASDs ruled out.

22. Desoto et al. 2007 J Child Neurol "Blood Levels of Mercury Are Related to Diagnosis of Autism: A Reanalysis of an Important Data Set" 22:1308.

This study is a correction to a previous study that claimed mercury levels in children's blood did not correlate with the presence of autism. In this reanalysis, Desoto shows clearly that a statistically significant link appears between blood mercury levels and autistic disorder in children.

23. Geier et al. 2006 J Toxicol Env Health A "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" PMID 16766480.

This study shows significantly increased risk ratios for autism, speech disorders, mental retardation, infantile spasms, and thinking abnormalities reported to VAERS found following thimerosal-containing DTP vaccines in comparison to thimerosal-free DTPH vaccines, with minimal bias or systematic error.

24. Nataf et al. 2006 Toxicol Appl Pharmacol "Porphyrinuria in childhood autistic disorder: implications for environmental toxicity" PMID 16782144

Children with autism showed statistically elevated levels of urinary porphyrins that specifically show mercury toxicity due to environmental exposure. This was a large study of 106 children with autism compared to children with Asperger's and control children. Neither the Asperger's or control group showed elevations in urinary porphyrin levels.

25. Herbert 2005 Neuroscientist "Large brains in autism: the challenge of pervasive abnormality" PMID 16151044.

The author of this study links large brain size with neuroinflammation associated with toxic heavy metal exposure. The author posits that this type of inflammation could be treatable and increase the success of medical interventions for autism.

26. Burbacher et al. 2005 Environ Health Perspect "Comparison of blood and brain mercury levels in infant monkeys exposed to methylmercury or vaccines containing thimerosal" PMID 16079072.

Infant macaques retained significantly higher levels of elemental mercury in their brain tissue when exposed to thimerosal in infant vaccines versus methylmercury. The half-life of the mercury associated with thimerosal exposure was indefinite as it lasted much longer than the overall testing period.

27. Yel et al. 2005 Int J Mol Med "Thimerosal induces neuronal cell apoptosis by causing cytochrome c and apoptosis-inducing factor release from mitochondria" PMID 16273274

Thimerosal at levels comparable to infant exposure via vaccines caused neuronal cell death through changing the mitochondrial microenvironment. Thimerosal induced cell death was

associated with mitochondrial depolarization and a significant level of reactive oxidative stress intracellularly.

28. James et al. 2005 Neurotoxicol “Thimerosal neurotoxicity is associated with glutathione depletion: protection with glutathione precursors” PMID 15527868.

This study investigated the cellular response to thimerosal toxicity including a very profound decrease in intracellular glutathione levels. Earlier research by this same author showed that autistic children had significantly lower glutathione levels as compared to neurotypical control children.

29. James et al. 2004 Am J Clinical Nutrition “Metabolic biomarkers of increased oxidative stress and impaired methylation capacity in children with autism” 80:1611.

Children with autism have a diminished methylation capacity leading to higher sustained levels of oxidation stress, due to deficiencies primarily in glutathione. Vaccines produce a very high level of oxidation stress to the body upon administration.

30. Waly et al. 2004 Mol Psychiatr “Activation of methionine synthase by insulin-like growth factor-1 and dopamine: a target for neurodevelopmental toxins and thimerosal” PMID 14745455.

This study shows that a novel growth factor signalling pathway regulates methionine synthase(MS) activity and thereby modulates methylation reactions. The potent inhibition of this pathway by ethanol, lead, mercury, aluminum and thimerosal suggests that it may be an important target of neurodevelopmental toxins.

31. Hornig et al. 2004 Mol Psychiatr “Neurotoxic effects of postnatal thimerosal are mouse strain dependent” PMID 15184908.

Specific mouse strains showing autoimmune disease sensitivity exhibited autistic behaviors and autistic-like brain pathologies after being exposed to thimerosal. Normal strains of mice did not exhibit these behaviors or neurological features.

32. Holmes et al. 2003 Int J Toxicol “Reduced levels of mercury in first baby haircuts of autistic children” PMID 12933322.

This study shows that autistic children are poor secreters of mercury via hair, which a normal physiological mode of mercury detoxification. Thus, autistic children subjected to mercury exposure would likely experience a longer, sustained toxicological effect.

33. Aschner et al. 2002 Mol Psychiatr “The neuropathogenesis of mercury toxicity” PMID 12142946.

The study elucidates “little” difference between methylmercury and ethylmercury (breakdown product of Thimerosal) toxicity to cells counter to CDC sponsored studies that declared that ethylmercury was “safe mercury.”

34. Makani et al. 2002 Genes Immun "Biochemical and molecular basis of thimerosal-induced apoptosis in T cells: a major role of mitochondrial pathway" PMID 12140745

This study shows that thimerosal causes cell death in T lymphocytes (immune cells) via a mitochondrial depolarization mechanism.

35. Bernard et al. 2002 Mol Psychiatr "The Role of Mercury in the Pathogenesis of Autism" PMID 12142947.

This paper links thimerosal exposure via infant vaccines to autism based on the pathologies associated with autism as well as the timing of autistic regression. Emphasis is made on the total mercury exposure to infants in the vaccination schedule used in the 1990's and early 2000's.

36. Bernard et al. 2001 Med Hypotheses "Autism: A Novel Form of Mercury Poisoning" PMID 11339848.

Parallels are made between the signs and symptoms of mercury poisoning and infantile autism. A comprehensive analysis is included on the comorbidities of autism and their corresponding analogs due to mercury exposure.

37. Verstraeten et al. 1999 Internal CDC Abstract for the Epidemic Intelligence Service Meeting of 2000 "Increased risk of developmental neurologic impairment after high exposure to thimerosal-containing vaccine in first month of life."

This original version of the Verstraeten et al. paper (that was ultimately "watered down" before it was published in final form in 2003) shows risks of autism at 7.6-fold for children exposed to thimerosal in the first month of life compared to unexposed controls.